

which is now at a depth of 201 feet. Its size is 43 feet 2 inches by 12 feet. The second shaft is the Auchincloss which is at a depth of 130 feet, and the third is intended to be an air-shaft and second opening, and is at a depth of 130 feet. The three are the same size h. y.  $23\frac{1}{2} \times 12$  feet. They are to be sunk to the lower seam, which is at a depth of about 700 feet.

The Parish Coal Company is reopening the old Buttonwood shaft and enlarging it. At the end of the year it was opened to a depth of 443 feet, and in its enlarged size of  $32 \times 12$  feet, it has passed one of the seams partially mined when it was in operation about 25 years ago.

The Newport Coal Company is sinking a new shaft  $15\frac{1}{2} \times 12\frac{1}{2}$  feet which is now at a depth of 70 feet and is expected to cut the Ross seam at a depth of 400 feet, and they expect to work the Ross and a split of the Baltimore seams.

There were a number of improvements effected beside those recorded above, such as additional steam boilers, pumps and machinery, and improvements in the distribution of the ventilation, and in the condition of the collieries in and out, which would be of no special interest to note in detail, in this report.

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

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

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

#### Improvements by the Susquehanna Coal Company.

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

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

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

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

#### Improvements by the Delaware, Lackawanna and Western Railroad Company.

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

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

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

#### Improvements by the Parrish Coal Company.

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

**The Bliss and Auchincloss Nos. 1 and 2 Shafts.**

These three shafts are the property of the Delaware, Lackawanna and Western Railroad Company, located in Hanover township, about 8 miles southwest of Wilkes-Barre city. They were started in 1892. The three are of equal size, being 12x43 feet 2 inches. At the close of 1894 the Bliss shaft was completed to the bottom of the Red Ash seam at a depth of 904 feet. The two Auchincloss shafts at this time were at a depth of 851 feet each, and were connected underground by a passage driven in one of the coal seams passed. They are still sinking. A slope is being sunk on the Ross seam from the old Hanover tunnel gangway to effect a second opening in this seam for the Bliss shaft, and the old Hanover slope was reopened on the Baltimore seam, from which a gangway is being driven to make connection in that vein. The pitch in both these slopes, in some parts, is as steep as 55 degrees.

A breaker is in progress of construction at the Bliss shaft which will be completed early in 1895.

The following, furnished by Mr. A. H. Storrs, superintendent, gives a detailed account of the machinery and improvements made at these shafts during 1894:

**Bliss Shaft.**

During the early part of 1894 there were put in operation at this new shaft a pair of first motion hoisting engines, and with them the sinking of the last 200 feet of the shaft was done. The shaft sinking is now completed, the Red Ash vein having been reached at a depth of 888 feet, and the work of opening out the several veins is now progressing.

The engines above referred to are a pair of 36-inch diameter by 48-inch stroke slide valve engines, directly connected to a drum shaft 19 inches in diameter and 18½ feet between bearings. On this shaft there are a pair of conical drums 9 feet diameter at small end, and 13 feet diameter at large end, with a cylindrical extension at large end.

One drum is keyed fast to the shaft; the other is fitted with a clutch admitting of the adjustment of the ropes to permit of hoisting in balance from the intermediate veins in the shaft. Each drum will coil 1,269 feet of 1½-inch diameter rope. The engines are fitted with the "Poore" balanced slide valves, and with steam reverse so arranged that the motion of the reversing engine exactly follows that of the hand lever, permitting of linking up if desired.

A novelty for this region is the use of the "Gooch" valve motion, which seems to have peculiar advantages for this service.

Two brakes are provided, one on each drum. These engines have been set in a brick house with iron roof trusses and roof covering.

A slope is being sunk on the Ross vein from the old Espy tunnel gangway to make connection with the Bliss shaft. This is operated by engines on the surface through a bore hole. The two old Espy slopes have been pumped out and gangways are being driven east and west from them.

#### Auchincloss.

At this colliery two new hoisting plants have been installed during the year, and are now being used to complete the shaft sinking.

The shafts are now down about 900 feet each. The engines at the main shaft are a pair of 36-inch by 48-inch slide valve engines, the same as described for Bliss, excepting that the drums will each coil 1,800 feet of 1½-inch rope. These drums are of same diameter as those at Bliss, but of wider face.

At the second opening are a pair of 32-inch diameter by 60-inch stroke engines with Corliss valve motion, being the first engines of this type to be used for hoisting in this region. The cut-off on these engines is controlled by a governor which takes control of the engines upon their reaching the maximum speed, about 3,000 feet per minute in the shaft. When running at lower speeds, the engineer has the same control of the engines with throttle and reverse as in the usual slide valve type.

The drums on these engines are conical, 11 feet 8 inches diameter at small end, and 15 feet, 10 inches diameter at the large end, with cylindrical extension at the large end. They will coil 1,800 feet of 1½-inch rope each.

One drum is fitted with a clutch, the same as on the "Bliss" engines. As with the others, they are fitted with steam reverse, and two brakes, one of which in this case is operated by steam.

During the early summer, the two shafts at the Auchincloss were walled with concrete, from the rock to the surface, a height in one shaft of somewhat over 100 feet, and in the other of about 80 feet.

The average thickness of these walls is four feet, and the shafts are 12 feet by 43 feet 2 inches inside of walls. The concrete was machine mixed and as many as 1,200 barrels of material, stone, sand and cement were used in 12 hours, making 5 feet height of wall all around the shaft.

#### Breaker No. 3, Delaware and Hudson Canal Company, Destroyed by Fire.

At about seven P. M., Thursday, November 15, 1894, fire was discovered in the pump room at the main No. 3 shaft of the Delaware and Hudson Canal Company, and every effort made to extinguish it failed. The breaker, pump room, engine and boiler houses were

since 1892, when ground was first broken to sink the shaft. The machinery and every structure connected with it is of the best order. They are working at present three seams of coal, and the ventilation is produced by a thirty-five foot fan of excellent construction somewhat different from the other fans in use here, a drawing of which is here presented showing the construction and setting. The fan shaft is 15 inches in diameter and 20 feet 3 inches between centers of bearings of which there are only two. It is operated by a direct acting Corliss engine 28x48 inches. The breaker was completed in 1895.

The coal is taken from the shaft to the breaker by a Dodge conveyor, having flights 10x48 inches every 4 feet, up an incline of 20 degrees and 230 feet long.

It is intended to use self dumping cages in the shaft, which will dump into a small pocket at the surface landing, from which the coal will be fed into the conveyor. There is also provided a Coxe dump, by means of which the coal brought to the surface from adjacent tunnels and slopes can be dumped into the conveyor.

The conveyor is carried from the ground to the breaker on an iron bridge of two spans.

The breaker and conveyor are driven by a 22x48 Corliss engine, and the breaker is equipped with 18 6 foot and 8 foot 4 inch x 12 foot screens, and 5 pairs of rolls with the necessary elevators and lip screen conveyors.

Coal for the boiler is taken from the breaker to boiler house by a conveyor. At the shaft an iron tower has been erected, carrying shieves 13 feet diameter.

The shaft has been walled with concrete of an average thickness of 4 feet, for a depth of 120 feet.

A duplex Rand air Compressor has been installed, also a small electric generator, which runs a pump on the Ross slope about 5,000 feet distant from the generator, which also furnishes light for the various engine rooms, both at Bliss and Auchincloss.

#### **Auchincloss.**

The shaft sinking has been continued throughout the year, except for a few weeks when scarcity of water prevented. The main shaft having reached a depth of 1,427 feet, and the second opening 1,377 feet, with the close of the year.

Description of Compressed Air Motor Haulage Plant at the Susquehanna Coal Company's No. 6 Colliery, Glen Lyon, Pa., March 1, 1896.

This plant consists of a three stage air compressor, built by the Norwalk Iron Works Company, supplying air at 600 pounds per

*Johnston*

A compressed air locomotive was put in the No. 6 slope to haul the coal from the foot of the planes to the bottom of the slope. This is the second one put in at this colliery and they work very satisfactorily.

#### Improvements by the Kingston Coal Company.

In the No. 1 shaft a tunnel was driven from the Cooper to the Lance, having 8x12 feet area and 300 feet in length.

One gravity plane 600 feet long was finished and another is being made.

In the No. 3 shaft a tunnel was driven from the Ross to the Red Ash, 420 feet in length and 8x12 feet area.

#### Improvements by the Delaware, Lackawanna and Western Railroad Company.

In the Bliss colliery two new rock tunnels were driven; one 681 feet long, from the Ross to the Ross seam across a basin, and one from the Baltimore to the Baltimore seam 400 feet across the same basin. Both have a sectional area of 84 square feet.

The Auchincloss shafts were both sunk at the close of the year to a greater depth than any other shafts in this region. The No. 1 was at a depth of 1,719 feet and the No. 2 at a depth of 1,692 feet. Both will be completed during 1897.

#### Improvements by the Parrish Coal Company.

In the Buttonwood mine four new gravity planes varying in length from 300 to 800 feet were made. Three are in the Hillman and one in the Kidney seam. A slope is in progress of sinking on the Hillman to work the coal to the dip from the shaft. It was at a length of 240 feet at the close of the year.

#### Improvements by the Plymouth Coal Company.

The rock slope in the Dodson mine was extended from the Ross to the Red Ash seam, an extension of 298 feet. Size, 14x8 feet. Also, another rock slope for second opening 275 feet and 14x8 feet area. These slopes open the Red Ash seam for this colliery.

There were a number of short tunnels, gravity planes and other minor improvements made at a number of the mines, but they were of minor importance and so are not recorded.

Inside: New openings in Cooper seam, Shaft No. 1, in two places in No. 13 tunnel.

Enlarged main gangway from foot of No. 1 North Shaft to head of No. 9 Slope, and to No. 13 tunnel.

New bore hole, 960 feet deep, from surface to Lee seam, for No. 10 Slope hoisting rope.

#### Improvements at the Delaware and Hudson Collieries During 1902.

Plymouth No. 2.—Tunnel in G vein through fault 200 feet long, 7'x12'. Tunnel from Red Ash to top split, 275' long, 7'x16'.

Outside: A Norwalk compressor, 24"x14½"x22"x24", was installed for furnishing air for pumping.

Shaft No. 1.—A Dickson compound triple expansion pump, with a capacity of 3,000 gallons per minute, size of pump 15"x26"x16"x48".

Shaft No. 3.—Tunnel from Red Ash seam to top split, 275' long, 7'x16'. A 10"x48"x24" Jeanesville pump was installed at the foot of shaft.

Outside: A new breaker engine, 16"x30", was attached to the old one, changing it into a double engine.

Boston: Reopened tunnel and sank slope in the Bennett seam, and put in a pair of 24"x48" haulage engines to take coal from the slope to the breaker.

Outside: Installed nine new cylinder boilers, 34"x36' in length.

Placed one pair of engines, 26"x48", at the bore hole to hoist out of plane from top split of Red Ash.

#### Improvements at the Alden.

A slope in the Cooper seam 550' long to reach the basin.

Tunnel 100' long from the Cooper to Hillman seams, 14'x7' through the rock.

There has also been provided for cases of emergency two "Vajen's" improved head protectors.

#### Improvements at the Delaware, Lackawanna and Western Collieries During 1902.

Woodward.—A new steel trestle connecting the breaker with the shaft, and four batteries of Sterling boilers have been installed. One electric hoist and one electric motor have also been installed at this colliery.

Avondale.—One electric motor has been placed inside.

**Auchincloss.**—An electric breaker of 500 tons daily capacity has been placed in operation and is giving perfect satisfaction.

New slope in Ross tunnel No. 6 unfinished. New tunnel slope No. 6, Ross to Ross, unfinished. Shaft No. 7 sunk 40 feet, concreting to rock and permanent engine and head frame foundations completed.

DELAWARE AND HUDSON COMPANY

Conyngham

No. 4 tunnel driven from the Abbot to Snake Island vein, 325 feet.

No. 5 tunnel driven from the Abbot to Snake Island vein, 100 feet.

No. 6 tunnel driven from the Abbot to Snake Island vein, 150 feet. The Abbot vein slope No. 4 was sunk a distance of 900 feet. Hillman shaft recribbed from rock to surface, and new head frame and house built.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Auchincloss No. 2 Shaft

A tunnel 7x12 has been driven from the Baltimore vein for the purpose of the development of the Hillman vein. Auchincloss No. 2 shaft.—The Baltimore vein has also been connected by a short tunnel to the Hillman vein for ventilating purposes.

Bliss Mines

The southwesterly side of this breaker was entirely reconstructed and improved upon by the installation of new shakers, belt conveyors and spiral slate pickers. A tunnel 7x12, 396 feet long, was driven from the Red Ash vein to the Ross vein for ventilation and haulage. One 10 ton electric locomotive was installed in the Ross slope, Espy tunnel, doing away with mules on this lift. A small 10 foot fan was located on the Forge vein for ventilation.

Truesdale

This is a new opening or operation. They are putting down at this location two shafts to be known as No. 1 and No. 2 Truesdale shafts. No. 1 will be a four compartment shaft, one pump way, two hoist ways and one airway, 45 feet 2 inches by 14 feet in the clear. No. 2 shaft will have two hoist ways and one air and will be 37 feet 2 inches by 14 feet in the clear. Operations have also been started to sink a slope to the Mills vein, a distance of 1,500 feet to the basin. They have also opened an old tunnel, known on geological survey maps as the Holland tunnel, and already gangways are being driven east and west to what is known as the Forge vein in this locality. The outside appearances of the collieries have been improved by the use of mineral paint and whitewash.

RED ASH COAL COMPANY.

Colliery No. 1

One 12 and 18x8x18 compound noncondensing duplex plunger Jeanesville pump.



## 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

*Admission*

feet on an average dip of 19 degrees. Ross vein No. 2 shaft has been re-opened east of shaft for a distance of 400 feet. Concrete brick and iron air-bridge was constructed across shaft level gangway east of No. 1 slope, Baltimore vein. Concrete walls have been erected at the entrance into air shaft at Mills and Ross seams. Concrete and iron pump room, located in George vein was completed during the year, and 20x36x10x36 double acting steam condensing pump was installed.

Bliss Colliery.—No improvements worthy of note at this colliery.

Truesdale Colliery.—No. 1 shaft has been sunk to a depth of 567 feet to the Red Ash seam. No. 2 shaft has been sunk to a depth of 562 feet. Preparations are being made for developments at No. 1 shaft east and west for mining purposes, north and south for ventilation and drainage. Permanent hoisting engines and other necessary apparatus for the mining of coal are now being installed. Breaker and washery will be completed early during the coming year. The work of development in the tunnel and slope is being pushed as rapidly as possible. A 24 foot Guibal Vulcan ventilating fan is on the ground and will be installed as soon as weather conditions will permit. Three high pressure Babcock and Wilcox steam boilers have been completed, enclosed in brick and iron building, which will be equipped with modern electric ash and coal conveyors and other up-to-date improvements. In connection with the above it would be well to state that it is the intention of the management to drive all the machinery in above breaker and washery by electricity. In order to accomplish this a large electric plant is now being erected on the east shore of the Susquehanna river to generate power for this work as well as the other collieries located in this section.

This plant will consist of Babcock and Wilcox boilers, five steam turbines, which will generate 5,000 H. P., to be distributed along high tension lines at high voltage to be converted to 250 and 275 volts at the collieries.

#### ALDEN COAL COMPANY

##### Alden Colliery

No. 1 shaft—Outside.—1 boiler plant with 3 sets of the 200 H. P. each finger water tube safety boilers.

No. 2 shaft—Outside.—1-8 inch bore hole, 507 feet deep, from surface to E vein for inside slope.

No. 2 Shaft—Inside.—Rock tunnel from Cooper to Hillman, 110 feet long; rock tunnel from Cooper to Cooper, through Anticlinal, 156 feet; rock tunnel from Cooper to Hillman and Mills, 120 feet; not yet completed.

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

## IMPROVEMENTS

## SUSQUEHANNA COAL COMPANY

## Number 5 Colliery, Outside

One pair 16x30 engines erected at No. 5 Breaker to hoist coal into breaker.

One pair 16x24 engines erected on dirt bank.

One battery of 500 H. P., B. and W. boilers erected, making this plant now 2,500 H. P.

One 400 H. P. Climax boiler erected on No. 5 dirt bank, replacing old cylinder boiler plant.

## Inside

Number 2 Shaft.—New pneumatic haulage plant installed with three stage Norwalk compressor 22 inch steam, 16 inch and  $\frac{1}{2}$  inch by  $5\frac{1}{8}$  inch air, 24 inch stroke and Porter pneumatic locomotive 8x14 inch with air line carrying 1,000 pounds pressure.

Number 4 Shaft.—New plane from Bottom to Top Ross.

Tunnel from South tunnel to Twin vein.

New slope from the Basin to Top Ross.

## Number 6 Colliery, Outside

Two 400 H. P. Climax boilers at No. 7 Shaft.

## Inside

Tunnel from Bottom to Top Ross in No. 6 tunnel.

New plane No. 1, Shaft No. 7, 159 yards.

New plane No. 2, Shaft No. 7, 196 yards.

New dirt and rock conveyor to carry waste material from breaker to foot of dirt plane. Outside.

New Slope Bottom Ross, Shaft No. 7, 80 yards. Inside.

## Number 7 Colliery, Outside

New boiler coal conveyor.

## Inside

A plane from Forge to Cooper Seams, No. 1 N. Shaft, 79 yards.

Second opening Hillman vein.

New slope Forge Seam.

## DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

## Auchincloss Colliery

Four rock tunnels 7x12 have been driven through faults, connecting Ross and Baltimore veins, also Mills and Hillman veins, for ventilation, development, etc.

The installation of a 16 foot dust fan, mechanical pickers, etc., in this breaker, has added decidedly to its efficiency.

A  $19\frac{1}{2}$ x $19\frac{1}{2}$  brick and concrete lamp house has been erected.

## Bliss Colliery

Two rock tunnels 7x12 have been driven from Baltimore vein to Forge vein.

## DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

**Auchincloss Colliery.**—One 7x12 horizontal rock tunnel from Mills vein to Mills vein across the basin.

One 7x12 rock tunnel from Baltimore vein to Baltimore vein across basin on 5 per cent. grade.

One 7x12 rock tunnel from Baltimore vein to Ross vein 680 feet long, parallel with No. 5 tunnel, for ventilation and transportation.

Several other short rock tunnels were driven through faults and disturbances for ventilation and transportation, etc.

The work of installing a creosoting plant on the outside, for treating mine timber, will be completed early during the year 1908.

**Bliss Colliery.**—The Bliss breaker is undergoing a general overhauling and the work is now being completed. The extensive repairs that are being made are expected to be in shape to permit the operation of the colliery by February 1, 1908.

A 200 H. P. induction motor and electric hoist has been installed at Espy tunnel, Red Ash vein slope. This slope has been abandoned for many years and is now being pumped out with the intention of mining the balance of the coal in this territory.

The work of developing Twin vein has been started. Several rock tunnels have been driven from the Ross vein to the Twin vein.

One 7x12 rock tunnel has been driven from Ross vein to within 300 feet of Baltimore vein. This work will be completed early in the year 1908.

Wooden or combustible shanties and engine house pump rooms have been disposed of at this colliery and are being replaced with concrete and steel ones.

**Truesdale Colliery.**—Work of sinking slope from surface to Local basin, Mills vein, is under way and should be completed early in the year 1908.

A 200 H. P. electric hoist has been installed on Mills vein slope and is in operation.

The work of installing 5 stage centrifugal pump, electrically driven, is about complete. The building for this pump is made entirely of concrete, steel and brick, and will be lighted by electricity throughout.

Two rock tunnels from shaft level gangway No. 2 Shaft, 7x12, have been driven to the south basin from Ross vein to Red Ash vein. Equally distant between these there is one 7x12 tunnel being driven north from Ross vein to Forge vein. A concrete and steel room has been erected near the foot of the shaft for emergency hospital purposes.

A 200 H. P. electrically driven hoist is now being installed in No. 4 Slope No. 2 Shaft.

Two electric locomotives have been installed in these shafts and this has done away with all the mules formerly used.

Slopes are being sunk in the same with as much speed as possible for the development of this important colliery.

Operations were begun on the location of this plant, May 4, 1903, at a place known as Luzerne Grove, which was then practically a wilderness.

## DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

**Auchincloss Colliery.**—During the year there has been erected and completed under the advice and direction of the United States Forestry Department, a chemical plant for the treatment of mine timbers to prevent decay. The plant has been in operation for some time.

This colliery closed down during the early part of the year to change the road gauge from 30 to 35 inches. By this change they are now permitted to use an entirely different motor in the locomotives and have been enabled to reduce the voltage in the trolley lines from 500 to 250 volts.

No. 1 hoisting engines have been equipped with the Nicholson overwinding device and will soon be in operation.

The new concrete and brick wash-house with metal lockers is about completed.

The work on the concrete and brick partition in No. 1 shaft separating the outlet and inlet airway is under way and will be completed early in the year 1909.

A Woodhouse chemical engine of 120 gallon capacity has been installed to be used for mine fires.

**Bliss Colliery.**—The general overhauling of the breaker was completed during the early part of the year and operation resumed with very satisfactory results.

A 200 H. P. electrically driven hoist was installed on No. 9 slope, Red Ash vein, to replace a small air hoist formerly used at this point.

The tunnel from Ross to Baltimore vein mentioned in my report for the year 1907 is now completed, and another 7 x 12 rock tunnel, on 15 degree pitch, has been driven from Ross to Baltimore vein for second opening and ventilation for the former tunnel. Work of connecting these two tunnels is now under way.

A rock tunnel 7 x 12 was also driven from Ross to Forge vein from what is known as Gorrigan gangway at the foot of Espy tunnel slope.

**Truesdale Colliery.**—The work of sinking Mills No. 5 slope to local basin, Mills vein has been completed and work of development is now going on.

No. 6 slope, which has been sunk on the Hillman vein, is being very rapidly developed and a 200 induction motor hoist has been installed in a brick and concrete building on this slope, which is now being sunk to a depth whereby the lifts East and West will be started from the same.

Other improvements: 60,000 gallon capacity reservoir; brick and concrete oil house with Bowser tank arrangement; wash house with expanded metal lockers; concrete and brick supply house; brick and concrete fire pump house; chemical engine house, and Woodhouse chemical engine of 120 gallon capacity.

The rock tunnel referred to in my last year's report from Ross to Ross vein through anticlinal to Red Ash vein has been completed.

Tunnel driven from Forge to Baltimore vein, No. 2 Shaft, has been completed.

A large opening has been driven from No. 1 East lift No. 1 Slope, to the surface, to increase the quantity of air entering this slope. This also reduces a large amount of work in connection with ice cutting on No. 1 Slope during the cold winter weather.

**EXPLOSION AT AUCHINCLOSS COLLIERY**

On November 9, at 2.50 in the afternoon, an explosion of gas occurred in No. 2 shaft, Auchincloss Colliery, of the Delaware, Lackawanna and Western Railroad Company, at Nanticoke, fatally burning Peter Prokropos and setting fire to the timber and coal at the face of chamber known as No. 40, which produced smoke and gas that suffocated eight other workmen, as follows: John Dixon, Stanley Plitka, John Keloski, Charles Sokot, John Gilgenast, Gus Brozka, Anthony Kochinski, Charles Bozoska, and slightly burning Carl Idukis.

The section of the mine in which the explosion occurred is known as No. 1 counter off No. 1 slope, Ross seam, and is ventilated by a separate and distinct split of air independent from all other parts of the mine and in which about 50 men are employed, but as is the custom a number of them emerged from the mine earlier in the day, among them being Mike Bolrosky, miner No. 40, in whose place the explosion is supposed to have occurred and for whom Carl Idukis, the injured man, was laboring. Bolrosky testified at the inquest, held for the purpose of inquiring into the cause of the accident, that on entering his chamber on the morning of the explosion and on leaving it at 12:20 P. M., he made an examination of his place and found it free from gas and in good condition. He also testified that he worked in this particular place, chamber No. 40, for one year and during that time he recalls only one occasion on which he found an accumulation of explosive gas. Therefore, the cause of the accumulation of gas between 12:20, the time miner No. 40 left his chamber, and 2:50, the time of the explosion, can only be conjectured.

Chamber No. 40 is driven at about a five per cent. dip off No. 1 counter and is about 400 feet long, and at the face is a very abrupt upthrow or anticlinal, in consequence of which the coal was in a laminated condition and fell away from the working face, allowing the occluded gases to readily disintegrate.

Three theories were advanced as to the cause of the explosion, all of which were plausible. The jury empaneled to investigate the cause of the accident accepted the third reason herein given.

The first theory advanced was that miner No. 47, who was driving a heading from chamber No. 47 in the direction of chamber No. 40, and whose safety lamp was found intact and in good condition hanging on the rib after the accident, neglected to examine properly for gas while he was working, and his lamp filled with gas and exploded.

The second theory was that the laborer in chamber No. 40, immediately prior to the explosion, pushed a car into the face of the workings, and it was standing on the branch in chamber No. 40, when the miner left the mines, and in passing the highest point of the chamber with the car a quantity of gas that had lodged at that point left the roof and filled the partial vacuum created by the passing car and ignited by coming in contact with the lamp of the man pushing the car.

The third theory, and the one accepted by the jury as having caused the explosion, was that the seam of coal at the face of chamber No. 40, having suddenly changed from a light dip to a pitch that is almost perpendicular and being of a laminated nature, a pocket of gas was liberated and filled the workings with fire damp at the point where the men were at work, which was ignited in some unknown manner, possibly by coming in contact with one of the workmen's lamps, or by one of the men striking a light.

The most unfortunate incident in connection with this disaster was the failure to escape of the six men who were suffocated. They were working fully a 1,000 feet from where the fire occurred and were warned to leave the mine as there was something wrong. This was evident by the filling of the workings with smoke and afterdamp, but after they had examined the air current in the workings and expressed the opinion that the trouble that existed in the portion of the mine from where the smoke was coming was but slight and would not endanger their lives, they decided to remain. They had sufficient time to reach a place of safety, had they heeded the wise warning of one of their number. They remained, however, and the workings filled with smoke and afterdamp to such an extent that escape was then impossible; the rescuing party being unable to reach them before the deadly vapors overpowered them.

At an inquest held in the town hall at Nanticoke on the 18th and 19th of November, 1909, the following verdict was rendered: "John Keloski et. al. came to their death on the 9th day of November at the Auchincloss colliery of the Delaware, Lackawanna and Western Railroad Company by being smothered in bad air after an explosion of gas in the said colliery. Eight fellow workmen lost their lives at the same time and place as a result of the explosion. The evidence shows, first, that a large rush of coal came from the face of chamber No. 40, and we believe that this rush liberated a large quantity of pent up gas and that it came in contact, in some way, with fire and exploded. Second, that all men working in this place used safety lamps only. As to how the gas was set off there has been no testimony introduced to explain. Third, we believe that the ventilation in the district where the explosion took place was all that could be desired. We therefore find that the said company was in no way responsible for the accident. Fourth, we deplore the use of spurious mine certificates and urge every effort on the part of mine officials, mine workers officials and county officials to eradicate the evil."

The following jurors rendered and signed the above verdict: Thomas Beese, Thomas Curtis, Thomas Cook, Gustav Hankey, Frank Schwartz, Joseph Elmy.

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## CONDITION OF COLLIERIES

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### SUSQUEHANNA COAL COMPANY

Number 5.—Ventilation good; drainage fair; condition as to safety good.

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PA Mine Inspection 1909

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in the rock on a pitch of 60 degrees to the George seam, where it connected with the bottom of an air shaft 60 feet deep, sunk from the surface.

No. 18 and No. 19 rock planes were driven from the bottom to the Top Ross seam.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

*Auchincloss Colliery*

Outside.—A new brick and concrete wash house, with expanded metal lockers, has been completed

Erection of 1,000 horse power boiler plant, enclosed in a concrete building, with feed-water regulators, pumps, governors, etc., is under way and will be completed during the early part of 1910.

One 25-foot ventilating fan and fan house for No. 1 shaft is in course of erection.

Inside.—The erection of a brick partition separating intake and return airways through No. 1 shaft will be completed during the early part of 1910.

Several new concrete and steel air bridges have been erected to improve the ventilation.

The work of sinking No. 3 slope through an anticlinal from Ross to Ross vein has been completed, and a second opening has been driven for the same.

A rock tunnel has been driven from George to Baltimore vein on the West shaft level gangway. This tunnel cut the Baltimore vein on a very heavy pitch, and the coal is giving off gas quite freely.

*Bliss Colliery*

Outside.—A 1,600 gallon Bronze centrifugal pump electrically operated has been installed in the breaker building for coal washing purposes.

Considerable improvements have been made in this breaker, including the installation of mechanical pickers, etc., to facilitate the handling and cleaning of coal.

A 2,000 horse power boiler plant, enclosed in a concrete building, is now under way and will be completed during the early part of 1910.

The shaft hoisting engines have been repaired by the installation of two new drums, clutch wheels, and other necessary equipments.

Inside.—Two 150 horse power electric hoists have been installed on coal slopes to replace air hoists formerly used.

Inside.—Rock tunnel from Ross to Baltimore vein on 15 degree pitch, which was nearly completed during the year 1908, was completed early in 1909.

The work of extending No. 4 tunnel from Twin to Forge vein was completed during 1909.

Rock tunnel driven from "E" gangway, Ross to Forge vein basin, is now about completed.

Extensive repairs were made to the shaft hoistways by repairing shaft timber, etc.

*Truesdale Colliery*

Outside.—Installed steam hoist on the surface to operate No. 3 slope Red Ash vein, the cable being conveyed through a bore hole to the slope, which operates very successfully.

A bore hole was driven from the surface to the bottom of No. 6 shaft.

No. 12 Slope was driven 149½ yards in No. 6 tunnel. New electric haulage was installed in No. 6 shaft.

Tunnel from the Bottom to Top Ross seam was driven 190 yards.

A 20 by 9 by 18 Duplex Plunger pump was installed.

No. 7 Shaft.—New rock plane was driven 109 1-3 yards.

No. 11—Slope was driven 88 yards.

No. 6 Shaft.—Installed new electric haulage.

No. 1 Drift.—An electric hoist with one Westinghouse Railway type No. 101 E 40 horse power 220 volts series wound 500 R. P. M. motor complete with R 32 single hand controller and grid resistance, has been installed in No. 11 slope.

Colliery No. 7.—An A. C. 150 K. W. engine and generator have been installed for the purpose of running electric motors to be installed in No. 1 shaft.

A. D. C. 200 K. W. engine and generator have been installed for the purpose of furnishing power for lighting the various offices, breakers and other buildings about the Nanticoke collieries.

New fan house, with a 5 by 10 foot Capell fan to be driven by electricity, was completed.

No. 1 North Shaft.—New slope No. 28 was driven 62 1-3 yards.

No. 1 South Shaft.—Second opening No. 19 Slope was driven 105 2-3 yards.

#### DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

**Auchincloss Colliery.**—A 25 foot ventilating fan is being installed. The brick partition separating hoistway and airway, referred to in last year's report, is now completed.

Two rock tunnels have been driven from the George to the Baltimore veins, west of No. 2 shaft, by which a tremendous amount of gas has been liberated. It is intended to use one of these roads for development and transportation purposes, while the other will be used for ventilation and return.

There has also been erected on the outside a 10 by 12 concrete and brick building in which is housed the Draeger rescue apparatus, consisting of four helmets, oxygen storage tanks, pulmotor, electric lamps and other necessary equipment.

A 1,000 horse power boiler plant housed in a concrete building has been erected and is in operation.

A 200 horse power electric hoist has been installed on No. 3 slope, Ross vein.

A 6½ ton electric locomotive has been installed in the Baltimore vein, No. 1 slope.

Bliss Colliery.—A 2,000 horse power boiler, housed in a concrete building, has been erected and is in operation.

A 10-ton locomotive has been installed on West gangway, Espy tunnel, which hauls coal from the interior part of the workings to the surface.

The work of installing a 150 horse power hoist on No. 9 plane, Baltimore vein, is underway.

Truesdale Colliery.—The work of installing two new Jeffrey ventilating fans on Nos. 1 and 6 slopes is underway.

A 24-foot Vulcan fan is being installed on No. 1 shaft.

Colliery No. 7.—An electric sewing machine was installed in the harness shop.

Electric haulage was installed in No. 1 shaft and 2 electric motors were put in service to replace aid motors which were transferred to another mine.

A waterway was driven between Nos. 1 and 2 shafts a distance of 133 yards.

No. 30 slope in No. 1 shaft was driven 136 yards during the year.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

**Auchincloss Colliery.**—The 25-foot ventilating fan referred to in last year's report is now in operation.

The work of erecting a brick partition between hoistway and airway, No. 2 shaft, is under way, and when it is completed a 35-foot ventilating fan will also be placed at the mines.

The work of erecting mule barns, pump-rooms, engine-houses, etc., of incombustible material will soon be completed.

Bliss Colliery.—The work of erecting brick partition in this shaft, separating hoistway and airway, is under way.

A brick and concrete wash-house for employes, with improved lockers, has been built.

A new fire-fighting apparatus has been installed on the outside, with new fire-pump, fire-line, etc.

The colliery has been equipped with four Draeger helmets known as the "Life-saving Apparatus," housed in a small brick building on the property, and men have been trained in their use.

Built a concrete and brick foremen's office and lamp-room.

The rebuilding of mule barns, pump-rooms, engine-houses, etc., of incombustible material, will soon be completed.

No. 13 slope has been sunk from the Mills to the Hillman vein. Second opening for this slope is now under way.

Truesdale Colliery.—The work of reconstructing the breaker with steel supports and pockets is under way.

The ventilating fans referred to in last year's report for No. 1 shaft and Nos. 1 and 6 slopes, have been completed.

A new rock conveyor and trestle erected from the breaker to the rock bank.

New and improved steam lines have been installed at this colliery connecting the boiler plant with various engines.

The colliery has been equipped with four Draeger helmets, known as the "Life-saving Apparatus," housed in a small brick building, and men have been trained in their use.

A rock tunnel has been driven for development, from the Mills vein, No. 5 slope, down Hillman and Baltimore seams to Forge vein.

A rock slope has been sunk through Warrior Run anticlinal to Red Ash vein.

Several short rock tunnels have been driven from Ross to Top Split Red Ash vein, which will be used for development and ventilation.

A new concrete and brick mine foremen's office has been erected at Nos. 1 and 6 slopes.

WEST END COAL COMPANY

West End Colliery.—During the year a double inlet, reversible, exhaust and blow fan was erected and put in operation at this colliery. The arrangement of the doors in the accompanying plan shows

No. 4 slope in No. 4 shaft was driven 88 yards.

Number 6 Colliery.—Installed in breaker new dump shakers and a new dust fan.

One hundred twenty-five new steel body mine cars were added to equipment.

No. 22 tunnel, No. 6 slope, was driven 129 yards, and a 10 by 5 double inlet fan, driven by electricity, was erected for the purpose of ventilating the workings therein.

No. 3 rock plane, No. 6 slope, was driven 60 yards and completed.

No. 35 tunnel, No. 7 shaft, was driven 54 yards and completed.

New airway No. 11 slope, No. 7 shaft, was driven 137 yards and completed.

A new hoisting engine and engine house were erected at the head of No. 7 shaft.

No. 9 slope, No. 7 shaft, was driven 68 yards.

Number 7 Colliery.—Installed in breaker new spiral slate pickers, new dump shakers and a new dust fan.

Installed in electric power house: 1 motor, 2 generators and 2 Ridgeway electric engines, 10 by 10 and 25 by 24.

Placed in North and South shafts 64 sets steel timber—40 sets at foot of North shaft and 24 sets in South shaft barn.

No. 29 slope, North shaft, was driven 171 yards and completed.

No. 31 slope, South shaft, was driven 100 yards.

Nanticoke Washery.—The washery was completed and began operations May 22.

#### DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

**Auchincloss Colliery.**—The 35-foot ventilating fan referred to in last year's report is now in running order.

All mule barns, pump-rooms, hoist-rooms, etc., have been reconstructed of concrete and steel.

Bliss Colliery.—The concrete and brick partition separating hoistway and airway in this shaft is completed to the surface.

Built a new brick and concrete supply storeroom. Completed the rebuilding of mule barns, etc., reported under way in last year's report.

Several rock tunnels driven for development and ventilation purposes.

The hoisting engines on the shaft have been equipped with Welch automatic engine stop.

Truesdale Colliery.—The work of reconstructing this breaker with steel is now completed.

Shaft hoisting engines have been equipped with the Welch automatic engine stop.

Several rock tunnels have been driven for development purposes, return airway, and second openings, from Mills to George vein, Ross to Red Ash vein and from Forge to Baltimore vein.

At No. 20 tunnel, Sugar Notch, Truesdale mine, the work of driving through to Red Ash vein was completed during the early part of the year.

## CONDITION OF COLLIERIES

### DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

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

Bliss and Truesdale Collieries.—Ventilation good; drainage fair; condition as to safety good.

### SUSQUEHANNA COAL COMPANY

Numbers 5 and 6 Collieries.—Ventilation and drainage fair; condition as to safety good.

No. 7 Colliery.—Ventilation fair; drainage and condition as to safety good.

### WEST END COAL COMPANY

West End Colliery.—Ventilation and drainage fair; condition as to safety good.

### LEHIGH AND WILKES-BARRE COAL COMPANY

Wanamie Colliery.—Ventilation and drainage fair; condition as to safety good.

### ALDEN COAL COMPANY

Alden Colliery.—Ventilation and condition as to safety good; drainage fair.

### E. S. STACKHOUSE COAL COMPANY

Salem Colliery.—Ventilation and drainage fair; condition as to safety good.

## IMPROVEMENTS

### DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

**Auchincloss Colliery.**—Steel supports have been erected on the main haulage road, No. 1 shaft, to replace timber, reducing to a great extent the possibility of danger to the employes in this section of the mine.

A rock slope has been driven from the Ross to the Red Ash seam, No. 2 shaft. A rock slope has been sunk from the top Ross vein to the bottom Ross vein, No. 1 shaft. Second openings and ventilating tunnels will soon be provided for these slopes.

No. 6 slope has been sunk from the Mills to the Hillman vein, and will be connected to the Baltimore vein.

A rock tunnel is now being driven from the Twin to the George vein.

Bliss Colliery.—A ventilating shaft has been sunk from the surface to the Baltimore vein, upon which will be installed a twenty foot multi-blade ventilating fan, erected by the Vulcan Iron Works.

No. 7 tunnel and its second openings are now being extended from the Baltimore to the Mills vein.

## CONDITION OF COLLIERIES

## DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

**Auchincloss.**—Ventilation, drainage and condition as to safety, good. Roads, fair.

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

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

## SUSQUEHANNA COAL COMPANY

Numbers 5 and 6.—Ventilation, roads and drainage, fair. Condition as to safety, good.

Number 7.—Ventilation, fair. Roads, drainage and condition as to safety, good.

## WEST END COAL COMPANY

West End.—Ventilation, roads and drainage, fair. Condition as to safety, good.

## LEHIGH AND WILKES-BARRE COAL COMPANY

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

## ALDEN COAL COMPANY

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

## E. S. STACKHOUSE COAL COMPANY

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

## IMPROVEMENTS

## DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

**Auchincloss Colliery.**—Shaft timber in No. 1 shaft is being replaced with concrete and steel.

The work of driving several rock tunnels from one seam to another for development, ventilation, etc., was completed during the year.

Bliss Colliery.—The ventilation fan referred to in my last report has been installed and is now in operation. A rock tunnel has been driven from Baltimore to Forge vein. Concrete walls and I beams are being placed at the Ross vein shaft level.

Truesdale Colliery No. 20 Tunnel section.—A slope is being sunk from the surface to the Red-ash vein at this point. A 250 H. P. electrically operated hoist has also been installed. A rock tunnel No. 1 East lift, No. 10 slope, is being driven to the Ross vein. No. 6 slope is being extended from the Hillman vein across the measures for a distance of 900 feet more or less. A rock tunnel has been driven from the Mills to the George vein for development.

A rock manway is being driven parallel with No. 7 tunnel Red-Ash vein. Numerous other rock tunnels have been driven or are now

## CONDITION OF COLLIERIES

### DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

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

Bliss and Truesdale Collieries.—Ventilation and condition as to safety, good. Drainage, fair.

### SUSQUEHANNA COAL COMPANY

Nos. 5 and 6 Collieries.—Ventilation and drainage, fair. Condition as to safety, good.

No. 7 Colliery.—Ventilation fair. Drainage and condition as to safety, good.

### WEST END COAL COMPANY

West End Colliery.—Ventilation and drainage, fair. Condition as to safety, good.

### LEHIGH AND WILKES-BARRE COAL COMPANY

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

### ALDEN COAL COMPANY

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

### E. S. STACKHOUSE COAL COMPANY

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

## IMPROVEMENTS

### DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

**Auchincloss Colliery.**—The work of replacing timber in No. 1 shaft with re-enforced concrete is still underway. The replacing of timber sets with steel along the main haulage road, from the end of the concrete walls in No. 1 shaft, Baltimore vein, has been pushed during the year with satisfaction. Several wood sets of timber supports have been removed, eliminating the fire risk. Several rock tunnels have been driven for developing ventilation and other purposes.

Bliss Colliery.—A small air shaft, extending from the surface to the Mills seam and used as a second opening, is being recribbed with concrete wall.

Truesdale Colliery.—The work of reconstructing this entire breaker with steel is underway, and the east side of same will be completed during the year 1916. For developing, transportation and ventilation, 18 rock tunnels of various lengths, have been driven from seam to seam.

Installed 25 new steel body mine cars at colliery.

Placed 139 sets of steel timber in the North shaft.

No. 59 tunnel, from Middle Ross to Top Ross seam, South shaft, was driven 45 1-3 yards during the year.

No. 62 tunnel from Mills to Hillman seam, North shaft, was driven 35 yards.

Installed in the North shaft 3 Westinghouse 8-ton locomotives.

At No. 8 shaft, electric sub-station was erected.

An air compressor 14 by 9 by 12 was installed.

#### DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

**Auchincloss Colliery.**—Outside: Renewed cross-arms carrying high tension lines. Installed two 27-ton steam locomotives to transport coal from Auchincloss to Loomis.

Inside: Rock tunnel, Baltimore to Mills vein, 72 feet long, was driven.

Installed electric hoist, No. 24 tunnel, Baltimore vein, No. 2 shaft.

Rock tunnel from Hillman to Mills vein, 150 feet long, was driven.

Installed one 7-ton reel locomotive, Ross vein, No. 2 shaft.

Installed one 7-ton locomotive, No. 23 tunnel.

**Bliss Colliery.**—Outside: A new sprinkling system was installed in the breaker.

Air shaft from the surface to Mills seam was enlarged and provided with iron stairway.

Inside: No. 15 slope was driven from Ross to Ross vein through fault, 159 feet long.

New pump station at Baltimore landing was completed, and one Scranton pump, size 28 by 12 by 36, capacity 1,200 gallons per minute, was installed.

#### LEHIGH AND WILKES-BARRE COAL COMPANY

**Wanamie No. 18 Colliery.**—Outside: Completed during the year, 18 by 30 inch tower hoisting engines and brick house. Brick colliery shop. 24 by 42 inch hoisting engines and brick house, No. 2 slope.

Inside: No. 36 tunnel extended Baltimore to Baltimore; No. 26 tunnel extended Baltimore to Kidney; No. 38 tunnel extended to Ross; No. 6 slope extended Bottom to Top Red Ash; tunnel driven Hillman to Top Hillman.

#### ALDEN COAL COMPANY

**Alden Colliery.**—Rock plane driven from Cooper to Hillman; air shaft driven from Cooper to Hillman; rock slope driven from Cooper to Bennett in the North basin.

One pair 15 by 18 inch geared Vulcan engines installed for a tower hoist, at the breaker.

An 18 by 30 by 10 by 36 compound duplex Goyne pump, with a 10 by 14 by 18 condenser, has been installed at the bottom of No. 1 shaft.

#### MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held in Nanticoke, June 6 and 7. The Board of Examiners was composed of Joseph J. Walsh, Mine Inspector; F. H. Kohlbraker, Superintendent; John H. Keating and Albon Gonsoski, Miners.