angle of inclination is 9° 35′. The slope was driven part of the way through coal, at a cost of $364, but there were 28⅔ yards of rock to cut, from nought up to eight feet, which cost $283 33, and 77 yards driven through sandstone, which cost $3,080. The whole cost for sinking the slope was only $3,952 33. They have a pair of engines, 13-inch cylinder and 18-inch stroke; estimated horse power, 50; the size of their drum is six feet diameter, which has an approved brake attached to it. There is no second opening to the slope, but they are driving for one toward No. 1 drift, and expect to make a connection soon.

Other New Openings and Connections.

The Delaware, Lackawanna and Western railroad company have made connections between the Hampton shaft and the Oxford shaft, at Hyde Park, and between Tripp's slope and the Brisbin shaft, in the Third ward, Scranton. They have also sunk an air shaft, at Hyde Park, into the workings of the Oxford shaft, and connects also with the Hampton shaft workings. A fan is to be placed at this air shaft which will assist in ventilating both collieries named.

The Pennsylvania coal company have completed a new slope at No. 1 tunnel, in Pittston township, which is intended for hoisting coal. They have also made a second opening for No. 4 slope, in Jenkins township, which is to be used also for ventilation; and the workings of old No. 10 shaft in the 14-foot seam, have been connected with the new No. 10 shaft, in Pittston. No. 2 shaft, Dunmore, was sunk to the lower seam.

The Delaware and Hudson canal company have made a connection, in the 14-foot seam, between Marvine and Leggetts Creek shafts, Providence; and at No. 1 shaft, Carbondale, an air shaft has been sunk, and two more air shafts at No. 3 shaft, and still another at the Coal Brook colliery. These air shafts are only poor-make shifts, unless mechanical means are used to produce ventilation. There are too many of them in Carbondale. What is needed there is a system of air courses inside of the collieries.

At the Filer colliery, Winton, a drift has been driven from a ravine into the workings, for a traveling way for the men to go to and from their work. A new drift has been opened at the Greenwood colliery for mining coal, and the same company have made an additional opening for coal at the Sibly colliery, in Old Forge township. An opening has been made at the Green Ridge slope for ventilation. The above are all the openings and connections made in the district during the year, so far as I am informed.

Idle and Abandonded Collieries.

The Archbald shaft, Lackawanna township, and Oxford shaft, Hyde Park, owned by the Delaware, Lackawanna and Western railroad company, were idle all through the year; the last work done at the Hyde Park shaft was done in February, and the Scranton coal company's drifts at Bellevue were idle. Bellevue slope and shaft worked only 22½ days.

No. 1 shaft, Pittston township, owned by Pennsylvania coal company, was idle; No. 2 and No. 3 shafts were abandoned as hoisting shafts, and are now used as pumping shafts.

The Marvine shaft, Providence; Powderly slope, Carbondale township, and Breaker, Forrest and Jefferson tunnels, Carbondale City, all owned by the Delaware and Hudson canal company, were idle.

The following collieries have also been idle: Rolling Mill colliery, Scranton, consisting of a slope, tunnel and drift; the Ontario colliery, Pleasant Valley, and the Heidelberg colliery, Pleasant Valley. Spring Brook No. 1

rock to the Marcy vein. The sinking below the Big vein was done with Ingersoll's rock drills, and giant powder fired by electric battery. No headings have yet been driven except about the foot of the shaft, and what coal has been mined was hoisted to the surface with the bucket used in sinking. The Marcy vein at this point is eight feet thick, and the quality of the coal is good.

The hoisting engine is forty-horse power; diameter of drum eight feet, geared, four to one. The breaker engine is also forty-horse power, and the machinery consists of a set of large rolls, one main screen, and pony and pea coal screen, and pony rolls and screens. All the machinery was furnished by Messrs. Wisner and Strong, Pittston, excepting the pump, and is of good workmanship. The pump is on hand but is not set, nor will it be before spring; the one now in use, a No. 6 Knowles, disposes of the water without any trouble.

The sinking of the shaft and building of the breaker was successfully completed without any accident, under the direction of Mr. Bennett. The colliery is delayed in its operation, waiting for the building of an extension of the Heidelberg branch of the Lehigh Valley road to take away its coal. The capacity of the breaker will be about three hundred and fifty tons per day.

HEIDELBERG SHAFT.—This is a new shaft, sunk by the Lehigh Valley Railroad Company, on a large tract of land owned by them, adjoining the Butler colliery, in Pittston township. The shaft is forty-two and a half feet long, by twelve and a half feet wide, and is three hundred and fifty feet in depth, reaching the lowest vein of coal in the Wyoming basin. At the depth of seventy-five feet, the Big vein was struck, fifteen feet in thickness; and at a depth of one hundred and twenty-five feet, the Marcy or Clark vein was penetrated, ten feet in thickness—both of these veins are said to be in fine condition, and the coal of an excellent quality. At the depth of one hundred and seventy-five feet, and two hundred and fifty feet, they cut two small veins, unpromising at the shaft, but proving better at other points, indicating that they may be workable. The shaft is intended for two pairs of carriages to the lower of these two small veins, (two hundred and fifty feet,) thence to the bottom, one pair. There is an upcast apartment extending the whole depth of the shaft having an area of one hundred square feet, and upon this it is purposed to erect a good large fan to provide ventilation for the workings in all the veins. With such an upcast and with a first-class fan, the ventilation of the mines is amply assured. No explosive gas has been developed yet, nor is there very much water, though it is expected that considerable water will be met as the workings extend, and circumstances will determine whether steam or Bull pumps will be used.

The second opening is a slope driven across the measures at an angle of twenty-five degrees, and to be connected through each vein with the shaft. The total length of the slope will be over four hundred feet; it will be used also for a traveling way, and it is of such width, (being fourteen feet,) that

if needed at any time, they can, by building a strong partition, cut off a hoisting way in the slope without interfering with its safety as a traveling way.

The plans for hoisting and breaker engines and other necessary machinery are not yet fully completed, but I am assured by Fred. Mercur, Esq., the general superintendent of the Lehigh Valley company, that this new colliery shall not bring discredit on my district. From the reputation of the company and that of Mr. Mercur, I have no fear but the colliery will be first class in all its parts when completed. My present understanding is, that the old Heidelberg breaker will be fitted up with improved machinery, and that the coal will be run on the surface from the shaft to this breaker for preparation for market. The shaft and slope have been sunk without a single accident, which is very gratifying.

GREENWOOD SHAFT.—In my report for 1879 I mentioned that the Pennsylvania Anthracite Coal Company proposed sinking a shaft at the Greenwood colliery, in Lackawanna township. They commenced sinking the shaft in January and suspended work on it in July, 1880, after sinking it one hundred feet deep, leaving thirty-five feet yet to go to strike what is known as the No. 4 vein. The shaft is eleven by twenty-eight feet, and the cause of its abandonment is not known outside of the parties in charge. It is my humble opinion that it was a great mistake to put a shaft down where this is located, for the great body of the coal lays to the dip from the shaft. Two shafts should have been sunk at the lowest practicable point on the property, near the breakers, which would open up the whole property at once and put it in good shape. But it is to be presumed that those in charge have reasons which are satisfactory to them for locating the shaft where it is, and it may not be justifiable to doubt their wisdom. I certainly do not desire to interfere with their affairs in any manner, but I would like to see the company prosper. It is not known when the sinking of the shaft will be resumed.

NEW TWIN SHAFT.—This new shaft is located close to the junction of the Lackawanna and Bloomsburg and Lehigh Valley railroads at Pittston, and sunk by the Pittston Coal Company. It has an area of one hundred and forty (140) square feet which is to be divided into two equal sized hoisting ways, and the shaft is two hundred and nineteen (219) feet deep to the bottom of the "Marcy" or "Clark" vein. This will be hereafter the main shaft and the downcast for ventilation, the old shaft being the upcast upon which it is proposed to erect a good sized fan in place of the small one now in use. The old shaft will also be the second opening and is already in communication with the new shaft. The coal at this point is from four and a half to five feet thick and of excellent quality, free from slate and bone. There are one hundred and forty-five acres to be worked, and a large part of the land, judging from adjacent collieries, is underlaid with coal of an average thickness of ten feet. The fourteen feet and seven feet veins have been exhausted through the old shaft. From a point near the foot of the

At No. 9 colliery, the hoisting-shaft was sunk from the 14-foot to the Red Ash seam, a distance of 300′, which opens a large area of good coal for this colliery.

In No. 10 shaft, a tunnel was driven through an anticlinal 428′ with a sectional area of 84′; between this and No. 9 shaft in the Marcy vein it will be used for transporting coal.

In the Hoyt a tunnel was driven from the foot of the shaft in the 14-foot vein to the Marcy, a distance of 300′, which opens a large field of good coal. A new slope is being sunk in the Marcy seam to connect the ventilation.

Shaft No. 4, which has been idle since 1886, has been sunk from the Marcy to the Red Ash seam 211′. The air connections have been completed between the shafts in both veins. A new 20-foot fan has been erected on the new shaft sunk in 1888, to ventilate the workings of both veins. The coal hoisted from these shafts will be taken to the Ewen breaker to be prepared for market.

Lehigh Valley Coal Company.

The Heidelburg slope No. 1 has been extended through a rock-fault 450′, sectional area 7′x12′, with a gradient of 16°, which opens a large field of good coal for this colliery. The second opening is now in progress, being rapidly driven to completion, when a new fan will be erected thereon to furnish ventilation.

Delaware, Lackawanna and Western Railroad Company.

At the Hallstead colliery a new shaft 10′x12′ has been sunk on the west side of the Lackawanna river from the surface to the Red Ash seam, a distance of 279′, to be used for a second opening and for pumping water from the mine. A new 16-foot open fan was erected on the old second opening, close to the hoisting-shaft. This makes the second fan used in ventilating this colliery, and it gives general satisfaction.

The new Pettebone shaft of this company was completed to the Red Ash seam, which was cut at a depth of 1,126′. The air-shaft cut the Red Ash seam at a depth of 1,143′. The both shafts have been connected in the bottom seam. A new 17-foot open fan was erected on the main shaft. These shafts open an extensive field of good coal. A pair of direct-acting hoisting engines were placed to hoist therefrom. A new breaker is in the course of erection at this writing, which is expected to be ready to prepare coal for market in the month of July, 1890.

Newton Coal Company.

At the Twin shaft a new 24-foot fan was erected to ventilate the workings of the Red Ash vein. This makes the second fan erected on this colliery.

The new breaker is quite an improvement on the old one. It is furnished with first-class machinery for cleaning and preparing coal for market. Its capacity will be about 800 tons per day. It was started to prepare and ship coal on August 25, 1890.

Lehigh Valley Coal Company.

At the Maltby colliery a new Guibal fan, 18′ diameter, was erected on a shaft sunk for the purpose close to the out-crop of the 11-foot seam on the mountain north of the main hoisting shaft. This makes the second fan at this colliery.

In the Prospect colliery a rock tunnel was driven from the Baltimore to the Skidmore seam, a distance of 250 feet, with a sectional area of 9.1 square feet. A tunnel was likewise driven from the Abbott to the Bowkly seam in the same colliery, a distance of 100 feet. Thickness of Skidmore vein 4′ 6″. Thickness of the Bowkly seam 7′.

In the Midvale colliery a rock tunnel was driven from the level of old slope in the Hillman to the five foot seam, a distance of 300 feet. Sectional area 91 square feet. Thickness of seam 4′.

In the Henry colliery two rock planes were driven through the strata from the Baltimore. The first to the Hillman seam on a pitch of 25°, a distance of 650 feet. The other was driven to the five-foot seam, a distance of 550 feet on the same pitch. Sectional area 100 square feet. This opens up a large district of coal for this colliery.

At the Heidelburg No. 1 slope a new fan 15′ diameter has been erected on an opening driven for the purpose on the side of the hill, back of the slope opening. It ventilates the new workings at foot of slope, and the old tunnel workings which were formerly ventilated by a furnace

Delaware and Hudson Canal Company.

In Pine Ridge colliery a rock tunnel was driven from the top split of the Baltimore seam to the bottom split, a distance of 165 feet. Sectional area 72 square feet.

In the Delaware shaft a new gravity plane was driven on a pitch of 7°, a distance of 1,100 feet, with a sectional area of 128 square feet.

Delaware, Lackawanna and Western Railroad Company.

In the Hallstead colliery an underground slope has been sunk in the red ash seam 400 feet, which opens up the coal to the dip of the old slope.

A new inside plane has been completed 900 feet in the same seam on a grade of 4°. These improvements will increase the output of the shaft considerably, likewise shortening the transportation to the foot of the main shaft.

Wyoming Valley Coal Company.

At the Forty Fort colliery an underground slope was sunk on a line with No. 1 tunnel in the bottom split of the Baltimore seam, with a sec-

Lehigh Valley Coal Co

placed at the head of slope to hoist the coal to breaker. Likewise a pair of engines was erected at the head of Coal Brook slope to hoist the coal.

At the Prospect Shaft a brick addition to the boiler house was made enclosing a 250 horse power B. & W. boiler. A new brick engine house has been completed. In the Midvale slope on different levels. Three rock tunnels were driven from the Hillman to Brookley veins, which will be used for the transportation of coal.

In the Hillman slope a rock tunnel was driven from the Hillman to the Bowkley veins.

At the Henry colliery the hoisting shaft was extended from the Baltimore to Skidmore veins. A rock tunnel was driven through an overlap to the five-foot, 220 feet. The second opening tunnel is being driven at present.

The two new shafts begun in 1902, were sunk to Red Ash vein, a distance of 675 feet from the surface. A brick engine house 34x72 feet was erected for the hoisting engines of these shafts.

The Wyoming shaft, the old wood cribbing from the surface to the rock, was replaced by concrete, which makes a good job at this shaft.

At the Heidelburg No. 1 slope a new rock plane, 18 degree pitch, was driven from the lower split to the upper split of Red Ash vein, a distance of 212 feet. The second opening was driven on a 30 degree pitch. A rock slope is being sunk from the Marcy to Clark vein, also a second opening shaft for same.

A new 12-foot diameter ventilating fan was erected. A new brick boiler house was built, enclosing a 450 horse power return tubular boiler. Dispensing with the old boiler plant.

Improvements by the Delaware and Hudson Company

At the Baltimore tunnel the General Electric Company has installed an electrical haulage which handles all the coal from the Red Ash vein to the mouth of tunnel, doing away with the use of a rope haulage plant and hoisting plant at No. 4 shaft. The Stanton vein slope has been extended 250 feet. A new breaker is in course of erection to prepare the coal which is now taken to No. 5 breaker for preparation.

Improvements by the Hudson Coal Company

A new breaker has been completed at Pine Ridge with a new steel head frame erected over the shaft. The foot of the shaft has been remodeled by brick arching and a chain hoist put in for handling the empty cars. To accomplish all of the above work at the foot of

Heidelburg Number 2 Colliery.—Extensive repairs were made in breaker during the year.

Robbing of Red Ash vein was extensively carried out.

Silting of a portion of Red Ash vein under the Delaware and Hudson Railroad tracks was completed.

HILLSIDE COAL AND IRON COMPANY

Number 1 Slope in Thomas Shaft has been driven on the Middle Split of the Red Ash vein from the shaft level toward the basin, a distance of about 600 feet; area 6x16 feet. This Slope is continued as a steam plane to the top split of the Red Ash through the dividing rock, and has been driven a distance of about 300 feet. After entering the top split, the same engines will also serve on a continuation of the plane driven toward the basin as a slope in the top split, which will be driven as far as the coal can be worked.

These engines will therefore handle the coal in the Bottom Red Ash Slope and on the Power Plane Slope in the top split of the Red Ash. The Number 1 Power Plane in the middle split of the Red Ash has been extended a distance of about 350 feet; area, 6x14 feet. Condition, good.

Fernwood Colliery.—A washery 40x60x76 feet high has been built to wash out the Fernwood culm dump.

A power house built of brick 35x35x16 feet, and one 150 K. W. 275 to 300 volt electric generator, with 19x18 inch Ewen engines have been installed, and three 7½ ton electric motors in Number 1 Slope. Condition of colliery, good.

Clarence Colliery.—The Number 1 Slope has been extended 106 yards during the year, area 6x12 feet, and the Number 2 Slope 79 2-3 yards, area 6x12 feet. Condition of colliery, good.

HUDSON COAL COMPANY

Laflin Colliery.—New trestle from plane to breaker to replace one blown down by storm, new blacksmith and carpenter shop, locomotive house and supply house.

Number 5 Slope Bottom Red Ash, driven 600 feet.

Number 3 Plane driven 100 feet in rock from bottom to top split Red Ash and continued in vein 150 feet.

Number 6 Slope opened and driven 100 feet.

Condition of colliery, good.

Pine Ridge Colliery.—Number 13 Slope driven through rock from Hillman to Rock vein a distance of 250 feet, and continued in Rock vein a distance of 550 feet.

An 8 inch bore hole was put down 102 feet for rope for Number 13 Slope.

Number 14 Slope in Kidney vein extended 100 feet and completed, Number 15 Slope in Hillman vein extended 200 feet.

Number 16 Slope in Rock vein opened and driven 425 feet. A 22 inch bore hole was sunk for the purpose of pumping through to the surface from Checker vein, a distance of 464 feet.

A 6 inch bore hole sunk 146 feet to Hillman vein for flushing purposes.

A 6 inch bore hole sunk 203 feet to Rock vein for flushing purposes. Condition of colliery, fair.

In both of these shafts electric motors, about six in number are used for transportation on main roads. Condition of colliery, good.

FIRE IN NUMBER 7 SHAFT, PENNSYLVANIA COAL COMPANY

On the morning of December 3, a fire was discovered in Number 7 Shaft 14 Foot vein west level heading, on south pitch in chambers, just inside of Marcy vein tunnel. After fighting the fire with hose, etc., for a few days, it was decided to build dams and flood the workings with water from bore holes going down on highest point above the fire. The dams were started on December 9, and finished December 13, about 100,000 bricks having been used. The first bore hole was started December 11, the second December 13, and both were finished in 5 days, working two shifts of 10 hours each.

On December 28 when pressure was 21¾ pounds, it was decided to strengthen the dams, which was done by timbering and lagging and filling in between pillars and lagging with 2½ feet of concrete. The depth of the bore holes was 247 and 248 feet, respectively. Highest pressure on dams was reached January 8, at 2 A. M. with 65 pounds pressure to the square inch.

On January 12, 1907, at noon, it was decided to make an opening in one of the dams to ascertain if the fire was out. On January 14, a hole had been broken through the wall and an investigation made and declared that the fire was out.

Condition of the colliery, good.

LEHIGH VALLEY COAL COMPANY

Mineral Spring Colliery.—Additional machinery was placed in Breaker consisting of new elevator conveyor lines, mechanical pickers, etc., to handle culm bank coal in reclaiming banks on west side of breaker.

New standard fence complete around the property.

Number 35 Tunnel finished through Coal Brook anticlinal.

Number 32 Tunnel finished through Mineral Spring anticlinal.

Numbers 38 and 39 Tunnels also finished through such anticlinal.

A pair of 20x30 inch second motion friction drum hoist engines are being installed on surface in concrete brick house for Number 8 Inside Slope Red Ash vein, rope passing through 6 inch cased bore hole.

A new brick-concrete washhouse completed at Coal Brook.

A new brick-concrete washhouse completed at Mineral Spring.

A new brick supply house and blacksmith shop completed at Coal Brook.

Silting has been extensively carried on throughout the year in the Baltimore and Checker veins Mineral Spring. Condition of colliery, good.

Heidelburg Number 1 Colliery.—Inside. A 4,500 foot engine plane was driven and graded for economical transportation in Red Ash vein.

A 1,400 foot gravity plane was installed in Marcy vein, to which a new tunnel, 370 feet, was driven to Clark vein as a tributary. A 45 foot air shaft acting as second opening was also completed.

The ventilation of the Marcy and Clark veins was improved by an air shaft from the surface.

Robbing was extensively carried on in Red Ash vein.