

downcast and upcast shafts are 300 feet deep; the barometer indicated an atmospheric pressure of 29.4: the mean temperature in the downcast is given at 24° Fah., and 153° as the mean temperature in the upcast; the motive column or the difference in weight of air column in the shafts was 5.103; the amount of ventilation was 115,330 cubic feet per minute; and the horse power of the furnace (worked out as per formula of J. J. Atkinson and others) is 17.834 H. P.

If the gentlemen had gone a step further, and had calculated the percentage of power expended to overcome the friction and actually expended to produce the ventilation, in each of the foregoing experiments, they would have added much to their value. They will do so undoubtedly, and will not rest until they have completely mastered the subject of scientific ventilation in all its various phases.

FOREST CITY COLLIERY.

This colliery is located in Clifford township, Susquehanna county, and is therefore outside of my district. It consists of a drift, which is worked by the Hillside coal and iron company, for which Samuel Hines, Esq., Scranton, is agent. The other officials are: W. E. Colborn, general mine superintendent; David M'Donald, mine boss; and B. F. Storm, outside foreman. They employed 58 men and boys during the year 1876, and mined 13,508 tons of coal. A fatal accident occurred at this colliery on the 6th day of December, caused by a premature explosion of a blast. Thomas Donohue, the miner, and John Gilmartin, the laborer, were tamping a hole, when the powder exploded, killing Gilmartin instantly, and severely injuring Donohue. The accident was promptly reported to me by Mr. Hines, but I did not feel that I had any right to make an investigation because the colliery is not within my district.

what it is in the Pierce colliery. The coal will bear me out in what I say, and will establish its reputation in market beyond the possibility of evil-designing persons to do it an injury.

There is but one thing needed to make the Pierce mines a first-class colliery, and that is the erection of a good fan to ventilate it properly, and I trust that ere I shall be called upon to pen my next annual report, that the lessees, Messrs. Jones, Simpson & Co., will do this one thing needful.

Forest City Colliery.

The Forest City colliery is located in Susquehanna county, is owned by the Hillside Coal and Iron Company, and was added to the eastern district of Luzerne and Carbon counties, by an act of the Legislature at its last session. The colliery is a small concern, and consists of a drift driven to the crop of the coal through sand. The coal is very near the surface, and a great part of it is known as "rusty coal," and is therefore condemned as being unfit for the present fastidious market. The time will come, however, when this fastidiousness will pass away, and when anthracite will be a luxury, even though it may be a little "rusty." The extent of the area of coal in this locality has not been ascertained, but it is believed not to be very great. There is no breaker attached to the colliery, and all the machinery there is of any kind consists of screens driven by horse power, said screens being connected with chutes to deliver the coal into cars on the Jefferson branch of the Erie railroad.

The condition of the mines in regard to ventilation, when I first visited it was about as bad as it could well be, but it has been considerably improved since then. As I have stated elsewhere, an air shaft has been sunk and a furnace built, which has improved things considerably; but I protested against the putting in of a furnace, on the principle that money expended on furnaces in such shallow workings is money thrown away, but it seems the company has more money than it knows what to do with, and prefer to throw it away in this manner. As the works extend a little they will find that their furnace will have to be re-placed with a fan, as I have already informed them. The mine superintendent will learn after awhile that it is futile for him to contend against the unyielding and inflexible laws of nature, and he may, through experience gained at the expense of the company, learn something of the nature of these laws.

THE "MINE CLERK."

Much has been said in and out of the Legislature in relation to the office of "mine clerk." It seems to be the general impression that the "mine clerk" is a clerk to the "mine inspectors," and that as such, he attends to all the clerical work of the mine inspector's offices; that he keeps a complete record of all the inspector's acts, arranging all matter pertaining to accidents, relative to the condition of the mines and machinery, relative to the ventilation of the mines, and all other things appertaining to the

Total number of employés,	21,269
Tons of coal mined for each employé,	401
Total number of persons working in mines,	14,729
Tons of coal mined for each,	579
Total number of miners and laborers,	10,199
Number of tons of coal mined for each,	836
Ratio of employés per life lost,	373
Ratio of employés for each personal injury,	95

Respectfully submitted.

PATRICK BLEWITT,
Inspector of Mines.

Colliery Improvements During 1887.

Delaware, Lackawanna and Western Railroad Company.—This company reports but very few improvements during the year, except driving headings and airways to open up their different mines, so as to mine sufficient coal to supply the market.

Cayuga Shaft.—The company is sinking a new shaft about one mile north-east of the main shaft for a supply shaft and for the purpose of lowering and hoisting persons into and out of the mines.

Sloan Shaft.—Sunk a new slope in coal in mine; and are also building a new plane in mine.

Storr's Shaft.—Are sinking a new shaft for second opening and supply shaft.

Delaware and Hudson Canal Company have not reported any improvements during the year 1887, except the usual advancement of their workings to supply the coal demand and sinking the two shafts at Dixon mines from G or Big to Clark vein of coal.

A. Langdon & Co.—*Belmount Colliery* put in place three new boilers, erected a double elevator and built two new pockets in breaker.

Bridge Coal Company—*Bridge Shaft Mines.*—This company made second opening in new County vein, and are now finishing new foot for same.

Lackawanna Iron and Coal Company—*Capouse Shaft Mines.*—This company is driving a tunnel from rock to Diamond vein; size, 14x6 feet.

Dolph Coal Company—*Dolph Mine.*—This company is driving a rock tunnel.

Hillside Coal and Iron Company—*Forest City Mines.*—The shaft reported as being sunk 160 feet to bottom vein in last year's report (1886), has reached a depth of 199 feet. Suspension of work for some months accounts for it not being finished. Work is now going rapidly forward to completion.

face at shaft and roadbed of tunnel, at which point it is dumped and the coarse coal separated from the fine, the coarse coal to be shipped direct to market and the fine to Bunker Hill breaker. A 90 horse-power engine will be used for hoisting the coal. Three boilers are in place, each 36' long and 30" diameter for the present furnish sufficient steam for hoisting and for one No. 4 Knowls pump at bottom of shaft.

Yours, very respectfully,

JAMES YOUNG,
Mine Superintendent.

Capouse shaft, Lackawanna Iron and Coal Company.—Have constructed a new plane between G and Rock veins 369' long; sectional area equal 96 square feet and on an angle of 15°.

Pine Brook shaft.—Finished plane 1,500' long; sectional area, 6'x14', equal 84 square feet on a pitch of 15°.

Clifford shaft.—Finished one new plane 887' long; sectional area equal 72 square feet on an angle of 6°.

Forest City mines.—Finished a new slope 400' long; sectional area, 84 square feet on an angle of 9°.

Glenwood mines.—Constructed a slope 400' long; sectional area, 48 square feet on an angle of 14°.

Keystone tunnel.—Finished a new plane 1,100' long; sectional area equal 98 square feet on a pitch of 7°.

Elk Creek drifts.—Constructed a plane 80' long; sectional area, 5'x16', equal 80 square feet on an angle of 38°.

Eaton tunnel.—Extended slope 500 feet; sectional area, 6'x14', equal 84 square feet on a dip of 1 in 9.

Edgerton Coal Company is opening a new drift into bottom coal $1\frac{7}{8}$ miles north of Edgerton No. 2, close to where the old Hendricks breaker stood and on the same tract of land.

Dolph tunnel.—Finished plane No. 5, 525' long and on a pitch of 3°; also plane No. 6, 300' long on an angle of 3½°.

Grassy Island colliery.—Sunk second opening shaft from Grassy island to Clark vein, a depth of 157' feet; sectional area, 308 square feet; also new air shaft for drift workings and built a new furnace.

Jermyn No. 3 slope.—This colliery is located in Dickson City borough about 2,000' northwest of Jermyn shaft No. 4; it consists of a slope and breaker; the slope is sunk. From surface to first vein of coal is 600' and to second vein of coal 800'. It is connected with mine workings of Jermyn No. 4 and is ventilated at present by the fan at Jermyn No. 4. They are sinking a fan shaft northeast from mouth of slope; it is now down about 175'; they are also erecting a fan. The breaker is new and located 200' southeast of slope mouth; it has a capacity of 1,000 ton of coal per day and is furnished with all the modern improvements.

Lackawanna shaft.—Finished a plane 300' long; sectional area, 8'x18'

Clifford Colliery.—Finished one plane in mines.

Erie Colliery.—Graded planes on west side of shaft from Bengough's heading through old chambers to Gilhool's heading.

Shaft No. 2, Forest City.—Finished plane in mines.

Glenwood No. 1 Shaft.—This shaft has been sunk through the "Grassy Island" to what is known as the Carbondale top vein, 60' below the Grassy Island Vein. Permanent mining has not yet commenced.

Keystone Tunnel.—We are improving the breaker by enlarging it, also by putting in place one pair of rolls 26" x 22" and one pair 26" x 12", for the purpose of breaking coal down to small sizes. They will be in place January, 1891.

Elk Creek Mines.—Have sunk a shaft to third vein of coal.

Marshwood Mines.—Finished one inside plane

Ontario Mines.—Finished one inside plane 300' long.

Pancoast Mines.—Finished rock tunnel and proved good coal.

Richmond No. 3.—Shaft down to the "G" vein of coal, they have not commenced opening out the mines yet. A breaker is in course of construction. They have not commenced to open up any of the veins of coal yet.

MT. JESSUP COAL COMPANY, LIMITED,

WINTON, PA., *January 8, 1891.*

Mr. PATRICK BLEWITT, *Inspector of Mines, Scranton, Pa.:*

DEAR SIR: Herewith I hand you our yearly report for 1890.

Regarding explosion of boiler at our fan shaft on night of January 21, 1890, by which Michael J. Murley lost his life, I would respectfully refer you to the evidence at coroner's inquest, of which you doubtless have a copy, and also to the verdict of coroner's jury.

As to our improvements for the year, we have concentrated all of our boilers at the breaker and abandoned the old plant at fan shaft, having put in three (3) new steel boilers 30" diameter by 36' long, and two iron boilers 40" diameter by 35' long, all in first class condition. Steam is conducted through a new line of 5" gas pipe to our big pump, a distance of 2,000', and from thence through four and three inch branch lines to our hoisting engines and pumps and up the fan shaft to fan engine.

The total distance from boiler house to our lowest pump on underground slope is 3,900'. We made connection with the Olyphant Water Company's main by laying 2,500' of 2" gas pipe and have now a good supply of pure water.

We put in a line of perpendicular elevators in our breaker for hoisting screenings and pickings, also put in a set of small "pony" rolls for reducing pickings. Besides which, we have made other minor improvements on breaker.

Yours truly,

ELI T. CONNER, *Superintendent.*

Hillside Coal and Iron Company.

At Glenwood a new air shaft was sunk to the Archbald seam, a distance of 136 feet. Three new planes were also completed, the length of which are 425, 500 and 525 feet respectively.

At Erie a new air shaft was sunk, sectional area of which is 64 square feet, and a depth of 19 feet.

At Keystone a new tunnel was driven from the surface to the Archbald seam, a distance of 175 feet.

At Forest City a new air shaft was sunk, having an area of 144 square feet, and a depth of 180 feet. A new "Broadbent" fan was also erected at this place 25 feet in diameter, driven by an horizontal engine, cylinder 20"×36" directly connected to the fan shaft.

At Clifton a new plane 300 feet long, with a sectional area of 84 square feet, and a gradient of 15° has been completed.

Murray Carney and Brown.

A new plane 2,500 feet long with a grade of 6 feet to the 100 feet has been completed; they have also enlarged their breaker thereby increasing its capacity from 75 tons to 250 tons per day. Three new boilers have also been placed in position.

Pancoast Coal Company.

This company sunk its main shaft to the bottom split of "G" vein, a distance of 295 feet, area 10'×34'. It is intended to sink the main shaft to the same seam this year for a second opening.

Northwest Coal Company.

At Simpson slope a new fan 15 feet in diameter was erected to ventilate the coal slope workings, exhausting 75,350 cubic feet of air per minute, with a working speed of 70 revolutions per minute. It is run by an horizontal engine cylinder 12"×24".

Moosic Mt. Coal Company.

At Marshwood a new slope has been sunk a distance of 850 feet on a gradient of 10½ degrees, with an area of 72 square feet.

Elk Hill Coal and Iron Company.

At Richmond No. 3 a new air shaft, which was also a second opening, was sunk from the surface to the 14-foot vein, a distance of 155 feet. Sectional area 63 square feet.

This company is also sinking a new shaft and building a breaker in Fell township.

Mt. Jessup Coal Company, Limited.

At this company's colliery a new slope has been sunk through old workings to an abandoned levee opening up work in solid coal and pillars. Eight boilers were replaced by new ones.

Table Showing the Occupation and Percentage of Persons Killed and Injured while Following these Occupations During the Year 1893.

Occupation.	Killed or fatally injured.	Per cent.	Injured.	Per cent.	Total.	Per cent.
Miners,	18	35.3	35	36.45	53	36.0
Miners' laborers,	20	39.2	28	29.16	48	32.7
Runners,	2	3.9	3	3.12	5	3.4
Drivers,	3	5.9	18	18.80	21	14.3
Door boys,	2	3.9	3	3.12	5	3.4
Company laborers,	4	7.9	1	1.04	5	3.4
Foot men and head men,			5	5.20	5	3.4
Shaft sinkers,			1	1.04	1	0.7
Slate pickers,	2	3.9	2	2.07	4	2.7
Total,	51	100.0	96	100.0	147	100.0

IMPROVEMENTS MADE IN 1893.

Delaware and Hudson Canal Company.

At the Marvine shaft a new plane was made, 1,430 feet long, area 98 square feet, grade 8 degrees.

At No. 1 shaft, Carbondale, two new air shafts were sunk a distance of 20 feet, which greatly improved the air at the extreme end of the workings.

At Grassy Island a second opening was driven at the extreme end of the plane working from the "Grassy" vein to the surface; length, 275 feet; area, 84 square feet.

Hillside Coal and Iron Company.

At Glenwood three new planes were made, the length of which are 400, 600 and 600 feet, respectively; sectional area of each 84 square feet, on angles of 12, 18 and 19 degrees.

At Erie two new planes were completed, one 150 feet long, with an area of 112 square feet; the other has 98 feet area, and is 175 feet long, on a pitch of 14 degrees.

At Forest City, No. 2 shaft, a new plane, 600 feet long, 6 feet high and 14 feet wide was put in operation.

A new plane, 275 feet long, 14 feet wide and 6 feet high was also put in operation at the Clifford shaft.

of new hoisting engines, 22x30, have been erected, and 1½-inch ropes, with heavy shieves, placed in shaft. Two new carriages with pneumatic fans have also been placed in the shaft. A road has been graded and built from No. 1 shaft, in Grassy Island vein, a distance of 5,500 feet, to reach certain numbers of pillars from this vein.

At Edgerton, a road 5,250 feet long has been graded and built from what is known as the Edgerton drift to the coal upon the Pierce Coal Co. property. A tunnel is now being driven to reach coal in what is known as the Russell tract, and two planes are now being built to reach this coal.

At Lackawanna colliery eight jigs of the Reading pattern have been placed in the breaker.

Hillside Coal and Iron Company's Improvements.

A washery at Clifford breaker has been erected to wash fresh-mined culm, all sizes above birdseye having been taken out. It was started about May 1. The capacity is 300 tons a day.

Forced draft plant with Sturtevant blower, 7x4 feet, to increase the capacity of the Clifford boilers. The blower is capable of furnishing blast for 900 horse-power.

Savory's plane, on the Ontario tract, Clifford mine, 1,500 feet long, 7x14 feet in area, has been finished.

No. 6 plane, on the Ontario tract, Clifford mine, 600 feet long, 7x14 feet, in area.

One hundred horse-power electric hoist, west plane, No. 2 shaft, **Forest City**. This plane is 1,800 feet long. The hoist has a capacity of 500 loaded cars per day. There are four headings and two lifts. The hoist pulls the loaded cars out of the headings and draws up the empty cars.

A tunnel in No. 2 shaft, Forest City, from the upper split of the shaft vein to the lower split, 750 feet long, 7x10 feet in area. This tunnel is two-thirds completed.

A curved self-acting plane at Glenwood breaker. The plane is 990 feet long, 780 feet of which is in the Archbald seam, and 120 feet on the curve carrying the plane into the rock in an easterly direction toward the small seam above the Archbald, which was reached at a distance of 90 feet after the curve was made. The plane was projected in this way because of the pitch of the two seams. The curve has a radius of 50 feet, and the cars pass around it without difficulty, and I see no reason why it cannot be operated as easily as the ordinary straight line self-acting plane. It is 7x16 feet.

Remarks on Accidents.

A few brief notes on fatal accidents, made from actual observations by visiting, for the purpose of investigation, the scene of each one,

TABLE F—Nationalities of Persons Killed or Injured.

Nationalities.	Killed.	Injured.	Totals.
Pole,	6	24	30
American,	6	22	28
Irish,	5	17	22
English,	6	14	20
Welsh,	2	13	15
Slavs,	2	9	11
Italian,	3	6	9
Austrian,	2	4	6
Hungarian,	2	4	6
Russian,	4	1	5
German,	2	2	4
Scotch,		2	2
Totals,	40	118	158

Improvements at Collieries.

Delaware and Hudson Company's Improvements.

At Clinton a new air shaft 10x12 feet and 240 feet deep was sunk for ventilating purposes, and a new fan was installed to ventilate the East Side tunnel.

At Coal Brook a rock plane 300 feet long was driven from bottom to top vein, and an air shaft sunk. A new air compressor was installed and three new air motors added for haulage. A new drift was opened on East Mountain; and an air shaft sunk.

At Jermyn No. 1 a new 22-foot fan was installed, to replace the old one. A rock plane 600 feet long, driven to shorten transportation, and improve ventilation, was made.

Grassy Island.—The rock vein was opened and air connections made.

At Eddy Creek a slope was sunk from surface to rock vein to improve ventilation on Mills tract workings.

Hillside Coal and Iron Company.

A new breaker was built at Forest City to replace the old one, which was destroyed by fire in early part of the year.

The Price Pancoast Coal Company has sunk the main shaft to Dunmore veins; also, installed a new fan 35 feet in diameter.

The Johnson Coal Company has driven a 1,000-foot tunnel from prove ventilation on mills tract workings.

North End Coal Company

North End, ventilation fair, drainage fair.

Improvements

The Hillside Coal and Iron Company made the following improvements at their various collieries during the year.

Clifford Shaft.—One balance plane driven 6x14 feet, 498 feet long.

Extension of No. 8 plane on east side, 6x14 feet, 198 feet long.

Engine plane on west side, partly driven, 6x10 feet, 300 feet long.

Forest City Slope.—Have sunk an air shaft at the extreme south workings, 12x25 feet in depth; also a new slope to the New County vein (opened from surface) 8 feetx16feet, 250 feet long.

Forest City No. 2 shaft.—The present air shaft was continued from the Clark to the Bottom or Dunmore vein, a distance of 245 feet; size of shaft, 12 x 12 feet. The cribbing at the head was replaced at the same time with concrete.

They have also installed at their Forest City No. 2 shaft (one in the Clark Vein and one in the Bottom or Dunmore vein) two 6½ ton mine locomotives with cable reels attached. These motors are used in place of mules to bring the coal from the face to the passing branches, where the larger motors get the coal.

It has been the practice for years at this colliery, to use a small size locomotive, but being equipped with a trolley, they had found considerable difficulty with having to extend the trolley wires in the chambers as the places advanced, and also found it quite expensive. The later type of motors, with the reel attachments avoid the necessity of trolley wires being put up in the chambers, and are working very successfully. They are so well satisfied with it, and especially in laying out new workings, that they will endeavor to do without mule haulage altogether, as besides the other conveniences, the motors do not take up as much height as mules, and consequently they find they do not have to cut as much rock in a low vein as would otherwise be necessary.

They have also installed at No. 2 shaft one Jeansville Woodlined Compound Duplex Plunger Pump, size 18 and 28x10x18 inches, and at Clifford shaft a Scranton Steam Pump Company's Compound Duplex Plunger Pump, 18 and 28x10x18 inches; both of these throwing to the surface; and at Clifford shaft they have constructed a mule barn (inside) to accommodate about 50 mules.

Scranton Coal Company

At their Johnsons No. 1 shaft, Priceburg, a pair of Vulcan Hoisting engines 28x48 inches has been installed.

condition; while great attention is paid to production, equal attention is given to ventilation, and no expense or labor is spared in providing adequate ventilation and a healthy atmosphere for the employes.

On February 6, an explosion of fire-damp caused a mine fire in the Diamond vein workings of No 1 Shaft. Evan Gabriel, the Fire Boss, had noticed a squeeze in this vein, and held the men at the Fire Boss station until he made the second examination. On the second examination he invited William Jones, James and Edgar Weber and Albert Simms, to accompany him, all using naked lights. They walked up the rock plane, and had proceeded a short distance inside of a door when an explosion occurred, killing Gabriel, and injuring Jones so that he died in a few days.

The explosion set fire to the timbers, but it was impossible to reach it on account of the after-damp. They immediately set to work to conduct the air to the fire, and at the same time preparations were made to get a supply of hose and water.

The first day of the fire was extremely dangerous, as the true condition of the Big vein was not known, and also the danger of an accumulation of a large body of gas coming back to the fire and causing a second explosion.

Qualified men were sent in different sections, to examine and report conditions, when it was found to be safe to proceed and extinguish the fire which proved to be very extensive, but which was put out without any serious accident, owing largely to the skilful manner in which the work was conducted.

HILLSIDE COAL AND IRON COMPANY

Forest City Colliery.—The ventilation in the solid workings of this colliery is good, and has been much improved recently by placing doors in the chambers.

Robbing of pillars is an important part of the work at this colliery, and in some places it is decidedly difficult to maintain ventilation such as there is provided in the solid workings, but it is the best that can be expected.

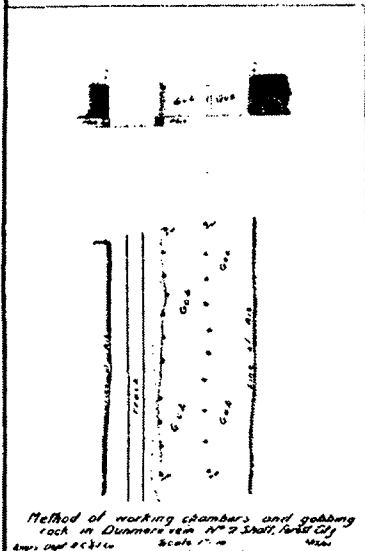
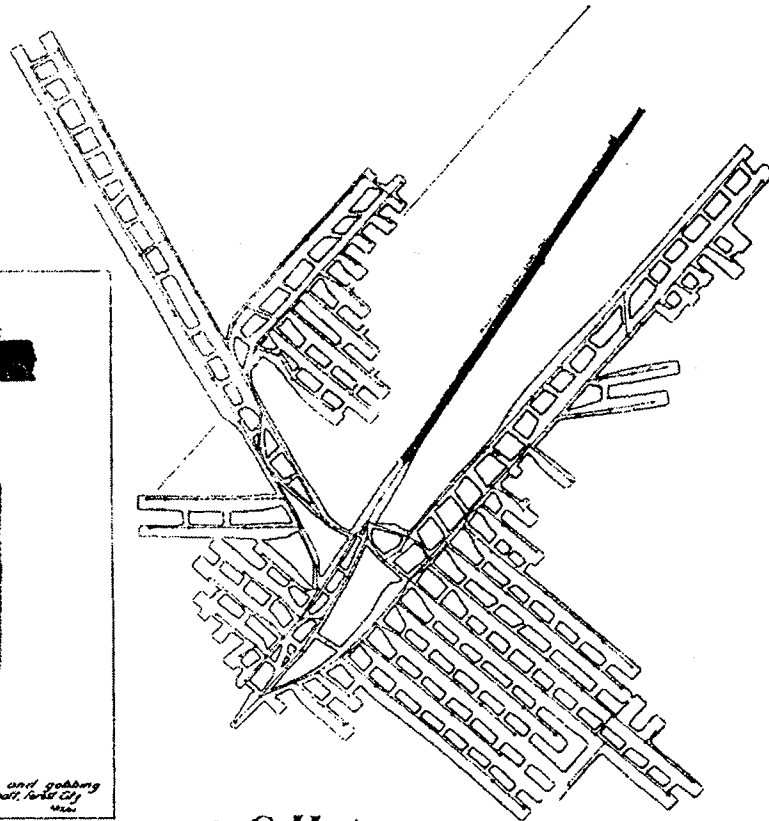
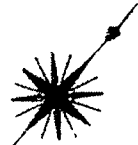
The success attending the robbing of pillars at this mine deserves more than passing notice, and for this reason, a plan of a certain portion of the workings and also showing their method of working them, is attached hereto.

Ninety-eight per cent. of the coal is taken out, and the output from one of the workings is wholly dependent upon robbing.

No delays are occasioned by caves, turning the road, building cogs, moving gobs, and several other delays that occur when robbing a territory of workings that have been unsystematically mined; the output at this place goes right ahead the same as though working in the solid.

'WARREN'

LOT



Method of working chambers and gobbing rock in Dunmore vein No. 2 Shaft, Forest City, Pa. Scale 1/2" = 10'

No. 2 SHAFT.

FOREST CITY, PA.

DUNMORE VEIN

Hillside Coal & Iron Co.

The improved haulage and equipment at this colliery, is in a condition second to none in the region.

HILLSIDE COAL AND IRON COMPANY

At Forest City colliery a 7x12 inch Quintuplex Electric plunger pump, equipped with a C. C. 90 H. P. motor, the pump having a capacity of 600 gallons per minute against a head of 450 feet, has been installed in the Red Ash vein at No. 2 shaft.

An additional 7½ ton electric motor, with cable reel attachment, has been added to the Red Ash vein; also a 7½ ton with cable and reel attachments, added to the equipment of the Clark vein.

Also at Forest City (outside) a very modern supply house, 35x50x18, has been constructed, with a fire-proof addition 18x21x18, used for an oil house.

The interior arrangement—equipment for handling oil by the use of pumps, manner of storing supplies, and method of keeping a record of the same—is indeed of great value to the colliery, and reflects credit on its designers.

At Clifford colliery a steam plane, 900 feet in length, area 7x12, has been driven up the west rise.

At Glenwood colliery a new cold air blast for the boiler plant, with fan and engine, has been installed, and a new 6" steam line from Glenwood boiler room to the pump shaft, a distance of 3,000 feet, has been erected, which will allow the shutting down of the boiler plant at the pump shaft the greater part of the year, when the pumping is not excessively heavy.

TEMPLE IRON COMPANY

At Northwest colliery a plane 417 feet long has been driven from the Clark to the New County vein.

Remarks

A review of the operations in this district for the year 1904, shows an unsatisfactory condition regarding accidents.

The high percentage of accidents caused by falls of roof, is no exception to records of former years. The attention of those interested, has been repeatedly called to the irregularities that cause this class of accidents, but a reduction can never be looked for until the employees see that it is better to observe and obey the law concerning the examination and securing of the roof of their working places than it is to disregard it.

There were 36 fatal accidents, 17 of the victims were English speaking persons, and 19 foreign speaking. From this it will be seen that the increase in the number of accidents in the mines is not wholly due to the "foreigner," as is very often asserted.

under the Lackawanna River to avoid dangers from flooding; a 30 inch pump hole, 130 feet deep drilled; a centrifugal slush pump, 36 inches in diameter, driven by single engine, 8 x 10 inches, installed.

Jermyn Colliery.—Brick boiler house addition, 54 x 70 feet, containing 4 Wickes boilers, 300 H. P. each, in course of construction; two 24 inch bore holes, 235 feet deep, drilled for pumping water to surface; two Scranton Compound Duplex pumps, 19 x 36 x 21 x 36 inches, capacity 5,000 gallons a minute, installed; new plane from Archbald vein to Grassy vein driven 350 feet; one six and one-half-ton motor with reels installed; an 8 inch bore hole, 120 feet deep, drilled for slushing purposes.

White Oak Colliery.—Two 10 inch bore holes drilled for exhaust steam and discharge from slope pump; one 19 inch bore hole drilled for pumping water to surface; one Scranton Plunger pump, 20 x 10 x 36 inches, capacity 800 gallons a minute, installed; one Allison Plunger pump, 20 x 10 x 24 inches, capacity 600 gallons a minute, installed.

HILLSIDE COAL AND IRON COMPANY

Forest City Colliery.—The old Forest City breaker washery was torn down and a new one, 68 feet wide, 100 feet 6 inches long and 130 feet 7 inches high, erected. The lower portion of this washery up to the machinery line, including the pockets, is of reinforced concrete. All mud coal, including chestnut, and all small sizes from buckwheat down, are prepared there, and ten double-compartment jigs are used in separating the impurities from the coal. Two additional boilers, 125 H. P., locomotive type, have been added to the Forest City breaker boiler room, and the water tunnel connecting the Clark vein workings at No. 2 shaft was completed by the Delaware and Hudson Company and connection made, which will drain the entire workings above that level. Clifford breaker was abandoned the latter part of the year and all the coal, including that from Clifford shaft, is now being prepared through the Forest City breaker and washery. A new Compound Duplex Plunger pump, 18 x 28 x 10 x 36 inches, has been installed in the dip workings in Clifford shaft to deliver water to the surface or to the new washery, as needed.

ARCHBALD COAL COMPANY

Tappans Colliery.—The coal from this colliery heretofore was delivered into the Delaware and Hudson railroad cars on a siding at Archbald, after being hauled in wagons a distance of one and a quarter miles. To eliminate this expense a new track has been laid, 6,600 feet in length, with 40 pound 'T' iron rails, from the breaker to the top of an incline plane. A new incline has been built, 1,750 feet in length, with 40 pound iron; new coal pockets have been built at bottom of new plane where coal is dumped from special cars, built for the use of the colliery, and taken to and from the breaker by a new twenty-ton locomotive. A branch of the Delaware and Hudson Railroad is built from the main line nearly midway between Archbald and Winton to the new coal pockets. This is a decided improvement and reduces the cost of transportation from the colliery to the railroad, and will also be the means of increasing the output of the colliery. The old Pierce Coal Company's shaft has been reopened

locomotive to dispense with the dumping of coal at the chutes and transportation by means of large cars. A pump shaft was sunk 80 feet to the Top split of the Clark vein, where a single Goyne pump 22x16x36 inches was installed at the foot.

Jermyn Colliery.—A rock plane 700 feet in length was completed from the Archbald to the Grassy vein. To improve transportation on the inside, a 6-ton electric motor was installed. New hoisting engines with double drums of the Flory type, size 14x20 inches, were placed in the Archbald vein haulage extension and Grassy vein plane. *Outside.* A plane for rock dump was built, operated by a 25 horse power electric motor. To drain the upper veins of the West side workings, a concrete culvert 300 feet long, and an open ditch 350 feet in length were built. A new electric power house, 36x50 feet, was built of brick.

White Oak Colliery.—From the Archbald vein No. 6 tunnel a second opening or tunnel 250 feet long, 7 feet high and 12 feet wide, was driven to the surface, and a new return was driven for the installation of a fan. The rope haulage at the head of No. 8 plane, Dunmore vein, was extended 2,500 feet.

HILLSIDE COAL AND IRON COMPANY

Forest City Colliery.—A rock tunnel was driven 7 by 10 feet in section and 275 feet in length, to serve for a second opening for the "Ring" vein. A new 16-inch bore-hole was put down a depth of 225 feet, located 540 feet east of the shaft, and a 12-inch casing pipe inserted, to get rid of the excess water from the 2nd and 3rd Dunmore veins in rainy seasons. The same kind and size of bore-hole was put down near the Forest City Washery to supply the washery with water from the mine. One new 7½ ton cable reel electric motor was installed for the purpose of increasing the output.

The fan and air shaft at No. 2 Shaft are undergoing extensive repairs which have not yet been completed. A new concrete locomotive house was built, size 45 feet 2 inches x 57 feet 3 inches.

Erie Colliery.—The colliery has been shut down since August on account of extensive repairs to the breaker. The result will be better preparation and a larger output. New shaking screens and patent pickers are being added.

The shaft was overhauled, new buntings and guides placed, also new carriages installed. The East side fan was remodeled and rebuilt entirely on the old foundation.

Glenwood Colliery.—The breaker was abandoned May 3, 1909, and has been torn down, with the exception of the North wing, which will be used for a washery. The coal from the Glenwood mine will be transported underground to the Erie shaft and hoisted to the Erie breaker, where it will be prepared.

HUMBERT COAL COMPANY

Sunnyside Colliery.—Two new drifts were opened to the Dunmore vein. A new breaker is in course of erection, with a capacity of 800 tons per day, to replace the one destroyed by fire July 3, 1909. A new boiler plant has been erected of concrete 120 feet from new breaker.

HILLSIDE COAL AND IRON COMPANY

Forest City Colliery.—A new brick hose house has been built for a meeting place for the officials of the company and First Aid Society, size 52 by 32 feet. A brick supply house has been erected. A new engine house has been built and a pair of engines for operating Clark vein slope installed; also a pair of 14 by 30 inch cylinder engines erected near head of rock slope, Clifford shaft. These engines will be used to operate a new steam plane recently completed in Bottom Dunmore vein, east side, and also to drop the coal from the first Dunmore vein to the Bottom Dunmore vein by way of rock slope. The fan house, air duct, etc., at Clifford shaft have been improved, resulting in improved ventilation. The fan previously ventilating the Clark vein, No. 2 shaft was connected to the Dunmore vein, alone, improving the ventilation. The fan formerly ventilating the Forest City slope is connected to the Clark vein, which is an improvement. Two batteries of return tubular boilers, 600 horse power, installed at No. 2 shaft boiler plant and housed by a corrugated iron building. A rock slope has been driven from the top to bottom split Clark vein No. 2 shaft, and an electric hoist installed, to eliminate a heavy grade on haulage road and relieve a section of pillars. A new motor road to a point near foot of Clifford shaft has been graded and completed. The purpose is to take all the Clifford shaft coal to foot of No. 2 shaft.

Erie Colliery.—The extensive repairs to the breaker begun in 1909 were completed and operations resumed February 16, 1910. The two shafts at the Glenwood that had been abandoned were filled with rock and culm to protect the workings from danger from the Lackawanna river at this point. A number of air bridges and walls have been built with a view of improving the ventilation, which was badly needed.

I expect that in the near future, the collieries of the Hillside Coal and Iron Company, which have been in a condition far from satisfactory relative to ventilation, will be among the best ventilated mines in the district, and credit will then be given the officials who are endeavoring to bring this change about.

CONDITION OF COLLIERIES

HILLSIDE COAL AND IRON COMPANY

Forest City.—Ventilation, drainage and condition as to safety, good.

HUDSON COAL COMPANY

Clinton.—Ventilation, drainage and condition as to safety, good.

CONNELL ANTHRACITE MINING COMPANY

Connell.—Ventilation, drainage and condition as to safety, good.

NORTHERN ANTHRACITE COAL COMPANY

Murray.—Ventilation, drainage and condition as to safety, good.

O'BOYLE-FOY ANTHRACITE COAL COMPANY

O'Boyle-Foy.—Ventilation, drainage and condition as to safety, good.

RANDALL AND SCHAAD BROTHERS ANTHRACITE COAL CO., LTD.

Randall and Schaad.—Ventilation, drainage and condition as to safety, good.

CLINTON FALLS COAL COMPANY

Clinton Falls.—Ventilation, drainage and condition as to safety, fair.

STILLWATER COAL COMPANY

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

IMPROVEMENTS

HILLSIDE COAL AND IRON COMPANY

Forest City Colliery.—A new washery has been erected near the former location of the Clifford breaker, in order to prepare the coal in the Clifford culm dump.

Two batteries of return tubular boilers, 600 H. P., have been installed in No. 2 shaft fireroom. The old boiler house has been replaced by a new and more up-to-date corrugated iron building.

A pair of first-motion engines, 22 by 36 inches, installed on the surface near No. 2 shaft for operating the Dunmore slope, to replace a smaller pair of second-motion engines. A corrugated iron building surrounds these engines.

A new slope has been started on the Gray tract about one and one-half miles below Forest City Colliery. This will open up the second and third Dunmore vein in this territory and will be operated by a pair of first-motion engines located at the head of Oak street, Vandling. These engines have been installed and a corrugated iron house completed. A concrete subway has also been constructed accommodating two tracks underneath Oak street from a point about 150 feet above Main street to a point about 75 feet below Clinton street, or a total of about 600 feet.

Bottom Dunmore Vein.—A new motor road from the foot of Clifford shaft to the foot of Dunmore slope has been completed; Clifford shaft has been abandoned as a hoisting way and hereafter all the coal will be transported to the foot of Dunmore slope by motor and hoisted to the surface by way of No. 2 shaft.

A rock tunnel has been driven in a southerly direction through a fault south of the Dunmore slope, which will develop the 3rd Dunmore vein beyond the fault.

HUDSON COAL COMPANY

Clinton Colliery.—Inside: New haulage road driven about 2,000 feet and is in operation.

Outside: A washery, 62 by 80 feet, has been built and is nearly ready for operation. Two and one-half miles of poles and wiring completed for electrifying the colliery.

Twelve-inch pump hole 400 feet deep to Clifford vein.

NORTHERN ANTHRACITE COAL COMPANY

Murray.—Installed a 24-inch cast iron column pipe in air shaft, through which to pump mine water to the surface.

Also installed two piston pumps, capable of discharging 1,200 gallons per minute to the surface, with a piston travel of 137 strokes per minute.

Replaced 25 feet of old cribbing on the air shaft with new timber and backed it with a concrete wall 2 feet thick. All wooden buildings in the mine are also being replaced with concrete buildings.

IMPROVEMENTS

HILLSIDE COAL AND IRON COMPANY

Forest City Colliery.—Two additional locomotive boilers were added to the breaker fire room. At the Gray slope a wash house, oil house and powder house were completed. An electric air compressor was added to the equipment. A hospital was built inside, a bore hole 10 inches in diameter was drilled from the surface to the bottom vein for pumping purposes. At No. 2 shaft a pair of first motion engines was installed and coal is now being hoisted from the Dunmore vein to the surface. The shaft was cribbed with concrete from the surface to the rock. Also installed a new centrifugal pump, electrically driven, having a capacity of 1,000 gallons per minute.

SACANDAGA COAL COMPANY

Sacandaga No. 1 Colliery.—New pockets on breaker, with capacity of 300 tons, were installed, and a new office and supply house completed. A rock tunnel slope was sunk to the Bottom Dunmore vein, and an air shaft sunk to Top Dunmore vein. An air shaft was also sunk to the Bottom Dunmore vein. An outside plane 1,600 feet long, connecting with two miles of railroad to the new No. 2 colliery, was completed.

Sacandaga No. 2 Colliery.—Completed balance plane 400 feet. Drove a number of openings and started to open up the water level gangway across the foot of the property, which will probably extend 4,000 feet. Completed a new concrete powder magazine according to DuPont specifications, a new barn, and a large sized shifting shanty for the company men.

CLINTON FALLS COAL COMPANY

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

WACHNA-TAYLOR ANTHRACITE COAL COMPANY

Wachna-Taylor Colliery.—Ventilation and drainage, fair. Condition as to safety, good.

IMPROVEMENTS

HILLSIDE COAL AND IRON COMPANY

Forest City Colliery.—Inside: At Gray's slope, completed a motor barn, pump room and mine foremen's office of fireproof construction, and installed a 1000-gallon centrifugal pump, which delivers water direct to the surface. A dam was erected near Gray's slope to supply an air compressor with water.

At No. 2 shaft, a hospital of fireproof construction was built near the foot of the shaft. Installed a 6-stage 2000-gallon centrifugal pump.

Outside: At Clifford Shaft, completed a frame building, covered on the outside with sheet iron, and installed a 20-foot ventilating fan and fan engine to take the place of building and equipment destroyed by fire during the early part of the year.

Laid an 8-inch steam line from Forest City boiler rooms to Clifford, a distance of 4,000 feet, for the purpose of doing away with Clifford boiler plant.

A shaft 10 feet by 10 feet and 105 feet deep was sunk from the surface to the Dunmore vein, for a second opening and air shaft.

LACKAWANNA COAL COMPANY, LIMITED

Lackawanna Colliery.—Completed a 7 by 14 foot rock plane, on a 15 degree pitch, from Clark vein to Dunmore vein, a distance of 490 feet; a 7 by 10 foot airway from Clark vein to New County vein, on a 45 degree pitch, 165 feet in length. The tunnel from the surface to the Dunmore vein, above the mountain fault, which was abandoned several years ago, has been reopened for the purpose of mining the coal on the Delaware and Hudson Stevens farm tract, above the mountain fault.

Installed two 250 H. P. Maxim boilers, and an additional 220 inch fan blower, also a 16 by 10 by 18 inch duplex boiler feed pump.

The old boiler house has been torn down, and a fireproof building of steel frame, with asbestos protected corrugated steel roof and siding, has been erected in its place.