proved that a volume of 1,800 cubic feet of carbonic acid gas, per minute was generated, and that there must be a brisk fire existing somewhere in the mine to produce such a large quantity. Shortly after the temperature rose so as to verify our apprehensions. At the South Wilkes-Barre colliery, and also at the Nanticoke collieries, the instrument is used to ascertain the percentage of fire-damp in the air of each split, and it enables them to regulate the air so that the gas can be diluted evenly in the different air currents.

AN AUTOMATIC CAR TRANSFER SYSTEM.

A drawing is here presented showing an automatic system for transferring cars from the shaft-head to the breaker dump at the Baltimore No. 2 shaft of the Delaware and Hudson Canal Company. It has been in operation for about one year, and works satisfactorily. This was designed by Mr. C. H. Scharar, chief engineer of the coal department, who kindly consented to have it appear in this report. It explains itself, and can be easily understood from the drawing.

THREE NEW COAL BREAKERS.

Three new breakers were erected in this district during the year 1892. The first one completed was that of the Susquehanna Coal Company, a short distance north of their No. 1 shaft at Nanticoke. It is to prepare the coal previously shipped through the old No. 2 breaker, now abandoned, and is known as the No. 7 breaker.

The second was the No. 5 breaker at the South Wilkes-Barre colliery of the Lehigh and Wilkes-Barre Coal Company. This breaker was completed in the latter part of September, and has been operating successfully since.

The third is the No. 4 breaker of the Kingston Coal Company, erected to replace and do the work of the two breakers burned May 5, 1891. This new breaker started to prepare coal for the market in December, 1892.

The three breakers are large structures, equipped with the latest and most efficient machinery, and on the most approved plans for the purpose of cleaning and preparing a large production of coal. They are safe for the employes, and heated comfortably by steam. The stairs and machinery are well guarded, so that no one can be hurt inadvertantly.

RECORD OF COLLIERY IMPROVEMENTS DURING 1892.

The spirit of improvement was active during the year 1892 in this district, and a detailed account of its work is shown in the following:

Improvements by the Lehigh and Wilkes-Barre Coal Company.

At the Hollenback No. 2 colliery a new fan was erected to ventilate the new Red Ash seam workings. It is 35 feet diameter, and in run-

Improvements by the Susquehanna Coal Company During 1901.

Colliery No. 5.—Shaft No. 2, Nanticoke, completed rock plane from Lee to Ross seams, total length 430 feet—outlet for second opening from head of No. 5 plane to connect with old workings in No. 4 tunnel—airshaft 100 feet deep from surface to head of No. 5 plane.

Shaft No. 4.—Extended rock foot on east side of shaft 125 feet, turned south and drove tunnel 220 feet and struck the coal; drove a tunnel on the north side 600 feet from the foot before reaching the seam, and an outlet for the second opening.

Shaft No. 5.—A plane 350 feet long to the top of the anticlinal on east side of shaft.

Slope No. 4.—Reopened the slope from No. 7 to No. 8 lifts.

Colliery No. 5.—Outside, Babcock & Wilcox boiler plant 500 horse power, and a large addition to the breaker to be used as a jig house.

Colliery No. 6.—Opened up Rider seam in No. 6 tunnel; open cut ten feet deep and 370 feet long for the purpose of getting around to the other pitch at No. 6 slope; No. 6 South shaft, a new traveling way from the head of No. 4 plane to the foot of shafts so that the men need not walk on the motor road. Outside, installed 1,000 horse power Babcock & Wilcox boilers, and large addition to the breaker.

Colliery No. 7.—No. 1 North shaft reopened Cooper seam from No. 17 tunnel, that had been abandoned for several years. No. 1 South shaft, reopened No. 10 slope from top to bottom to take the coal from southeasterly portion up No. 10 slope instead of up No. 5 slope; drove trail slope 500 feet long in Ross seam to develope basin; sunk a bore hole from the surface to the head of No. 10 slope eight inches in diameter for the slope rope. Outside, 500 horse power Babcock & Wilcox boilers; compressor plant to run air motor in No. 1 South shaft, and in the breaker, several Anthracite separators or spiral slate pickers.

In compliance with act No. 212, session of 1901, approved by the Governor the 29th day of May, 1901, this company has at each mine an emergency hospital for the care of injured employes, at least eight feet by twelve feet, and containing the following articles for immediate use: Four woolen blankets, two rubber blankets, eight quarts carron oil, two small rubber tourniquets; one large body rubber tourniquets, one bottle antiseptic lotion, one bottle aromatic spirits of ammonia, one dozen roller bandages, three triangular bandages, one roll adhesive plaster, ten wooden splints, one wash basin, one tin cup, two linen towels, one paper of No. 3 pins, one dozen safety pins No. 2½, one teaspoon, one scissors, two bars surgeon's soap, twelve oz. absorbent lint; twelve oz. absorbent cotton; a sufficient supply is kept at the office to supply the hospitals when necessary; also a record book, two kerosene lamps, two chairs, two benches, two stretchers and a table. The rooms are heated by steam and are very comfortable. Every mine that I have visited since this law went into

during 1901. An 8" bore hole, 749 feet in depth, was sunk from the surface to the Red Ash seam, for operating a new slope in this seam.

Baltimore No. 2.—The hoisting engine house, fans and fan houses and a new steel tower over-shaft were rebuilt. A new plane was constructed from the top of shaft to railroad level for handling the output of this shaft.

Baltimore Tunnel.—No. 6 Slope, Red Ash seam, extended 300 feet; No. 7 Slope extended 400 feet and No. 10 Plane extended 400 feet.

Improvements at the Collieries of the Susquehanna Coal Company During the Year 1902.

No. 5 Colliery.—Outside: Remodelling breaker and rebuilding jig house.

New boiler plant, 2,000 horse power B. & W. boilers, replacing old cylinder boiler plant.

New compressor house, with two-stage Ingersoll-Sergeant compressor, 20" steam, 20¼" and 32¼" air, 24" stroke.

Inside: No. 2 Shaft, No. 13½ inside slope, opened 400 feet to replace No. 13 Slope closed during strike.

Second opening on head of No. 12 rock plane from Lee to Ross.

No. 4 Shaft: New airway in Ross seam from North tunnel to No. 4 air shaft.

Second opening from South tunnel.

Steel roof supports at lower landing, Shaft No. 4.

No. 4 Slope: Rock plane from Mills to George seams, 434 feet long, 7'x14' on a 20-degree pitch.

No. 6 Colliery.—Outside: New B. & W. boiler plant, 2,000 horse power, with steam lines to No. 6 Shaft, replacing cylinder boilers.

New water hoist tanks in No. 6 North Shaft, which is being made into a water hoist shaft.

No. 7 Colliery.—Outside: New hoisting engines, 32"x48", with 13' cast drum, double air brake, and over-winding device, replacing old 28"x72" engines at No. 1 deep shaft.

Pneumatic haulage plant, No. 1 to No. 3 Shafts, completed with three-stage Norwalk compressor, 22" steam, 16", 5⅝" and 11½" air, 24" stroke, and Porter pneumatic locomotive, 8"x14", with air line carrying 900 pounds pressure, replacing rope haulage.

Old rope haulage engines repaired and put in place for Slope No. 10.

New lamp house constructed, from old rope haulage engine house.

B. & W. boiler plant, 2,500 horse power, replacing 48 cylinder boilers.

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 2-20¼ 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 1½ miles, completed.

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

Sugar Notch No. 9 Colliery

Outside.—Fuel conveyor breaker to boiler house.

Inside.—No. 18 tunnel Baltimore to Cooper, 57 yards; No. 13 tunnel Baltimore to Stanton, 135 yards; No. 16 tunnel Twin to Cooper, 33 yards; No. 17 tunnel Ross to Twin, 37 yards.

Maxwell No. 20 Colliery

Inside.—No. 18 tunnel Red Ash to Ross, 98 yards; No. 10 tunnel extended to Ross, 124 yards; tunnel airway for No. 7 slope, 67 yards; No. 7 tunnel Red Ash to Red Ash, 39 yards; rock plane airway Red Ash to Ross for No. 18 tunnel, 51 yards.

SUSQUEHANNA COAL COMPANY

Colliery No. 5

Outside.—Two new bridges built across Forge Creek for transportation from shafts Nos. 4 and 5, also from No. 14 slope and No. 4 and 4½ drifts. A new Ingersoll duplex compound air compressor placed to further increase the amount of air for hoisting and pumping from No. 2 shafts and No. 4 slope.

Inside.—New tunnel No. 4½ from surface towards Ross seam above drainage level. New slope sunk in Twin Seam inside tunnel No. 8 in No. 2 shaft.

Colliery No. 6

Outside.—A new jig house was commenced for the better preparation of coal at this breaker.

Inside.—An air shaft was sunk to the bottom split Ross seam No. 6 slope; a new shaft 13x16 feet 6 inches was sunk to a depth of 402 feet to the bottom split Ross vein, also head frame, hoisting engines and foundation, compressor, boilers and boiler house, steam line and tracks on surface for same shafts.

Colliery No. 7

Outside.—New jig house as previously mentioned completed and now in operation, also boiler house to contain 4,000 H. P. Babcock and Wilcox boilers has been begun and will be completed during the present year.

Inside.—No. 13 tunnel extension to Hillman seam in No. 1 North shaft; a 12 inch bore hole a depth of 979 feet was driven from the surface to the Lee vein for steam line to furnish steam for pumping from the various levels in No. 1 shaft. There were also purchased during the year at No. 5 colliery, 200 steel mine cars.

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 ½ inch by 5⅝ 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 19½x19½ brick and concrete lamp house has been erected.

Bliss Colliery

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

Bliss Colliery.—Ventilation good; roads and drainage good; condition as to safety good.

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

WEST END COAL COMPANY

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

LEHIGH AND WILKES-BARRE COAL COMPANY

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

ALDEN COAL COMPANY

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

IMPROVEMENTS

SUSQUEHANNA COAL COMPANY

Colliery No. 5, Outside.—Installed a new fan to remove the dust from the breaker.

Addition to breaker and machinery.

Inside, No. 2 Shaft.—One new air locomotive.

No. 8 tunnel extended to connect No. 2 shaft with No. 4 slope, 182 yards.

New plane No. 6 in Ross seam.

New slope No. 20 in new lift in Ross seam, 148 yards.

No. 4 Slope.—New slope in Forge seam, 193 yards.

No. 4 Shaft.—Second opening for No. 3 slope, new slope No. 3, 141 yards.

Colliery No. 6, Outside.—Two new locomotives to haul coal from No. 7 shaft, No. 10 slope and No. 1 drift to the breaker.

Inside.—New electric haulage in No. 6 tunnel.

New engines for No. 1 plane in No. 7 shaft.

Tunnel Ross to Twin seams in No. 6 tunnel, 71 yards.

No. 11 slope in No. 7 shaft, 228 yards.

Colliery No. 7, Inside.—Two new air motors with air lines for No. 1 North shaft.

No. 17 plane in No. 15 tunnel, 100½ yards.

One new air motor for No. 3 shaft in South shaft No. 1.

New slope No. 23 West Ross in No. 1 South shaft, 205 1-3 yards.

New slope from head No. 12 plane to the Ross seam, in No. 1 South shaft, 228 yards.

Number 6.—Ventilation good; drainage fair; condition as to safety good.

Number 7.—Ventilation, drainage and general condition, good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Auchincloss.—Ventilation, drainage and general condition, good.

Bliss.—Ventilation, drainage and general condition good.

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

WEST END COAL COMPANY

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

LEHIGH AND WILKES-BARRE COAL COMPANY

Wanamie.—Ventilation, drainage and general condition, good.

ALDEN COAL COMPANY

Alden.—Ventilation, drainage and general condition, good.

IMPROVEMENTS

SUSQUEHANNA COAL COMPANY

No. 5 Colliery.—A new pump house was made at the foot of No. 2 shaft in which a Goyne Duplex pump, 40 x 23 x 48 inches was installed.

No. 8 tunnel, connecting No. 2 shaft with No. 4 slope, was completed.

No. 6 Colliery.—Built a concrete wash-house with four shower baths and clothes lockers.

An electric generator, operated by a 17 x 15-inch Ridgway engine was installed in the power house.

The steam locomotive used in No. 6 tunnel was replaced by a 7½ ton electric motor.

An electric hoist was installed at the top of No. 12 slope.

No. 7 Colliery.—A brick building 10 feet 9 inches by 10 feet 9 inches was erected and is known as the Draeger Rescue Station. All the necessary equipment, including 4 helmets and charging tanks, is kept in the building ready for use. The station is in charge of John B. Jones, whose duty is to visit the several mines of the company once each month and train the different corps selected for this purpose in the proper manipulation of the apparatus. The apparatus is most effective when it is worn by persons who by training have learned to have confidence in its efficiency.

A return airway 108 yards long was driven in the Cooper seam, from No. 17 plane to No. 13 tunnel level.

A return airway was driven in the Mills seam from the west gangway, No. 30 tunnel to the anticlinal, from which point it was driven

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 underway 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 Ridgway 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.

A rock slope is being driven through fault, west of No. 7 tunnel, to the Ross vein.

The entrance to the Espy tunnel section has been made fireproof by removing all timber sets, cribbing, et cetera, and erecting side walls and I beams.

SUSQUEHANNA COAL COMPANY

Colliery No. 5.—49 new steel-body mine cars were added to equipment.

81 sets of steel timber were placed in No. 8 tunnel.

No. 21 plane in No. 2 shaft was driven 78 yards.

For protection against fire about the colliery an Ajax chemical fire engine was added to equipment.

Mills slope in No. 4 slope was driven 48 yards and completed.

A new No. 46 tunnel from Mills to Mills seam in No. 4 slope was driven 83 yards.

A new No. 47 tunnel from Forge to Cooper seam in No. 4 slope was driven 68 yards.

A new 14 by 8 by 13 horizontal piston pump was installed in the Hillman slope in No. 2 shaft.

The head of No. 4 slope, which was originally wood, was made fireproof with concrete and steel. There is no wooden timber in this slope within 800 feet of the head.

A new Telephone Exchange was installed in the supply store. The exchange is connected with all openings about Nos. 5 and 7 Collieries and an operator is on duty from 6 a. m. to 6 p. m. daily.

Commenced the building of a new steam line from Colliery No. 7, new Babcock and Wilcox boilers, to Black Hill, Lee, Ross and No. 1 slope. This line will be 15 inches for a distance of 2,200 feet and 5 inches for a distance of 4,300 feet.

No. 4 slope in No. 4 shaft was driven 29 yards and completed.

Colliery No. 6.—Installed in the power house a 20 by 24 by 7 inch R. H. Hamilton engine and Westinghouse generator.

Added to equipment 51 steelbody mine cars and a 10 by 16 inch tank locomotive. The locomotive hauls the coal between No. 7 shaft and the breaker.

No. 22 tunnel was driven 52⅓ yards and completed.

No. 11 slope in No. 7 shaft was driven 78 yards and completed.

11 sets of steel timber were placed in pump house at foot of No. 6 shaft.

No. 22 tunnel outlet was driven 190 yards.

A new 10 by 5 double inlet exhaust mine fan was installed to ventilate No. 7 shaft workings.

An electric pump was installed in No. 13 slope, No. 1 drift.

Colliery No. 7.—Placed in breaker 7 spiral pickers. In March commenced the erection of 4 batteries, 1818 horsepower Babcock and Wilcox boilers. This plant will furnish steam for the operation of Black Hill, Lee, Ross and No. 1 slope, replacing the old cylinder boilers now located at No. 2 slope, Lee and Ross.

New rock plane in north shaft was driven 86 yards and completed.

No. 31 slope in south shaft was driven 100 yards.

Installed in No. 19 slope in south shaft a pair of 10 by 12, 50 horsepower double cylinder friction drum hoisting engines.

Placed in No. 7 plane in north shaft 33 sets of steel timber.

An airway, top split of Mills, north shaft, was driven 132 yards,

under way for the development of this property. This colliery is the only one in operation in the Anthracite Coal Fields that has shipped to market over one million tons of coal in two successive years.

SUSQUEHANNA COAL COMPANY

Colliery No. 5.—Placed in No. 8 tunnel 50 sets of steel timber. Placed in No. 6 lift, No. 4 slope, 25 sets of steel timber.

Colliery No. 6.—Installed a shortwall electric mining machine At the head of No. 7 shaft a new steel head frame was built to replace the wooden structure. A wash-house was built during the year and a new fire alarm system was installed in the breaker.

Colliery No. 7.—A rock airway, for the purpose of ventilation, from the lower workings of the south shaft to the surface, was driven 259 yards during the year.

LEHIGH AND WILKES-BARRE COAL COMPANY

Wanamie Colliery.—Tunnel for ventilation driven from Top to Bottom Baltimore, No. 24 tunnel east. No. 37 tunnel driven from Top Baltimore to Hillman. Tunnel driven from Hillman to Hillman, No. 12 tunnel west. No. 13 slope extended Top Baltimore to Baltimore.

CONDITION OF COLLIERIES

SUSQUEHANNA COAL COMPANY

Numbers 5, 6 and 7 Collieries.—Ventilation, fair. Drainage and condition as to safety, good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Auchincloss and Bliss Collieries.—Ventilation, drainage and condition as to safety, goood.

WEST END COAL COMPANY

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

LEHIGH AND WILKES-BARRE COAL COMPANY

Wanamie No. 18 Colliery.—Ventilation fair. Drainage and 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.

EAST ALDEN COAL COMPANY

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

IMPROVEMENTS

SUSQUEHANNA COAL COMPANY

Colliery No. 5.—Purchased 24 new steel body mine cars. Installed in No. 5 breaker 4 new Wilmot jigs.

Placed 151 sets of steel timber. Erected electric sub-station for electric haulage. Completed 12 inch steam line for new power plant.

Rock tunnel No. 6, in No. 4 shaft, Stearns, from Bottom to Top Ross seam, was driven 109 2-3 yards during the year.

Colliery No. 6.—Purchased and placed in service 28 new steel body mine cars.

No. 5 tunnel, from Bottom Ross seam in the Glen Lyon basin to the Bottom Ross seam in the Priscilla Lee basin, was driven 186 yards during the year, making a total of 1,043 yeards driven to date.

No. 5 plane, from No. 5 tunnel, was driven 297 1-3 yards during the year. No. 32 tunnel, from No. 5 tunnel, was driven 69 2-3 yards during the year.

A new wash-house was erected at No. 7 shaft.

Colliery No. 7.—Installed 12 Wilmot jigs and 3 Norman pickers in No. 7 breaker.

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 condensor, 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.