

lars from 10 to 15 feet wide to sustain the roof, and cross-entrances 60 feet apart for the purpose of ventilation; the roof is good rock; the mines are in a good working condition.

Ventilation is produced by furnaces; the intake is located at the mouth of the tunnels; area 75 feet; the outcasts are located in furnace air shafts; area 60 feet; the main doors are hung so as to close of their own accord; they have attendants at main doors: the amount of ventilation has been measured and reported; ventilation is good.

Machinery.—They use one breaker engine of 35-horse power and two hoisting engines on the planes outside of 45-horse power each; the boilers have been cleaned and examined and reported in good condition; they have a steam-gauge to indicate the pressure of steam; the breaker machinery is boxed and fenced off so that operatives are safe; they require no machinery around the tunnels.

Remarks.—They have furnished a map of the mines; the furnace air shaft can be used as a second opening; they have a house for men to wash and change in; the mining boss seems to be a practical and competent man; there are no boys working in the mines under twelve years of age; the engineers seem to be experienced, competent and sober men; the parties having charge know their duty in case of death or serious accident.

OAK HILL COLLIERY.

This colliery is located in Lackawanna township, and situated on the east bank of the Lackawanna river, on the Lehigh and Susquehanna division of the Central railroad of New Jersey; it is operated by the Glenwood coal company. Geo. Filer is general mine superintendent, Timothy Parfery is mining boss and David Stearns is outside foreman.

Description.—The opening to the coal consists of three tunnels, namely, Nos. 1, 2 and 3; there is a breaker connected with these mines; they mine and prepare 200 tons of coal per day; they employ 30 miners, 25 laborers, 6 drivers, 4 door-boys and 4 company men in the mines; 25 slate pickers, 4 head and plate men, 4 drivers, 8 company men, 4 mechanics and 2 bosses outside; in all 111 men and boys; they are working the old vein; average thickness six feet; they work headings and air-ways 15 and chambers 25 feet wide; they leave pillars from 10 to 12 feet wide to sustain the roof, and cross-entrances sixty feet apart for the purpose of ventilation; the roof is good rock; the mines are in a good working condition.

Ventilation is produced by means of furnaces; the intake is located at mouth of tunnels, area from 50 to 60 feet; the outcast is located in furnace air shaft, area 75 feet; the amount of pure air is 13,200 cubic feet per minute; the main doors are hung so as to close of their own accord; they have attendants at the main doors; the air is circulated to the face of the workings in one volume in each tunnel; the amount of ventilation has been measured and reported. ventilation is good.

Machinery.—They use one steam engine at the breaker of 25-horse power; the boilers have been cleaned and examined and reported in good condition; they have a steam-gauge to indicate the pressure of steam; the breaker machinery is boxed and fenced off so that operatives are safe; they require no machinery around the tunnels.

Remarks.—They have furnished a map of the mines; they have a second opening; they have a house for men to wash and change in; there is some standing water in the mine; the mining boss seems to be a practical and competent man; there are no boys working in the mine under twelve years of age; the engineer seems to be an experienced, competent and sober man; the parties having charge know their duty in case of death or serious accident.

CARBON HILL COLLIERY.

This colliery is located in Old Forge township, and situated on the west bank of the Lackawanna river, on the Lackawanna and Bloomsburg railroad; it was operated by the Glenwood coal company, now in bankruptcy. George Filer is

general mine superintendent, Edward Jones is mining boss and A. Wisenflew is outside foreman.

Description.—The opening to the coal consists of 2 shafts and a tunnel; one of the shafts caved in about 2 years ago, and is now used as a pump shaft; there is a breaker connected with these mines; they mine and prepare about 250 tons of coal per day; they employ 40 miners, 40 laborers, 5 drivers, 3 door-boys and 5 company men in the mines; 25 slate pickers, 4 head and plate men, 3 drivers, 2 company men, 3 mechanics and 2 bosses outside—in all 132 men and boys. They are working the Carbon Hill vein of coal; average thickness, 6 feet; they work headings 15, air-ways 15 and chambers from 25 to 27 feet wide; they leave pillars from 8 to 15 feet wide to sustain the roof; they leave cross-entrances 60 feet apart for the purpose of ventilation; the roof is rock; the mines are in a good working condition.

Ventilation in the shaft is produced by a steam jet, and in the tunnel by a furnace; the intake for the shaft is in main shaft, area 100, and the upcast is in main shaft, area 60 feet; the intake for tunnel is at mouth of tunnel, area, 50 feet, and the outcast is in furnace air shaft, area 60 feet; there is some noxious gas evolved in the shaft; the mines are examined every morning before men go to work, and every evening to see that the main doors are closed; the main doors are hung to close of their own accord; they have attendants at main doors; the air is circulated to the face of the workings in the shaft in one volume; the amount of pure air in the shaft is 4,000, and in the tunnel 5,000 cubic feet per minute; the amount of ventilation has been measured and reported; ventilation is good.

Machinery.—They use one breaker engine, 25-horse power; 2 hoisting engines, 45-horse power each, and 1 pumping engine, 60-horse power; they have a safety carriage, with all the modern improvements; they have an adequate brake, and flanges of sufficient strength and dimensions for safety attached to the hoisting drum; the boilers have been cleaned and examined and reported in good condition; they have a steam gauge to indicate the pressure of steam; the breaker machinery is boxed and fenced off so that operatives are safe.

Remarks.—They have furnished maps of mines; they have no second opening for the shaft yet, but they have for the tunnel; they have a house for men to wash and change in; there is some standing water in the old shaft workings; the mining boss seems to be a practical and competent man; he has a fire-boss to assist him; there are no boys working in the mines under 12 years of age; the engineers seem to be experienced, competent and sober men; they do not allow any persons to ride on loaded carriages in the shaft; they do not allow over 10 persons to ride on the safety carriage at one time; the parties having charge know their duty in case of death or serious accident; the tunnel workings is a different vein of coal from the vein that they are working in the shaft; the shaft landings are protected by safety gates.

ELLIOTT, KEORNER & Co.'s NEW COLLIERY.

This colliery is located in Old Forge township, and situated one mile and a half north-west of the Lackawanna river; the opening to the coal consists of a shaft and slope; the shaft is 85 feet deep to the first workable vein; the opening is 10 feet by 45 feet; the slope is located 1,500 feet south-west of the shaft in progress of sinking; they employ 48 men and boys in and around the works.

PYNE COLLIERY.

This colliery is located in Lackawanna township, and situated about 2 miles north-west of the Lackawanna river; this is a new colliery, owned by the Delaware, Lackawanna and Western railroad company; the opening consists of a shaft and slope; they are also building a new breaker; in the slope they employ 12 sinkers and 4 mechanics. S. D. Kingsley, Esq., has charge of building all the new breakers and keeping them in repairs for this company; he employs about 16 carpenters; John M'Andrews has about 15 masons, and the company has about 12 company men; in all 59 men.

and No. 2 drifts, Lackawanna township, and **Carbon Hill** slope, Old Forge township, were abandoned by the Glenwood coal company, in September, 1876, on account of the poor quality of the coal.

EXPERIMENTS ON FANS AND FURNACE.

I have not had time to experiment but little on account of multiplicity of other duties ; but Benjamin Hughes, Esq., general mine superintendent for the Delaware, Lackawanna and Western railroad company, together with Thomas D. Davies, Esq., his assistant, and others, have made some very interesting tests on fan and furnace ventilation, which are too good to pass by unnoticed. One of the tests was made with the water-gauge on the fan at Pyne shaft. The fan is 12 ft. diameter, 4 ft. face and has two circular inlets 6 ft. each, and was run at two and a-half revolutions to engine's one. The area, where the velocity of the air was taken, is 105 ft. From the tests made, we have the following table :

Tests made on Fan at Pyne Shaft, Lackawanna Township, Pa.

Revolutions of engine.	Revolutions of fan.	Velocity of the air per minute.	Water-gauge.	Amount of ventilation in cubic feet per minute.	Amount of air exhausted per revolution of the fan.	Horse power.
40	100	760	.6	79,800	798	7.5
45	112½	835	.8	87,675	779	11.0
50	125	950	.9	99,750	798	14.1
55	137½	1,016	1.0	106,680	776	16.8
60	150	1,108	1.1	116,340	775	20.1
68	170	1,255	1.2	131,775	775	24.9

After the above tests were completed the doors at the head of the shaft and slope were thrown open, making two inlets; the fan was run at the speed of the last test, and gave 141,750 cubic feet per minute. This is an exceedingly favorable showing, and if all our mine managers would devote part of their time in testing their ventilators in this manner they would be richly rewarded in the valuable information and experience gained, which must result in great good to themselves, to their employers and to the miners.

Another series of tests were made on the fan at Taylor shaft, Lackawanna township. The dimensions of this fan are as follows: Diameter, 14 ft.; face, 4½ ft.; area of section where the ventilation was measured, 92 ft.; and fan running two revolutions to engine's one. In this case we have the following table:

Tests made on Fan at Taylor Shaft, Lackawanna Township, Pa.

Revolutions of engine.	Revolutions of fan.	Velocity of the air per minute.	Water-gauge.	Amount of ventilation in cubic feet per minute.	Amount of air exhausted per revolution of the fan.	Horse power.
40	80	725	.4	66,700	833.75	4.20
45	90	775	.6	71,300	792.02	6.74
50	100	862	.8	79,304	793.	9.99
55	110	917	.85	84,364	766.94	11.29
60	120	1,012	1.1	93,104	775.86	16.14
70	140	1,175	1.4	108,100	772.14	23.84

The result of the test made on the power of the furnace at the Dodge shaft, Lackawanna township, by the same gentlemen, is equally creditable to them as the above. The furnace is a double one, with grate surface of 48 square feet for each, or a combined surface area of 96 square feet; the

diameter by three and a half feet face. Everything about this colliery is first-class.

Hillside Shaft.

A plane has been extended six hundred and fifty feet long and a slope three hundred feet.

Spring Brook Mines.

A self-acting plane six hundred and fifty feet long is in course of construction, and a slope three hundred and fifty feet long finished.

Pennsylvania Coal Company.

Are sinking a new shaft at Lackawanna, Old Forge township. It is down forty-five feet below the surface. They are also pumping out the water in the **Carbon Hill** shaft, preparatory to working the coal out of that property.

Dunn Colliery.

Is a new one, located in Old Forge township, about one thousand five hundred feet south of the *Sibley shaft*. It is owned by the Pennsylvania Anthracite Coal Company. There is a slope sunk to the coal, and are now sinking a shaft, which is down about fifty feet. There is also a new breaker in course of construction. Capacity, about six hundred tons per day.

Greenwood Colliery.

Shaft No. 1 is now down to the coal, and they are driving towards second opening. They have erected a new boiler, engine, and head house, and put in place new boilers and machinery. They have also built a new fan, fourteen feet diameter by four feet face.

National Mines.

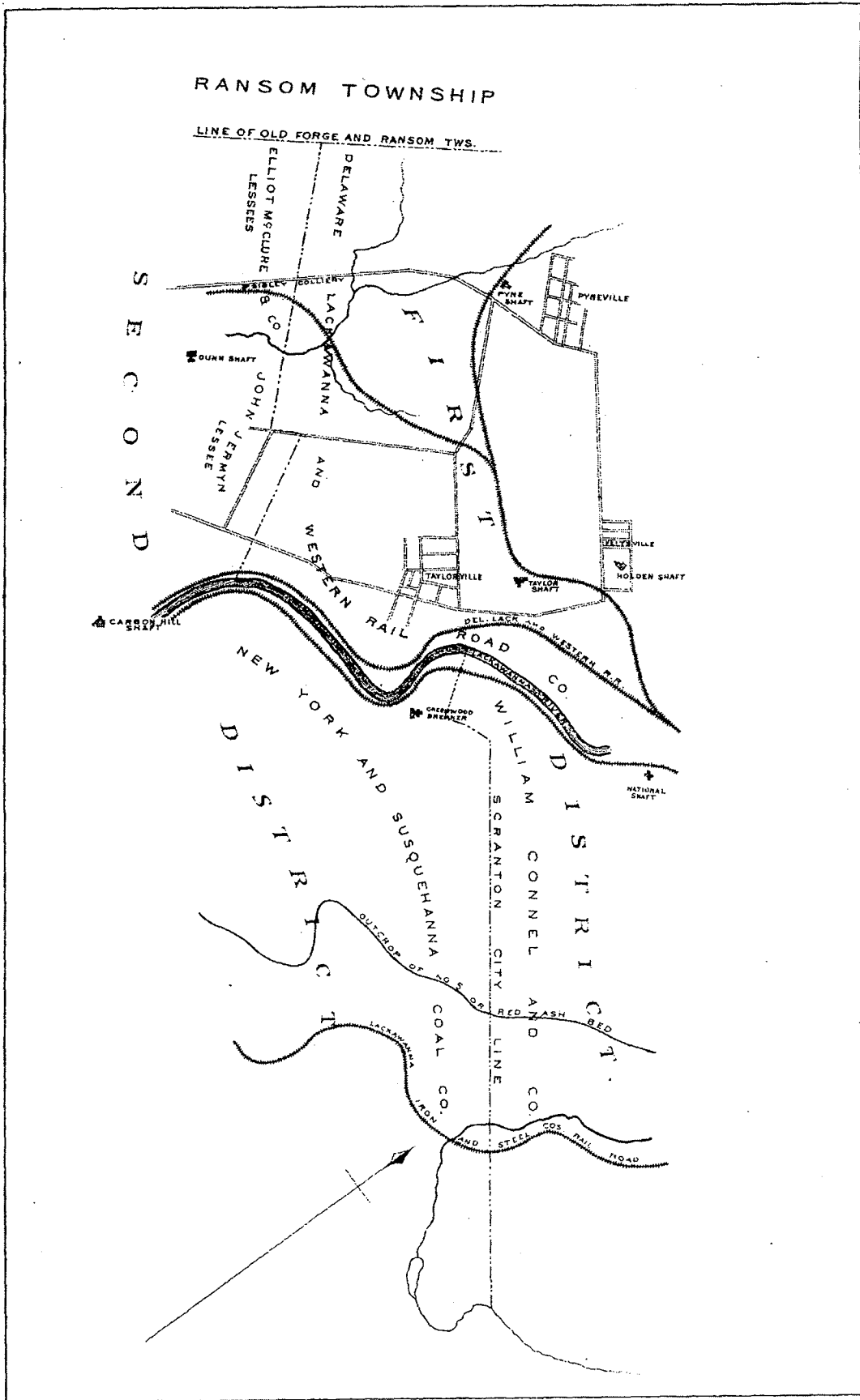
The shaft has been finished and sunk to No. 5 seam of coal, which the company commenced in 1881. The second opening is not complete yet.

Pine Brook Shaft.

The second opening and air-shaft, fourteen feet circular, that was commenced in 1881, has been finished, and the company have erected over it a double or two fans on one shaft. They are seventeen and a half feet in diameter by four feet face. These fans are fastened on the same shaft, about eight feet apart. They are the first of this pattern erected in this district, and they give a larger volume of air than any others in it. The style and drawings of this fan are fully described in Mr. G. M. Williams' report of last year, page 148 to 151.

Lucas Shaft.

This is a new shaft, located at Green Ridge, city of Scranton—is owned and operated by the Lucas Coal Company, Limited. They are now working the G or big seam of coal. The shaft is 10×30 feet; depth one hundred and fifty feet to coal. The breaker is one of the largest in the val-



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