

These gas-feeders have, in many cases, been extinguished, and the straw appearing unscorched and perfectly cool when taken out and examined.

In addition to the above long list of items then comes the loss of time caused by accidents occurring under this head. Whenever there is a serious accident, or a fatal case, the colliery is stopped for the day, and very often until the day after the funeral, causing the loss of from one to three days per accident to the miner and his laborer. This ought also to be added to the expense of our present system of exploding blasts.

In the above we have only reckoned the matter of dollars and cents to the miner and his laborer, which is impossible to get exactly, on account of the time required to pick out the tamping and re-touch after re-loading of the charge; also the expense of the powder lost and the value of the time lost in these various operations.

Next comes the loss of *human lives* and loss of limbs. Many of those injured must be cripples for life, and therefore are objects of public charity generally. But the matter of loss of lives is not to be calculated by dollars and cents. In order to do what we can to save the lives and limbs of those poor and unfortunate beings any system should be adopted that promises an improvement over the present. I dwell more upon this item than on any other in the whole list of accidents, the reason for which is this: I see that it is one of the heaviest items on the list, falls of roof and sides being the highest and blasts the second highest. In the second place I think that an improvement could and should be made in this department resulting in the saving of many lives that would otherwise be lost.

In the total number of lives lost in England for 1874, amounting to 1,056, thirty were attributed to blasts in various ways, equal to 2.84 per cent. of the whole number, while ours in this district for 1876 equals 18.18 per cent., nearly six times the percentage of the former. This is due no doubt from the excess of powder used in this district over what they require to use in mining the bituminous coals.

The other four deaths classed under this head occurred as follows: One by falling under a locomotive engine in the mines; one by being drowned in bottom of new shaft by falling under platform which was covered by several feet of water; one by being crushed by hoisting carriage in carriage pit at foot of shaft; a boy 12 years of age looking for employment, and one died from wounds received by being kicked by a mule.

ON SURFACE.

There were three lives lost under the above head. One by car on culm bank, one by railroad cars under coal breaker, one by falling into pony rollers in breaker, by carelessness, on his own part; his age being but about ten years, he probably did not comprehend the great danger incurred when disobeying the advice of men and boys around him.

IMPROVEMENTS.

There has been but a very limited amount of work done in this district under the above head during the year just ended. Indeed, much less than in any year since 1870.

SHAFT SINKING.

The **Ellenwood** coal company has completing one of their shafts to the coal, but a connection to the second shaft, which is intended as their second opening, is not yet effected.

The Maltby circular shaft, begun in 1872, has not yet been completed. The time of my last visit, during the summer, the cast iron tubing had

been lowered to a depth of about one hundred and forty feet, and the superintendent stated that they had about fourteen feet more to go before striking the solid rock. Subsequently I have been informed that the whole operation has been suspended for some time.

Second Opening.—The following shafts at present have no lawful second opening: Nos. 1 and 2, Susquehanna coal company, at East Nanticoke; Conyngham shaft, Delaware and Hudson coal company, near Wilkesbarre; **Ellenwood** shaft, Ellenwood coal company, near Kingston. The respective parties are driving for the second opening in each case, except the latter; operations in the same having been suspended since 1875.

MINES ON FIRE.

The Empire mine fire is not extinguished altogether yet. Although it causes but very little inconvenience or expense as at present. Whatever amount of fire that there is in the said old mines is located very near the crop of the seam. The same being above water level is hard to overcome in any manner, as the periphery of so large an area is almost impossible to be made perfectly air tight; hence a certain amount of fresh fuel is added to the fire, no doubt continually. The inclosed space having been opened at the lower level several times, the carbonic acid gas has been drained from the higher point, and to get another fresh supply sufficient to fill the whole space, the same being manufactured by the slow process of the consumption of oxygen by the present fire is almost out of the question.

The Baltimore Old Mine Fire.—This old mine is still burning. It is confined to the boundaries, as described in my last report, and requires but a few persons to attend to the same.

Prospect Shaft Fire.—The Prospect shaft colliery was again visited by the ravages of a fire during the year of a very severe character.

On the — day of January, at about 8 P. M., a blast was fired in the face of the north-west gangway, from which the gas ignited around the face. The men began to combat the fire, but by some mishap one of the water connections would not work, hence they could not employ their hose and force of water upon which they depended. Before they got the same changed and in order to work, requiring perhaps three-quarters of an hour, the fire had gained such headway that they were unable to cope with it. The fire had crept back opposite them through the airway or return, they being in the intake. In the combat the boss, Samuels and two of his men were more or less burned on their faces and hands, but not seriously, but before twelve o'clock midnight they were all compelled to abandon their efforts and retreat to the surface, after which the water from the reservoir was turned in to flood the mine. They had a two and a-half inch gas pipe from the shaft's foot to the face of the gangway, connected immediately with the reservoir on the surface, thus having a head of six hundred (600) feet. This appliance had been kept in readiness and often successfully employed since the great fire of 1874. The operation of flooding the mine by letting in the water from the large reservoir near the shaft's head, and pumping from the river and canal, sufficient to prevent the admittance of atmospheric air, took several days. After that the water had reached a height of about one hundred (100) feet, or sixty (60) feet above the highest point excavated in the workings—pumping water into the shaft was discontinued. Having given ample time for cooling the strata, the hoisting of water from the mine was now commenced. Some of the chambers on the pitch had been worked up quite a ways, having reached perhaps, in some cases, as high as forty feet vertical above the shaft gangway.

On the seventh of March they had reached or got the water out to within about forty (40) feet of the shaft's bottom.

Ross and Twin veins, its total length being one thousand two hundred and seventy feet. This opens a large territory of coal.

The No. 4 slope was extended, reaching a point two hundred and eighteen feet below the old level, and opens a new lift of excellent coal.

A new colliery is to be opened at Morgantown, four miles west of Nanticoke. The shaft is $33' \times 12\frac{1}{2}'$ area, and will have a probable depth of eight hundred feet to the Ross seam. A horizontal tunnel is being driven also to cut the same seam, which is seven feet high by sixteen feet wide, and is expected to cut the coal at a length of about one thousand two hundred feet. The shaft was down at the end of the year to a depth of fifty-six feet, and the tunnel was in from the opening a distance of seventy-five feet.

At the Grand Tunnel the water was pumped from the old No. 3 slope, and a new slope is being driven down from a point near the bottom of the old McFarlane shaft, which was, at the end of the year, down a distance of eight hundred and twelve feet below the line of the old workings. This will open an extensive area of coal of the Red Ash seam and of good quality.

The Wyoming Valley Coal Company.

At the Forty-Fort shaft an underground slope is in progress of being driven to work the coal lying below the shaft level. It was down, at the close of the year, a distance of nine hundred feet, on an average grade of seven degrees, and is still continued.

At the **Harry E.** colliery a new tunnel was driven from the surface to the Bennett vein, a distance of two hundred and twenty-five feet. Its size is $9' \times 7'$, and it has cut the vein nine feet thick of excellent coal.

The Delaware, Lackawanna and Western Railroad Company.

At the Avondale colliery this company is sinking a new air-shaft, with a view of putting a fan on it to increase the ventilation of the underground slope. The shaft is $16' \times 12'$ area, and was sunk to a depth of one hundred sixty-five feet at the close of the year. The underground slope has opened a large extent of workings, and the new fan will prove an effective addition to the ventilating power.

The Woodward shafts have not yet been completed, and it may take another year to complete their sinking. No. 1 was at a depth of five hundred and thirteen feet and No. 2 four hundred and eleven feet at the close of the year 1883. They are beginning to prepare for the erection of a breaker, and have partly graded the railroad beds leading to that structure.

The Pettibone shaft was started to sink on April 18, 1883, and after encountering great difficulties in passing through clay and sand, they have successfully reached the rock at a depth of eighty feet. The progress of this enterprise has been watched with unusual interest, because it was generally supposed that a shaft could not be sunk on the sandy flats, owing to its great depth of sand. This company contemplate sinking another shaft to constitute the second opening required by law, and it will be started in the course of a few months.

8 MINE INS.

The Parrish Coal Company.

This company began to operate the Parrish colliery, and started the breaker in the latter part of December, 1884. The breaker is a model of neatness, and everything in the structure is well arranged for producing its intended work. There are two forty-horse-power engines, one to hoist the coal over the inclined plane up to the breaker, and the other to run the breaker machinery. Both are supplied with steam from two new boilers located close to the structure. They are mining the Baltimore and Ross seams, have four horizontal openings or drifts, one of which is on a level with the bottom of the breaker-plane, and the coal from the others is lowered over gravity planes. It is a new colliery operated by a company organized in 1884.

Destruction of Coal Breakers by Fire.

The old Hartford, or No. 6, breaker of the Lehigh and Wilkes-Barre Coal Company, at Ashley, took fire in some mysterious manner about eight o'clock, P. M., January 22, 1884, and was burned to the ground. It was the oldest structure of this kind in this valley, and was still capable of passing a large quantity of coal.

The Forty-Fort breaker of the Wyoming Valley Coal Company took fire early in the morning of November 27, and was totally destroyed. It is not known how it took fire, and this will very probably remain a mystery. The coal is now taken to the **Harry E.** breaker and shipped from there.

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Improvements by the Forty Fort Coal Company.

Two new exhaust fans, 15 and 20 feet in diameter respectively were installed at the "Harry E" Colliery, replacing the old ones, which were inadequate to supply the ventilation required. The new fans exhaust 219,040 cubic feet of air per minute.

Improvements by the Hillside Coal and Iron Company.

A new air shaft has been sunk to a depth of 70 feet sectional area 10x10 feet, in the Consolidated Colliery, to be used for ventilation.

Improvement by the Westminster Coal Company.

A new fan 12 feet in diameter has been erected at this colliery to ventilate the underground slope workings. Engine 14x13-inch with a working speed of 60 revolutions.

Improvements by the Raub Coal Company, Limited.

A tunnel has been driven in the out crop of the Red Ash vein, a distance of 300 feet at the Louise colliery of this company, the coal from which is run down a gravity plane to the breaker. A new fan 12 feet in diameter has been installed on this tunnel which exhausts 60,000 cubic feet of air per minute to ventilate the workings.

Improvements by Robertson and Law.

A new slope has been sunk at the Katy Did Colliery a distance of 450 feet from the surface; area, 7x8 feet, with a gradient of 18 degrees.

A tunnel has been driven from the surface to the "Brown" seam, a distance of 100 feet; area, 10x10 feet, which is used for transporting coal.

Improvements by the Algonquin Coal Company.

On the Pine Ridge shaft of this company a new underground slope has been driven from the "Kidney" to the "Hillman vein," a distance of 632 feet, area, 7x20 feet. Three new gravity planes were made, varying in length from 380 to 460 feet. A tunnel has been driven from the Hillman to the Rock vein, a distance of 631-2 feet; area, 7x12 feet.

ers at the breaker were abandoned. In the mine an additional intake air course was driven in the eleven-foot seam and the return air course enlarged, which increased the volume of air in the six-foot vein from 85,000 cubic feet to 145,000 cubic feet per minute.

Pennsylvania Coal Company.—The No. 6 shaft was enlarged from 10x16 feet to 10x31 feet to make room for two hoist-ways a pump-way and an air-way from the surface to the Pittston seam, a distance of 312 feet, which shaft was then continued down to the Red Ash vein 300 feet. The location for a new breaker has been staked out to be built in the spring of 1898, which will prepare the coal from shafts Nos. 5, 6 and 11.

At No. 4 shaft of this company three new Babcock and Wilcox water tube boilers of 150 horse power each were erected, which take the place of twelve cylindrical boilers formerly used. Also at the Ewen breaker six Babcock and Wilcox boilers were erected and put in operation on February 13, 1897, which supply steam to the breaker, and to No. 7 and Hoyte shafts, supplanting the 27 cylindrical boilers previously used.

Forty Fort Coal Company.—At the **Harry E.**, a new pair of First motion engines have been placed on the head of the inside slope in the Red Ash seam. Diameter of cylinders 30 inches, length of stroke 48 inches. The drum shaft is 14 inches in diameter and made of steel, length being 28½ feet. There will be 8,000 feet of one and one-half inch rope on the drum; 15 cars will be hoisted on a trip.

Raub Coal Company.—At the Louise Colliery an addition of 36 feet was built to the breaker and new machinery placed in position, thereby increasing the capacity of the breaker to 800 tons per day. New openings have been driven from the surface to the Ross and Red Ash seams by tunnels on the property lately acquired by the company. A small locomotive takes the coal from these openings to the breaker, a distance of one mile.

At 5 P. M., March 1, 1897, a settling of the surface was discovered on the east side of Eighth street, in the borough of Wyoming, Pa., which caused considerable anxiety to the people who resided in that vicinity. Realizing that the workings of the Pittston seam of the Mount Lookout Colliery had extended under that portion of the town, word was sent to notify William A. Thomas, the inside foreman of the colliery, of the fact. He immediately descended the shaft to make an investigation of the mine. On reaching the foot he encountered a rush of sand and water coming through the rock tunnel. Knowing the danger of being caught by the rush, he retreated to the foot of the shaft and was hoisted to the surface again. The mine had stopped work that day at 3 P. M., and all the men had come out some time before the rush took place. Therefore, the officials did not attempt to go down again for one hour. When the

surface to Ross and Red Ash veins, upper workings—serving as means of better ventilation, also as more convenient and safe entrance and exit to that portion of workings which are located so far from main opening.

TEMPLE IRON COMPANY

Harry E Colliery

Outside.—On the hoisting shafts they have put in new 10 foot drum on the hoisting engines, clutch gearing, which enables them to hoist from either of the three levels with both cages, which is we think a very decided improvement. The old drum was an 8 foot diameter drum without clutch, with which they could only hoist from lower level with both cages at one time.

Inside.—Slope being driven in 11 foot vein from shaft level down towards basin, with plane going to outcrop on same line as slope, this will be slope and plane combined, with pair of 14x16 engines in place to operate the same.

Ross

There has been a tunnel driven from Red Ash to Ross vein, size 12x8 feet on a pitch of 15 degrees. This will be the outlet for coal from new slope and plane which is being constructed in Ross vein.

Harry E. Colliery, Ross Vein

Inside.—There is also another tunnel from Red Ash to Ross, 10x6 feet on a pitch of 40 degrees which is return airway for new slope and plane.

The above mentioned improvements are the new work that is being done. Aside from that which would be more under the regular order of work, but which is improvements just the same, is the decided improvement in the ventilation which has been accomplished by the enlarging of the areas of airways both inlet and outlet airways at this colliery the past year.

Forty Fort Colliery

Outside.—New breaker capacity 1,000 tons per ten (10) hours. This breaker was put in operation on June 9, with the most modern machinery for the preparation of coal.

Shaft.—Widened out cage ways and retimbered in the new from top to bottom with concrete wall $2\frac{1}{2}$ feet thick, 20 feet from top down, all around the shaft. One new Sterling boiler 125 H. P.

to do the work required. The engines are enclosed in a fire proof building, size 22x33 feet.

A 10x18 foot frame building was erected to enclose fire pump.

Forty Fort Colliery.—A 10x14 inch locomotive has been installed to haul mine rock from the shaft to the dump, and a 16x24 foot locomotive house erected for same.

A 14x42 foot addition to the carpenter shop has been built; also a 12x16 foot addition to the oil house.

A water pipe consisting of 212 feet of four-inch pipe, and 288 feet of three inch pipe, has been laid from the water main to outside barn, for fire protection.

The 3-inch steam pipe which supplied the Ross slope engines was too small to carry the amount of steam required and they found it necessary to lay 1,000 feet of 4-inch pipe to those engines; also 600 feet of 6-inch pipe to carry exhaust steam to the return airway. This was done at our suggestion.

A slope is being sunk from Road 8 A in the 4 foot vein to reach the basin in the southeast corner of this property.

The Ross slope struck a roll which they are driving through on a 6 degree grade. This slope was driven in the rock a distance of 227 feet, and has about 150 feet more to go before reaching the coal.

The development of the Ross and 11 foot veins is progressing satisfactorily.

Five bore holes were put down from the surface to the 4 foot vein to test the rock cover of the same, along the D., L. and W., Bloomsburg R. R. Division.

A 7x12 foot rock tunnel was driven from Road 13 in the bottom split of the 11 foot vein to the top split, and a 7x8 foot air shaft, fifteen feet deep, was sunk from top to bottom split. This work was done to develop the top split of the 11 foot vein in this locality.

Harry E Colliery.—A new breaker has been erected on the easterly side of the old structure and is now practically completed. All the machinery is in place except the breaker and conveyor engines, which cannot be placed until the old breaker is abandoned, on account of obstructing the present loading tracks. The shaft head frame is framed and ready for erection. New self dumping cages have been made and delivered, ready for installation.

New cylinders, 26x48 inch, have been purchased to replace the present cylinders on the hoisting engines, which are 22x48 inches, and of sufficient power to operate the new cages, which are much heavier than the old ones.

A 20x22 foot fire proof brick building, with concrete floor and iron roof, has been erected over the Ross S'lope engines which are located at the head of the air shaft and in close proximity to the supply and fan house, and replaces an old dilapidated frame building.

A 12x16 foot frame building used as a harness repair shop has been erected at safe distance from the barn, to replace a 10x20 foot frame building which stood so close to the barn as to be a menace in case of fire.

A 16x22 foot addition to the blacksmith shop has been erected owing to insufficient room in the original shop.

A new 16x10x18 inch duplex pump, built by the Scranton Steam Pump Company, was installed at No. 25 lift, Red Ash vein, and 2,300 feet of cast pipe laid from this pump to the foot of the shaft.

A new 26x12x36 inch duplex Coyne pump was installed at the foot of shaft, and 410 feet of 14 inch cast pipe erected in the shaft to carry water from this pump to the surface.

A 6x7 foot manway, 56 feet in length, was driven from the Red Ash to the Ross vein, on 35 degrees pitch.

A new mule stable with 14 stalls has been built in the 11 foot vein.

PENNSYLVANIA COAL COMPANY

Central Colliery.—Car shop 63x33 feet, built of brick.

Wood shed 75x17 feet, built of wood.

Slope engine house, 36x26 feet, built of brick. Clark slope Laws shaft.

Engine house 45x21 feet 7 inches. Built of brick. Laws shaft.

Wash house, 30 feet 3 inches x 18 feet 4 inches. Built of brick. Divided into three compartments.

Boiler house 114x59 feet, wooden frame, covered with corrugated iron and consists of 8 Keeler boilers of 150 H. P. each.

New shaft tower on Laws shaft.

Mine car haulage for empty mine cars at breaker.

Rearrangement of the outside mine car tracks.

Barnum Colliery.—Brick locomotive house at No. 2 shaft.

Brick wash house at No. 2 shaft, divided into apartments for the miners, outside men and foremen.

New barn at No. 2 shaft outside.

Brick oil house at Barnum breaker furnished with oil pumps complete for lubricants.

Added one battery 300 H. P. B. and W. boilers to the boiler plant.

KINGSTON COAL COMPANY

No. 4 Colliery.—Completed the new boiler plant of 1,200 H. P. Babcock and Wilcox boilers. This is only one-half of the final boiler plant planned.

Built conveyor lines for fuel from breaker to boiler house.

Built a conveyor line to carry refuse from breaker to Williams' patent crusher. This rock is then crushed and flushed with the culm into the mine workings.

They have built new warehouse and office.

They have drilled about 12 bore holes to prove rock cover over Orchard vein.

They are driving a rock plane from Bennett vein on 15 degrees pitch to cut upper vein.

The plane has reached during the year the Orchard vein.

STEVENS COAL COMPANY

Stevens Colliery.—Installed 20 foot fan at new plant; put in a division partition shaft for upcast airway to fan.

Completed hoisting arrangements at new shaft, by installing cage on south side, fans, etc.

Installed 90 H. P. electric engine and generator for electric haulage in mines.

November 26, Burt Cruickshank, American, reelman on motor, was instantly killed at Mount Lookout Colliery, Temple Iron Company. He was employed to attend to the reel wire on the electric motor in No. 6 slope, Marcy vein. He apparently made a mistake in hooking on the lead wire and fell under the motor.

Miscellaneous

July 6, John Onderko, Slavonian, laborer, was fatally injured at Maltby Colliery, Lehigh Valley Coal Company. He was employed as a laborer around the breaker. He was walking over a trestling or bridge, leading from the breaker to the foot of the plane and fell off, a distance of about 8 feet. Outside.

October 27, Joseph Mackin, American, breaker oiler, was fatally injured at Exeter Colliery, Lehigh Valley Coal Company. He was leaving the oiler's room, about 5.45 P. M., after oiling the machinery and looking it over, when a cyclone struck the breaker, causing the tower hoistway, the mud screen and the belt rooms to collapse. Mackin was pinned fast among the debris. Rescuing parties worked heroically to liberate him. It was eleven hours before he was found. He died about 3 P. M. on the 28th. Everything that was possible was done for him.

November 11, Joseph Bessermey, Slavonian, platform man, was fatally injured at Maltby Colliery, Lehigh Valley Coal Company. He was helping to tear out some chutes in the breaker, and was running the plank out through the window. He stepped back where there was an opening left over the belt room, and fell through it. This opening was guarded by railing, but he went over the railing.

CONDITION OF COLLIERIES AND IMPROVEMENTS

KINGSTON COAL COMPANY

Completed the second half of 2,400 H. P. boiler plant.

Installed Norwalk compressor, capacity 2,400 cubic feet per minute; fire pump and fire lines around plant and breaker, compound duplex Goyne pump 28x18x10x36 inches; bore hole to surface through which to pump water. Erected warehouse and office.

Kingston No. 2 Colliery.—Culm hole at breaker for flushing culm into workings. Condition of collieries is good.

TEMPLE IRON COMPANY

Harry E. Colliery.—The new breaker which was practically completed in 1905, was placed in operation on July 23, and is working very satisfactorily. The breaker tracts were graded and relaid. New scales, both empty and loaded, were installed. A new shaft head frame was erected and self-dumping cages installed. Portions of the shaft cribbing and buntons were renewed, and 4½x11 inch guides placed in the shaft to replace the old 6x8 inch guides. A concrete retaining wall was built around the head of the shaft in place of the old wooden cribbing.

A new carpenter, blacksmith and machine shop was built. This is a concrete building, 56 feet 6 inches x 28 feet. The foundation is made of concrete, 21 inches thick. The building walls are 8 inches

11-15

thick; there are two 8 inch concrete partitions which divide the building into three equal parts. The roof trusses are made of steel, with steel purlines and covered with galvanized steel roofing.

Road 24, in the Red Ash vein, was re-opened and 1,400 feet of track laid from the main slope to face of gangway. This gangway was continued through the rock a distance of 150 feet, striking the Red Ash vein on the easterly side of the fault. This gangway is now connected with workings on Road 28 and is a decided improvement in both transportation and ventilation.

No improvements at Mount Lookout and Forty Fort worth mentioning. Condition of collieries is good.

LEHIGH VALLEY COAL COMPANY

Exeter Colliery.—New self-acting gravity plane in operation between the Babylon and Red Ash veins. This dispenses with the upper landing in the Red Ash shaft.

The air motor haulage has been extended 2,000 feet and the feeding locomotives are now in service.

A new permanent brick arch bridge completed in South district, Red Ash vein.

A new permanent concrete air bridge completed in Marcy vein Pittston shaft.

The old wooden crib in Pittston shaft replaced by concrete, with new buntings and concrete connections to fan.

New engine installed driving Pittston fan.

On October 27 the Exeter breaker was practically destroyed by a cyclone or tornado sweeping up the Wyoming Valley. Work was immediately started cleaning away the debris and rebuilding, so that at the close of the year the new structure was almost completed and coal expected to be running through the breaker by the middle of January. During this interval an entirely new arrangement of tracks was made entailing 1,500 feet of grading and 2,000 feet of tracks, giving a safer means of transportation around the head of the Pittston shaft.

The position of the tower hoist engines has been changed, as well as the location of the breaker engine, both being closer to the breaker, thus avoiding any danger of conflict in the transmission power ropes, etc. The new buildings for these engines are of concrete with iron trusses and corrugated roofs.

All that remains of the old structure, practically speaking, are the pockets and the main screen room over the pockets. In the new structure every provision has been made for light, convenience and safety of the workmen. The timbers are of yellow pine, post and bracket structure resting upon concrete foundations.

A new 30 K. W. generator has been installed for illuminating purposes, in the breaker, yard, buildings and shafts.

New conveyor lines were extended and the old culm banks on the south side of the property are being regulated in the Exeter washery.

A new arrangement of tracks has been made at the head of the Red Ash shaft to avoid any possible contact with the hoist ropes.

The surface test holes to determine safe rock cover working, limit of Checker vein, have been continued throughout the year.

about 200 feet southeast from the slope, from which the water is discharged through a new 14 inch bore hole, 150 feet deep, to the surface, where it is utilized in handling the material from the culm bank now being prepared.

The Red Ash workings east of the Lackawanna river are being silted preparatory to robbing the pillars.

At Babylon about 1,500 feet of standard gauge track have been laid and a steam shovel placed for the removal of the culm bank to the Lawrence washery for preparation.

TEMPLE IRON COMPANY

Mount Lookout Colliery.—Three 120 K. W. 250 volt direct-current generators have been installed in the electric plant to replace three 100 K. W. 500 volt generators, and the circuit in the mine changed to conform with the 250 volt current.

A new fire-proof brick boiler house, 33 x 51 feet, with steel roof and adjoining coal bin, 15 feet 2 inches x 51 feet x 17 feet deep, of reinforced concrete, has been built, and two 250 H. P. Stirling water tube boilers installed therein.

Harry E. Colliery.—A new brick boiler house, 144 feet 4 inches x 41 feet, with steel roof and adjoining coal bin of reinforced concrete, 17 feet 6 inches x 144 feet 4 inches x 20 feet deep, has been built. The five original Stirling boilers have been rebuilt and two others of 250 H. P. each added, making a plant of 1,625 H. P. at this colliery. Forced draft by blower fan, feed water regulators, fuel and ash conveyors have also been installed.

A new ventilating fan, 25 foot diameter, 8 foot face, has been erected at the No. 2 Shaft, driven by an 18 x 36 inch engine. The fan house, casing spiral and chimney are all of reinforced concrete.

KINGSTON COAL COMPANY

Kingston No. 4.—A new brick electric generator house completed, in which three 240 K. W. direct driven generators have been installed.

A new four-stage centrifugal pump placed in the Orchard vein.

One 24 x 10 x 36 Duplex pump at Orchard Level.

One new 28 x 10 x 36 Duplex pump at Bennett vein, together with new culm and steam lines for same.

One 20 x 38 x 10 x 36 Compound pump installed at Red Ash shaft discharging through a new 10 inch bore hole, 650 feet long, to the surface.

One new concrete reservoir, with a capacity of 750,000 gallons, to supply the breaker and washery.

Two 20 x 12 x 36 pumps located at the reservoir.

Brick addition to the warehouse.

One brick waiting room for the miners and safety lamp station built at the head of No. 1 Shaft.

Boring surface test holes continued throughout the year.

A new 8 x 25 foot fan in concrete casing and house finished, new fan in operation since March.

A new school for the instruction of the foreign miners and other employes of the company has been opened and has met with encouraging success. The course of lectures on mining questions has also been continued throughout the year.

Exeter—Inside.—Preparations for the installation of a new pumping plant in the Pittston vein are being made. The air-motor haulage system was installed in the Checker vein. In the Marcy vein preparations are being made for the installation of air motor haulage.

A "Y" slope was completed in the Marcy vein in the west district and engine installed. Considerable changes in the extension of air haulage in the Red Ash vein were completed.

TEMPLE IRON COMPANY

Mt. Lookout Colliery.—A bore hole was drilled from the surface to the Marcy vein, through which a rope operates the Ross slope. A pair of 14x18-inch Flory engines was installed in the 22 x 22 foot brick building for power to operate the above mentioned slope. 516 feet of 8-inch steam pipe from the new boiler house, leading to both fans and both hoisting engines, were installed. This gives them two steam lines to both hoisting engines and fans. An 18 x 30-inch engine was installed to operate the North side fan, to replace the 13 x 16-inch engine formerly in use.

Forty Fort Colliery.—A 7 x 12 foot airway was driven from the Eleven Foot vein to the surface, in a 30 degree pitch, and a 7 x 20 foot ventilating fan, enclosed in a concrete building, installed on airway. A new brick engine house and new foundations were erected immediately in the rear of the old hoisting engine house, and the hoisting engines moved into the new building. A brick building was also erected to cover the breaker pumps.

Harry E. Colliery.—A Carpenter dust-removing system has been installed in the breaker and is giving very good results.

KINGSTON COAL COMPANY

No. 4 Breaker is being overhauled and rebuilt while mining operations are carried on as usual. The work is almost completed. The circular screens have been dispensed with and new mechanical pickers installed, dispensing with all boys under the age of sixteen years. A new brick-concrete wash house for the employes has been constructed, equipped with 100 steel lockers, 12 bath tubs, shower bath, hot and cold water and all conveniences. A new brick addition to boiler house has been completed and 600 H. P. additional B. & W. Water Tube boilers installed. The wooden building encasing the engines at No. 2 bore-hole and Cooper slope substituted with brick-concrete. The No. 1 shaft rock slope 450 feet long driven through roll in rock for the development of the Orchard vein under the Flats. A similar slope has been driven through the fault to reach the Bennett vein. A brick safety lamp station installed on the surface. An additional ambulance, with rubber tires, spring stretchers, etc., has been purchased. The school for the foreign miners was continued throughout the year. A duplex four stage centrifugal pump installed in the Orchard vein, inside slope. Concrete girders have substituted the old wooden timber at No. 4 shaft and turnout. A new Emergency Hospital at foot of the shaft. Three ventilating tunnels completed in Orchard vein. A new quintduplex electric pump, 1,200 gallons per minute, is being installed at the foot of inside Red Ash slope, discharging through 10-inch wood lined pipe 5,000 feet in length. Two new concrete-steel overcasts completed in Ross vein.

blower, driven by a 16 by 16 inch automatic engine, and an 8 inch cast iron pipe used to convey the ashes from the ash pits to the bin. The ashes in this bin can there be loaded into mine cars or run through a set of crushing rolls that have been installed for that purpose, and then flushed into the mines. A 10 inch bore hole was sunk from the surface to the Pittston vein, a depth of 266 feet, for this purpose. The air, which is discharged from the ash bin, is also used for blowing the fires under the boilers.

Eight new plunger jigs were installed in the breaker, six of which were to take the place of old jigs that were worn out.

A 7 by 14 foot rock slope was sunk on a 25 per cent. dip, a distance of 356 feet, from the Marcy vein to the Ross veins on the west side of the property, to develop the Ross veins in that vicinity.

Forty Fort Colliery.—A new barn with a concrete floor, with a capacity for 65 mules, has been erected in the Eleven Foot vein.

A balance plane, 2,300 feet in length, has been installed to handle the coal in the Eleven Foot vein above the shaft level.

A pair of 10 by 12 inch hoisting engines was placed on the west side of the Eleven Foot slope to sink a new slope to the land line, a distance of 950 feet.

A 10 by 12 by 16 inch Jeanesville pump was installed at the foot of the Ross slope, replacing a No. 8 Knowles, which was inadequate to handle the amount of water.

Harry E Colliery.—An 8 inch bore hole was sunk from the surface to the Red Ash vein, a depth of 530 feet, and a 6 inch steam pipe laid from the boiler house to this bore hole, a distance of 1,880 feet, to supply steam to the lower workings of the Eleven Foot vein, and also to the Red Ash vein.

The Six Foot vein workings at this colliery, which were abandoned some years ago on account of the large amount of water flowing into the workings, have been reopened and the water removed. The slope in this vein for a distance of 3,000 feet has been relaid with 40 pound rails, and a 14 inch by 36 inch hoisting engine is used to operate it.

The old air shaft has been reopened and a 13 foot diameter fan installed.

A small area of Four Foot vein overlies these workings, and a 7 by 12 foot rock plane was driven from the Six Foot to the Four Foot vein, a distance of 80 feet. An 8 by 10 foot air shaft was sunk from the surface to the Four Foot vein, a distance of 84 feet.

A mine track has been laid from the mouth of the Six Foot tunnel to connect with the Harry E mine tracks leading to the breaker, a distance of 1,700 feet. This coal is conveyed from the tunnel to the breaker with a 15-ton steam locomotive.

KINGSTON COAL COMPANY

Kingston No. 4 Colliery.—The breaker has been equipped with a new "Carpenter" galvanized pipe-water column spray dust eradicator system. A brick extension completed to wash house, entire building now being equipped with two hundred lockers, bath tubs, shower baths, etc.

A brick waiting station completed for miners at the head of the No. 4 shaft. Completed two concrete powder houses, one new carpenter-blacksmith-car shop and a new warehouse ambulance shed.

this electric equipment was to abandon the boiler and compressed air plant, which supplied the lower workings of Forty Fort and Harry E collieries with power, and which was very expensive to operate and maintain.

The barns, engine rooms, pump rooms, etc., inside are constructed of concrete and steel and are strictly fireproof. A shaft, 6 by 6 feet and 50 feet deep, was sunk between the overlap in Four Foot vein, connecting No. 3 slope Four Foot workings with South slope Four Foot workings. This is an additional opening for the South slope section and will afford more efficient ventilation for this section. A rock plane was driven on a 30 degree pitch between the Eleven Foot and Six Foot veins, a distance of 210 feet, for the purpose of making an additional opening for the Six Foot vein workings.

Outside: No. 1 air shaft was retimbered, the airway between the shaft and fan rebuilt, and the fan and fan house substantially repaired. Twelve new jigs of the plunger type were installed in the breaker. The Jackson tunnel, which is used as a waterway for the Six Foot old workings above the shaft level, was opened up and retimbered a distance of 257 feet. This tunnel is now 8 by 18 feet. A telephone system was installed connecting the office outside with the Eleven Foot, Six Foot and Four Foot veins.

Harry E. Colliery—Inside.—One 8 by 12-inch duplex double-acting plunger pump, operated by a 20-horse power electric motor, was installed in a fireproof building of concrete and steel on No. 38 lift. Red Ash vein, and two 8 by 12-inch duplex double-acting plunger pumps are operated by 75-horse power electric motors, were installed on No. 32 lift in a building constructed of concrete with steel for roof supports. Installed one centrifugal pump, with 3-horse power electric motor in No. 24 lift dip; and three 22-horse power electric hoists, one in No. 28 lift, one in No. 24 lift and one in No. 24 intermediate lift. 3,210 feet of extra heavy cast iron flanged pipe laid from No. 19 to No. 32 lift; 750 feet of 8-inch wrought iron pipe laid from No. 32 to No. 38 lift; 2,000 feet of 6-inch wood pipe laid to carry silt to the lower workings in Red Ash vein. A pair of 13 by 18-inch hoisting engines installed at the head of Eleven Foot slope to replace the old engines, which were inadequate to do the work. A rock plane, 6 by 8 feet, 90 feet long, was driven on a 45-degree pitch between Six and Four Foot seams, for a second opening and to improve the ventilation.

All engine houses, stables and pump rooms inside are constructed in a substantial manner of concrete with steel supports.

Outside: A contract was made with the Luzerne County Gas and Electric Company to supply Harry E. and Forty Fort collieries with electric current. A brick building 12 by 12 feet was erected over a bore hole formerly used to supply the Red Ash workings with compressed air, for a sub-station where the Electric Company delivers the current at a voltage of 6,600 volts and it is transformed to 440 volts for use at the colliery. A similar sub-station was erected in the old compressor house to supply the Forty Fort workings with power. A telephone system was installed connecting the outside with the Red Ash and Ross veins.

MT. LOOKOUT COAL COMPANY

Mount Lookout Colliery.—Inside: All timber supports were removed from the main pump room in Pittston vein and replaced with

one room for keeping Wolfe safety lamps and electric hand lamps and the other for storing the mine rescue apparatus. This room serves as a First Aid Hospital, complete with operating table, surgical appliances, et cetera.

FORTY FORT COAL COMPANY

Harry E. Colliery.—Inside: Installed a pumping station in the Six Foot vein. Drilled two bore holes for the purpose of furnishing steam to the pumps and discharging the mine water. A 400-gallon motor driven Alberger turbine pump and a 200 gallon Aldrich triplex electrical pump were installed in the Six Foot vein. 10,000 feet of 1/0 copper wire were installed to transmit power for the operation of these pumps.

Installed a 7-ton Morgan-Gardner electric locomotive and a 6-foot Morgan-Gardner coal cutting machine; also a 200 K. W. Westinghouse induction motor generator set in a fireproof building, 15 by 15 feet, transforming 440 volt alternating current to 250 volt direct current.

Installed a pair of 10 by 12 inch Flory engines to operate No. 2 slope, Top Ross vein.

Outside: Built a 12 by 12 foot brick addition to the transformer station to accommodate additional transformers; also a 12 by 12 by 18 foot brick building at the breaker for a transformer station to furnish power for the Six Foot slope.

Forty Fort Colliery.—Inside: Drove a 6 by 8 foot second opening and manway 105 feet from the Top Ross to the Bottom Ross vein, on an angle of 45 degrees. Installed a pair of 10 by 12 foot Flory engines on the rock slope to drop coal from the Top Ross vein to the Bottom Ross vein; also a pair of 14 by 18 foot Flory engines in the Six Foot vein to operate No. 2 slope in the Eleven Foot vein by running a rope down a borehole.

Outside: Built an addition 8 feet 6 inches by 52 feet to the boiler house and added one 500 H. P. Sterling boiler to the plant. Extensive breaker repairs and improvements were also made.

MT. LOOKOUT COAL COMPANY

Mt. Lookout Colliery.—Inside: Installed a 28-A Jeffrey 6 foot coal undercutting machine and constructed a fireproof air bridge in No. 9 slope.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Pettebone Colliery.—Inside: Completed sinking a rock slope from the Bennett vein to the Red Ash vein. The work of sinking a slope from the Cooper to the Red Ash vein, on the south side of No. 1 shaft, is underway. Preparations are being made for second openings by tunnels from the various seams cut by No. 12 slope from the Bennett vein to the Red Ash vein.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held in Pittston, April 22 and 23. The Board of Examiners was composed

CONDITION OF COLLIERIES

LEHIGH VALLEY COAL COMPANY

William A. Seneca, Stevens, Exeter, Westmoreland and Maltby Collieries.—Ventilation, drainage and condition as to safety, good.

FORTY FORT COAL COMPANY

Forty Fort and Harry E. Collieries.—Ventilation, drainage and condition as to safety, good.

KINGSTON COAL COMPANY

Kingston No. 4 Colliery.—Ventilation, drainage and conditions as to safety, good.

MOUNT LOOKOUT COAL COMPANY

Mount Lookout Colliery.—Ventilation, drainage and conditions as to safety, good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

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

HEALY COAL COMPANY

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

WHITE COAL COMPANY

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

IMPROVEMENTS

FORTY FORT COAL COMPANY

Harry E. Colliery.—The main shaft wooden cribbing has been fitted with an interior steel cribbing, from a point six feet below the lip of the shaft for a distance of 51 feet five inches below that point. The steel crib measures 21 feet 2 inches by 10 feet 9 inches, and is built up of 12 inch by 20.5 inch steel channels, set with the web against the wood crib and bolted through the flanges with $\frac{3}{4}$ bolts, spaced 2 feet apart. The buntons are each composed of 26 inch by 15 inch steel ship channels riveted back with $\frac{1}{4}$ inch space between. This space accommodates a vertical wall plate of $\frac{1}{4}$ inch by 12 inch steel at each end of each buntion. The crib is stiffened longitudinally by $\frac{1}{4}$ inch by 7 inch steel plates between the flanges of the 12 inch channels at every third course; these plates project into a groove in wood crib and anchor and steel firmly against any downward slip.

All inequalities in the old wood crib behind the steel work have been filled with blue stone concrete, well rammed.

The air shaft shas been relined the upper 26 feet by placing a new interior crib of 10 by 12 hemlock in position inside the original crib, and filling all voids, by removing decayed wood in old crib, with concrete and cement. The new crib measures 10 by 24 feet.

New buntons have been placed for a distance of 76 feet from the mouth of the shaft. The airway brattice has been entirely renewed from the bottom at the Red Ash vein to the top. It is doubled boarded with white pine, with ends bricked up against the rock.

Completed a 7 by 12 foot rock plane on a 25 degree pitch, a distance of 90 feet from the bottom to the Top Ross vein, to improve the haulage; also a 7 by 12 foot tunnel from Bottom Ross to Top Ross on Road 22, to develop the Top Ross vein in that locality.

Installed a Pennsylvania rock crusher, size W-6, which is operated by an 18 by 36 inch steam engine.

Forty Fort Colliery.—Completed a 7 by 12 foot rock plane driven from Road 8-A, Chamber 1, in the Bottom Ross vein, to Road 9, in the Top Ross vein, to further develop the Top Ross vein in that locality and also to improve the transportation.

KINGSTON COAL COMPANY

Kingston No. 4 Colliery.—In No. 1 shaft, a new overcast has been built in Orchard vein for ventilation, and a short tunnel completed from Cooper to Lance vein.

In No. 4 shaft, a new overcast was built in the Red Ash vein for ventilation, and a tunnel driven from Checker to Bennett vein.

Installed a 10 by 16 inch air engine at the bottom of Ross vein.

Outside: A bore hole was drilled from surface to Orchard vein for electric wires, removing latter from inside traveling way.

A new playground for children of employes was built in Pringle Borough.

At No. 4 shaft, a 25 foot Guibal steel fan, uniflow steam valve movement, was installed, and a concrete fan house built for same.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Pettebone Colliery.—In No. 20 tunnel, Five Foot vein, an electric hoist, equipped with a 75 HP motor, was installed.

Outside: Installed a new electric sub-station equipment; two 27-ton steam locomotives to haul coal from Nos. 3 and 4 shafts to the breaker. Extended electric power lines from Woodward mine to Pettebone. Extended power line from Nos. 1 and 2 shafts to Nos. 3 and 4 shafts. Also installed one electrically driven, 16 foot Sturtevant ventilating fan at Nos. 3 and 4 shafts.

Completed annex to breaker, new wash-house and brick and concrete oil and supply house.

Two rock pulverizers have been installed at the plant.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foreman and assistant mine foreman was held in Pittston on June 5 and 6. The Board of Examiners was composed of Samuel