

but that, as I have already shown, is no defence. In the three collieries first named they have relied entirely through all these long years on natural ventilation for a supply of air for their workmen. They have done literally nothing to assist nature to do the work, and as the workings extend from year to year the ventilation gets worse and worse.

Soon after I entered upon the duties of my office, I gave No. 3 shaft, Carbondale, my particular attention; and after making a thorough examination of the workings I immediately called the attention of A. H. Vandling, Esq., general agent for the company, to the condition of the colliery, and in reply to my communication Mr. Vandling assured me that the matter would be attended to immediately. His note is couched in the following words:

"Noting your favor of the 4th inst. (December, 1876,) concerning ventilation in our Carbondale mines—the results of your examinations and conclusions are surprising, for the reason that I was not previously aware of such deficiency or sufficient cause for complaint. The matter will have our due and immediate attention."

I am happy to state that improvements were projected immediately after this correspondence, which, when perfected, will remove all cause for complaint, and will put those collieries on an equality, regarding ventilation, with the best ventilated collieries in the district. An air-shaft is to be sunk for No. 3 shaft, and a fan is to be placed there; and I expect this will be followed with another fan for No. 1 shaft, and another for the Coal Brook colliery in place of the miserable little furnaces they now have there at the bottom of very shallow shafts, and hence almost worthless. I feel under great obligation to A. H. Vandling, Esq., general superintendent, for his prompt co-operation and manly course in relation to my efforts to enforce the mine ventilation law; and I am certain that the miners at Carbondale, before another year ends, will have cause to bless him for his prompt action in the premises.

#### MISCELLANEOUS COMPANIES AND OPERATORS.

The collieries of the smaller companies, in regard to ventilation, may be divided into three classes—the first class having good and satisfactory ventilation, the second class having middling, and the third class having poor and very unsatisfactory ventilation. The first class consists of the following collieries: Roaring Brook colliery, Dunmore; Jermyn's shaft, Green Ridge; Mt. Pleasant slope, Hyde Park; Pine Brook shaft, Scranton; Green Ridge slope, Dunmore; Capouse shaft, Hyde Park; and Meadow Brook collieries, Scranton. The second class consists of the following: Erie shaft, Carbondale township; Phoenix shaft, Ravine shaft, Twin shaft, Seneca slope, and Butler shaft, Pittston; Hillside colliery, Pleasant Valley; **Filer & Livey's collieries, Winton**; Greenwood colliery, Lackawanna township; Columbia colliery, and Beaver mines, Pittston. The following make up the third class: Sibley shaft, Old Forge township; Everhart colliery, Jenkins township; Jermyn's slope and shaft, Jermyn; Park coal company's slope, Hyde Park; Fair Lawn slope, Scranton; Jones & Simpson's colliery, Archbald; and Tompkins shaft, Pittston. All are graded, as regards merit, in the order in which they are named in each class. The collieries which are not named in the above classification, I as yet knew comparatively nothing about. I have suggested important improvements in many of the collieries in the third class, and the owners and agents have shown a ready disposition to act on the suggestions given. Some of them, it is true, complain of the hard times and consequent lack of funds to provide themselves with the necessary mechanical power to properly ventilate their mines, but all admit that the improvements demanded are sorely needed. I deeply sym-

11 MINE R.P.

angle of inclination is  $9^{\circ} 35'$ . The slope was driven part of the way through coal, at a cost of \$364, but there were  $28\frac{3}{4}$  yards of rock to cut, from nought up to eight feet, which cost \$283 33, and 77 yards driven through sandstone, which cost \$3,080. The whole cost for sinking the slope was only \$3,952 33. They have a pair of engines, 13-inch cylinder and 18-inch stroke; estimated horse power, 50; the size of their drum is six feet diameter, which has an approved brake attached to it. There is no second opening to the slope, but they are driving for one toward No. 1 drift, and expect to make a connection soon.

#### OTHER NEW OPENINGS AND CONNECTIONS.

The Delaware, Lackawanna and Western railroad company have made connections between the Hampton shaft and the Oxford shaft, at Hyde Park, and between Tripp's slope and the Brisbin shaft, in the Third ward, Scranton. They have also sunk an air shaft, at Hyde Park, into the workings of the Oxford shaft, and connects also with the Hampton shaft workings. A fan is to be placed at this air shaft which will assist in ventilating both collieries named.

The Pennsylvania coal company have completed a new slope at No. 1 tunnel, in Pittston township, which is intended for hoisting coal. They have also made a second opening for No. 4 slope, in Jenkins township, which is to be used also for ventilation; and the workings of old No. 10 shaft in the 14-foot seam, have been connected with the new No. 10 shaft, in Pittston. No. 2 shaft, Dunmore, was sunk to the lower seam.

The Delaware and Hudson canal company have made a connection, in the 14-foot seam, between Marvine and Leggetts Creek shafts, Providence; and at No. 1 shaft, Carbondale, an air shaft has been sunk, and two more air shafts at No. 3 shaft, and still another at the Coal Brook colliery. These air shafts are only poor-make shifts, unless mechanical means are used to produce ventilation. There are too many of them in Carbondale. What is needed there is a system of air courses inside of the collieries.

At the **Filer colliery**, Winton, a drift has been driven from a ravine into the workings, for a traveling way for the men to go to and from their work. A new drift has been opened at the Greenwood colliery for mining coal, and the same company have made an additional opening for coal at the Sibly colliery, in Old Forge township. An opening has been made at the Green Ridge slope for ventilation. The above are all the openings and connections made in the district during the year, so far as I am informed.

#### IDLE AND ABANDONED COLLIERIES.

The Archbald shaft, Lackawanna township, and Oxford shaft, Hyde Park, owned by the Delaware, Lackawanna and Western railroad company, were idle all through the year; the last work done at the Hyde Park shaft was done in February, and the Scranton coal company's drifts at Bellevue were idle. Bellevue slope and shaft worked only  $22\frac{1}{2}$  days.

No. 1 shaft, Pittston township, owned by Pennsylvania coal company, was idle; No. 2 and No. 3 shafts were abandoned as hoisting shafts, and are now used as pumping shafts.

The Marvine shaft, Providence; Powderly slope, Carbondale township, and Breaker, Forrest and Jefferson tunnels, Carbondale City, all owned by the Delaware and Hudson canal company, were idle.

The following collieries have also been idle: Rolling Mill colliery, Scranton, consisting of a slope, tunnel and drift; the Ontario colliery, Pleasant Valley, and the Heidelberg colliery, Pleasant Valley. Spring Brook No. 1

lution, or 149,694 cubic feet per minute, with a water gauge of only .3 of an inch, the power applied being 5.47 H. P.

The fan at the Ravine shaft of the Pittston Coal Company gives very unsatisfactory results, and the difficulty is to be found in the contracted sectional area of the upcast and in the miserably constructed air-courses, and can be easily overcome by a small outlay of labor.

This table has cost me a large amount of labor, but I am happy to believe that it has answered a good purpose. It has caused an unusual amount of inquiry into the subject of ventilation by our mine managers, and the inquiry will go on and cannot fail to do great good. My intention was to compile a table on fans and another on furnaces, for the purpose of comparing them.

Table No. 9 includes as many furnaces as I could collect data for. All the furnaces of the Pennsylvania Coal Company, and all but one belonging to the Delaware and Hudson Coal Company, are omitted; but the latter were omitted because the fire was drawn when the inquiry was made in relation to them, the mines being idle. The furnaces of Jermyn's shaft and slope, Jermyn, and at the Eaton colliery, Jones, Simpson & Co., Archbald, have also been omitted for the want of the necessary data.

It would be interesting, perhaps, to comment on all the furnaces, but my time at present will not permit it, and it must suffice, therefore, to notice one or two of them. There is only one furnace in the table that can be rated as a first-class one, and that is the one at the Dodge shaft, belonging to the Delaware, Lackawanna and Western Railroad Company. I do not know that there is another in all the coal regions that will compare with it. This one is a double furnace, having a grate surface of 112 square feet; the sectional area of the upcast is 132 square feet, and it has a vertical depth of 330 feet, and when last tested it gave 142,406 cubic feet of ventilation, the horse power being 26.66. Now the original cost of this furnace must have been greater than the cost of the Bellevue fan with the engine and all complete, and the running expense of the furnace, compared with that of the fan, is simply enormous.

The poorest furnace in the table is that at the **Filer colliery**, at Winton. But the difference in the temperature between the downcast and upcast, in this case, is so unaccountably small, that I judge there must be a big mistake in it.

The table will demonstrate, I think, to the entire satisfaction of all scientific and candid minds that furnaces in shafts, under one hundred feet deep, are entirely worthless, even in the most favorable season of the year, and it is my candid opinion, that money expended on furnaces in workings under three hundred feet deep is money very unwisely invested, to say the least; and under any and all circumstances, the fan is by far the best and cheapest mechanical means to ventilate our collieries. All of those tests have been made under the most favorable conditions to the furnaces; and I hope to see the day when all these furnaces will be re-placed with fans,

day. The colliery was opened in the spring and summer of 1877, and commenced shipping a small quantity of coal in November of the same year, and from that date to the 31st of December, 1878, the colliery has produced sixty-six thousand five hundred tons of coal.

The breaker belonging to the colliery is located in Winton borough, and is connected with the mines by three miles of narrow gauge railroad, the gauge being three feet, and the track composed of "T" rails, forty pounds to the yard. The average grade is one hundred and twenty-five feet to the mile; but the part nearest to the mines is much heavier than the lower part. This road is equipped with two mine locomotives and two hundred and fifty mine cars. The usual number of cars for one locomotive to haul up the grade is thirty, though forty can be taken; but it is slow work with the latter number. The loaded cars run from the mines to the breaker by gravity, with strong brakes on every other car, and with three runners or brakemen on each train of thirty cars. The breaker used is one that was built by Messrs. Filer & Livey, and has a capacity of eight hundred tons per day. Its height of dump above the Winton Branch railroad track is eighty-one feet. The original cost of the breaker, including all the machinery, was \$45,000; but the Pierce Coal Company purchased it for just half that sum. The total cost of the whole improvement of the company, including road and equipments, opening the colliery, breaker, and machinery, was about \$90,000.

When the colliery was first opened it had a very unpromising reputation, the coal was pronounced as being of too poor a quality to pay for mining it, and the gentlemen who invested their money in it were set down as little better than subjects for the lunatic asylum. It was said that the vein was more than half waste, and that the coal was utterly unmarketable. I cannot conceive what object the would-be wiseacres could have in spreading such unfounded reports, unless it was from an execrable desire to injure the gentlemen interested in the enterprise. If that was the object, then it was so contemptibly base and unworthy that the parties who were guilty of the wrong ought to hang their heads down in shame and disgrace, and never hereafter have the presumption to claim that they are honest men. But if these false and damaging reports were circulated through ignorance, then the parties are very much to be pitied. Whatever the motive was in circulating such reports, it was very evident that they had prejudiced the mind of the public against this colliery, and until I visited the mines I must admit that I had decided unfavorable impressions in relation to the enterprise; and when I went through the colliery I was astonished at the wonderful difference there was between the reports I had heard and the reality as I saw it. I went through the whole colliery carefully, and found that the coal was of excellent quality in every place that the vein was proven; and it gives me great pleasure that I can congratulate the parties interested on their merited good fortune. I have not seen the Archbald vein anywhere in that section superior, if equal, to

Of the smaller companies and operators, I have two to report who have replaced furnaces with fans during the year. Messrs. Jones, Simpson & Co., have put in a twelve feet diameter fan at the Pierce colliery, in Archbald borough, and Messrs. William Connell & Co. have replaced their furnace with a fourteen feet diameter fan, which commenced running October 28, 1879. The Butler Coal Company have replaced a six feet diameter Patterson fan with a sixteen feet Guibal fan, and the little one has been removed to the Twin shaft, Pittston Coal Company, and the Hillside Coal and Iron Company have removed their fan from the Powder Mill shaft, in which the coal is exhausted, to a new air shaft sunk for the Spring Brook tunnel.

All the miscellaneous collieries are in a satisfactory condition at present, excepting the following: Jermyn's shaft and slope, Jermyn borough; Eaton colliery, Archbald borough; Filer colliery, Winton borough; Greenwood colliery, Lackawanna township; Hillside colliery, Pleasant Valley borough; Columbia mines, Pittston township, and the Beaver mines, Pittston borough. The first three named, the Greenwood, and the two last named, are the only very bad ones, and each of these must receive particular attention during the current year. The larger number of the collieries of the small operators, are in very good condition as to ventilation.

Taking the whole of my district, I think that it can be safely said, that the progress made during the year in bringing the condition of the collieries up to what it should be, is highly encouraging and satisfactory, and the work accomplished can be taken, no doubt, as an assurance that what is still wanting, will be done in due time.

#### Prosecutions for Violations of Law.

It is one of the most unpleasant duties of the position of an inspector, that he feels compelled, in certain instances, to enter criminal proceedings against mine bosses or workingmen, for violations of law. I have often felt that I would prefer to suffer the penalty myself than do this, if I could escape my oath-bound duty by doing so. Whenever I have been forced to prosecute, I have done it "with malice towards none and charity towards all," and have never asked the courts to inflict any but a nominal punishment. But I have been sorely grieved at the course pursued by the operators, superintendents, and workingmen, in defense of the unfortunate parties prosecuted. I do not complain at their availing themselves of all legal and honorable means in defense of the accused, but when they assail the motive of the inspector, and attribute his action to a feeling of spite and a desire for revenge, in retaliation for some real or imaginary wrong they may be conscious of having perpetrated against him, they make the cross a very heavy one to bear. I cannot account for this, only as a verification of the old maxim, that "The guilty fleeth when no one pursueth him." But it grieves me that any one, who claims an intimate acquaintance with me, can imagine it possible for me to be capable of indulging in a low and mean desire for retaliation and revenge; for I thank God that

TABLE No. 5.—A table of statistics connected with the working of Coal mines and Lackawanna, and a portion of Wayne and Susquehanna counties,

MISCELLANEOUS

Number.	NAME OF COAL MINE OR COLLIERY.	Where Located.	By whom Operated.
1	Everhart colliery,	Jenkins township,	Waddell & Co.,
2	Tompkins shaft,	Pittston borough,	A. Tompkins,
3	Fairmount shaft,	Pittston township,	A. Morris & Co.,
4	Seneca slope,	Pittston borough,	Pittston Coal Company,
5	Twin shaft,	"	"
6	Beaver slope,	"	Waterman & Beaver,
7	Butler shaft,	"	Butler Coal Company,
8	Mosler shaft,	Pittston township,	"
9	Heldberg shaft,	Hughestown borough,	Lehigh Valley Coal Company,
10	Columbia shaft,	Pittston township,	C. M. Sanderson & Co.,
11	Hillside shaft,	Pittston borough,	Grove Brothers,
12	Spring Brook,	Marcy township,	Hillside Coal and Iron Company,
13	Greenwood,	Pleasant Valley borough,	"
14	Sibley shaft,	Lackawanna township,	Pennsylvania Anthracite Coal Co.,
15	National,	Old Forge township,	"
16	Meadow Brook,	Lackawanna township,	William Connell & Co.,
17	School Fund,	Scranton city,	"
18	Mount Pleasant,	Scranton city, Hyde Park,	School Fund Coal Association,
19	Capouse shaft,	"	Mount Pleasant Coal Company,
20	Pine Brook shaft,	Scranton city,	Lackawanna Iron and Coal Co.,
21	Fairlawn shaft,	"	"
22	Jermyn's Green Ridge,	"	Fairlawn Coal Company,
23	Green Ridge slope,	"	John Jermyn,
24	Roaring Brook shaft,	Dunmore borough,	Green Ridge Coal Co., (Limited,)
25	Elk Hill,	"	Roaring Brook Coal Company,
26	Pier's shaft and slope,	Dickson city,	Elk Hill Coal Company,
27	Pierce,	Winton borough,	Filter & Levey,
28	Eaton,	Archbald borough,	"
29	Jermyn No. 1 shaft,	Jermyn borough,	Pierce Coal Company,
30	Jermyn slope,	"	Jones, Simpson & Co.,
31	Erie shaft,	"	John Jermyn, Esquire,
32	Belmont,	Greenwood borough,	Hillside Coal and Iron Company,
33	Elk Creek,	Carbondale city,	Butler Coal Company,
34	Forest City,	Felt township,	Brennan & Bridget,
35	"	Clifford twp., Susquehanna co	Hillside Coal and Iron Company,

PENNSYLVANIA

36	Slope No. 2,	Jenkins township,	Pennsylvania Coal Company,
37	Shaft No. 6,	"	"
38	Shaft No. 5,	"	"
39	Shaft No. 11,	"	"
40	Shaft No. 7,	"	"
41	Shaft No. 4,	"	"
42	Slope No. 4,	Pittston borough,	"
43	Tunnel No. 1,	Jenkins township,	"
44	Slope No. 6,	Pittston township,	"
45	Shaft No. 1,	"	"
46	Shaft No. 8,	"	"
47	Shaft No. 9,	"	"
48	Shaft No. 10,	Hughestown borough,	"
49	Baraum Shaft,	Marcy township,	"
50	Shaft No. 12,	"	"
51	Shaft No. 13,	"	"
52	Law shaft,	Pleasant Valley borough,	"
53	Stark shaft,	Old Forge township,	"
54	Shaft No. 2, Dunmore,	Pittston township,	"
55	Gypsy Grove,	Lackawanna township,	"
		Dunmore borough,	"

DELAWARE, LACKAWANNA AND

56	Pyne shaft,	Lackawanna township,	Del., Lack'a and West'n R.R. Co.,
57	Taylor shaft and drift,	"	"
58	Archbald shaft,	"	"

Collieries in the Eastern District of Luzerne and Carbon, now including all of State of Pennsylvania, for the year ending 31st day of December, A. D. 1881.

COAL COMPANIES.

Name of General Mine Superintendent and Assistants.	Name of Mining Boss.	Name of Outside Foreman.	Number.
Hon. Thomas Waddell . . . . .	Elihu Smith, . . . . .	William Mitchell, . . . . .	1
D. Davis, . . . . .	David W. Evans, . . . . .	D. Davis, . . . . .	2
A. Morris, . . . . .	J. Abbott, . . . . .	G. R. Smith, . . . . .	3
Nelson Cowan, . . . . .	Thomas Watkins, . . . . .	P. O. Boyle, . . . . .	4
"	M. J. Langan, . . . . .	John Haston, . . . . .	5
Daniel Edwards, . . . . .	Fred. Burkert, . . . . .	John J. Powell, . . . . .	6
S. B. Bennett, . . . . .	Adam John, . . . . .	Robert Jaques, . . . . .	7
"	William Neal, . . . . .	G. H. Tench, . . . . .	8
Fred. Mercour, . . . . .	Henry Chapman, . . . . .	A. G. Mason, . . . . .	9
R. T. Bliss, . . . . .	W. C. Noll, . . . . .	R. T. Bliss, . . . . .	10
Evan J. Evans, . . . . .	Evan J. Evans, . . . . .	W. G. Evans, . . . . .	11
Samuel Hines, assisted by W. E. Colbourne	Joseph Davis, . . . . .	Sylvester Biesecker, . . . . .	12
Benjamin Reese, . . . . .	J. D. Davis, . . . . .	J. D. Caryl, . . . . .	13
"	Martin Ryan, . . . . .	M. L. Coyne, . . . . .	14
William Connell, . . . . .	W. F. Courtwright, . . . . .	A. F. Doud, . . . . .	15
"	Thomas L. Jones, . . . . .	Patrick Judge, . . . . .	16
A. B. Stevens, . . . . .	Samuel T. Jones, . . . . .	John Connell, . . . . .	17
William T. Smith, . . . . .	John W. Davies, . . . . .	D. P. Brooks, . . . . .	18
Reese G. Brooks, . . . . .	James R. James, . . . . .	Thomas D. Bevan, . . . . .	19
"	John Lovering, . . . . .	Walter Hussey, . . . . .	20
James P. Hosie, . . . . .	Reese R. Griffiths, . . . . .	Henry Hess, . . . . .	21
O. J. Jermyn, . . . . .	Daniel Bradley, . . . . .	James P. Hosie, . . . . .	22
J. S. Johnson, . . . . .	Joseph D. Lloyd, . . . . .	John Biglin, . . . . .	23
John R. Davis, . . . . .	Timothy Parfrey, . . . . .	W. S. Boyd, . . . . .	24
William H. Richmond, . . . . .	P. H. Mongan, . . . . .	"	25
George Plier, . . . . .	Patrick Riley, . . . . .	W. J. White, . . . . .	26
John H. Hosie, . . . . .	Richard D. Roberts, . . . . .	M. E. Brown, . . . . .	27
Edward Jones, . . . . .	Michael Grimes, . . . . .	Alexander Craig, . . . . .	28
John Jermyn, . . . . .	James Eaton, . . . . .	George W. Eaton, . . . . .	29
"	Robert Carter, . . . . .	John Knight, . . . . .	30
Samuel Hines, assisted by W. E. Colbourne	Alfred Green, . . . . .	Peter Merritt, . . . . .	31
Paul Burton, . . . . .	Alexander Aikman, . . . . .	William Walker, . . . . .	32
Henry J. Brennan, . . . . .	"	"	33
Samuel Hines, assisted by W. E. Colbourne,	David Williams, . . . . .	Paul Burton, . . . . .	34
"	Henry J. Brennan, . . . . .	Henry J. Brennan, . . . . .	35
"	Alexander McCann, . . . . .	W. B. Williams, . . . . .	36

COAL COMPANY.

William Law, . . . . .	Henry Jopling, . . . . .	John Ginn, . . . . .	38
"	William Reynolds, . . . . .	T. H. McMillan, . . . . .	37
"	Benjamin Harding, . . . . .	Peter J. Daley, . . . . .	38
Andrew Bryden, . . . . .	"	"	39
William Law, . . . . .	William Reid, . . . . .	John Fortius, . . . . .	40
Andrew Bryden, . . . . .	Philip McCabe, . . . . .	James Delaney, . . . . .	41
"	James Watson, . . . . .	Samuel McDowell, . . . . .	42
William Law, . . . . .	Samuel Bennett, . . . . .	Thomas Hastie, . . . . .	43
Andrew Bryden, . . . . .	Alexander Thompson, . . . . .	H. Fergusson, . . . . .	44
"	"	Dalton Morse, . . . . .	45
"	"	Hugh Fergusson, . . . . .	46
"	Adam Harkness, . . . . .	Cuthbert Snowden, . . . . .	47
"	John Lewis and William Abbott, . . . . .	"	48
"	"	"	49
"	James A. Bryden and Robert Bryden, . . . . .	Anthony Horan, . . . . .	50
William Law, . . . . .	Robert McMillan, . . . . .	Thomas Martin, . . . . .	51
"	Thomas Wier, . . . . .	"	52
"	John Allen, . . . . .	G. M. Snyder, . . . . .	53
"	Alexander Laird, . . . . .	John Stillwell, . . . . .	54
James Young, . . . . .	John Moffatt, . . . . .	John W. Marshall, . . . . .	55
"	P. H. O'Hara, . . . . .	William Jennings, . . . . .	56

WESTERN RAILROAD COMPANY.

Benjamin Hughes, . . . . .	John L. Lewis, . . . . .	Adam Rheinhart, . . . . .	56
Thomas D. Davis, assistant, . . . . .	Morgan Harris, . . . . .	John P. Cooper, . . . . .	57
"	Elijah Dagger, . . . . .	John Fern, . . . . .	58

charged to the account of years in the past, long before Mr. Vandling assumed the control of the mines, and this fact should be credited to him. He has always been found ready to admit the necessity of improving the mines, and has shown a desire to do everything possible for the health and safety of the workmen.

The Pennsylvania Coal Company's collieries stand about as they did one year ago. No material improvement has been effected in any of their old collieries. The new No. 1 Barnum shaft, however, is provided with a fan which will produce ample ventilation for this new colliery, and another fan will be provided for the No. 2 shaft. I am very sorry that I cannot report all the collieries of this company in as good condition as could be wished. John B. Smith, Esquire, the general agent of the company, has always treated me with uniform kindness, and has always professed a desire to improve the condition of the mines under his charge; but the mine superintendents have not seemed so ready to do what is needed. My remarks on the condition of these collieries in my report for 1879, will apply to them still.

The collieries of the smaller companies and operators in the district are in excellent condition as to ventilation, excepting the following: Everhatt colliery, Jenkins' township; Beaver colliery, Pittston borough; Columbia mines, Pittston township; Hillside colliery, Pleasant Valley borough; Greenwood colliery, Lackawanna township; Elk Hill colliery, Dickson City borough; **Filer colliery**, Winton borough; Jermyn's shaft and slope, Jermyn borough; Brennan colliery, Fell township; and Forest City colliery, Forest City. Some of these have been improved during the year, but none of them will ever have good ventilation until they are provided with a fan in place of the miserable furnaces now in use in them. The workings are so shallow in these collieries that furnaces cannot ventilate them. None of these can be classed as very bad, excepting the Jermyn shaft and slope and the Brennan colliery.

An air shaft has been sunk for the Hillside colliery, Pleasant Valley, and as soon as connection is made with the workings a fan will be placed on this shaft, which will remove all cause for complaint in this case.

A new fan has been erected by Messrs. Jones, Simpson & Co., at the Eaton colliery, Archbald borough, which was sorely needed. This improvement will place the Eaton colliery in the first class as soon as the air courses are put in proper shape inside.

The main roads and traveling ways have been improved in many of the collieries, but there is a great deal yet to be done before they are all satisfactory in this respect. The importance of having clean and unobstructed roads is not realized by many of the mine bosses, but I am more convinced of it every day, and I am positively certain that many accidents to drivers and runners would be averted if the roads were kept reasonably clear of obstructions. All places where drivers are obliged to hitch and unhitch their mules from cars in motion, such as passing branches, the approaches to the foot of shafts or slopes, and inside at the chambers, should be cleared

*Jessup Coal Company—Filer's Slope.*—This company is sinking a new slope in coal; it is now down 900 feet. Sectional area, 96 feet.

*Hillside Coal and Iron Company—Glenwood Shafts.*—The work on the two shafts and breaker, reported in last year's report, 1886, under the head of Erie colliery improvements, has been advanced as follows: The shaft to top vein has been completed at a depth of 100 feet. The shaft to bottom vein has reached a depth of 160 feet. Work is being pushed rapidly forward in this shaft. The breaker to prepare the out-put of these two shafts for market is about finished, and is expected to prepare coal from the top vein about February 1, 1888. This Company is also sinking the Clifford shaft, at Forest City, as rapidly as possible.

*John Jermyn—Jermyn No. 4 Shaft* has built a new reservoir for spring water to supply the boilers. Started sinking a new slope November 5, 1887, and are down 170 feet. Slope opening, 14'x7'; pitch, 1 foot in 3 feet. Has set three new boilers in place; one pair of engines, 10"x10"; one fan engine, 12"x12", and one pumping engine.

*Wm. T. Smith—Mount Pleasant Slope.*—Sinking a new shaft to Clark vein. Size of shaft opening is 30'x11'. Depth of shaft from surface to bottom of little vein, 27 feet; Diamond vein, 139 feet; Rock vein, 171 feet; G or Big vein, 241 feet; new County vein, 292 feet; and to Clark vein, 365½ feet.

*Moosic Mountain Coal Company—Marshwood Colliery* have everything ready to ship coal when branch track to breaker is finished. Are now pushing the work rapidly forward.

*William H. Richmonds—Richmond Shaft.*—Finished sinking shaft reported in 1886, and are now mining coal in No. 2 vein.

*Winton Coal Company—S. V. White Mine* has sunk a new shaft and built a new furnace.

*Pennsylvania Coal Company—Shaft No. 1 Dunmore.*—The second opening of this shaft is not yet completed.

*William Connell & Co.—Stafford Shaft* has been put in good working order. A new hoisting tower and new engine and boiler houses have been erected. A new nine foot diameter fan has been put in place, and a new railroad track has been laid connecting this shaft with the National breaker, where the coal is prepared for market.

*Watkin's Son & Co.—Watkin's Colliery.*—This company has erected a new breaker, having a capacity to prepare 500 tons of coal per day of ten hours. Have also erected a boiler house, blacksmith shop, barn and office, etc. Also sunk slope, opened a tunnel, sunk air shaft, and built air stack and furnace for ventilating purposes.



*Buffalo Mines.*—Built a three-foot gauge track railroad from mines to Jefferson branch of N. Y., L. E. & W. R. R., a distance of two and one-third miles. Coal is hauled by a small locomotive. A new hoisting engine, new main and pony rolls and screens were also put in, and the breaker and machinery given a thorough overhauling.

*Belmont Mines.*—A new water-level tunnel; was opened to coal headways, and airways were driven to cut off the distance in haulage.

*Edgerton No. 2* was opened by a water-level tunnel. It is located about two miles northeast of breaker. Coal is hauled by a small locomotive on a three-foot gauge track.

*Eaton Tunnel.*—Drove a heading to surface for manway and ventilation; size of opening, 6'x9'=54 feet.

*Eaton Shaft.*—Sunk a shaft from surface to the present working or "Archbald" vein 162 feet deep; size of opening, 10'x20'=120 feet area.

*Jermyn No. 3.*—Sinking slope; it is down 700 feet; opening 14'x7'=98 feet area; driven on a grade of one in three feet; in place, six new boilers, one pair of hoisting engines, 10'x10', one fan engine, 12"x12", and one pump, and are also building new breaker.

*Mount Pleasant Mines.*—Sinking a second opening from G, or Big vein, to Clark.

*Filer's Slope, now Mount Jessup.*—Have driven slope in coal about 1,000 feet in length.

*Lackawanna Shaft.*—Have placed an endless wire rope about 2,000 feet long in main gangway for haulage; it works satisfactorily; it is cheaper and better than horses or mules.

*Pancoast Shaft.*—Have put in a new set of boilers; have put in Zeigler's patent slate-pickers; have graded slope to a uniform grade for about 1,000 feet; they are using the electric arc light at this colliery and it gives general satisfaction.

*Rushbrook Shaft.*—Have erected a new blacksmith shop, 20'x20', a new powder house, 10'x10', a new barn, 14'x20'; have placed in mine a No. 10 Knowles pump, sunk a second opening to top vein, and have driven headings in top vein going east 350 feet, and in the same vein going west 300 feet; the east heading in bottom vein has been driven 400 feet, and in the same vein going west 125 feet.

*Spencer Shaft.*—Are driving slope in coal northwest of shaft; in middle vein they are down about 800 feet.

Hon. Thomas Waddell is at present opening up a new mine in Winton borough.

*Note.*—The Peakville Coal Company's colliery was idle during the year and did not ship any coal.

The Rushbrook colliery did not ship any coal during 1888.

Bridge colliery was sold and abandoned August 16, 1888.

Shaft No. 2, Penn. Coal Company, located in Dunmore, was abandoned September 1, 1888.

equal 144 square feet on an angle of  $15^{\circ}$ ; also constructed another plane 800' long; sectional area, 8'x14', equal 112 square feet on an angle of  $12^{\circ}$ .

**Mount Jessup slope.**—Constructing plane 600' long through old workings on an angle of  $8^{\circ}$ .

SCRANTON, *February, 1890.*

P. BLEWITT, *Mine Inspector:*

The following changes have been made at the Mount Pleasant colliery:

The old slope has been abandoned for hoisting. Coal is now being hoisted in new shaft, 370 feet deep, to Clark vein, with a landing at Big vein for coal from that and Rock veins.

There is a new plane in operation in Clark vein 750' long to haul coal to foot of shaft, operated by a pair of engines at head of plane, steam for them being carried down the shaft. Also, another plane in Big vein 1,050' long, operated by a pair of engines outside, the rope being carried down the shaft in a box. The old fan and air shaft is now idle, mine being now ventilated through a new air-way in main shaft by a new Guibal fan, 20' in diameter, 6' face, run by a direct connected, 16'x30'', 75 horse-power engine. The breaker has been altered and improved, and a tower built to dump coal from shaft. The machinery has been changed to conform to the different run of the coal, and the size of both pairs of rolls has been increased, and two new main screens have been added to the old ones.

The section of breaker that was over the main tracks of the Delaware, Lackawanna and Western railroad has been taken down. The breaker is heated throughout by steam, the roofs, also the sides and ends that are exposed to the railroad, are covered with iron. The old retail pockets which were under the breaker have been abandoned and new ones built which hold about 500 tons. They are located about seventy-five feet south of the breaker, and are filled by a conveyor running under the large pockets, and from there by an elevator.

The boiler house has been removed from the side of the breaker, and a new one built one hundred feet north of it, with an addition of four cylinder boilers, 34'x30'', and two return-flue boilers, 14'x60'', making fourteen boilers in all. Capacity of breaker, 1,000 tons.

W. T. SMITH,

By THOMAS SPRAGUE, *Superintendent.*

*New York and Scranton Coal Company.*—This company is opening up their property at Peckville, Blakely borough. The breaker is nearly ready for machinery. They are sinking two shafts. Main shaft opening is 11'x29', and 100' deep. Second opening shaft is down 80', and the opening is 11'x17'. The name of the colliery is to be the Ontario.

*Pancoast shaft.*—Constructed new slope 400' long; sectional area

*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.

The latter is a second opening, having a depth of 350 feet on a grade of 20 degrees; area, 84 square feet. The shaft is 12x26 feet and 220 feet deep. Two good veins of coal are being opened, one at the bottom of the shaft, the other fifteen feet above. A new fan 14 feet in diameter, 6 feet face, run by an horizontal engine, cylinders 12x24 inches, was also erected.

This company is also sinking their Richmond No. 3 shaft to the Clark vein from the 14-foot, a distance of 150 feet; size, 11x24 feet.

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The Blue Ridge Coal Company completed two new slopes, one 300 feet long, the other 210 feet; the area of each is 75 square feet; grade, 15 and 12 degrees respectively.

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The **Mt. Jessup Coal** Company sunk a short air shaft near the face of the workings; depth, 25 feet; area, 60. A new slope, 538 feet long, on a grade of 8½ degrees, was made through old workings, and another slope, 1,038 feet long, with an area of 60 feet is being continued towards the basin.

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A tunnel from the surface to the lower Dunmore vein was driven by the Moosic Coal Company. It is 600 feet long, with an area of 72 square feet, and will be used as a water course.

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At Carbondale a new breaker was built by the Boyer Coal Company on the foundations of the old Butler breaker; capacity, 200 tons a day.

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A new breaker was also built by the Thomas Waddell Coal Company at Winton, Pa.; capacity, 500 tons a day.

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#### Breakers Burned.

Two breakers were burned to the ground during the year. The Moosic Mount Coal Company's at Marshwood, and the Stroud and Chamberlain at Carbondale, neither of which will be rebuilt.

The Moosic Mount coal will hereafter be prepared for market at the Mt. Jessup breaker in Winton, which is being enlarged for this purpose. The coal formerly prepared by the Stroud and Chamberlain breaker will in the future be prepared for market by the new Boyer breaker.

Two new tunnels have been driven at Coal Brook, one from the top vein to the surface, a distance of one hundred and sixty feet, and one from the third vein to the surface, a distance of one hundred and seventy-five feet.

At Clinton two new slopes have been driven; one is 3,100 feet long, the other 700 feet. The first has an average grade of 8 feet in 100, the other 6 feet in 100.

Richmond No. 3 shaft has been sunk from the Clark to Dunmore Nos. 1 and 2 veins, a distance of 132 feet. Its size is 10x22 feet.

At Richmond No. 4 a new plane 800 feet long has been made.

At Mt. Jessup a tunnel 464 feet long has been completed from the Clark to the No. 3 Dunmore vein.

Near their No. 1 colliery the Pennsylvania Coal Company has erected six Babcock and Wilcox water tube boilers of 900 horse power. The pressure carried per square inch is 110 pounds.

Steam is supplied for No. 1 colliery breaker and shaft, to Gypsy Grove colliery breaker and its two shafts, and have supplanted the 27 cylindrical boilers 36x30 feet formerly used at these places.

The Lackawanna Coal Company has sunk an air shaft, having a sectional area of 120 feet and a dept of 55 feet.

A new air shaft was sunk from the surface to the Dunmore vein by the Johnson Coal Company. Its depth is 310 feet and has 1200 feet area.

A tunnel 7x14 feet and 1,300 feet long has been driven from the big vein to the Dunmore.

At Pancoast a new slope 800 feet long has been sunk in Clark vein and another is being sunk in No. 3 vein.

The Dolph Coal Company has sunk two new slopes, one 350 and the other 650 feet deep. One is 6x16 and the other 6x12. They have also made a new plane 500 feet long, and sunk two new air shafts each 62 feet deep.

The Riverside Coal Company has made a new slope 900 feet long.

Many other small air shafts, tunnels, slopes and planes have been made during the year for the purpose of properly ventilating the workings and to keep up the output of coal, but they are not reported.

#### A FEW REMARKS ON THE STATISTICS FOR FIVE YEARS.

By a retrospective glance at the mining statistics of this district for the five years ending December 31, 1896, we find that there were 30,702,284 tons of coal produced and 29,367,733 tons shipped; 79,645 persons were employed for 939 days, during which time 1,056,055 kegs of powder of 25 pounds each, were consumed.

Of the total number employed 243, or a small fraction more than three-tenths of one per cent. were killed. Of the 243 killed, 154 lost

second opening, which had been but recently completed. As the only other way of escape was cut off by the fire at the head of the main shaft.

The Riverside Coal Company's breaker of 1,000 tons a day capacity was destroyed by fire on May 11, since which time a new one has been erected on the site of the old one.

The Delaware and Hudson Canal Company has built a new breaker of 2,000 tons a day capacity at Olyphant. A new coal washery has also been erected by the same company; and a new air shaft has been sunk for the Morvine and Dickown shafts, and a 20-ton air locomotive has been installed at Leggett's creek.

Compressed air coal drills have been introduced by the Elk Hill Coal and Iron Company at Richmond No. 3.

The tail rope system of haulage has been adopted by the Delaware, Lackawanna and Western Railroad Company at Storrs No. 1 with good results.

Many other improvements have been made by other companies for facilitating and increasing the output of coal.

The ventilating facilities are ample throughout the district, and on the whole the air currents are well conducted to the faces of all working places.

Culm is being successfully flushed into the old workings of Grassy Island and Eddy Creek by the Delaware and Hudson Canal Company. Also by the Mt. Jessup Coal Company into their slope workings.

Considerable "pillar robbing" has been done during the year by several companies, but the number of accidents attending this critical work has been remarkably few.

The Russel B., formerly the Old Buffalo mine, was abandoned in August.

The general condition of the collieries is good, and I am pleased to say that the provisions of the mine law are being very generally observed by those in charge of the mines.

The report contains the usual statistical tables, together with a brief description of each accident, but in view of the fact that a monthly narrative report of the daily performance of my duties has been made to the Chief of the Bureau of Mines, containing suggestions and recommendations from time to time as the circumstances required, the report is not as lengthy as heretofore.

Respectfully submitted,

EDWARD RODERICK,

Inspector First Anthracite District.

The annual examination of applicants for mine foreman and assistant mine foreman certificates of qualification, was held at Carbondale on July 12 and 13 by the Board of Examiners, consisting of

No. 2 Shaft, Inside.—The new engine plane that was commenced in 1904, has been completed and is now in operation. A new air-bridge has been built on engine plane, sectional area, 120 square feet.

#### STERRICK CREEK COAL COMPANY

Sterrick Creek.—The Dunmore fan, which was located above the Clark vein water level, about 4,000 feet east of breaker, was removed to the Clark vein air shaft, a distance of 3,000 feet south westerly. The new location is 400 feet from the Dunmore haulage engines and the fan receives its steam from the pipe line which supplies these engines. The friction is reduced by this change, three thousand feet, and the efficiency of the fan increased.

A ten inch bore hole was driven from the surface to the Clark vein, depth 265 feet, and 2,000 feet of 6 inch wooden pipe laid to carry the culm from the breaker to the Clark vein workings. Eight new shaking screens were installed in the breaker with decks ranging from 18 to 24 feet in length, to take the place of eight 12 foot shakers, which were inadequate with the increased output.

Three balance planes above the water level in the Dunmore vein were changed to one plane, and a pair of 12x12 inch engines installed to operate the same.

#### DOLPH COAL COMPANY

Air shaft completed from the surface to the Clark vein. A new ventilating fan, 20 feet in diameter, erected at head of air shaft. Extensive improvements were made outside. Previous to 1905, no box cars could be run under the breakers, owing to their height. With the improvements made, this condition is changed. The new chain hoist at head of breaker works very satisfactorily, and with the electric motor which conveys the mine cars to and from the "chain hoist," a great many mules are dispensed with, and all trouble in this line eliminated.

#### MT. JESSUP COAL COMPANY

A new ventilating fan has been erected at the head of the "North pitch" air shaft to ventilate the Clark vein workings. The diameter of fan is 14 feet.

#### HILLSIDE COAL AND IRON COMPANY

Erie.—One new 900 H. P. Sterling type water tube boiler plant with Sturdevant cold air blast and exhaust steam boiler feed heater.

Two 12x6x12 inch duplex plunger pumps for boiler feed and fire protection in boiler plant. One new washery; capacity 800 tons per day. New steam plane 7x12 inch in area and 4,200 feet in length. The same is equipped with a pair of engines 16x20 inch cylinder.



Blue Ridge Tunnel.—Condition as to safety good, drainage and ventilation fair. They are robbing pillars.

Richmond No. 3 Colliery.—Condition as to safety good, drainage fair, ventilation good.

DELAWARE AND HUDSON COMPANY

Olyphant Colliery No. 2 Shaft.—Condition as to safety and drainage good, ventilation generally good.

Grassy Island Slope.—Condition as to safety and drainage good, ventilation good with the exception of the Four Foot vein. This vein is very difficult to ventilate as it is thin and the roof is continually falling in the air courses.

Grassy Island Shaft.—Condition as to safety and drainage good, ventilation fair. There is room for improvement.

Eddy Creek Colliery, Birds Eye Mines.—Condition as to safety, drainage and ventilation good.

No. 4 Drift.—Condition as to safety good, drainage and ventilation fair.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Storrs Colliery No. 1 Shaft.—Condition as to safety, drainage and ventilation good.

No. 2 Shaft.—Condition as to safety and drainage good, ventilation fair. There is room for improvement.

PENNSYLVANIA COAL COMPANY

No. 1 Colliery No. 1 Shaft.—Condition as to safety and drainage good, ventilation fair.

No. 2 Shaft.—Condition as to safety and drainage good, ventilation fair.

Gipsy Grove Colliery.—Condition as to safety, drainage and ventilation good. This mine has been very much improved.

STERRICK CREEK COAL COMPANY

Sterrick Creek Colliery.—Condition as to safety, drainage and ventilation good. Six air bridges were built during the year, which improved the ventilation.

LACKAWANNA COAL COMPANY

Lackawanna Colliery.—Condition as to safety, drainage and ventilation good.

DOLPH COAL COMPANY

Dolph Colliery, Hackley Slope.—Condition as to safety, drainage and ventilation good.

Hannah Bell.—Condition as to safety good, drainage and ventilation fair.

MOUNT JESSUP COAL COMPANY

Mount Jessup Colliery, Peck's Shaft.—Condition as to safety good, drainage fair, ventilation good.