REPORTS

OF THE

INSPECTORS OF COAL MINES

OF THE

ANTHRACITE COAL REGIONS

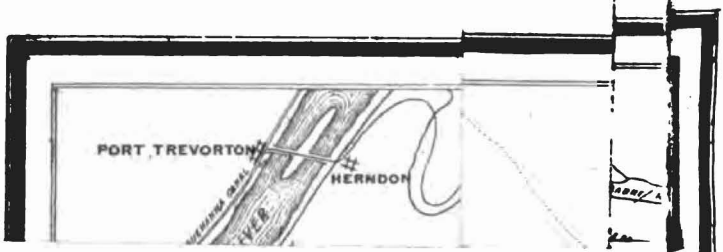
OF

PENNSYLVANIA,

FOR THE

YEAR 1870.

HARRISBURG:
B. SINGERLY, STATE PRINTER.
1871.



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COMMUNICATION.

To His Excellency, JOHN W. GEARY,
Governor of the Commonwealth of Pennsylvania:

SIR:—In compliance with the requirements of an act of Generel Assembly, approved the 5th day of April, A. D. 1870, entitled "An Act for the preservation of the records of inspectors of mines, etc."

I have the honor to herewith submit the following information of statistics, data, matter and thing which came under my notice, with other information annexed thereto, as may be of general interest in relation to mining and the safety of persons employed in mines, etc.

Your Excellency will please find annexed hereto the detailed reports of the inspectors of the mining district of Schuylkill, comprising the counties of Schuylkill, Northumberland, Columbia and Dauphin respectively, with such information, data, matter and thing that came under their several notices to the close of the year, viz: Of deaths and accidents in and about the mines; the condition of mines and ventilation of same; of shafts, slope and drift collieries; of steam engines, steam boilers and all mining machinery; of new lifts or mines; of old or abandoned collieries; of maps furnished of the same, with useful tables and statistical information which may prove to be of public interest to mining and the coal trade, some of which have been kindly supplied by Bannan & Ramsey, editors of *Miners' Journal*, Pottsville, Pa., and other reliable sources, which makes my report the more interesting on the subjects referred to and connected with the anthracite coal business of the State, and the general interest of the mining public, for the year ending December the 31st, A. D. 1870, and of the Commonwealth the ninety-fifth.

P. F. M'ANDREW,
Clerk Schuylkill district.

REPORT

OF THE

CLERK OF THE MINING DISTRICT OF SCHUYLKILL, Etc.

To the Senate and House of Representatives of the Commonwealth of Pennsylvania:

Gentlemen:—In compliance with the requirements of law for the preservation of the records of inspectors of coal mines, etc., and the law for the health and safety of persons employed in coal mines, which acts were approved the 3d day of March and the 5th day of April, A. D. 1870, I have the honor to herewith submit the several reports of the inspectors of coal mines of the mining district of Schuylkill, comprising the counties of Schuylkill, Northumberland, Columbia and Dauphin, respectively, together with the report of the clerk of the mining district of Schuylkill, setting forth the statistics, data, information, and all matter and thing that came under our several notice, each report detailing such information as come to the notice of each respective party, etc.

The law of March the 3d, 1870, went into operation in the mining district of Schuylkill on the 20th day of September, ult., when Frank Schmeltzer was appointed Inspector of Coal Mines for the First, or Pottsville district, which district comprises all the collieries south of the Broad mountain, and east of the West Branch of the Schuylkill river to Carbon county line, in Schuylkill county. John Eltringham was appointed Inspector of all the coal mines in the Second, or Ashland district, which district comprises all the collieries north of the Broad Mountain, together with all the collieries in Columbia county and those of New Boston basin, and David Edmunds was appointed Inspector for the Third, or Shamokin district, which district comprises all the mines in Northumberland and Dauphin, together with all the collieries in Schuylkill county west of the West Branch of the Schuylkill river, in Schuylkill county; which districts were laid out by a board of examiners, who had been appointed by the judges of the courts of common pleas of Schuylkill county, in conformity with the act of General Assembly as aforesaid. The lateness of the appointments, and the amount of labor to be performed before the close of the year in examina-

tion of mines and machinery, afforded but very little time for the inspectors to make out statistics, etc. The many other claims on the services of the inspectors, attending inquests, accidents, etc., claimed a large portion of their time. As clerk of the mining district, and knowing the aid my humble services could render them from my experience, I assisted the inspectors in classifying and tabulating their several reports. In view of the large casualties about the mines, when there was no inspector as well as since, I considered it my duty to render assistance and collect information, hoping my course will meet your friendly approbation.

The fearful mortality and casualties which closes the year, far exceeded our expectation; and has, indeed, cast a silent gloom over many poor families in the district.

The year 1870 closes with the following statistics of mortality. The inspectors' reports show that 196 collieries have been inspected, 19 of which had been inspected prior to June 1, 1870, on which date John Eltringham's term of office expired, &c., and in his room, on the 20th of September ult., Frank Schmeltzer was appointed, and from which date he examined 71 collieries. David Edmunds examined 55 collieries, and John Eltringham, being re-appointed, examined 51 collieries=196 collieries.

From the records of such information it is to be regretted the following casualties are reported, and vouchers for the same on record in my office, showing that 129 persons lost their lives; that 298 persons were maimed and injured; that 81 persons are widowed and 280 persons are orphans; that up to September 22d ult., 93 persons were killed, 157 do. were maimed and injured; and from that to the year just closed, 36 persons were killed and 141 persons were injured; that during the 3⅔ months while there was no inspector, 48 of the above 93 were killed and 89 were injured.

Casualties.—In Pottsville district 32 persons were killed and 60 do. injured before, and 14 were killed and 67 were injured after the appointment of inspector Schmeltzer.

In Ashland district 48 persons were killed and 58 do. injured before, and 14 do. killed and 35 were injured after the appointment of inspector Eltringham. In Shamokin district 13 do. were killed and 38 do. injured before, and 8 do. were killed and 40 injured after the appointment of inspector Edmunds.

DISTRICT CASUALTIES.

First, or Pottsville district,	46	persons	killed and	127	do. injured.
Second, or Ashland...do..	62	.....do.....		93	....do.
Third, or Shamokin ..do..	21	.....do.....		78	....do.
Aggregate casualties=	129	.....do.....		298	....do.

28 of the injured died subsequently of the results of injuries.

MONTHLY CASUALTIES.

	Killed.....	Widows....	Orphans....	Persons injured .....
January	2	1	4	8
February	9	8	27	18
March	15	6	20	33
April	7	7	29	6
May	10	6	23	4
June	9	8	26	9
July	5	2	4	23
August	28	18	65	32
September	12	8	24	64
October	17	8	25	39
November	7	4	15	29
December	8	5	18	34
	129	81	280	298

N. B.—26 persons' names in the report of the injured were not furnished; the total is correct.

CAUSES OF CASUALTIES.

	Killed....	Injured..	Total.....
By fall of coal	38	46	84
By fall of rocks	7	3	10
By explosions of gas	6	86	92
By explosions of powder	1	14	15
By explosions of blasts	6	17	23
By explosions of boilers	6	10	16
By falling in slopes and shafts	26	3	29
By being crushed in rollers	4	2	6
By being crushed in machinery	1	1	2
By breakings of chains	1	2	3
By wagons running over them	9	18	27
By falling of gangway and inclined planes	2	1	3
By sundry sorts of accidents	6	56	62
By fall of a schute and crushed in wheels	2	1	3
By severe injuries	10	34	44
By being crushed to death	2	4	6
By falling and running of mules	2	.....	2
Aggregate casualties for 1870	129	298	427

CHARACTER OF THOSE INJURIES.

4 persons lost an arm each.
5 persons lost a leg each and otherwise injured.
8 persons had an arm broken and otherwise injured.
38 persons had a leg broken and otherwise injured.
11 persons had been dangerously hurt.
66 persons had been severely hurt.
2 persons had both logs amputated.
10 persons had their skulls severely injured.
6 persons had been badly scalded.

2 persons had lost both eyes and otherwise injured.
4 persons had been internally injured.
6 persons had been badly crushed.
4 persons had their toes and fingers cut off.
6 persons had their hands badly crushed.
1 person had his arm and legs broken.
86 persons had been burned by explosions of gas.
39 persons met with sundry accidents.

298 persons received injuries; 28 persons of this number died.

The above exhibits the character of these injuries. It will be observed the general suspension, which lasted to the 4th of August, had a tendency to check the casualties. Ninety-six inquests were held in the district, 92 of which rendered verdicts of accidental deaths, and 4 do. entertained opinions of criminal negligence in employing incompetent persons to manage and control engines and machinery. By these casualties 125 families were left in needy circumstancse, 1 do. had good property and 3 owned some means.

Coal statistics furnished me by Mr. Bannan, of the *Miners' Journal*, show that 6,342,509 tons had been mined in the district in 1870, by a force of 30,000 persons, distributed as follows, viz:

COUNTIES.	Collieries	Force employed.	Tons sold.	Tons, home cons'ption.	Total tons mined.
Schuylkill	154	21,000	3,138,429	800,000	3,938,429
Northumberland	34	7,000	1,020,712	357,000	1,377,712
Columbia	10	1,400	307,551	107,000	414,551
Dauphin	4	600	453,817	158,000	611,817
	202	30,000	4,920,509	1,422,000	6,342,509

COUNTY CASUALTIES PER TONS MINED.

COUNTIES.	Total tons.	Killed.	Killed—tons min'd.	Injured—tons min'd.	Widows—tons min'd.	Orphans—tons min'd.
Schuylkill	3,938,429	1	35,166	15,628	63,033	15,628
Northumberland	1,377,712	1	98,408	39,363	196,816	52,989
Columbia	414,551	1	207,275	46,061	414,551	.....
Dauphin	611,817	1	611,817	305,908	611,817	305,908
	6,342,509	1	49,174	21,283	87,302	22,651

The mining district of Schuylkill employs 30,000 persons in and about the mines.

1st district, or Pottsville, employs 10,000 persons and mines 2,072,845½ tons.
2d " Ashland, " 11,000 " " 2,280,135½ "
3d " Shamokin " 9,000 " " 1,989,528 "
3 districts " 30,000 " " 6,342,509 "

First district mined 2,072,845½ tons and employed 1 person for each 207 tons mined; 1 person lost a life for each 45,061 tons mined, and for each 16,321 tons mined 1 person was injured.

Second district employed 11,000 persons and produced 2,280,135 tons. For each 207 tons mined 1 person was employed; for each 36,776 tons mined 1 person was killed, and for each 24,517 tons mined 1 person was injured.

Third district employs 9,000 persons and produced 1,989,528 tons, and for each 221 tons mined 1 person is employed. For each 94,739 tons mined 1 person lost a life, and for each 25,506 tons mined 1 person was injured.

District tonnage, force employed and casualties per ton in the mining district of Schuylkill, in 1870:

30,000 persons employed, one-half of which work the mines, i. e. 15,000 persons produce 6,342,509 tons of coal. For each 422 tons mined 1 person is employed; for each 49,166 tons mined 1 person lost a life, and for each 21,283 tons mined 1 person was maimed or injured; for each 78,302 tons mined 1 person is a widow, and for each 22,651 tons mined 1 person is an orphan.

SCHUYLKILL COUNTY CASUALTIES.

In 1869, 4,688,904 tons mined.	In 1870, 3,938,429 tons mined.
For each 81,944 tons 1 death.	For each 35,164 tons 1 death.
51,526 tons 1 injury.	15,628 tons 1 injury.
151,296 tons 1 widow.	54,700 tons 1 widow.
31,259 tons 1 orphan.	15,628 tons 1 orphan.
213 tons 1 employed.	187 tons 1 employed.

1869.	1870.
56 persons killed.	112 persons were killed.
91 persons injured.	252 persons were injured.
30 persons widows.	72 persons were widows.
150 persons orphans.	252 persons were orphans.
327 cases of distress.	688 cases of distress.

CASUALTIES.

In Great Britian it will be observed that the proportion is 1 person to every 103,000 tons mined, but this is found to be on the decrease yearly.

Compiled from *Miners' Journal*, coal statistics:

Northumberland	1 death to each	175,000	tons.
Durham	1 "	176,000	"
West Lancaster and N. Wales	1 "	32,000	"
Yorkshire	1 "	113,000	"
Derby, Nottingham, Lancashire, Stafford and Cheshire	1 "	128,000	"
Shropshire and N. Stafford	1 "	99,000	"
Worcester and South Stafford	1 "	95,000	"
Mammoth, Gloucester, Somerset and Devonshire	1 "	96,000	"

South Wales	1 death to each	98,000	tons.
East and West Scotland	1 "	177,216	"
Schuylkill county in 1869	1 "	67,800	"
Schuylkill county in 1870	1 "	28,605	"
Schuylkill district, 1870	1 "	42,138	"

Extract from *Miners Journal*, coal register, 1870:

NUMBER OF COLLIERIES IN GREAT BRITIAN.

DISTRICTS.	No. collieries.	Tons mined.	Hands employed	Lives lost.
Northumberland	175	14,400,000	32,000	69
South Durham	171	15,300,000	37,000	87
N. and E. Lancashire	292	7,033,000	26,300	65
West Lancashire and N. Wales	208	7,600,000	32,000	237
Yorkshire	459	9,705,000	37,000	80
Leicester, Nottingham, Derby and Warwickshire	195	7,699,000	28,000	60
North Stafford, Chesshire and Shropeshire	215	6,000,000	21,000	61
South Stafford and Worcestershire	550	9,900,000	28,000	104
Monmouth, Gloucester, Somerset and Devonshire	201	6,200,000	26,000	61
South Wales	300	9,000,000	29,300	104
East and West Scotland	457	14,709,959	50,160	83
Schuylkill district	202	6,342,509	30,000	129
Schuylkill county	154	3,938,429	21,000	112
Northumberland county	34	1,377,712	7,000	14
Columbia county	10	414,551	1,400	2
Dauphin county	4	611,817	600	1

"It will be observed in Scotland that 50,000 persons are employed in and about the mines, presuming 40,128, or four-fifths this force work in the mines, and produce 14,709,959 tons, all of which is utilized in that country, this will average a tonnage to each person employed in these mines of 366½ tons per annum." The Schuylkill district employed a force of 30,000 persons at the collieries, one-half of which only work in the mines, and produceed in, *say* seven months, 6,342,509 tons, or equal to 423 tons each.

This shows our miners produce more coal than do the miners in Scotland.

Schuylkill district sold this year 4,920,509 tons and consumed 1,422,000 tons=6,342,509 tons. This consumption is not overdrawn.

DISTRICT STATISTICS.

202 collieries are in active operation this year.
30,000 hands have been employed this season, etc.
2,520 head of stock have been used in and about the mines.
20 shaft collieries.
147 slope collieries.
156 drift collieries of all descriptions had been in operation.
593 steam engines are used at the collieries; with
1,442 steam boilers and of all grades and conditions.
30,515 horse power of steam has been used or produced.
8,526 mine wagons are in use.
230,093 feet of wire ropes is used.
70 steam fans are in use; the balance of the collieries are ventilated by furnaces and natural means.

CONDITION OF DISTRICT VENTILATION.

1st district,	11	good,	44	moderate,	and 16	inadequately.			
2d "	20	"	26	"	14	"	14	not visited.	
3d "	16	"	24	"	15	"	2	"	
	47	"	94	"	45	"	16	"	
	94								
	45								
	16								
	202								

Aggregate, 202 collieries.

Scientific Miners and Mine Superintendents.—Seldom such persons are to be met with; even they who pretend to superior knowledge on that head are found to be far behind expectations; of the uses of scientific instruments it appears they are deficient. Had the uses of those instruments been properly understood, the character, condition and the necessary quantum of air could be correctly ascertained, and controlling remedies provided which would guard against accidents and injuries.

Of the instruments needed in connection with this matter, 1st *Fahrenheit's thermometer*, which indicates the difference between the outside and inside temperatures, which differences are in favor or against natural ventilation, as heat expands the air and renders it buoyant; this circumstance favors natural ventilation; and if explosive gas (carburetted hydrogen) is generated in a mine where the temperature is higher than outside, with a proper proportion of fresh air diluted with it, then its condition is absolutely dangerous.

2d. *Aneroid barometer* indicates the difference of atmospheric pressure inside and out, and a sudden fall in this instrument inside, and a corresponding rise in the thermometer, indicates the air explosive and the presence of fire-damp. And a rise in this instrument will determine the presence of black-damp, (or carbonic acid gas.) The air which remains after an explosion, is known by the name of choke (or after) damp, and is very deleterious to animal life; the lamp will burn an instant, then explode and death is instantaneous.

3d. *An anemometer* (or air fan) will indicate the velocity of the air current. The section area of any opening, multiplied by the distance in feet per minute, will ascertain the quantum of air supplied. *Should the velocity exceed seven feet per second in an air course where fire-damp is evolved, an explosion is imminent.* Such is often the case in contracted headings, etc.

In conformity with the provisions of the fourteenth section of an act of General Assembly of the Commonwealth of Pennsylvania, approved the 3d day of March last, "providing for the health and safety of persons employed in coal mines," which fourteenth section required that inspectors of coal mines, commissioned under this act, should furnish themselves with the most approved modern instruments and chemical tests for carrying out the intentions of the act, which was intended to ascertain the condition, quality, properties and quantity of matter, as gases and acidulated vapor in combination with the air in coal mines, etc.

This involved an intelligent knowledge of the necessary instruments and their respective uses to enable them to report intelligently. While, without such instruments and a knowledge of their uses, it is impossible to know the quantum of air necessary to supply in ex[illegible]re

large percentage of gases and noxious air are generated, it requires more than ordinary intelligence to accomplish this information.

Fahrenheit scale of thermometers are those most used in America. *Centigrade and Beaumur's* are used in Europe. To enable persons to convert the scales I give the following table: "Haswell."

To convert Fahrenheit and Centigrade, deduct 32° and ÷ by 18.
To convert Centigrade to Fahrenheit, multiply by 1.8 and + 32.
To convert Fahrenheit to Beaumur, deduct 32, × by 4 and ÷ by 9.
To convert Beaumur to Fahrenheit, multiply by 9, ÷ by 4 and + 32.

An hydrometer or psychrometer is necessary to ascertain the quantum of vapor absorbed in the air, and this will account for its respiratory condition, &c.

It is known that carburetted hydrogen (fire-damp) will explode only when mingled with six times its volume of pure air, and at this stage it explodes at its greatest violence, and the intensity of its flame is=1,500° Fahrenheit, (and that of boiling water=212°,) and its expansive force is 1,700 volumes to 1 do. of air, and will continue to explode until mixed with 16 times its volume of air, when it ceases to ignite. It is also known the *Davey lamp* will explode in a current of explosive gas when its velocity is at 8 feet per second, and the Stephenson lamp will explode at 25 feet per second. Narrow air-courses, &c., in a mine where fire-damp is evolved is highly dangerous, and should not be tolerated or even resorted to, as the results cannot be determined.

London Mining Journal:

Table No. 1, Haswell, showing the condition of air by its velocity and heat:

TABLE No. 1.

Velocity in miles per hour.	Velocity in feet per minute.	The force on a square foot in lbs. in proportion to its velocity.	Air, its degrees of heat or rarity.	Grains weight in a cubic foot of air.	Expansion of heated air, as per volume.
		Lbs. ozs. drs.			
1 mile.	88	0 0 1¼	32	559	100
2 "	176	0 0 5	42	539	102
3 "	264	0 0 11	52	529	104
4 "	352	0 1 4¼	62	518	106
5 "	440	0 1 15¼	72	506	109
6 "	528	0 2 14	82	495	111
7 "	616	0 3 15	92	487	113
8 "	704	0 5 1	102	479	115
9 "	792	0 6 7¼	112	470	117
10 "	880	0 7 14	122	461	119
11 "	968	0 9 9	132	453	121
12 "	1,056	0 11 8	142	446	123

A person correctly understanding the above table and the uses of the described instruments, and an ordinary knowledge of the common rules of arithmetic, with a good practice and common sense, can, in working a colliery, so construct its air-courses, headings and workings, as to render a mine safe under the influence of a good steam suction fan, and really none but such persons can be relied upon as safe managers of a mine.

Collieries.—The improvement in ventilation in ingress and egress roads is slowly improving, but generally with success, although there are some few collieries where the boss miners are reluctant to make any satisfactory effort in the needed improvement until after some serious accident occurs, and then but bunglingly. This arises from conceit and to disguise their ignorance from their employers, the result of which may be easily understood. Inspectors, too, should be persons of good intelligence, or their instructions may seriously conflict with well founded plans.

The proper and timely timbering of doubtful places, and a resort to strong pillars and large air-courses and outlet air-holes, and safety egress roads, cannot be too highly valued, as miners will always work cheaper in safe mines than in dangerous ones. Strong machinery well applied, with safe grades and good tracks, is a benefit. With reasonable rules and regulations, and scrupulously enforced, avoids much discontent. Sufficient supply of the necessary mining material, advantageously stored for use, is another important matter. A few bosses (but the right sort) will also prove to be economical. All of one nation and too many relations is often a scourge to the employer, and such examples are often met with.

Fire-damp, (or carburetted hydrogen gas,) in its pure condition, is ascertained to weigh 263.52 grains, or one-half that of pure air per cubic foot, and requires six volumes of air to one volume of this gas to render it explosive, or say 44 grains of fire-damp and 483.04 grains air=527.04 grains in a cubic foot of this explosive mixture, it will still continue to explode in increased mixtures of air, until the proportions arrive at 16 volumes of air to 1 volume of this gas; at this stage it becomes inexplosive, or say 3 grains of gas to 524.04 of air nearly. *Black-damp* is found to weigh twice that of air, or 1,054 grains per cubic foot; it is instantaneously destructive to life but will not explode. White or stone-damp will not explode but will support flame, and is quite deadly in its effect. *Choke or after-damp* is that gas left in a mine after an explosion; it will destroy life instantaneously, and will return to its original quality and explode with equal violence.

A knowledge of the destructiveness of the quality of all those gases should be properly understood by persons employed in mines, as well as mine managers, or else the casualties consequent in ignorance of their nature, will constantly have a serious result. Therefore, the proper remedy left us to warrant safety, is ample ventilation. The proper arrangement and distribution of air in splits and districts, with a sufficient draft at the surface to secure a proper velocity of the air traversing the mine, with ample air channels for egress, are the best remedies against casualties in mines that generate gas; and where such a course is not adopted casualties and injuries must eventually result, and it is to be regretted many collieries of this class exist.

It is to be hoped that under the present legislation, and the desire evinced by many operators to conform with the requirements of the law, that the time is not distant when the office of Inspector of Mines will be equal to what is claimed for it, i. e. a great public blessing, and a protection to person and property.

Good government of a mine operator must ultimately result to his benefit as well as to the persons employed in his mines. Certain it is, that a proper regard for persons and property will be observed by those having charge and management of collieries; as they alone are the parties which must be directly responsible for any and all failures on their part for mismanagement or wrong doing in their capacities. The good this will effect is incalculable, both to the land owner, operator and miner alike, as this was

a source of the greatest evil ever produced against the coal interest of the region; and many able men, as capitalists, have in the past been ruined for want of such general information; whilst he confidently relied on the integrity and skill of such persons, who, by self approbation and reasonable excuse, insinuated themselves into full confidence of their employer, who might be entirely ignorant of the first principle of mining, when, to his great surprise, he found himself totally bankrupt, and his colliery so far damaged, that to recover it was far beyond his ability. Now this evil cannot be the cause of further complaint whilst state inspectors are competent and perform their duties; mines cannot be damaged by incompetent persons, whilst the State places guardians over public property, whose duty it is to administer equal and impartial justice as public interest requires. This, alone, is a great benefit to the operators, as amongst other beneficial results which will accrue from prudent councils of practical inspectors, whose office it is to afford relief to the suffering miners, and see that an adequate amount of ventilation is circulating in the proper departments of the mine, and that the necessary security to life and property is constantly receiving attention, that an undue or unwarrantable course of mining be not pursued, whereby its destruction would be the result.

TABLE No. 2.

Names of persons killed in and about the mines in the mining district of Schuylkill, for the year ending Dec. 31, A. D. 1870.

DATE.	Names of persons killed.	Locations of the collieries.	Wife.....	Children...	Causes of death, remarks, &c.
January 24...	John Reese.....	Lost Creek	1	4	Killed by a fall of coal in the mines.
29...	John Elliott.....	Norton.....	.....	.....	Killed by a wagon run over him in the mines.
February 6...	John George.....	Wiggan & Co.'s.....	1	1	Killed by a fall of coal in the mines.
7...	John Early.....	Colorado	1	3	Killed by fall of coal in the counter gangway.
8...	Isaac Reynolds.....	Sherman.....	1	.....	Killed by fall in the slope, while oiling.
10...	John Hilton	Thomas.....	1	.....	Died from injuries—lost both legs.
11...	George Lee.....	Norwegian.....	1	1	Killed by explosion of gas in the mine.
12...	John Schell.....	Lorberry.....	1	7	Died from injuries from a breast.
17...	John Walsh, (boy)..	East Pine Knot.....	1	10	Orphans—killed by a fall of rocks in the mines.
21...	James Ormes.....	Glendower West.....	1	5	Killed by the breaking of slope rope in the mines.
22...	Henry Wesner..... 11 men.	Boston Run.....	.....	.....	Crushed to death by cars and schute.
March 2...	Michael M'Grath....	Snyder's shaft.....	.....	.....	Killed by premature explosion of a blast in the mines.
9...	Chas. Burchhill.....	Glen Carbon.....	.....	.....	.....do .....do .....do.
12...	Wm. Jamison	New Mines.....	1	3	Killed by being thrown down the slope by a discharge of water.
14...	Isaias News.....	Maple Dale	1	4	Killed by fall of coal in the gangway.
14...	John O'Neil.....	Wiggans & Co.'s.....	1	1	.....do .....do .....do.
22...	John Kelly, (boy,)...	Potts' mine.....	.....	.....	Killed by the explosion of the breaker boilers at 7 o'clock A. M., while preparing for to go to work, destroying the building and machinery, and injuring ten others—Wolf Creek disaster.
22...	Wm. Keoch, "	.....do.....	.....	.....	
22...	R. Hennesy, "	.....do.....	.....	.....	
22...	J. H. Koelle, "	.....do.....	.....	.....	
22...	M. Gavan.....	..... do.....	1	6	
22...	T. Walsh, (boy,).....	Shamokin	....	.....	Killed by being crushed by the pump-bob.
29...	Edward Evans.....	Koh-i-noor.....	.....	.....	Killed by being upset from the bucket in the shaft and instantly killed—Shenandoah City disaster.
29...	Henry Campion.....	Koh-i noor shaft.....	.....	.....	
29...	Wm. Zimmerman....	.....do	1	4	
29...	Abel Ebb..... 15 men.	.....do.....	1	2	
April 1...	James Gauntlett.....	Saylors'.	1	.....	Killed by a fall of coal in the mines.
4...	Peter Marrah.....	St. Nicholas.....	1	5	Died from injuries received in the mines.
10...	Wm. Maley.....	Glendower.....	1	3	Died from lock-jaw from injuries received in the mines.
21...	Wm. Prichard	Turkey Run.....	1	4	Killed by an explosion of blast.

TABLE No. 2—Continued.

DATE.	Names of persons killed.	Locations of the collieries.	Wife	Children ...	Causes of death, remarks, &c.
April 26.....	M. O. Hara	Hill & Harris'	1	9	Died by injuries received from fall of coal.
26.....	Henry White.	Greenwood	1	4	Died from injuries from explosion of blast.
26.....	Wm. Weldon ..... 7 persons.	Tamaqua	1	4	Died from injuries received.
May 18.....	John Clark.....	Tamaqua shaft.....	1	.....	Killed by gangway falling on him.
18.....	Rich'd Sutton.....	Wm. Penn shaft	1	7	Killed—caught by the descending cage.
27.....	H. Gouldner, (boy,)	Tamaqua slope	.....	.....	Killed—crushed in the rollers.
28.....	George Hehler.....	Hien & Glasmire	1	6	Burned to death by explosion of gas.
29.....	Geo. Heigeld, (boy,) 5 persons.	Tamaqua slope	.....	....	Killed—crushed in the rollers.
June 1.....	Patrick Connell.....	Silver Brook.....	.....	.....	Killed by explosion of a blast.
3.....	John Woll.....	Newtown	1	6	Killed—caught by the cage in taking off tools.
6.....	Edward Davis	Preston, No. 1	1	4	Died by injuries from a fall of coal.
13.....	Richard Nutt..	Delano .....[Creek.	1	.....	Killed by fall off coal cars.
15.....	Patrick Doyle.....	Harris & Co.'s, Silver	1	3	Killed by fall of coal in the mines.
15.....	Frank Lewis...	Glenworth	1	5	Killed by rope breaking and fell to bottom of slope.
24.....	John Purcell..... 7 persons.	Silver Creek	1	2	Killed by fall of rocks in the mines.
July 1.....	Pat'k Elliott, (boy,) 1 person.	Boylan's...	.....	.....	Killed by fall of rock in the gangway.
August 4.....	Windom Lewis	Honey Brook	1	4	Killed by a wagon—chain broke.
10.....	Thomas Quigley.....	Heins & Glassmire	.....	.....	Killed by falling down the shaft 300 feet. The cause of this disaster was an imperfect pinion-wheel breaking, the machinery demolished; the cage, with 12 men, fell through the cage floor into the sump, and was crushed and drowned by the rope coiling on the men in the water. An awful calamity. (New Philadelphia disaster.)
10.....	George Stott	.....do	1	6	
10.....	John Roper.....	.....do	1	1	
10.....	Jacob Kline.	.....do	.....	.....	
10.....	David Jones, (old,)..	.....do	.....	.....	
10.....	John Mathews	.....do	1	6	
10.....	Hugh M'Anulty.....	..... do	1	7	
10 . ..	John M'Ginley	..... do	1	.....	
10.....	Elisha Emanual	.....do	1	6	
11.....	James Hardy..... ..	Hickory	.....	.....	Killed by a fall of coal while at work.
16.....	Thos. Gallagher.....	Plank Ridge	1	6	.....do ..... do ..... do .....do.
19.....	John Swartz.....	Copely	1	.....	Killed by a fall of coal—at work.
20.....	Frederick Brown....	Ellwood	1	6	Killed by railroad train passing over him.

August	23...	Joseph Phlegar.....	Shoemaker's.....	.....	.....	Killed by being crushed in the rollers.
	29...	George Taylor	Preston, No. 3	1	4	Killed by the wagon being improperly placed on the cage, and said to be caught by the slope timbers, near the surface, the wagon and men thrown down the distance of 300 feet in the slope, shockingly mangling the unfortunate men—Girardsville disaster.
	29...	John Taylor	..... do.....	1	1	
	29...	William Taylor.	.....do.....	.....	.....	
	29...	Thomas Robins.....	.....do.....	1	4	
	29...	Philip Farley.....	.....do.....	1	2	
	29...	M. Weihl.....	.....do.....	1	4	
	29...	Thomas Burk.....	.....do.....	1	1	
	30...	John Brinkman.....	Knickerbocker.....	1	4	Killed by a fall of coal in the mines.
	31...	Unknown	St. Nicholas	.....	.....	.....do.....do .....do.
	31...	Henry Longfeld..... 25 persons.	Plank Ridge.....	1	3	.....do..... .....do.....gangway.
Sept.	3...	Robert Lewis.....	Wadesville shaft.....	1	6	....do..... .....do.....mines.
	3...	Benj. Worfington....	Black Valley mines....	1	2	Killed by a fall of coal—the pick pierced his body through.
	3...	John Gramm.....	Suffolk.....	.....	.....	Died of injuries received from a fall of coal
	3...	Peter Reichwine.....	Locust Dale	1	4	Killed by being crushed by the cars.
	15...	James Slattery.....	Knickerbocker.....	1	2	Killed by a fall of coal in the mines.
	15...	Michael Early.....	.....do.....	.....	.....	Died from injuries received from a fall of coal—arm amputated.
	17...	John Henry, (boy,)	Tamaqua.....	.....	.....	Killed by a fall of coal, while picking it.
	19...	Edward Condron.....	Colorado.....	1	4	Killed by cars run over him while in motion.
	20...	Patrick Delaney.....	Otto, No. 2.....	.....	.....	Killed by being run over by a wagon, while walking on plane, hauling water.
	23...	Paul Guy.....	Wadesville slope.....	1	4	Killed by a fall of coal; working in breast No. 9.
	27...	William Kear	Coal Castle railroad....	1	.....	Killed by being run over by railroad cars.
	27...	Matthew Kennedy .. 12 persons.	Bear Run.....	.....	.....	Killed by a fall of coal in the mines.
October	3...	J. Hartman, (eng'r,)	Glen Carbon	1	1	Killed by fall in the slope, while fixing pumps.
	4...	Jos. Teigiman	Wadesville shaft	.....	.....	Died from the effect of powder explosion in rollers.
	14...	John Gallagher.....	Boston Run	1	3	Killed by a fall of coal in the mines.
	14...	August Garth.....	Tower City.....	1	2	.....do.. .....do ....gangway.
	14...	Lewis Combs.....	.....do.....	.....	.....	.....do.....do.....do.
	14...	Patrick Calaghan....	Furnace	1	4	Killed by a fall of top rock in mines.
	16...	Frank Curran	St. Clair shaft.....	.....	.....	Died from injuries—scull fractured by a fall of coal.
	17...	Patrick Hagerty.....	Raven Run.....	.....	.....	Died from injuries from a fall of coal.
	18...	Thomas Farnon.....	Phœnix, No. 3.....	1	4	Died from effects of an explosion of gas.
	23...	Amos Snyder	Otto, No. 1.....	1	6	Killed—crushed by wagons in gangway.
	24...	Richard D. Lever....	Wiggans.....	.....	.....	Died from injuries received from a fall of coal.
	25...	John Curry, (boy,)..	Preston, No. 3	.....	.....	Killed by a mule falling on him.
	29...	Daniel M'Eleney.....	St. Clair shaft.....	.....	.....	Killed by a fall of coal in the mines.
	31...	George W. Davis..... 14 persons.	Palmer.....	1	3	Died from injuries received from a fall of coal.
Nov.	8...	John Shoemaker.....	Raven Run.....	1	1	Killed by a fall of coal in the mines.
	9...	Stephen Whelan.....	Glendower.....	.....	.....	Killed by a fall in the slope.

TABLE No. 2—Continued.

Date.		Names of persons killed.	Location of the collieries.	Wife.......	Children ..	Causes of death, remarks, &c.
Nov.	14......	Henry Supple	Pine Knot	......	......	Killed—his clothes caught in shafting.
	14......	M. M'Mullen	Cuyler	1	5	Died of injuries from a blast.
	16......	John R. Williams....	St. Clair shaft............	1	5	Died from an explosion of gas.
	18......	John Kear	Thomaston	......	......	Killed by a fall of coal in mines.
	24......	Rud. Leaver	Wiggans........................	1	4	Died from injuries from a fall of coal.
Dec.	2......	David W. Evans......	Diamond Wolf	1	4	Killed by a fall of coal in the mines.
	5......	M. Hannon................	Ashland	......	......	Killed by fall off a mule.
	5......	M. Crane	Centralia	......	......	Killed by fall of coal in the mines.
	6......	M. M'Manmon	Union	......	......	Killed by being crushed in the rollers.
	13......	James Day................	Beechwood	1	4	Died from effects of an explosion of gas.
	18.... .	M. Crow	.........do	1	3	.........do..................do..................do.
	18......	Christian Ringisen...	Shenandoah	1	7	Died from effects of a fall of rocks.
	28......	Isodore Graver	Mahanoy	1	......	Died from effects of injuries in mines.
				72	252	

COUNTY CASUALTIES FOR THE YEAR 1870.

Counties.	Men killed.	Injured.	Widows.	Orphans.
	112	252	72	252
Northumberland	14	35	7	26
Columbia	2	9	1	....
Dauphin	1	2	1	2
As far as heard from in 1870..............................	129	298	81	280

TABLE No. 3.

Names of persons killed in the mines of Northumberland county, as far as ascertained, for the year ending December 31, A. D. 1870.—P. F. M'ANDREW, Clerk.

DATE.	Names.	Wife	Children ...	Collieries.	Remarks.
May 9.....	George Watters.....	1	3	Trevorton	Died from injuries—hurt at breaker.
10.....	Wm. Burk	1	3	Big Lick.....	Died from his injuries—hurt in mines.
10.....	James Dowley.....	.....	.....	Shamokin.....	Died—crushed by wagons in the mines.
25.....	John Wild.....	1	4	Daniel Webster.....	Died from injuries by explosion of gas.
25.. ..	Maurice Downey	.....	.....	Hickory Swamp	Died from injuries by fall of coal.
June 6.....	Joseph Murphy.....	1	2	Trevorton.....	Killed by fall of gangway timber.
25	Robert Parker.....	1	4	Northumberland.....	Killed by fall of coal in the mines.
July 2.....	Wm. Griffiths	1	4	Trevorton.....	Killed by fall of coal in the mines.
August 30.....	Philip Carr, (eng'r,)	.....	.....	Franklin	Killed by fall of rocks in the mines.
30.....	John Reed.....	.....	.....	Locust Gap	Found dead at the mines.
Sept. 6.....	James Hill.....	1	2	Luke Fidler	Died from injuries—fall of rocks.
October 3.....	Andrew Jetker.....	1	4	Henry Clay.....	Suffocated by gas from a dirt bank.
6.....	John Devitt.....	.....	.....	Enterprise.....	Died from injuries from fall of coal.
6.....	M. Ryan.....	... ..	.....	Brady.	Killed—crushed by wagons.

14 persons killed—8 widows, 26 orphans—35 injured.

TABLE No. 4.

Names of persons maimed and injured in and about the mines in the mining district of Schuylkill, for the year ending A. D. 1870, county of Schuylkill only.—P. F. M'ANDREW, Clerk.

DATE.	Names of persons injured.	Locations of collieries.	Wife	Children	Causes of injuries, remarks, &c.
Jan. 3	Wm. Ryan	Hickory	.....	.....	Injured by explosion of gas.
3	Lawrence Burns	....do	.....	.....	.....do.....do.
3	John Shall	Lorberry	1	7	Injured by premature explosion of a blast—died.
29	Frank Bowen	....do	.....	.....	Injured by premature explosion of a blast.
29	Wm. Tower	....do	.....	.....	.....do.....do.....do.
25	Martin Commons	Plank Ridge	.....	.....	Injured by fall of coal in the mines.
25	Andy Kennedy	Gormans	.....	.....	Injured—run over by wagons in the mines.
25	James Mucklow	Tamaqua	.....	.....	Injured—head crushed descending the slope.
25	Martin Whalen 9 persons.	Silver Creek	.....	.....	Injured—crushed between wagons in slope.
Feb. 2	Wm. Daugherty	Colorado	.....	.....	Injured by a fall of coal in the mines.
3	John Hillton	Thomas	.....	.....	Injured—lost both legs by fall of coal—died.
3	Richard Knight	....do	.....	.....	Injured by explosion of gas in the mines.
3	A miner	Boston Run	.....	.....	Injured by explosion of powder in the mines.
11	A miner	....do	.....	.....	.....do.....do.....do.
11	George Lee	Norwegian	1	2	Injured by explosion of gas in an old breast—died.
11	George Minis	....do	1	3	Injured by explosion—the same discharge of gas—now disfigured thereby.
11	A Polander	Knickerbocker	.....	.....	Injured by fall in the shaft.
11	A miner	Glendower	.....	.....	Injured—lost a thumb by the chain.
11	John Cuthbert	Rauch Creek	.....	.....	Injured by fall of earth in digging a pump way.
11	And. Rupp	Lorberry Tunnel	.....	.....	Injured—arm broken by a stroke of hammer.
16	Patrick White	St. Clair shaft	.....	.....	Injured—skull fractured by a prop in the mines.
16	Thomas Davis	Boston Run	.....	.....	Injured—leg broken by a fall of coal in the mines.
16	Boy Williams	Raven Run	.....	.....	Injured—three wagons passed over his arms.
16	M. Mooney	Girardsville	.....	.....	Injured—foot cut off by a wagon running over it.
24	John Evans 16 persons.	St. Nicholas	.....	.....	Injured by a slow blast in the mines.
March 8	Thos. Purcell	Glendower	.....	.....	Maimed in eye badly by blast—died.
3	Jno. Delaney	....do	...	.....	Maimed in hand badly by blast.
3	A miner	J. Wood's	.....	.....	Injured by suffocation of gas in mines.

March	3	A miner	J. Wood's.	....	.....	Injured by suffocation of gas in mines.
	4	Wm. Reese	Eagle Hill	.....	.....	Injured—two fingers crushed by a log.
	4	Wm. Magrath	Snyder's shaft	.....	.....	Injured badly by premature explosion of blast.
	4	Thomas Magrath	do.	.....	.....	Injured by the above cause.
	4	John Marlow	do.	.....	.....	do. do.
	5	John Edmonds	Glendower	.....	.....	Maimed—eyes and legs—by explosion of blast.
	5	Wm. D. Branan	do.	.....	.....	Maimed—hands badly—by explosion of blast.
	5	Patrick Mullin	Reevesdale	.....	.....	Maimed—leg broken by fall of coal in mines.
	5	J. Moyer	Tamaqua shaft	.....	.....	Injured by being dragged under a wagon.
	16	Wm. Major	Middleport	.....	.....	Injured by falling under loaded railroad car in motion.
	21	Sam. Klinger	Tower City	.....	.....	Injured—leg and arm broken by gangway wagon.
	21	John Combes	Pott's.	....	.....	Injured by boiler explosion at breaker, at 7 o'clock A. M., while preparing for work. The engineer appeared to be incompetent for such duty, and is blamed for the accident, by which five more lives were lost.
	21	John Sheaffer	Pott's, Wolf Creek	.....	.....	
	21	Crist. Weaver	Pott's	.....	.....	
	21	Thos. Campbell	do.	.....	.....	
	21	Jacob Friler	do.	.....	.....	
	21	Jacob Molley	do.	.....	.....	
	21	Bernard Mohan	do.	.....	.....	
	21	Alex. Leybach	do.	.....	.....	
	22	Isaiah News	Mapledale	.....	.....	Seriously injured—died shortly after.
	28	Wm. Warning	Boylen's	.....	.....	Seriously injured by a fall of coal.
	28	Julius Toste	Coply	.....	.....	do. do.
	28	George Shoen	Coply	.....	.....	Seriously injured by a fall of coal—leg broken in two places.
	28	Henry White	Greenwood	.....	.....	Seriously injured by explosion of blast—died April 26.
	30	M. O'Hara 28 men.	Hill & Harris	1	9	Seriously injured by fall of coal—died April 27.
April	2	Thomas O'Neil	Wm. Morgan's	.....	.....	Seriously injured by explosion of gas and fall of coal.
	2	Robt. O'Neil. (boy,)	do.	.....	.....	Very badly burned and poor circumstances.
	2	Wm. Maley	Glen Carbon	1	4	Injured very badly by a wagon and died of lock-jaw.
	8	Thos. H. Branan	Shulenberger's	1	6	Slightly burned by explosion of gas.
	12	Thomas Cole	Llewellyn slope, No. 2,	.....	.....	Severely burned by explosion of gas.
	12	Henry Mason	Wadesville	.....	.....	Severely injured by a fall of top coal
	12	Thos. Jackson	Silliman's	.....	.....	Severely burned by an explosion of gas.
	12	August Fleel	do.	.....	.....	do. do.
	12	Frank Quinn	do.	.....	.....	do. do.
	26	Wm. Shawerberry. 10 men.	St. Nicholas	.....	.....	Severely injured—leg crushed in the mines.
May	19	George Hehler	Hien & Glasmire	.....	.....	Severely injured by explosion of gas—died May 28.
	19	Conrad Sealbach	do.	.....	.....	Severely injured—his clothes nearly burnt off—lives.
	26	James Larkin. 3 persons.	Swatara	.....	.....	Collar bone broken by the slope rope.
June	2	Martin Whalen, Jr.	Silver Creek	.....	.....	Badly crushed by wagons in mine.
	12	A miner	Eschelman's	.....	.....	Badly crushed by a fall of coal.

TABLE No. 4—CONTINUED.

DATE.	Names of persons injured.	Locations of collieries.	Wife.....	Children...	Causes of injuries, remarks, &c.
June 12....	Mr. Volger.....	Colorado	.....	.....	Badly crushed by a fall of coal.
15.....	John H. Williams...	Eagle Hill	....	.....	Maimed—leg cut off by wagons.
22.....	John Littlefield..... 5 persons.	Colorado	.....	....	Severely—leg broken by fall of coal.
July 19.....	John Wenke.....	Whitstone's slope.....	.....	.....	Badly burned by explosion of gas.
19.....	James Boyd	.....do	.....	.....	Slightly burned by explosion of gas.
22.....	Thos. Moss. (boss,)..	Buckville.....	.....	.....	Badly burned by explosion of gas.
22.....	Chas. Dolan.....	.....do	.....	.....	.....do..... do ..... do.
22.....	Hugh Dolan	.....do	.....	.....	.....do ..... do ..... do.
15.....	Timothy Crowley....	Wood's, Shp. Mt.....	.....	.....	Badly—hands burned by explosion of gas.
15.....	Samuel Kersey	Rauch Creek.....	.....	.....	Badly crushed by a wagon in slope.
15.....	Mr. Lindsey.....	Whitstone & Co.	.....	.....	Badly—by a fall of coal—knee fractured.
26	Peter Gilbert.....	Bowman's	.....	.....	Badly—by a fall of coal.
28.....	George Becker ..... 10 persons.	Knickerbocker.....	.....	.....	Severely—by falling through the trestle-work.
August 1.....	— ——, (an engin'r,)	Gilberton	.....	.....	Foot crushed in the rollers.
1.....	John Jones	St. Clair shaft.....	1	3	Badly burned by explosion of gas.
1.....	Frank Smith.....	.....do	1	3	.....do..... do ..... do.
4.....	John W. Arthur	Honey Brook	..	.....	Badly—by a wagon—the chain broke.
10.....	Albert Koch	Hein & Glassmire.....	....	.....	Maimed for life by the defective machinery, the cage falling down the shaft with twelve men, six of which were killed; three died same night and the others linger; the three last named died same evening in the mines.
10.....	Wm. Mathews	..... do	.....	.....	
10.....	Patrick Day	.....do	1	8	
10.....	John M'Genly	Swenly & Glassmire...	1	.....	
10.....	Hugh M'Anulty.....	.....do	1	5	
10	Elisha Emanual.....	.....do	1	6	
11.....	Henry Fry.....	Turkey Run	....	.....	Leg broken in two places by wagons.
15.....	——— Donohoe.....	Kentucky.....	.....	....	Severely—by breaking of slope chain.
17	Thos. M'Manus	Crest Fraus.....	....	.....	Severely—by a fall of coal on his head.
17.....	John Fogarty.....	Good Spring	....	.....	Severely crushed between wagons.
18.....	Hugh Stride.....	St. Nicholas.	.....	.....	Severely—leg and eyes, by explosion of a blast.
18.....	Anthony Brown	St. Clair shaft.....	....	.....	Severely—in the thigh by a wagon.
18.....	A. Bower	Rauch Creek	.....	.....	Severely—on his head and hip by a fall of coal.
20	Henry Muckle.....	Middle Creek.....	.....	.....	Severely—and toes cut off by a wagon.
23.....	John O'Niel.....	Beachwood	.....	.....	Severely—and leg broken by a wagon.

	23	Joseph Phlegar	Shamokin			Dangerously wounded—died.
	29	Wm. Taylor	Preston, No. 3			Severely—thrown off a cage in the slope—died.
	29	Brian Magee	East Pine Knot			Severely—cut on his head by fall of timber.
	29	Thomas Evans	....do			Hands severely crushed by wagons.
	29	Joseph Ormsby	Shenandoah City			Severely burned by explosion of gas.
	29	Jas. Branan	.....do			.....do.....do.....do.
	29	M. Bamrick	....do			.....do.....do.....do.
		26 persons.				
Sept.	1	John Gram	Suffolk			Severely injured by a fall of coal—died.
	2	Frank Lynch	Reevesdale			Severely—ankle and ribs broken by fall of scaffolding.
	2	George Boyer	.....do			Wrist broken.
	2	Gideon Billman	.....do			Badly bruised in his person.
	3	The boss	Feeder Dam			Badly—by an explosion of gas in mine.
	3	Gottlieb Schimpp	Old West West			Badly injured by falling machinery.
	3	Frank Gallagher	Girardville			Severely—leg and arm broken—caught in screens.
	4	Hugh Straat	St. Nicholas			Severely—by a premature explosion of a blast.
	10	George Jones	Hartford			Severely injured by a fall of coal in mines.
	13	James Beveridge	Otto			Severely injured by an explosion of fire-damp.
	13	Wm. Kavanagh	Osterman's			Severely injured by a fall of coal in the mines.
	15	John Smedley	Wilson's			Severely injured by an explosion of powder.
	16	Edw. Condron	Colorado			Mortally injured—run over by cars—died.
	16	Robert Lee	St. Clair shaft			Severely—by an explosion of powder.
	16	Hugh Meade	.....do			.....do.....do.....do.
	16	M. Early	Knickerbocker			Arm cut off by fall of coal—died afterwards.
	17	Jacob Deitz	Lower Rauch Creek			Severely injured by an explosion of powder.
	17	John Henry, (boy,)	Tamaqua			Mortally injured while picking coal—died.
	17	James Irvin	Lawrence			Arm broken—badly injured by fall of coal.
	17	A fireman	Phœnix, No. 2			Seriously injured by a boiler explosion.
	17	John Meaks	St. Nicholas			Do. run over by a wagon—ankle broken.
	17	M. Brenan, (boy.)	Middle Creek			Do. run over by a wagon.
	18	John Simendenger	Rauch Creek			Do. by an explosion of gas in the mines.
	19	Henry J. Sikes	Focht & Whittaker's			Do. arm caught in cog-wheels.
	19	Levi Shoffstall	Nuttings			Severely crushed between wagons.
	19	John Simendenger	Rauch Creek			Do. by an explosion of gas in the mine.
	28	John Morgan	Althouse & Co.'s			Do. by premature explosion of a blast.
		27 persons injured.				
October	4	John Tracy	Wadesville shaft			Seriously burned by powder.
	4	P. Ferguson	.... do			.....do.....do.....do.
	4	J. Zwelkey	.... do			.....do.....do.....do.
	8	Thomas Fannon	Phœnix, No. 2	1	5	Mortally burned by explosion of gas.
	8	John O'Neil	.... do	1	4	Seriously burned by explosion of gas.
	8	James Blacker	St. Clair shaft			.....do.....do.....do.
	8	Thomas Johns	.... do			.....do.....do.....do.

TABLE No. 4—CONTINUED.

DATE.	Names of persons injured.	Location of collieries.	Wife.....	Children...	Causes of injuries, remarks, &c.
Oct. 8	Patrick Martin	Lorberry	.....	.....	Seriously burned by explosion of powder.
8	John Whitmeyer	Rauch Creek	.....	.....	Head badly injured—chain broke.
10	Chas. Goodman	Swift Creek	.....	.....	Severely burned by an explosion of gas.
10	Jacob Goodman	do	.....	.....	do do do do.
10	R. Lever	Wiggan's	.....	.....	Severely injured in the mine—died 24th inst.
10	Frederick Walter	Rauch Creek	.....	.....	Severely burned by an explosion of gas.
10	J. Walter	do	.....	.....	do do do do.
11	George Lord	Focht & Co.	.....	.....	Fingers crushed by logs and stones.
12	A miner	Wadesville shaft	.....	.....	Burned by an explosion of gas.
12	A miner	do	.....	.....	Burned by an explosion of gas—his own act
13	Thomas Jones	Newtown	.....	.....	Seriously injured by a fall of coal.
13	Frank Peters	Swatara	.....	.....	do do do do.
17	Patrick Daugherty	Raven Run	.....	.....	Seriously injured in the abdomen by fall of coal—died.
17	Dan. Snyder	Bowman's	.....	.....	Seriously injured by fall of coal in the mines.
19	Anthony Monaghan	Preston, No. 2	.....	.....	Leg broken by a fall of coal in the mine.
20	John Serrell	Wadesville shaft	.....	.....	Badly burned by an explosion of gas.
20	Joseph Tempest	do	.....	.....	do do do do.
20	John O'Neil	do	.....	.....	do do do do.
20	L. Monaghan	do	.....	.....	do do do do.
20	John O'Neil	do	.....	.....	do do do do.
20	Patrick M'Mahon	do	.....	.....	Leg cut off by a loaded wagon on the plane.
20	Patrick Mulherin	Preston, No. 2	.....	.....	Head crushed by top rock in gangway.
21	George W. Davis	Palmer	.....	.....	Fatally injured by fall of coal—died 31st.
22	Wm. Corner	Feeder Dam	.....	.....	Seriously injured by an explosion of gas.
22	John Maley	Wolf Creek	.....	.....	Legs broken and injured by a fall of coal.
24	Jacob Hentz	Nuttery's	.....	.....	Legs broken by a fall of coal in the mines.
24	John Bonawits	Rauch Creek	.....	...	Head severely cut by falling in a schute.
26	M. M'Mullen	Raven Run	.....	.....	Both eyes and arms destroyed by a blast.
26	Nicholas Purcell	do	.....	.....	Both eyes terribly injured by same blast.
29	Edward O. Gorman,	St. Clair shaft	.....	.....	Slightly injured by a fall of coal in mines.
29	Thos. Sheehan (boy)	Lorberry	.....	.....	Lost an arm in the breaker cog-wheels.
	38 persons.				
Nov. 4	Patrick Whelan	East Pine Knot	1	8	Severely burned by an explosion of gas.
4	Matthew Kelly	do	1	5	do do do do.

4	Daniel M'Cuen	East Pine Knot	1	5	Slightly burned by an explosion of gas.
4	Thomas Buckey	do			do do do.
4	James Price	do	1	4	do do do do.
4	Martin Dunn	do	1	5	Dangerously burned by an explosion of gas.
8	Jeremiah Gorman	Raven Run			Dangerously injured by a fall of coal in the mines.
10	Thomas Noble	Stella			Dangerously injured by timber falling in the slope.
14	John R. Williams	St. Clair shaft			Dangerously injured by an explosion of gas—died.
10	Christian Weaver	Swatara			Badly crushed by a wagon.
10	M. Levens and his assistant	Diamond W. Creek			Severely injured by a fall of coal.
12	Patrick M'Hale	Phœnix, No. 1			Severely injured by a chain in the slope.
12	Thos. Watkins	Kais M. H. G.			Severely burned by an explosion of gas.
12	Hugh M'Cawley	do	1	8	do do do do.
12	John O. Boyle	do			do do do do.
19	A miner	Revenue			do do do do.
20	John Reese	Coal Mount			do do do do.
21	Dennis Lee	Feeder Dam			do do do do.
25	Henry Alspach	Rauch Creek	1	2	do do do do.
25	Charley Quinn (boy)	do			do do do do.
27	George Black	Keystone			Severely burned by an explosion of a blast.
27	John Connelly	do			do do do do.
28	Patrick Gaughan	Pine Forest			Severely injured by an explosion of gas.
28	Christian Ringisen	Shenandoah	1	7	Severely injured by fall of rocks—died.
28	Joseph Hibbert	Keely Run			Severely crushed by wagons—hip broken.
Dec. 1	Washington Orme	St. Clair shaft			Crushed by wagons running over him.
2	John D. Evans	Diamond W. Creek	1	4	Severely burned by an explosion of gas.
2	David Jones	St. Clair shaft			do do do do.
2	James Bergen	Glen Carbon	1	4	do do do do.
2	John R. Williams	Oakland	1	5	do do do do.
3	John Kline	Pine Forest			Legs broken by a fall of coal.
3	Patrick Kavanagh	Feder Dam			do do.
3	Benj. Kreisinger	Enterprise			Legs broken by rolling of a log.
3	Frank Manuel	Owen & Loug's			Lost an arm by an injury.
6	John Flynn	Silver Creek			Thigh and ribs broken by a fall of rocks.
6	Henry Tobias	Swatara			Severely hurt by a fall of coal.
6	Thomas Lepper	do			Severely burned by an explosion of gas in October 12.
12	James Day	Beachwood			Mortally burned by an explosion of gas—died 13th.
12	Michael Crow	do			Mortally burned by an explosion of gas—died 18th.
13	Martin Magher	Maizes			Fingers cut off in cog-wheels at breaker.
14	Solomon Miller	Swatara			Leg broken by a fall of coal.
14	James Thomas	Big Lick Run			Leg broken by a fall of coal in November.
14	Wm. Widenmayer	Plank Ridge			Leg crushed by a fall of coal.
15	John Deener	Newtown			Injured by a fall of coal.

TABLE No. 4—CONTINUED.

DATE.	Names of persons injured.	Location of collieries.	Wife.....	Children.	Cause of injuries, remarks, &c.
Dec. 15	Jacob Williams.....	Pine Forest shaft..	.....	.....	Severely burned by an explosion of gas.
15.....	Thomas Phillips.....	.....do.....	.....	.....	.....do.....do..... .....do.
28	Killian Herth.	Middle Creek.....	.....	.....	.....do.....do.....do.
28.....	Killian Herth, Jr.....	.....do.....	.....	.....	.....do .....do..... .....do.
30.....	John E. Jones	Glendower.....	.....	.....	.....do..... do..... .....do.
	Henry Jenkins.....	.....do.....	.....	.....	.....do.....do..... .....do.

226 persons—28 of which died of their injuries. 26 persons more were injured, whose names were not furnished. 252 persons are the aggregate number maimed and injured in the county of Schuylkill.

TABLE No. 6.

Names of persons maimed and injured in and about the coal mines of Northumberland county, for the year ending December 31, *A. D.* 1870.

DATE.	Names of persons maimed, &c.	Location of collieries.	Wife.....	Children.	Remarks on how maimed and injured.
April 5.....	James Wood.....	Trevorton	.....	.....	Badly burned by powder.
Aug. 20.....	Chas. Miller	..... do..	.....	.....	.....do.....do.
June 25.....	Robert Parker.....	Gable.....	.....	.....	Crushed by a fall of rocks in the mines.
25.....	John Wild.....	Webster.....	.....	.....	Severely—by an explosion of gas—died.
25.....	Daniel Richards.....	.....do..	.....	.....	Severely—by fall of props in gangway.
25.....	Morris Downey.....	Hickory Swamp.....	.....	.....	Severely—fall of top coal in the mines.
July 2.....	John Dund.....	Trevorton	.....	.....	Severely—by fall of coal.
2.....	John Hunt.....	.....do.....	.....	.....	Severely—by a screen falling on him.
12.....	Jonas Hummel.....	Brady	.....	.....	Shoulder dislocated and body bruised.
12.....	Jacob Lesser.....	Bear Valley.....	.....	.....	Hips, shoulder and ribs broken—fall of coal.
13.....	Peter Eddy.....	Greenback.....	.....	.....	Head caught in the belting—badly.
22.....	Elijah Brewbaker...	Burnside.....	.....	.....	Arm broken—run over by a wagon.
Aug. 3.....	Mat. K. Dandow.....	Shamokin	.....	.....	Foot crushed by railroad cars.
5.....	John Dutter.....	Luke Fidler.....	.....	.....	Severely—by explosion of powder in the air shaft.
5.....	Samuel Swalm.....	Hickory Swamp.....	.....	.....	Internally injured by fall of coal.
13	John Kain, Jr.....	Excelsior.....	.....	.....	Internally injured and back hurt—fall of coal.
13.....	Thomas Steel.....	Luke Fidler	.....	.....	Face and arms badly—by explosion of gas.
20.....	Benjamin Hudson... 16 persons.	S. John's.....	.....	.....	Leg broken by a fall of coal.
Sept. 16.....	Robert Bird	Cameron.....	.....	.....	Ankle broken by a fall of coal in mines.
16.....	Gabriel Wetzell.	Bowers & Co.'s.....	.....	.....	Injured by falling off breaker building.
16.....	James Hill.....	Luke Fidler	.....	.....	Injured—fall of top rock in the mines.
20	M. Sheehan.	Brady	.....	.....	Arm broken by a fall of timbers in mines.
20.....	Philip Nagle.....	Henry Clay.....	.....	.....	Leg broken by a fall of coal in the mines.
Oct. 1.....	Adam Campbell	Locust Gap.....	.....	.....	Thigh lacerated—run over by a dirt car.
6.....	John Levitt.....	Enterprise.....	.....	.....	Died from fractured leg—by a fall of coal.
27.....	Nathan Erdman.....	Luke Fidler.....	.....	.....	Foot sprained and internal hurt, by a fall of coal.
Nov. 10.....	Wm. Harris.....	Cameron.....	.....	.....	Severely injured by a fall of coal.
10.....	Dan. Owens.....	Dan. Webster	.....	.....	Leg amputated—crushed in slope timber.
15.....	Thos. Cahill	.....do.....	.....	.....	Severely burned by an explosion of gas.

TABLE No. 6—Continued.

DATE.	Names of persons injured.	Locations of collieries.	Wife.....	Children...	Causes of injuries, remarks, &c.
Nov. 15.....	Thos. M'Cormack....	Dan. Webster.....	.....	.....	Severely scalded by a boiler explosion.
15.....	Thomas Peters.....	Shamokin	.....	.....	Severely injured by the discharge of a blast.
15.....	Thos. T. Jones.....	.....do	.....	.....	.....do .....do .....do .....do.
15.....	George Divine	Trevorton.	.....	.....	Severely injured by fall of coal.
Dec. 20.....	Christian Etzel.....	Hickory Swamp	.....	.....	.....do .....do .....do.

TABLE No. 7.

Names of persons killed in and about the mines of Columbia county, for the year ending December 31, *A. D.* 1870.
P. F. M'ANDREW, Clerk Mining District of Schuylkill.

DATE.	Names of persons killed.	Locations of collieries.	Wife.....	Children....	Remark on how killed, &c.
July 14.....	William Connelly ...	Hazle Dell.....	1	.....	Killed by a fall of a schute and maimed six others, who were on a truck when the Princeton engine run it into the schute, breaking it down and causing the accident.
Nov. 7.....	John Shoemaker... ..	Union.	.....	.....	

2 persons killed, 1 person widow, 9 persons injured.

Number of persons killed in Dauphin county collieries reported for the year 1870.

1 person killed at Big Lick slope and 2 do. injured. 2 persons injured, 1 person widow, 2 persons orphans.

TABLE No. 8.

Names of persons maimed and injured in and about the mines of Columbia county, for the year ending December 31, A. D 1870.—P. F. M'ANDREW.

DATE.	Names of persons maimed, &c.	Locations of collieries.	Wife.....	Children....	Remarks on causes of injuries.
July 14*	Pat. Monaghan	Anderson's			Injured by engine Princeton pushing a loaded truck, on which seven men were on unloading castings, under Gorrell's slate schute, and upsetting the schute on the men and truck with violence, killing Patrick Monaghan and injuring six others.
14		do			
14	[Names of the parties	do			
14	injured were not	do			
14	yet furnished.]	do			
14		do			
18	Wm. Dunn	J. E. Winkoop's			Leg broken by a wagon when at work.
Sept. 6	Daniel Munday	Hazle Dell			Injured by a fall of coal in gangway.
6	Thos. Prothero	J. M. Freck's			Injured by a discharge of a blast.

2 persons killed, 9 persons injured. 2 persons injured in Dauphin county, 1 person killed.

*Six persons were injured more or less; their names were not furnished.

LIST OF OPERATORS, *together with the quantity of coal mined by each company, firm and individual, in the counties of Schuylkill, Northumberland, Columbia and Dauphin, for the year ending December* 31, *A. D.* 1870.

NAMES OF OPERATORS.	Location of collieries.		Tons mined.
Schuylkill county.	*East Mahanoy.*		
Hosea & Longstreet	Silver Brook	1	
Lee & Wren	Delano	1	8,326
Lineaweaver & Co	Hoffman	1	15,838
Bedford & Coxe	Mahanoy	1	39,271
Lentz & Bowman	Copley	1	51,583
Focht & Whittaker	Aller & Focht	1	28,626
J. B. Boylan	Glendon	1	28,251
B. L. Eschelman	Grant	1	28,625
Gorman & Co	Oak Hollow	1	28,786
Bowman & Co	Beaver Run	1	8,011
Pomroy & Rickert	East Mahanoy	1	710
Caldwell & Connant	Primrose	1	35,739
Wm. F. Patterson	Hartford	1	10,900
Althouse & Focht	Boston Run	1	67,580
Romell, Hill & Harris	E. S. Silliman	1	19,271
Hill & Harris	Mahanoy City	1	8,716
Lee & Wren	Elmwood, (new,)	1	
George W. Cole	Tunnel Ridge	1	43,590
St. Nicholas Coal Company	St. Nicholas	1	65,089
Suffolk Coal Company	Suffolk	1	19,267
J. C. Scott & Sons	Mapledale	1	32,996
Knickerbocker Coal Company	Shenandoah, (south,)	1	32,535
Wiggan & Treibles	Bear Run	1	43,507
New Boston Coal Company	New Boston	1	4,152
M'Neal Coal and Iron Company	M'Nealville	2	69,147
M'Neal Coal and Iron Company	Coal Run	1	Incl'd. 251
J. O. Robinson	West Lehigh	1	2,480
Lee, Grant & Co	Plank Ridge	1	81,280
James Neill, trustee	Shenandoah City	1	59,975
Kendrick, Davis & Dovey	Indian Ridge City	1	New.
Richard Heckscher	Koh-i-noor	1	New. 767
D. B. Hass & Co	Turkey Run	1	12,089
Maize & Lewis	West Shenandoah	1	11,486
Atkins & Brothers	Furnace	1	35,134
Gilberton Coal Company	Gilberton	1	50,812
Hickory Coal Company	Draper	2	38,374
Lawrence, Merkle & Co	Lawrence	1	36,414
Miller & Maize	Miller & Maize	1	New.
Thomas Coal Company	Thomas	1	70,919
Philadelphia Coal Company	Colorado	1	123,550
Philadelphia Coal Company	Shenandoah	2	80,263
Philadelphia Coal Company	Lehigh, No. 3	1	New. 3,152
S. E. Griscom & Co	William Penn	1	35,304
Col. J. J. Conner & Sons	Girardsville	1	29,602
Col. J. J. Conner & Sons	M'Michael	1	
Day, Huddell & Co	Bear Ridge	1	2,568
Theodore Garrettson & Co	Girard	1	38,616
Anderson & Ryon	Union	1	41,416
Goodrich & Audenreid	Continental	1	37,653
Girard Mammoth Company	Girard Mammoth	1	39,133
S. M. Heatton	Cuyler	1	50,644
H. A. Moody & Co	Preston, Nos. 1, 2, 3 and 4	4	91,060
Moody, Brendzell & Co	Eagle	1	25,650
Emanuel Bast & Co	Union	1	29,870
J. M. Freck	Centralia	1	41,590
Robert Gerell & C. F. Norton	Hazle Dell	1	90,786
Taylor, Lendsey & Bast	Big Mine Run	1	46,514
G. S. Repplier & Co	Locust Run	1	12,695
Wm. Montelius	Stewartsville	1	69,846

List of Operators—*Continued.*

NAMES OF OPERATORS.	Location of collieries.		Tons mined.
Lewis & Atkins	Cambrian	1	18,724
James R. Cleaver	Excelsior	1	39,618
Pattersons & Eltringham		1	7,162
Jenkins & Co.	Charter Oak	1	6,684
Eltringhams & Pattersons.	Pioneer, (included,)	1	Idle.
Wm. Kendrick & Co.	Keystone	1	52
Robinson & Co.	Reno	1	20,575
S. P. Longstreet	Coal Ridge	1	2,010
Locust Dale Coal Company.	Locust Dale	1	51,302
Locust Dale Coal Company.	Miriam	1	36,096
George W. John & Bro	Eagle, No. 2, (Monitor,)	1	8,968
Graber & Kemble	A. S. Wolf	1	13,068
Graber & Kemble	Locust Gap	1	38,286
J. Bartholomew, Jr	Locust Summit	1	31,500
J. Bartholomew, Jr	Locust Spring	1	
Richard B. Douly & Co.	Ben. Franklin	1	29,170
Smith, Reese & Co.	Lady Franklin	1	New.
Mt Carmel L. M. C. company	Reliance	1	45,513
Frank Rhoads & Co	Coal Mountain	1	15,900
Henry Saylor.	Caledonia	1	6,475
S. Johns & Sons	Green Ridge	1	7,072
John H. Gable	Lancaster, No. 2	1	7,869
J. B. Langdon.	Hickory Ridge	1	6,262
Shamokin Coal Company	Hickory Swamp	1	38,054
Enterprise Coal Company	Enterprise	1	28,516
Enterprise Coal Company	Margie Franklin	1	1,388
A. R. Fisk & Co	Mount Franklin	1	New.
Excelsior Coal Company.	Excelsior	1	39,490
J. B. Douty.	Henry Clay, No. 2	1	24,480
J. B. Henry	Daniel Webster	1	17,419
Guiterman & Gorman	Greenback	1	18,966
Robertson Guiterman.	Henry Clay, No. 1	1	36,970
Bechtel, Kulp & Co.	Franklin	1	2,778
Bechtel, Kulp & Co.	Clinton	1	5,277
David Tillett & Co.	Royal Oak	1	280
May & Patterson.	Buck Ridge	1	57,269
J. B. Langdon	Big Mountain	1	56,600
S. Bittenbender	Burnside	1	37,560
Bohner, Shipp & Co	Frank Gowen	1	32,409
Burnside Coal and Iron Company	Luke Fidler	1	46,760
William Brown	Lambert	1	6,429
John Hass & Co	Cameron	1	132,411
Diamond Vein Coal Company	Shamokin	1	1,383
Shamokin and B. Valley Coal Co.	Bear Valley	1	41,199
J. E. Rathbun & Co	Trevorton	1	71,288
Schuylkill first anthracite coal	*field.*		
Summit Branch R. R. Co	Short Mountain	1	67,775
Joseph Anthony, superintendent.	Franklin Mountain	1	88,964
Wm. B. Fowle, general manager.	Big Lick and Williamstown	2	296,423
Savage & Kauffman	Brookside	1	21,830
Savage & Althouse.	Tower City	1	28,490
Philips & Shaffer	Philips & Sheafer tunnel	1	New.
W. H. Schmole.	Black Diamond	1	8,820
Henry Heil.	East Franklin	1	12,710
Miller, Groff & Co	Black Heath	1	75,128
Miller, Groff & Co	Laurel Run	1	
Miller, Groff & Co	Lincoln or Lorberry tunnel	1	
Nutting & Lewis	Eckert	1	30,786
Owen, Eckel, Colket & Co	West End	1	1,604
Owen, Eckel, Colket & Co	Colket	1	28,144
Owen, Eckel, Colket & Co	Eureka	1	1,233
Tremont Coal Company	Middle Creek	3	10,867
Winlack & Co	Newtown	1	943
Dundas. (breaker burned,)	Dundas, No. 6	1	213
C. M. Shoemaker.	Pyne	1	31,978

List of Operators.— *Continued.*

NAMES OF OPERATORS.	Location of collieries.		Tons mined.
Cain, Hacker & Cook	Otto, Red Ash	1	31,116
Cain, Hacker & Cook	Otto, White Ash	1	36,253
David Hoch & Co	Forestville	1	12,012
W. H. Whitaker & Co.	Diamond	1	15,156
Thomas H. Schollenberger.	Glendower	1	23,170
Thomas H. Schollenberger.	Black Heath	1	New.
Thomas H. Schollenberger.	Thomaston shaft	1	25,225
Thomas H. Schollenberger.	Thomaston slope	1	New.
John Wadlinger	Hecksherville	1	41,853
John Lucas	Oak Dale	1	41,740
John Lucas	Richardson	1	2,996
Pine Knot Coal Company	East Pine Knot	1	30,228
Pine Knot Coal Company	West Pine Knot	1	14,943
Kear Brothers & Co	Mine Hill Gap	1	33,263
Abandoned	White Oak	1	607
Morgan, Williams & Co.	Phœnix, No. 1	1	14,981
E. A. Packer.	Phœnix, No. 2	1	15,441
John C. Northall	Phœnix, No. 3	1	15,605
John Wadlinger	Palmer	1	3,543
Dillman & Seltzer	Dillman & Seltzer	1	1,367
Sonner, Hodge & Co.	Black Heath	1	16,876
Wolf Creek Diamond Company.	Wolf Creek	1	23,996
Kear & Ansty	Wolf Creek, (Kear,)	1	22,258
William Proute	Live Oak	1	7,689
J. K. Seigfried	Beechwood	1	38,508
Pomroy & Rukert	Revenue	1	18,611
J. W. Denning & Co	Flowery Field	1	12,002
Christian Frantz	Manchester	2	14,823
Hickory Coal Company	Wadesville shaft	1	72,500
Hickory Coal Company	Old Hickory slope	1	New.
Kendrick, Dovey & Co.	St. Clair shaft	1	48,663
Lucas, Denning & Co	Spruce Forest	1	3,697
G. S. Puppler	Mammoth, (N. Castle,)	3	Aband. 9,755
John R. Peihm	Eureka	1	1,233
George W. John & Bro.	Eagle, No. 1, (St. Clair,)	1	42,813
George W. Snyder.	Pine Forest shaft	1	24,489
Whittlesy & Co	Ravensdale	1	16,568
Feeder Dam Coal Company	Feeder Dam	1	13,952
Beddall & Robertson.	Mill Creek	1	6,508
James C. Oliver	Eagle Hill	1	42,372
J. Ryon & Co.'s Diamond C. Co.	Glentworth, (new,)	1	1,674
Abraham Focht	Commercial	2	32,104
Hine & Glasmire	New Philadelphia, (Gate vein,)	1	5,176
Harris & Williams	Ledger Vein, (Silver Creek,)	1	27,800
F. De Socarrez	Snift Creek	1	6,140
B. Robotham.	Peach Mountain	1	5,734
Schail & Donohoe	Kentucky	1	19,712
Moss & Ablett	Buckville.	1	5,980
Tamaqua Company	Newkirk. (not leased,)	1	
James Glenn & Co.	Reevesdale.	1	12,110
Borda & Donaldson	Wabash	1	1,270
Alaska Coal Company.	Alaska, (Tamaqua,)	1	14,315
Sharp Mountain Coal Company	No. 1 shaft, "	1	18,578
Eugene Borda	Greenwood, "	1	68,546
Whetstone & Co.	LeVan, "	1	16,821
George Ormrod.	East High Mines, (Tamaqua,)	1	498
Honey Brook Coal Company.	Honey Brook	3	143,970
Lehigh region.			
Buck Mountain Coal Company	Buck Mountain	1	100,957
Sharp, Weiss & Co.	Council Ridge	1	167,232
G. B. Markle & Co	Jeddo	1	257,.94
Ebervale Coal Company	Ebervale.	1	220,950
Harliegh Coal Company	Harliegh	1	146,117
Staut Coal Company	Milnesville	1	81,423
Linderman & Co.	E. Sugar Loaf	1	277,576

LIST OF OPERATORS—*Continued.*

Names of operators.	Location of collieries.		Tons mined.
A. Pardee	Hazleton	1	433,489
A. Pardee	Sugar Loaf	1	
A. Pardee	Cranberry	1	
A. Pardee	Crystal Ridge	1	
Taggart & Co.	Mt. Pleasant	1	47,281
W. T. Carter	Colerain	1	171,113
German Pennsylvania Coal Co	Trescow	1	96,787
Spring Mount Coal Company	Jeansville,	1	148,220
A. L. Mumpert & Co.	Yorktown	1	163,025

The quantity of coal transported over the lateral railroads in Schuylkill county during the year 1869 was, (tons)..... 5,170,085
Sent to market by railroad and canal..... 4,848,725
Sold in towns and villages along the line and company's use .. 321,359

The quantity supplied to the following points on line of railroad and canal:

	Railroad.	Canal.	Tot'l tons.
Leesport	5,270	14,098	19,368
Hamburg	4,933	3,621	8,554
Reading	214,875	25,263	240,138
Birdsborough	10,238	11,134	21,372
Douglasville	5,045	10,718	15,763
Pottstown	48,327	812	49,129
Phœnixville	86,076	978	87,154
Port Kennedy	12,026	.....	12,026
Norristown	193,104	2,940	194,044
Conshohocken	10,170	1,747	11,924
Springmill	.....	13,182	13,182
Swede's Furnace	14,590	.....	14,590
Robesonia	18,180	.....	18,180
Sinking Spring	116,126	.....	116,126
Lebanon	88,332	.....	88,332
Supplied to the above points in 1869	.....	.....	909,891

Increase over 1868 of 153,394 tons.

The quantity of coal sent to Philadelphia for the last ten years, &c.:

Year.	Railroad.	Canal.	Tot'l tons.
1860	305,819	495,080	800,899
1861	273,473	473,965	747,438
1862	316,631	290,583	607,214
1863	388,352	237,563	625,915
1864	373,070	307,430	680,500
1865	380,233	296,925	677,158
1866	475,180	421,525	896,705
1867	386,933	336,364	723,297
1868	697,277	255,767	953,044
1869	898,663	205,185	1,103,848
	4,495,631	3,320,387	7,815,018

The following quantity of coal was transported over the lateral railroads in Schuylkill county for the year 1869:

Mine Hill and Schuylkill Haven railroad..	1,731,245	—increase,	239,319
Mahanoy and Broad Mountain railroad...	1,549,637	"	200,827
Mill Creek railroad.....	318,830	"	32,414
Schuylkill Valley railroad.....	181,390	—decrease,	450
Mount Carbon railroad.....	237,939	—increase,	78,675
Little Schuylkill railroad	584,722	"	194,728
Lorberry Creek railroad	59,586	—decrease,	41,255
Good Spring railroad.....	84,493	—increase,	23,153
Lehigh and Mahanoy railroad	423,456		
Union railroad.....	144,080		
The tonnage of these roads this year is...	5,315,378		
The increased tonnage over 1868 is	727,891		

The coal received from the Lorberry and Good Spring mines was transported over the Union, and all coal received from the Mahanoy and Broad Mountain railroad was transported over the Mill Creek railroad, as furnished by parties having charge of the coal accounts.

SHAMOKIN COAL TRADE.

The following is the quantity of coal transported over the Shamokin division of the North Central railroad, and distributed over the following railroad lines, for the year 18—:

	Tons.
To the Mine Hill railroad.....	72,284
To the Lykens Valley railroad	6,191
To the Philadelphia and Erie railroad	87,362
To the Elmira Division railroad	136,128
To the Northern Central railway.....	105,142
To the canal to Sunbury.....	67,416
Total tonnage	474,523

Some of the operators in the Shamokin region only sent a portion of their coal over the Shamokin division of the Northern Central railroad; the correct reports of the coal trade from this region are not at hand.

COAL TONNAGE OF SCHUYLKILL DISTRICT IN 1870.

Collieries.	Shipped.	Consumed.	Total tons mined.
154 Schuylkill..	2,403,793	800,000	3,203,793
34 Northumberland.....	1,132,484	299,700	1,432,184
10 Columbia	331,074	45,074	376,074
4 Dauphin	453,814	70,000	523,814

SUPPLY OF BITUMINOUS COAL.

A study of the geology of the coal regions of Pennsylvania will show, by close approximation, that one-third of the whole area of the State contains large deposits of bituminous coal. This is sufficient to convince any one of the vastness of the bituminous deposits, its future importance and

its boundless resources, when compared with the limited area of our anthracite coal fields, can we appreciate their immense value as the most available deposits, and the easiest of access to the sea-board as a necessary fuel. The anthracite area cannot be correctly estimated, owing to their anticlinal dip, their great depths, thickness and formation, as in that case, the conclusions would be out of place, from the great number of the underlying strata "or veins," extending to several thousand feet in depth, at angles varying from 90° to 7°, forming numerous large basins throughout the anthracite coal region.—*Extract from Miners' Journal Coal Register.*

ANTHRACITE COAL AREA OF THE STATE OF PENNSYLVANIA,

And the total resources of the several regions in the anthracite regions.

REGIONS.	Area in sq. miles.	No. of sq. acres.	Thickness of coal, in feet.	No. of tons by calculation.
Schuylkill	180	115,200	100	12,041,094,643
Lehigh	44	28,160	50	1,471,705,709
Shamokin	50	32,000	70	2,341,350,000
Lackawanna	180	115,200	60	7,220,274,839
Wyoming	98	62,720	100	6,555,762,142
	552	353,280	*76	29,630,187,333

*Average thickness.

PHILADELPHIA AND READING RAILROAD.

The quantity of coal transported over the P. & R. R. R. from all sources for the year ending 1869. All anthracite coal from the Schuylkill region and bituminous from Harrisburg was 4,239,457 tons, of which amount was received—

	Tons.
From Schuylkill Valley railroad	132,325
From Mill Creek railroad	223,587
From Mahanoy and Broad Mountain railroad	1,386,339
Total delivered at Port Carbon	1,742,251
From Mount Carbon railroad	176,527
From Mine Hill and Schuylkill Haven railroad	1,120,964
From Auburn and Susquehanna railroad	106,996
From Little Schuylkill and Port Clinton railroad	542,185
Total tonnage of anthracite	3,688,923
Bituminous and anthracite from Harrisburg, Dauphin, Allentown and Alburtus	550,534
Aggregate tonnage of all sorts, @ 2,240 lbs	4,239,457

The prices of anthracite coal rose to $10 per ton part of the season, which amount would increase to the enormous sum of $42,394,570 00.

SCHUYLKILL NAVIGATION COAL TRADE.

The tonnage shipped by the Schuylkill navigation canal, for the year ending December the 31st, 1869.

Received from the following lateral railroads and from part of the Shamokin coal region:

	Tons.
At Port Carbon docks, by their own cars	253,605
At Mount Carbon docks, by their own cars	28,527
At Schuylkill Haven docks, by their own cars	393,283
At Port Clinton docks, by their own cars	23,464
Total amounts of tons shipped	698,879
Of this amount there was shipped to New York	316,389
To Philadelphia and its vicinity	203,236
Amount	519,625
The balance shipped to thirty other different points of	179,254
	698,879

The canal tonnage, though the season was slack, owing to low water, which detained the boating some five weeks in the briskest part of the season, amounted to 698,879 tons, a decrease under the shipments of the previous year, of 288,749 tons.

The P. & R. R. R. tonnage this year is	4,239,457	@	$10=	$42,394,570
The canal tonnage this year is	698,876	@	10=	6,988,790
Amount of tonnage and price	4,938,333			49,383,360

Thus it is seen the canal transported but about one-sixth of the tonnage of the railroad or the one-seventh of the whole tonnage of the Schuylkill region. Its shipping capacity materially depends on the season, and the surplus water retained in the reservoirs is not adequate to sustain a full supply for a good boating season.

NORTHUMBERLAND COUNTY COAL TRADE.

The following quantity of coal was shipped from Northumberland county for the year ending December 31, 1869; was 974,017 tons, distributed as follows over the different railroads, viz:

	Tons.
East, *via.* P. & R. R. R.	541,255
West, *via.* Shamokin division Northern Central railroad	408,014
Zerbe Valley railroad	18,139
Lehigh Valley railroad	6,609
Total	974,017

DISTRIBUTION OF COAL.

[*Extract from coal statistics.*]

This statement will give a synopsis of the quantity of anthracite coal shipped to the seaboard, and consumed in the coal region, for the year ending December, 1869, as will be seen by the following statistical distribution of the whole supply of anthracite furnished by the different sections or mining department, as follows, viz:

	Tons.
By Philadelphia and Reading railroad	3,178,039
By Schuylkill Navigation canal	591,814
By North Pennsylvania railroad	171,296
By Lehigh coal to Bristol	185,011
To Philadelphia and vicinity	4,126,160
By Delaware and Hudson canal	1,254,480
By New Jersey Central—Lehigh coal	610,003
By New Jersey Central—Lackawanna coal	810,896
By Pennsylvania coal company	775,611
By Morris and Essex railroad	360,066
By Morris canal	129,895
By Lehigh, Delaware and Raritan canal	247,345
By Belvidere and Trenton railroad	455,684
To New York and vicinity	4,643,980
By Northern Central railroad	146,534
By Wyoming and Tide-water canal	123,706
To Baltimore and vicinity	270,240
Total anthracite coal sent to the seaboard	9,040,380

QUANTITY SUPPLIED SHORT OF TIDE-WATER.

By Philadelphia and Reading railroad	923,504
By Schuylkill navigation	113,549
Total supply in Schuylkill valley	1,037,053
By Lehigh Valley railroad	676,866
By Lehigh and Susquehanna railroad	159,726
By Lehigh canal	58,319
By Delaware Division canal	35,681
By North Pennsylvania railroad	55,609
By East Pennsylvania railroad	10,219
Total supply to Lehigh valley	996,420
By Delaware and Hudson coal company	128,066
By Pennsylvania coal company	191,024
By Delaware and Lackawanna railroad, (west,)	453,173
Total to New York State	772,263
By New Jersey Central railroad	135,163
By Morris and Essex railroad	192,217
By Morris canal	151,022
By Belvidere and Delaware railroad	72,539
Total to New Jersey	550,941

	Tons.
By Wyoming canal, (short of tide-water,)	225,000
By Sunbury, (west,)	223,490
By Northern Central railroad, (south,)	414,665
Total	863,155
By total sent to market, short of tide-water	4,219,832
Add coal consumed in the coal region, (estimated,)	2,500,000
Total	6,719,832
Total sent to tide-water	9,040,380
Aggregate coal tonnage supplied in 1869	15,760,212

This is the first time that any reliable statistical report has been made of the amount of anthracite coal mined and consumed, since the general mining business got in full operation. It shows the quantity consumed on the different lines of traffic, and also the quantity sent to the seaboard. It will be seen by the above, that but 9,040,380 tons of the anthracite coal reached tide-water, and that 6,719,832 tons was consumed inland.

It will be observed that the valley of the Schuylkill took 1,037,053 tons, and that the valley of the Lehigh only used 996,420 tons, although the iron trade of the valley of the Schuylkill is not in so encouraging a condition as that of the Lehigh valley.

PORT RICHMOND COAL TRADE.

The following, which is furnished from accounts given at Port Richmond, shows that there was shipped:

	Tons.
To east of New York	1,247,657
To New York State	611,457
To New Jersey State	140,630
To Pennsylvania, and vicinity of Philadelphia	206,697
To south of Pennsylvania	154,459
To foreign ports outside of the United States	17,182
Total	2,378,082

It will be observed that the quantity of coal shipped south and to foreign ports from Philadelphia is small in comparison what is shipped east.

Compiled chiefly from coal, iron and oil, from Statistic Bureau at Washington, for 1869.

COUNTRIES SENT TO.	Imports of bituminous, tons.	Value of same.	Imports of anthracite, tons.	Value of same.
England	83,014	$303,445	.....	.....
Scotland	5,603	13,115	.....	.....
Ireland	302	743	.....	.....
Canada	257,185	630,571	176,452	$951,761
British West Indies	30,560	123,017	353	2,265
British East Indies	100	536	1,541	3,165
Australia	9	60	.....	.....
Hamburg	42,034	13,241	.....	.....
French possessions in America	232	1,097	.....	.....
All other French possessions	40	183	87	815
Brazil	137	481	.....	.....
Mexico	11	20	2,013	8,952
Uruguay and Chili	24	96	12,186	71,152
Danish West Indies	4,330	18,518	463	4,009
Venezuela	20	49	1,077	3,921
Cuba	.....	.....	853	3,361
Porto Rico	.....	.....	10,643	64,510
China	.....	.....	32	230
Dutch East Indies	.....	.....	21,511	117,744
Dutch West Indies	.....	.....	2,900	15,370
	423,601	1,205,172	230,111	1,247,255

Most of the following general and statistical information on the productions, consumption, deposits, areas of coal beds and coal veins, etc., have been compiled by permission of B. Bannan and Samuel Harris Daddow, from their work on coal, iron and oil; a work of extraordinary merit on general subjects, relating to geology and formation of coal, iron and oil, a work on our mines and mineral resources, recently published by Messrs. Bannan & Daddow, Pottsville, Pa.; a book containing a large amount of original matter, highly recommended by the press, *Philadelphia Press*, *Philadelphia North American*, *Boston Advertiser*, *Philadelphia Inquirer*, *Scientific American*, *Washington Chronicle*, *N. Y. Tribune*, letters of H. C. Carey, Schuyler Colfax, J. Fulton, C. D. Wilber and others, for which permission I am obliged.

COUNTRIES FROM.	Tons, imports.		Tons, exports.	
	423,601	$1,205,172	230,111	$1,247,255
Japan	.....	.....	16,307	88,599
United States of Columbia	.....	.....	32,332	182,918
Hawaiian Islands	.....	.....	446	2,911
Hayti	.....	.....	1,934	9,590
Central American States	.....	.....	1,995	11,970
All Portugese possessions	.....	.....	44	392
All other countries	204	1,020	.....	.....
British possessions in Africa	.....	.....	585	3,265
	423,805	1,206,192	283,754	1,546,900

423,805 tons of bituminous coal entered the United States, costing $1,206,192 00, which is equivalent to $2 82½ cents per ton, whilst there was exported from the ports of the United States 283,754 tons, costing $1,546,900 00, which is equivalent to $5 42 per ton.

All the coal imported was bituminous. The exportations consisted o bituminous, semi-anthracite and anthracite. Up to the close of the last fiscal year no distinctions were made in the kind exported. Mr. Walker states henceforth they will be kept separate.

To show how the proportions run he has shown that in

	Tons.			Tons.	
July	30,534	@ $141,303	—other coal,	5,912	$36,891
August	14,285	70,313		10,771	80,109
September	12,540	65,409		15,679	117,144
	57,359	277,025		32,362	234,144

No doubt the unsettled state of the Southern States in the year 1869 was such that the demand for commercial coal was very limited, the prostrate condition of the iron interests in those States was comparatively idle, and it necessarily required a settled state of trade and society to again resume its former status, before merchants would resume an active business. But this happy state of affairs is rapidly gaining ground, from the friendly and charitable policy shown to those rebellious sections of the nation by the present administration, a renewed confidence is rapidly restoring the people to a more lasting and permanent commercial and mercantile alliance, which will no doubt stimulate the whole people north and south.

FUEL ON THE SEABOARD—ANTHRACITE AND BITUMINOUS COAL.

In consequence of the great consumption of anthracite coal on the sea-board, but little attention has heretofore been bestowed on the bituminous coal trade of the country. But the time has arrived when this trade must attract its share of commercial importance on the sea-board, or in a short time it will be found the prices of fuel will increase pretty rapidly.

	Tons.
The whole quantity of anthracite sent to market in 1869 was	13,221,860
Of which reached the sea-board was	9,000,000
Leaving consumed short of tide-water	4,221,860
The whole quantity of bituminous and semi-bitminous coal to tide-water	3,886,930
Consumed short of tide-water was	1,200,000
	5,086,930
Total supply to the sea-board was	12,886,930
Total supply short of tide-water was	5,400,000
Total sent to market was	18,286,930
Total consumed in the coal region	3,713,075
Total, including all coal mined in this State south of the Alleghenies	22,000,000

This quantity of coal is produced by a population not exceeding 650,000, and from a comparatively small area of territory. This trade is gradually growing up since 1820, which year it reached 360 tons.

The investments for Schuylkill county alone, where were mined 6,500,000 tons of coal in 1870, an idea can be formed of the necessary investments required to transport 22,000,000 of tons of anthracite and bituminous coal to market. The total present investments in railroads and canals alone, we presume, cannot fall short of $305,000,000.

A glance at the trade exhibits the following results:

In 1855 the reciprocity treaty was confirmed with Canadas, which permitted Nova Scotia coal to be imported duty free. In 1855 Nova Scotia imported 103,222 tons of coal. In 1865 this treaty was terminated with that province. In 1866 we imported from Nova Scotia the largest quantity ever imported in any one year, which was 465,194 tons. Increase in ten years of 361,972 tons.

The semi-bituminous and bituminous coal trade of the United States, transported to the seaboard, was in—

	Tons.
1855	963,779
1865	2,373,512
Increase in ten years of	1,459,933
Which is equal to an annual increase of	140,973

In 1866 the tariff of $1 25 per ton in gold was charged on Nova Scotia coal. We now give the average prices of N. S. coal and that of the Cumberland coal at Boston from 1861 to 1869, inclusive, as taken from the Boston shipping lists.

	Nova Scotia coal	Cumberl'd coal	Freight	Am't cost.
1861, at Boston	$4 67	$3 44	$2 25	$5 69
1862, free at Boston	5 60	4 23	2 42	6 65
1863, ...do	7 40	5 57	3 28	8 85
1864, ...do	10 40	6 84	3 39	10 23
1865, ...do	9 60	7 57	3 59	11 16
1866, duty $1 25 at Boston	8 54	5 94	3 53	9 47
1867, ...do....do	8 10	4 97	2 68	7 65
1868, ...do....do	8 16	4 71	3 21	7 92
1869, ...do ....do	7 78	4 97	2 83	7 80
1870, ...do ....do	7 25	....	....	....

These figures clearly demonstrate the state of the trade in the years 1861 to 1864, that the Cumberland coal trade nearly perished under the free trade system, whilst it took from revenue over $516,000 and drove our own coal out of the New England market, and in the winter of 1865, when there was no duty on Nova Scotia coal, they ran up the prices as high as $15 50 per ton in Boston; and owing to the scarcity of the Cumberland coal the traders took this advantage of the state of affairs. After the duty was put on the Canadian coal both coal fell in price, but our coal was much lower than Nova Scotia coal, as the foregoing figures prove. The argument, therefore, that the imposition of duties enhanced the price of our bituminous coal to consumers is effectually disproved by these official figures. The duty of $1 25 per ton on N. S. coal did not increase the price of that coal, because it fell in price also, but the supply diminished, while that of our own coal was largely increased at these reduced rates, and the producers, and not the consumers, paid the duty.

In connection with this we give the average prices of coal, (anthracite coal,) on board of vessels at Philadelphia for the same period, together with the rates of duty. These official figures are correct and we challenge contradiction, and are arguments much more reliable than mere assertions:

Years.	Duty.	Prices on board ships.
1861	Canada coal free	$3 39 per 2,240 lbs.
1862	"	4 40 "
1863	"	6 06 "
1864	"	8 39 "
1865	"	7 86 "
1866	$1 25	5 80 "
1867	"	4 37 "
1868	"	3 86 "
1869	"	5 37 "

Now consult these figures closely. In 1834 a duty of $1 68 per ton on foreign coal, and an average price for that year was $4 84. The compromise of 1833 reduced the duty to 20 per cent. in 1839 and 1840, and the prices rose as duties decreased. In 1842 the highest duty ever imposed on foreign coal was enacted, ($1 75 per ton,) and then prices immediately lowered to $3 27 in 1843. The average prices maintained for the seven years preceding 1849, was $3 63 per ton. From this period steam power has superseded all other modes of power for moving machinery in the preparation of coal, which cheapens and increases production, and since then the trade is more regular and prosperous. The stimulus given to the trade kept low prices under the reduced duty, to 24 per cent. But when the foreign coal was admitted free in 1854, under the treaty of that year, prices instantly rose, and would so continue were it not for the great monetary revulsion of 1857, which cause was want of adequate protection to home industry, and an excess of commercial industry and importations which broke down the general business of the country, and from that time the condition of business suffered up to the rebellion. In 1866 again, a duty of $1 25 was imposed on all foreign coal, by the abrogation of the reciprocity treaty.

In 1866 the supply of semi-bituminous and bituminous coal, mined in the United States and moved to the seaboard, was 2,995,533 tons; in 1869, 4,839,745; increase in four years, 1,844,212 tons, which is an average of 461,051 tons annually, while the increase for 1869 was 917,806 tons, which increase in one year is 101,697 tons more than the total tonnage of foreign imported coal, from all sources, in the years 1868 and 1869, which amounted, in the aggregate, to only 826,109 tons, and was sold, at reduced rates, on board vessels, for the last two years, than in 1862. Our bituminous is preferable to manufacturers, from its non-combustion quality, to the N. S. coal, and whilst our anthracite is chiefly sought for domestic purposes.

The Nova Scotia coal, when stocked in large or small quantities, is liable to spontaneous combustion. Many of our gas coals are superior to Nova Scotia coal and is now largely used. Pennsylvania sent upwards of 400,000 tons of gas coal to New York in 1869, and Virginia sent 269,158 tons of gas coal to Baltimore. These figures disprove every assertion made by Nova Scotia interest, and prove also that the United States must depend on developing her own internal resources, and to supply our own markets with cheap fuel in times of war as well as in times of peace.

While the Canadian coal resources is but limited, and cannot supply our increased market, yet they can supply sufficient to check our home markets and cripple our investments as the abrogation of duty did in 1854.

In 1885, fifteen years hence, the interests of the country will probably

require 25,000,000 tons of fuel for home use. Of this quantity not over 9,000,000 of tons can be expected as part of this supply from the anthracite regions of Pennsylvania. The bituminous regions will be looked to for the balance of the supply, say 16,000,000 tons, to keep prices at a fair market on the seaboard. To show this estimate is not overdrawn, we will state the increase in the supply for the last ten years averaged, annually, 1,081,163 tons; one year the increase was 3,300,000 tons. It will only take an annual increase of 1,666,600 tons for the next fifteen years to run up to 25,000,000 of tons. We don't apprehend that these figures are too high if the internal interests of the county are sustained by Congress, and the capital of the country is secured from external influence of foreign countries, which would only benefit the few speculators that abandon their country and principles and invest in foreign trade. To secure the transportation of this quantity of coal, it will require an investment in transportation facilities amounting to $300,000,000, independent of the vast sum it will require to open up new collieries, erect buildings and machinery. We think these estimates are safe whatever.

THE DEEP ANTHRACITE BASINS OF SCHUYLKILL.

Development of those deep basins.

The future increase in the production of coal, from this region, must come from these deep basins, which contain the nine-tenths of our future supply. Any increase production from surface works, as drifts and slopes, or small shafts, cannot be depended upon and will be more than counterbalanced by the rapidly exhausted and abandoned mines.

Whatever may be the increase in the anthracite trade, this increase must be obtained from comparatively deep basins and deep shafts. Not the increase in the near future, only be obtained, but the production cannot be procured from our present shallow mines, which are at present at their maximum capacity. Every year will diminish their return and demand much deeper sinking, and develop more coal by deeper penetration to the lower basins.

Our remarks will be confined to the first, or southern coal field, because in this field the limits of the out-crop production has already been reached; in fact, its production must rapidly diminish, unless deep basins are open, as the manner of mining this out-crop working have been ruinous to vast bodies of coal left behind, by a system of unpractical mining and an overdrawn production from poorly managed collieries.

We mean the coal produced from those basins in which the beds appear at the surface, and are available to drifts, tunnels and slope openings.

Exclusive of the Mine Hill basins the two first tier of basins south of the Mine Hill may be denominated "out-crop basins." The first irregular line of shallow basins represented by "Windy Harbor," "John's Basin," "Mount Laffee," and similar basins along the southern slope of the Mine Hill ridge, east and west, have generally a double out-crop, or north and south dip. The second tier of basins has only one out-crop, and that not always continuous or uniform, on the Mammoth. From the narrow basins north of the Mine Hill ridge, and these two basins, the entire production of the hard white ash of the south coal field has been obtained, with the insignificant exception of a trifling quantity from the Sharp mountain outcrops, and the semi-anthracite obtained from the Dauphin fork of the western end of this field as it approaches near Susquehanna river.

The old way of mining by drifts and slopes can only be pursued in these out-crop basins, and only to a limited extent in the second tier of basins,

because the veins are interrupted by many irregularities, which in many cases become a permanent bar to slope operations, while the long slope dips of its southern axis is very objectionable.

Perhaps less than one-third of the coal of this second tier of basins can be obtained by slope operations, though we find it already penetrated by shafts below the second and third lifts of the slopes on its out-crops from Eagle Hill to Wadesville and to Heckscherville.

The Mammoth Vein coal bed, in the second tier of basins, shafts from 500 to 1,000 feet deep will be required to penetrate their synclinals. We have reliable data on which to base the estimate of 1,000 feet as the maximum depth of the second tier of basins.

It is not positively necessary that a shaft should be sunk to the lowest point of the basin, because when these veins dip to any considerable angle the coal may be operated by means of slopes driven along these angles, and the coal brought to the bottom of the slope and raised by slope machinery. The shaft has been found to be the most economical and best plan for mining in these basins, and incurs less expense and is the safest method for developing the resources of the mine. Though it is a matter of outlay at first, shafts of much less depth will reach the deep veins of the second basins at many available points, affording very extensive breast works, as are to be found at Pine Forest shaft and Thomaston. These shafts might be more favorably located, but circumstances, which commonly predetermine these questions, and situation and convenience is consulted.

The deep basins in which the Mammoth vein does not out crop, are three in number, not including the small surface basins, which do not at all affect the deep coal beds. The first deep basins are on the third tier south of the Mine Hill. These basins range from 1,000 to 1,500 feet deep to the synclinals of the Mammoth vein, as a general rule through the horizontal strata; few places a shaft can be availably located on these basins between Tuscarora and Donaldson, below the out crop of the Tracy or (K.) vein, while generally the synclinal of the Tracy basins are from 300 to 500 feet below the surface, on the Mill Creek and Delaware tracts, through which the third tier of basins range.

The fourth and fifth tiers of basins range from 1,500 to 2,000 feet in depth to the synclinals of the Mammoth or E. vein, while the basin of B. is from 400 to 500 feet deeper; their development is more a matter of time and necessity; but the third tier is now available, and their development is urgently demanded by every industrial measure, and mining, manufacturing and commercial interest of the country.

Carbonate iron ores which chiefly out crop in the third basins, are considered to be of some importance, however very little attention has been bestowed on their development as to bring them into commercial importance. The iron ores of the anthracite measures are confined to a very limited portion of the strata near its centre. They exist exclusively in the soft slates, which form nearly all the productive soils within the coal field. Those slates rapidly decompose when exposed to the action of the atmosphere; all the ores that exist in these strata are enveloped to a great depth with a crumbling cover.

TABLE No. 11.—*Of tons of coal per acre; weight of bituminous coal in tons per acre, from one foot thick to twelve feet eleven inches; calculated for a specific gravity of* 1.25; *computed from reliable statistics*—HOPTON.

FEET THICK.	Tons.	1 inch.	2 inches.	3 inches.	4 inches.	5 inches.	6 inches.	7 inches.	8 inches.	9 inches.	10 inches.	11 inches.
1	1,519.25	1,645.85	1,772.45	1,899.06	2,025.66	2.152.27	2,279.87	2,405.48	2,532.08	2,658.69	2,785.29	2,911.89
2	3,038.50	3,165.10	3,291.70	3,418.31	3,544.91	3,671.52	3,798.12	3,924.73	4,051.33	4,177.94	4,304.54	4,431.14
3	4,557.75	4,684.35	4,810.93	4,937.56	5,064.16	5,190.77	5,317.37	5,443.98	5,570.58	5,697.19	5,823.79	5,950.39
4	6,077.00	6,203.60	6,330.20	6,456.81	6,583.41	6,710.02	6,836.62	6.963.23	7.089.83	7,216.44	7,343.04	7,469.64
5	7,596.25	7,722.85	7,849.45	7,976,06	8,102.66	8,229.27	8,355.87	8,482.48	8,609.08	8,735.69	8,862.29	8.988.89
6	9,115.51	9,242.11	9,368.71	9,495.32	9,621.92	9,748.53	9,875.13	10,001.74	10,128.34	10,254.95	10,381.55	10,508.15
7	10,634.76	10,761.26	10,887.96	11,014.57	11,141.17	11,267.78	11,394.38	11,520.99	11,647.59	11,774.20	11,900.80	12,027.40
8	12,154.01	12,280.61	12,407.21	12,533.82	12,660.42	12,787.03	12,913.63	13,040.24	13,166.84	13,293.45	13,420.05	13,546.65
9	13,673.27	13,799.87	13,926.47	14,053.08	14,179.68	14,306.29	14,432.89	14,559.50	14,686.10	14,812.71	14,939.31	15,065.91
10	15,192.52	15,319.12	15,445.72	15,572.33	15,698.93	15,825.54	15,952.14	16,078.75	16,205.35	16,331.96	16,458.56	16,585.16
11	16.711.77	16,838.37	16,964.97	17,091.58	17,218.18	17,344.79	17,471.39	17,598.00	17,724.60	17,851.21	17,977.81	18,104.41
12	18,231.02	18,357.62	18,484.22	18,610.83	18,737.43	18,864,04	18,990.64	19,117.25	19,243.85	19,370 46	19,497.06	19,623.66

A STATEMENT *of the number of new slopes open as new lifts in the collieries of Pottsville, No.* 1 *district, for the year ending, Dec.* 31, *A. D.* 1870.

	Names of colliery.	Locations.	Depth in yards...	Operators' names.
1...	Diamond slope.....	Forestville.....	100	Vanderhelden & Hoch.
2...	.....do.....	Do. Woodside	50	.....do.....do.
3...	Glendower slope	Mt. Pleasant.....	100	Thomas H. Shollenberg.
4...	Glen Carbon slope	Glen Carbon.....	100	Lucas, Demungs & Co.
5...	Thomaston, sinking...	Thomaston	100	Schollenberg & Co.
6...	Live Oak slope..	West Mt. Laffee	100	William Proutt.
7...	Wolf Creek.....	Wolf Creek.....	100	Messrs. Kear & Anstey.
8...	Eagle Hill slope	Eagle Hill.....	100	James C. Oliver.
9...	Glenworth slope	Eagle Hill	100	J. Ryon and Wren & Co.
10...	Peach Mt. slope.....	Tuscarora.....	65	Rowbotham & Co.
11...	Swift Creek slope.....	Do. West.....	100	Van Winkle & De Socarrez.
12...	St. Clair, (new,).....	St. Clair	.....	George & William John.
13...	Tuscarora slope.....	Tuscarora.....	100	Pardee & Roberts.
14...	Mt. Side slope	New Kirk.....	110	Tamaqua Company.
15...	Buckville slope.....	Buckville.....	100	Moss & Habbletts.
16...	Novelty slope..	New Philadelphia	.....	William Morgan & Co.
17...	Black Heath.....	Mt. Pleasant.....	.....	Schollenberg & Co.
18...	Heckscherville.....	Heckscherville.....	.....	John Wadlinger & Co.
19...	Silver Creek.....	Silver Creek	100	Focht & Co.

Ashland, No. 2 *district.—New lift slopes.*

1...	Keystone.....	Locust Dale.....	.....	Kendrick & Dovey.
2.....	Locust Dale.....	.....do	.....	Locust Dale Coal Co.
3.....	Tunnel slope.....	Ashland	.....	Patterson & Eltringham Sons.
4.....	.....do.....	.....do	.....	
5.....	Preston, No. 3	Girardsville	.....	H. A. Moody & Co.

A STATEMENT *of abandoned slope collieries in the First district, Pottsville, from the commencement of slope collieries to the close of* 1870.

	Names of collieries.	Locations.		By whom operated, &c.
1...	Gate slope.	Pottsville	1	Charles Lawton.
2...	.....do.....West	.....do	1	James Thomas.
3...	Sharp Mountain	.....do	1	Alfred Lawton.
4...	Yorkville Farm	.....do	1	G. H. Potts.
5...	Duncanville	Near Pottsville	1	George Rich.
6...	Duncan.....	.....do	1	Duncan Coal Company.
7...	North America.....	.....do.....	2	North America Coal Co.
8...	Delaware, West.....	.....do	3	Delaware Coal Company.
9...	.....do .....East.....	.....do	2	Delaware Coal Company.
10...	North America	..... do	1	E. W. Maginnis.
11...	Sharp Mountain	.....do	1	Van Winkle & De Socarrez.
12...	Young's Landing.....	.....do	1	
13...	Greenwood.....	In Pottsville.....	1	Esquire Nice.
14...	Sharp Mt., East.....	Near Pottsville.....	1	John C. Nevills.
15...	Guinea Hill.	In Pottsville.....	1	Charles Potts.
16...	Connecticut shaft.....	Near Pottsville.....	1	Connecticut Coal Company.
17...	West Wood slope.....	.....do	1	Fogarty & Co.
18...	Old Salem slope.....	.....do	1	Haywood & Milnes.
19...	Delaware, No. 1.....	Minersville.....	1	Spencer & Brother.
20...	Mt. Foot, Mine Hill G.	.....do	1	Wallace & Rothermel.
21...	.....do .... do.	.....do	1	Goodman Dolbin.
22...	Wolf Creek, Red Ash,	.....do	1	Potts & Audenreid.
23...	Wolf Creek.....	.....do	1	Morgan Brace.
24...	Minersville.	At Minersville.	1	G. S. Repplier & Brother.

STATEMENT—*Continued.*

	Names of collieries.	Locations.		By whom operated, &c.
25...	New Castle, (east,).....	New Castle..	1	Fogarty & Kelly.
26...	New Castle, (east,).....	.....do.....	1	Parmelee & Douty.
27...	L. C. Daugherty	Mine Hill..	1	L. C. Daugherty.
28...	Green Briar.....	.....do.....	1	Thomas, Wren & Co.
29...	Dexter.....	Mt. Laffee	1	Llewellyn and others.
30...	Revenue, (idle,).....	.....do.....	1	Pomroy & Eckert.
31...	Primrose, (north,).....	.....do.....	1	
32...	Mine Hill Gap.....	Near Minersville.....	1	W. & C. Hill.
33...	Thomaston shaft.....	.....do.....	1	Manhattan Coal Company.
34...	Coal Castle.....	Coal Castle..	1	John Maginis.
35...	New Castle slopes	N. Castle.....	3	George S. Repplier.
36...	Wadesville slope	Wadesville..	1	James Thomas.
37...	Wadesville slope	.....do..	1	Jonathan Wesley, Sr.
38...	St. Clair slope.....	St. Clair	1	Kirk & Baum.
39...	Mt. Hope slope.....	.....do.....	2	George W. Snyder.
40...	Primrose slope.....	.....do. (east,)	1	——— Griffith.
41...	Primrose slope.....	.....do. (west,)	1	G. Parvin & Co.
42...	Primrose sh't & slope,	.....do.....	2	Beatty, Holmes & Garretson.
43...	Gorman, old slope	.....do.....	1	Gorman & Co.
44...	Red Ash slope.....	.. ..do..	1	Beatty & Co.
45...	Red Ash slope.....	.....do.....	1	E. W. Maginnis.
46...	Mill Creek slope	.....do.....	2	George W. Snyder.
47...	Port Carbon slope.....	Port Carbon.	1	Richard Jones.
48...	Capewell slope..	St. Clair	1	Samuel Capewill & Bros.
49...	Windy Harbor ..... '...	Near St. Clair.....	1	Henry Guiterman.
50...	Windy Harbor	.....do.....	1	Whitfield & Co.
51...	Five Points slope..	Near Port Carbon..	1	Eckert & Co.
52...	Oliver's slope.....	Combola.....	1	James C. Oliver.
53...	Bear Ridge	.....do.....	1	
54...	Tucker's slope.....	Silver Creek.....	2	Murry, Winlack & Randal.
55...	Neal's slope.....	.....do.....	1	James Neal & Co.
56...	Novelty slope..	New Philadelphia	1	J. J. Conner & J. O. Rhoades.
57...	Kaskawilliam	Middle Port.....	3	P. D. Luther & Co.
58...	Hartman slope.....	Mt Pleasant.....	1	
59...	Holmes's Vein slope...	St. Clair	1	Wm. Price, of St. Clair.
60...	Tuscarora slope.....	Tuscarora.	1	Carter & Co.
61...	Tucker slope	Upper Tuscarora.....	1	Tamaqua Company.
62...	Tamaqua Gap slope....	Tamaqua.....	1	D. slope...do.
64...	Greenwood slope.....	.....do.....	1	E.
65...	Greenwood slope.....	.....do.....	1	F.

REFORMS IN MINES.

The reforms needed in many of these collieries was to effect a proper plan for ventilation, requiring some time and involving considerable expense in its execution, which the then condition of the mine would not remunerate until further progress be made, or a new lift driven. This required expensive machinery and a full treasury to further develop the colliery. Collieries so circumstanced should be carefully considered before forcible proceeding should be instituted against its interest, whilst its present condition, under ordinary care, would not involve the life or interest of the miners, and to exercise such judgment as the merits in those cases requires, is no trifling subject; many such collieries are daily to be met with throughout the coal region.

Some collieries we visited last year, were to be abandoned this present season, chiefly caused by being nearly worked out, the over-worked condition of the mine, or the expired term of the leases and other causes. The miners in such collieries were suffering a little from poor ventilation, owing to the above causes, and the severe crushings of the upper old works, which destroyed all the permanent locations for out-east air shafts; and such per-

manent locations, if found, would not warrant its removal, fearing the closing in of districts of the mine. This was a subject which required very careful attention, as a hasty course pursued in such cases as the stoppage of a colliery would necessarily suspend labor, and throw hundreds out of employment; such an act would directly conflict with the interest of the land owners, operators and miners alike. Our instructions and advice were to secure all the safe approaches for the men, and take advantage of every feasible circumstance, assist ventilation by every means, and extract what coal that could safely be removed, until the final abandonment of the mine. The great evil to contend with in such mines was powder smoke, whilst it could not be easily avoided.

OPERATORS.

The operator must necessarily risk every hazard, of which, indeed, many exists; the first of which are rock or coal faults, tunnels and ventilation channels, the wear and tear of machinery and stock, the suspensions of miners and market fluctuations, cost of transportation and superintendents, together with thousands of other items, which gradually but surely follow.

The production must eventually overcome all these burthens, so as to leave the tenant a margin for profit, and very often, after long and fruitless toil, he retires a ruined man from the effects of some or all the above causes; whilst others, again, who are more fortunate, gradually accumulate a splendid competency, but this is often the result of mere accident in business, or the great resources of the colliery. But whatever this may be, such profits are but a small percentage on the large amount expended. Therefore the greatest care and skill, combined with good judgment, are necessary to be exercised at every point, outside as well as inside, in savings, as the very best regulated colliery in the district has its percentage of loss.

MINERS.

The miners, as a class of people, are hard working men, many of which are inured to this sort of slavish labor from youth; and of all the calling of man, there is none else attended with such perils and dangers. His health, life and the maintenance of his family is imperiled by incalculable dangers, as falls of rock, coal, blasts, crushes, explosions, closing in of the mine, derangement of ropes, chains and machinery, the inhalation of noxious gases and deleterious effluvia of noxious vapor, which certainly destroys his vital functions, and shortens a life naturally allotted to man, so that slowly but too surely destroys his vital functions and claims him a victim for an early grave. Were it not for his habits and associations, his life, indeed, would be direful and extremely pitiable.

It is well known that male and female, old and young, worked in the English and Welsh mines, and not until the happy accession of Princess Victoria to the throne of Great Britain that females were prohibited from the slavery of the mines.

Chiefly owing to the condition of some of the mines those who had profitable collieries accepted the basis with but little hesitation, whilst the other class reluctantly complied and continued the agreement to the close of the year, and until the prices of coal steadily reduced to a point at which this basis could not warrant scarcely any of the collieries to be kept in operation. The cost of production and transportation was such, together with the downward tendency of the gold markets and stocks, breadstuffs, fabrics and general business, that to continue mining and forcing the coal to

the seaboard the prices would in that event decline still lower, and the consequence would be a general prostration of the trade. Purchasers would not bind themselves to contracts, the operators seeing their only hope lay in suspension for a time. The miners appeared to be persistent in their demands; any attempt at reconciliation was futile, neither party yielding. Finally the operators and coal dealers consented to yield to a basis fixed at $2 50 per ton as above. This was rejected by the miners and became more inflexible, until finally it subsided into a controversy through the press.

Some water level collieries, which do not entail much expense, with others which were operated by companies, others that were forced to continue their repairs and improvement, kept on slowly at former rates, but scarcely paying expenses. The majority of the miners left for other sections and were employed at any thing. The prostration throughout the district was very distressing and ruinous.

MINING—COAL, IRON AND OIL.

Under scientific mining may be included the application of the methods and arts as a science to apply to practical mining operations, and the great necessity of practically educated mining engineers, as managers, is at present seriously felt. The anthracite coal veins of the district are so numerous, varied and magnificent, and its coal fields are so extensive, and the engagement in coal business is so much sought after, that the great amount of waste is not at all noticed. In properly developing a mine, according to the inclination of the dip of the veins, is a matter which the simple and unlearned miner could not well overcome. To him, scientific mining is a matter far above his comprehension, and he will resort, therefore, to the most reckless and wasteful methods, which has neither stability, economy or profit; he is constantly in error, troublesome in his requirement, expensive in his estimates, less productive, and his whole life is a system of blunders, and to work by modern, practical plans, of the most approved surveys, is a thing he could not attempt. But in the absence of a practical, experienced man, often valuable collieries are entrusted to persons who are incompetent to manage them, more particularly when the colliery is a deep slope or shaft. The result of this course is frequently followed by an abandonment of the mine; hence, millions of tons of the finest coal in the world are lost. Ventilation, in the hands of such men, is of no consequence, very little or none at all; the miners in such a colliery cannot be of much profit to themselves, much less to the employer; he must bear the losses by delays occasioned by irregularities and bad ventilation; that the whole business of the colliery is one series of disappointments, complaints and dissatisfaction, and may finally result in the abandonment of the colliery.

COAL MEASURES.

In this connection it may be proper to present, in a practical manner, the place of *coal among the rocks*, and to briefly show their extent of our great Appalachian formations or the immense area of the American coal fields within its wide domain, which extend from the Laurentian basins to Alabama, and from the anthracite coal fields of Pennsylvania to the eastern slope of the Rocky mountains. The largest developed coal deposits is found on the eastern border, in the anthracite coal region of Pennsylvania, and the great Allegheny bituminous coal field, which embraces a vast area within this coal territory, and which have their greatest development near-

est the Atlantic face. The average thickness of the workable anthracite is equal to from 60 to 100 feet thick; the workable coal of Cumberland bituminous is about 35 to 50 feet thick; and the average workable thickness of the Allegheny coal is from 25 to 50 feet thick; the average thickness of the Great Western coal is from 10 to 25 feet thick. It will be seen that a gradual thinning out of the coal strata takes place as it advances westward through the extensive level country. Within a very recent period coal has been discovered in the south escarpment of the Rocky mountains, which appears to establish the belief that the deposit is inexhaustible, but cannot truthfully say to what extent, though the area appears to be very extensive and the quantity very good.

THICKNESS AND AREA OF THE COAL FORMATION.

According to "Coal, Iron and Oil" the eastern half of the continent contains five large coal fields, extending from Newfoundland to Arkansas. The first is that of the British provinces, which is very much confused by upheavings of the original stratas. The area of coal measures in these provinces probably exceeds 9,000 square miles.

It thus appears that the foregoing statements will approximate closely with the present known deposits in the several anthracite coal regions of the State, notwithstanding the quantity of coal that has been mined since the commencement of the trade in this country. Of this large amount yet to be mined under the present reckless system, a vast portion of which will be lost to those directly interested, and will ultimately result as a national loss to the country. As yet no correct estimate can be approached with any degree of certainty of the actual quantity of anthracite deposit in the several regions, as there are constantly many new additional increases in collieries, and much more to be developed; that the actual quantity based on present calculations is but a mere hypothesis. From the natural dip of the anticlinal measures of the veins, the coal deposits must be much more extensive. The superficial measures alluded to above do not embrace the areas of anticlinal and synclinal dip of the coal veins.

An exhibit of the quantity of anthracite coal sent to market from the several regions since the commencement of the trade in this country, from 1820 *to* 1869, *inclusive.—Schuylkill canal.**

Anthracite coal regions.	Tons shipped by canals.	Tons shipped by railroads.	Aggregate tonnage of each region by all sources, of 2,240 pounds.
Schuylkill	27,163,040	53,793,295	80,956,335
Lehigh	24,609,798	18,809,450	43,419,248
Wyoming	10,228,583	59,011,081	69,239,664
Shamokin	5,637,204	9,237,579	14,874,783
Lykens Valley		2,609,623	2,609,623
Semi and semi-bituminous coal.			
Cumberland	4,769,521	10,501,595	
Pennsylvania and Broad Top		13,250,844	
Foreign imported			10,016,419
In other States of the Union			53,500,000

*In the year 1825 the Schuylkill canal navigation went into operation from Pottsville.

TABLE No. 12.—COAL TRADE OF GREAT BRITAIN.

The following table will exhibit the quantity of coal mined and exported from Great Britian from the year 1854 to the year 1869, inclusive. The value of the coal mined in 1869 is given as the price at the pits, less price of transportation, was in 1869, $27,500,000:

YEARS.	Tons raised.	Tons exported of 2,240 lbs.
1854	64,600,000	4,300,000
1855	61,400,000	4,900,000
1856	66,600,000	5,800,000
1857	65,300,000	6,600,000
1858	65,000,000	6,500,000
1859	71,900,000	7,000,000
1860	83,200,000	7,400,000
1861	85,600,000	7,200,000
1862	86,600,000	7,600,000
1863	88,200,000	7,500,000
1864	92,700,000	8,000,000
1865	98,100,000	8,500,000
1866	101,630,000	9,367,000
1867	104,500,480	10,569,829
1868	103,141,157	10,967,032
1869	105,000,000	11,500,500
Sixteen years	1,343,471,637	123,704,361

BELGIUM COAL PRODUCTION.

The quantity of coal mined in the Kingdom of Belgium, for the years 1866 and 1867, was, in 1866, 12,774,662 tons; in 1867, 12,755,822 tons; of this quantity, 3,252,957 tons were sent to France in 1867, having no further data of the Belgium coal statistics at hand nor the market prices in the Kingdom.

The annexed table exhibits the quantity of anthracite and bituminous coal sent to market from each region for each decade, from the year 1820 to the year 1869, as the production of each region has been ascertained.

TABLE No. 13.—*Coal consumed in the Union for six years, to* 1869.

From 1820 to	From Schuylkill region.	From Lehigh region.	From Wyoming region.	From Shamokin region.	From all other regions.	From Cumberland bituminous, all sorts.	From foreign coal imported	Aggregate tons each decade as ascertained.	Aggregate tons exported as ascertained.
1829	186,059	166,131	7,000	.....	.....	.....	273,568	632,758	.....
1839	3,031,960	1,319,968	846,832	11,930	.....	.....	954,166	6,164,856	.....
1849	10,358,740	4,317,749	4,216,253	149,937	25,325	356,008	1,373,049	20,797,061	85,189
1859	27,192,390	11,951,286	12,961,725	875,644	2,367,648	5,307,583	2,302,349	62,958,625	942,529
1869	37,801,520	18,311,440	42,243,951	4,603,094	14,894,917	9,607,446	5,305,506	132,767,874	2,034,067
	.....	.....	.....	.....	.....	.....	.....	.....	3,061,785

Aggregate of bituminous coal mined in other States of the Union within the following periods, as shown by statistic reports elsewhere.

	Total coal consumed each year, tons.	
1864	8,500,000	22,000,000
1865	8,000,000	21,800,000
1866	8,500,000	25,500,000
1867	9,000,000	26,800,000
1868	9,500,000	29,200,000
1869	10,000,000	30,800,000
Quantity of coal consumed in six years in the Union	53,500,000	156,100,000

—*Coal Statistics, B. Bannan.*

Coal tonnage of Great Britain for 16 *years is as follows:—B. Bannan.*

	Tons.
Total quantity mined is	1,343,471,637
Total quantity exported is	123,704,361
Total quantity consumed was	1,219,767,276
Average quantity mined per annum	83,966,977
Average quantity exported per annum	7,731,523
Annual home consumption	76,235,454
Average coal tonnage of Belgium—	
Will approximate annually to	12,500,000
Average exportation annually	3,500,000
Average home consumption annually	9,000,000

Coal tonnage of the United States for last 16 *years, as follows:*

Pennsylvania anthracite coal	168,597,722
Cumberland bituminous coal	12,932,643
Mined in other States of the Union	53,500,000
Imported coal	7,077,689
Total tonnage in 16 years	242,108,054
Average tonnage per annum	15,131,753
Average tonnage consumed for last six years	156,100,000
Average consumption per annum for last six years	26,016,666
Total export for six years	1,304,363
Average annual export	217,394
Quantity mined for the last six years in the kingdom of Great Britain	588,241,637
Do. in the United States	155,801,710
Average tons produced in England per annum	98,040,273
Average tons produced in the United States per annum	25,966,952

England mines 3¾ times more coal than the United States, an exhibit of the relative products and consumptions of both nations.

How coal is prepared is objectionable and ought to be condemned; the wasteful manner in which the anthracite coal of Pennsylvania is mined and manufactured for market and domestic use. It is to be deplored that it is necessary to use ponderous machinery to crush and reduce its ordinary condition to graded qualities, to suit the convenience of the consumers. That the great loss it incurs on the producers is not at all remunerated by current rates, nor the fluctuating state of the markets. It is not an exaggeration to say that fully one-fourth of all the anthracite coal now mined is lost to the whole country, besides the cost it incurs to remove it away from the buildings. That this branch of national commerce needs legislation and the fostering care of the government is a palpable fact. The unsightly waste-heaps to be met with everywhere throughout the regions are manifestly claiming the attention of thinking men, and careful consideration.

The experiment may prove successful in abolishing the use of machinery in the preparation of the anthracite coal, as well as the bituminous coal, which is marketed in its crude state, without any reference to its graded sizes; and no doubt the same rule would, and no doubt could be applicable to both sorts of coal alike. This would be an immense saving in the items of building and fuel, and domestic economy. All these items rest on the producer as a heavy tax, and in no case can he expect to be able to retrieve his loss.

Take the English mined coal. It is all marketed as it comes out of the mines, which saves to the producers an immense margin for profit. Also, our bituminous coal is thrown into market as it comes from the mine. Then there can be no plausible reason why the anthracite coal cannot be marketed in the same condition, as the reduction made in favor of domestic consumption would fully re-pay purchasers. Everybody conversant with the business can truthfully corroborate these statements as facts.

COAL TRADE OF GREAT BRITAIN.

SUMMARY *of the coal product of the United Kingdom, for the years* 1867 *and* 1868.

COUNTIES.	Tons of 2,240 lbs. 1867.	Tons of 2,240 lbs. 1868.
Durham and Northumberland	24,867,444	24,894,167
Cumberland	1,512,514	1,378,026
Yorkshire	9,843,575	9,740,510
Derbyshire	4,550,550	4,957,879
Nottingham	1,575,000	1,568,439
Leicester	1,150,000	608,088
Warwick	880,850	624,859
Stafford and Worcester	12,526,554	12,294,780
Lancashire	12,841,500	12,800,500
Cheshire	935,000	937,500
Shrope	1,558,500	1,495,500
Gloucester and Somerset	1,975,000	1,969,000
Monmouth	4,569,500	4,250,500
South Wales	9,082,300	8,950,500
North Wales	2,371,250	2,385,000
Scotland	14,125,943	14,709,959
Ireland	125,000	126,950
Total produce	104,500,489	103,141,157
Decrease		1,359,323

Of this quantity about 10,000,000 of tons were exported in each year—the balance consumed at home.

The number of collieries in 1867 was 2,904, and in 1868, 2,922; an increase of 18 collieries. The product of these collieries in 1868 averaged 35,300 tons each. The average tonnage to each colliery in the anthracite coal region in Pennsylvania, in that year, was much greater. In Schuylkill county alone there were 72 collieries, the least of which shipped 40,985; the greatest shipped 119,277 tons, equal to 5,000,000; average colliery shipment was 70,000 tons, of 2,240 lbs, without reckoning their consumption, showing that 420 collieries of the anthracite coal region of Pennsylvania shipped 15,000,000 tons—the 2,922 collieries of the British Isles shipped 103,141,157 tons—showing that our collieries, (though many of them are very poor ones,) shipped on a general 36,000 tons in a short sea-

son, whilst the English collieries run steady throughout the year, and that our small collieries done the one-seventh of the whole coal trade of England, Scotland and Wales, although by the reckless waste of the anthracite coal of Pennsylvania, by the mode of its preparation for market, fully one-third of it is lost, or equal to 5,000,000 of tons annually, at an average price of $5 per ton, would amount to $25,000,000.

This exhibit of the waste of coal by the present mode of preparing it for domestic and manufacturers' use may appear too extravagant, nevertheless it is quite true, and must come under one of the causes of advancing the prices of coal, as the reckless waste made by heavy machinery at some collieries is enormous when coupled with the cost of handling in the mines and outside. Evidences too melancholy of this sort are to be met with at all our collieries, while none of this character are met with in Great Britain or in any of our bituminous coal regions.

We are of opinion that much of this great waste of coal could be avoided by using different machinery, the consumers to prepare the coal to suit their respective purposes, as is the case in all bituminous districts. The impurities could be removed at the mines, and nothing but a marketable article transported to market.

This is the plan adopted throughout the entire west, and it works well. All the small fractured coal can be used separately or in whole, and is good economy in domestic management of coal, and we cannot see the reason why it could not be put in practice and save to the public this large amount of excellent fuel.

The very fine dust can be made use of to a very great extent in buildings, when admixed with equal portions of sand. Its mortar is more durable than most of the commercial cements of the market, and gives to mortar that—

ANTHRACITE COAL.

Experiments similar to those above gave an evaporation, with the aid of a blast, of from 7½ to 9½ of fresh water for one pound of coal. Average weight per cubic foot, 53.500 pounds.

MISCELLANEOUS.

One pound of anthracite coal, in a cupola furnace, will melt ten pounds of cast iron; eighty bushels of bituminous coal, in an air furnace, will melt ten tons of cast iron. Small coal produces three-fourths the effect of large coal of the same sort. Ten pounds of fresh water have been evaporated in a tubular boiler by one pound of anthracite coal.

TABLE *showing the weights, evaporative power, by weight, bulk and character of fuels, from reports of Professor Walter R. Johnson*, 1844.

DESIGNATION OF FUEL.	Spec. gravity.....	Weight per cubic foot—lbs.....	Lbs. steam—water at 212 deg.—by 1 lb. fuel.....	Lbs. steam—water at 212 deg.—by 1 cubic foot.....	Wt. of clinker per 100 lbs. coal—lbs.
Cumberland	1.313	52.92	10.7	573	2.13
Blossburg, Va	1.337	53.05	9.72	522.6	3.40
New Castle	1.257	50.82	8.66	453.9	3.14
Pictou	1.318	49.55	8.41	478.7	6.13
Pittsburg	1.252	46.81	8.20	384	.94
Liverpool	1.262	47.88	7.84	411	1.86
Connelton, Ia	1.273	47.65	7.34	360	1.64
Scotch	1.519	51.09	6.93	369	5.63
Anthracite.					
Peach Mount	1.464	53.79	10.11	581.3	3.03
Forestville	1.477	53.66	10.06	577.3	.81
Beaver Meadow	1.554	56.19	9.88	572.9	.60
Lackawanna	1.421	48.89	9.79	493	1.24
Lehigh	1.610	55.32	8.93	515	1.08
St. Clair	1.564	54.32	9.99	575	.86
Coke.					
Virginia	1.323	46.64	8.47	407.9	5.31
Cumberland	.....	31.57	8.99	284	3.00
Midlothian	.....	32.70	8.63	282.5	10.51

The above exhibits the ultimate effects, as a safe estimate for practical rules. A deduction for coal of $\frac{14}{100}$ should be made. Winchester bushel equals 2,150.42 inches.

FUEL—HASWELL.

With equal weights, that which contains most hydrogen ought, in its combustion, to produce the greatest quantity of heat, where each kind is exposed under advantageous circumstances. Thus, pine wood is preferable to hard wood, and bituminous to anthracite coal.

Different fuels require different quantities of oxygen; for the different kinds of coal it varies from 1.87 to 3 pounds for each pound of coal; 60 cubic feet of air is necessary for one pound of oxygen; and making a due allowance for loss, nearly 90 cubic feet of air will be required in the furnace of a boiler for each pound of oxygen.

All bodies when intensely heated become luminous. When this heat is produced by combination with oxygen they are said to be ignited; and when the body heated is in a gaseous state it forms flame. No bodies appear visible, even in a faint light, below 870°.

Carbon exists in nearly a pure state in charcoal. It combines with no more than $2\frac{2}{3}$ times its weight of oxygen. In its combustion one pound of it creates sufficient heat to increase the temperature of 13,000 pounds of water 1°.

Hydrogen exists in a gaseous state, and combines with eight times its weight of oxygen, and one pound of it in burning rises the heat to 42,000 pounds of water 1°.

The chemical quantity of air required for the combustion of one pound

of bituminous coal is 150.35 pounds cubic feet. The bulk of the products of combustion in a furnace is about 465 cubic feet for each pound of bituminous coal burned. An increase in the rapidity of combustion is accompanied by the diminution in the evaporative efficiency of the combustion.

BITUMINOUS COAL.

Accurate experiments upon the practical burning of coal in a steam boiler, gave an evaporation of from 6 to 9 pounds of fresh water, under a pressure of 30 pounds to the square inch.

AVERAGE WEIGHT PER CUBIC FOOT, IN POUNDS.

Cumberland coal	52.844
Virginia	49.276
West Virginia	47.20
English, foreign	49,845

ANALYSIS OF FUEL—HASWELL.

	New Castle coal,	Virginia coal	Cumberl'd coal,	Pennsylvania anthracite coal,
Carbon	75.28	64.72	80.	89.458
Hydrogen	4.18	21.56	18.40	7.112
Nytrogen	15.96	13.72	1.60	3.430
Oxygen	4.58	.....	.....	.....
	100.	100.	100.	100.

CONSTITUTION OF WATER BY WEIGHT AND MEASURE.

	Weight.	Measure.
Oxygen	88.9	1
Hydrogen	11.1	2

One cubic inch at 60°, the barometer at 30 inches, weighs 252.458 grains, and it is 830.1 times heavier than atmospheric air. One cubic foot weighs 1,000 ounces, or 62½ pounds avoirdupois; a column one inch square and one foot high weighs .434028 pounds. It expands one-ninth of its bulk in freezing and averages .0002517, or $\frac{1}{3973}$ for every degree of heat from 40° to 212°; density, 39.38°.

ANTHRACITE COAL FIELDS OF PENNSYLVANIA.—*Coal, Iron and Oil.*

This very interesting subject claims for itself our most serious attention, and in doing it justice, without being partial, is our object as far as we can gather any reliable information without rendering the subject irksome to its patrons, but as interesting as possible without being superfluous in our descriptions or details.

This subject before us requires at our hands a correct exposition, in detail, of each different large coal field, of which the anthracite coal region of

Pennsylvania is formed, their geological features, their extent and locality as far as they may be at present developed. But, to consider the immense and extensive area which depends on it for its fuel for it future supply, its central location and its prospective resources, which seem to render the anthracite region so valuable, with the present means to apply for producing coal, at once claims the attention of the State and the support of every thinking man.

In the very short period since anthracite coal first came to be used to any extent, the whole country enjoyed an unprecedented increase in the prosperity of business, trade and commerce, which by far surpasses that of any other country in the world. This is due to our institutions and the progress of industry and *properly paid labor.* This gave wings to every species of employment, which soon strengthened the growth of the great resources and wealth of the country, and stimulated the energies of our people which, with judiciously directed capital, placed every section, city and hamlet throughout the land in direct communication with each other by an extraordinary net work of railroads, which has far surpassed the shrewdest men's anticipations. The relative value of the bituminous and anthracite coals in the territory would undoubtedly be in favor of the 470 square miles of anthracite workable veins against the 200,000 square miles of bituminous coals. Its especial quality renders it a most valuable production, yet its period of exhaustion is more certain, owing to its superficial deposit and its certainty for manufacturing uses than the anthracite, which from its adaptation for domestic use and the enormous depth and numerous stratified veins, which is receiving the attention of the largest portion of the people of the country, surrounded as it is on all sides by the largest business interests of the nation.

Much depends on the accessible localities of coal basins than on their extent and quality, as they stimulate capital and develop business around them. About twelve millions of a population derive their chief supply of fuel from the anthracite region, and will continue so, as the estimated period of their exhaustion cannot be satisfactorily known. The production of anthracite last year reached 13,000,000 of tons, and by taking the increase the past decade, and the succeeding decade at the same ratio, no doubt it will run up to about 20,000,000 of tons. That this increase must be supplied from the anthracite region there can be no doubt, from its proximity to the seaboard, its availability and cheapness for all commercial and mercantile use, as it has on all occasions proved itself superior to bituminous in almost every instance, since it is not at all probable that the bituminous will supersede it whilst the anthracite lasts.

At present the anthracite lands are really estimated far below their value, but in a few years they will be estimated at very high prices, and no doubt their owners will derive high revenues from their coal lands, much above what they now receive. The average price per acre of coal land now is estimated at $—— per acre, whilst the coal lands in England, which are far older, command from $5,000 to $7,000 per acre. Those lands seldom change owners, and hence the great interest taken in their security and husbandry.

As has been referred to elsewhere, our old miners have mined the coal in a primitive manner in this region. As the coal was found plentiful, the easiest way was resorted to, though the most expensive, and from its commencement the loss enormous; it is not too much to say it is one-half. English and Belgian economy has reduced their loss to about 10 per cent. Our present resources are fully competent to produce 15,000,000 tons, and, under a proper protective policy, these figures would run up to 22,000,000 tons in a few years. This difference is a dead loss at present. The saving

to the community and country would be immense if our operators would economize the great waste and work their mines in a thorough practical manner. Lifts that now last but 8 years would then last 13 years, and the saving would be as 20 is to 50 per cent., and not less than 2,000,000 tons of coal would thus be obtained.

We will endeavor to counsel mining economy throughout the district, as the cost is nothing compared with the good result. In this we hope to receive the approbation and good will of all.

DESCRIPTION OF COAL FIELDS.

(Extracted chiefly from Coal, Iron and Oil.)

In our description of the respective coal fields we shall first commence with Schuylkill county, as

THE FIRST OR POTTSVILLE BASIN.

This very extensive basin lies between the Sharp mountain and Gate Ridge; it underlies Pottsville, Port Carbon and Palo Alto, is a mile wide, and extends from near Middleport to the Tower City fork, a distance of 30 miles, and preserves its uniform dip throughout; its north dip averages 87°, and is supposed to be 3,000 feet deep at Pottsville. This peculiarity is found to pervade the coal measures all along the Sharp mountain, and is clearly defined at its channel gaps, throughout its entire length. At Middleport the basin spreads out to double its size eastward; this is caused by an abrupt formation of the Sharp mountain, the oblique angle formed by this change of the conglomerate floor, several axis originate, and in the vicinity all the anticlinals of the western portion of the field start out, but none of them are so conspicuous as the Gate Ridge anticlinal, and the southern basin just described. The dip differs but very little from Pottsville to Tower City; the veins seem to yield to lateral pressure; many of them are not worked under present circumstances, it appearing that the stratifications of rock and coal measures have yielded to sideral force, and the stubborn position of the Sharp mountain, that the whole measures are crushed to one-fourth of their regular distances. The effect of this contracting force tends to depress the already depressed basins, but, also, to elevate the anticlinals or ridge; it is obvious that the depression of the scynclinals naturally increase the depth of the basins.

The Gate Ridge Anticlinal conforms to the dip of the south basin, (or Pottsville basin,) and presents the same appearance on their north dip as in the Sharp mountain; the south dip presents a singularity of formation on both the anticlinal and synclinal axis, which appears to underlie the south basin. The veins out-croping in the Gate Ridge all dip south, as if independent beds, though most of them are north dippings of the second basin, and only half south dipping veins of the South or Pottsville basin. The Gate and Salem veins are the same, but the Gate vein is the north dip of the second basin, and the Salem being the south dip of the Pottsville basin. This singularity was for a long time a subject of controversy amongst the miners, and there are still skeptics amongst us who will not be convinced of the truths which are every day made manifest by recent and clearly explored developments. This subject is fully made manifest in the Mahanoy coal field, and occurs more rarely in the Shamokin coal field and the Wyoming basins. In 1834 fourteen distinct veins were cut in the Daddow tunnel, drove south in the Sharp mountain, and, although they appeared to

dip south, it was subsequently proven they finally changed to perpendicular, and lastly to a north dip and basined. Time eventually proved this to be correct, and is the result of thirty-six years labor and experience.

THE SECOND BASIN, OR GATE RIDGE.

This basin lies between the Gate Ridge and Mill Creek anticlinals, and owing to the upper veins only coming to the surface has not been largely developed. Here, at Centreville, Colonel George Shoemaker obtained the first coal that was successfully used in Philadelphia, and is the product of the *Lewis* vein. Considerable mining has been done on the Lewis vein at Mill Creek, and the underlying veins; the Big and Little Tracy veins were opened to by tunnels, and considerably worked; these veins are generally smaller here than elsewhere. The Gate viens do not appear to enter the third basin, but out-crop in the Norwegian or Delaware tract. This company formerly mined extensively at Minersville, West Norwegian and East Norwegian tracts, but only one lift on the latter tract. The most of this mining was conducted under the superintendence of Mr. Frank Daniels, who, for a long time, had the management of these collieries, assisted by John Reed, Esq. The lower veins on these tracts are not disturbed by mining, and, since the dissolution of that company in 1850, this large tract is lying idle. General John White, of Philadelphia, opened these mines in 1834; John R. White, Esq., of Philadelphia, is the present representative of the old and distinguished firm, and was the first to use slope mining, and the second who used the Batten breaker.

THE THIRD BASIN—DELAWARE MINES.

The third basin appears to be generally a mixed one, but the elevation of its central axis does not throw the veins to the surface. Little has been accomplished at Mill Creek in this basin, though the Delaware coal company worked these red ash veins extensively on their tracts. In compliment to my old friend and employer, Captain W. Shillaber, I must beg leave to refer, that under his general superintendence this company, at that time, was in its best prosperity, but the terrible crash of trade of 1841 decided its fate since.

The depth of this basin is not fully understood, but estimated at 1,000 to 1,200 feet. With these simple references we will close the present description of it, as it is almost a total wilderness this last twenty-four years, comparatively speaking. We refer to the Mill Creek, North America, East and West Delaware, Westwood and Llewellyn tracts, the white ash of which has not been touched so far.

THE FOURTH BASIN—ST. CLAIR,

Or the St. Clair Shaft basin, which is located west of the Delaware anticlinals and the old Furnace tract, near the Mine Hill, separated from the latter by small anticlinals, and is, perhaps, deeper than the third basin, as is estimated to be 1,500 feet deep. This is supposed by the sudden increase dip of the anticlinals near the shaft. The south dips of the veins in this basin are easy and undulating, particularly in the vicinage of the Delaware and St. Clair lines. Its north dippings are in uniformity with the north dippings of the other three southern basins, steep and abrupt. All the veins of this basin out-crop (except a few) north of this basin, on Mill creek. But at Mount Laffee the Primrose and Holmes are the lowest out-

crop veins. The Mammoth vein appears to roll over into the fifth and last basin, south of the Mine Hill ridge.

THE FIFTH BASIN—WADESVILLE.

This is a small, irregular basin—one of small dimensions—and known as the John's at St. Clair. Its eastern terminus is found east of Wadesville, but a corresponding one starts north of its western limit and extends beyond west of Minersville. The St. Clair section of this basin is a collection of small basins, and continues but a short distance to the east. The Mammoth range will be covered, probably, by 1½ miles in this small basin. The Seven Foot, which is always considered to be a spur of the Mammoth, is the upper vein in this basin; but at Mount Laffee this basin contains the Primrose and Holmes veins in addition. These veins are long and profitably worked here, and still there is a very large body of coal yet to be opened. It has been operated by several lessees. Gen. J. K. Seigfried is at present operating the Beachwood colliery, which is a very productive one. There are four collieries in operation in this basin.

THE SIXTH BASIN, OR MINE HILL BASIN.

This is the last basin in the Pottsville district of the same. This basin commences, or has its eastern terminus on Mill creek, above St. Clair, but the underlying veins are small, and are poor, as they extend some miles east. The Mammoth, however, is not found east of Mill Creek. At Coal Castle this basin is one-half mile wide, and not less than 1,000 feet deep. It is not, however, a single basin, but secondary one, known as the Jugular "overthrow." This basin is sharply inverted at Coal Castle, stretched along the south of the Broad mountain, on the north side of the main basin. The Mammoth vein basins twice, once in a regular way in the main south, and in an irregular way in the north, and to all appearances forms another series of veins, which were believed to be other white ash veins. This notion gave credence to the Jugular bed, which is the name given the Mammoth at Coal Castle. This very strange formation would mislead some miners, as the south dip is regular, and the stratification uniform. The trifling evidence of an anticlinal between the basins is of little account. The axis of the out-crop veins are sharp and rock formation violently deformed, so there is very little evidence of the overlap vein. This is not the case further west. At Black Valley the evidence is clear, and no person who is well acquainted with the locality of this basin will pretend to doubt it, or support what was called the Jugular formation. From the developments formerly made at Coal Castle, it was then supposed that a larger bed than the Mammoth existed in the anthracite region. But of late Professor Rodgers's theory, in his Geology of Pennsylvania, where it refers to this locality, is now set aside by actual experience.

The Mine Hill basin is fourteen miles long and shoots out into two spurs at its western end as before remarked. No traces of red ash veins appear in the basin.

THE SEVENTH, OR SWATARA BASIN.

This basin proceeds west of Llewellyn to near Tremont, and has the same peculiarities as those at Pottsville. There are three basins which properly belong to this basin. The first is a prolongation of the Pottsville basin; the others are the continuation of the other axis, but greatly broken up in their course westward by changes in their anticlinals and synclinals

from north to south, with sudden deep depressions and changes which differ materially with other basins in this section of the coal field. Beyond this locality, west, the axis separates, the northern anticlinals turning north-west and the southern axis veering a little south; the former taking a course S. 76° W., latter a course S. 50° W. The distance run by the former is 8 miles and by the latter 11 miles, and are 7 miles apart at their terminus, forming an angle of 26°. This sudden change divides the coal field as it approaches the Susquehanna river westward, and forms the south and north forks; the west prong forms the Lykens Valley field; the southern prong forms the Dauphin field. This latter field is a singular basin. A third basin has been proved at Bear Gap, but of its extent we have little information at present. A little west of Swatara the upper seam terminates. The seven foot vein is worked in the two small north basins. The veins run here uniform. The lower veins are not supposed to be yet worked. D. P. Brown first developed these veins extensively, but did not develop those under the Skidmore vein. The Buck Mountain vein lies east of Forestville mines, and is here six feet thick and lies under the Mammoth some sixty feet. The Mammoth, however, is split here. A 45 foot slate separates it into an upper and lower bench, its lower seam being six feet thick and its upper seam 16 to 20 feet, whilst its consort, the seven foot vein, is 7 feet thick, and lies 40 feet above the upper seam. The Holmes & Primrose veins are here in their proper position, and dip at an angle of 45°. The Orchard and Diamond veins are found here and appear to be the uppermost seams. The two southern basins contain the Big and Little Tracey's, and are workable coal. At present these basins are comparatively idle. The upper levels or lifts are nearly exhausted, though there is still a vast quantity of coal remaining, yet it requires more extensive workings and heavier machinery to develop the deeper seams.

THE EIGHTH, OR LYKENS VALLEY BASIN.

Five miles west of Tremont this basin commences its westward course to Bear valley, and here loses every vestige of the Red Ash seams, and the White Ash also, as they rise to the surface, pointed at their extremities in narrow spurs, whilst the centre of this basin contains 15 seams of coal, the lower being the longest and the upper the shortest, likened to as many vessels placed within each other. The comparative depth of this lowest basin at Pottsville is 3,000 feet; the lowest at the western terminus of the Short mountain is about 50 feet, near Wiconisco. The parallel basins are not given as they exist in each field, side by side, as it rather confuses than instructs. Not until deep shafts are sunk can any reliable information be given of the lower seams. Here the coal field is broadest, and this subjects it to many interruptions. At the east and west terminus of the Pottsville coal field these basins are few and narrow, while in its centre, near Mount Laffee, they are more numerous and broader and more regular. For a similitude I would refer the imagination to a fleet of large vessels, moored in a stream or pool, while many of them touch side by side, but walled in by the high conglomerate walls of the Sharp mountain on the south and the Broad mountain on the north, while within these large vessels there are 15 smaller ones, one resting within the other until the very smallest rests on top. This picture may not be scientifically drawn, yet it no doubt will convey a correct idea; it may convey the general character of these basins. It is not necessary to say why there are but three or four workable seams at Wiconisco, whilst at Pottsville there are 15 seams. While at Wiconisco only one basin is seen, the other two sink under the south base of Big

Lick mountain and the other under the north base of Short mountain. The miners here, however, think different, and say their seams lie under the conglomerate. However, there is no such perplexity elsewhere in the region, and modern investigation is quite as perplexing as the old.

THE NINTH, OR DAUPHIN BASIN.

This southern coal field is a single long, narrow basin, being an extension of the parallel of the Sharp Mountain, or the great Pottsville basin, possessing the same peculiarities as that does. In tunnelling across this mountain the Dauphin and Susquehanna coal company fully developed what others but conjectured. The several seams contained in this basin no perceptible deviation had been discovered, except the lower beds are split; both the Buck Mountain and Mammoth seams are split. There are some twelve veins proved on this basin; the Primrose vein is found in the Yellow Spring tunnel, at its synclinal axis, where it forms an inverted acute angle, and is cut through its base, which is forty feet thick. Should this basin prove her average thickness, her depth must likely be 800 feet below the tunnel. West of Tremont the anthracite increasingly partakes of the bituminous quality, but east of Tremont, to the Lehigh region, there is but very little perceptible difference in the fractures of either basin along the Sharp mountain to the Nesquehoning mines.

The western terminus of the Dauphin basin and the Short mountain coals can be classed as semi-bituminous. The red ash seams do not exist in the eastern or western ends of the anthracite coal field; and such red ash beds as may be discovered belong to the lowest stratas or seams. A speculative interest might probably say from the breadth of the Pottsville basin, as it is at present, say five miles, that the weavy deep dips of the axis of these is equal to ten miles superficial surface, and very likely this is not far from the truth.

THE MIDDLE ANTHRACITE COAL FIELDS.

THE TENTH, OR ASHLAND BASIN.

This is denominated the Ashland basin. It is bounded on the north by the Locust mountain and on the south by the Mahanoy mountain. It extends from Raven run west, seven miles to Locust Gap summit. Around Ashland, in this basin, a very large amount of coal deposit is found above water level. The many undulations in the measures bring the seams to the surface in successive anticlinals. The mountains are high and well defined, which makes the coal available at any point, as there exists a great uniformity of character between the Pottsville and Mahanoy measures. The Mahanoy basin is very narrow; the northern dip of the seams average 48°, the south dips 40°. But in regard to the veins there is more difference. The lower veins in this basin are much thicker and more productive than at Pottsville. The Mammoth vein here is found to exceed 40 to 60 feet thick. The upper seams do not vary much from their measures at Pottsville, but are much purer, and the veins under the Mammoth are less pure than those in the first basin, and are more in conformity with the Lehigh basins. The Primrose vein, in the Mahanoy basin, will average 12 feet in thickness, often larger, and in good condition. This basin has produced a larger quantity of coal for the period it has been in operation than any other basin of equal territory in the region, and as yet is but partially developed. There are 20 collieries in operation in the Ashland basin. Most of the coal

has been mined above water level. Its deposits are inexhaustible and its quality very good.

THE ELEVENTH, OR MAHANOY BASIN.

This basin is a prolongation of the Ashland basin, which is divided into two by the abrupt interference of Bear mountain, at the junction of Raven run with the Shenandoah creek, east of Girardsville, the Mahanoy basin taking a course N. 82° E., eleven miles long, and averaging one mile wide; the other branch, or the Shenandoah City basin, taking a course N. 72° E., seventeen miles long. The breadth of the coal measures from north to south, at Mahanoy City, is over three miles. This basin lies very deep, and the seams are finely developed in uniformity of character. Six regular veins out crop on the north side. The Primrose vein is the first or upper one at St. Nicholas, and is found to be 10 feet thick. The Mammoth lies 100 yards north of it, and is 16 feet thick. The four foot vein is 10 yards north of this, and is 4 feet thick. The Leader, or seven foot vein, lies 15 yards north of this, and is 7 feet thick. The Skidmore vein lies 60 yards north of this, and is 14 feet thick. The Buck Mountain vein is still 100 yards north of this, and is 18 feet thick. The aggregate thickness of the six veins at this point is 69 feet of workable coal. Here the M'Nael basin takes its eastward course, and divides the Mahanoy and Shenandoah basins, a description of which will be given in connection with these basins. The Primrose vein, in the Mahanoy basin, appears to be 12 feet thick, and larger at some points, and generally in good condition. In the vicinity of Mahanoy City an enlargement of the Mammoth seam takes place, while the quality of the coal is not in the least affected by its increased size. This peculiarity is manifest in every such enlargement of the Mammoth seam in every section of the region. These changes are met with where the Mammoth overthrows and forms basins. There are some miners who still persist in the jugular opinion, which in fact is nothing more than these enlargements, such as are to be met with at Locust Dale, the M'Nael and other points in the region. The last ten years has furnished abundant proof of the falsity of the jugular theory. There are 22 active collieries in this basin, several of which are water level collieries, but nearly all of which are sinking slopes.

THE TWELFTH, OR SHENANDOAH CITY BASIN.

This basin is formed of the North Fork of the Ashland basin; it runs from Raven run N. 72° E. 17 miles to the boundary line of Carbon county; it is flanked on the north by Locust ridge. The coal seams dip north and south along the ridges. At Shenandoah City an enlargement of the Mammoth takes place. The operation at the Shenandoah City colliery is on the inverted north dip. An enormous thickness of coal is found here. The quality or quantity of coal in this basin cannot be excelled; and mining is carried on under the best system introduced in the whole region. The undulations of the formations east of Shenandoah City are gradual; the dip on the south side of the basin will average 30° to 40°, but those on the north are more abrupt, and dips from 45° to 60°. But those inverted dips are not confined to this locality alone; they are to be met with elsewhere throughout the region. There is an exception to these changes all along the Broad and Mahanoy mountains on the southern extremity of the field, as the frequent undulations bring the seams to the surface in succession, in conformity with the regular coal measures of the regular basins. There are

other features in connection with the Shenandoah City basin that are more favorable to the coal seams than those in the Pottsville basins. The Shenandoah veins are much thicker in the lower seams, and the coal has less impurity. But the seams below the Mammoth are more in conformity with the beds in the Lehigh region.

The extraordinary deposits of anthracite coal throughout this basin cannot be excelled by any other in the State. The Koh-i-noor shaft of Richard Heckscher, Esq., is located, which in point of construction and general adaptation, surpasses any such structure of the kind in the State. Mining is carried on here under the best English system, and is found to be a complete success. The William Penn shaft is next in importance, and, under the direction of E. S. Griscom, Esq., proprietor, it has proved a success. These gentlemen have diligently investigated every minutiæ in the line of mining; coupled with their long experience as practical men, it is safe to presume their future will be crowned with success.

There are other equally fortunate operators located here; and, from present indications, the Shenandoah basin will command its full share of influence in the coal trade.

THE THIRTEENTH, OR NEW BOSTON BASIN.

This new basin was formerly opened by Mr. Frank Daniels, in 1842, but abandoned in consequence of no means of transportation and other inconveniences. But in 1864 the New Boston coal company developed the eastern section of the basin, which, until then, was comparatively forgotten. This is a small but regular basin, containing the white ash beds in their proper thickness and perfect condition. Its extreme length, as far as has been successfully discovered, is six miles, but we would not wish to be understood that this is their proper length. The local situation forbids this supposition, and many indications of formation go to convince and establish the truth of their continuation of the basin further south.

The basin under consideration is formed on the flat of the Broad mountain, some 1,550 feet above the mid-tide at Philadelphia, on the Delaware river; the seams dip south at an angle of 30° to 35°, and its north dippings are found to exceed 70°. The Mammoth vein is 360 feet below the surface, and 730 feet to the Buck mountain, and 800 to 900 feet to the bottom seam. The basin contains six workable veins; in this basin the aggregate thickness is 107 feet. The seven feet seam is the uppermost vein and lies 20 feet above the Mammoth, which was found to run from 60 to 80 feet in thickness. 75 feet below the Mammoth the Skedmore vein is found, which is nine feet thick. 200 feet below this is found the Buck Mountain seam, and is 18 feet thick; and 100 feet under this again is the Alpha or first seam in the series, and is six feet thick. Here the theories advanced by scientific men are challenged. Their theory of sedimentary formation in basins may seem to gain a plausible credit, but as this basin is found much higher than any in the surrounding regions, and located on the summit of the Broad mountain, is a question. The theory we can form of this basin, which we find a perfect natural one, is that at this point the Big Mahanoy mountain splices into the Broad mountain, and thence eastward, forms one ridge, but we believe the Mahanoy ridge continues on its eastern course distinct *internally* from the Broad mountain formation. Hence the basin inclines S. 75° W., ranging in this line, which would nearly connect it at Mount Pleasant, west of Glen Carbon. The causes of these wonders in nature appear not to be fully explained; the miner, eventually, is the only reliable source of information. However, this basin is not at present fully

developed. There is only one colliery in operation in the basin at present, although the identity of the coal seams are sufficiently established to warrant its claims as a complete basin to be undisputably correct and worthy of credit.

THE FOURTEENTH, OR M'NAEL BASIN.

The M'Nael basin is situated W. 35°, N. 1½ miles from Mahanoy City and E. 7° S. 2 miles from Shenandoah City, and extends from St. Nicholas to Coal run line, 3 miles in length and 1½ miles in breadth. A large quantity of coal is found above water level in this basin. Mr. Frank Daniels, superintendent of the M'Nael coal company, developed this basin, and gives the credit to the Primrose vein of 16 feet in thickness, nearly all pure coal. An enlargement of the Mammoth again takes place here, and similar to the Mammoth at Shenandoah City, of which we have already mentioned in connection with that basin. From present indications this small basin cannot be surpassed by any in the region. The ample structures for preparing coal and the appearance of the veins, with the other substantial improvements under construction, as the sinking of new slopes, &c., points to the future prosperity of this place. The veins here dip south, though some partly dip north and lap back on the south dips, so that most of those seams have the appearance of south dipping veins, and are of the form of some basins around Pottsville. Generally speaking, such seams are not favorable for mining. As yet no mining difficulty from such causes has been experienced here, and the future prospects are very favorable, as the coal is found not to be affected in its purity by the increased size of the seams or its general formation or condition.

On the estate of Alter & Stephens, west of the Catawissa railroad, two narrow basins have been proved, the two lower seams of which are found to be good workable coal. It appears the conglomerate formations interrupt the regular continuation of these basins. This section of the anthracite region is therefore thrown into narrow basins, which widen out and deepen as they extend westward.

THE FIFTEENTH, OR TAMAQUA BASIN.

This basin commences east of Middleport and extends to Carbon county line, some 11½ miles. Its southern boundary is the Short and its northern boundary the Broad mountains. The basin gradually tapers eastward, from 3½ miles in breadth, at Middleport, to 1½ at Carbon county line. Here the coal veins on the north dip, on the Sharp mountain, are nearly perpendicular. At Middleport the basin is formed into several small ones, which gradually disappear as they approach the Little Schuylkill river at Tamaqua. Here they appear to take their regular form to their eastern terminus in Carbon county. Their anticlinals are very abrupt at Tamaqua; much more so along the north flank of the Sharp mountain. Their southern dip in many places in the valley exceeds 45° at Buckville and 59° at Swift Creek. The collieries of the Tamaqua district are amongst the oldest in the anthracite coal region. The coal seams of this basin are alphabetically classified, from A to R. r. This accounts for the whole number of coal seams in this section of the coal field, which is said to be 15 in number, as follows: A, or Alpha, 3 feet of coal; B, or Buck Mountain, 10 feet do.; C, or Gamma, 5 feet do.; D, or Skidmore, 8 feet do.; E, or Mammoth, 25 feet do.; the Leader, or seven foot vein, 7 feet do.; F, or Holmes, 4 feet do.; G, or Primrose, 10 feet do.; H, or Orchard, 6 feet do.; I, or Little Orchard,

3 feet do.; J, Diamond, 7 feet do.; K, or Big Tracy, 9 feet do.; L, or Little Tracy, 4 feet do.; M, or Gate, 9 feet do.; N, or Sandrock, 3 feet thick; aggregate thickness of workable coal in the fifteen seams is 106 feet.

There are several minor veins found in these measures but are only insignificant and are passed over unnoticed.

The Kaskawilliam, Tuscarora, Tuckerville, Buckville, and other small basins, lie within this territory.

Most of the upper coal has been mined out, and several deep slopes are also finished, although there are many valuable improvements, and new slopes and lifts in course of construction and completed. The veins at Riversdale are known from E to Rr, but some of these veins are split, such as double qq, double pp, and double rr. It may be safely estimated that two-thirds of all the coal mined in this region is from the Mammoth vein; and as long as this vein is so productive the large veins will be resorted to for furnishing the supply needed.

Tamaqua is favorably situated as to coal and general traffic, east, west, north or south, but more particularly south and north, as the northern railway intercourse is directed to Philadelphia passes through here; and should the Trevorton railroad be extended to the Pennsylvania Central railroad at Millerstown, a distance of 18 miles, a large amount of travel and traffic would be directed this way.

Mining in the Mammoth vein is much more productive and economical to operate than smaller veins. From its size and general regularity very little difficulty need be apprehended. It is not so expensive in comparison as the smaller veins, as there can be a much larger quantity produced at an average cost of lesser veins. Still another feature in its favor, from this large vein tunnels can be driven to the North or Southern veins; it affords ample room for opening tunnels or turn-outs, the excess of coal being more than adequate to defray the necessary expenses. That the Mammoth vein is a natural accommodation for mining purposes in those regions is certainly a great blessing, although it is not without its risks.

THE SIXTEENTH, OR HONEY BROOK BASIN.

This basin is situated in the north-eastern section of the county, at new Pottsville, bearing N. 73° E., at the junction of Luzerne and Carbon counties, in the south-western section of the Beaver Meadow basin, about 3¼ miles long and 1 mile wide. Here the John B. M'Creary mines are in operation. This is the only firm operating in this basin. The synclinals here dip about 48°; the veins are very regular and of great thickness. The Wharton veins run parallel with the Mammoth vein, and only 18 inches of a parting slate between them throughout. The north and south dips are worked. The Beaver Meadow basin will be described in its proper place among the basins of Carbon county, when that subject comes under consideration.

THE SEVENTEENTH, OR SILVER BROOK BASIN.

The Silver Brook basin is situated in the extreme eastern end of the Shenandoah basin, where the boundary line of Carbon and Schuylkill counties line, and is a continuation of Shenandoah basin. It extends a mile into Carbon county or the Lehigh basin. Its extent from Catawissa tunnel to the county line is 4 miles and its main breadth is about 1 mile. Here the surface of the North Mahanoy mountain forms into a table-land, the drainage dips southward, and is the northern extremity of the Little Schuylkill river.

The mines are opened here by the firm of Hosua & Longstreet, under a shaft operation. The basin contains the Big vein, Skidmore, Seven Feet and Primrose veins. These veins dip 40° south at the shaft. At present the company only mines the Big vein and Primrose veins The coal is 40 feet thick in these two veins and of superior quality. Little can be said of the synclinals of these veins, as the shaft is not sufficiently deep to prove their depth. However, it is unsafe to conclude on general information, as the formation is not intelligently investigated to warrant a correct description, though sufficient evidence is given in the mining of these veins to justify the conclusion that a large deposit of coal remains in the basin. At present there is but one operation located in this basin, and our description therefore is limited. None of the red ash veins are discovered here. It is considered the basins are not very deep, though this supposition is not well founded; time will fully develop this matter, as the relative dip and distances are nearly similar to the Shenandoah veins, and from this fact we must conclude the deposits can not be much prejudiced by speculative theories, as the identity and true quality of the seams are correctly developed at Beaver Meadow, Shenandoah City, Girardville, Ashland and Locust Dale, and are recognized as the same veins, no further proof of their similarity is needed here.

THE EIGHTEENTH, OR THOMASTON BASIN.

The Thomaston basin, from its eastern point, rises at the apparent junction of the Mine Hill ridge with the Broad mountain, some distance west of Silver Creek reservoir, and extends westward to the western limit of Foster township, some 8 miles long, and will probably average ¾ mile wide. The prominent veins of the region are worked in this basin. The local nomenclature differs from the names of veins elsewhere. The Big, or Mammoth vein, 22 feet thick; the Leler vein, 7 feet; the Crosby, 14 feet; the Church vein, 9 feet; the Holmes vein, 7 feet; and the Buck Mountain veins and Jugular veins are said to exist, but so far very little has been done to establish their correct identity in the basin, and in fact their existence was not materially deemed of much consequence, as tunneling expenses to properly explore them would be an unwarrantable outlay whilst so large a quantity of coal stood within easy reach, and this cause was resorted to.

It is astonishing what amount of coal this basin has furnished these last 40 years, and at present no apparent appearance of exhaustion. The Peaked mountain, at Glen Carbon, splits the basin into two west prongs, the Monteray north and Hartman branch south. The Mammoth vein in this basin got the name of the Jugular vein, in the north basin. The formation is in favor of the theory and calculated to mislead even good miners, since the seams all dip regularly south, and are uniformly stratified. Scarcely any apparent evidence is manifest of any sort of an anticlinal between both basins. The upper seams out-crop in sharp axis, and the rocky formations are greatly displaced, and there is but very little evidence here of an overturn in the seams. At the Mine Hill gap the mountain, both east and west, gives extraordinary evidences of volcanic disturbances, as the surfaces on both sides of the gap subsided in alternate steps towards the gulf. The conglomerate floor of the Mammoth vein spans this gap from north to south in one mighty arch, some 40 feet thick, of solid massive formation. The span must be one-fourth mile wide and 150 feet high. This point affords the very best field of observation, as the Mammoth vein, on the south side, comes out boldly to view, its dip being 33° S. Numerous attempts have been unsuccessfully made to explore certain missing seams

under this natural arch, which gave some slender proofs of existing veins, but did not warrant their complete development on the proofs furnished. While the large veins lay exposed and available, the expenditures required to prosecute further developments were considered by interested parties a needless outlay, and therefore the explorations were discouraged. Still the belief is presumptive that anticlinals do exist within this great arch, and had the confused mass now remaining in this gap been removed, no doubt but these veins would be exposed in full view.

The length of this chasm is some 440 yards, in breadth 300, or equal to 27 acres, apparently sunk into the earth, as but very little visible appearances of an inundation exists on the lower or southern side. Very little alluvial surface remains over the great conglomerate arch, although the debris is manifest for a short distance below it in the valley approaching Minersville. The West Branch of the Schuylkill river runs through this gorge, and thence west to Glendower and north to the Broad Mountain summit level, receiving numerous suborn tributaries on its route through Glen Carbon valley or Thomaston basin.

Here Richard Heckscher, Esq., operated on a large scale, very successfully, for a number of years, both here, at Forestville, Woodside and Black Heath, but of late transferred his title, as the Forest improvement company, to the present or Manhattan coal company, and at present opened operations at Shenandoah City in a large shaft, which he sunk to the bottom of the Mammoth basin, which vein is proved to be 49 feet thick, of the finest quality of White Ash coal. This enterprise cannot be equalled by any other works in the Union, as the whole is established on the most approved modern plans adopted in England.

Now that we have attempted the description and established the different basins and coal veins in the Schuylkill county district, from our own experience, and such reliable data as came to our hand, much of which has been gleaned from Daddow & Bannan's Treatise on Coal, Iron and Oil, for correct reference, and hope our statements are based on correct information, without resorting to minor detail and circumstances of changeable formations as are but of little value. But will now proceed to locate and describe the several and distinct basins lying within the district of Northumberland county, and do them that justice which their interest merits, hoping it will be fully sustained by facts as important to that section of the anthracite region and the country at large, as the coal interest of the country requires. Although a newly developed section, its geographical position renders it one of the most favored locations in the State. Its numerous out-lets to the far west by the western railways gives it a pre-eminence in market advantages in all seasons of the year. From this region the Baltimore and other southern city markets can be constantly supplied, whilst a large portion of its coal trade goes east to New York State and city, and a large balance of it finds its way to Philadelphia by the different railway lines of the P. and R. R. R. company.

The coal of this district is pronounced to be equal to any in the market, and much less of impurity in it than in other localities. The shipments of late years are rapidly advancing in increase over former years, and the state of society is quite encouraging. The relations existing between operators and miners is nearly satisfactory, and seldom any serious difficulty exists. Up to this season scarcely any difference existed, though throughout this season many of the collieries continued in operation. At present, August 6, harmony once more prevails, and employers, miners and laborers are once again occupied in their usual business, with no anticipation of returning to strikes in future.

This state of affairs is to be deplored, as great evils result from the distress necessarily following long suspensions, and a resort to such courses is to be deprecated.

The exercise of moderation in its incipient stages would avert great calamity and distress, besides the inevitable ruin to invested capital and a pecuniary loss to labor.

To come back to our subject, relating to the Northumberland mining district, we will first commence with the first.

THE NINETEENTH—FIRST, OR TREVORTON BASIN.

This basin rises 8 miles east of Herndon, and extends towards Shamokin Summit 4½ miles, and about 1½ miles wide. The veins partake of the character of the Mahanoy veins. In the vicinity of Trevorton the veins are found thicker than further east in the valley, and partake somewhat of a semi-bituminous character as they approach the Susquehanna river. Though at Mount Carmel these veins are better and more productive; and we can class the Locust Ridge anticlinal in this estimate of quantity and product.

At Trevorton the Mammoth vein is called the Twin veins, as here it is found split, as it is in other basins, but in other places in this region it is found as consistent and regular as can be, and is very productive in coal, and superior in quality and quantity.

Near Trevorton the Mammoth consists of two large veins, one of 16 and the other of 20 feet thickness, which are separated by an irregular parting slate, enough to entitle these veins to be classed as two separate and distinct veins. As they traverse further east they tend more closer, and increase in size as they approach the summit; but at Shamokin they are reduced to 7 and 9 feet thick, and separating slates vary from 10 to 30 feet in thickness. This character in the formations here is not an exception to this region, as it has been found in Mount Laffee and at Osterman's mines, west of Donaldson, in Schuylkill county, and elsewhere through the anthracite coal fields, although it is not the common or usual condition of the Mammoth vein, but is considered its imperfection wherever found in this condition. The bottom vein of the Twins is found to be the most productive of the two every place throughout the region.

We here give a concise description of the veins found at Trevorton, adopting the nomenclature that has been used in that locality: The O—Zero, 9 feet thick, slaty, soft, uncertain and unproductive; west side of gap, 9 feet, red ash, impure, uncertain in thickness; east side do., 8 feet thick, three-fourths dirt; 4th vein, 1¼ feet, is a regular vein near the top of conglomerate formation; 5th, west side, 15 feet thick, impure stratifications; the east side a good quality and large quantity; 6th is a 1½ foot vein, found east and west sides; 7th is a 3 feet vein, found good, both east and west of the gap; 8th is a 15 feet thick vein, found good, both sides of the gap; 9th is a 15 feet thick vein, or the Twins, which form one vein ¾ mile west of Trevorton, where the coal is found over 30 feet thick; 10th is 2½ feet vein, found both east and west, which will correspond with the Holmes vein elsewhere, as the upper vein in the Trevorton basin; 11th is the Primrose, which is found near Shamokin, 150 feet above the Twins, and is from 10 to 7 feet thick; 12th, or Big Orchard vein, is here fully developed; but 13th is less certain to be the Little Orchard and is large for that vein; yet far enough removed from the North Diamond, though it has an affinity to the character of that vein, and seems to be the upper workable vein in this basin between the Locust mountain on the North, and Red ridge on the south, but it is supposed that the Big and Little Tracy seams

exist in this basin, although as yet little has been done in their development from their remote positions, and their uncertainty as productive veins at present.

THE TWENTIETH, OR SHAMOKIN BASIN.

This is the largest basin in Northumberland district, extending from the junction of the north and south branches of Shamokin creek to the Trevorton summit, in length 10 miles, in width 3 miles. This, as before stated, is the central basin of the Shamokin coal field. The total area of coal measures of this field is estimated at 91 square miles. The Shamokin coal field, from Helfenstine, on the south of the Mahanoy mountain, to the northern boundary at the second mountain, at Locust Gap, is 4½ miles broad, and undulations are more frequent than in the eastern section of the field, but are not so abrupt at their angles. The basin, as a generality, is not so deep nor steep in dips as those in the Pottsville or Mahanoy basins. The basin is in its lowest depth at the town of Shamokin.

Though the basins in this section are less in depth than they generally are found elsewhere, they are more uniform in dip, the inclinations less angular, but their axis of prolongation are less uniform and reliable, with a corresponding depreciation in their size and character. The coal is very excellent, but the small veins are not so productive in the central and western parts of the region, but in the southern part they possess the same excellence which distinguishes them in the Mahanoy region. If the veins are less in size they are more in number, and have the appearance of being split, as is the manifest case of the Mammoth veins. There are many other veins which, from their local inferiority, deserve no description at present, because they are inferior deposits, and have no established situation in proper coal measures of the anthracite region. With no little share of industry we are enabled to collect local data from practical men, who have established correct information out of a confusion of theories in reference to the questioned regularity of the coal seams of this basin, though the types of the veins are not so analagous as to identify them with their associates in other basins, and these peculiarities are only local, not general, and our familiarity with this region would warrant us in our opinion on the configuration of the stratas. We formerly stated our opinions of the coal measures of the anthracite coal region, and have every reason to believe our opinions deserve credit in saying that the veins occupy a uniformity of measure consistent with their regularity of bearing east and west, unless abruptly deranged by great local interruptions. The increase of seams can only be accounted for by the theory of splitting of the seams, as the lower veins are invariably found split and divided by partition slate of ancient data, as in the case of the Buck Mountain vein. The conclusions arrived at in this case are applicable to the other vein, that the intruding slate increased in thickness and so widely separated the seams which are found to concentrate east of or at Girardsville. At Shamokin there are some 15 narrow synclinal and parallel deep troughs or basins, and three regular anticlinal within these basins, i. e. the Green Ridge, the Red Ridge and Coal Ridge. These prominent anticlinals spring out of the Shamokin mountain. These three basins are sub-divided by other inferior basins, and saddles into corresponding inferior basins, which exist as narrow troughs. These peculiar forms of saddles and basins of synclinal and anticlinal basins confuse the regularity of the seams. The broken aspect of the hills are of considerable altitude, which presents a very large body of coal deposit above water level, and brings the coal veins a reasonable distance from the

surface. It is presumed that 1,000 feet will equal the vertical depth of the Shamokin basin at its greatest depth. The Mammoth vein may be reached at from 200 to 500 feet by shaftings. Slopes are coming into full operation here, but much of the coal is at present mined above water level.

At present there are some 20 collieries in operation in the Shamokin basin, all doing a thriving business in their line.

THE TWENTY-FIRST—THIRD, OR LOCUST GAP BASIN.

The Locust Gap basin is situate in and around the water gat here in the Locust ridge, at its junction with the Mahanoy mountain, 6 miles east of Shamokin, and 5½ do. west of Ashland. The southern branch of the Shamokin creek rises at the summit, between Ashland and Locust Gap town, which water gat cuts all the upper coal veins, dividing them east and west. The veins here dip south in the Locust ridge, but dip north in the Mahanoy mountain, where the basin enters the Ashland basin, and continues some distance west of the town. The various veins of the region are found here in good condition, large in quantity and excellent in quality. As yet no developments are made on the north dips on the Mahanoy mountain. The synclinals at this place are not properly or satisfactorily proven, but the deposits are very extensive and abundant. Recent improvements show that the quantity is almost inexhaustible, and warrants the belief that the coal veins are consistent throughout the entire basin.

Very recently, however, contrary to opinions indulged in by some miners, that the veins did not exist south of the Mahanoy mountain, we find at the town of Helfenstine, 2 miles south of Locust Gap, on the property of Judge Helfenstine, the veins are fully proven to exist, and are now developed by two new operations open thereat, which properly sets aside every extravagant theory concerning the non-existence of coal south of the mountain. The collieries are open on the south side of the Mahanoy mountain, near the Big Mahanoy creek, 5½ miles south of west from Ashland, and from appearance contain a large deposit of coal. The veins dip north. Two collieries are in operation at Helfenstine, and no doubt but many more will soon be erected.

There are six collieries in full operation in the Locust Gap basin, and ample room for as many more.

THE TWENTY-SECOND—THE FOURTH, OR MOUNT CARMEL BASIN.

The Mount Carmel basin is situate in the eastern section of Northumberland county, near Columbia county line, and north of Locust Gap. It is 4 miles long by 2½ broad, and corresponds in its similarity with the Shamokin basin, its synclinal and anticlinal features agreeing with the western basin. The Green Ridge rises in its eastern section, which extends some 3½ miles into Columbia county. A large body of excellent coal is developed here; also the Coal Ridge and Shamokin Mountain veins are open here. Their basins and saddles are similar to those of the Shamokin basin. The coal trade of this place is opened to all the markets of the country by the number of railroads traversing the districts, such as the Pottsville and Sunbury, the Mine Hill railroad, the Shenandoah railroad, the Mahanoy and Shamokin railroad, the Lehigh Valley and Jersey Central railroad, and the Dauphin and Trevorton railroad. These lines enter the valley from all sides, and at present constitute this place one of the most favored locations in the State. A large quantity of the coal mined comes from drift openings. Slopes are also in operation, though the basins are available to shaft

operations. At present there are six collieries in operation in the basin, with room for many more.

The Helfenstine basin is but recently developed, and the full extent of its limits is not as yet fully explored. After due inquiry will be able to describe it hereafter.

THE TWENTY-THIRD—COLUMBIA COUNTY DISTRICT.

The mining district in this county is but small, and limited to the southern angle bordering on the town of Ashland, in Schuylkill county, on that line from north of Girardsville to west of Locust Dale; it runs 4½ miles S. 70° west; on Northumberland county line it runs 3¾ miles west 23° north; thence 5¾ miles north 0° east; thence to the point of beginning, 2 miles east 10° south. The district contains three small basins, namely: Locust Dale, Centralia and Green Ridge.

The quantity and quality cannot be surpassed by any of its limits in the State, particularly Centralia and Locust Dale basins, which are actively operated these last 15 years. In this district are proved all the veins known in the Mahanoy valley. Only the Mammoth and Skidmore veins are yet worked, as the capacity for preparing coal is not adequate to the amount which could be mined were all the veins worked, yet the facilities are very extensive.

THE TWENTY-FOURTH—THE FIRST, OR CENTRALIA BASIN.

This basin we first propose to describe: It commences at Centralia, runs east to the boundary line of Schuylkill county. The synclinals of the Mammoth, Skidmore and Seven Feet veins are here largely developed. We are guided by the investigations of Alexander W. Rea, late general engineer and superintendent of the Locust Mountain coal and iron company; he being the first, and, up to his death, resident engineer for that company. He had thoroughly identified the veins, their general local peculiarity, and shows these coal veins to be consistent with the other similar veins throughout the region. The basin contains but one regular basin, some two miles in length by one mile in breadth. The veins dipping south at 45°, whilst those dipping south at 33°. The veins are very thick both sides of the basin and continue so its whole length, and occupy a very conspicuous uniformity of character for excellence, purity and inexhaustible quantity. Those veins under the Mammoth are very deep in the basin, but are not at present worked.

To account for the large size of these veins it is presumed the Twin veins or splits in the Shamokin region form into their positions as they approach eastward, similar to a like cause in various other basins in the anthracite region. The probability is that as they extend eastward, the partition slate thins out completely, the veins uniting in regular form, but much more enlarged. This singularity is not rare, but almost local through the region. The common thickness of the Mammoth here ranges from 30 to 40 feet thick.

THE TWENTY-FIFTH—THE SECOND, OR LOCUST DALE BASIN.

This basin is located west of the town of Ashland, and running along the county line from Centralia to the eastern line of Northumberland county, the distance of 2½ miles, and in breadth, 1 mile, which basin ranges along the southern slope of Locust mountain, to where it unites with the Maha-

noy mountain near Locust Gap summit. The extraordinary enlargement of the veins at this place makes it a very productive locality. The veins have a sharp dip of from 50° to 60°.

The enlarged coal measures at this point are quite extraordinary, though we must not claim this a basin particularly, but a half basin, as the Ashland basin is part of the same—the one on the south flank of the Locust ridge and the other on the north side of the Mahanoy mountain. Properly this should be considered one basin. It contains all the known veins in Ashland district, and are exceedingly productive. At present there are but three collieries in operation at Locust Dale. They are about the oldest north of the Broad mountain, and have good market facilities by railway.

George H. Potts, Esq., operates the Locust Dale colliery; G. S. Repplier operates the Locust Run, and the Cambria coal company the Cambria. The fourth, or Locust Mountain colliery is at present abandoned. The two former collieries are very successful, and have been in active operation for over 15 years. At Mr. Potts's mines Mr. Louden Beadle first tried his experimental steam fan ventilator, which he afterwards perfected, and made it a practical success. These fans are adopted rapidly anywhere they can be conveniently used. They will eventually supersede all other modes of ventilation.

THE TWENTY-SIXTH—THE THIRD, OR COAL RIDGE BASIN.

This is a new basin, but lately developed by Maurice Robinson. It is located east of Mount Carmel, on the Coal ridge and Shamokin mountain. There is but one colliery as yet open here, though it promises soon to become an important place. The anticlinals and synclinals, known in eastern Shamokin and Mount Carmel basins, are found with but little or any difference in their general character, and as they are not wholly developed, a description of them would be but speculative and intruding on the work of our report. However, a favorable opinion of its large deposits is amply sustained by practical business men and operators. Time will reveal the matter fully.

In concluding our classification of the basins of the four counties, we have faithfully described them as carefully and intelligently as gleaned from "Coal, Iron and Oil," and trust they may render satisfaction. And in doing this it may not be out of place to attempt a description of the great conglomerate floor of the anthracite coal field.

This peculiar rock formation seems to be the coal base of the carboniferous area. Any reliable coal field is not found in any other condition. Scarcely an exception can be made to sub-carboniferous period in England since the practically developed coal formations are definitely assigned to prominent positions, whilst the first is still doubtful as to antiquity or place.

In the vicinity of Pottsville this great belt of conglomerate is over 1,000 feet thick. A vast mass of nodules of quartzose, of every variety of colors and sizes, from a large egg to a grain of sand, imbedded in a stratification, shales, sandstone and thin coal seams, and is found a persistent strata below the bituminous as well as the anthracite coal seams. At Mauch Chunk, in the eastern end of the field, this stratum is found to be 950 feet thick. A few miles west, at Nesquehoning, it is found 792 feet thick; at Tamaqua it is 803 feet thick, and at Bear Gap, 450; at Lorberry Gap, 675 feet; at Yellow Spring, 660; at Wiconisco, 460 feet, but is found at the latter place double between the north and south basins.

In the detached basins it is found from 650 to 700 feet; at Ashland, 800 feet; at Shamokin, 650 feet; at Solomon Gap, Wyoming, it is found 170 feet thick; and at Nanticoke, 60 feet, but is often greatly increased in thick-

ness by the mass of sandstone under it. The conglomerate seems to be about 100 feet thick at Broad Top, and, including the slate and sandstone, is 250 feet thick. In Sullivan county the mass of conglomerate is about 30 feet thick, while the sandstone between it and the red shale is 300 to 500 feet thick, which contains some small seams of limestone are to be met with. Explorations further west may be out of place here.

COAL VEINS.—"*Coal, Iron and Oil.*"

Their nomenclature theorically and practically. First in this series is the

A, OR ALPHA.

This is found to be the lowest vein in the anthracite region, frequently neglected in this region, its measures seldom exceeding 1 to 2½ feet thick, but is consistently found to occupy its proper geological position near the conglomerate rocks. This vein is close above them or on them. The coal is often found pure and excellent, and its formation has been greatly preserved over a wider extent of territory from the greater tenacity of the rock. Through Kanawha and West Virginia, at Ironton and other like places, it is distinguishable through the coal measures.

B, OR BUCK MOUNTAIN VEIN.

This is the next upper seam in the coal measures, and is distanced from A vein by a partition rock of more than 30 to 100 feet thick, partly conglomerate and sandstone or slate, frequently by slate, and generally a large workable vein of 12 to 18 feet thick, and at Nanticoke and other localities it is found to be from 20 to 30 feet thick. This vein of coal derived its present name from its being operated by the Buck Mountain coal company in the eastern end of the Hazleton basin. The seam which was worked at this place by this company was from 12 to 20 feet thick, being celebrated for its purity and steam qualities. It is found at Black Creek, in its pure condition, of an average of 12 feet thick; at St. Nicholas, in the Mahanoy basin, its thickness averages 18 feet; at Tamaqua, 15 feet; at New Boston, 18 feet in thickness, pure and excellent. The coal of this vein may be accepted as generally good, and a leading vein in the class of the anthracite coal veins. It is as important as the Mammoth, as large and more extensive. It is the principal seam in the Western coal fields, and supplies nearly all the coal used in making iron. Its quality is dense, solid and tenacious. It is our best furnace coal. Its ash, which is red, is its only defect. It rarely fails to make good coke, and generally carbonized before used in western furnaces.

C, OR GAMMA SEAM.

This seam is small and generally unimportant. In size it ranges from 4 to 8 feet in thickness, and split by slate partings, which is its ruin; though in the Mahanoy, New Boston and some of the Lehigh basins it redeems its character and is considered a fair producer. The Mammoth and other large veins eclipse it, otherwise it would bear a fair character. If found in this condition in the west it would be deemed of important value.

The desire amongst business men to mine large veins, to increase shipments to a high pitch, overlooks the small veins, as they, at best, are a risk by either slopes or tunnels. They are best developed by shaftings for other larger veins, like the Buck mountain veins.

D, OR SKIDMORE VEIN.

The Skidmore vein is known in this and in the Lehigh regions as Wharton. It is commonly found from 6 to 12 feet in thickness; its quality is not inferior to the other large veins, and is considered a good, workable and producing vein. Its slate and impurities are so concentrated that the cleaning and separation of it is not too troublesome. Nothing very remarkable worth notice in reference to this vein, except that it proceeded the Mammoth formation, which is separated from it by a seam of slate and sandstone, from 30 to 100 feet thick.

In the Scranton region it underlies the Mammoth some 20 feet, while at Carbondale the separation is but a few feet. In Carbondale the veins are all developed, and found almost homogenously blended, except by their stratas of slate; and the seams perceptibly diminished and the dippings nearly horizontal. Though mining in that region is of old date, from 1820, and at moderate depth, those which approach the surface, dip from from 3° to 10°, and can be worked with better advantage than high dipping veins.

E, OR MAMMOTH VEIN.

This seam receives its name as the Mammoth vein, from its great thickness of coal, and its persistent local presence throughout the anthracite coal region. From its great extent and frequent enlargements, it is considered the most productive coal vein in the world. Its thickness varies from 8 to 80 and sometimes 100 feet thick. Its estimated average thickness is 25 feet, and will sustain this thickness throughout its whole length and breadth.

In the Lehigh region it measures 40 to 60 feet thick; in Schuylkill do.; at New Boston 60 feet; in the Mahanoy do. 30 feet; on the M'Nael estate 50 feet; at Shenandoah 70 to 80 feet; at Shamokin, Twin veins, aggregate 25 feet; in the Wyoming region 20 feet; at Scranton 14 feet; at Carbondale 20 feet; at St. Clair shaft 24 feet; at Kar's slope at Mine Hill Gap 20 feet; at Swatara 10 to 14 feet; at Lower Rauch Creek 12 to 20 feet thick; at Ashland Pioneer mines 35 to 70 feet thick; and is consistent in its quality throughout. The probabilty of properly describing the correct matter or substance which produced this mass of coal is a question yet to be clearly discussed and confirmed. As yet those who have written upon this occult subject have, in a great measure, failed to establish reliable data, or convince the world by absolute facts. We are forced, therefore, to submit its discussions and theories to more competent minds, and pursue our descriptions of its astonishing value as a mighty producing deposit of coal, with less irregularities and perplexing rock fault than any other seams in the coal kingdom.

The stratified impurities are trifling and scarcely denote any different series of stratas, but would positively indicate the whole formation to be general simultaneous.

SEVEN FEET VEIN, (E,) SPLITS OF THE MAMMOTH VEIN.

This vein may be termed the pioneer or associate of the Mammoth vein; its persistent presence as a consort seam to the Mammoth, is found almost everywhere in proximity to it, and generally partakes of its character. Its size is from 4 to 10 and 15 feet thick. Locality often changes its appearance. Its location, as a regular coal seam, is often disputed in certain districts where it almost unites with the Mammoth at 0 to 20 feet above it.

The latter is the usual thickness of the separating wall of rocks at Pottsville and Mahanoy basins. This thickness often is changed by the enlargements of the Mammoth seam; and in common are generally mined at the same time, as it is an effective auxiliary in ventilating the Mammoth by cross holes mined through the parting wall from vein to vein.

F, OR HOLMES VEIN.

This is a consistent small vein, overlying the Seven Feet vein. Its average thickness is three to five feet in the anthracite regions. It is not extensively worked though its coal is good, but it being considered unprofitable, while the larger seams can furnish a ready supply, though in some districts it assumes profitable and productive proportions, and is extensively worked.

This seam, by some, is considered the uppermost white ash seam, although this theory is often contradicted in some regions. Like the Buck Mountain basin, in some regions its lower seam yields a similar red ash, but this is not its general characteristic, though the A seam produces red ash altogether.

G, OR PRIMROSE VEIN—PITTSBURG BED.

This is a large and productive seam; is found uniform in character and good in quality. Its economy for mining cannot be surpassed. Its usual thickness is from 8 to 16 feet, and is classed with the white ash veins, though generally it partakes of a mixed ash, part red and part white, called pink ash. In some districts its characteristic is altogether white ash, and therefore entitled to be classed with white ash seams. It lies from 250 to 400 feet above the Mammoth seam. This vein is the most consistent in the whole group of coal veins, and is so considered in the bituminous coal fields.

Rarely more than one slate is to be met in it; often none at all. It is much less subject to local interruptions than the Mammoth, and its impurities are nothing but thin bone coal, except in faulty districts, where it yields to confused interruptions, like the other seams.

In deep basins we find the veins are much thinner than in the shallow basins; the greater angle of dip of the seams the more it is reduced in thinness; it not only becomes more impure, but often worthless. This remark will apply to other deep seams, as well as to the Primrose. The cause of this change needs sufficient investigation to render the subject more intelligible. The fact may be here stated that all coal seams formed in extremely deep basins are reduced in thickness as their depth increases, and the fact is fully proven, almost to a certainty, in the districts of Pottsville, Tamaqua and Tremont.

H, OR ORCHARD VEIN.

The H vein is a regular seam of great uniformity of character and quality. It ranges from 4 to 8 feet in thickness. Its situation in the formation is about 100 feet above the G vein. Its ash is pure red, and is considered the first red ash seam in the series. Its coal is commonly coarse in appearance, but as a domestic fuel it cannot be easily surpassed. It got the name of hemlock coal of James Silliman, Esq., of Pottsville, and others, from its supposed vegetable origin. Though this is not its general character in many locations it is found a fine, lustrous coal, and, until lately, vied with

the best white ash coal, and in fact, was the ruling article in market prior to slope developments, and still commands a respectable reputation in market. The seam is separated by a small bench of impure mining. The lower seam is from 1 to 2 feet thick. The upper seam is more pure and regular. The coal very good, with small slips of thin bone coal, in layers of different thicknesses. But, generally speaking, the vein is considered a profitable one for mining economy and production.

I, OR LITTLE ORCHARD VEIN.

This is a smaller coal seam overlying the Big Orchard, and is found some 50 feet above it. The coal ranges in thickness from 2 to 4 feet, and is consistently associated with the G seam in the Pottsville region, but in other districts appears to be disputed as another different vein, as at Scranton it is supposed it unites with H vein, and disappears from the group altogether, although this supposition is doubted, and that H seam disappears and the Diamond seam assumes its position. However this may be is a matter of conjecture amongst miners. This small vein produces the best article of coal in the region, when found in its full condition, but otherwise it contains some impurities. Its character is suddenly changed, and becomes difficult to mine from the singular formation of angular blocks in wedged benches and slips, which become dangerous to the miner. Great caution in this respect is necessary to be used by those who are not adepts in the art of mining, and often the old, practical man is deceived and falls a victim to its treachery. The simplest pressure or force applied to one of those large blocks may displace it, and often, from its own weight, may become detached and come tumbling down on its unprotected victim, and maim or crush him to death; and one such block displaced may cause others to come down after, which is often the case in many places.

J, OR DIAMOND VEIN.

This seam is found uniform in its general character, and one of the larger red ash veins in the series of red ash seams. Its thickness ranges from 4 to 9 feet, and lies from 250 to 300 feet above H, or 400 to 500 feet above G, or Primrose vein. This vein has a number of names, according to locality, as "North Diamond," at Wadesville, the "Peacock," at Oak Hill, and was named the Daddow vein, in respect of Mr. Daddow, Sr., who assisted the classification and location of some of these seams formerly when they were but imperfectly understood. When found in its proper thickness it produces largely of fine, lustrous coal. Its appearance and fuel qualities cannot be excelled by the coal of any other seams. The seam is not very reliable in some basins, but subject to many irregularities, suddenly from the purest to the dullest, and again to inferior stuff. These faults are not so very extensive, though mining on any extensive scale cannot compare with that conducted in the large seams, which admits of economy, large product and profit. The red ash veins are, as a general thing, abandoned for the large white ash veins. But the time will come when the red ash will be resorted to for supplies and remuneration. When those times arrive then mining will become dangerous, as the tremendous lodges of water that flood the large veins will threaten the stability of the mines of the red ash veins. This is not the case at present, as these veins are full of untouched coal, which form safe barriers to water lodgements, the more safer for mining the large veins.

This vein is said to be split in two by a soft bench of mining, the lower

bench pure and solid, with a conchoidal seamy fracture, with seamy impurities of trivial character. The upper seam is slightly different, productive of more waste and sometimes unremunerative in the increased expenditure in removing waste that cannot be stowed away in the excavations.

K, OR BIG TRACY VEIN.

This seam averages from 6 to 12 feet in thickness. Its place in the series is from 200 to 250 above the J vein, but between these veins are found 3 small seams, nearly approaching the workable size, one of which is the Clinton, which ranges some 3 feet, which contains some good coal, but stratified with many seams of bone or slate, soft, shelly and subject to much waste in its preparation for market, and most commonly the Clinton is abandoned.

The K seam is solely confined to Pottsville region. It is not found near Tamaqua or Tremont, and not found in many of the other regions, except Shamokin, and there only in portions. The seam is liable to faults. Its tendency to small fracture in many places unfits it for machine manufacture, and its waste is often troublesome and expensive. Much of the vein under this circumstance cannot be made remunerative. It is estimated that one-fourth of the area occupied by this seam cannot at present be made available, though seldom this vein is mined below water level.

L, OR LITTLE TRACY VEIN.

This is a solid seam of superior coal, and scarcely impure or faulty, ranging in thickness from 3 to 5 feet, but some decreases to 1 foot. Its coal presents a superior appearance and an excellent fuel for all purposes. It is an economical working vein when in its regular size, producing very little waste. Its impurities are very readily detached, and injures not its marketable qualities. Its base is a soft mining seam, and affords easy mining operation, which facilitates the production more rapidly and less laborious. Blasting is not so much resorted to, owing to its easy undermining, which if this was not the case powder would be exclusively resorted to.

There is not so much difference in the I and L veins, but considerable difference in their mining economy, as I contains no mining seam, and its coal is produced by blasting, whilst L seam has the advantage of a soft mining base, needing little or no powder.

It has a number of local names in the different basins, as the Little Diamond, from its lustral appearance, the yard coal, from its size, the Mason, the Rabbit-hole, the Charley Pott, Palmer, &c. Its situation in the series is from 50 to 100 feet above the K vein, and about 150 feet below the G, or Gate vein.

M, OR GATE VEIN.

This is a consistent seam and the upper reliable one in the series of anthracite seams, and the most valuable above the Primrose vein. Extensive operations have been conducted in this vein, at great depths and in many localities. For instance by Col. J. J. Conner, Novelty colliery, New Philadelphia; at West West, Old Salem colliery, York farm, by George H. Potts, etc. Is found more reliable in character, less interrupted in uniformity, better in quality than any of the other red ash seams in the upper series, a singularity which can be but guessed at by theory in the absence of a more correct geological truth. The seam averages from 4 to 16 feet in thickness, but its most productive thickness is from 5 to 10 feet. Its south

and north dips differ much in thickness and quality, the south seam being the most productive.

A singular fact arises in the case of this seam—that the north dip seldom out-crops. This feature applies to the veins below it. The north dips of these veins around Pottsville are inverted or nearly perpendicular, which case governs the upper seams to some extent, and appear as if the north seams at their out-crops were dipping south, in which case it confused both scientific and practical men, who clung to the supposition that the Schuylkill basin contained 140 distinct seams instead of 15, as is now correctly established by practical experience.

This vien was worked at the following places. under the following names, i. e., at Centreville as the Spohn, at Pottsville as the Gate, at Port Carbon as the Salem, at the Delaware mines as the Peach Mountain, at Millcreek as the Lewis; at all of which places, and in these different basins and different dips, this vein was worked as distinct seams. Many experienced miners then were slow in receiving the fact of it being one and the same vein throughout all circumstances and geological difficulties.

To convey an intelligent impression of the synclinal and anticlinal dips in our anthracite coal fields to persons not accustomed to the inverted dips, and even practical foreign miners who have experience in gentle levels, is a very difficult matter. Illustrations in this report will convey the impression much better than explanations or descriptions. Inverted dips confuse the formation in deep basins below the red ash seams, and have caused considerable annoyance in locating, by their confused formation, as is the case with the Mammoth vein at Coal Castle, at Tremont and other localities, which insinuated the theory of the fabled Jugular or Mountain vein, which, together with other such simple theines, and persons of small experience and less common sense, who forced their arguments to such an extent as to ruin hundreds of capitalists and land-owners, decoying them to furnish means for their foolish explorations on the road to ruin.

This is not an over-drawn picture; it is an absolute fact, and many well known miners of long experience, of noted standing, attached themselves to this opinion, whose persistent act leaves visible monuments of impoverished districts and ruined capitalists, particularly in the region of Schuylkill valley.

But the Jugular vein has not been developed yet to a certainty, and capitalists will not invest in its exploration. That has been too often attempted which resulted in regrets; and still we find those who risk small sums in tunnelling experiments for it, and suddenly close up their accounts, commonly at the sheriff's office; though some of its devotees may be accidentally rewarded by tapping the Buck mountain vein in a workable condition.

The M has much less range than the K vein, and may not cover more than 60 square miles of area in the anthracite regions, however its superficial is less than its true area. In basins where it is sound, its contraction is less than half its original form, the veins frequently perpendicular. At New Philadelphia M is found dipping 80° south, while opposite, in the north dip in the Sharp mountain, this seam is vertical and often inverted. Under these circumstances it is imprudent to conjecture the depth of the basins, though this is not the case in shallow basins. For instead of being depressed they appear to be upheaved by contracting powers; the supposition is that all basins or seams having *long axis* may be deep basins, is sufficient evidence in proof of the circumstance exists in the Pottsville region.

N, OR SANDROCK VEIN.

This seam is the uppermost one in our anthracite coal measures, and considered too small for mining purposes. It ranges from 2 to 4 feet thick, and is 100 to 150 feet above M. The only note worthy of remark in reference to this seam is that it is the upper seam in the anthracite field, and the fifteenth seam in the coal series. In connection with this description it may be proper to say that we have given the local names of the veins and basins in the now new mining district of Schuylkill, and traced the general locations of the important and inferior seams, with as much accuracy and care, from sources of acknowledged merit, with just regard to the public interest and information, as space in this report may permit, making the subjects as clear and brief as would convey full information of the subject, which, indeed, is now becoming one of great national importance, and deserves the fostering care of the general government.

The annexed table will exhibit the thickness of coal, in feet, in each seam, and the separating stratas of rock in a cross section in Pottsville basin, which will enable the reader to form an idea of the formation of coal and rock measures in this locality, which do not very materially differ in the other basins south of the Broad mountain.

TABLE No. 14.—"*Coal, Iron and Oil.*"

Average thickness of coal veins and rock measures at Pottsville.

Alphabetic class names.	Local names of coal veins.	Thickness of coal seams. Feet—from			Thickness of rock measures. Feet—from			General remarks.
1st, or A	Alpha, or bottom v	4	to	1	50	to	10	Average thickness of coal and rock seams as have been found at Pottsville and vicinity. Alpha seam being the lowest and the Sandstone seam the upper one in the anthracite coal region of Pennsylvania.
2d, or B	Buck Mountain	30	to	6	75	to	35	
3d, or C	Gamma	8	to	2	150	to	40	
4th, or D	Skidmore	12	to	4	150	to	40	
5th, or 7 feet	Seven feet vein	4	to	9	30	to	3	
6th, or E	Mammoth	100	to	12	100	to	22	
7th, or F	Holmes	6	to	3	300	to	41	
8th, or G	Primrose	16	to	6	150	to	44	
9th, or H	Orchard	8	to	4	150	to	92	
10th, or I	Do. Little	4	to	2	100	to	21	
11th, or J	Diamond	10	to	5	300	to	35	
12th, or K	Tracy	12	to	6	250	to	150	
13th, or L	Do. Little	4	to	2	100	to	50	
14th, or M	Gate, or Gap	16	to	6	200	to	150	
15th, or N	Sandrock	4	to	2	150	to	100	
Aggregate		238		69	2,155		833	

By this it is shown that the maximum thickness of coal is 238 feet, and the minimum do. 69 feet; an average of probably 140 feet will not be too much. On the same basis the rock may average 1,800 feet, rock and coal together, from the Alpha to the sand rock seams, 1,940. To this again add the supercumbent strata above N seam, which will probably average 700 feet. Thus the approximate depth to the conglomerate floor of the anthracite coal basin is 2,640 feet. This measure may, and, no doubt, will vary, according to locality, as at Wadesville shaft, where it is 692 feet to the bottom of the E vein, from measurements taken by Mr. J. G. Hardy, while excavating the shaft under his superintendence, which is about on the same

base level with mid-tide in the Delaware river at Philadelphia. And according to the approximated calculations in the foregoing table, the basin of the Mammoth or E vein, at Pottsville, would be, at its supposed lowest depths, some 1,948 feet below mid-tide at the same place.

Presuming it may be of public interest to give general information of the elevation of different points of interest in the mining district, etc., above mid-tide at Philadelphia, at which coal is mined; assuming that the lowest basin is at Pottsville, we may conclude the coal in the lower seams lies 2,000 feet deeper than the surface of the ocean at the city of Brooklyn, which is nearly on the same parallel of latitude as Pottsville. Latitude, 40° 40′ north.

Through the courtesy of Franklin B. Gowen, Esq., president of the Philadelphia and Reading railroad and Schuylkill navigation companies, I have been furnished the following tables of elevations, through the kindness of his engineers: First, Joseph Byers, Esq., C. E. M. and B. Mt. railroad; second, William H. Biens, R. E. Mine Hill railroad; third, Henry K. Nichols, R. E. Schuylkill Valley railroad, and James F. Smith, Esq., Res't C. E. Schuylkill navigation canal. From these statistics we can be correctly informed on this subject, for which I am much obliged.

TABLE No. 15,

Of elevated points on the Mine Hill and Schuylkill Haven railroad and its laterals, respectively, above mid-tide, at Philadelphia.

Locations above mid-tide, Philadelphia.	Feet above mid-tide.
Schuylkill Haven Junction Nav. crossing	520
Westwood, old colliery, junction	663
Westwood and Muddy Branch junction, Weaver colliery	697.75
D. Hoch & Co.'s colliery, head of West West	873.11
Cain, Hacker & Cook's colliery, Muddy Branch	853.11
Junction Swatara and Middle Creek railway	817.11
Swatara Falls colliery, Claud, White & Co	1,019.14
Tremont coal company's colliery, Middle Creek	1,015.14
Junction Tremont, Mt. Eagle, at Tremont, Fisher colliery	758.15
Henry Heil colliery, Upper Rauch creek	1,136.19
Wm. & Thos. Kear's colliery, head of Wolf creek, Minersville,	788.9
Wm. & Thos. Kear's colliery, Mine Hill Gap, north side	841.10
East Pine Knot colliery, Laurel Run siding	881.10
T. H. Schollenburg's colliery, Thomaston	967.115
Lucas, Denning & Co.'s colliery, Dundas & Richardson siding,	1,033.13
T. H. Schollenburg's colliery, Glendower	1,200.135
Head of Mine Hill planes, Broad mountain	1,519.185
Foot of Mine Hill planes, north side Broad mountain	802.205

NOTE.—Thomas & William Kear's slope, at Wolf Creek, near Minersville, is 1,520 feet deep, on an angle of 33°; will equal 828 feet perpendicular. Thus the difference of altitude of this slope bottom and mid-tide at the Delaware river is 39.1 feet.

TABLE No. 16,

Of elevations of different points in Ashland basin and vicinity, at water level, or 0° zero.

Pioneer colliery, first in Ashland at water level drift	853.22.5
T. & L. Herman colliery, foot of Big Mine Run planes, at water levels	988.24.5
J. E. Wincoop's colliery, at head, ditto	1,279.25
John Anderson & J. Ryon, P. J., ditto	1,285.25
R. Gorrell's colliery, near Centralia, Columbia county	1,355.25.5
Jos. M. Freck's colliery, near Centralia, Columbia county	1,425.26
Keystone colliery, Wm. Kendrick, near Locust Dale	1,025.25
Locust Dale coal company's colliery, at Locust Dale	1,086.25.5
Merriam colliery, at Locust Summit	1,330.27
Graber, Kemple & Co.'s colliery, at Locust Gap, Northumberland county	1,190.28
Locust Gap colliery, in the Gap Locust creek	1,090.28
Junction of Mine Hill and Shamokin Valley R. R. and Pottsville ditto	1,025

TABLE No. 17.

Elevations furnished by H. K. Nichols, Esq., R. E., Pottsville, Pa., actual level.

Mount Carbon and P. and R. R. R., at Mt. Carbon R. junction,	591.2
Wadesville, Upper Danville and Pottsville R. R.	790.48
Mount Laffy, J. M. Seigfried colliery, do	847.78
Mill Creek junction, P. S. Repplier's colliery, Mill Creek R. R.,	876.1
Port Carbon crossing	627.8
Pottsville, Pennsylvania hall, front on street	603.75
Middleport	712.9
Tuscarora	895.7
Mountain Link summit, midway to Tamaqua	1,024.8
Tamaqua, centre of town	787.5
St. Clair furnace, at St. Clair shaft	706.1
St. Clair, Geo. W. John & Bro.'s colliery	827.9
New Castle, G. S. Repplier's colliery	875
Sharp Mountain colliery, at Pottsville, Van Winkle & Co.	1,273.6
East Mahanoy junction near E. Mahanoy tunnel, Lehigh Valley R. R	1,093
East Mahanoy, east end of tunnel	1,312.2
East Mahanoy, north end of tunnel	1,334
Mahanoy City, Hartford colliery, Wm. Patterson	1,235
St. Nicholas colliery, Waste House run	1,140.9
Top Broad mountain, near New Boston colliery	1,723

By James F. Smith, Esq., C. E., Schuylkill navigation company.

Surface of water at Silver creek dam	1,510.63
Surface of water at lock, No. 1, at Port Carbon	618.63

Distant from Philadelphia 101 miles; the water has a fall of 892 feet in 7 miles, or 127¼ per mile.

By the way, the Schuylkill navigation canal company has leased the said improvement and its franchises to the P. and R. R. R. Co. for the full term of ninety-nine years, from the 20th July, Anno Domini 1870, forward, which canal has been in operation from the year Anno Domini 18—.

TABLE No. 18.

The following statistics of elevations have been furnished by C. E. Byers, C. E. and Superintendent B. Mt. railroad.

	Feet high.
Pine Grove, opposite the depot, above mid-tide	512
Lorberry Junction	611
Terminus of branch to the Rauch creek breaker	1,001
Switch Junction, Miller & Graff's new breaker, Lor. Ex. R. R.	1,278
Switch-back terminus to Miller & Graff's new breaker	1,364
Tremont depot	764
Junction of Heil & Detter branch and Good Spring railroad	764
Terminus of Heil & Detter branch junction, Owen & Long's breaker, Good Spring railroad	917
Owen & Long's breaker branch terminus, drift	1,012
Donaldson water-level	923
Nutting & Lewis's breaker branch junction with Good Spring R. R.,	1,101
Nutting & Lewis's breaker branch terminus of Good Spring R. R.	1,177
Good Spring station	1,320
Osterman's breaker, Dr. Schmole's slope	1,428
Keffer's, Summit station	1,463
Tower City station, at Savidge & Co.'s slope	1,350
Brook Side colliery, at Savidge & Kauffman	1,275
Junction Lorberry Ex. and Lorberry railroad	1,134

NOTE.—At Dr. Schmole's slope, on the Broad mountain, the vein outcrops and the dip of the veins are north, at an angle of 80° in the slope. No opinion can be formed of the depth of this basin. It is seen as above that the elevation is 1,428 feet above mid-tide. The breadth of this basin is not given, and should it throw this dip regular the depth must be enormous, as the large surface of table land extending all around indicates the measures regular.

	Feet.
Head of Mahanoy planes	1,479
Foot of Mahanoy planes, north side	1,124
St. Nicholas colliery	1,155
Ashland depot	881
Oakland	940
Ashland Summit, near Welsh company's colliery	1,155
Potts colliery, Locust Dale	1,095
Kendrick's colliery, Locust Dale, (Keystone,)	1,025
Ben. Franklin, west of Helfenstine	1,175
Locust Swamp Summit, near Locust Gap	1,238
Montelius colliery, at Mount Carmel	1,072
Coal Ridge, No. 2	1,131
Preston colliery, No. 1, at Girardsville	1,090
Cuyler colliery, Raven Run	1,360
Col. J. J. Conner's colliery, Girardsville	1,051
Wm. Penn colliery, S. E. Griscom, Esq	1,073
Koh-i-noor colliery, Richard Heckscher, Esq., Shenandoah City	1,240

Continental colliery	1,366
Centralia Summit, Columbia county	1,455
New Boston slope, Schuylkill county	1,520
Greenback colliery, Shamokin region	895
Shamokin Depot, Northumberland county	730
Trevorton colliery, at Trevorton town, Northumberland county	760

By referring to the above tables of elevations the actual difference between points can be easily ascertained above tide-water mark at Philadelphia, which directly refers to the difference of levels at the openings of the collieries. The depths of the different basins can be approximately estimated from these datas, and will convey a clearer information on this part of our subject, on the great resources of the mining district of Schuylkill, that heretofore was wanting among the people. Others more competent to speak on this subject had overlooked this item of public information thus far, and I trust will be received with proper regard.

Taking the difference of level at Pottsville at 600 feet, and that of Wadesville, at the Wadesville shaft breaker, at 700 feet, we find the depth of the shaft to be 692 feet; to this add 30 feet deep sump, and we find the sump at this shaft to be 22 feet lower than mid-tide at Philadelphia.

This shaft is operated by Wm. Draper, Esq., and opens on the fifth basin in the Pottsville region, 2 miles north of that place. The surface water of Silver creek dam is 818 feet above its mouth. New Boston colliery, being the highest coal mined in the district, is found at its out-crop at the slope to be 1,520 feet above tide water, and 820 feet above Wadesville shaft.

The different altitudes at which coal is mined in the Schuylkill district is a subject which perplexes many. These basins, which are clearly understood by the mining people generally, are so often the subject of wonder. Their numerous contractions and expansion, their anticlinal and synclinal dips and over-lappings, their sudden changeableness and great depths, a constant deviation from anthracite to bituminous, as the seams approach westward; the appearance of the red ash in the upper and lower seams, with the white ash occupying the centre, a state dissimilar to that which the bituminous occupies wherever discovered. Geologists have attempted to solve this great problem of nature, but the arguments put forth to sustain these theorical convictions are often practically proven to be hypothetical, much less but strange and paradoxical.

We have met with the same expansions and contractions in the region lying south of the Sharp and north of the Blue mountain, in the semi-lime and red shale formations of that valley, through its whole length and breadth, is similar to those same changes in the coal region.

The anthracite coal seams over-lie the lime bed, which dips at Bloomsburg, in Columbia county, and rises near Reading, in Berks county, Pa.

It thus appears that the foregoing statements will approximate closely with the present known deposits in the several anthracite coal regions of the State, notwithstanding the quantity of coal that has been mined since the commencement of the trade in this country. Of this large amount yet to be mined, under the present reckless system, a vast portion of which will be lost to the persons directly interested, and will eventuate as a national loss to the country. As yet no correct estimate can be approached with any degree of certainty of the actual quantity of anthracite coal in these several regions, as there are constantly new additions making and more to be developed, that the actual quantity based on present calculations is but a mere hypothesis. From the nature of the anticlinal dip of the coal measures the coal deposits must be much more extensive.

An Exhibit *of the quantity of coal sent to market from the several anthracite regions of the State, since the commencement of the trade in* 1820 *to the close of the year* 1869.

Anthracite regions.	Tons shipped by canals.	Tons transported by railroads.	Aggregate tonnage of each region by all sources, 2240 lbs.
Schuylkill	27,163,040	53,793,295	80,956,335
Lehigh	24,609,798	18,809,450	43,419,248
Wyoming	10,228,583	59,011,081	69,239,664
Shamokin	5,637,204	9,237,579	14,874,783
Lykens Valley	.....	2,609,623	2,609,623
Semi-bituminous.			
Cumberland	4,769,521	10,501,595	15,271,116
Pennsylvania C. and Broad Top	.....	13,250,844	13,250,844
Foreign, imported	.....	10,016,419	10,016,419
	4,769,521	83,768,858	88,538,379

LIST OF OPERATORS *of collieries and land-owners in the different counties of the mining district of Schuylkill, for the year 1870, and tons mined in 1870—shipments as far as heard from.*—B. BANNAN'S *statistics.*

Number in Schuylkill county.	Names of collieries.	Names of operators.	Names of land-owners.	Locations of collieries.	Tons shipped.
West Schuylkill.					
1	Brookside	Savage & Kaufman	Munson & Williams	Williams Valley	21,880
2	Tower City	Savage & Althouse	do	do	28,490
3	Schmole	Bd. Mt. M. Coal Company	Bd. Mt. M. Coal Company	Bd. Mt. Summit	8,820
4	Franklin	Henry Heil	G. B. DeKeim & Co	Upper Rauch Creek	12,711
5	Black Heath	Miller, Graff & Co	Swatara Coal Company	Lower Rauch Creek	75,128
6	Laurel Run	do	do	Lorberry Tunnel	
7	Phillips & Shaffer	Phillips & Shaffer	Fishing Creek Company	South Mountain Valley	
8	Lincoln	Levi Miller & Co	do	do	
9	Lorberry	Miller, Graff & Co	Swatara Coal Company	Lorberry Mines	
10	Fisher's	Allen Fisher	do	Tremont	
11	Eckert's	Nutting, Lewis & Co	Swatara Co. and others	Donaldson	30,736
12	West End	A. Eittein & Co	Tremont Coal Company	do	1,604
13	Colket	Owen, Long & Co	do	do	28,176
14	Middle Creek	Tremont Coal Company	do	Middle Creek	10,867
15, 16, 17	Swatara Falls, (3)	Swatara Falls Coal Co	Manhattan Coal Company	Swatara	
18	Newtown	C. F. Kull & Co	Helfenstine & Co	Newtown	
19	Dundas, No. 6	Reed, Emswiler & Co	Estate of J. Dundas	Sharp Mountain	
Middle Schuylkill.					
20, 21, 22	Otto, (3)	Cain, Hacker & Cook	Manhattan Coal Company	Muddy Branch	67,389
23	Forestville	J. Wadlinger & Co	do	Forestville	
24	Diamond	Whittaker & Co	do	do	12,012
25	Phœnix, (3)	Morgan Williams	Phœnix Park Coal Co	West West	14,981
26	do	Z. P. Boyer	do	do	15,441
27	do	J. C. Northall	do	do	15,441
28	Glendower	T. H. Schollenberger	Manhattan Coal Company	Glen Carbon	48,391
29	Black Heath	Idle at present	do	Mt. Pleasant	
30	Peaked Mountain	Lucas, Dennings & Co	Reichson and others	Glen Carbon	44,736
31	Glen Carbon	do	do	do	
32	Heckscherville	J. Wadlinger & Co	Manhattan Coal Company	Heckscherville	45,386
33	Thomaston shaft	T. H. Schollenberger & Co	do	do	48,391
34	West Pine Knot	Pine Knot Coal Company	Dundas estate	Coal Castle, (west,)	45,271
35	East Pine Knot	do	do	do (east,)	

LIST OF OPERATORS—CONTINUED.

Number in Schuylkill county.	Names of collieries.	Names of operators.	Names of land-owners.	Location of collieries.	Tons shipped.
36	Black Heath	Sanner, Hodges & Co	Wharton and others	Coal Castle, east	16,878
37	White Oak	Coal & Wrin	Morris Patterson	West New Castle	
38	Mine Hill Gap	Kear Brothers & Co.	Dundas estate	Mine Hill Gap	33,263
39	Kear's W. Creek	do	Wharton and others	Wolf Creek	22,258
40	Wolf Creek	Wolf Creek Diamond C. Co.	do	do near Minersville,	23,319
41	West Mount Laffee	Joseph Patterson	Joseph Patterson	Mine Hill Gap	
42	Beach Wood	J. K. Seigfried	do	Mount Laffey	38,508
43	Revenue	Pomroy & Rickert	do	do	18,611
44	Norwegian	Norwegian Coal Company	Major Wetherill and others,	do	2,295
45	Dexter	Abandoned	Joseph Patterson	do	
46	Saylor	Dennings & Co	Cummings and others	Wadesville	12,002
47	Manchester	Crist Franz, 2	Major Wetherill and others,	do	14,823
48	Hickory shaft	Hickory Coal Company.	do	St. Clair.	72,498
East Schuylkill.					
49	Mammoth	G. S. Repplier, Esq	Pott & Bannan	New Castle	9,755
50	Spruce Forest	Lucas, Dening & Co.	Richardson & Co.	do. east.	3,697
51	J. R. Deihm	John R. Deihm	Major Wetherill & Co.	St. Clair	
52	Eagle	G. W. Johns & Bro	do	do borough	42,318
53	Pine Forest shaft	G. W. Snyder.	do	do east	24,489
54	Ravensdale	Whittlesy & Co	Lewis & Baber	Ravensdale	16,568
55	Feeder Dam	Feeder Dam Coal Company.	M. C. Coal Company	Port Carbon, north	13,982
56	A. Robertson	Andrew Robertson	do	do west	6,508
57	St. Clair shaft	Kendrick & Davy	Casey & Lee	St. Clair borough	
58	Eagle Hill slope	Jas. Oliver & Co	Baber & Innes	Eagle Hill	42,372
59	Glenworth slope	Jas. Ryon & Co	do	do	
60	Commercial		Bast and others	Valley Furnace	
61	Ledger vein	Harris & Williams	Valley Furnace estate	Silver Creek Furnace	27,999
62	Coal Hill	H. Guiterman	do	Middleport	Abandoned.
63	New Philadel'a Gate	Hein & Glasmire	do	New Philadelphia	5,176
64	Kaskawilliam	P. D. Luther	Kaskawilliam Coal Co	Middleport, west	
65	Swift Creek	E. De Socarez.	Bast and others	Tuscarora, south	6,140
66	Peach Mountain	B. Rowbottom	do	do	5,714
67	Kentucky	Shall & Donohoe	Tamaqua Coal Company	do west	19,712
68	Pardee, new	Tamaqua Coal Company	do	do east	
69	Buckville	Moss & Co	do	Buckville	
70	New Kirk	Tamaqua Coal Company	do	New Kirk	

71	Reevesdale	James Glenn & Co	do	Reevesdale	12,115
80	Reevesdale Mt. Side	Tamaqua Coal Company	do	Sharp Mountain Side	14,350
81	Tamaqua shaft	G. Whitstone	do	Tamaqua	16,821
82	Greenwood, No. 1	E. Borda	do	do east	68,546
83	Greenwood, No. 2	do	do	do do	
84	Tunnel, No. 10	do	do	do do	
85	Summit	G. Ormrod	do	do	
86	Levan	Whitstone & Co	do	do north	
87	High Mines, east	do	do	do do	
88	High Mines, west	R. Cusha & Co	do	do do	
89	Reevesdale	Ablett & Co	do	Reevesdale	5,891
90	Sharp Mount	Wood		Pottsville, south	
91	Duncan	Duncan Coal Company	Duncan Coal Company	do north	Abandoned.
92	Sharp Mount, east	Van Winkle & Co		do east	
93	Honey Brook, S.	J. M'Creary & Co		New Pottsville	
94	Silver Brook	Hosea & Longstreet	Catawissa Railroad Co	Silver Brook Summit	
95	Mount Rose	Mercer Coal Company	Delano Land Company	Mahanoy, N. east	8,477
96	Mount Etna	Co-operative Coal Company	do	do do	8,589
97	Mahanoy	Bedford, Cox & Co	do	do do	31,978
98	Copely	Lentz & Bowman	do [Co.,	do do	50,128
99	Silliman	S. E. Silliman	Philadelphia and Mahanoy	do do	40,333
100	Mahanoy City	Hill & Harris	do	do do	22,605
101	Focht & Co	Focht & Whitaker	Delano Land Company	do do	31,159
102	Glendon	J. B. Boyles	do	do do	27,497
103	East Mahanoy	Rickert & Co	do	do do	7,150
104	Primrose	Candwell & Co	Delano, Kear & Pattersons	do do	35,904
105	Beaver Run	Bowman & Co	Delano Land Company	do do	8,421
106	Grant	B. L. Eshelman	do	do east	28,720
107	Oak Hollow	Gorman & Co	do	do do	31,016
108	Hartford	W. F. Patterson	Kear & Patterson	do do	11,176
109	New Boston	New Boston Coal Company	New Boston Co [Co.,	do south	4,152
110	Tunnel Ridge	Geo. W. Cole	Philadelphia and Mahanoy	do do [las,	46,801
111	St. Nicholas	S. Denison & Bros	do	do west, St. Nicho-	69,139
112	Suffolk	Suffolk Coal Company	do	Waste House Run	19,391
113	Mapledale	Scott Sons & Co	do	Mapledale	41,633
114	Shenandoah	Knickerbocker Coal Co	do	St. Nicholas	36,243
115	Boston Run	Focht & Althouse	Kear & Patterson [Co.,	Boston Run	67,580
116	Bear Run	Wiggan & Treibles	Philadelp'a and Mahanoy C.	St. Nicholas	46,801
117	M'Nael, No. 2	M'Nael Coal & Iron Co	M'Nael Coal and Iron Co	Yatesville	72,655
118	Coal Run	do	do	do	
119	Barry	do	do	do	
120	Plank Ridge	Grant, Lee & Co., Silliman trustees	Bowers and others	Shenandoah City	85,529

LIST OF OPERATORS—CONTINUED.

Number in Schuylkill county.	Names of collieries.	Names of operators.	Names of land-owners.	Location of collieries.	Tons shipped.
121	Shenandoah City	J. O. Rhoades & Co	Bowers and others	Shenandoah City	63,095
122	Turkey Run shaft	Kendrick & Dovey	do	do	48,463
123	Kehly Run	Thomas Coal Company	Girard estate	do	78,360
Middle Mahanoy.					
124	Furnace	Atkins & Brothers	Gilbert & Sheafer	Mahanoy valley	37,604
125	Gilberton	Gilberton Coal Company	Gilbert and others	do	61,122
126	Draper	Hickory Coal Company	do	do	
127	Lawrence & Co	Lawrence & Merkle	do	Mahanoy planes	37,603
128	Bear Ridge	Bear Ridge Coal Company	Girard estate	do	2,396
129	Girardsville	Col. J. J. Conner	do	Girardsville	40,280
130	M'Michael	Conner & Sons	do	do	
131	Colorado	Philadelphia Coal Company,	do	Seltzinger's patch	131,349
132	Shenandoah, 2d	do do	do	Lost Creek	85,314
133	Lehigh, 3d	do do	do	do east	4,069
134	Wm. Penn shaft	S. E. Griscon & Co	do	Shenandoah, west	37,666
135	Koh-i-noor shaft	R. Heckscher & Co	Gilbert & Sheafer	do	771
136	Turkey Run	D. B. Haas & Co	do	do east	
137	West Shenandoah	Maize & Lewis	do	do west	
138	Girard Mammoth	Girard M. C. Company	Girard heirs	Raven Run	41,192
139	Cuyler	S. M. Heaton & Co	do	do	53,341
140	Girard	Garretson & Co	do	Girardsville, south	40,333
141	Preston, No. 1	H. A. Moodie & Co	Preston Coal and Imp't Co.	do north	
142	do No. 2	do do	do do	do	91,066
143	do No. 3	Idle	do do	do south	
144	do No. 4	H. A. Moodie & Co	do do	do	
145	Big Mine Run	Taylor, Bast & Co.	Locust Mount. C. and I. Co.	Big Mine run	46,514
146	Big Mine Run, east,	E. Bast	Bast, Anspach & Co.	do	29,578
147	Excelsior	J. R. Cleaver	J. P. Brock & Brother	Ashland	10,369
148	Black Diamond	Burget Heiss	do	do	
149	Tunnel	Patterson & Co.	do	do	7,162
150	Charter Oak	W. Jinkins & Co	do	do	
151	Pioneer	Patterson & Co	do	do	
152	Keystone	Kendrick & Co	do	Locustdale	20,575
153	Yorkville	Job Rich	York Land Company	Pottsville	
154	Old Salem		West West	West West	

COLUMBIA COUNTY COLLIERIES.

Number in Columbia county.	Names of collieries.	Names of operators.	Names of land-owners.	Location of collieries.	Tons shipped.
1	Centralia	J. M. Freck	Locust Mt. Coal and I. Co.	Centralia	41,518
2	Hazle Dell	R. Gorrell	do do do	do	90,820
3	Continental	Goodrich & Co.	Girard's estate	do east	39,550
4	Union	J. Ryon & Anderson	do do	do do	42,546
5	Locust Run	G. S. Repplier	Locust Mt. Coal and I. Co.	do south	12,647
6	Red Ridge	Robinson & Co	Green Ridge Coal and I. Co.,	do west	
7	Cambrian	Cambria Coal Co.	John P. Brock & Bro.	do south	18,725
8	Locust Dale	Locust Dale Coal Co	Locust Dale Coal Co	do do	36,096
9	Eagle	J. E. Winkoop & Co	Bast, Anspach & Co.	do east	25,640
10	Locust Mountain	Abandoned	Locust Mt. Coal and I. Co.	do south	
164					

DAUPHIN COUNTY COLLIERIES.

Number in Dauphin county.	Names of collieries.	Names of operators.	Names of land-owners.	Location of collieries.	Tons shipped.
1	Short Mountain	Major J. Anthony, for company, and W. B. Fowle, general superintendent.	Summit railroad company	Wiconisco	67,775
2	Frankten		do do do	do	
3	do east		do do do	Williamstown	89,619
4	Williamstown		do do do	do west	296,423
168					

NORTHUMBERLAND COUNTY COLLIERIES.

Number in Northumberland county.	Names of collieries.	Names of operators.	Names of land-owners.	Location of collieries.	Tons shipped.
1	Merriam	Locust Dale Coal Co	Locust Dale Coal Co	Locust Gap	
2	A. S. Wolf	Graber & Kimble	Locust Gap Iron Co.	do do	52,890

LIST OF OPERATORS—CONTINUED.

Number in Northumberland county.	Names of collieries.	Names of operators.	Names of land-owners.	Location of collieries.	Tons shipped.
3	Locust Gap	Graber & Kimble	Locust Gap I. Company	Locust Gap	50,654
4	Locust Summit	J. Bartholomew & Co	Locust Mt. Summit Co.	do do	31,799
5	Locust Spring	do do	do do do	do do Summit	
6	Ben Franklin	R. B. Douty & Co	Helfenstine Bros	Helfenstine	29,170
7	Beddall	Beddall & Co	do do	do	
8	Coal Ridge, No. 1	Idle	Coal Ridge Coal and I. Co	East of Mt. Carmel	51,184
9	Coal Ridge, No. 2	Longstreet	do do do	do do	50,684
10	Stuartville	William Montelius	do do do	do do	69,853
11	Reliance	Locust Mt. Coal and I. Co	Locust Mt. Coal and I. Co	South do	46,126
12	Coal Mountain	F. Rhoads & Co	Sns. Coal and C. Mt. Co	North do	15,839
13	Green Mountain	S. John & Sons	Green Ridge L. Company	Green Mt. Carmel	6,207
14	Caledonia	Henry Saylor	Henry Saylor	North of Mt. Carmel	10,078
15	Enterprise, No. 1	Enterprise Coal Company	Fulton Coal Company	West do	29,176
16	Enterprise, No. 2	do do do	do do	do do	
17	Excelsior	Excelsior Coal Company	do do	do do	39,618
18	Greenback	Guiterman & Co	North'berland Land Ass'n	East of Shamokin	19,066
19	Henry Clay	John B. Douty	Fulton Coal Company	South do	24,470
20	Henry Clay, 2	Robinson & Guiterman	North'berland Land Ass'n	do do	37,009
21	Buck Ridge	May & Patterson	Renshaw & Johnson	do do	56,829
22	Big Mountain	J. Langdon	Big Mt. Improvement Co	do do	56,584
23	Frank Gowen	Boughner, Skipp & Co	Bellass heirs	do do	32,323
24	Franklin	Ryer & Bros	North'berland Land Ass'n	do do	2,896
25	Clinton	Bechtel, Kulp & Co	do do do	do do	5,948
26	Daniel Webster	J. B. Henry	do do do	East do	17,468
27	Luke Fidler	Burnside Coal and I. Co	Burnside Coal and I. Co	do do	46,869
28	Lambert	T. S. Deweese, agent	Shamokin Coal Company	do do	78,054
29	Hickory Swamp	Shamokin Coal Company	Northern Central railway	do do	38,064
30	Cameron	John Haas & Co	Cameron & Packer	North do	182,411
31	Burnside	S. Rettenbender	Big Mt. Improvement Co	South do	37,638
32	Bear Valley	Sha'n and B'r Valley C. Co.,	Carbon Run I. Company	West do	41,181
33	Mt. Pleasant	W. A. Richardson	Burnside Coal and I. Co	East do	18
34	Trevorton	Packer & Rathbun	Phila. & R. R. R. and others,	South of Trevorton	67,847

The Trevorton is the most westerly and the Silver Brook the most easterly collieries in the great Mahonoy basin, distant 36¼ miles. The Short mountain the most western and the Summit the most eastern collieries in the great Pottsville basin, distant 45¾ miles. The Dauphin basin extends 9 miles further west than the Trevorton basin, and the Dauphin basin extends a few miles further west. The Schuylkill and Mahanoy basins separate quite considerably as they extend westward. The Schuylkill basin rises three-fourths of a mile west of the Lehigh river and north of Mauch Chunk. The Mahanoy basin rises 10 miles west of the same point, at the junction of the Nesquehoning and Lehigh River railroads. Their distance apart at the Schuylkill county line is 3⅝ miles; their main distance apart, from Trevorton to Dauphin basin, is 27 miles, thus showing the gradual spreading out of the field westward. No coal is found east of the Lehigh river, in Carbon county, and only 11 collieries in operation in that county, and 25 operating collieries in Lehigh region of Luzerne county. These basins are narrow and contracted, but still in the same geographical position as the larger basins, pointing east and west.

In the foregoing tables I have succeeded in giving the correct names of the different collieries, operators, land-owners and locations of all the important collieries in the mining district of Schuylkill, as are at present in each county, under their present proper names, many of which have changed the names they bore last year, and are subject to be occasionally changed as they fall into new hands.

We find in the county of Schuylkill 154 collieries, Columbia county 10, Northumberland county 34, and Dauphin 4; aggregate number of collieries being 202 in operation. There are, however, not less than 80 land sale drift collieries, and quite a number of coal washing establishments in the district, which employ a number of hands and supply quite a considerable quantity of coal, which commands rapid sale, owing to its purity and freedom from dust.

TABLE No. 20.

Of wire ropes manufactured by John A. Roebling, Trenton, New Jersey—tons as a breaking strain.

ROPES OF 133 WIRES.					ROPES OF 49 WIRES.					
Trade number.....	Circum. in inches,	Diameter.	Price per foot in cents.....	Breaking strain in tons of 2,000 lbs. Tons	Circumference of hemp ropes of equal strength...	Trade number.....	Circum. in inches,	Price per foot in cents.....	Ultimate strength per tons of 2,000 lbs.—tons.....	Circumference of hempen ropes of equivalent strth in inches.....
1	6½	2⅛	$1 20	74.00	15½	11	4½	54	36.00	10½
2	6	2	1 05	65.00	14⅝	12	4¼	47	30.00	10
3	5½	1¾	91	54.00	13	13	3¾	41	25.00	9⅛
4	5	1⅝	78	43.60	12	14	3½	35	20.00	8¼
5	4½	1½	65	35.00	10½	15	3	29	16.00	7¼
6	4	1¼	53	27.20	9½	16	2¾	23	12.30	6¼
7	3½	1⅛	41	20.20	8	17	2½	18	8.80	5¼
8	3⅛	1	34	16.00	7	18	2¼	15	7.60	5
9	3	⅞	28	11.40	6	19	1⅞	13	5.80	4⅜
10	2½	¾	25	8.64	5	20	1¾	11	4.09	4
10½	2	⅝	24	5.13	4½	21	1⅝	9	2.83	3½
10⅝	1½	9–16	23	4.27	4	22	1½	8	2.18	2⅞
10⅞	1⅜	½	22	3.48	3⅞	23	1⅜	7	1.63	2½
						24	1	6½	1.38	2¼
						25		6	1.03	2
						26		5½	.81	1⅞
						27		5	.56	1½
						27½		4	.25	.....
						28	.....	3	Large sash cord.	
						29	.....	2	Small sash cord.	

For safe working load allow 1.5 to 1.7 of ultimate strength, according to speed and vibration. Drums, sheaves and pulleys should be double the diameter in feet that the rope is in inches, but never under the minimum of the rope diameter. Ropes will wear double as long on large drums; and also with the speed, it is better to increase the load than the speed. A hemp centre rope wears much better than a wire centre on short bends, and should not be coiled or uncoiled like hemp ropes; all twists must be avoided. Raw linseed oil is the best preserver, mixed with lamp-black; best preserver for ropes under water, three-fourths tar and one-fourth slacked lime, to coat it over.

TABLE No. 32.—Weight of T rails.

Showing the number of tons per mile by the number of pounds per yard, as per standard weight at the old Haywood rolling mill, Pottsville, Pa., 1868.

At 16 pounds per yard equals	$25\frac{1760}{2240}$	tons per mile.
At 18 ....do....do	$28\frac{640}{2240}$	....do.
At 20 ....do....do	$31\frac{960}{2240}$	....do.
At 22 ....do....do	$34\frac{1280}{2240}$	....do.
At 25 ....do....do	$39\frac{640}{2240}$	....do.
At 28 ....do....do	44	....do.
At 30 ....do....do	$47\frac{320}{2240}$	....do.
At 33 ....do....do	$51\frac{1920}{2240}$	....do.
At 45 ....do....do	$65\frac{960}{2240}$	....do.
At 48 ....do....do	$75\frac{960}{2240}$	....do.
At 68 ....do....do	$106\frac{1920}{2240}$	....do.

The above table will enable you to approximately estimate the cost per mile of the different sizes of T rails in common use in and about the mines, and is useful and convenient for all purposes, and will serve as a guide to the managers of coal works or railroads now in common use.

Maps of collieries furnished to inspectors of mines for the year ending December 31, A. D. 1870.—P. F. M'ANDREW, Clerk.

Shenandoah City.
Suffolk.
E. S. Silliman.
Tunnel Ridge.
Hill & Harris.
Wiggan & Co.
Duncan.
Preston, No. 1.
Preston, No. 2.
Preston, No. 3.
Preston, No. 4.
St. Nicholas.
East Pine Knot.
West Pine Knot.
Gilberton, north.
West Mahanoy.
Kentucky.
Knickerbocker.
Warrington.
Mammoth vein.
Plank Ridge.
Manchester.
Norwegian.
Greenwood.
Bull Run.
No. 10 Tunnel.
Pine Forest.
Glendower.
Thomaston.
Heckscherville.
Otto, No. 1.
Otto, No. 2.
Otto, No. 3.
Diamond, Wolf creek.
Hoffman.
Phœnix, No. 1.
Williamstown.
Big Lick.
Reevesdale.
Wabash.
Wolf Creek.
Diamond, Forestville.
Middle Creek.
Brookside.
Tower City.
Focht & Alter.
Girard.
Colorado.
Shenandoah, west.
Cuyler.
Locust.
Grant.
Mahanoy City.
Mapledale.
Oak Hollow.
Lentzs & Bowman.
Glendon.
Silver Brook.
Beaver Run.
P. and M. coal company.
Bear Ridge, Gilberton.
Primrose.
Ledger vein.
Richardson.
Spruce Forest.
Oakdale,
Summit Hill, Nos. 8 and 2.
Plank Ridge.

For pulleys that run rapidly, line the grooves with leather set on end; this is an excellent way to preserve the ropes. Wire ropes should be kept well oiled in winter to free it from rust.—*Haswell.*

TABLE No. 21.

Showing the mean pressure of steam.

Steam expansion.	Multiplier.	Steam expansion.	Multiplier.	Steam expansion.	Multiplier.
1.	1.000	3.1	.688	5.2	.510
1.1	.995	3.2	.676	5.3	.504
1.2	.985	3.3	.665	5.4	.499
1.3	.971	3.4	.654	5.5	.494
1.4	.955	3.5	.644	5.6	.489
1.5	.937	3.6	.634	5.7	.484
1.6	.919	3.7	.624	5.8	.479
1.7	.900	3.8	.615	5.9	.474
1.8	.882	3.9	.605	6.	.470
1.9	.864	4.	.597	6.1	.466
2.	.847	4.1	.588	6.2	.462
2.1	.830	4.2	.580	6.3	.458
2.2	.813	4.3	.572	6.4	.454
2.3	.797	4.4	.564	6.5	.450
2.4	.781	4.5	.556	6.6	.446
2.5	.766	4.6	.549	6.7	.442
2.6	.752	4.7	.542	6.8	.438
2.7	.738	4.8	.535	6.9	.434
2.8	.725	4.9	.528	7.	.430
2.9	.712	5.	.522	7.1	.427
3.	.700	5.1	.516	7.2	.423

To find the mean pressure of steam on a piston.

RULE.—Divide the length of the stroke, added to the clearance in the cylinder at one end, by the length of the stroke at which the steam is cut off added to the clearance, and the quotient will express the expansion it undergoes.

Find in the above table, in the columns of expansion, a number corresponding to this; use the multiplier opposite to it and multiply it into the full pressure of the steam per square inch as it enters the cylinder.

STEAM.—HASWELL.

Steam, at the boiling point, is equal to the pressure of the atmosphere, which is 14,706 pounds per square inch. Under this pressure alone, water cannot be heated above the boiling point.

A cubic inch of water evaporated under common atmospheric pressure is converted into 1,700 cubic inches of steam, or, say, one cubic foot, and supplies a force equal to 2,200 pounds, one foot high. One pound of water converted into steam at 212° Fahr. will heat 5½ pounds of water at 32° to 212°, and that the sum is 6½ of water. Steam, when at the expansive power of the atmosphere, will flow into vacuo at 1,400 feet per second, and when at twenty atmospheres its velocity is increased but to 1,600 feet per second, and when flowing into the open air, at the same pressure, 650 do.; 27,206 cubic feet of steam, at atmospheric pressure, equals one pound avoirdupois.

Of boiling points corresponding to altitudes of the barometer from 26° to 30°.

Barometer.	Boiling points, (deg.)	Barometer.	Boiling points, (deg.)	Barometer.	Boiling points, (deg.)
26.	404.91	27.5	207.55	29.	210.19
26.5	205.79	28.	208.43	29.5	211.07
27.	206.67	28.5	209.31	30.	212.

Table of expansive force of steam, from 212° to 349°, in atmospheres of 30 inches of mercury. Experiments at Franklin Institute, Philadelphia.

Atmospheres	Degrees of heat.	Atmospheres	Degrees of heat.	Atmospheres	Degrees of heat.
1.	212.	4.	291.5	7.	326.
1.5	235.	4.5	298.5	7.5	331.
2.	250.	5.	304.5	8.	336.
2.5	244.	5.5	310.	8.5	340.5
3.	275.	6.	315.5	9.	345.
3.5	284.	6.5	321.	9.5	349.

The use of these tables are important for practice to engine-men and those having charge of steam engines and steam boilers.

Example.—Suppose the steam to enter the cylinder at a pressure of 34.7 pounds per square inch, and to be cut off at one-fourth the stroke of the piston. The stroke being 10 feet long.

Thus—10 feet equals 120 inches+.5 (or ½) inch for clearance=120.5; ¼ of stroke is 30 inches+.5 for clearance, which equals 30.5. Then 120.5÷30.5=3.95, the relative expansion, which falls between 3.9, in the table, and 4. Referring to the table, the multiplier for 3.9 is 605, and the difference between that and 4 in the table is 008. Hence multiplying 008 by .5 and subtracting the product 004. from 605, the remainder, 601, is the multiplier for 3.95. Therefore, 601×34.7 pounds is equal to 20.855 pounds per square inch, the mean effective pressure on the piston as required. When great accuracy is required the space between the cylinder and the steam valve must be added to the clearance.

A pressure equal to that of the vacuum existing must be added to the pressure of the boiler, as indicated by the steam gauge.

By properly observing the rules and table, any person can easily qualify himself in finding the actual pressure of steam on the cylinder head at any stage of the steam as per indicator.

RULES FOR CALCULATING THE CAPACITY OF ENGINES.

Rule.—Square the diameter of the cylinder bore, and multiply the product by the decimal .7854 for all such occasions, and that product by 10, and the whole of the last product by 144; this will show the number of pounds weight the engine can raise one foot high in a minute, then divide the number of pounds thus obtained by 33,000 pounds, which is equal to one horse-power, and the quotient will be the required horse-power. I have taken 10 pounds in this example for the pressure of steam per square inch, and the number of revolutions at 10 per minute, and 9 feet stroke of the piston.

Example.—What is the power of a steam engine, the bore of whose cyl-

inder is 40 inches in diameter and the stroke 9 feet, at 10 revolutions per minute?

TO ASCERTAIN THE CENTRIFUGAL FORCE OF A FLY WHEEL.

Rule.—Divide the velocity in feet per second by 4.01, also, the square of the quotient by the diameter of the wheel; this quotient is found to be the required force, assuming the weight of the body as 1. Then this multiplied by the weight of the body is the centrifugal force.

Problem.—What is the centrifugal force of the rim of a fly wheel 10 feet in diameter, running with a velocity of 30 feet per second.

Example.—30÷4.01=7.48 this÷10, or diameter, equals 5.59 times the weight of the fly wheel rim. Answer, with a fraction over ½. Or thus

4.01÷3000= 7.48 quotient.
2807 7.48√
1930 5984
1604 2992
3260 5236
3208 10÷559504 square of the quotient.
52 50
59 5.595 answer, is equal to 5½ times the weight
50 of rim, with a fraction over.
95
90
50

The weight of a fly wheel for a 30-horse engine may be 6,000 pounds, its diameter 16 feet and making 45 revolutions per minute. What is its centrifugal force in pounds weight? Answer, 33,129 pounds or over 16½ tons centrifugal force.

FLY WHEELS.

Rule.—To multiply the horse-power of the engine by 2,240 pounds and divide the product by the square root of the velocity of the circumference of the wheel in feet per second; the quotient will be the weight in 100 pounds.

Problem.—An engine of 35-horse power, diameter of fly wheel is 14 feet and the revolutions 40 per minute. What is the weight of the wheel?

Rule.—$35\times2240\div40\times14$ ft.$\times3.1416\div60^2=\frac{78400}{8886}\times100=9{,}130$ pounds.

Steam boilers.—The tensile strength of iron boiler plates ranges from 50,000 to 60,000 pounds per square inch of section if the material is good. It increases in strength when exposed to moderate heat, and reduced when the tension is crosswise to the direction of the fibre.

Construction of boilers.—The necessary allowance for the spaces between the rivets, by extreme tension and oxidation, reduces the measure of this strength for practical use as follows: Iron 10,000 to 12,000 pounds.

Riveting.—A double riveted joint is equal to $\frac{1}{10}$, and a single riveted joint is equal to $\frac{45}{100}$ of the strength of the boiler plate.

Water.—Fresh water—its constitution by weight and measure: Oxygen by 88.9 and 1. Hydrogen by 11.1 and 2.

One cubic inch at 62°, the barometer at 30 inches, weighs 252,458 grs., and it is 830.1 times heavier than air. A cubic foot of water weighs 1,000 ounces, or 62½ pounds avoirdupois. A column of water, 1 inch square and 1 foot high, weighs .434028 lbs. It expands $\frac{1}{9}$ by freezing, and averages $\frac{1}{3\,9\,7\,3}$ for every degree of heat from 40° to 212°, but its maximum density is 39.38°, and shows an increase in bulk from 40° to 212° of one foot in every 23.09 feet. Mine water contains one-thirtieth of its volume of gaseous element and spring water one-fourteenth, for the use of mine managers and miners in mines that generate gas.

FORCE OF WIND.

Miles per hour.	Feet per minute.	Pounds per square foot avoirdupois.	Miles per hour.	Feet per minute.	Pounds per square foot avoirdupois.	
1	88	.005	10	880	5.00	Brisk blowing.
2	176	.020	20	1,760	2.000	Very brisk.
3	264	.045	30	2,640	4.500	High winds.
4	352	.080	40	3,520	8.000	Very high winds.
5	440	.125	50	4,400	12.500	Stormy.
6	528	.180	60	5,280	18.000	Very stormy.
7	.....	.260	70	6,080	24.500	Great storm.
8	704	.320	80	7,040	32.000	Hurricane.
.....	.....	.....	100	8,800	50.000	Tornado.

TABLE No. 26.

The atmosphere at 27,500 *feet, the barometer at* 30 *inches and the thermometer at* 55°. *The inches and parts of lines on the barometer, and a corresponding number of feet in height, as per table. For use of miners.*—HASWELL.

Height of inches on the barometer.	Feet in height.	Height of inches on the barometer.	Feet in height.	Height of inches on the barometer.	Height in feet as per table.
30	.....	28.2	1.702	26.4	3.615
29.9	.92	28.1	1.799	26.3	3.719
29.8	1.84	28	1.897	26.2	3.824
29.7	2.76	27.9	1.996	26.1	3.926
29.6	3.68	27.8	2.095	26	5.000
29.5	4.62	27.7	2.194	25	6.111
29.4	5.56	27.6	2.392	24	7.263
29.3	6.50	27.5	2.491	23	8.462
29.2	7.44	27.4	2.592	22	9.907
29.1	8.38	27.3	2.692	21	11.000
29	9.33	27.2	2.793	20	12.345
28.9	1.028	27.1	2.895	19	13.750
28.8	1.123	27	2.997	18	15.214
28.7	1.219	26.9	3.099	17	16.740
28.6	1.315	26.8	3.201	16	18.335
28.5	1.411	26.7	3.304	15	20.500
28.4	1.505	26.6	3.406	10	27.500
28.3	1.605	26 5	3.511		

NOTE.—A sudden rise in the thermometer and a corresponding fall in the barometer, in a mine where explosive gas is evolved, indicates the state of the mine atmosphere to be in an explosive condition, whether the air current travels fast or slow, if sufficiently mingled with explosive proportions.

TABLE No. 27.

Showing the motion of different air currents in miles per hour and in feet per minute and seconds, to enable persons having charge of mines where carburetted hydrogen gas is evolved, by measurement of the air, how and when to avoid explosions.

Miles per hour.	Aggreg'e feet in length.	Feet per minute.	Feet per second.	Remarks on lamp tests in England in 1869.
1	5,280	88	1⅓	Where pure gas is evolved explosion will not take place, but will suffocate. When explosive gas is mingled with (6) six times its volume of fresh air it will explode at its greatest violence, and as the mixture of fresh air is increased to seventeen times its volume it ceases to explode, and is not then dangerous but has a sickening influence. The Davy lamp explodes in a current of air at eight feet per second, and the Stephenson lamp exploded in a current of twenty-five feet per second, and the Clanney lamp stood all these tests. The Davy lamp is the most sensitive in either carburetted hydrogen and carbonic acid gases, and most reliable of all.
1¼	6,600	100	1 5-6	
1½	7,920	132	2 1-5	
1¾	9,240	154	2½	
2	10,560	176	3	
2¼	11,880	198	3⅓	
2½	13,200	220	3⅔	
2¾	14,520	242	4	
3	15,840	264	4⅓	
3¼	17,160	286	4⅔	
3½	18,480	308	5⅛	
3¾	19,800	330	5½	
4	21,120	352	5 5-6	
4¼	22,440	374	6⅛	
4½	23,760	396	6 6-10	
4¾	25,080	418	7	
5	26,400	440	7⅓	
5¼	27,720	462	7⅔	
5½	29,040	484	*8	
5¾	30,360	506	8 5-12	
6	31,680	528	8 4-5	
6¼	33,000	550	9⅛	
6½	34,320	572	9½	
6¾	35,640	594	9 9-10	
7	36,960	616	10 4-15	

* Explodes.

VENTILATION.

Natural ventilation in mines is caused by the greater degrees of heat therein. Much of this heat is generated from the persons and animals employed in them, and also from the decomposition of matter and from debris and waste left in them, which increases the temperatures often to 80°. The average natural temperatures may be fixed at 52° in mines of 660 feet deep, leaving 28° of drying temperature, or of expanding power, in the air within them, when the atmospheric temperature is at 52° outside.

TABLE No. 28.

Showing the expansion of the heated air and its weight in grains per cubic foot, and the volume at 100 cubic feet.

Deg. of heat.	W'ght of a cubic ft. in grains.	Volume of air at 100 cubic feet.	Deg. of heat.	W'ght of a cubic ft. in grains.	Volume of air at 100 cubic feet.
32	550	At 100	132	453	It increases to 121
42	539	It increases to 102	142	446	do 123
52	529	do 104	152	439	do 125
62	518	do 106	162	432	do 127
72	506	do 109	172	426	do 129
82	495	do 111	182	420	do 131
92	487	do 113	192	413	do 133
102	479	do 115	202	407	do 135
112	470	do 117	212*	401	do 137
122	461	do 119			

* Water boils.

Calculations and deductions can be inferred from this table of temperatures and bulk of the volume at different degrees of heat.

TABLE No. 29.

Table of the pressure of air in pounds avoirdupois, per square foot of surface area of shafts of different depths, and subject to different degrees of temperature. Depth of shafts in feet. Calculations for miners' use.—HIPTON.

Temp'rature in degrees.	Depth, 120—lbs.	Depth, 180—lbs.	Depth, 240—lbs.	Depth, 300—lbs.	Depth, 360—lbs.	Depth, 420—lbs.	Depth, 480—lbs.	Depth, 540—lbs.	Depth, 600—lbs.	Depth, 660—lbs.	Depth, 720—lbs.
32	9.710	14.565	19.421	24.276	29.131	33.986	43.697	48.552	53.407	58.262	63.118
40	9.550	14.332	19.109	23.887	28.664	33.442	42.996	47.774	52.551	57.551	62.106
50	9.367	14.054	18.734	24.717	28.101	32.784	42.152	46.835	51.519	56.202	60.886
60	9.187	13.780	18.373	22.960	27.560	32.152	41.339	45.933	50.526	55.119	59.712
70	9.013	13.510	18.026	22.532	27.039	31.545	40.558	45.064	49.574	54.077	58.584
80	8.846	13.268	17.691	22.114	26.537	30.960	39.806	44.228	48.656	53.074	57.497
90	8.684	13.027	17.369	21.711	26.054	30.096	39 080	43.423	47.763	52.107	56.449
100	8.529	12.794	17.058	21.323	25.887	29.859	38.381	42.646	46.911	51.173	55.440
110	8.379	12.569	16.758	20.948	25.138	29.327	37.707	41.896	46.086	50.276	54.465
120	8.235	12.352	16.496	20.586	24.704	28.821	37.055	41.176	45.290	49.407	53.525
130	8.095	12.142	16.189	20.237	24.284	28.392	36.426	40.474	44.521	48.569	52.616
140	7.959	11.939	15.919	19.999	23.870	27.859	35.818	39.793	43.778	47.758	51.738
150	7.829	11.743	15.658	19.572	23.487	27.401	35.230	39.145	43.059	46.978	50.888
160	7.702	11.554	15.405	19.256	23.107	26.958	34.661	38.512	42.363	46.215	50.066
170	7.580	11.370	15.160	18.950	22.740	26.530	34.110	37.900	41.269	45.480	49.270
180	7.461	11.192	14.923	18.653	22.381	26.115	33.576	37.307	41.037	44.768	48.499
190	7.346	11.020	14.693	18.360	22.039	25.712	33.059	36.732	40.405	44.078	47.759
200	7.235	10.852	14.470	18.087	21.705	25.322	32.557	36.178	39.792	43.410	47.027
210	7.127	10.690	14.239	17.817	21.380	24.944	32.070	35.634	39.197	42.761	46.324
212	7.106	10.658	14.211	17.764	21.317	24.869	31.973	35.527	39.080	42.633	46.186

The above table will show the weight of air in a shaft, at a certain depth and temperature, thus: Multiply the area of a shaft by the number of pounds, and strike off the three decimal figures, the remainder will be the total weight of air in pounds, in a shaft of the depth and temperature, as above described, and will be found available for these purposes.

Information on natural ventilation, which chiefly depends on the amount of heat generated in the mine. In winter, when the temperature at the surface is low, and the weather extremely cold, the force of the ventilation currents in the mine is strong, and in some well managed mines will extinguish a common light. As summer advances, and the temperature on the surface rises, the force of the ventilation currents diminishes accordingly until it corresponds with the inside degrees of heat, and when at that stage it ceases to ventilate. Then strong furnaces are needed for this purpose, which are placed in the upcast by this method. The draught is increased and the air is set in motion. In mines where a natural current of air would produce 17,500 cubic feet of air per minute, the heat in the mine to be 10° above that in the downcast, but when a furnace was used which rose the heat to 47° above that in the downcast, and so according to the increased heat from the furnace, the current of ventilation produced 51,000 cubic feet of air. This was under favorable circumstances, the depth of the outcast being 110 yards and the section area 50 square feet. It is stated that a heat of 28° had been produced in a mine, that is the temperature in the upcast was 28° above that in the downcast. This natural heat of the mine produced 120,000 cubic feet of air per minute. Then the furnace was put to work, and the heat rose in the upcast shaft to 86°. This produced 200,000 cubic feet of air. This will show that the furnace added 80,000 cubic feet per minute, yet neither natural or furnace ventilation can be depended on. Careful experiments show that 459 cubic feet of air, at 0°, or Zero, of Fahrenheit, the thermometer weighs 39.76 pounds, when the pressure is 30 inches of mercury, of the density due to 32°, a pressure equal to 14¾ pounds per square inch, which is the ordinary pressure of the atmosphere, but it only weighs one-thirtieth of this when the pressure is only one inch of mercury. And since 459 feet of air, at 0°, expand exactly one cubic foot for each degree of heat added, we get the following rule to find the weight of air, at any temperature and under any pressure.

Thus, $W.=\frac{1.3253\times 1.}{459+t.}$

Where 1=the height in inches indicated by the barometer, and t=the temperature by the thermometer, at 38°, under a pressure of 30 inches of mercury, 100 cubic feet of air, as per table, weighs just 8 pounds. If 225,176 cubic feet of air be produced per minute, the temperature in the downcast to be, say 43½°, and the temperature in the upcast shaft to be 211° by the given rule, (if the barometer be taken half-way down the shaft, and it to show a pressure of 30½° inches of mercury,) the weight of a foot of air, taking the average in the downcast shaft, would be .08044 pounds, the shaft to be 900 feet deep. This would produce a pressure of .8044 pounds $\times$900=72,539 pounds on each square foot by its mere weight, the hot air in the upcast being much lighter by being hotter, and only produce a pressure on each foot=54,297 pounds, and the difference of pressure on each foot of area between the two columns of air is=18,099 pounds. In order to find the horse-power producing ventilation, we require to multiply this difference of pressure, 18,099 pounds on the square foot, by the number of cubic feet of air produced per minute, and divide the result by 33,000 lbs., or horse power, which in this case will give a ventilating power, thus:

Lbs. Cubic feet per minute.

$$\frac{18,099 \times 225,176}{33,000} = 123\tfrac{1}{2} \text{ horse power.}$$

Much valuable information may be gained from this calculation and from the relation the inside and outside temperatures bear to each other, as when equal all ventilation will cease, unless artificial and mechanical means be adopted and put in operation.

BLASTING IN MINES.—HOPTON.

Blasting is sometimes allowable in mines where safety lamps are used, but is entirely under the control of experienced and reliable boss miners, who use touch-paper only. But explosive gas will ignite at the flash of powder, should the flash reach the gas whilst in its explosive state; this precaution is to guard against accidents. When gas is so far diluted with common air, say six times its volume, it will then explode, at its highest force, from the flame of a naked lamp, in the safety lamp or a powder flash, and those who think different are in the wrong. It is also known that gas sometimes explodes, when in small quantities, in the safety lamp; and if this locality be then filled with tobacco smoke, naked lights may be safely introduced; but if the gas should be above the explosive mixture, the gas will extinguish the tobacco in the pipes.

Strong currents of air passing through where the miner is at work does not warrant the situation safe from gas, unless he can understand that the same current is pure air, and not loaded with impure air, otherwise his situation is dangerous, as he cannot depend on the volume of air, but on its purity; nor is the miner free from danger should the large volume of air be kept constantly in motion, as the change in the atmosphere causes an accumulation of gas at one time greater than at another, and so it will affect the volume of air and become dangerous; nor can he be safe if only he discovers a small portion of gas, unless he knows the quantity of gas in the air, because if the gas be found pure, very little will be seen before it explodes. He, therefore, must know the quantity as well as the quality to know his place is safe.

It must be evident, from the extensive use which has been made of this lamp, that those circumstances occur rarely indeed. The most extensive practice proves this, and it is quite clear when we consider that to get an inflammable current whose velocity is sufficient to explode a common Davy lamp, requires a large discharge of gas, and, at the same time, a large volume of air to dilute it to the inflammable point, as the following table will show:

Experiment No. 1.

	Velocity of current, ft. per sec'nd.	Number of experim'ts in seconds.	The actual results.
Davy lamp	8	4	Exploded.
Stephenson ...	8	10	Went out.
Clanny	8	5½	Went out.

Experiment No. 2.

	Velocity of current, ft. per sec'nd.	Number of experim'ts in seconds.	The actual results.
Davy lamp....	11½	2	Exploded.
Stephenson...	11½	60	Still burning.
Clanny.....	11½	6	Exploded.

Experiment No. 3.

	Velocity of current, ft. per sec'nd.	Number of experim'ts in seconds.	The actual results.
Davy.....	14½	3	Exploded.
Stephenson ...	14½	5	Went out.
Clanny	14½	3	Went out.

Experiment No. 4.

	Velocity of current, ft. per sec'nd.	Number of experim'ts in seconds.	The actual results.
Davy	19½	3	Exploded.
Stephenson...	19½	6	Went out.
Clanny.....	19½	3½	Went out.

Experiment No. 5.

	Velocity of current, ft. per sec'nd.	Number of experim'ts in seconds.	The actual results.
Davy	25	1	Exploded.
Stephenson ...	25	4	Went out.
Clanny, Gray	25	59	Still burning.

Experiment No. 6.

	Velocity of current, ft. per sec'nd.	Number of experim'ts in seconds.	The actual results.
Davy	34½	1	Exploded.
Stephenson ...	34½	4	Exploded.
Gray's Clan'y	34½	15	Still burning.

TABLE *of the expansion of air by the degrees of heat. For the use of miners and inspectors of mines.*

Fahrenheit.	Fahrenheit.	Fahrenheit.
32 degrees, air =..... 1,000	50 degrees, air =..... 1,043	80 degrees, air =..... 1,110
33.....do..... 1,002	55.....do..... 1,055	85.....do..... 1,121
34.....do..... 1,004	60.....do..... 1,066	90.....do..... 1,132
35.....do..... 1,007	65.....do..... 1,077	100.....do..... 1,152
40.....do..... 1,021	70.....do..... 1,089	200.....do..... 1,354
45 .....do..... 1,032	75.....do..... 1,099	212.....do..... 1,376

By application to the above table persons employed in mines may easily find to expansion of the mine air by the use of Fahrenheit thermometer, and its effect in ventilating mines.

In mines where no artificial mode of ventilation is used the natural ventilation is much better in winter than in summer, owing to the outside cold temperature being much under the inside temperature, which generally ranges from 40° to 80° in deep mines, while in summer this ventilation is checked by the higher summer temperature, which tends to force the gas to its local situations, and is, therefore, dangerous to life.

Every cubic foot of water evaporated in a boiler, at the pressure of the atmosphere, will heat 2,000 feet of enclosed air to an average temperature

of 75°, and each square foot of steam pipe surface will warm 200 cubic feet of space.

AIR.

One hundred cubic inches of atmospheric air at the earth's surface, when the barometer is at 30 inches, and at a temperature of 60°, weighs 30.5, or 30½ grains, being 830.1 times lighter than rain water.

The atmosphere extends 45 miles beyond the earth's surface. The mean weight of a column of air a foot square and of an equal altitude with the atmosphere, will weigh 2,116.8 pounds avoirdupois. It consists of oxygen 20, and nitrogen 80 parts, and in 10,000 parts contains 4.9 parts of carbonic acid gas. Its pressure is estimated at 15 pounds, but by calculation, 14.7 pounds per square inch; 13.29 cubic feet of air weighs 1 pound, and 1 ton of air occupies 29,769.6 cubic feet of space, and from 32° to 212° expands from 1,000 to 1,376=$\frac{1}{4}\frac{3}{7}$ its bulk for every degree of heat it undergoes.

OFFICE EXPENSES *of the Clerk of the mining district of Schuylkill.*

An office for the preservation of the records of inspectors of mines in said district, for the collection, classification and tabulation of all data and information relating to mines, the condition of ventilation, and dangers incident to mines that may be on fire, inundated, abandoned or otherwise injured, so as to jeopardize the lives of persons employed therein, and record all maps, plans and papers of reference thereto, and prove the same to be accurately made, drawn or surveyed, so that accidents may not occur through their unfitness; and to keep record of all deaths and injuries that may at any time occur in his district, and file the same; of the verdicts of inquests and evidence of witnesses in said cases as records at law, and do such other things as are necessary and expedient.

To one year's office rent	$85 00
To one office desk	16 00
To office fixtures	17 00
To office letters, three months, (139,)	4 17
To letter press and fixtures	13 00
To books	3 50
To pens, inks and paints	2 50
To stove and fixtures	10 00
To three tons of coal	13 50
To safe for records	16 00
To seven months' stationery	10 60
To seven months' gas bills	8 50
To statistic report	6 50
To telegraph expenses	4 87
To incidental expenses	6 00
Amount	217 14

The above is correct to the best of my belief.

P. F. M'ANDREW,
Clerk mining district of Schuylkill.

REPORT

OF THE

INSPECTOR OF MINES OF THE FIRST, OR POTTSVILLE, DISTRICT FOR 1870.

To His Excellency JOHN W. GEARY,

Governor of the Commonwealth of Pennsylvania:

SIR:—In compliance with the requirements of the act of General Assembly, approved the third day of March, Anno Domini 1870, an act providing for the health and safety of persons employed in coal mines, I have the honor to herewith submit a detailed report of the result of my inspection of the collieries of the First, or Pottsville, district, for which district your Excellency conferred on me the honor of inspector of coal mines, my commission bearing date September 20, Anno Domini 1870.

Not without some apprehension I entered this new field of labor, being accustomed to the varied and eventful toils of a mine from early youth, which truly diminished my prospects at receiving that sort of training which would enlarge and enable my usefulness. Cultivated education enables us to cope with difficult subjects, and when coupled with practical experience we find we are able to cope with difficult undertakings and accomplish results which would be considered impractical. Wishing to impart to others what information and experience I have obtained from a long life as a miner, and to conduce to the true interest of my appointment in my new field of usefulness, I will endeavor to discharge these arduous duties diligently and prudently, hoping my humble services will bring to those people over whom I am appointed as inspector that necessary amount of relief as the law imperatively demands at my hands as a public officer, and in discharging these duties I do so to the best of my ability, and call upon all honest and truly good people to obey the mining law, its provisions, rules and requirements, and to afford such aid and relief to those whose humble condition it is to delve and dig in the deep and dangerous caverns of a coal mine, amid innumerable dangers that momentarily surround them, amid noxious and deleterious gases and unhealthy vapors that certainly destroys their vital existence and shortens the life naturally allotted to man. My hope of success in carrying out the provisions of the law arises from the efforts now making by most of our operators in the improvement of ventilation and ingress and egress roads for persons' safety, and in reforming the sources of supplying sufficient fresh air for their hands. The complaints about ventilation are perceptibly abating, and an increase of carefulness and caution is prevailing. The fearful lists of casualties before us nerve us to action, and clothed with authority derived from the proper source, I hope my instruction and directions will prove successful while discharging

my duties, having proper regard for the interest of the miner and the property of the operator, but in no event shall the life and safety of the miner be trifled with at my hands. The lives of so many fellow-miners is a sacrifice, which claims the charitable and stringent protection of law. I would be derelict in my duties before humanity were I unfaithful to the trust now confided to me. Many collieries are so situate in my district that it is eminently necessary to have them accurately surveyed and mapped, owing to their dangerous condition from large bodies of water flooded in them and others of them that are on fire, whilst a great many miners are daily occupied in lifts or levels that underlie these superincumbent dangers. Others again generate fire-damp to an alarming extent, and as the mines gradually open deeper the perils of the miner doubly increase. Being thoroughly conversant with the mines of my district, and acquainted with most of the operators and miners, it lessens the temerity that might naturally attend a stranger. I am the more forcibly impelled to discharge my duties faithfully, as I believe in doing so relief will be ultimately extended to the miners of my district. The short time since I entered on duty 71 collieries had been examined, and to do any other duties would embarrass me. Numerous inquests and other serious matters left me little time to make an extended report. Through the courtesy of Mr. M'Andrew, clerk of the mining district, all of us were relieved from most of this labor and deserves our thanks. I would conclude by saying that an effort made by our operators through the winter season by improving ventilation, and the means of ingress and egress, would greatly add to the comfort and safety of their hands. I do not hesitate to say our mines will be much benefited and improved this year, as most of the operators in my district are evincing a spirit of improvement, in conformity with the requirements of the provisions of the act of General Assembly of 3d March, 1870.

FRANK SCHMELTZER,
Inspector of mines.

COLLIERY REPORTS.

FIRST DISTRICT, POTTSVIILE—71 COLLIERIES INSPECTED.

A descriptive and statistic report of the condition of the several collieries within this district, setting forth the result of my labors from September 22, to December the 31st, Anno Domini 1870.

FRANK SCHMELTZER,
Inspector of Mines.

No. 1.—*Inspected September* 22, 1870.

Description.—Saylor colliery, Wadesville, is situate four miles north of Pottsville, on the estate of Messrs. Wetherill, Seitzinger and others; operated by J. Dennings, working the Primrose or G vein by a slope 330 feet deep. The coal is 6½ feet thick, dipping 23° south; 2 gangways are open; the east gangway is open 600 yards in; the west do., on the lower level, is open 670 yards in=1,270 yards, working 10 breasts.

Ventilation is produced by a small steam exhaust fan and some air holes on the upper level; scarcely any gas is generated. Drainage is effected by a pole pump. No ingress or egress roads are as yet available except the slope and out-cast.

Engines.—A-60 horse engine works the slope and pump, with 3 boilers whose condition is not known; 75 hands are employed; 4 mules and 30 wagons are used, and shipments are 20 cars per day. One person killed by a fall of coal; verdict, accident. For casualties, see lists of deaths and injuries on page 13.

Remarks.—Ventilation moderate and promises to improve it; the slope and gangways in fair condition; the fan I directed to be changed; I instructed to have a new spreader chain and sockets made for slope ropes; to have maps and plans of colliery furnished me; to have the boilers examined and report furnished; to timber some places up and enlarge the out-cast air shaft; to increase the fan draw-holes, and make an out-let road for men on east side of slope, and do other necessary things for the health and safety of men as the law directs.

No. 2.—*Inspected September* 27, 1870.

Description.—Wadesville shaft colliery is situated 3½ miles north of Pottsville, on the estate of Wetherill, Seitzinger, De Keim and others; leased by William Draper, Esq., working the Mammoth, the Seven Feet and Four Feet veins, by a shaft 692 feet deep, its total depth, which penetrated through the following coal veins, viz: The Sandrock, the Gate, the

Big Tracy, the Little Tracy, the Diamond, the Orchard, the Little Orchard, the Primrose, the Holmes, which are over-lying veins, while the Skidmore, Gamma, Buck Mountain and Alpha veins are under-lying veins. The Four and Seven Feet veins over-lie the Mammoth vein some feet, and are worked together; the coal of the Seven Feet vein is 9 feet thick, and that of the Four Feet vein 5 feet thick, while that of the Mammoth is 14 feet thick, dipping 14° south; numerous gangways estimated last year to 6½ miles, increased to date by 2,128 yards; aggregate length of gangways is 13,568 yards; working a large number of breasts.

Ventilation produced by a 25-horse power steam fan, "Beaddle style," drainage effected by two fourteen ton buckets; 8 per cent.; 2 roads for ingress and egress for safety of miners in case of an accident to the slope, viz: One out by the Hickory colliery, the other out by the fan out-cast air course; 7 steam engines=870 horse power; 23 boilers 34 in.+from 21 to 30 feet long; 299 square feet of grate surface. Maps and plans of the colliery furnished. 411 hands employed; 21 mules and 60 wagons in use; shipping capacity 200 cars per day. Casualties in and about the collieries this year was — killed, — injured, — widow, — orphans; a record of evidence and verdict of jury in —— case on file.

REMARKS.—*Condition of colliery.*—Ventilation comparatively good; carburetted hydrogen is the principal sort of gas evolved; the air is conducted remarkably well; in no department has gas power to accumulate to any very dangerous extent, whilst still an improvement is going on to effect a proper amount of ventilation. The drainage is effected by 500-horse power engines, with iron buckets, in which men are taken in and out of the shaft, in the department where stood the pump columns, which is securely bratticed off from the coal shaft and is considered safe. In no district of the mine is there any sort of furnace permitted. The air-courses, as a general thing, are sufficiently large. The miners had no complaint to offer and were always permitted to use sufficient timber and material to safely secure their working places. Statements of mining progress have been furnished; no levels, etc., have been abandoned; no intervening lands to prevent the completion of outlets; a dressing and wash house not called for; a good, practical mining boss is employed, together with active firemen; such safety lamps as are used are kept in tolerable good order; no speaking tubes used as yet; no large bodies of water lodged in the mines; all hoisting machinery in secure condition; no persons under twelve years of age employed inside; the engineers are competent men, and none else permitted to handle the engines, etc.; in most cases have secured all dangerous places; constant attention given to the requisite amount of ventilation; cages securely covered, and its gearing sufficiently safe; not more than — men to ride on an empty cage at one time; employ none but trustworthy persons to act as top and bottom men; do not restore reckless or incompetent persons who have been discharged; some improvements are to be made which requires some time to effect the desired result; the company desires to comply with the requirements of the mining law.

Among the many improvements in progress I noticed a dirt plane, 250 feet long; two new engines of 500-horse power to hoist out the water, four new boilers, 34 inches by 36 feet long; a stack, 13×13 and 65 feet high; a large water-tank, a new drum on first inside plane, a 40-horse power engine to re-place the present fan engine, and other numerous improvements, which will facilitate an increase of shipment; already the shipments nearly double that of last year.

No. 3.—*Inspected September* 28, 1870.

Description.—Eagle Hill shaft colliery is situate five miles east of Pottsville, on the estate of Messrs. Lewis & Baber, leased by James C. Oliver, working two veins; is 10 years in operation; a slope on the Primrose vein, 602 feet deep, dipping south 30°; coal 8 feet thick; a new lift of 600 feet more is now in operation; also a shaft sunk to the anticlinal of the vein; a tunnel from the Holmes vein runs north to the Primrose, by which the coal is brought to the slope, thence to the shaft. Coal in the Holmes vein is 8 feet thick; 4 gangways open; 14 breasts working; ventilation effected by a steam fan; 6 per cent. of carburretted gas evolved; mines drained by a 40 horse steam pump in the slope; ingress and egress, traveling roads; 4 steam engines=125 horse power in use; 9 boilers, 34 inches by 30 feet long, in use; 117 square feet of grate surface; 200 men employed; 12 mules; 60 wagons in use. Shipping capacity, 40 cars per day. Casualties, — killed, — injured, — widows, — orphans.

Remarks.—*Condition of Colliery.*—A boiler explosion took place on the — of September; no persons were injured; after investigating the cause of this accident, I am of opinion it occurred from want of a proper supply of water. The shaft requires some re timbering; ventilation effected by a 10-horse steam fan; safety lamps are used in the mine; the improvements in gangways extend to 375 yards; last year, — yards=—yards; the air courses are receiving some marked improvement, and a resort to a better system of ventilation is receiving attention; generally the mines are in a better condition than heretofore.

Instructions.—I directed the broken spiders on the drum to be removed, and to apply a safe-brake to it; to have the boilers properly examined, and their condition reported; to permit no more than (10) ten men to ride up or down on the cage; to have the cage securely covered, and fence off all dangerous places inside and out at the colliery; to employ a careful, practical fireman, who shall thoroughly examine every working place each morning, and report the condition to the boss miner and men before they enter their working places; to secure all batteries and air-courses, and get a full supply of pure air into each working district, so as to dilute and remove all noxious gases from the men; to get the steam fan air-course enlarged; to furnish intelligent maps of the mines and report on the condition of the air as required by law; to have the safety lamps kept in a safe condition, and due attention given to all things that may affect the health and safety of miners; to at all times supply them with proper timber and material for miners to secure their working places, and not to have more than fifty persons employed in any division of the mine at a time; there are no bodies of water standing in the mines; speaking tubes are not deemed necessary in the shaft; the cage is to be securely covered on top to prevent accident to persons ascending or descending; the drums are to be secured as required by law; the hoisting rope, and all its fixtures are to be made satisfactory, and no persons under 12 years of age will be employed to work in the mine; riding on loaded cages or wagons is prohibited, and all other necessary precaution, which will ensure the safety of men, will be attended to. Should our regulations and instructions be properly respected no doubt it will prove a benefit.

No. 4.—*Inspected 29th September*, 1870.

Description.—Hon. James Ryon, W. Wren & Co., Glenworth colliery, situate near Port Carbon, on the estate of Lewis & Baber, in operation —

years. The veins worked on this colliery are the Primrose and Holmes veins, which are the eighth and ninth veins in the series, and known as G and F veins. The F vein lies next above the E, or Mammoth vein. The mines consist of two openings, a slope of two lifts is sunk on the south dip of the Primrose vein. The first lift is 602 feet deep; the new lift 330 feet deep, dipping 30° south, 81 yards east of the slope; a tunnel cuts the F vein 158 feet north. The coal seam is 8 feet thick, and working several breasts, and the character of the mining done in the new lift is generally breast working. The coal is a strong quality and mining is considered a safe operation. Ventilation is very satisfactory; produced by a 10-horse steam fan. About 4 per cent. of carburetted hydrogen gas is evolved, but under present steam fan operation no fears are entertained of any serious accident.

Another slope is sunk on the south dip of the ——— vein, 200 yards south of the first slope, but at present is used for pumping; there are no lodgments of water in the mines; there is a traveling road for ingress and egress; a 60-horse steam pump is used for draining purposes in the first slope and a pole pump in the latter one. In the working of this colliery a proper regard for the health and safety of men is evinced.

In addition to the power in use, a 40-horse engine was put in use this year, making in all five engines, of 165 horse power; two new wire ropes are used, and a large tank for an additional supply of water, with many other improvements, which places the colliery, in its present condition, amongst the best in the district.

Engines.—Their character and condition, together with all their appointments, their hoisting and pumping machinery, is safe; eleven good boilers in use, having been inspected a short time ago and their condition said to be satisfactory; a new steam gauge put on this year; the grate surface is equal to 140 square feet; the water is arranged so as to be little liable to accidents; fencings are placed on any dangerous places for further security to persons employed.

Maps.—The colliery maps are found, by examination, to be satisfactory, and find by them there are some 16,000 yards of gangways open in the mines, but a large portion of them are now idle. The colliery bids fair to produce largely for some years to come. The mine is in operation some 32 years; at present 200 hands are employed; 12 mules and 60 wagons are in use.

Remarks.—There are no interving lands to prevent the completion of outlets, and the dividing rock-seam is sufficient to work with safety; the miners don't desire a house to dress in; not more than ten persons are permitted to ride up or down the slopes at a time; nor are persons under 12 years of age employed in the mines; safety lamps are used to some extent; a full supply of timber is furnished miners to secure their working places, and the condition of ventilation is satisfactory; the air is separated in splits, to traverse each division, as required by law. The colliery has undergone extensive improvements during this year, and is complying with the needful requirements of the law.

No. 5.—*Geo. W. Johns & Bro.'s—Eagle colliery.*

Description.—Situate in Mill Creek valley, at the borough of St. Clair, on the estate of Messrs. Wetherill, Keim, Seitzingers and others. The veins worked in this colliery are the Four Feet, Seven Feet, Mammoth and Skidmore veins. The mines consists of two openings, i. e., one above and

one below water level, in a series of small detached basins on the south flank of the Mine Hill ridge. The former, or Drift colliery, first enters the south dip of the Seven and Four Feet veins, for a long distance, as both these veins are generally worked together, for very advantageous purposes. Thence by a rock tunnel to the north, the Mammoth vein has been robbed back, both being extensively worked for a long distance to the east by a number of lateral gangways drove in the coal; 33 feet of coal are worked here.

At a point to the east of the entrance to the tunnel to the north the Skidmore vein has been cut on its south dip, and in addition to the above openings, above water level, a drift or dry slope has been opened on the mountain, at the east end of the basin, on the Mammoth vein, from which coal has been mined and conveyed to the breaker. The mines have been worked on a safe plan, with regard to safety of men. No steam fan ventilation is used, as no fire damp is evolved. The ventilation is produced by a series of air-courses and gangways, which makes coal mining here a safe operation for men.

The other openings consist of a slope on the Mammoth vein, 200 yards deep, dipping 27° south, having nine lateral gangways open on it. The character of work done here is robbing back pillars. Ventilation in this department is effected by the course on the Seven Feet vein, as well as the Mammoth, generally by the drift level. There are three ingress and egress traveling roads in this district for the safety of men. No gas is found to evolve, or any serious lodgment of waters. No steam pumps are used, or fan ventilation at present, though the mine is worked well with regard to safety and health of miners.

The character and condition of all the machinery is good. The hoisting and pumping machinery is well secured to avoid accident to men and boys, also the general condition of the miners for safety is satisfactory; such needed improvements as are necessary are pushed forward. The thickness of rock seams is such as will justify the working of the mines with safety to the men. Timber, in proper quantities, is fully supplied to miners to secure their working places. Ventilation is moderate and the air-courses of good size, to conduct a good supply of air. On inquiry on this head no complaints were advanced by the men, and all were evidently satisfied.

Breaker.—This is a very large structure of its kind, capable of containing 200 cars of prepared coal, situate contiguous to the slope and railroad; use a 30-horse power engine, with 2 good boilers, each 30 in.×24 feet long, with 26 square feet of grate surface, and well secured from accidents arising to hands. The boilers were examined and considered safe. The water is arranged so as to be little liable to accident under ordinary care.

Maps.—The colliery maps are found by examination to be intelligent and satisfactory, and within the requirements of law, and find by them there are 27,280 yards of gangways open in the mines. The character of mining now carried on is generally robbing back the pillars. The quality of the coal is excellent in all these veins, having scarcely any impurities in it, being generally hard, and its condition generally safe for mining. The colliery is now 26 years in operation and still bids fair to produce largely for some years to come.

Engines.—Six steam engines, of 245-horse power are in use, with 15 good boilers, having 180 square feet of grate surface. A force of 265 hands is employed; 40 mules and 150 wagons are in use; shipping capacity, 90 cars per day.

No. 6.—*Inspected October* 6, 1870.

Description.—Frank Wadlinger, Myer & Co.'s Phœnix, No. 4, colliery, is situated west of Minersville, on the estate of the Phœnix park company. It consists of two drifts on the Diamond or J vein; the south drift is open in 150 yards on the south dip, at an angle of 15°; the coal is 6 feet thick; best quality red ash. No gas is evolved; the condition of ventilation is very satisfactory. 7 men are employed. The north drift is in 100 yards, on a south dip of 15°; the coal is 6 feet thick and of the same quality. 9 men are employed, working 4 breasts; the character of mining done is extending gangways and breast work, which is considered a safe operation.

Engines.—A 10 horse engine runs the breaker; 2 boilers, 27 inches+ 22 feet each, which are new. The coal is hoisted on an inclined plane from the drift level to the breaker.

Remarks.—This is a new opening; there had been a slope operated on this colliery a few years ago and was abandoned. I directed the fencing off of all dangerous places and machinery in an around the establishment for the security and safety of the employees, and gave such other instruction as was requisite and necessary for ventilation and safety.

Remarks.—I had instructed Mr. Croxton, the boss miner, to furnish me the necessary information semi-annually as is required by law, of all abandoned portions of the mines and mining progress; the weekly condition and quantum of air traversing the different divisions of the mines; the character of mining done; of any casualties, if any; the state and condition of boilers, as with regard to safety; the condition of slope and tackle; of air-courses; of ingress and egress traveling roads; to put a substantial steam fan on the Skidmore or D vein; to furnish maps of improvements in the mine; to have all dangerous places well secured from accident; to see that the requirements of the law and his regulations are fully respected, and do all other needful improvements as will conduce to the safety and health of his men.

No. 7.—*Inspected October* 7, 1870.

Description.—George W. Pomroy, superintendent, Feeder Dam colliery, situate one mile north of Port Carbon, on the estate of the North America company, in operation some —— years. The colliery consists of a slope sunk on the south dip of the J or Diamond vein, dipping 26° south; there are two lifts sunk on this slope, with only one track used on the lower level. The mines are worked by gangways running east and west; the character of mining done is breast work; the coal is strong, and mining is considered a safe operation. The character of the gas evolved is carburetted hydrogen; its quantum will average 5 per cent.; ventilation is produced by a steam fan of 6-horse power; not adequate for the amount of ventilation needed.

The slope is 185 yards deep; the coal is 5 feet thick; both lifts are worked at present; having inspected the mines and find its condition on an average satisfactory.

There are two ingress and egress roads, one each side of the slope; there are 4 gangways in the mine; their aggregate length being 900 yards. The east and west air courses are each of a twenty-four square feet area. The slope is used for a down-cast; the gangways are used for in-takes; thence forced up in the breast workings and returns through headings in the pillars to the fan out-cast. The Mill Creek pike road passes over the west

gangways, which is supported by strong pillars and rendered safe. The gangways have a section area of 46½ square feet; the breasts are 8 yards broad with two schutes each; the pillars are 6 yards thick. This manner of mining is considered safe. The steam exhausts into the up-cast and serves as a jet.

Ventilation.—This subject has received our instructions for its improvement by several changes in the air gates and fan, which will result in its favor.

Remarks.—5 breasts are working on each gangway in the new lift, and 11 do. in the upper lift=21 breasts. A run of one mile east and one-half mile west limits the gangway workings. The mine is dry; the eastern section evolves more gas than the west. The slope is tolerably well preserved; the west slope chain I condemned, which broke on the 13th instant; the spreader chains are poor, and ordered their removal.

Engines.—In use, one 6-horse power fan, open periphery; one 25-horse power slope engine, sufficiently strong; one 12-horse power breaker engine; aggregate power 43 horse; their machinery is in a fair condition. 6 boilers in use have been lately examined and considered safe; the water is not good. I directed the drum to be secured by 6-inch horns and a brake attached, and all other necessary improvements to be made as will protect the hands and render their security.

The temperature by thermometer was 65° outside and 68° inside—difference, 3°; the temperature by barometer was 29$\frac{18}{20}$° outside and 29$\frac{3}{10}$° inside—difference, $\frac{14}{20}$; showing ¼ inch on the bar, or the quantum of gas in the air, and a rise of 3° in the thermometer corresponding to the fall in the barometer, which indicates the quantum of gas evolved. One drum of unequal proportions, i. e. one-half of which is 8½ feet, and the other 10½ feet in diameter and 11 feet long, with all the machinery attached is kept in a fair condition. But the disposition manifested by the boss to comply with the requirements of the law is not as it might be.

No. 8.—*Inspected October* 4, 1870.

Description.—John Lucas & Co.'s Richardson colliery, situate at Glen-Carbon, on the estate of Richard & Webster. The colliery consists of 2 slopes, sunk on the Big Crosby vein, dipping 56° south. The old slope is sunk 100 yards deep under the water level, the coal of which is mined out and now is used for a pumping slope and an ingress and egress traveling road. The new slope is sunk 200 yards deep, which makes a new lift altogether. The fan out-cast shaft is still west of the new slope. Three veins are worked east and west in this slope, each having 2 gangways. The Crosby vein is 14 feet thick, the Daniel vein is 7 feet thick and the South vein is 6 feet thick=27 feet thick of coal. The tract is 2 miles long. No intervening lands prevent the driving of air-holes or out-come roads. The colliery is lately put in operation, and the improvements are on an extensive scale, consisting of an entire new breaker, new stone engine house, with 2 sixty-horse engines and 6 new boilers in use; also a forty-horse breaker engine and a twenty-horse fan engine.

Gangways.—The new west gangway is in 100 yards, with a 36 square feet air-course drove along with it to its face, and 2 breasts working on it; 19 men are employed in it; and the east gangway is in 100 yards to its face, with 2 breasts working on it, with a similar air-course along it as the west gangway; 16 men are employed in it. A tunnel is in the course of con-

struction from the Crosby to the South vein, with 15 men employed in it; in all 50 men, divided into 3 paunels. The character of those gangways and work done is considered safe.

Ventilation.—A twenty-horse power steam fan is now in operation to ventilate the mines, and the air-courses are of such dimensions and area that render satisfaction.

Engines.—1 sixty-horse pumping engine in the old slope, with 2 sixty-horse hoisting engines in the new slope; a twenty-horse fan engine and a forty-horse breaker engine; 5 engines=240 horse power. The breaker and fan engines receive steam from the new slope boilers, which, when last examined, were considered in good order.

Remarks.—The air-course is calculated to be used in case of an accident happening to the slope, its section area being 44 square feet. The pump-way is bratticed off for an air-course and traveling road. There is a fire boss employed in each panel of the mine for greater security to men, &c. Fire-damp is plentifully evolved in the second lift, and preparation is making to destroy its influence.

John Hartman, slope engineer, was accidently killed by falling down the slope while fixing the pumps. The verdict of the coroner's jury in the case exonerated the operators from blame. The evidence, &c., in this case is on file in the office of the mining district. This firm is doing all they can to insure the health and safety of men and those employed. The second outlet for men will be 80 feet west of the slope, and a tunnel is now driving from the church to the Crosby vein. I desired the boss, Mr. Delaney, to get all the machinery in and about the colliery securely fenced off for the safety of his hands.

No. 9.—*Inspected October* 14, 1870.

Description.—Van Winkle & De Socarrez's Swift Creek colliery, situate near Tuscarora, on the estate of Gideon, Bast & Co. It consists of a new slope, in operation one year. The slope is sunk 110 yards deep on the Holmes vein, dipping 65° south. There are 2 wagons, 1 pump and 1 road in the slope, the workmanship of which is in good order. The character of mining done here is breast mining and gangway driving, which is a safe operation, but since the increased opening of the mine considerable gas is evolved, and the miners are less or more in danger from its influence.

Gangways.—Two gangways are open in this colliery. The east gangway is in 155 yards, working 4 breasts, employing 10 men. The west do., is in 155 yards, working 9 breasts in it, employing 32 men. The section areas of these gangways is 60 square feet and that of the air-course 44 square feet.

Ventilation.—A steam jet is used to aid ventilation. The air outlet is made in the slope pillar; the west side air-hole is 15 yards from the slope. The fan outcast shaft is of an area equal to both air-courses.

Engines.—A 25-horse breaker engine, a 120-horse slope engine and a 20-horse steam fan in operation; 8 good boilers in use; when last examined were reported to be in good order.

Remarks.—A donkey truck is used to haul up the loaded wagons by a chain. The character of the engines and machinery is good. There was no fireman employed to look after the gas. Two men were badly burned on the 12th inst., by an accumulation of gas in the first headings. I ordered the employing of a fireman who understood gas, to be forthwith put

on duty, and further repair and secure all dangerous places in and about the mines and machinery; charged the boss and engineer with caution and vigilance; heard the evidence in case of the burned men, and gave the necessary instructions for the better regulation and safety of persons employed, and will further see these improvements will not be neglected.

No. 10.—*Inspected October* 16, 1870.

Description.—Lucas & Denning's Spruce Forest shaft colliery, situate north of St. Clair, on the estate of John Richardson, on the line of the Mill Creek and Broad Mountain railroad. It consists of a shaft 225 feet deep, dipping 88° south, one cage track and one pump road. This shaft is sunk on the Primrose vein, the coal of which is six feet thick. The drainage is effected by a pole pump of 14 inch column. There are 3 gangways open in the mine. The breaker is located 1,200 yards west of the shaft. Its shipping capacity is 60 cars per day.

Gangways.—The east gangway is in fault; the vein pressed out to one foot thick; 15 men work in this district. The west gangway has 8 men in it and i s condition is not satisfactory. There is no outlet on either side of the shaft. There are some 1,300 yards of gangways open in the mine.

Ventilation.—Atmospheric action is the only mode used in ventilating this mine, and this cannot be of much use in warm weather. There are two firemen employed to keep the place free of gas; about 10 per cent. of gas is evolved.

Engines.—One 80-horse engine in use to hoist and pump with; 6 boilers, each 34 inches by 30 feet long, and a 25-horse breaker engine, with 2 boilers, and a 15-horse breaker engine at the slope, to screen and break coal, where the grosser impurities are removed; and a steam pump is also used in the slope of a six inch column. These engines, with all their appointments, look well.

Remarks.—There are no escape roads either side of the shaft for men to escape by, except the air-holes, which is a very unsafe way. I have given instructions to open one, and do such other needful improvements as will effect better ventilation and the safety of men in case of an accident to the shaft. The colliery is a small one, and the character of the work done is breast, gangway and pillar mining, and generally dangerous from the angle of dip of the seam, as mining in such high angles is quite different to that of flat veins. I will soon visit this colliery to see my instructions are carried out to satisfaction. There are 32 men and boys employed inside and 25 hands outside, and 8 mules used. A good brake is now applied to the drum, but the cage needs greater security. The wire rope is considered good.

No. 11.—*Inspected October* 17, 1870.

Description.—Christian Frantz's Manchester colliery, situate at Wadesville, on the estate of Wetherill, Seitzinger and others. The colliery consists of two slopes. No 1 slope is sunk on the Orchard, or H vein, 600 feet deep, dipping south 15°. Its sectional area is =84 square feet. A coal track, pump track and a manway are open in the slope. The coal is over 6 feet thick. Two gangways and a slant gangway are open in this mine. The character of mining done here is principally robbing pillars and some breast work.

No. 2 slope is sunk on the Lewis vein, and is sunk 135 feet deep, on a south dip of 16°. The section area of this slope is 98 square feet, having a coal track, pump and road. These slopes are 600 yards apart, from south to north. I find by maps of the mines there is some —— yards of gangway openings in the colliery, many yards of which are now abandoned. The character of mining done at present is breast and pillar work, and mining is considered a safe operation. There are —— gangways opened in the mine. Although some little gas is evolved, still very little annoyance is experienced.

Ventilation.—The modes used to ventilate the mines are by air-holes and furnaces. Though not of that character which would insure success, still the condition of the air was moderate, the miners having no complaints to make.

Engines.—A 40-horse engine in use at No. slope, with 4 good boilers, each 30 in.×20 feet long. A 35-horse breaker engine, with two boilers, each 30 in.×20 feet long. A 40-horse engine at No. 2 slope, with 4 boilers. All of which have been examined two months previous to my first visit.

Having examined the mines, engines, machinery and their different appointments, I found them to be in ordinary condition. The water is not so well arranged in the breaker boilers as might be.

Remarks.—The slopes are used as downcasts, the air passing in each gangway to suitable points, where it is forced into the breasts through headings in pillars. This arrangement is effected by gates on the gangways. The air thence traverses through to the out-let air-courses, going to the furnaces or air-holes. In winter this sort of ventilation is more effective, as the outer atmosphere is colder than that of the mine atmosphere, which, by its heat, it becomes much lighter and buoyant, that mine ventilation is much improved as the atmosphere grows colder and *vice versa*.

I directed the opening of an egress traveling road for the safety of men from the north to the main gangway and from the dip gangway, to drive a shaft and rig a windlass on it in case of accident in the slope. I have been furnished an intelligent map of these mines, which is placed on file in the office of the district. 186 men and boys are employed, with 10 mules and 60 wagons in use.

No. 12.—*Inspected October* 19, 1870.

Description.—Thos. Rickert & G. W. Pomroy's Revenue colliery, situate at Mt. Laffee, 3 miles north of Pottsville, on the estate of Joseph Patterson, of Philadelphia. The colliery consists of a slope and drift openings. The slope is sunk 600 feet deep on the H, or Orchard vein, dipping 15° south. Its section area is 152 square feet. The colliery is 35 years in operation, and passed through several hands in that time. A drift open on the Red Ash vein some 700 long; this vein is nearly flat. The character of work done in these mines is general breast, pillar and gangway work, and mining is considered a safe operation in these mines. The coal in the H vein is 6 feet thick and that of the Red Ash 5 feet thick, and of the best quality.

Gangways.—The east lower gangway is 533 yards in, working 4 breasts, and have 11 men in it; and in three slant gangways there are 12 men employed, making 720 yards and 23 hands. The west gangway is 183 yards long and 25 men employed in it, working 7 breasts. 333 yards of a gangway on the Orchard vein from the tunnel has 10 hands in it, and 200 yards

of a water level tunnel with 10 hands in it. The second out-let on the Orchard vein is 300 yards from this tunnel. I find there are 7 gangways open =1,969 yards, working some 15 breasts and robbing out pillars.

Ventilation.—The slope is used as a down-cast, and this part of the mine is ventilated by a 15-horse steam fan. The air-courses are not sufficiently secured, and ventilation is deficient to some extent. The drift mine is ventilated by a furnace, which gives some satisfaction. These mines are at present nearly exhausted, and are suffered less or more to dilapidate or become disused altogether.

Engines.—There are 3 steam engines in use=85-horse power, the same as used last year; 8 boilers, in ordinary condition. Their safe condition is not known, all the machinery of which is cared well.

Remarks.—The colliery is nearly worked out, and in four months is supposed will be abandoned, unless under new arrangement with the land-owners. Some of the gangways need repairing, and also the slope, but all the works in the Orchard vein are in good condition.

The breaker got destroyed by fire on the evening of the 12th of November, and operation is suspended for some time.

No. 13.

Visited the Dexter colliery, at Mount Laffee, which is located on the Joseph Patterson estate, and found it dismantled and abandoned. The colliery was a new one but the coal did not prove to be workable, and the firm of Russel, Evans & Llewellyn, who were all practical men, and who, after all their efforts and expense, were compelled to abandon the colliery and dispose of its machinery and engines at a great sacrifice of labor and money.

No. 14.—*Inspected October* 20, 1870.

Description.—Potts & Seigfreid's Beech Wood colliery is situate at Mt. Laffee, on the estate of Joseph Patterson, of Philadelphia. The colliery consists of a slope, sunk 780 feet deep, on the E or Mammoth vein, dipping 49° south. There are two coal tracks, pump road and a traveling road in it. Its section area is 160 square feet. There are four coal veins worked in this colliery, and mining has been carried on here over 36 years. A considerable amount of carburetted hydrogen is evolved in the Seven Feet vein. Both fire and choke damps are abundantly produced in all the seams. The Davy lamps must be used constantly to insure any degree of security to miners, though the character of work done is tolerably safe.

Gangways.—Several gangways are opened in the mine—some 4,000 yards. The mining resorted to is some breast-work, pillar, skipping and gangway work. The east tunnel gangway, 83 yards, has 23 men in it; the west gangway, working 6 breasts, has 18 men in it; the east bottom gangway has 16 men working 6 breasts; the new slant do. has 13 men working 4 breasts; the old slant gangway has 27 men working 9 breasts; 70 cars of prepared coal are sent daily to market.

Engines.—There are 5 steam engines in use; their aggregate power is 236 horse; 10 good boilers, but their safe condition is not known; the wire ropes and spreader chains are considered substantial; the water-tanks have a capacity of 2,160 gallons.

Ventilation.—The mine is ventilated by a 20-horse steam fan. The air-courses are to be enlarged and improved this winter, and all other necessary improvements for the safety and health of the hands will receive attention. This I require to be done, as the large volumes of noxious gasses evolved requires the necessary channels to supply a sufficiency of fresh air to traverse the different sections of the mines, to safely remove these dangerous elements and make it safe for miners to work in.

Remarks.—There are two wagons hoisted at once in the slope, and it is claimed by the operator that he is justified in hoisting (10) ten men in each wagon at a time. I dissent from this claim, and direct that not more than 10 men shall ride up or down the slope at any one time, and so directed the operator. The wire rope is a 54-ton rope. The aggregate weight of rope, wagons and coal is assumed to be 10 tons, and that of 20 men, each at 165 pounds=3,300 pounds, or $1\frac{1}{3}$ tons; the rope, 780 feet long, of $1\frac{3}{4}$ inch diameter, at 4lbs. 8 ozs. per foot=3,510 pounds, and over 3 tons of coal each; that the weight when hoisting men is equal to 8,810 pounds, on an incline of 49° dip, which is equal to $4\frac{1}{2}$ tons; but in case of an accident to the rope, there is no telling the damage that might happen to the men. Outside of this case the mine is kept in good order. The drainage is good. With a little more done for ventilation, the colliery is in good order. About 220 hands are employed, with 12 mules and some 55 wagons. Our attention will be further directed to this colliery. A correct map of this colliery is demanded.

No. 15.

I visited the Duncan colliery, situate two miles north of Pottsville, on the Duncan estate. I find it totally abandoned, the engines, machinery and building removed. The mine is flooded with water. This slope was the deepest in the anthracite coal region, it being sunk 1,500 feet deep on the south dip of the Lewis vein, dipping 25° south. An accurate map of the survey of these mines has been furnished and is now on record for further reference. In case of any further improvements by others, the surveys will designate the locality and amount of water accumulated and the thickness of the dividing rocks, so as to enable parties interested to provide against danger from water, etc.

No. 16.—*Inspected October* 23, 1870.

Description.—John Lucas & Co.'s shaft, or Oakdale colliery, situate at Glen Carbon, on the estate of Richardson & Webster. The colliery consists of two shafts; several veins of coal are mined in these shafts. No. 1 shaft is sunk 90 yards deep on the Daniel vein; this shaft is now idle. The new shaft is close to the old one, and is sunk 100 yards deep on the Daniel vein; this vein is 14 feet thick, the Little Daniel vein is 4 feet thick, the Crosby vein is 6 feet thick, the Leader vein is 5 feet thick, the Drain vein is 6 feet thick. These 5 veins dip south, and contain 35 feet thick of coal, and all workable and of good quality. 200 yards of a tunnel driven on the west side to cut these veins, and a slant gangway is also open in the vein; the tract is some 2 miles long.

Gangways.—The east new vein gangway is in 230 yards, and working 4 breasts, with 14 men in it. The west do. do. is in 100 yards, and work-

ing 4 breasts, with 19 men in it. The west upper counter gangway is in 65 yards, working 2 breasts, with 9 men in it. The Daniel gangway to tunnel 1,250 yards in, and 12 breasts working, with 36 men in it. The east lower Daniel gangway is 80 yards in, working 2 breasts, with ten men in it. The upper east Daniel gangway is 100 yards in, with 14 men in it; total gangways 6=1,825 yards, working 24 breasts, with 102 men employed; there are some 30 men working in other parts of the mine=132.

Ventilation.—This is effected by a 20-horse steam fan, and when properly applied will result in great benefit to the miners. I have given such instructions as will soon remedy any defect in ventilation, and secure a safe out-let for the men to travel by; so far the miners do not complain of bad air.

Engines.—7 engines in use, their aggregate power=695-horse, i. e. two 50-horse new shaft engines, one 50-horse old do. engine, one 500-horse Bull pump engine, one 20-horse fan engine, one 20-horse breaker engine, and a 6-horse full pump engine, with 17 new boilers, which are cleaned out often; the water is so arranged as to be considered safe under ordinary care. All these engines, machinery, boilers and their appointments are satisfactory.

Remarks.—The firm have erected a steam fan on their colliery, which, when properly secured, will be a great success. The boilers have been cleaned and considered safe; the ropes and machinery were also considered good, and the drums secured. The character of work done is generally breast and gangway mining, and considered a safe operation. The ventilation was nearly satisfactory.

The temperature was found as follows: The thermometer stood at 60° outside and inside 62° degrees—difference, 2°; the barometer stood at 29 $\frac{8}{10}$ inches outside and inside 29—difference, $\frac{8}{10}$. The temperature, as per scale, 55° on the thermometer and 29 inches on the barometer; the difference in temperatuae is 7°, and the rarity in the air was $\frac{8}{10}$ inches, or 8 per cent. I have instructed all the officers in their duties as required by law for them to observe.

No. 17.—*Inspected October* 25, 1870.

Description.—The Pine Knot coal company's West Pine Knot colliery, situate near New Castle, Schuylkill county, on the estate of Dundas. The colliery consists of a slope sunk 237 yards deep, on the south dip of the E or Mammoth vein, in two lifts, dipping 65° south; 4 seams are worked in this colliery. The E vein is 16 feet, the South do. 5 feet, the Crosby 6 and the Leller vein 5 feet thick, producing 32 feet of coal. The colliery is in active operation now 31 years. I find by its maps there are 6 gangways open in it=2,500 yards long; the tract is some 2 miles long; the partition slate which divides these veins is of such thickness and quality as will insure the safe mining of these veins all at the same time. The rock strata which separates the Crosby and Leller veins is tunnelled 50 yards; and the strata which separates the Holmes vein is 25 yards thick; and that which separates the E vein is 27 yards thick. And the character of mining done here is considered a safe operation; and the mining now in progress is some breast work and robbing out pillars.

Gangways.—The east gangway, on the Crosby vein, has 15 men in it; the Church gangway has 13 men in it; 17 men work in the other gangway; other gangways are idle at present; the appearance of these gangways is satisfactory.

Ventilation.—The slope is used for a down-cast, and is separated in splits. The air in the gangway west of the tunnel is good; and that in

the Church vein is a down-cast, and that in the Crosby is used as an up-cast air. I found no complaint amongst the miners about bad air.

Engines.—There are in use 3 steam engines=210 horse power, with their machinery are in good order; 11 boilers are used; their condition is not known, but from appearances to be good. I have examined the wire ropes, and think them sufficiently safe, and directed the persons in charge to be very attentive in performance of their duties.

Remarks.—I directed attention to have a new drum wheel put on; I found the air tolerable good, and desired a change to be made in the Crosby air; to put a door on the Crosby gangway and open the tunnel, and split the air in the Church gangway and force it to the face, thence up the breasts and back, through to the pump slope, to which should be an up-cast; the headings are too small at present. I directed a second out-let to be opened forthwith, for a safe ingress and egress for the miners, the section area of which must be 40 square feet; 3 new boilers are now used at the breaker; a new slope is sinking on the Church vein, which will be drove from the surface to the lower lift, of a section area of 96 square feet, and a new air-way east of slope, when finished, will also become another out-let. I have found the colliery in a considerable good condition, with a disposition evinced by the company to conform with the requirements of the law for the health and safety of the hands employed.

No. 18.—*Inspected October* 25, 1870.

Description.—Pine Knot coal company's colliery, situate at Coal Castle on the estate of James Dundas, Esq., operated by Mr. Fuller & Co., Major L. S. Baldwin, agent. This colliery is in operation some 30 years. It consists of a slope, sunk 235 yards deep on the south dip of the E vein, dipping 65° south. Four veins of coal are worked in this colliery. The character of work done is breast and gangway mining, and is generally considered a safe operation. The E vein is 16 feet thick, the South vein is 5 feet, and the Crosby vein is 6 feet, and the Leller vein, 5 feet thick. These veins are connected by a tunnel, with east and west gangways driven on each. These veins all lie in the Glen Carbon basin, and are now mined on their second lift, the upper levels being nearly exhausted. The drainage of the mines is effected by a 150-horse power pumping engine, and so arranged as to work 4 working barrels and 3 columns. The mines are ventilated by a 10-horse steam fan.

Gangways.—The west gangway on lower lift is in 980 yards, working 4 breast and 2 skipps, with 36 men in it, and has 126 yards more to go to the line of the West Pine Knot colliery, when the coal will be conveyed thence to its gangway and that slope for a second ingress road. The east gangway is in 693 yards, working 14 breasts with 57 men in it. The east Crosby gangway is in 165 yards, working 15 men. Its west do. is in 87 yards, with 14 men in it.

Ventilation.—The mines are ventilated by a 10-horse fan. The slope is used as a down-cast; the air is split and brought east and west to the faces of the gangways, thence up into the breasts and back through the pillar headings to the second lift, to the tunnel, and there brought east and west, similar to the other lift, and finally communicates at the fan out-cast.

Engines.—Eight steam engines are in operation at the colliery, as follows: One 450-horse pumping engines, one 90-horse slope engine, to hoist coal, etc., and two 90-horse hoisting engines, one 30-horse engine for use of

miners and tools, etc., a 30-horse breaker engine, a 20-horse dirt plane engine and a 10-horse steam fan engine, their aggregate steam power=810-horse, with 19 steam boilers, each 36 inches by 30 feet long. Their condition is considered safe. Having examined the engines, ropes, machinery and tackle, and finding the whole in apparent good order, with careful engine men, gave me some satisfaction.

Remarks.—Owing to some gas evolving in the breasts, I have instructed the boss miner and firemen not to allow any person enter any working place with a naked lamp until first the firemen make a thorough examination of each place and report the condition of each place, and see that none but practical miners worked in such places where gas was evolved; that two safe out-lets for miners must be made available at all times for egress and ingress for the safety of men, and do all other things deemed necessary, as is required by law; that the engines, boilers, machinery and tackle must be carefully managed and frequently examined and signals be obeyed; that a full supply of fresh air shall be provided in each division of the mine; that proper rules and regulations be publicly posted to govern the employees, and that any infringement or disregard to the obligations of the law shall be reported and suitable remedies applied to enforce obedience thereto. I found Mr. Baldwin very active and energetic in discharging his duties and prompt in reporting matters under his superintendence.

No. 19.—*Inspected October* 27, 1870.

Description.—Hoch & Co.'s Forestville colliery, situate west of Forestville, on the estate of the Manhattan coal company and others. This colliery is many years in operation. It consists of a slope sunk three lifts on the south dip of the Black Heath vein, dipping 42° south. The old lift is 140 yards deep; the new lift is 170 yards deep, which is an improvement; has remodelled the old work and built a new and extensive breaker; the slope is 410 yards deep; the new lift is 90 yards; the character of mining done in the old lifts is robbing pillars and that of the new lift is gangway and breastwork. Only two gangways at present worked.

Gangways.—The east gangway is in 200 yards and 25 men in it. The west do. is in 300 yards with 23 men in it. The work done in this lift is satisfactory. Twenty-eight men are on the east side.

Ventilation.—The slope is used as a down-cast. The air is split at the bottom and brought in in the gangways east and west. Two fire bosses are employed to keep the mines safe, as a considerable quantum of gas is evolved. All the holes in the headings must contain 20 square feet of a section area and keep three such headings in each pillar, and to bring the air back by these headings through the breasts to the out-cast at the fan.

Engines.—One 90-horse hoisting and one 90-horse pumping engine are in use at the slope, and a 60-horse hoisting engine is also used and works 2 pole pumps, a 20-horse breaker engine, and a 10-horse fan engine, used for ventilation, all of which are in good order. There are 15 boilers in use; their condition is reported satisfactory. The water is so arranged as to be considered safe under ordinary care.

Remarks.—The new lift is built remarkably secure. Ventilation is to be improved. The second out-let is in course of driving on the east of the slope, with three working shifts of two men to each shift. Nine new boilers are added and other improvements are going on. I have ordered the completion of the traveling road and air-courses, and desired to be furnished with a map of the mines. The men make no complaint of bad ventilation.

No. 20.—*Inspected October* 27, 1870.

Description.—John Wadlinger and others, New Woodside Slope colliery, situate at Woodside, near Forestville, on the estate of the Manhattan coal company. The colliery consists of a new slope, sunk 50 yards deep on the Forestville vein. 300 yards of gangway are open east, with 23 men employed in it. The west side is now idle.

Engines.—One 25-horse engine, 10 boilers in use to supply steam for hoisting and pumping. These boilers were examined lately and found in good condition. The engines, machinery, boilers and tackle are in good order.

Remarks.—The colliery is new and mining is not as yet extensive. Some fire-damp is evolved. The services of a fire boss is necessary to keep the mine in a safe condition. Other precautionary measures will be put in practice to insure the safety of the miners. Our especial attention will be given to this matter to secure that end.

No. 21.—*Inspected October* 28, 1870.

Description.—Morgan Williams's Phœnix, No. 1, colliery, situate at Phœnix Park, south of Minersville, on the estate of Packard & Co., and is in operation some 26 years. It consists of a slope, sunk over 1,200 feet deep in three lifts. The present lift is 150 yards deep, on a 25° south dip on the Primrose or Phœnix vein, which is 7 feet thick. The slope has 2 tracks and 1 pump road in each lift, its section area being 152 square feet. Its air-courses are enlarged under the direction of inspector Eltringham, and an attempt made to improve ventilation by enlarging the heading in the pillars and increasing their number and section area.

Gangways.—Gangways are in operation in the mine. First, the south dip gangway is open 800 yards, working 11 breasts in it with 41 men employed. The north dip gangway is open 400 yards east of the tunnel, with 11 men in it, skipping pillars. The west gangway is open 200 yards, with 5 men in it, robbing out coal. The character of mining done is generally skipping pillars and some breast work.

Ventilation.—Ventilation is effected this year by a steam fan, which, when the necessary air-courses are completed and properly communicated, will greatly improve the condition of the mines and effect the health and safety of the miners. A small gangway is now driving from the up-cast to the surface. This will have two doors on it, which object is to prevent the fan taking air from the surface. Its section area is $5\frac{1}{2}+9=14\frac{1}{2}\div 2=7\frac{1}{4}\times 6=43\frac{1}{2}$ square feet. The slope is used as a down-cast. The air is split at its bottom passing in east and west, and returning back through the breasts to crossing over the anticlinal into the north gangway, and airs that division of the mines to the face of these gangways; thence back through the workings to the out-cast air shaft to the fan.

Engines.—Four steam engines are now in use at the colliery. A 45-horse hoisting engine, a 50-horse pumping engine, a 20-horse breaker engine and a 12-horse steam fan engine, of an aggregate power=127 horses, with 10 boilers, the condition of which is not reported. These engines, machinery and slope ropes and tackle are in a fair condition. The water in these boilers is so arranged as to be considered safe under ordinary care.

Remarks.—Having carefully examined the mines and machinery, &c., which are in a fair condition, but the amount of gas evolved requires great

care, and safety lamps are necessary for miners to use for their safety. When the air-courses are connected, with other small alterations, ventilation will be greatly improved, and our special attention will be given to this matter until this object is fully accomplished to our satisfaction.

The temperature outside was as follows: The thermometer stood at 60°, and inside at 60°—difference, 0°; the barometer at 29 $\frac{1}{10}$ lines, inside at 29 $\frac{3}{10}$—difference, $\frac{3}{10}$ lines; this shows that no natural ventilation could be obtained, as both temperatures were alike; the difference in the barometer showed the slope to be 300 feet deeper, perpendicularly, than the surface, and that black or choke-damp prevailed.

No. 22.—*Inspected October* 29, 1870.

Description.—William Prout's Live Oak or West Mount Laffee colliery, is situate at South Mine Hill Gap, on the estate of Joseph Patterson, Esq., of Philadelphia. The colliery consists of a slope sunk; 2 lifts; the new lift is 125 yards deep; its whole depth is now 960 feet, on the south dip of the E or Mammoth vein, dipping 16½° south. The old section of the slope underwent considerable repairs last season.

Two veins are worked in this colliery, the E and Seven Feet veins; the Seven Feet vein is opened into by a tunnel from the E vein; the run eastward on this tract is 1,600 yards to its boundary line, and some 200 yards westward. The safe condition of the slope is not yet effected and requires some strengthening.

Gangways.—The east gangway on the new lift is in operation, with two shifts working in it. The west gangway is open to the line; the character of work now doing is breast work; the old levels are nearly mined out.

Ventilation.—The mine is ventilated by a 20-horse steam fan, which, when all the air-courses are properly connected, will be found sufficient to ventilate the mines effectually. The slope is used for a down-cast; at its bottom the air is split, goes in east and west in the gangways to their faces, thence forced up the working breasts and returning through the pillar headings to the fan out cast shaft. It is expected to still improve ventilation by increasing the areas of the headings, and more air gates, &c., which will command the air currents and conduct them in larger volumes to the proper districts, and thereby render the better safety of the miners from the influence of gas explosions.

Engines.—A 90-horse engine, used for pumping of 2 columns @ 14 and 16 inch; a 50-horse hoisting engine; a 25-horse breaker engine, with 2 good boilers, and a 20-horse steam fan ventilator; 8 boilers, in 4 nests, the condition of which is not at present known; 4 steam engines in operation; their aggregate horse power equals 185, with 10 boilers in use; the machinery, wire ropes and tackle are in good order.

Remarks.—The thermometer indicated the temperature outside at 50°, and inside at 58°; difference, 8°; barometer, outside @ 29 $\frac{1}{10}$ inch.; inside @ 29 $\frac{7}{10}$ inch.; difference, $\frac{6}{10}$ inches; showing 8° in favor of natural ventilation, and $\frac{6}{10}$ on the barometer indicates the presence of choke-damp in the mine. There is some fire-damp evolved, and often considerable, but the operation of the steam fan overcomes this danger to a great extent; should the air passages and connections be properly arranged, the fan would have the desired effect; but, as the gangway openings are not at present sufficiently extended to the locations where permanent air-holes will be established, it is necessary to vigilantly guard against explosions of gas. The

new lift is only of late in successful operation, and the character of the work appears safe. The slope old lifts require some repairs, and a resort to air-gates and large headings will greatly favor mining operations. I have directed that no men should be permitted to enter working places until first examined by the fire boss, and their condition reported to the miners, and that they, themselves, should carefully approach their working place and further examine it and ascertain its safe condition. The character of mining done is driving gangways, headings and breast work. I have instructed the bosses, engineers and slope hands in the duties required of them. I find by measurement 15,300 cubic feet of air to pass per minute, with 290 yards of new gangway open, working 12 breasts with 46 hands employed; no second out-let made; the out-cast air shaft has a section area of 37½ square feet; I ordered the commencement of a second outlet; I ordered the drum to be secured by a good brake; two new ropes in use in the slope, of 1½ inch diameter=35 tons rope, car, coal and rope, 6 tons—difference, 29 tons; the force employed is 75 hands, shipping 20 cars per day.

No. 23.—*Inspected October* 31, 1870.

Description.—William Kendrick and John Dovey's St. Clair Shaft colliery, situate in St. Clair, on the estate of Henry C. Carey & Lea. The colliery consists of a shaft sunk on the E, or Mammoth vein, 590 yards deep. Its section area is —— square feet, having two compartments for cage-ways and one do. for a pump-way. The coal is delivered from the cages into the coal schute on the top of the breaker building, from thence it is moved by inclined schutes through rolls and separating screens, to the large bins, from whence it is loaded into cars and shipped to market. A 2-inch wire rope is used in the shaft, and the engines and shaft machinery are of a superior power and finish, that cannot be excelled in the region. The shaft was first sunk by Mr. Alfred Lawton to the G, or Primrose vein, after which Enoch Maginnis, Esq., sunk it to the E, or Mammoth vein, superintended by Scott Steel, Henry Duncan and John Holmes. Mr. Maginnis operated the colliery for several years. The shaft is in operation 17 years, and is still in a prosperous condition; by being kept in full operation the mines can ship 10,000 tons monthly. The colliery is operated by the present firm since the first of 1870. From the bottom of the shaft to do. of the east plane is 175 feet; the plane is 200 feet long, and from E vein plane to the Seven Feet plane is 275 feet; the Seven Feet plane is 148 feet long; from head of Seven Feet plane to bottom of Duncan plane is 725 feet long; the Duncan plane is 381 feet; from head of Duncan plane to the E tunnel is 249 feet; the tunnel is 309 feet; a vast area of ground is now open in the mine, which is formed in three levels, the condition of which is satisfactory.

Gangways.—Baker gangway, from tunnel, 500 yards; the Milworth gangway is 480; these are the only gangways worked at this date. West side—north plane, two gangways working=243 yards. It may be said there are 4 principal gangways open, with numerous branch gangways diverging from them in all directions. The character of mining done is opening gangway and breastwork, and consider the plan of working a safe operation.

Ventilation.—This operation is produced by a steam exhaust fan. The old Kirk slope is used for an in-take air-course; thence east and west in the Seven Feet vein, and ventilates the workings in that vein; thence pass

through a tunnel into the underlying E, or Mammoth vein; circulates east and west through the breast workings; turns and pass through a tunnel to the Seven Feet vein, on its second lift, and ventilates all this place east and west; thence through a tunnel to the E vein, on its second lift, and ventilates that region and returns to the tunnel on the Seven Feet vein; thence down the first incline plane to the Seven Feet gangway; along it to the head of west plane; thence by a monkey air-course to its face, and back through the breasts to the west plane and down this plane to foot of the shaft, where the fan is located; thence up the shaft, which is used for an up-cast. Mr. Humphries is making some improvements on the present plan, and will accomplish, when completed, a decided success.

Engines.—Drainage is produced by a 500-horse double acting steam pump—2 20-inch columns; 120-horse hoisting engine; a 30-horse breaker engine; a 30-horse dirt plane engine; a 10-horse steam fan; 5-horse smithing engine; 10-horse feed pump=aggregate=7 engines=705-horse, with 13 good boilers; the water is so arranged as to be safe; use steam gauges, working at 70 pounds. These engines and machinery are kept in a creditable manner, under the direct superintendence of Mr. Jonathan Bowen, who, by the way, is a practical machinist and outside foreman.

Remarks.—The present plan of ventilation, of using the air in the upper levels, where its temperature is greatly increased and fills it with impurities, bringing it down from lift to lift in each level to the foot of the shaft. Here the temperature was found at 80°, and only 48° outside, the difference being 32°. At 80° the expansion=1,110 cubic feet, and at 48° the expansion=1,037 do.; the difference=73 cubic feet, which is against the present mode of ventilation. Atmospheric gravity at foot of shaft is=14 pounds per square foot, whilst if the air was reversed, this temperature and pressure would favor natural ventilation. In this case the natural law is opposed, and hence the necessity of using a more powerful ventilating fan.

No. 24.—*Inspected November* 3, 1870.

Description.—George W. Snyder's Pine Forest Shaft colliery, situate east of St. Clair, on the estate of Wetherill, Seitzinger and others. The colliery consists of a shaft, sunk 100 yards deep on the E, or Mammoth vein, and a tunnel opens the 7 foot vein. Both veins are worked eastward on a large scale and only on a small scale westward. The two upper lifts are abandoned. The mines are ventilated by a steam fan, which has been removed from its former location some 1,000 yards eastward to a more useful locality for its operation. The shaft is used as a down-cast air shaft. The 7 foot tunnel is 94 yards east of the slope in the lower lift. Both these gangways are worked eastward. The fault in the E vein caused a sit in its gangway. It was found necessary to open a cross-hole from the 7 feet gangway into the E vein 65 yards farther east, and drive the E gangway there west to meet this sit or crush. This plan proved a success, but the large quantum of gas that was produced required extraordinary vigilance to enable the miners to prosecute the work with any degree of safety, and only by the use of safety lamps this was effected. The changing of the fan, the interference of water and the trouble with the crush in the E gangway, aided the accumulation of the fire-damp, but as soon as these troubles were overcome ventilation was again established, and a resort to a better system of air-courses will be effected and the mines put in a safer condition in a short time.

The shaft engines are of great power, the ropes strong and in good order. The cage is made secure, and every necessary precaution taken to insure the safety of the hands. There are — out-lets in this colliery.

Gangways.—The E and 7 foot gangways are open in east 2,400 yards. The parting rock between these veins is 13 feet thick, and 3 tunnels opened into them, at different distances, to facilitate the conveyance of coal. Carburetted hydrogen is a serious annoyance in working the eastern gangways at present. The character of mining done is driving gangways, headings and breast work. The west gangways on those veins are at present stopped.

Ventilation.—A 20-horse power steam fan is used to ventilate the mines, lately removed from its former location 1,000 yards eastward, where its operation will be more effective. The shaft is used for a down-cast air-course. The air passes in the E vein gangway on its lower level eastward to the tunnel, where a door drives it up the cross-headings and passes on to the face of the work, returning west along the gangway; thence out through the breasts to the up-cast on Mt. Hope; thence along Crow Hollow gangway and out to the fan. Some improvements are now under way to relieve the present condition of the air-courses, to conform with the changes made by the present location of the fan, which will be an advantage, as the accumulation of carburetted hydrogen gas in the mine at present is considerable, and none but the most careful miners should be permitted to work in certain districts with or without safety lamps. Some parts of the mines are quite free from this dangerous element, and great care is necessary on the part of the men themselves to secure their own safety.

Engines.—There are 7 steam engines, of the very best sort, in use on the colliery, and equipped in a most complete manner. Their machinery, ropes and tackle are in good order. The aggregate power of these engines =528 horse, with 18 good boilers and a sufficient supply of water, and so arranged as to be considered safe, and their condition reported good.

Remarks.—The shaft is in a safe condition, with safe ropes and fixtures. There are -- outlets for miners and safety lamps for all who need to use them. The gas is very troublesome at present, but relief is constantly under way. The boilers receive attention, and none but competent persons are in charge of engines and machinery. I have approved of the reforms ordered by my predecessor, inspector Eltringham, in the improvement of ventilation, &c., and hope our advice to the managing officers will have a beneficial effect.

No. 25.—*Inspected November* 4, 1870.

Description.—Thomas H. Schollenberger's Thomaston Water Level colliery is situate at the old shaft colliery, on the estate of the Manhattan coal company. It consists of a drift gangway on the Daniel vein, which is some three miles in length. The character of the work done here is principally robbing out pillars, etc. The shaft is nearly worked out and it is intended to stop its operation soon. The workmanship of this shaft is still good and its engines and machinery in fine condition. The shaft is separated by a partition in two departments, the cages working separately and safe. The total length of its gangways=22,500 yards; its depth is 84 yards deep, on the Big Daniel vein, which dipped at an angle of 34° north, its veins lying in the Glen Carbon basin. There are still large coal deposits on the tract. One hundred and twenty-eight hands are employed at present. Little need be said of this colliery at present. It is in contemplation to sink a new lift shortly, and of it I will report in detail.

No. 26.—*Inspected November 7, 1870.*

Description.—Hein & Glasmire's New Philadelphia colliery, situate east of that place, on the estate of the Valley Furnace company. It consists of a shaft sunk 100 yards deep on the north dip of the Gate vein. The section area of the shaft is 6×16=96 square feet, working only one cage. The pumps are located in the shaft and partitioned off; a 40-horse engine is used to both hoist and pump with. This colliery was, unfortunately, the scene of a disastrous accident, on the 10th of last August, by which 9 men lost their lives; but the coroner's jury in this case rendered a verdict exonerating the operators from blame. This unhappy affair caused the death of 9 men, 6 of whom left widows and 26 orphans. The three others that were injured recovered. The accident occurred by the breaking of a driving-wheel. The drum, having no brake, yielded to the weight of the rope, cage and 12 men, the force of descent being so great that the building was shattered and the machinery removed, the cage breaking through the sump cover, carrying with it in its descent the 12 men, which were instantly covered with water and in this condition held down by the coils of the shaft rope. The circumstances of the operators was such that they could not, from their sources of revenue, keep the place in that style of safety that is required by law, but are doing all they can do for better ventilation and safety of their hands.

Gangways.—The west gangway is open in 400 yards, of an area of 33 square feet section, working 1 breast and 12 men. The east gangway is open in 400 yards, of a like area, with 18 men in it. The character of work done is driving gangway and breastwork, and is considered safe were it not for gas.

Ventilation.—A 6-horse steam fan assists to ventilate this mine. Its diameter is 6 feet and condition but temporary. The shaft is used as a downcast, the air split into both gangways, a narrow air-hole on the west side, which is used for an out-let and air-hole. The air is passed in the gangways to their face, thence back through the breast to an air-way. Both these airways are 30 yards from the gangway face. I have given instructions for remedying the bad air, as gas accumulates very fast and safety lamps are necessary to be used, and the requisite improvements are to be at once commenced.

Engines.—A 40-horse shaft and pumping engine in use, a 20-horse breaker and a 6-horse steam fan engine, with 4 boilers. Their condition is not known, as they are second-hand boilers and appear to be long in use. The character of the engines, machinery, wire ropes and tackle is not as satisfactory as that required by law, but preparations are now on foot to improve the condition of things so as to give satisfaction.

Remarks.—I have carefully inspected the mines and found their condition to need some improvement. I directed a second out-let to be commenced forthwith, with three shifts of hands to drive the gangway eastward to a point where a permanent pillar be left, and in its centre open an outlet to the surface, and have it well stepped for the men to travel in; and a like one on the west side. I have instructed the boss and men in their duties, as regards riding in the shaft and working amongst gas, &c., and in the other needful improvements inside and outside, which are proper and necessary, and to improve the condition of the air as is required. Some 65 hands are employed, with a shipment of some 15 cars per day.

The temperature outside was 56°, do. inside 54°—difference, 2°, against natural ventilation, with the fan even in operation; by the barometer at $29\frac{3}{10}$ inches outside and $29\frac{5}{10}$ inside, indicating $\frac{2}{10}$ of choke damp in the

air. Part of the mine was poorly ventilated whilst in another district it was fair. My attention will be directed to this colliery until proper ventilation is established.

No. 27.—*Inspected November* 6, 1870.

Description.—Abraham Focht's Warrington colliery, situate near New Philadelphia, on the estate of Gideon, Bast and others. This colliery consists of three slope openings on the Holmes vein. No. 1 and No. 3 slopes are sunk on the south dip of 50°, and No. 2 slope is sunk on its north dip at an angle of 65°. No 1 slope is nearly worked out and is to be henceforth used as a pumping slope, and No. 2 slope is also nearly exhausted of coal; and a further description of them is unnecessary at present. The No. 3 or new slope is 810 feet deep, some 60 yards west of the No. 1 slope, which is 310 feet deep; the No. 2 slope is 810 feet deep. These slopes are sunk on the anticlinal of the coal seam, so the buildings are grouped together, and for advantageous purposes. A new tunnel is driven north 82 from the slope 178 yards, to what is claimed to be the E or Mammoth vein. In this new tunnel the Seven Feet vein was struck 114 yards from its mouth, and the E or Mammoth vein struck at 65 yards north of it; in this distance the seam passed over a saddle and abruptly dipped south and north. The vein was just discovered but not fully developed.

The Seven Feet vein is open in gangways east and west, each of a section area of 64½ square feet. The character of workmanship done in the mines and new slope gives evidence of skill and durability. Mr. William Herman is superintendent for owners, assisted by Patrick Doyle, as boss miner.

Gangways.—There are at present 4 gangways open, 2 on the Holmes and 2 on the Seven Feet veins; and the character of mining doing is extensions of gangways and tunnelling, which is a safe operation.

Ventilation.—This is effected by air-holes at present, until the character of the E vein is once permanently established; then a 20-horse steam fan will be employed and permanent air-courses established for that purpose, so as to insure a safe ventilation for the future of the colliery. By measurement I found the complement of air to be satisfactory and double the quantum required by law.

Engines.—A 60-horse hoisting engine in the new slope with 8 good boilers; a 150-horse pumping steam engine of two 16-inch columns, and a pole pump of a 28-inch barrel in the north slope, with 9 good boilers; a 60-horse hoisting and an 80-horse pumping engine in the old slope, of two 16-inch columns, and a 25-horse breaker engine, with 3 boilers; 5 engines of an aggregate power of 375-horse, with 20 boilers, and 1,800 feet of 1⅜ inch or 40 tons ropes, and 650 feet of 1½ inch or 35 tons ropes, and 829 feet of 1¼ inch or 27¼ tons rope. Their tackle and appearance is good.

Remarks.—5 veins can be worked east and west in this colliery, i. e. first the Primrose, the Holmes, the Seven Feet, the Mammoth and Skidmore veins; there are other veins of less note which at present claims little attention. The engines, boilers, machinery and slope tackle belonging to each of these slopes and breaker are all in excellent order and well conditioned, and its future prospects are very encouraging to both land-owners, operator and the community at large. As the sinking of this slope and driving of the tunnel was considered a doubtful operation—by some to be a futile undertaking—yet the proofs which accurate surveys gave of the

relations of the different stratas, gave sufficient evidence to those experienced men that their labor was not wasted in a wrong direction, until they finally achieved their object, and once more revealed the Mammoth's identity in its place in the Silver Creek basin.

No. 28.—*Inspected November* 14, 1870.

Description.—Tamaqua company's Wabash colliery, situate at Buckville, on the estate of Tamaqua coal company. It consists of two openings on the C vein. The new slope is sunk 600 on its second lift, at an angle of 45° dip south. The mine is drained by a 500-horse bull engine. New and extensive buildings are erected and sufficient capacity to prepare 200 cars per day. The mines are ventilated by an 8-horse steam fan. The company is now prepared with every facility to do large business, with approved engines and machinery, which cannot be equalled in the region. The long runs east and west on the coal veins to open constitutes it a very extensive colliery.

Gangways.—The upper level gangways are nearly worked out. From bottom of the new slope to the south tunnel is 60 feet; from O vein to the P vein is 248 feet; to the Leader vein, 50 feet; the P gangway is 40 yards; its section area is=70 square feet, with 7 hands employed in it; west gangway is in 25 yards, and 6 men working in it; the coal is 20 feet thick. The east gangway on the Q vein is in 25 yards, and 6 men in it. Its west do. is in 25 yards, and 5 men employed in it. The coal is 6 feet thick. Its section area=48 square feet. The distances above refer to the thicknesses of the parting rocks between the several veins, which is safe for any mining operations. The character of mining done here at present is driving gangways, &c.

Ventilation.—An 8-horse steam fan assists to ventilate the mines at present. The slope is used as a down-cast air-course, the air divided in splits at the bottom and forced in the ——— to its face; thence out by the ——— to the tunnel, and continued on in this manner.

Engines.—A 500-horse bull engine drains the mine; two 60-horse engines are used in the slope for hoisting coal; a 250-horse engine drains the old levels; a 30-horse engine is used at the breaker; and a 30-horse engine is also used at the new breaker, and a 2-horse feed pump to charge the boilers, 13 of which are in use. Their condition is not at present known. The engines are 7, with an aggregate power of 932 horse, with their ropes, machinery and tackle. I find in good condition.

Remarks.—This colliery has been some 34 years in operation, the drift of which is in some 3,700 feet long, and supplies coal for any purpose. The old lifts are now nearly exhausted, and this new lift will soon have a large supplying capacity, as all the veins in that basin can be successfully mined and the coal conveyed to the new slope, and having the breaking and screening power for preparing coal, it is calculated the colliery will last many years in successful operation. Carburetted hydrogen is evolved in different quantities in each of these veins in this basin, and the only safe mode to cope with it is by the application of a more powerful steam fan, with a corresponding large series of air-courses and headings and sufficient out-lets. A monkey gangway is driven on the P vein gangway to carry the — come air in. The number of men and boys employed is —. The temperature outside was —. Rarity of air by barometer was —.

No. 29.—*Wolf Creek Diamond colliery.*

I visited this colliery November 16, 1870, to ascertain the condition of the mines and the ventilation of the same, and also to ascertain whether Mr. Eltringham's orders had been carried out, a report of which will be made in connection with his annual report, as this colliery was under his jurisdiction until the first of June, 1870.

I find the east gangway, on the 7 foot vein, to be open in 400 yards from the tunnel. The coal is 5 feet thick. This is on the fifth lift of the Diamond slope, with 7 men employed in it. The headings have an area of 28 square feet. Its west gangway is in 672 yards from this tunnel, and working 3 breasts, with 29 men in it. The Reese Davis vein gangway is in 720 yards, with 27 hands in it. Its east gangway is in 1,020 yards, working 13 breasts, with 32 hands in it. Seven mules are used in the mines for all purposes. I found the mines nearly in a full supply. An out-let ingress and egress road is made 768 yards east of the slope, and are now driving another 720 yards west of the slope, both of which are on the Reese Davis vein. I ordered to be furnished with a map of this colliery for further information.

The engines, machinery, ropes and tackle look good. The condition of the boilers is considered safe. Mr. Baddow deserves credit for his good management of the mine, and the other officers are equally careful. A serious accident occurred at this breaker last March, by the explosion of a nest of boilers, by which 5 persons were killed and 9 injured. This sad accident caused deep regret amongst the community in behalf of the poor families and injured persons, and also the company officers, as it was supposed they intended no injury or dereliction of duty. The coroner's jury in this case had been empanelled two days, and after due deliberation and hearing witnesses in the case, rendered a verdict that the accident was caused by the incompetency of an engineer in not having a sufficient supply of water in the boilers. The explosion killed 5 persons and injured 10 others. It demolished the building and destroyed one or two boilers.

No. 30.—*Inspected November* 9, 1870.

Description.—The Kear Bros. & Co.'s Mine Hill Gap colliery is situate at the Mine Hill gap, on the estate of Dundas. The colliery consists of 3 slopes of 3 lifts, sunk 300 yards deep on the north dip of the E or Mammoth vein, of a section area of 176 square feet, supported on each side by strong 50-feet pillars between each slope. No. 1 slope is used solely for hoisting coal; No. 2 is used for pumps and No. 3 is used for a steam fan out-cast air-shaft. The buildings are substantial stone work, and the slopes are well timbered and safely built; No. 2 slope is also used as an ingress and egress road, where the men and mine material are raised and lowered in. A large quantity of gas is evolved in the mine, and it is found necessary to use the Davy lamp only in the most parts of the mine. Ventilation is effected by a 20-horse steam fan. The utmost vigilance is constantly necessary to secure the safety of the hands and guard against explosions. The character of mining done is generally driving gangways and breast-work. There are five veins worked in this colliery, as follows: The E vein is 20 feet thick, with 2 lifts of 2 gangways each=80 feet of coal; the Leller is 6 feet; the Crosby is 6 feet; the Big Vein is 16 feet; the Daniel vein is 6 feet thick. There are 114 feet of workable coal, and 9 regular gangways open in 2 lifts, with 2 tunnels to convey the coal to the slope.

Gangways.—I find by examination there are 9 gangways open and their aggregate length exceeds 10,000 yards. Their condition is satisfactory; the drainage is good and the appearance of the work done gives satisfaction.

Ventilation.—A 20-horse steam fan is used. The slope is used for a downcast to the lower level; is there split and traverses to the Leller vein; goes in east with that gangway to its face; returns up and back through its breasts and headings to the tunnel; passes over it and in to the west side, in a similar way, where it is again split and brought into the Big vein, where it is made to pass in east and west, returning as above and communicating in the up-cast air-shaft. I find this shaft too contracted to admit a full supply of air to pass through it. The air is here so heavily charged with dust and smoke as to be unbearable. Water tanks are erected to supply in case of the mines igniting from explosions of gas.

Engines.—There are 9 steam engines in use. Two 100-horse slope engines, one 6 do. feed pump, one 40-horse engine to lower and hoist men and tools, one 150-horse Bull pump engine, for drainage, with a 6-horse feed pump; one 20-horse steam fan engine, one 30-horse breaker engine and a 30-horse dirt plane engine—in all 9 engines=482 horse, with 26 good boilers, which are kept in good order. The water is so arranged as to be safe under ordinary care.

Remarks.—This year the firm has put an 800-horse Bull pump in operation, making an aggregate steam power of 1,282 horse. This is the largest steam power in the district. The temperature of the mines was found as follows: By the thermometer, outside 56° and inside 58°, difference 2°, and by the barometer, do. 29 $\frac{2}{10}$ inches, do. 28$\frac{1}{2}$ inches, do. $\frac{7}{10}$ inches, showing that the heat and rarity of the mean atmosphere indicated an explosion of gas imminent. The current of air was found fair, but required some improvement. Two fire-bosses are on duty; the air was found very poor in the Mammoth east gangway, where 30 men were employed. I directed to enlarge the air-courses and suspend mining in the lower lift until better ventilation be effected. Twenty-two hands were at work in the west side, but a supply of fresh air must be brought into the lower lift to carry off accumulating gas whilst reforms are going on. I required intelligent maps of this mine to be furnished me, and desired every dangerous place in and about the mines to be properly secured, to avoid accidents, and do all other obligatory improvement in the line of safety to men and property, as the law directs. Two hundred hands are employed; shipping capacity 150 cars per day. The drainage of the mines is a complete operation. The general condition of engines, boilers, ropes, machinery and all other appointments gives satisfaction. But any failure in ventilation may at any time result seriously, as the quantum of gas evolved will average 20 per cent.

No. 31.—*Inspected November* 17, 1870.

Description.—Kears & Amesty's Wolf Creek Slope colliery, situate near Minersville, on the estate of Wharton and others. The colliery consists of one slope of five lifts, sunk 1,520 feet deep, on a 33° south dip of the Reese Davis vein, and is now the deepest slope in the anthracite coal region. The new lift was put in mining operation this year. The east and west gangways are open in some —— yards each, and are at present working 20 breasts, employing some 54 men. There are other veins on this tract, of great value, which will be opened by tunnels. A 20-horse steam

fan ventilates the mines. A considerable amount of carburetted hydrogen gas is evolved in these coal seams, and the present application of the steam fan will control this dangerous element. The colliery is in successful operation some 40 years, and the coal deposit is still very extensive. The Wolf Creek basin is, and has been, one of the most productive in the coal region. The mines have been operated by Richard Kear and heirs nearly 30 years. Its elevation above mid-tide is 798 feet.

Gangways.—The upper level gangways are nearly exhausted, of which there were many, averaging some 20 in number; their aggregate length is estimated at some 22,000 yards.

Ventilation.—A 20-horse steam fan ventilates the mine successfully; the slope is used for an in-take; the main out-let is open west of the slope.

Engines.—A 60-horse hoisting engine, used at the slope; a 40-horse pumping engine, with 2 columns, in two lifts, with 8 boilers, in 4 nests, with their valves, &c., in good condition; a 30-horse dirt plane engine, with 2 boilers in use; a 20-horse breaker engine, with 3 boilers in use; 5 steam engines, with 13 boilers; their machinery, ropes and tackle all in a satisfactory condition, and are under the care of comptent hands.

Remarks.—I have carefully examined the character of the mine and its workmanship, and think it fully reliable. I have found a good current of air in the different divisions in proper splits, with headings and air-courses of sufficient section areas, and the steam fan so located as to be permanently effective.

No. 32.—*Inspected November* 17, 1870.

Description.—Patricks, Donohoes & Shall's Kentucky Slope colliery is situate near Tuscarora, on the estate of the Tamaqua coal company. This colliery is in operation some 25 years. It consists of 2 openings, and works 2 veins of coal. The first opening is a drift, by which the E and D veins were worked above water level. The coal in the E, or Mammoth vein, is 25 feet thick, and that in the D, or Skidmore vein, is 8 feet thick; all the coal in this drift level is nearly extracted, and is now used as an out-let for the drainage of the slope level. The second opening is a slope sunk 525 feet deep on the south dip of the E vein, which dips 33°, with 2 tracks; 1 pump and 1 traveling road are open in the slope. The slope is sunk 300 feet below the level of the drift, and used to raise the coal to the surface level at the breaker, on an equal elevation with the lateral railroad, which has an elevation of 1,028 feet above mid-tide at Fairmount. The mines are well ventilated by a 20-horse steam fan. The character of mining done is robbing back old districts and breast work, which I consider a tolerable safe operation at present. Very little gas of any sort is evolved, and the operation of the steam fan supplies a sufficient amount of air for the miners.

Gangways.—The Skidmore and E vein gangways are separated by 16 yards thick of rock; its character is very safe; a tunnel connects these gangways; there are 3 main gangways open, and 1 slant do., whose aggregate length exceeds 17,325 feet, with 758 feet of a tunnel=18,083 feet.

Ventilation.—This operation is produced by a 20-horse steam fan. I found the air very good in the mines, and no complaints amongst the miners about bad air.

Engines.—A 40-horse slope engine is used for hoisting coal, with 4 boilers; a 30-horse breaker engine, with 3 boilers; a saw mill, of a 20-horse power, is attached by beltings and steam pipe to this engine; a 20-horse fan en-

gine ventilates the mines; 4 engines=110-horse power, with 7 good boilers; the condition of these engines, boilers, machinery, ropes and tackle is good and safe under ordinary care; the water is arranged so as to be safe.

Remarks.—I found the workmanship of the slope and gangways in good condition; the drainage of the mine perfect; a sufficient supply of timber and mining material on hand for miners' use; the air conducted into the different divisions of the mine properly; an out-let ingress and egress traveling road each side of the slope; on the east side this road is located 8 yards from the slope, and on the west side, 384 yards from it, and the drift, which is a rock tunnel, is also used as a safe traveling road; I find the engines and machinery under the care of competent hands, and all dangerous places about the engines and machinery fenced in for safety.

No. 33.—*Inspected November* 17, 1870.

Description.—R. Rowbottham's Peach Orchard Slope colliery is situate near Tuscarora, on the estate of Gideon Bast and others. It is quite a new colliery; put in operation this year. It consists of a new slope sunk on the south dip of the F, or Holmes vein, at an angle of 65° dip; its section area is=90 square feet; its depth is 60 yards; the coal is 5 feet thick, and the mine in a tolerable condition, and mining operations are safe. The only work now doing is driving gangways.

Gangways.—The east gangway is in 250 yards.

Ventilation was found inadequate, and of no effect at the time; I instructed Mr. Yost, the boss miner, how I wished him to conduct and supply sufficient air in the mine, and improve its condition generally.

Engines.—A 40-horse engine is in use at the slope, with a 10-horse engine used for pumping out water; 3 boilers are used; their condition is not known; the wire rope, which is a 27¼ ton rope, is in a fair condition; its tackle should be much better to insure safety.

Remarks.—I directed a new out-let to be opened on the east gangway out to the surface, and a proper stepping made in for men to travel in, in case of necessity. When the colliery is in full operation it employs some 50 hands. I further examined the engines and machinery and found them to be in reasonable good order. The operator intends to improve the condition of such things as is necessary through the winter season and have matters in better order in spring.

No. 34.—*Inspected November* 21, 1870.

Description.—Thomas, Moss & Hablet's Buckville Slope colliery is situate at Buckville, near Tamaqua, on the estate of the Tamaqua company. The colliery is many years in operation; it consists of a slope sunk on the south dip of the C vein, 600 feet deep, on a 45° dip; the new lift is 330 feet deep; the company have erected a new and substantial building this year; completed the new slope and breaker; put up a 500-horse Bull pump 20 yards west of the slope. The old levels are nearly exhausted of coal; the tract contains some 6 workable coal veins which can be all opened by a single tunnel, and the coal conveyed in it to the slope. The company is improving and re-constructing the colliery in such a manner so as to make it a first-class colliery for a long time to come.

Gangways.—The gangways are alphabetically classified. The east gangway on the E vein is open in 350 yards and west 250 yards; the F do., on its bottom level, is open in 200 yards, and west 500 yards; from slope to east tunnel, 75 yards; from F vein to E vein, 88 yards; working 3 breasts with 30 men. A monkey air course is open along this gangway of an area of 25 square feet; the vein is 13 feet thick. The pump slope is 10+14=24÷2=12×9=108 square feet. The up-cast shaft is 5+9=14÷2=7×7=49 square feet. The chararter of mining done is in driving gangway, opening breasts and breast works.

Ventilation.—An 8-horse steam fan produces ventilation, but this is not adequate to supply a sufficient quantum; some fire and choke-damp are evolved, and it is necessary to erect air gates and headings of sufficient area to command the air into the working places to insure the safety of the men. I have examined each division, and gave such instruction as will remedy the evil complained of.

Engines.—A 500-horse power Bull or Cornish engine drains the mine, and two 50-horse engines are used for hoisting in the coal slope, also one 250-horse pumping engine is used in the old level for draining it, and a 30-horse breaker engine and an 8-horse steam fan; number of engines in use, 6=888-horse power, with 13 good boilers. I found the engines, boilers, machinery, ropes and tackle in good condition.

Remarks.—Owing to the character of the E vein gangway, I directed an out-let traveling road to be opened on it for men's safety, as it is in a poor condition, and to open an air-course on this gangway, to put up a door on the gangway and drive the air in at the last cross-hole, thence up through the breasts and return it through these breasts and headings to the connecting air-course on the out-cast air shaft to the fan, and otherwise strengthen and repair the mines, so as to make it safe and healthy for men to work in, as often the want of such precautions result in loss of life and destruction of property. Whilst none are able to judge of the character of the strata, or the influence of the great pressure of the superstratum to crush or close any section of it without giving the least motion, which often involves a serious result.

No. 35.—*Inspected November* 23, 1870.

Description.—John Whitstone's Tamaqua shaft colliery is situate at Tamaqua, on the estate of the Tamaqua company. These mines are in operation some 40 years. The colliery consists at present of three openings, working some six veins. *First.* A shaft is sunk 364 feet deep on the Big P vein, which dips 85° north. All these veins are located in the north slope of the Sharp mountain and in the Tamaqua basin; the dividing rock stratas are of less thickness on the south side of this basin than they are found on its north side, and the axis of the veins are nearly and in some places perpendicular, a quality which they assume on the whole length of the north slope of the Sharp mountain, in Schuylkill county. Four veins are operated by the shaft, i. e., the Big and Little P and the Big and Little Q veins. Two cages are used in the shaft. The structure of the shaft and its ropes and fixtures are apparently in good order. The upper levels have been all exhausted of coal. The shaft is now used as a down-cast. The air brought in in the P gangways is made to traverse the four gangways, by means of cross-holes in the partition rocks, thence up into the working places and returning back through the pillar headings to suitable air-

courses that leads it to the out-cast. All these gangways are opened and connected by tunnels at convenient points, which facilitates the conveyance of coal, etc. The character of mining done at present is generally robbing pillars and some breastwork. The other opening are two new drifts, open on new veins, south of those already known, on a level with the shaft mouth, and in appearance are profitable ones, as the coal is some ten feet thick and a superior quality. The run on the dip of these veins exceeds 600 feet and in length over 1½ miles.

Gangways.—Six gangways are open on the colliery; the aggregate opening in the shaft, gangways and tunnels exceeds 4,500 yards, with the drifts=650 yards=5,150 yards.

Ventilation.—A 20-horse steam fan ventilates the shaft colliery. The air in the double Q vein is fair, with 18 men in it; 3 men are repairing the P vein gangway; 19 yards thick in the dividing rock between these veins; a safe out-let road is in the Q gangway to the out-come traveling way. The air is tolerably well conducted in these gangways, and the gasses that prevailed here prior to the erection of a steam fan is now almost controlled by its influence. The drifts are aired by air-holes, and very little complaints are heard of it at present. The cold weather favors this sort of ventilation.

Engines.—Two 40-horse power engines are used at the shaft to pump by and a 60-horse engine for hoisting purposes, a new 30-horse dirt plane engine in use for that purpose, and a 50-horse breaker engine. These five steam engines=220 horse, with 16 boilers, whose condition is not reported, but assumed to be safe. The engines, machinery, ropes and tackle look well.

Remarks.—Under the direction of Mr. Eltringham many beneficial changes were made, but at that time the prospect of a transfer of a lease to the present parties interfered, in a manner, with the proper improvements then ordered. The erecting of the steam fan, and the opening of a traveling road, and other needed improvements, add greatly to the safety and condition of the mines. Twenty men work in the Q drift gangway—an out-let 200 yards from its face for miners to travel in with safety; 20 men work in the R vein gangway, robbing back pillars; this drift is 180 yards in. Last year these drifts formed a separate colliery, but this year the shaft colliery assumes it, and at present is working as one general colliery, under Mr. Whitstone, its operator.

No. 36.—*Inspected November* 25, 1870.

Description.—Peach Mountain Slope colliery, situate near St. Clair, (known as the Ravendale slopes,) on the estate of Lewis & Baber. The colliery consists of 2 slopes, sunk on the south pitch of the Skidmore, or D vein, at an angle of 40°. The old slope is sunk 90 yards deep; the coal on this lift is nearly all worked out, and is now used as an up-cast air shaft, and a pumping slope.

The new slope is sunk 186 yards deep, on the D vein, on a dip of 70°; the west gangway is in 356 yards. The character of work done is driving gangway, headings and breast work, which, from appearance, is tolerable safe. The slope is strongly built, and in good condition.

Gangways.—The west gangway is driven in some 356 yards, with 32 men working in it; the east gangway is in 350 yards; the coal is 11 feet thick, working 6 breasts and gangway heading, with 37 men in it; some carburetted hydrogen gas is found in this mine and requires to be carefully destroyed.

Engines.—The breaker is run by a 30-horse engine, with 2 good boilers; two 40-horse engines are used in the old slope for pumping purposes, and a 60-horse in use at the new slope, and 40-horse and 60-horse steam pumps in use; 13 boilers are in use, which were lately examined, and reported to be in a good condition.

Remarks.—I found it necessary to have a second out-let made, and ordered it to be at once commenced, with two shifts each day, and enlarge the air-courses to a proper area, and also to timber up the west gangway, and otherwise secure and improve its condition; I think the west rope in the new slope is not safe, and therefore directed it to be re-placed by a new one; to get the spreader chains made stronger, and have a secure brake put on the drum, and also directed the dangerous places in and about the machinery to be securely fenced off to avoid any accidents.

No. 37.—*Inspected November* 28, 1870.

Description.—Tamaqua Company's Greenwood Slope colliery, situate east of Tamaqua, on the lands of the Tamaqua company. The colliery consists of two openings; the first a drift on the Cross-cut vein, which at present is idle; the second opening is a slope, which is sunk 280 yards deep, on the south dip of the E, or Mammoth vein. It consists of three different lifts, with 2 tracks, 1 pump and a stepped traveling road for men. The mine is drained by 2 pole pumps, and a steam fan ventilates the mine. The character of mining done is gangway heading and breast work. The chain pillars lift at the heads of breasts are 9 yards thick; this is left to support the upper gangways.

Gangways.—The drift gangway is in 100 yards and idle, and the coal in fault. The east gangway in the slope is in 620 yards, and idle at present, with 2 men repairing it. The west gangway is in 800 yards; a parting slate of 15 yards thick separates the E and D seams; 2 shifts work this gangway, with 8 breasts working in it, and 33 men employed in it, and 350 yards of a gangway from bottom of slope eastward.

Ventilation.—A 15-horse steam fan ventilates the mines; the up-cast is in the pump road; the slope is used for a down-cast air-way; the air is divided at the bottom of the slope, and passes in the east and west gangways, comes back through the breasts and headings to the up-cast air shaft.

Engines.—A 15-horse steam fan in use. Two 40-horse engines are used at the slope on the F vein. One 80-horse pumping engine, with two 16-inch columns, with 9 boilers in use, and a 500-horse Bull pump and a 4-horse feed pump with 8 boilers. These boilers are reported to be in good order. The steam power used is=6 steam engines=679 horse, with 17 boilers, reported to be cleaned and in good condition.

Remarks.—I find the slope, buildings and engines in good order. The drainage is perfect. Carbonic acid gas is considerably troublesome in part of the mine. I desired Mr. Kemp, the boss miner, to bring the air through the gangway to the outside breast; thence by a monkey gangway to its face and back through the breasts; to use a stronger spreader chain and put a good brake on the slope drum, and to furnish me a map of the colliery. There are 109 outside and 64 inside hands employed. Outside temperature was 58°; do. inside, 60°; difference, 2° in favor of ventilation. Barometer at $28\frac{7}{10}$ inches; inside, $29\frac{1}{10}$; difference, $\frac{6}{10}$, or a pressure of 600 feet altitude, showing the presence of choke-damp equal to 276 feet of a pressure. The current of air was not measured until some future visit.

No. 38.—*Inspected December* 1, 1870.

Description.—John Wadlinger's Heckscherville Slope colliery. Is situate at Heckscherville, on the estate of the Manhattan coal company, Major A. B. De Saulles, general agent. It consists of a slope, sunk 180 yards deep on a 55° south dip on the Crosby vein. The colliery is in operation over 32 years. Ventilation is tolerable good, and the operator is preparing to put the mines in good order. The upper level caught fire last year. A large body of water is dammed in the upper lift, which is a dangerous element should the pillars yield. Preparations are now making to have it drained. A large Bull engine drains the whole of the mines in its neighborhood. For a fuller report see Mr. Eltringham's report.

No. 39.—*Inspected December* 2, 1870.

Description.—Lehigh Company's Bull Run colliery, is situate east of Tamaqua, on the estate of the Lehigh company. It consists of a water level tunnel, drove 400 yards to the Mammoth vein. The east gangway is extended 1,540 yards; the west do. 700 yards, with 3 breasts working in the east gangway, with 40 men, and 3 men robbing out the west do. A new slope is now sinking from the surface, which will extend 70 yards below this water level. A slope for the use of the pumps is already sunk 70 yards below this level, and its east gangway is in 123 feet. Its west do. is in 80 feet. The hoisting slope will be 140 yards deep on the south dip of the Big vein, at an angle of 43°. The buildings, &c., are in course of construction, and promises to become an excellent colliery. The coal is 42 feet to 60 feet thick.

Ventilation is effected by air-holes out to the surface. The tunnel is used as an intake, with a locomotive engine conveying the coal to the breaker. The condition of ventilation was found up to the requirements of the law.

Remarks.—A 20-horse locomotive engine used for conveying the coal, and a 30-horse breaker engine in use. A 40-horse engine is used inside to hoist the stuff out of the pump, slope, &c. 2 boilers used at the breaker and 1 flue boiler at the slope. I desired the erection of a steam fan for the colliery, and at present to use a hand fan at the up-cast to increase the current of air, as smoke interfered materially with the workmen. The character of mining done here is principally robbing out old works. It is intended the new slope will be in full operation in April next. I directed the fencing off of all dangerous places and machinery, and secure every dangerous place. I directed horns to be put on the drum and use caution in the management of the hands. I find 86 hands employed. James Strouse and John Whitehouse, engineers. Temperature outside, 42°; inside do., 46°; difference, 4°. Barometer, 28 inches; do., $28\frac{3}{10}$=300 feet altitude.

No. 40.—*Inspected November* 30, 1870.

Description.—Tamaqua Company's slope, at New Kirk, is situate near New Kirk, west of Tamaqua, on the estate of the Tamaqua company. It consists of a slope, sunk 355 feet deep on the south dip of the C vein, at an angle of 74°, having 4 tracks. A pump slope is partitioned off on the east side of it. The slope is sunk on the Greyer vein, which is 6 feet thick. North of this is a small vein 5 feet thick. The pumps are located on the

small vein, the dividing slate but thin. The coal in the C vein is 20 feet thick; the F vein is 12 feet thick; the north tunnel cuts 3 more veins; the E vein is 20 feet thick; the Cross-cut vein is 4 feet thick; the D vein is 8 feet thick. The upper lifts of these gangways are worked out on the water level.

Engines.—Two 60-horse engines are used for hoisting; a 60-horse engine is used for pumping; two 50-horse engines are used for pumping in the new slope; 13 boilers are in use; a 30-horse breaker engine with 3 boilers. These 6 engines equal 310 horse power, with 16 boilers, the condition of which is not reported.

Remarks.—The coal above water level is nearly exhausted, except the Cross-cut and G veins. Should the E tunnel prove the coal to be good, these veins will be worked again. These veins evolve large quantities of fire-damp. Mining is quite dangerous here unless careful firemen are employed. I have given such instructions as is necessary to those in charge to use great caution in the mine, and see that the working places are free from gas first before permitting any miner to enter his working place. By way of improvement a new steam pump is now in operation. The boilers are now reported to be in good condition. There are 3 new boilers more in use this fall. Very little has been doing at present. About 40 hands are employed. The outside temperature was 58° and 58° inside. Ventilation was therefore stationary and of no effect. The barometer was outside $29\frac{2}{10}$ inches and inside $29\frac{3}{10}$=100 feet depression, or one per cent. of fire-damp evolved.

No. 41.—*Inspected December* 1, 1870.

Description.—J. Johnson's High Mines colliery, situate near Tamaqua, on the estate of the Tamaqua company; it is some 40 years in operation, and consists now of 2 drifts; the coal is hauled up by the breaker engine from the water level by an inclined plane; these drifts run in east; the two veins worked are the A and C veins; the coal is very good; the A vein coal is 12 feet thick, and that of the C is 6 feet thick.

Ventilation.—The mines are ventilated by air-holes; the air traverses in the breasts to the face of the workings, by atmospheric action; some of these holes are run into the counter gangway. The A vein forms a Twin vein some 250 yards from the drift; the partition slate is only a few feet thick.

Remarks.—The condition of this colliery is improving; the airing and drainage is much better, and a better disposition to fix up things generally prevails. About 50 hands are employed, shipping some 20 cars per day.

No. 42.—*Inspected December* 1, 1870.

Description.—Whitstone's slope colliery is situate in Tamaqua, on the estate of the Tamaqua company; it has been in operation some 40 years; it now consists of a slope sunk on the F vein 112 yards deep on the south dip of that vein, at an angle of 56°; there are 160 yards of an air-hole, and 40 yards of a traveling road on the west of the slope; a considerable quantum of gas evolves in the face of the gangway; this gangway is in 850 yards, the east gangway is in to the Greenwood company's line, some 1,700 yards.

Gangways.—The west E gangway is in 850 yards; the E do. is in 1,700 yards, and are robbing all out; the F vein gangway is in 1,300 yards, with 400 yards to run. Nothing doing except extending gangways. 34 men work in these veins. The C gangway is in 1,000 yards, working 4 breasts, with 27 hands in it. The A gangway is in 800 yards, working 3 breasts, with 20 men in it; 40 hands outside; in all=121 hands.

Ventilation.—The mine is not ventilated by either a steam fan or furnace, but by the temporary action of the atmosphere. This, for slope mines, is altogether inadequate and insufficient, and dangerous, as when the outside atmosphere is any degree warmer than the mine atmosphere, there can be no draft or action within. In this case the mine produces considerable gas, so that safety lamps must be used in the distant parts of the mines; yet they resort to the beggarly system of insignificant air-holes, many of which are found half closed with *debris*, and totally unfit and useless. I therefore condemned the entire system and directed to forthwith proceed with a sufficient opening that will relieve the men.

Engines.—A 60-horse engine is used to work 2 pole pumps in the slope, and a 50-horse engine is used to hoist with; a 25-horse engine is used at the breaker; thus 3 engines=135-horse power, with 9 boilers, whose condition for safety is not known; 750 feet of 1½ inch wire rope is in use.

Remarks.—The condition of the mines was not improved; the gangways are poor, and ventilation very bad; the F gangway is 1,300 yards, and has to run 500 yards more; by a monkey gangway, over this main gangway, they manage to furnish a meagre supply of air; no breasts are working, but extending gangways and the air-courses; 10 men are working here; in the E gangway they employ 24 men, robbing back the coal; 80 yards of a solid rock seam divides these veins; 800 yards in on the E vein an out-let is made for to travel in; this I found closed at top, and this I directed to be open and made secure, and an out-let on the F vein, near the slope; some 700 yards of the E gangway is closed in at the face and abandoned; I insisted that a proper supply of air should be furnished in the mine, and all dangerous places and machinery should be securely covered in; and commence forthwith with the necessary improvements for the safety and health of the hands.

No. 43.—*Inspected December* 1, 1870.

Description.—Alaska Coal Company colliery, situate in Tamaqua, on the north of the borough, on the estate of the Tamaqua company. It consists of water-level drifts, running west on the G and P veins; the G gangway is in 1,000 yards, working 4 breasts, with 24 men; this gangway is in a poor condition, with no out-let or escape road, with some gas evolving. The P vein gangway is in 800 yards, working 3 breasts; 20 hands employed; the condition of it is poor. Six hundred and fifty yards from the drift an out-let for men runs out to the surface; this gangway is heavily crushed and its condition is bad.

Ventilation.—The ventilation of these gangways is attempted to be produced by a sort of air-holes; the air traverses in the gangways and returns by a monkey air-course, made 10 yards above the gangway; from this monkey it travels through the breasts to the up-cast air-hole. In the G gangway, on the upper level, an air-hole is found permanent, and when the lower one reaches this point it is to be connected therewith. Eighty yards from the face of the P gangway the upper lift gangway ends in solid coal,

and at this point it is intended to make a permanent air-hole for the present lift.

Engines.—A 40-horse engine runs the breaker; 3 boilers are in use, and a report of their good condition furnished; a new dirt plane engine, erected this year, of 40-horse power, with three boilers; the dirt plane is some 180 yards long.

Remarks.—The new dirt plane was built this season, and an engine used to elevate the dirt from the breaker; all the upper levels are exhausted of coal; the G vein is 8 feet thick; the P do. from 16 to 20 feet thick; 89 hands are employed; shipments equal 40 cars per day; the character of mining done is extension of gangway and breast work, which is considered a safe operation.

No. 44.—*Inspected December* 7, 1870.

Description.—Harris, Williams & Co.'s Ledger Vein colliery, is situate at Silver Creek, on the estate of the Valley Furnace tract company. It consists of a slope, sunk on the south dip of the D vein, or Ledger vein, and tunneled to the E vein south 27 yards. This slope is 100 yards deep on a 30° dip. The E vein splits off into two veins 350 from the first tunnel. A 15-yards tunnel opens the top bench of the E vein. The vein splits off in the west gangway too. The character of mining doing here is robbing back the pillars, &c., but on the east side are working 3 breasts on the top seam and 3 do. on the bottom seams of the E vein. The coal in the top seam is 16 feet thick, and that in the bottom seam is 6 feet thick.

Ventilation.—A 10-horse engine runs the steam fan. I found the colliery idle two weeks. The fan stood idle this time. The mine was full of carbonic acid gas, that I could not enter further than the first tunnel, 800 yards east of the slope. The mines appear in a good condition, though a vast amount of black or choke-damp is evolved.

Engines.—A 90-horse engine is used for pumping and a 50-horse do. used for hoisting coal. A 10-horse fan engine and a 20-horse breaker in use. The condition of the breaker was found on the 5th December to be good, and the 7 boilers at the slope were found to be good in November. The slope ropes are one year in use but appear good.

Remarks.—No men are allowed to go up or down the slope. A good ingress and egress man-road is east of the slope, and the second out-let is 339 yards from the slope. The 3 do. is 1,632 yards from the slope. The character of the dividing seams between the coal seams is strong sand rock and 4 feet bench of conglomerate. The grade of the traveling road and slope is sufficiently easy as to admit the passage of mules. This colliery is a long time in operation, and for many years leased by the Philadelphia Ledger company. 122 hands are employed. The mines will not be exhausted for four years to come.

No. 45.—*Inspected December* 8, 1870.

Description.—Murry, Winlack & Randal's Old Silver Creek colliery is situate at Silver Creek, on the estate of the Valley Furnace tract company. It consists of an old slope which was formerly operated by Mr. John Tucker; the works were very extensive but fell into decay of late and finally closed in last year, by which the present firm lost some 7 mules, a lot of wagons

and T rail and mining implements. However, the firm have re-leased the establishment for ten years and are now preparing to re-open it. Their purpose is to recover the coal in the chain and breast pillars. The manner in which the firm proposes to do this is somewhat a risk and may involve the lives of the miners. The slope closed in last year and all the different levels thereof are full of water; should the present way of working out the chain pillars yield to a crush it would, in that event, precipitate the whole mass into the collected water; this, no doubt, would result fatally.

Engines.—A 60-horse hoisting engine in the new slope, a 6-horse fan engine, a 60-horse slope engine, a 150-horse Bull pump engine and a 4-horse feed pump; 6 engines= 00-horse power, with 16 boilers. By the closing of the slope all the pumping engines, pumping machinery, slope ropes, wagons and railroad iron and implements were lost; the miners saved themselves by escaping in the egress air-course.

Remarks.—I objected to the prosecution of the plan proposed of robbing out the chain pillar until the water be first drained out and a thorough inspection made of the mines and their condition, as well on the part of the miners, land-owners and the lessees, as the conclusions arrived at may result more profitably and would not involve the lives of the men or any extraordinary expense, besides the recovery of the valuable engines, machinery and material that are at present lost, which is of great value and interest.

No. 46.—*Visited December* 7, 1870.

Description—P. D. Luther's Kaskawilliam colliery is situated near Middleport, on the estate of Hiester Clymer, John Van Buren and others. It consists of 3 slopes. I found the works idle and partially abandoned; this colliery was in operation 26 years, and at one time constituted one of the principle mines of the county, but, for some cause, was suffered to go to ruin and decay; at present it is only a monument of the past, and recorded amongst the abandoned collieries of the region. To develop these mines a shaft would be the best opening; this would penetrate all the veins in the basin, which is an extensive one, and the location is very advantageous; some of the machinery and engines still stand; but nothing to deserve further comment.

No. 47.—*Inspected December* 8, 1870.

Description.—S. Morgan & Co.'s Novelty colliery is situate near New Philadelphia, on the Estate Valley furnace company. It consists of a slope sunk on the Palmer vein. The first lift is 95 yards deep. The coal on this level is nearly all extracted; the present new lift (is or) will be 100 yards deep on the same vein, as an extension of the old lift. The character of work doing here is extending the slope, with three mining shifts working in it, with 28 men employed.

Engines.—A 60-horse engine in use at the slope; 4 boilers in good condition, with very excellent slope ropes $1\frac{3}{4}$ inch; a 10-horse engine runs a 10-foot fan, which receives its steam from the slope boilers; a 20-horse breaker engine with 2 boilers; a new dirt plane 180 feet long; 3 engines= 90-horse, with 6 boilers; their condition is reported good. It is intended this slope will be in shipping order in February next; other veins can be opened by tunnels, though that would be expensive at present under the circumstances.

No. 48.—*Visited December*, 1870.

Description.—James Glenn's Old Reevesdale Drift colliery, situate near Tamaqua, on the estate of the Tamaqua company. It consists of a drift tunnel, 400 yards in, to the R vein, opening the following veins, i. e., the C, B, D, E, F, O, P and P, Q, and q and r veins. The only vein worked in this opening is the R vein.

Gangways.—The west gangway is in 400 yards, and robbing out the loose coal, but preserving the pillars. The east gangway is in 350 yards, and worked as above. The angle of dip runs from 75° to 90°, and the coal ranges in thickness from 5 to 20 feet. I found the colliery idle at the time.

Engines.—A 20-horse engine runs the breaker; very little can be said about this place at present, though when in full operation it gives employment to 70 hands.

No. 49.—*Inspected December* 9, 1870.

Description.—Schure's & Brown's Norwegian Slope and Shaft colliery is situate near Mount Laffee, on the estate of Wetherill and others. It consists of 3 slopes and a shaft opening. This colliery has been in successful operation over 36 years. The first slope is sunk on the south dip of the Primrose vein, 280 yards, of 3 lifts; this slope is worked out, abandoned and filled with water. The second slope is located 20 feet east of the first slope, on the south dip of the same vein, sunk 100 yards deep; all the coal worked out, and only used for pumping water. The third slope is located 150 north of these slopes, and is sunk on the north dip of the same vein, to the depth of 100 yards, at an angle of 77°. This is a new slope. The shaft is located 400 yards still north of the new slope, on the south dip of the same vein, and is 55 yards deep. All the coal in this lift is worked out. The water is taken out by buckets. The slopes were sunk on the anticlinals of the vein, whilst the shaft was sunk nearly in the synclinal, or basin. On the western extremity of this tract 2 slopes were sunk on the same vein. The coal has also been worked out, the colliery abandoned and filled with water.

Gangway.—The new slope gangway is in most 400 yards, working 9 breasts, with 35 men in it. This is all the opening at present.

Engines.—A pumping engine=90-horse; a hoisting engine, 50-horse, and 2 20-horse breaker engines; one dirt engine=15-horse; a 20-horse steam fan engine, with 18 boilers; their condition is not at present known; the general appearance and condition of the engines and machinery is good, the slope ropes are old and worn; the dip of the slope is 77°, and in slopes of such angles it is necessary to have good and safe ropes and machinery.

Ventilation.—A 10-horse steam fan is used to produce ventilation, which so far appears to be satisfactory, though carburetted hydrogen gas is evolved to some extent.

Remarks.—The slope needs 8 sets of timber near its opening and the air-way must be repaired so as to make it a safe ingress and egress road for men to travel in. The boilers must be cleaned and examined and a report of their condition made to me; the valve-beams to be stamped so as to enable the engineer to know the pressure of steam needed. A large body of water stands in the upper levels. The company intend to use a steam pump for the purpose of getting out this water, and for that purpose are driving two cross-cuts from the breast-heads in the north slope, keeping 20

feet hose-holes ahead of their work for the safety of the miners. This work is doing in a body of coal and it is necessary to be very vigilant in this operation.

No. 50.—*Inspected December* 10, 1870.

Description.—Geo. Frank Richards & Co.'s colliery, situate west of Minersville, on the estate of the Manhattan company. It consists of a drift opening, extended 75 yards; the vein is 6 feet thick, on a south dip of the Diamond vein. The place is new. The character of mining done at present is extending gangway; 6 men employed; no engines or buildings in use at present; the prospect of the mine is favorable and, no doubt, will be remunerative. No gas is met with yet. The ventilation is good and the mine is safe. The coal is disposed of in town, as no lateral railroad is yet constructed to the colliery by which the coal could be sent to market.

No. 51.—*Visited December*, 1870.

Description.—G. S. Repplier's New Castle Slopes colliery, situate at New Castle, on the estate of John Bannan, Benjamin Pott & Richardson. This colliery has been abandoned since last summer, after it had been successfully operated for 38 years. It consisted of three slopes sunk on the north dip of the E vein. The character of mining done here of late years was such as to rob the pillars in such a manner as to bring on a settling or crush of the most of the surface. The buildings were dismantled, the machinery and engines removed, except that which was in the breaker buildings. This large establishment was destroyed by fire, on the 7th of December, with all its contents, which cost, in the aggregate, not less than $76,000. This building was only partially covered by insurance. The abandonment of these mines threw several hundred persons out of employment, who until then found their chief support by labor at the colliery. Many such melancholy examples are to be met with all along the valley of the Schuylkill, from Tamaqua to Tremont. Though this large district is at present, comparatively, in a state of being nearly abandoned—to the stranger it would appear so—yet by recent and successful developments at Phœnix Park, in boring, by the Pennsylvania Diamond drill company, under the direction and counsel of Gen. Henry Pleasant, C. and M. Eng. of the company, has accomplished the undertaking and has established the certainty of the underlying seams of the basin by boring $750\frac{9}{12}$ feet to the D or Skidmore vein. The correctness of Gen. Pleasant's conclusions has demonstrated the much desired results and sets aside all mongrel theories, cherished by sceptics, of the great depth of these veins. Gen. Pleasant has won for himself an enviable reputation in the history of the rebellion, in mining under and blowing up the forts at Petersburg, Va. He has likewise set aside the arguments so often advanced by these would-be-miners, by his late developments at Phœnix Park. Schuylkill county fostered many boastful characters, who stultified themselves on their conceited pretentions to a superior knowledge of mining and scouted the claims of an American to the art. Their own lack of any business capacity, proved by their futile endeavors to accomplish anything, except the ruin of their employers, is manifest in their career through the coal region. So far for an American.

No. 52.—*Inspected December* 12, 1870.

Description.—Joseph R. Wood's Sharp Mountain colliery is situate at Pottsville, on the estate of Richardson & Wood. It consists of a slope, sunk 110 yards deep, on the Bartloft vein. The coal is 6 feet thick, of a red ash character. Thirty yards of a tunnel opens the vein. Two veins are open in this tunnel. The first is 2½ feet, the second is 6 feet thick, working one breast, with 11 men working in the mine; 30 yards of gangway is open. The thickness of the slate between these veins is 10 feet. A 10-horse power engine is used at the slope, with one boiler, 34 inches by 22 feet long; 9 men outside; 20 hands employed. The colliery is classed as a land-sale colliery, supplying the town. The character of mining done is opening to new veins and working out top level coal.

No. 53.—*Inspected December* 12, 1870.

Description.—Baltaizer & Co.'s Sharp Mountain drift colliery is situate at Yorkville, near Pottsville, on the estate of Richardson & Wood. It consists of a tunnel, open in south to the white ash vein, some 64 yards; the east gangway is 300 yards in. A slope is sunk, 49 yards deep, on the east side, and 100 yards in from the tunnel. The coal is 6 feet thick. The west gangway is 325 yards in, working one breast. This is a land-sale colliery, employing some 16 hands and supplies coal to the town, and a tunnel on this level run in south would open all the veins on the north dip of the basin, which are the most southern coal veins developed in the anthracite coal region. Their dips, as shown here, are apparently south, but as they descend the basin are forced, by the conglomerate belt, to northward, by this great wall which separates the coal region from the red shale of the Atlantic belt.

No. 54.—*Inspected December* 13, 1870.

Description.—Job Rich's York Vein colliery is situate west of Pottsville, on the estate of the York coal company. It is 27 years in operation. It consists of a slope sunk 350 yards deep on the south dip of the Tunnel vein. There are two gangways open, one on the south and the other on the north dip of the vein; the coal is 7 feet thick; the south gangway is 360 yards in, and that in the north is 50 yards in. The character of mining done here is robbing back old work.

Ventilation is indifferent; a change in the character of the colliery will be soon made by re-opening it more west and on a lower level, where, at this point, I desired an out-let to be open for a safety road, which would serve for an out-let, air-course and mule road. A 20-horse engine is used to hoist with; the drainage is effected by conveying the water into George Potts's old level and out to the surface. Some 16 hands are employed here. A large body of coal is on the tract, but only the upper veins are worked at present; shafts are the only reliable means that can profitably develop the deep veins in this (Pottsville) basin, as the upper seams are exhausted by drifting and slope mining, since the commencement of mining in this region.

No. 55.—*Inspected December* 14, 1870.

Description.—John F. Simmons's York Farm colliery is situate near Pottsville, (West,) on the estate of the York coal company. It consists of a drift gangway opening. The drift is 200 yards in on the Selgard vein. The mine is a small one and nearly worked out and will soon be abandoned. Some 10 hands are employed in mining and preparing coal for town use. The coal is 4 feet thick and of very good quality; but difficulties in mining and mining expenses compel the present operator to abandon the works.

No. 56.—*Inspected December* 14, 1870.

Description.—Llewellyn & Co.'s York vein is situate west of Pottsville, on the York company's estate. It is a new enterprise and consists of a drift and new slope. The drift is 300 yards in, in 8 feet of coal; and the gangway now is been robbing back. A small slope is sinking on the end of the vein; is now sunk 46 yards on the Big Gate vein, at an angle of 70°, in 8 feet of good coal; a gin is used to get out the stuff at present and until the slope is sunk to its full depth. Should things prove satisfactory the operator would put a steam engine and enlarge the slope by commencing at bottom and excavate it up the plane with much less expense and trouble, and eventually it may become a profitable affair.

No. 57.—*Inspected December* 15, 1870.

Description—Thomas Evans & Co.'s North America Drift colliery is situate near Pottsville, on the North America company's estate. In consists of a drift opening on the north dip of the Spohn vein; the coal is 7 feet thick; the gangways are 100 yards in, with an out let 15 yards from its out to the surface, at an angle of 90°. 10 hands are employed. Is a small new land-sale colliery well managed.

No. 58.—*Inspected December* 15, 1870.

Description.—Joseph Picton's Tracey Drift colliery, situate near Pottsville, on the North America company's estate. It consists of a drift, open 100 yards in; coal, 20 feet; the air-hole is in 80 yards; the condition of the works is good; 8 men employed.

No. 59.—*Inspected December* 15, 1870.

Description.—William Clark's Little Tracy drift is situate near Pottsville, on the North America company's estate. It consists of a drift gangway, 200 yards in. This is a land-sale work. The character of work done here is extending gangways. Two miners at work.

No. 60.—*Inspected December* 15, 1870.

Description.—Timothy Cooney's Big Tracy drift is situate near Pottsville, on the North America company's estate. It consists of a drift, open.

178 yards in. The vein is 3 feet thick. The air-hole is in 100 yards. The work is in good condition; 10 hands employed. This is also a land-sale work, supplying the town with coal. The condition of air is good, and the place is made safe for the hands to work in.

No. 61.—*Inspected December* 15, 1870.

Description.—William Kenner's colliery, situate near Pottsville, on the estate of the Delaware coal company. It consists of a slope sunk on the Peach mountain, in coal 4 feet thick. The slope is 68 yards deep, and in good, workable condition. This, too, is a land-sale colliery, with 10 hands employed. A safe out-let is made on each side of the slope, with good air and safe workings.

No. 62.—*Inspected December* 16, 1870.

This is a small land-sale opening, by Lewis Faust, on the Lewis vein; a slope sunk some 50 yards deep; the gangway is open 30 yards in. I found the mine in a bad condition. The vein is only 2½ feet thick and of an inferior quality. I directed the repairing of the mine so as to secure it for the safety of the men to work, should the colliery be kept open; 4 men are mining here, hence the necessity of this improvement, fearing an accident to the hands which, from appearances, was at any moment liable.

No. 63.—*Inspected December* 16, 1870.

George Seibert's slope; a land-sale colliery. It consists of a slope sunk 14 yards deep on a 30° south dip of the split on the Lewis vein; the gangway is in 50 yards, in coal 4 feet thick. I found this small colliery in good condition. Seven hands were employed in this mine. Ventilation was satisfactory and safe for men to work in.

No. 64.—*Inspected December* 16, 1870.

William Mead's land-sale colliery. It consists of a slope sunk 50 yards deep on the Lewis vein, south dip. Eight persons are employed in this mine. I found the condition of the work to be as safe and satisfactory for strength and safety of miners and the necessary ventilation. Great care is necessary in these small works to secure the men, as the profits are small and often not adequate to warrant a liberal expenditure, from such a cause may be so neglected that serious results may be the consequence. A little economy in the proper time will be remunerated in the long run; but poor persons may, and naturally will, become covetous, which generally results in a disaster. Warnings of this sort are, unhappily, too frequent amongst us.

No. 65.—*Inspected December* 19, 1870.

William Mason's drift colliery. It is situated near St. Clair. The drift is open 100 yards in. The character of work done is mining out the crop-

coal, supplying the borough. It gives employment to some 8 hands. I found the mine in a safe condition for men to work in. Ventilation appeared to be adequate and things going on satisfactorily.

No. 66.—*Inspected December* 19, 1870.

Biddle & Robinson's Mill Creek drift colliery; it is situate near Mill Creek, on the North America tract. It consists of a drift opening on the Palmer vein. The gangway is open 600 yards in, working 6 breasts in 3 feet thick of coal. Twenty-five hands are employed and ship some 7 to 10 cars per day. A 10-horse power engine is used, with 1 boiler, the condition of which is not known. Otherwise I find the colliery in good order and mining a safe operation. No complaint of ventilation.

No. 67.—*Inspected December* 30, 1870.

Description.—John R. Deihm's North Vein colliery, situate north of St. Clair, on the estate of Wetherill & Seitzinger. It consists of a drift opening on the north vein; the coal 5 feet. This formerly operated by Mr. Philip Breen. The colliery stood idle for some years until this season, when the present operator erected a new breaker and prepared the mines for business. When this colliery is in full operation about 40 hands may be employed. Work continued but a few weeks before the close of the season. At the time this colliery was visited it was found idle, and, therefore, a full detailed report cannot be made of its condition at present.

No. 68.—*Inspected December* 30, 1870.

Description.—Thomas H. Schollenberger's Black Heath colliery, situate at Mount Pleasant, Upper Glen Carbon valley, (Taylorville,) on the estate of York and Schuylkill Co. It consists of a slope opening on the south dip or the Black Heath vein, dip 45°. These mines are in operation 14 years. Lately a crush in the west gangway compelled the abandonment of the mine, then operated by John Maginnis, Esq., and at present it came into the hands of the present operator, who drained the water and is now sinking a new lift, with improved machinery and facilities heretofore not in use on the premises. The tract is quite a valuable one, as the elevations of the mountain are such that it will afford 2 or 3 drift levels to be opened. It is expected the new works will be ready for shipping coal next spring, under every advantageous circumstances.

No. 69.—*Visited December* 31, 1870.

White Oak colliery, operated by Thos. Wran & Co. It consists of a tunnel, driven to the Jugular vein, which is supposed to be an underlying vein, though for many years had been operated by William Littleales by driftings on the (mythical) Jugular vein. Mr. Wran abandoned the enterprise after fruitless endeavors to establish the so-called vein, by disposing of the machinery, buildings, &c., after sacrificing time and money in his vain endeavors to recover what was presumed to be a mint in its line.

No. 70.

Visited Pardee's new slope, near Tuscarora, which was found idle and filled with water. The sinking of this slope at this point appears to be an unfavorable location, and after due deliberation, was directed to be closed. This tract is quite extensive, and in some future time will be again open at a more favorable locality.

No. 71.

Visited No. 8 Lehigh Company's mine, near the county line of Carbon and Schuylkill counties. I find the buildings and openings are located in Carbon county; the west gangways worked into Schuylkill county. I doubted my authority in this case, unless in company and by the consent of Carbon county mine inspector.

No. 72.—*Inspected October* 12, 1870.

Description.—T. H. Schollenberg's Glendower colliery is situate near Glen Carbon, west, on the estate of the York and Schuylkill coal company. It consists of a slope sunk 260 yards deep on the north dip 51°, on the Big Daniel vein. Several veins are open on the colliery by tunnels, &c. The colliery is undergoing a thorough improvement. Ventilation was not bad yet not satisfactory. The colliery received new engines this spring and other improvement has been made, so that it may be considered the colliery is remodelled. I had occasion to visit this colliery frequently, in order to effect a good plan for an ingress and egress road and ventilation. No complaints have come in from the hands. The colliery will soon be a first-class one. Mr. Eltringham also reports on this colliery.

VENTILATION.

Number of collieries that generate fire-damp.

Phœnix Park	2	Pine Forest	1
Forestville	3	Raven Dale	2
Minersville	2	Eagle Hill	1
Mine Hill Gap	2	New Philadelphia	1
East and West Pine Knot	2	Swift Creek	2
Thomaston, N. and South	2	Around Tamaqua	9
Glen Carbon, N. and South	2	Feeder Dam	1
Glendower, N. and South	3	Tuscarora	1
Mount Laffee	3		
Wadesville	2	Aggregate	43
St. Clair	2		

CONDITION OF VENTILATION.

11 collieries have adequate ventilation.
44 collieries have moderate ventilation.
16 collieries have not adequate ventilation.

DISTANCE TRAVELED.

446 miles by railroads.
1,735 miles by common roads=2,281 miles.

NEW SLOPES OR LIFTS SUNK THIS YEAR.

19 new slopes or lifts have been opened in First district this year; and
65 old slopes abandoned previous to the close of 1870, statements of which will be found on page 44.
25 land-sale drifts are in operation, which gives employment to ten men each=250 hands.

EXPENSES.

Inspector Frank Schmeltzer's expenses as inspector of the First or Pottsville district, in carrying into effect the provisions of the act of March 8, 1870, an act providing for the health and safety of persons employed in coal mines, for the three months ending December the 31st, A. D. 1870.

To one horse	$120 00
To one buggy carriage	200 00
To one set of harness	25 00
To three months' horse feed	58 00
To three months' house rent	51 00
To three months' office rent	21 25
To office fixtures	22 00
To post office expenses	4 86
To printing circulars, notifications to operators, &c	18 98
To three months' gas rent	3 00
To incidental incurred moving to Pottsville, &c	75 00
To official instruments, barometer and thermometer	14 20
To one tape line, $3; one rule, $2; one lamp, $4	9 00
To one mining dress	26 50
To sundry bills, &c	13 00
Amount	661 79

The above is correct to the best of my knowledge and belief.

FRANK SCHMELTZER,
Inspector of Mines.

REPORT

OF THE

COLLIERIES OF THE SECOND, OR ASHLAND, DISTRICT, FOR THE YEAR 1870.

To His Excellency JOHN W. GEARY,

Governor of the Commonwealth of Pennsylvania:

SIR:—In compliance with the requirements of an act of the General Assembly of the Commonwealth of Pennsylvania, approved the third day of March, Anno Domini 1870, "An Act providing for the health and safety of persons employed in mines,"

I have the honor to herewith submit a detailed report of part of the collieries of my district, as the Second, or Ashland, district, for which district your Excellency confered on me the honor of an appointment as inspector of coal mines, which commission bears date September 20, A. D. 1870.

Having been appointed inspector of mines in the county of Schuylkill, in conformity with the act of General Assembly of the 10th day of April, A. D. 1869, and served in the capacity of inspector up to the 31st day of May, 1870, on which date my term of office expired by the terms of the act of the 3d of March last past. When afterwards the franchise of the mining law was extended to the district of Schuylkill, comprising the counties of Schuylkill, Northumberland, Columbia and Dauphin, respectively, and in my room three persons were to be appointed, etc., whose districts should be laid out by a board of examiners who had been appointed by the judges of the courts of Schuylkill county, etc.

Having been secondly appointed for the Ashland district, and in obedience to this call I again returned to the field of duty. The experience of the past proved conclusively that a necessity still existed to aid the persons employed in coal mines to obtain for them relief as means of safety and health. The statistics of deaths and injuries in the first part of this report shows too conclusively that a great necessity exists for a more extended knowledge of working coal mines than was before commonly known.

Through the industry of the clerk of the mining district of Schuylkill, Mr. M'Andrew, he has brought to this report a mass of facts and statistics which, if commonly known amongst the mining public, would of itself be valuable information, and such that ought to be in the hands of our miners for their especial benefit, and particularly in the hands of mining bosses.

In conclusion, I would say the suspension in my district, for such a long time, had no beneficial result as regards ventilation. I always preferred to make my examination when the colliery would be in operation than when idle, as only then an inspector can judge of the condition of ventilation correctly and apply the remedies applicable to the needed improvements. I much regret I was not able to have all these collieries reported. But taking advantage of those that were complained of when at work, and

learning of good reports of the others, until a proper occasion would arrive for me to complete a full examination. Those that are not embraced in this report are of the very largest and best ventilated in the district, the names of which appear in this report.

JOHN ELTRINGHAM,
Inspector of mines.

P. F. M'ANDREW, *Clerk.*

COLLIERY REPORTS FOR 1870.

SIXTY-THREE EXAMINED—ASHLAND, SCHUYLKILL COUNTY, PA.

SECOND MINING DISTRICT OF SCHUYLKILL.

I herewith submit a descriptive and statistical report of the working condition of the several collieries within my district, setting forth the result of my examination of the same, as herein set forth, for the last five months of my first term, ending the 31st day of May, 1870, and for the three months and twenty days of my second term, ending December 31, A. D. 1870.

JNO. ELTRINGHAM, [L. S.]
Inspector of mines of Second district.

No. 1.—*Inspected January* 9, 1870.

Description.—Tamaqua Company's Buckville colliery, situate one mile west of Tamaqua, on the estate of the Tamaqua coal company, known as the lands of Messrs. Pardee, Roberts and others. It is in operation many years, and is one of the oldest in the county. The present company has erected extensive buildings on the site of the old colliery, and sunk a new lift in the old slope 600 feet deep on a south dip of the C vein, at an angle of 45°. Its section area is 184 square feet. Two tracks, of 56½ inch gauge, are laid in the slope. The engines and machinery are of the best character. The mine is undergoing a thorough course of repairs. The drainage and outside improvements are complete. Several veins are worked in this colliery, and work has been continued without intermission all through the year. The veins worked by the company, and in fact all the coal veins in the Tamaqua basin, are alphabetically classified, which renders their names and location the more intelligent for all purposes. I find by examination of its maps that there are two lifts sunk in the slope, and that there are —— yards of gangways opened in the mine.

Gangways.—The E vein gangway is worked in east —— yards, and its west do. —— yards; the east gangway on the lower level of the F vein is

in —— yards, and the west do., on same level, is in —— yards; to this add 200 yards of slope, which will give —— yards of opening on the colliery, with —— yards of tunnel, and 890 yards of outside tracks; aggregate length of rails laid is equal to —— yards, of 25 pounds=—— tons.

Ventilation.—An 8-horse power steam fan ventilates the mines; 8 feet mean diameter, 6 paddles, each 30 square feet area, and the ventilator is not sufficiently large to render proper service; the mine evolves a considerable quantity of noxious gases, together with powder smoke, renders the mines dangerous and unhealthy. The ventilation is not adequate at present to supply a proper quantum of fresh air to expel the vitiated air.

Engines.—A 500-horse power Bull engine, for pumping use, a 52-inch cylinder×10 feet stroke; also, two 50-horse power hoisting engines, used at the slope, each 16-inch cylinder×4 feet stroke; one 250-horse power pumping engine, used to pump out the old slope water, a 30-inch cylinder ×8 feet stroke; a 30-horse power breaker engine, used at the old coal breaker; a 30-horse engine, used at the new breaker, and a 2-horse donkey feed pump, all of which are kept in excellent order. The old pump engine is an 18 inch cylinder×8 feet stroke; there are 15 boilers on the premises, each 34 inches×by 36 feet long=540 feet long, all in good condition, and 210 square feet of grate surface, which is ample; 7 engines equal to 918-horse power. The drums are 8 feet diameter×12 feet long each, 5 spiders and 8 arms each, planked with 12 inch timber; 2 shafts, each 10 inches× 24 feet long; one 10 inches×16 feet long; a fly-wheel, 14 feet diameter, 6 arms, rim 5 inches×6 inches=30 inches section; 2 sheaves, each 8 feet diameter, with 4 inch grooves; 880 feet of 1¼-inch wire rope, breaking strain, 54 tons; loaded strain, 3 tons; 2,400 feet of new wire rope on hand for use.

Colliery No. 2.—Wiggan & Treibley's Slope.

Inspected January 15, 1870.

Description.—This colliery is located west of St. Nicholas, on the line of the Mahanoy and P. & R. R. R., 8 miles east of Ashland, in district No. 2, on the estate of the Philadelphia city tract. It consists of a slope sunk on the south dip of the Mammoth vein, at an angle of 43°, its section area being 18+24=42÷2=21×8=168 square feet. It contains 2 railroad tracks, of 48 inch gauge, 1 pump track and 1 traveling way. The slope is 600 feet deep; 750 feet of 1⅛-inch wire and 750 feet of 1¼ inch steel ropes are used in the slope, and considered to be equivalent to its task.

I have requested the engineer and slope men to examine the ropes and drum tackle twice daily, so as to be certain the hoisting tackle is safe for men to ascend and descend by, and to exert themselves in every instance to secure the safety of those persons in the mines.

Remarks.—I have inspected the mines, in company with the boss miner, and found many things required some improvement. I direct that to secure better ventilation all the batteries should be plank batteries, so as to effectually prevent air-lakes, and to canvas all the draw-holes; to place an air gate on the east gangway; the pillars to be headed or holed for the air to pass through to the back part of the workings, by bringing the air in by a monkey gangway from the said air gate to the face of the gangway; thence up fresh into the working breasts through these headings and return through the old finished breasts to the fan out-cast air shaft, so as to carry off all the noxious gas and vitiated air that may injure the miners'

health, and afford him relief from powder smoke and unhealthy vapor. I directed the enlargement of the air-courses and headings on each department of the mines so as to conform in their areas to that of the out-cast shaft, that friction may be, by this means, greatly obviated, and allow it a freer transit on its passage outward; to place an air-door on the Holmes east gangway, and drive up a sloping air-course to the steam air-course, which should be an overcast; the air comes out of the east Mammoth gangway; a door must be put on the west Mammoth gangway, and by this means the air can be forced to the fan out-cast by an over-cast or air-bridge on the slope, which I find this bridge now closed with *debris*, and directed it to be made larger and kept open. In this way the ventilation of the mine can be effected. The air-hole in the first breast should be of an area not less than 60 square feet.

Each pillar should be holed in three different places; the upper one of which to be kept open, the others closed after the breasts are finished, and all the air out-cast to communicate at the fan out-cast. The dog-hole or monkey gangway is thrice too small; part of the west side should be ventilated when working across the runs, the air passing to the face of the out-cast near the slope. To place a door on the gangway ahead of the air-hole, and clear the gangway of smoke, and drive it into the monkey gangway, to pass off at the tunnel mouth on the Skidmore vein gangway to the Holmes vein, and thence to the fifth breast and through four pillars to the fan out-cast shaft, its section area should be 47 square feet on both sides; the out-cast air shaft should be 72 square feet area. The miners complained of the trouble they sustained from powder smoke, but this evil was to be remedied soon; used no safety lamps but will soon need them.

Gangways.—There are 6 gangways working on this colliery. Three veins are worked on this colliery, the Mammoth, which is 18 feet thick, the Holmes is 14 feet thick and the Skidmore 10 feet=42 feet thick; 5,880 feet of gangways open to date; —— feet extended to this date; ——, total length of gangways.

Engines.—One 60-horse for slope use, one 60-horse double acting steam pump in the slope, one 40-horse used at the breaker for preparing coal and a 6-horse steam fan ventilator; this fan is inadequate and should be double this power for to be effective. All my instructions were to be carried out to satisfaction, and the health and safety of men to receive better attention; the engines, machinery and all their appointments were to be put in safe condition, and all the officers of the colliery instructed in their duties, and required to discharge the same as the law directs.

No. 3.—Bear Ridge Colliery.

Description.—North Gilberton, Boston and Mahanoy coal company. I inspected this colliery January 28, 1870. C. W. Kevysley, trustee for owners. This colliery is 10 miles east of Ashland, on the line of the Mahanoy and P. R. R. R. It consists of a new slope and drift. I found no ventilation in these mines; the smoke was in such volume the men could not work in it, and found no air to dilute or remove it. The condition of things generally was not creditable to the boss miner; I had instructed him how to succeed to ventilate the mines and relieve the miners, who truthfully complained of their condition. I found no means of ingress or egress except that in the slope. The air-hole in the thirtieth breast is closed with *debris*, and no access is had to the surface by it. John Dyer and Mr.

M'Grath, miners, know of no possible escape in the event the slope should close. A sump is constructing on the small vein east of the tunnel, of a capacity of holding 3,620 gallons of water. The new slope is sunk 330 feet deep on the E vein, having but one track at top and bottom, and 2 do. in its centre, where cars pass other on their course; a stepped traveling road is made in the slope; the old slope is now used for a pump road.

Ventilation.—A 15-horse power steam fan is used, but the manner in which the air-courses are driven, and their contracted areas, does not afford of a sufficient passage for air. An attempt has been made to get the air into the faces of the working places, but this is mostly a failure. The steam pump exhausts into the up-cast air-course; crosses over the new slope and thence out by the fan. The leakages are of such character that the effort at fan-ventilation is futile at present. I desired a change to be made at once which would effect the needed relief.

Engines.—A 50-horse slope engine, two 80-horse engines, a 200-horse pumping engine and a 15-horse fan, and a 50-horse pumping engine and a 50-horse breaker engine—in all 6 engines, with an aggregate horse power of 525 horse, with 16 boilers, each 36 inches by 36 feet long; 216 square feet of grate surface; 1,000 feet of $1\frac{3}{4}$ inch wire rope in use; its breaking strain=54 tons.

Remarks.—The coal is mined from the E vein. At present about 220 hands are employed; some 20 mules and 60 wagons are in use. Owing to the Mahanoy railroad passing over 5 of the breasts, it is a matter of great concern to have this place strongly secured to prevent an accident to passing trains, and too much vigilance cannot be exercised in this matter, as the result of an accident to passenger trains would result very seriously. The condition of ventilation is also demanding attention. Instruction to relieve these cases has been given and requested to be at once prosecuted with vigor, and will often receive our attention until the proper security is effected. (Dec. 22, 1870.) A pump and out-let is completed and has commenced to sink a new lift in their present slope. A joint stock company operates the colliery at present, the former firm retiring from the business. The management of the work goes on as formerly.

No. 4.—*Inspected March* 3, 1870.

Description.—Savage & Althouse's Tower City colliery is situate near Tower City, Schuylkill county, on the estate of Messrs. Monson & Williams, of Utica, New York State. It consists of a slope, sunk 85 yards deep on the Lykens Valley vein, dipping north 56°. The slope is in good condition. The engine house was destroyed by fire in February, but promptly re-built, and is constantly in operation. The coal on the east side gangways is improving. The condition of the mines is satisfactory, and mining operation is generally considered safe.

Engines.—Same as last year. Four of 115-horse power, with the addition of a 10-horse fan engine for ventilation purposes, which is now fitting up. Four good boilers, considered safe. A further report of this colliery will be found in connection with the report of inspector Edmunds, of district No. 3.

No. 5.—*Inspected March* 3, 1870.

Description.—Savage & Kauffman's Brookside colliery is situate near Tower City, in Schuylkill county, on the estate of Messrs. Monson & Williams, of Utica, York State. The colliery consists of a slope, sunk on the north dip of Lykens Valley vein 450 feet deep. Is now two years in operation. The market out-let at present is by P. and R. R. R. The company intends erecting a steam fan to ventilate the mines, and are doing other necessary improvements to benefit the condition of their miners.

Engines in use.—The same as those of last year, i. e. two 60-horse steam pump used in the slope and a 50-horse used at the breaker. Two 60-horse hoisting engines and a 4-horse feed pump=6 engines=294 horse power, with 4 good boilers, 34 inches×30 feet long. Their condition is considered safe. The machinery and all other appointments are in good order. A speaking tube is used in the slope, and every necessary precaution is taken to secure the comfort and safety of the men. An out-let traveling road is made in the air-course.

No. 6.—*Inspected March* 8, 1870.

Description.—Tamaqua Company's Reevesdale colliery, situate one mile west of Tamaqua, on the company's own estate, and operated by them. The colliery consists of a new slope, sunk 420 feet deep on the O vein, dipping 74° north, having 2 tracks of 56½ inch gauge. A pump slope is just finished, and are at present driving a tunnel to the P vein, 50 yards west of the slope, and running south to it.

Engines.—Two 60-horse engines in use, to hoist and pump by; a 6-horse feed pump; a 30-horse breaker engine and a 30-horse dirt plane engine; in all 4 engines of aggregate power=120 horse; 8 new boilders, each 34 inches×30 feet long, with 106 square feet grate area. Water is so arranged as to be safe.

Ventilation is effected by an air-hole at present; its condition is not quite satisfactory.

Remarks.—The R and O veins are the only veins worked at present; the R vein is 10 feet thick; the O vein is 12 feet thick. The colliery is located a great height above the water level, on a switch-track of the V. R. R. The colliery is now included in the first district, and will be classed in the reports of that district hereafter.

No. 7.—*Inspected March* 14, 1870.

Description.—Eschelman & Patterson's Grant colliery, situate east of Mahanoy City, on the estate of Delano company. It consists of a drift opening. drove north to the B vein, or Buck Mountain vein, above water level. The condition of ventilation was complained of, and having investigated the cause I found scarcely any ventilation, but a delay in driving out an air-hole to the surface was found to be the cause. I found miners at work in the tenth breast on the east gangway, driving up a breast, which was intended to be continued to the surface, and there to erect a furnace. To do this required more time than the proper ventilation could admit, and hence the cause of complaint. I directed that the breast should be worked up narrower, until the surface could be reached sooner, but finding

it had to pass through 70 yards of solid rock, I was agreed upon to treble shift the ganway 60 yards farther, to the Alter rock, to a point where the vein cropped out on the surface, and there open a permanent air-hole for all purposes, but this arrangement was again abandoned and the continuation of the No. 10 breast was adopted, and to pierce the rock to the surface, where it was finally decided to erect a 20-horse power steam fan. To this condition the miners seem to agree, as there was other air-holes outside. No. 10 breast, if repaired, would greatly assist the ventilation of the mine, until the completion of the large air-hole. This course was next agreed on by the boys and men, as there is scarcely any noxious air or gas evolved. The ruling complaint is powder smoke, and this evil is promised to be remedied. Otherwise the mining operations are considered satisfactory.

Engines.—Only one 25-horse engine in use at the breaker, with 2 good boilers, whose condition is considered satisfactory. The water is so arranged as to be supposed safe from danger to the hands employed in the breaker.

Remarks.—I am to continue my attention to this colliery until a satisfactory ventilation is effected, and will insist on its speedy completion.

No. 8.—*Inspected March* 23, 1870.

Description.—G. W. Snyder's Pine Forest Shaft colliery, situate near St. Clair, on the estate of Wetherill, Seitzinger and others. The colliery consists of a shaft sunk 100 yards deep on the E vein. The Seven Feet vein is opened to by a tunnel driven 43 yards south and 100 yards east of the shaft, on the same level. Both these veins are worked eastward for a considerable distance. I found ventilation considerably deficient. The heavy rains which prevailed at the time injured the old works, causing portions of the same to give way, which ultimately closed the fan out-cast air-shaft; this caused the ventilation to become bad, and the large quantity of gases evolved rendered the mines unsafe at the time; the heavy drainage in the next upper level required to be tapped by bore-holes, to take off the water, to enable the out-let air-hole to be open in solid pillars some 1,000 yards east of the shaft, where it was decided to remove the fan to, and relieve the condition of ventilation in all the eastern parts of the mines. A serious crush of the E vein impeded the driving of the east E vein gangway, and this caused the locality to fill with fire-damp; I removed the miners thence and directed their employment elsewhere; from the crushed condition of the vein, I suspended the driving of this gangway eastward, and ordered a cross-cut to be made from the seven feet gangway 60 yards ahead of its face into the E vein, and there drive the E vein gangway west and east, close to the top rock, so as to avoid a further crush or sit of the coal, and ventilate this operation with portable fans until the steam fan was put in effective position, and further forbid the opening of any breasts in the crushed district on the E vein at present. The water rushing from the bore-holes flooded the gangways a few days, and this caused the great accumulation of gas in the mine. It was unsafe for miners to work in any part of it for some time; and yet safety lamps must be used. There are four old levels over the present one, and these extensive openings cannot for some time be properly secured from the effect of accumulation of large bodies of gas, though exertions are now making to cope with this grievance; the use of safety lamps is constantly necessary and must be resorted to. The air

could not be measured for want of motion, and, in fact, there was no regular ventilation, and the situation of the miners was a critical one in this particular case. The colliery is now included within the collieries of the first district, and will be noticed in the report of that district.

No. 9.—*Inspected April* 25, 1870.

Description.—Atkins & Brother's Furnace colliery is situate near Gilberton, in the Mahanoy valley, on the estate of the late Stephen Girard. The colliery consists of two openings or drift levels. The veins are those of the E vein, dipping 45° south. The east gangway on the east drift is worked out and a counter-gangway drove north. The vein forms a level for some 80 yards, at which point the seam suddenly dips north, at an angle of 50°. A track laid in the breasts, which forms what is termed chambers. The pillars are holed for air-courses, and also tracks to convey the coal to counter-schutes; from thence through the old gangway to the breaker. The coal is 21 feet thick and of excellent quality. The character of the top rock is solid conglomerate, and mining is considered a safe operation. The pillars are 40 feet thick. There is scarcely any water in the mine.

Ventilation is effected by an air-hole. No fan or furnace needed so far. From the 7 foot gangway, the east and west sides of the mine, the height to the surface on the east side in the air-hole is 30 yards. Not more than one-half the quantity of air needed furnished by the present mode. Intends to drive breast No. 11 out to the surface and use it for an air-hole. This is in 50 yards of solid rock, and open with two headings. The air traverses the mine by atmospheric influence; hence no proper mode of ventilation secured.

Remarks.—The water runs out 760 yards to the tunnel N. 73° W. A furnace is to be erected on the 7 feet vein. The plane is 200 feet long. The evil complained of was powder smoke, which could be removed by a good furnace. Mining privileges extend a mile north, and an extensive coal field is open here. A force similar to that of last year is employed. In other respects the condition of things is satisfactory.

No. 10.—*Inspected April* 27, 1870.

Description.—G. H. Potts & Co.'s Diamond Slope colliery, situate near Minersville, in Wolf Creek, is now 37 years in operation, on the estate of J. P. Brock, Brother, Cummings and others. The colliery is now included within the Third district, and will be enumerated in the report of that district hereafter. This visit was occasioned by the disaster which originated by the explosion of a boiler at the breaker on the morning of the 22d April, which resulted in the death of John Kelly, (a boy,) William Keoch, Richard Hennesy, (boy,) John H. Kœlle, (boy,) and Mr. Given—5 persons; and the injuring of John Combs, John Sheaffer, Christian Weaver, Thomas Campbell, Jacob Friler, Jacob Molley, Bernard Mohan, Alexander Leybach and John Sheaffer—5 boys and 4 men. This fatal occurrence was supposed to be occasioned by a scarcity of water in the boilers and an incompetent engineer. The statements of witnesses and verdict of the coroner's jury in the above case are on file in the office of the district clerk.

Gangways.—I find 5 lifts sunk on this slope and 10 gangways open, their

aggregate length being 9,500 yards, all of which appear to be in ordinary condition. 17 breasts are now working, and mining operation in this mine is considered safe.

Ventilation.—The steam is in use and a considerable quantum of air circulates in the mine, but its great distance from the down-cast through the various districts and out to the fan is such that much of it is lost on its course, and heavily loaded with noxious air on its return at the out-cast. The air was found by measurement to be 5⅝ times slow.

Remarks.—I desired to double the doors on the Reese Davis gangway, and head all the pillars at the breast-heads for the air to traverse through on its outward course, each breast to have 2 schutes. Miners should keep a Davy lamp suspended at the top of the gangway to warn them of fire-damp, as a large portion of gas is evolved. The lamp must be cleaned and examined daily to insure safety. Mr. Baddow is charged with the management of mines, lamps and miners, and his duties in these premises are prescribed to him. I think him a competent and careful man, and one who is much needed.

No. 11.—*Inspected* ——— 31, 1870.

Description.—E. S. Silliman's colliery, situate near Mahanoy City, on the estate of Biddle, Dundas, Troutman and others; is in operation 10 years. It consists of 6 drift gangways, all of which run in west. The company is sinking a new slope on the south dip of the Skidmore vein. This slope once completed will constitute this colliery one of the best in the region. The destruction of the colliery building last winter caused a serious delay to the completion of the slope and a loss to the company of $60,000, besides a severe loss to the community.

Gangways.—I find, by examination of maps, there are over 12,500 feet of gangways open, and the character of mining done is mostly robbing back pillars, etc.

Ventilation.—The air I find passes in on the 3 lower drift levels as intakes; in No. 18 breast an air-hole passes up into the middle level; thence up into the upper level, airing all these levels by the action of the atmosphere. I found considerable smoke in the mines, and, therefore, ordered a furnace to be erected 250 yards further west from the face of the upper gangway. By very little expense, a furnace could ventilate the place well. The complaint of the miners about air was correct, but this evil was to be shortly remedied.

Remarks.—Two doors are to be put up near the brattice on the 16 feet vein gangway, and will drive an air-hole from one of the breasts into the upper level, and collect the air to the old breasts and thence out to the surface; will drive another from the bottom of the counter level and air the face of the work and return thence to the new furnace. For want of a current I could not measure the air and scarcely any ventilation was perceptible. The miners truthfully complained of smoke, but the boss promised to remedy this evil in a short time. The colliery being a water-level colliery, needed nothing more than sufficient air-holes of proper areas and check-doors to turn the air into the out-cast air-courses.

No. 12.—*Inspected April* 1, 1870.

Description.—Messrs. Nutting & Lewis's Swatara colliery is situate west of Donaldson, on the estate of the Swatara coal company; is 10 years in operation. It consists of a slope sunk on the E vein, 107 yards deep, dipping 25° south; its section area 184 square feet, having 2 tracks, a pump and traveling road; is well timbered throughout. There are 3 gangways open in the mine, and find they exceed 1,800 yards long; the E vein is split into two veins; the partition rock is solid and 6 yards thick. The Seven Feet and Four Feet veins are also worked. The south E vein is separated from the Seven Feet vein by 12 yards of solid rock, and the Seven Feet is separated from the Four Feet vein by 13 yards of solid rock. The rock benches are reliable and the character of mining in this colliery is considered a safe operation. There is no gas of any consequence found in the mines. The aggregate thickness of coal in the 4 veins=35 feet. The company has complied with the requirements of the law, in erecting a 15-horse fan and opened a traveling road in the small vein, having its entrances in the tunnel and at the surface west of the slope; sufficient air-gates erected in the gangways to force the air forward into the working places; the drainage is perfect; the roadway and switches are in good order. After interrogating several miners on the average condition of the air, they all admitted it to be very good.

Engines.—Three steam engines=155-horse power; 7 boilers, which when last examined were said to be safe. Water is so arranged as to be considered safe, and all other necessary precautions receive due attention.

Ventilation.—A 14-feet fan is now in operation, having perfect control of the mines; 2 new cross-holes are opened in the dividing slate, to admit a proper supply of air into the mines, each having an area of 26 square feet. I find the mines well supplied with air and properly separated in splits, etc.

Remarks.—The slope is well protected. A new 1¾ inch wire rope=54-tons strain, is now in use. The drums are protected and the machinery and fixtures receive such attention which renders general satisfaction, and every necessary endeavor is being made to comply with the requirements of the law.

No. 13.—*Inspected April* 3, 1870.

Description.—Emanuel Bast's Union colliery is situate 1 mile east of Ashland, at Big Mine run, on the estate of the ———. The colliery is 17 years in operation. It consists of 4 openings, i. e., a slope and drifts. The slope is sunk in two lifts of 822 feet, on the E vein, dipping 46° south, with an additional 150 feet from its mouth to the engine house. Its section area is=174 square feet. The new lift is but recently completed. The vein is 40 feet thick. There are 2 roadway tracks, one pump and one traveling way in the slope. The workmanship of the slope and gangways is substantial. Its drainage is effected by a 60-horse steam pump of two 16-inch columns. Three drifts are operated in connection with the colliery, each run in east, and its coals are conveyed by means of schutes and teams to the breaker. A tunnel drove north will open the Skidmore vein. The colliery and all its appointments appear to be in proper condition.

Gangways.—There are 5 regular gangways open in the mine. Their ag-

gregate length estimated at 18,000 feet, working a large number of breasts. The character of mining done here is considered a safe operation.

Ventilation.—A 20-horse steam fan is in operation, having its out-cast air-shaft from the lower lift to the water-level gangway. Here the fan is located. The section area of this air-hole is 59 square feet, and the area of the conducting air-courses exceeds 27 square feet each. These areas are considered large enough for present use.

Engines.—Seven steam engines in use—their aggregate power=397½ horse, with 20 boilers. When last examined were considered safe. The water is so arranged that under ordinary care they are not in danger of explosion. The machinery and all their appointments are well secured and receive due attention.

Remarks.—I found ventilation slow in the west gangway. A new air-hole is now driving on the lower side of this gangway, and shall come to an outside air-course to a brattice and connect there; then collect this air by a door that will force it into the face of the works; thence to return through the breast by the headings to the conducting air-course in that district. I found some fire-damp in breast No. 7; found no headings holed but one. I directed a heading to be opened from breasts No. 6 to No. 7, and forbid the use of naked lamps in this locality. I directed the boss to have all the safety lamps carefully cleaned and examined and enforce obedience to regulations. Breast No. 2, on the east side, crushed in and closed the manway; so also did No. 3 breast. The vein is now in soft coal and the air poor for many yards in. I desired the air to be brought in by the gangway to a point where this fault ends, and thence turn it into an air-course in the strong coal, cross it over the gangway, and use it after as an intake air-course. I desired some miners to inform me in the event of a failure on part of the boss to make desired and needed improvements. A favorable opinion concerning ventilation would be out of place at present.

No. 14.—*Inspected April* 12, 1870.

Description.—Messrs. Cain, Hacker & Cook's White Ash colliery, or Otto, No. 1, situate near Muddy Branch, 8 miles west of Pottsville, on the estate of the Forest improvement company. This mine is in operation some 31 years. The colliery consists of a slope sunk; two lifts on the E vein, dipping 22° south; the slope is 250 yards deep; the new lift is 130 yards deep. Mr. Thomas Schollenberger is agent. A tunnel drove 150 yards north of slope opens a small vein, the dividing slate of which is 22 yards thick. The stratas are confused and the vein somewhat irregular. The coal in the E vien is 10 feet thick, and that of the small vein 5½ feet thick. The character of mining is breast work and lobing; and this is conducted on a safe plan.

Gangways.—There are six gangways open in the mine; their aggregate length, 12,500 feet; and their condition as to safety is satisfactory.

Engines.—There are 4 steam engines in operation, with 8 boilers; when last examined was considered good; the water is so arranged that they are expected to be safe.

Ventilation.—The slope is used as a down-cast; a 15-horse steam fan; the air passes in the old west gangway to the 22d breast; thence, through the gangway to its terminus, returns east through the breast to a cross-hole near the over-cast in breast 22, and into breast 21, and down to the gangway; thence on to a tunnel 22 yards north to the back vein, it airs

this vein westward and passes up in the inside breast; thence east through these breasts to a cross-hole and out to the fan. The pillars are holed every 20 yards their length, with a main air-course at the tops of the breasts to remove any noxious gas that may evolve; 200 more yards of gangways are open since our visit, July, 1869.

No. 15.—*Inspected April* 13, 1870.

Description.—Cain, Hacker & Cook's Otto, No. 2, colliery, situate one-fourth mile east of Otto, No. 1, on the same estate, and is in operation for an equal space of time. This colliery consists of a slope sunk 240 yards deep on the same vein as that of No. 1; the new lift is 145 yards deep, and converts this into a new colliery; the vein dips 30° south. The character of mining done here is breast work, and that operation is considered safe.

Gangways.—There are 4 gangways open; their total length is estimated to be 8,000 feet. The character of mining done is breast work in the new lift and robbing out the old level.

Engines.—There are 8 engines in operation on the colliery, with 16 good boilers; the drainage of the mines is effected by a Bull engine of 250-horse power.

Remarks.—The colliery contained a lodgment of water, which it was found necessary to remove, and had to be approached by bore-holes. To Mr. Jamison and Sidney Jaggard was entrusted this duty, the situation being considered safe; and, while at work, the water was tapped unawares. Mr. Jamison, in his attempt to escape, fell on a sheet iron schute, on which he was carried with such violence to the gangway, whilst the water washed the *debris* over him in such a manner as to suffocate him instantly. The schute was 95 yards long, at an angle of 31°. He feared the whole breast gave way and in his confusion met this manner of accident. The jury in this case exonerated the boss from all blame. I had examined the place some time after, and heard the statement of the witness Jaggard, and am of opinion the cause of Mr. Jamison's death was accidental.

No. 16.—*Inspected April* 13, 1870.

Description.—James C. Oliver's Eagle Hill colliery is situated north of Port Carbon, on the estate of Messrs. Mattison & Beaber. The colliery consists of 2 openings. The first is a slope sunk in 2 lifts of 777 feet deep. The new lift is in operation since summer, and promises well. The character of mining here is breast work at present. The shaft is sunk on the anticlinal of the E vein, which is split in two branches; the top bench is 11 feet thick; the bottom on 12 feet do.; the top partition slate is —— yards thick. I find by the estimate of the gangways there are some 6,350 feet openings, besides 2 tunnels=240 feet long. The drainage is effected by a 50-horse steam pump, located in the lower lift of the new slope.

Gangways.—There are 7 gangways open in the mines, employing some 50 hands; the character of mining done is breast work and pillar robbing, and the same is considered safe.

Engines.—There are 6 steam engines in operation at the colliery; their total power is=196-horse, with 12 boilers, some of which I found to be old.

at the time, which I directed to be removed; and on the 22d of September 2 of these boilers exploded; no person was injured thereby.

Ventilation.—The colliery is ventilated by a 10-horse steam fan; the fan is 92 feet west of the shaft; an out-let 30 square area shaft, and is to be enlarged to 75 square feet; a cross-cut to the bottom bench is to be made, at the 20th breast, and to close the others; to put a door at the 20th pillar, and to put 3 doors on each gangway; to use the air in the west gangway; the pillars on the west side are headed every 15 yards up, to afford ample air-way, to supply this part of the mines and give satisfaction.

Remarks.—The new slope is well finished, and adds largely to the value of the colliery. From the manner in which the fan is covered, it cannot work to advantage. The working barrel of the old is split and abandoned. I found some gas in the mines, but not in any large body. A tunnel is driven north 50 feet, to the bottom of the Big vein, or E vein, and 150 feet east of the new slope; the dividing slate is 50 feet thick; the coal is 15 feet thick. A large quantity of coal is lost by the present mode of mining; the top rock is bad; 7 new and 2 finished breasts are now open on the new lift, on its west gangway; an ingress and egress road can be made to the upper level, on the east side, in the eighth breast, and a dog-hole continued to air the gangway; the dividing rock to the North vein is 120 yards thick; several of the miners had been interrogated on the condition of the air, all of which stated they had no great cause to complain.

No. 17.—*Inspected April* 13, 1870.

Lucas & Denning's Glen Carbon North Slope colliery is now included in the collieries of the first district, a description and statistic report of which will appear in connection with reports of the collieries of that district.

I visited the colliery to see what progress had been made respecting ventilation, and found the firm, Messrs. Lucas, Denning & Co., were sinking an air shaft of an area of 75 square feet. They have erected a 20-horse steam fan, 14 feet diameter, situated 80 yards west of the slope, and 25 yards deep to the first level; thence 180 feet west and down 210 feet to the second level, and thence continued down 300 feet to the lower level; which, when completed, will improve the ventilation.

A large new breaker has been erected, of a shipping capacity of 150 cars per day; its engine will be a 50-horse power, which is to receive its steam from the slope boilers, 300 feet distant; a trestle work connects the breaker with the slope, and in case of fire to either building the slope is quite safe from its effects.

This firm has erected another steam fan, of a 40-horse power, at their Oak Dale colliery, on the north side of the basin, and under its influence that colliery is greatly improved. I directed the b s to change its running so as to discharge the air better.

There are 6 new boilers on hand and to be put in use at the Oak Dale colliery. A large Bull pump drains this mine by a slope driven for that purpose. The shaft of this colliery is 426 feet deep. The vein dips 43° north. The condition of this shaft is satisfactory, and mining operation, as it is now carried on, is considered safe.

No. 18.—*Visited April* 22, 1870.

Thomas H. Schollenberger's Mount Pleasant, or Glendower colliery, is also included in those collieries of the First district, and will be reported on in connection with the reports of the inspector of Pottsville district.

I visited this colliery to ascertain the state of ventilation and the safety of the slope, and also that of the ingress road as had been complained of, and found the slope near the surface to be in a dangerous condition, not safe for men to work or ride in, the timbers yielding to side and top pressure. The fan out-let air-shaft was not finished and appeared to be in a bad condition. A suspension of work contributed to delay operations in driving air-courses and a tunnel.

In the line of improvements, two 90-horse engines were put up for the slope, 4 new boilers, each 34 inches×36 feet long. A 20-horse power fan engine was on the premises for immediate use. The colliery is receiving a thorough improvement, and in a short time will be in good condition.

Remarks.—Ventilation is not as yet up to that required by law, though it is found to be tolerable in some districts of the mine, and not until the fan is in complete working condition that ventilation will be properly secured.

No. 19.—*Inspected April* 26, 1870.

Description.—John Wadlinger's Heckscherville colliery is situate in Heckscherville, on the estate of the Manhattan coal company, Major A. B. De Saulles, agent for the estate, &c. This colliery is now included in the First district, and will be hereafter reported on in connection with reports of that district. At present I find the engines, boilers, machinery and all their appointments in good order. The character of work done is principally robbing pillars, which at all times is attended with some degree of danger.

Remarks.—The upper lift is on fire since August, 1869, and apprehension is entertained that if the fire reaches the chain pillars and destroys them, or even part of them, the large body of water that is at present dammed in that level will consequently give way and inundate the whole colliery, the consequence of which might result in a general disaster to all persons employed in the mines, as relief is impossible. This water is shut up in the Jugular vein level. The old slope is sunk on the Crosby vein. The deep slope was not tunnelled on the Daniel vein. There are 80 yards of a pillar between this gangway and the west end of the West Pine Knot gangway, but the fire has reached this pillar and is seriously threatening its destruction. The present firm is robbing out what coal they can. The location of the veins are thus: The Church vein is the most southern; next the New vein; next the Crosby; next the Leller; next the Daniel; next the Skidmore; and last the Jugular vein, with two small veins, lie still more northward. There are 30 pillars standing under the Roman Catholic church property. The Skidmore vein lies under its northern boundary, and the Leller and another vein run through its southern boundary. I ordered a pillar of a 100 yards thick to be left standing east and west of this property, which is completely undermined, and the cemetery is in some places falling in. Maps of this property were requested to be furnished me, but up to this date have not come to hand.

No. 20.—*Inspected April* 27, 1870.

Description.—John Wadlinger & Co.'s Diamond colliery is situated two miles west of Minersville, on the estate of the Manhattan coal company. It is an old colliery and in operation some — years; it consists of 2 slopes; the old slope is sunk on the Diamond vein, dipping 65° south. Its main depth is 462 feet and is still kept in a good state of preservation. A new slope is sunk north of this on White Ash vein. There are 3 veins mined on this colliery. The Diamond vein is 9 feet thick, the Red Ash 6 and the White Ash 6 feet thick. All these veins evolve a large quantum of carburetted hydrogen gas, and the Davy lamps are the only lamps used.

Gangways.—Two gangways=3,000 feet long are opened in the colliery. The character of the mining done here is some breastwork and robbing pillars, which operation is not without some danger, owing to the large amount of gas evolved.

Engines.—Four steam engines are in use. Their aggregate power is= 125 horse; 9 good boilers in use; 1,000 feet of 1½ inch wire rope in use= 35 tons. The wagon and coal weigh 6 tons.

Ventilation is performed by a 10-horse fan, whichr equired some little alteration, and the enlarging of its air-courses is necessary to effect a proper draft and circulation.

Remarks.—I found a few miners employed in the east division. I directed the security of all dangerous places and also to change the position of the fan. An air-hole is now in course of construction up to the old level and use it for a down-cast; the distance to this level is 144 yards. It can be used for an escape traveling road. The section area of this air-course is 27 square feet. Two tracks are laid in the slope, with one pump road and a traveling road. The breaker building is in a dangerous proximity to the slope in case of fire. The ventilation is not as it should be. The boss is preparing to have it improved. The miners do not complain, as promises of better attention to the needed improvement are made, and is expected to be fully up to the requirements of the law in a short time.

No. 21.—*Inspected April* 29, 1870.

Description.—John Lewis & Co.'s Cambrian colliery, situate a little west of Ashland, on the estate of John P. Brook & Bro. The colliery consists of a slope sunk on the west end of the E vein, dipping 25° north. There is no escape traveling road in the mine. The character of mining done is some breast and robbing pillars.

Gangways.—One east gangway, 400 yards in, and it is in a good condition.

Engines.—One 30-horse, with 3 good boilers in use, the condition of which is satisfactory.

Ventilation.—There is scarcely any sort of ventilation established in the mine and the miners truthfully complain.

Remarks.—To improve ventilation, I ordered a monkey gangway to be driven west, and to open it into an upper breast and bring it to the bottom of the up-cast shaft; to drive an over-cast at the slope bottom and thence into the counter-gangway, and communicate it with the old furnace, and use it; to hole heading through the pillars where they pitch. This work was to commence at once. The mines are in ordinary condition. There is no escape traveling road for the men. I directed this much needed road to be commenced soon, to relieve the miners in case of accident to the slope.

No. 22.—*Visited May* 18, 1870.

Description.—John Whitstone's Tamaqua Shaft colliery, situate at Tamaqua, on the estate of the Tamaqua company, and owned by them. I visited this colliery to investigate the cause of John Clark's death. The evidence in this case went to show that the deceased got up from where he sat, with others, and stepped on the bumpers of the last car of an empty train that was passing in the west gangway, and that suddenly the car came in contact with a timber and removed it; that caused the top to run and cover up the deceased so that he was crushed and suffocated by the fallen stuff. The verdict of the jury in this case exonerated the operator and company from all blame—that the getting on the car was the free act of the deceased.

Remarks.—The mines lay idle some time and the operator continued repairs as best he could. The gangway timbers were more or less rotten. The vein dips some 85° north, and crushes are imminent at any moment. The deceased, with others, was re-timbering this gangway and they knew its faulty places, and says the operator was doing all he could with it, and cannot be accountable for the condition of things, as he only lately got possession of the shaft colliery. Further details are not necessary here, as the result of our investigation is on file. The colliery is now included in the First district, and will be reported in connection with that district.

No. 23.—*Visited May* 28, 1870.

Description.—John Whitstone's Tamaqua Slope colliery is situated west of Tamaqua, on the estate of the Tamaqua company. I visted this colliery to investigate the cause of Henry Goldner's death. After due and careful examination, and hearing the statements of witnesses and facts in the case, it was shown he came to his death by being caught in the breaker rolls. The verdict of the jury in this case is that Henry Goldner came to his death by being accidentally caught in the breaker rolls. I also have all the facts in this case on file. The colliery being now included in the First district, a full report of its condition will appear in connection with the report of that district. I directed the mines should be ventilated by a steam fan, and re-timber the bad places in the gangways; to drive an ingress and egress traveling road for the safety of miners, and do other needful improvement as will effect the health and safety of men, and secure the stability of the mines and improve its condition.

No. 24.—*Inspected September* 27, 1870.

Description.—Draper's colliery is situate near St. Nicholas, on the estate of John Gilbert and others, and operated by the Hickory coal company. The colliery consists of a slope sunk 135 feet deep on the north dip of the E vein, in the Mahanoy basin. The tract is 2,000 yards long. A new slope was sunk this year.

Ventilation.—A steam fan ventilates the mines; the in-let to the fan is too small and must, therefore, be enlarged so as to effect better ventilation, and I find the out-let to be too small to properly discharge by; when these changes are made it will improve the condition of the air.

Engines.—A 40-horse engine is used at the slope, with 3 good boilers,

and a 30-horse engine runs the breaker, with 3 boilers; the condition of these engines, boilers and machinery is good. A good wire rope is used in the slope.

Remarks.—I directed the boss to have horns put on the drum, as a neglect of it may result in loss of life. I also directed the fencing in of all machinery, pumps, shaftings and all dangerous places, so as to make it safe for persons to work about them. A 20-horse engine runs a saw-mill, with one boiler. 1,000 feet of 1¼ inch wire rope is used in the slope; its strength is=27 tons. The vein dips 40° north; and its shipping capacity is 100 cars per day, with 210 hands employed.

No. 25.—*Inspected September* 29, 1870.

Charter Oak colliery, near Ashland, on the estate of John P. Brock & Bro., is worked out above water level, and at present abandoned. It consisted of 2 drift levels, which had been operated by several persons these last sixteen years; though by approaching the veins by a slope and tunnel no doubt it may become a profitable colliery.

No. 26.—*Inspected October* 7, 1870.

Description.—Hon. J. Ryon & Co.'s Union colliery is situate in Columbia county, near the confines of the town of Ashland, in Schuylkill county, on the estate of Stephen Girard. It is in operation some 13 years. It consists of drift level working on the Mammoth and Skidmore veins. The breasts are worked 11 yards wide and pillars 6 yards thick. The breasts are worked up 50 yards to the out-crop. The seams dip at an angle of 45°. The slope is 70 yards under the drift and sunk to the water level. The coal is all worked in east of the breaker. A counter level gangway is worked on the Skidmore workings. The breaker is 900 yards from this drift mouth. This vein is worked in west 600 yards, and the drift is used for an in-let.

Ventilation.—I found the condition of ventilation tolerably satisfactory. I recommended the improvement of the air-course. The engines and machinery I found in good order; the boilers are reported to be satisfactory; the water is so arranged as to be considered safe. The general condition of the mines, as regards stability, drainage and inside regulations is good. I intended to present a more extended report on this colliery, the notes of which were unintentionally mislaid, which gave us no little confusion, for which misfortune we offer our humble apology, and hope the foregoing may be accepted.

No. 27.—*Inspected October* 7, 1870.

Description.—Gorman & Winterstene's Delano colliery is situate east of Mahanoy City, on the estate of the Delano land company. It consists of a slope and drift openings. The drift is opened into the Buck Mountain vein on the south; these works are nearly exhausted of coal. The slope is sunk on the north dip of the Mammoth vein, 170 yards deep, on a 25° dip; its section area is $15+18=33\div2=16\frac{1}{2}\times11=181\frac{1}{2}$, the workmanship of which is well done; the coal is 25 feet thick. The Buck Mountain vein

is 9 feet thick; the Skidmore and Gamma veins lie between these two veins, but must be opened by a tunnel from the Mammoth gangway, as they did not out-crop at the surface, owing to the contour of the surface on the mountain side.

Gangways.—The Buck Mountain east gangway is 300 yards; the west do., 75 yards; the east gangway in the slope is in 120 yards; the west do., 125 yards; the area of the section of these gangways is 63 square feet. The character of the work doing is driving gangway and breast work, which is considered a safe operation in its line.

Ventilation.—The drift is ventilated by the action of the atmosphere.

Engines.—A 60-horse engine is used at the slope, with a 14-inch pole pump; 6 new and 2 old boilers are in use; 400 yards of 1¾-inch wire rope in use; a 20-horse breaker engine in use, with 2 boilers; the condition of these boilers is not reported; the machinery and ropes are in good order.

Remarks.—I directed horns to be put on the drum, and also a safe-brake; one of the pinion wheels is much worn; an out-let of 30 feet section is open to the old level, and thence to the surface, but this section of the out-let is too small; I directed the use of a steam fan, and place it on this out-let, but have it enlarged sufficiently for that purpose; the slope requires to be also enlarged from water to the surface, to admit of two tracks for hoisting purposes; I directed the fencing in of all dangerous places inside and out, for the protection of the employees. The present out-let is 120 yards from the gangway face. I have given the boss the necessary instructions to arrange the air in the works so as to furnish a sufficient supply of air and remove the heavy powder smoke, and also do all the necessary improvement that is needed for the health and safety of the hands; some 160 hands are employed.

No. 28.—*Inspected October* 9, 1870.

Description.—Bedford & Coxe's East Mahanoy colliery is situate near Mahanoy City, on the estate of the Delano land company. It consists of a drift, which cut four veins on its water level. The E vein is worked in east and west. The vein dips at an angle of 45°, with breasting 55 yards long and 8 yards wide, worked by one schute each, with 4 yards pillars. The character of mining done here is breast work and extension of gangways.

Gangways.—The east gangway on the Mammoth is in 800 yards; the west gangway is in 800 yards; working several breasts on them; the mining done is considered tolerable safe.

Ventilation.—This is effected by air-holes; the drift is used as an in-let; he air passes in by the gangways, and by divers means is passed through the workings.

Remarks.—I directed the boss, R. P. Jones, to have a schute in the centre of a breast, and open a manway from the gangway to the headings, and continue it each side of the breasts; these breasts are from 7 to 8 yards wide; the pillars from 4 to 5 yards thick; the headings should be made in every 15 yards their length. I desired that batteries on the schutes; that out-lets be made every 150 yards, and keep them in the heads of breasts; by this mode the level can be worked and the place ventilated; employs 120 hands; no gases are evolved; the boilers are reported in a safe condition.

No. 29.—*Inspected October* 14, 1870.

Description.—H. A. Moody's & Buckley's No. 1 colliery is situate near Girardsville, on the estate of Dr. Preston. It consists of a drift, opening on the Red Ash vein. Its gangway is 900 yards in. The character of mining done is extending gangway and breast-work, which is considered a safe operation. 49 breasts are open. They run up 80 to 90 yards; each from 9 to 10 yards wide. The pillars are from 4 to 5 yards thick, with 2 schutes to each, and pillars headed each 10 yards.

Gangway.—The only one gangway runs in west 900 yards. The boundary line is 600 more yards distant.

Ventilation.—This is produced by an 8-horse steam fan. The quantum of air needed is nearly up to the required point, it being in a tolerable condition and scarcely any sort of gas exists.

Engines.—A 30-horse engine runs the breaker. Its attachments and machinery are in a safe condition. An 8-horse steam fan engine, with a 10-feet fan, 3 boilers, whose condition is reported to be good and safe under ordinary care. The water is good and so arranged as to be considered safe.

Remarks.—I directed air in-lets to be open every 150 yards from each other to the surface, which will shorten the column of air and improve ventilation. I find the in-lets too far behind the working breasts. The air is forced in by batteries with canvassed draw-holes, but this plan does not supply a sufficient amount of air in the breasts. It passes inward through the breasts to the inside holeing; thence down on the gangway and returns to the fan. The air should be brought in the gangway from this holeing by a brattice by a door on the gangway outside the brattice, and the return air may go out by the gangway past the brattice. I directed the machinery and all dangerous places about the colliery well secured. A force of 125 hands is employed. Its shipping capacity=to 30 cars per day. The air was not measured.

No. 30.—*Inspected October* 14, 1870.

Description.—Heaton & Brother's Cuyler colliery is situate near Girardsville, in Raven run, on the estate of Girard heirs. The colliery consists of drift openings on the Skidmore vein. The coal is 14 feet thick. Its west gangway is 1,600 yards long. The breasts will be open hereafter with two schutes each, and will have a jugular man-way to each pillar. The breasts will be from 9 to 10 yards wide, with 5 yards pillars, which will be holed at intervals of 15 yards. The air courses are 36 square feet section area. The coal is transported over the L. V. R. R.

Gangways.—1,600 yards long of gangways are open. The character of mining done is breast-work, and the pillars were stripped too much, which may endanger the settling of some portions of the mine. This sort of mining will henceforth be prevented and a safer mode resorted to.

Ventilation.—A 25-horse engine, with a 10-feet fan, ventilates the mine, which is located — yards from the drift opening. The lower gangway is used for an intake; thence into the slant gangway and returning through the workings to the fan out-cast. No gas or smoke prevails.

Engines.—Three steam engines are in use at the colliery. A coal plane engine, of 40-horse power, raises the wagons from the drift level to the breaker. A 40-horse do. runs the breaker and a 25-horse engine runs the steam fan and a small feed pump, with 4 boilers, each 34 inches×30 feet

long. Their condition has been reported to be good. A low water steam jet is attached to these boilers, of the Allen patent. The fan is supplied from these boilers at a distance of 100 yards.

Remarks.—I found the air leaked on the doors and batteries. The coal seam dips from 5° to 18°, which will enable to work the mine by breast-work. Headings will be holed each 10 yards from the gangway, each 25 yards distance; doors to be placed at every fourth breast, which forces the air into the working breasts. To build some crib-works to support the falling rock where the pillars were crushed. The space is 37 yards wide, with no support but the top rock; to door the counter-gangway and force the air into the deep gangway, and hole a heading between the air-hole and first breast on the deep gangway; to battery up the air-hole and force the air forward. The smoke is troublesome to the miners.

No. 31.—*Inspected October* 21, 1870.

Description.—J. M. Freck's Centralia colliery is situated at Centralia, Columbia county, on the estate of the Locust Mountain coal and iron company. It consists of a slope opening sunk 220 yards deep on the south dip of the E vein, at an angle of 45° to 62°. Its section area is 22+28=50÷2=25×9=225 square feet; 2 tracks, 4 feet gauge, with traveling and pump roads. It is well built and is used for a down-cast. The air works in a split east and west. The mine is ventilated by a 15-horse engine with a 12-foot fan. The slope is sunk 2 lifts; a steam pump, 90-horse, drains the mine, and a sufficient out-let west of this slope for miners to travel in.

Gangways.—The west gangway on the lower level is in 580 yards, work-29 breasts; the east do. is in 300 yards; 7 breasts are working in it; these are all full of coal. The character of mining done is extending gangways and breast work, but the mode of working used I objected to as not safe. The drainage and ventilation might be much better. The breasts run up 240 feet. The coal is 22 feet thick, and its quality good. The section area of these gangways is $6\frac{1}{2}+13=19\frac{1}{2}\div 2=9\frac{3}{4}\times 8=78$ square feet.

Ventilation.—A 15-horse engine runs a 14-feet steam fan. The slope is used as a down-cast, and the air splits in east and west, in the gangways, thence up into the breasts and returns through them; on its return to the out-cast shaft a manway is made in each second pillar, but there should be a manway in each pillar. By measurement it was found the air was three times slow.

Engines.—A 90-horse engine is used at the slope, with 8 boilers in use; a 90-horse pumping engine; this receives steam from the slope boilers; a 25-horse breaker engine gets its steam from the slope boiler also; a 50-horse pumping engine is used in the old lift, with the 15-horse fan engine=5 steam engines, with 12 boilers, 2 of which are patched and reported to be safe. 2,000 feet $1\frac{3}{4}$ inch wire ropes are in use; its condition is good; the drum has no horns on it yet.

Remarks.—I directed the security of the drum by horns and break, and all dangerous places fenced off; that all breasts worked by the wagon shall have two schutes, with jugular prop each side of the breasts, and drive manway in all pillars when worked by the yard. The colliery is nine years in operation. The breaker was destroyed by fire in November. 200 hands are employed. The temperature was found by Fahrenheit's thermometer, outside to be 50°, inside, 67°—difference. 17°, which difference is in favor of ventilation; the barometer was outside at $29\frac{7}{10}$ and inside at $29\frac{1}{10}$—difference, $\frac{6}{10}$=to 600 feet depression of —— of rarity of the air.

No. 32.—*Inspected October* 22, 1870.

Description.—Beatty & Garrettson's Girard colliery is situate near Girardsville, on the estate of Girard heirs. It consists of 2 openings. The shaft is sunk 124 feet deep on the E vein to its basin; the seam dips 71° north. The character of mining done is extending gangway and breast work on the east side of the tunnel, but robbing out all the west side, and on the south side of the shaft are robbing out pillars; there the south seam dips at an angle of 45° and the north seam dips 60°; the breasts run up 26 yards to the surface; an air-course is used on top of the gangway; its section is 29 square feet; 21 breasts are now worked in it. A new slope is sunk 60 yards deep on the Six Feet vein; its north dip is 76°; it is intended to have the slope ready for shipping coal in spring; its section area is $15+18=33\div2=16\frac{1}{2}\times10=165$ square feet; the coal will be hoisted to the level of the breaker, and do away with manual labor.

Gangways.—Three gangways are found to be 2,998 yards long, with the east gangway still driving.

Ventilation.—The slope will be used as a down-cast. The air comes in the south dip, goes to the tunnel and splits there, goes west and south through the tunnel to the E vein, splits there and goes in east and west gangways, passes into their face; thence returns by a monkey air-course and communicates again at the fifth breast, and passes up in it to the surface to where it enters a box, 96 yards long, to the fan. This box leaks most of the air, and therefore ventilation is thereby impeded.

Remarks.—Two 60-horse engines are used at the slope, 12 feet drum. The drum is not secured by horns or flanges. A two-inch wire rope is used, with 6 new boilers, 34 inches×by 28 feet long, which receives steam 224 feet from these boilers. The machinery is all good. A drift comes into the bottom of the shaft, and this makes a good ingress and egress way for the hands. I directed a jugular to be open on the west side air-course, and bring the largest portion of the air in where the most hands work. The west side is too contracted, owing to the bad condition of the surface box. Several breasts are open to the surface on the east side. A hole should be open at the face of the east gangway to the surface, which would serve for a traveling way and inlet; when done to put a door outside of it on the gangway at the pillar, and secure it to the surface for a permanent air-hole. A little smoke but no gas prevails.

Engines.—A 20-horse saw-mill also runs the steam fan, with two good boilers. A 60-horse engine works the shaft and also runs the breaker, with 6 boilers, in tolerable condition, and 2 new 60-horse engines used for hoisting at the slope, all of which are in good order. The firm employs 125 hands. The safe traveling road starts from the bottom of the shaft on a water level to the outside, and is an easy and safe passage out.

No. 33.—*Inspected October* 25, 1870.

Description.—Goodrich & Audenreid's Continental Slope colliery. The colliery is situate at Dark Glen, in Columbia county, near the borough line of Ashland, in Schuylkill county, on the estate of Girard heirs. It consists of a slope, sunk 175 yards deep on the south dip of the Mammoth, or E vein, at a dip of 45°. The coal is 35 feet thick. Its gangways run east and west. Their section area is $7\frac{1}{2}+14=21\frac{1}{2}\div2=10\frac{3}{4}\times8=86$ square feet. The condition of the slope is good. Two tracks; 1 pump road is used.

The pump road is secured for a traveling road. These gangways are in good condition. The character of mining done is extending gangways and breast-work. These breasts are 12 yards wide, with 2 schutes to each. Their pillars are 8 yards thick; leaves a chain pillar under the old gangway 15 yards thick. The drainage is good. A 50-horse pump drains the upper lift and a 70 do. drains the new lift.

Gangways.—The new west gangway is in 275 yards; the east do. is in 325 yards, working 15 breasts, 8 of which are finished, with 12 breasts on the west side, all of which extend 90 yards.

Ventilation.—The new slope is used for a down-cast. An air-course is on top of the gangway. The air passes in these gangways and up into the workings and returns by a monkey air-course. It connects 12 yards east of the slope and thence out to the fan. By measurement I found the air to be=7,500 cubic feet per minute. No gas is found.

Engines.—Two 50-horse engines are used at the slope. A 50 do. is used to pump the old lift and a 70 do. is used to pump the new lift. A 25 do. runs the breaker and a 15-horse engine runs a 12 feet steam fan. These 6 engines are=260 horse, with 19 boilers, each 32 inches×28 feet long, which are reported good. 750 feet of 1¾ inch wire ropes are used. The drum is not flanged of a break attached but soon will.

Remarks.—I directed the machinery and all dangerous places in and about the colliery to be fenced off; that the pillars should be headed in each 15 yards up, so as to afford more air; to place a door on the gangway, at the third breast, to supply more air in the workings; to battery the lower heading, and keep the air up in its proper place, and continue this plan, which will furnish a sufficient supply of air; when a door is open the others are closed, which will produce a regular current of air; that no more than ten persons to ride up or down the slope at one time; there is no wash-house or speaking-tube used; 170 hands are employed; shipments are 80 cars per day.

No. 34.—*Inspected October* 26, 1870.

Description.—Robert Gorrell's Hazle Dell colliery, situate near Centralia, in Columbia county, on the estate of Locust Mountain coal and iron company. It consists of a slope sunk 324 yards deep, on the north dip of the Mammoth, or E vein, some 1,340 feet above mid-tide; the angle of dip is 35°; the slope has two tracks, 1 traveling road and a pump road; the present lift is the third; it is in successful operation 17 years; the old slope is used for a pump slope; the character of mining done is extending gangways and breast work; the coal is 35 feet thick.

Gangways.—The new west gangway is in 422 yards; the east do., 353 yards, with 10 yards breast and 7 yards pillars, which are holed every 10 yards up; the breasts run up 95 yards; the section area of these gangways is 6+13=19÷2=9½×8=76 square feet; the drainage is good; the mines and gangways are kept in good order.

Ventilation.—The mine is ventilated by means of air-holes made in the faces of breasts as in-lets, which draw down; an overcast communicates with No. 3 in-let, east; the air goes east in a monkey airway to the face of the works, returns west to breast 12, thence through the working breasts, to the slope up-cast; breasts 6, 7, 8, and 9 are broken through to the old level, and are used as inlets; an overcast communicates with these breasts, which forms an inlet; the air goes west by a monkey air-way, returns east

and up through the breasts to an outside one, thence up the slope; this plan works well; no gas is evolved, and mining is a safe operation here.

Engines.—Two 60-horses engines are used at the slope; 3 5-feet pinions; 2 15-feet drums, wheels; 2 15-feet drums, without flanges; 708 yards 1¼ inch wire ropes; 6 boilers, 34 inches×30 feet each; the engine is 280 feet from the boilers; their condition is reported to be safe.

Remarks.—I directed a door to be placed at each breast, and have a manway in every second pillar, but ought to have one in each pillar for more safety to men; I advised a jugular manway to be made each side of every pillar for safety and ventilation, as coal blocks the present manways, and they should be larger; by measurement the air was found to supply 5,700 cubic feet of air per minute; shipping 120 cars per day; some 250 hands are employed.

No. 35.—*Inspected October* 27, 1870.

Description.—Boylan's Glendon colliery, situate near Mahanoy City, on the estate of the Delano land company. It consists of a slope and drift openings. The slope is sunk 155 yards deep on the south dip of the 7 feet vein, at an angle of 22°; its section area is 14+16=30÷2=15×7=105 square feet, with 2 tracks, 1 pump and 1 man road; its structure is good; the east and west gangways are in 235 yards, working 8 breasts, each 10 yards wide, and 5 yard pillars; an out-let road is on the east side of the slope; a steam pump will drain the mine. The mining done is not satisfactory; the top rock is bad, which exposes the miner to danger; the drift is working, and are driving a tunnel south to the Skidmore vein; 62 yards of a rock seam separates the two coal veins.

Gangways.—The Skidmore gangway is in 850 yards; the 7 feet gangway is in 450 yards; backswitch do. is in 200 yards; the counter do. is in 1,300 yards; the slant do. is in 200 yards; the 2 new gangways, 235 yards; aggregate length, 1,985 yards.

Ventilation.—The slope is used as a down-cast. The air goes in east and west in splits and returns back through the working breasts to the out-cast, 12 yards east of the slope. The west side over-cast communicates at that point. The work is new and a better plan for ventilation is going forward.

Engines.—A 40-horse is used at the slope; 4 new boilers are attached, with 2 old boilers in the same bed; a 15-horse plane engine, with 2 boilers, and a 25-horse breaker engine. These 3 engines=80 horse, with 8 boilers; their condition is considered safe.

Remarks.—The colliery is 9 years in operation. The new slope was sunk this year and other improvements made. I directed horns and a brake to be put upon the drum; a fan will be put in operation; 390 yards of 1¼ inch rope is used. I directed the schutes to be worked with 2 schutes to each, and use jugular manways for miners to travel in, as the top rock is bad and this would be more safe than the present way of working.

No. 36.—*Inspected November* 3, 1870.

Description.—Buckley & Moody's Preston, No. 3, colliery is situate near Girardsville, on the estate of Preston coal and improvement company. It consists of a slope, sunk 50 yards deep, on the north dip of the E vein, at an

angle of 55°; the slope is new, being now sunk to the water level and still sinking it another lift deeper, which is anticipated to be completed in spring. The water level gangway is still going on and making a curve to the east. The character of mining done at present is extending gangway and breast-work, which is considered a safe operation under ordinary forms.

Gangways.—The drift gangway is in 1,000 yards; the area of its section is 70 square feet; the section area of the air-course is only 17½ square feet. This gangway requires some repairing. The gangway has still a run of 400 yards.

Ventilation.—The mine is ventilated by an inlet 1,000 feet from the slope. At this point a door turns the air in a monkey air-way, which is on the low side of the gangway; thence east to its face; returns west and up through the breasts; returns back on the gangway to an inlet door; thence up through the old workings to the face air-hole, where a 25-horse engine runs a 12-feet fan. Ventilation was found too slow.

Engines.—A 60-horse engine is used at the slope. Its drum is secured with horns, and will soon have a brake on; 2-inch wire rope is used; 3 boilers, each 34 inches by 36 feet long, running at 70 pounds of steam; a 25-horse engine runs a 16 feet steam fan. The general condition and appearance of the engines and machinery is good.

Remarks.—The coal from this colliery is conveyed to Preston, No. 4, breaker, by a small locomotive engine, a distance of one mile. A hole is now driving out to the surface; this is intended to be used as an inlet air-hole to shorten the column. This will reverse the air, which first supplies the breasts and goes east to the face of the gangway and returns by a monkey air-way to a door at the present inlet; thence west on the gangway to the double door, which forms the base of the out-cast to the fan. By such a change the doors can be removed and a better circulation effected. Safety lamps are needed, and good firemen, for better safety. Sixty hands are employed. I directed a thorough examination to be made by the fire-bosses, each morning, of all parts of the mine first before permitting any person to enter any working place, and see that each place is really safe for men to work in.

No. 37.—*Inspected November* 4, 1870.

Description.—Maurice Robinson's Coal Ridge colliery is situate near Mount Carmel, in Columbia county, on estate of the Coal Ridge and iron company. It consists of a slope sunk 155 yards deep on the south dip of 43°. The works are just open. The character of work doing is extending gangway and some breastwork. The vein is 15 feet thick and the quality of the coal is good.

Gangways.—The west gangway is in 90 yards, working three breasts; the east gangway is in 180 yards, working four breasts; each breast is 8 yards wide and pillars 7 yards thick. The drainage is effected by water wagons.

Ventilation.—The slope is used as a down-cast; the air goes in the gangways east and west, thence up into the breasts to the face of the work, and returns by a monkey air-way, to the up-cast 12 yards east of the slope, to where a 15-horse engine runs a 12-feet steam fan. Ventilation was found fair, and no complaints.

Engines.—A 90-horse engine is used at the slope; one drum 11 feet diameter, without horns or break; a 25-horse breaker engine and a 15-horse fan engine; both these are supplied with steam from the breaker boilers; 8

boilers are in use; these boilers are new; 400 yards of 1½ inch wire rope is used in the slope.

Remarks.—I directed the out-let to be enlarged to 70 square feet, so as to have an equal capacity of both the east and west air-courses, and to make an out-let road for miners, to sheath the breasts 3 by 3, by putting doors on each third breast, and head the pillars every 15 yards up; to battery the lower headings so as to keep the air in the face of the workings, and also to have all dangerous places fenced off for safety, and make such needful improvements as is necessary.

No. 38.—*Inspected November* 10, 1870.

Description.—Buckley & Moodey's Preston No. 4 colliery is situate near Girardsville, on the estate of the Preston coal and improvement company. The mines are in operation some 16 years; its location above mid-tide is 1,090 feet. It consists of a tunnel 337 yards long; opens the E vein south; the only gangway working is the west one, with 23 breasts on it, which are from 7 to 8 yards wide; the pillars are 7 yards thick; the seam dips from 45° to 89° north; the east gangway has 107 breasts open in it. The only mining now doing is robbing out pillars, &c.; this is the sort of mining done at present.

Ventilation.—A 7-horse engine runs a 10-feet fan; the condition of ventilation is scarcely adequate to supply enough of air; smoke prevails to some extent, but no gas is evolved; the inlet is on the mountain west of the tunnel.

Engines.—A 50-horse engine is used at the breaker, with 3 boilers; their condition is not satisfactory. I desired Mr. Williams, the outside boss, to get these boilers examined and report their condition; to fence in and otherwise secure all dangerous places, machinery, shaft and beltings in and about the colliery, for the security of the hands employed.

No. 39.—*Inspected November* 11, 1870.

Description.—F. & E. D. Denison, St. Nicholas colliery, situate west of Mahanoy City, on the estate of the Philadelphia and Mahanoy company; its elevation above mid-tide is 1,155 feet; the colliery is in operation 14 years. It consists of a slope sunk 122 yards deep on the south dip of E vein, at an angle of 50°. The character of mining done here is extending gangways and breast works; 36 breasts are open on the east gangway, each 12 yards wide, with 5 yard pillars. A tunnel 67 yards long opens the Skidmore or D vein east and west; the west do. is open in 140 yards, working 6 breasts; the east do. is in 200 yards, working 8 breasts; these breasts are 10 yards wide, with 8 yard pillars; the air-hole is open in the 8th breast; the breasts run out to the water level 128 yards; the coal is 14 feet thick.

Ventilation.—The mine is ventilated by a 16-horse engine, running a 12 feet steam fan; the slope is used as an inlet for the west side and returns by an over-cast to the east side of the slope to the fan out-cast. Breast No. 29 is used as an inlet for the east side; the air comes to the face of the breasts and traverses east in them to the face of the gangway; thence returns west to a door inside the Skidmore tunnel, passes up the old works to

the fan out-cast; the Skidmore vein ventilated by a furnace which does not supply a sufficient quantum of fresh air.

Engines.—Two 60-horse engines are used at the slope, and an 80-horse do. for pumping; a 16-horse engine runs the steam fan, and a 60-horse do. runs the breaker and sawmill, and a 60-horse steam pump drains the lower lift; 12 boilers are used, their condition is reported good; 300 yards of 2 inch wire rope in use. The drums are to receive horns and brakes soon. The engines, machinery, ropes and attachments are in good condition.

Remarks.—I directed an inlet to be made in breast 36, east side, on the E gangway; here to open a monkey air-course along this gangway pillar; thence up the breasts by a door and back on the gangway; thence to the crushed pillars; thence up the next breast, and back to the fan; the Skidmore air comes through the tunnel from the slope, to where a door cuts off the communication of the air of both veins, and works east and west by the schute batteries and air-holes, returns from east and west to the out-cast air-hole at the tunnel, up to the old level. The 6th breast on the Skidmore to be an air-hole; here to open a monkey air-course along the east gangway. The timber is too slight, which occasioned a sit in the gangway. I directed the removal of the families that resided in the houses that stood over the sunken ground. The heavy skipping of these pillars caused this crush, and in the event of heavy rains, it may at any time have a serious result.

No. 40.—*Inspected November* 12, 1870.

Description.—George W. Cole's Tunnel Ridge colliery is situated near Mahanoy City, on the estate of the Philadelphia and Mahanoy company. It consists of a slope and drift openings; the slope is sunk 480 feet deep, on a north dip of the Skidmore or D vein, on an angle of 42°; one track serves at top and bottom, and double tracks in the centre, where the wagons pass and re-pass; the gangways turn off east and west. The drift cuts the Sidmore, the 7 feet and Mammoth veins; this work is nearly exhausted of coal, but greatly aids the ventilation and drainage.

Gangways.—I find by its maps there are 7 gangways open; their aggregate lengths will exceed 10,440 feet. The character of mining done is extending gangways and breastwork, which is safely conducted.

Ventilation.—A 10-horse steam fan is in operation to ventilate the colliery. This ventilates the east side of the mine. The slope is used as an intake; the air passes in east; the air is forced up the working breasts by a door on the gangway; the air traverses the breasts; comes down the inside breasts to the gangway; passes in the cross-holes, where a door stands that forces the air up the breasts. The schutes are bratticed with canvas on the draw-holes; it returns to the fifth breast to the old level and up to the fan.

Engines.—A 40-horse engine and two 60-horse engines, with 6 boilers, are in use at the slope; a 10-horse steam fan, a 60-horse steam pump, 9 boilers; 5 steam engines in use, with 15 boilers; 1,000 feet 1⅜ inch wire rope in use. The engines and machinery, ropes and attachments are in good order.

Remarks.—I have given Mr. Lewis instructions to fence off all machinery and dangerous places in and about the colliery, and make the needful improvements for the safety of the hands. I desired the commencement of opening schutes and headings inside of the air-hole, place a door east of this air-hole to bear the air up the schutes to the face of the gangway, and

return it east through this air-hole to the south gangway, where stands a door to bear it west and up the inside breast and return it to where the pump stands, which is the up-cast air-shaft. The air is 3½ times slow, and it is heavily loaded with powder smoke and very unhealthy for the miners to breathe. I investigated the cause of an injury to Patrick M'Mahon, who was run over by a wagon, and found it was his own fault. I have given instructions that not more than ten (10) persons should ride upon an empty wagon at a time, and cautioned the engineer to be strictly particular in his duties.

No. 41.—*Inspected November* 14, 1870.

Description.—Mahanoy and Boston Coal Company's colliery, situate west of Mahanoy City, on the estate of John Gilbert. The colliery consists of 2 slopes opening, sunk on the south dip of the E vein. The first slope is used for a pumping slope. The new slope is 110 yards deep, with 1 track at top and bottom, with east and west gangways. A new lift has been sunk 110 yards deep, at a dip of 47°. Are opening east and west gangways and making a turn-out. The character of mining done in the old works is robbing out loose coal. These slopes are 50 feet distant. A steam pump is used for drainage and a pole pump of two 90-horse engines. The condition of the mine is tolerably good.

Gangways.—The east gangway is open in 860 yards; the west 1,200 do. The distance open is 2,060 yards, robbing back.

Ventilation.—This is effected by 16-horse steam fan, located 12 yards east of the slope. 200 yards from slope a door changes the air into a monkey air-course to the face, and returns back through the works to the up-cast. The west is aired by a cross-cut over the gangway, communicating with this monkey; thence west to its face and returns through the works to breast No. 7, and goes east over the slope to the out-cast. Ventilation is good. No gasses.

Engines.—Two 90-horse engines run the pole pumps; a 40-horse engine is used in the old slope; a 200-horse steam pump, a 16-horse fan engine and a 60-horse used in new slope. Six engines=496 horse, with 10 boilers, whose condition is reported good. 150 yards two-inch and 266 yards of wire ropes. Barometrical observations are, temperature outside, 50°; do. inside, 54°; difference, 4°. Barometer do. 29.6 and $29\frac{5}{10}$, or 22 grains per cubic foot lighter and 4 per cent. of expansion, showing the presence of fire-damp.

Remarks.—The condition of the colliery is favorable, and a desire to comply with the requirements of law is manifest. 150 hands are employed. Shipping capacity at 50 cars per day. Ventilation is improved and find no complaints.

No. 42.—*Inspected November* 21, 1870.

Description.—Lawrence & Merkle's colliery is situate at the Mahanoy planes, on the estate of John Gilbert, 6 miles west of Mahanoy City; it consists of a slope sunk on the north dip of the E vein, at an angle of 55°. The coal is 45 feet thick; the character of work doing is breast and gangway mining; 12 breasts are working, each 12 yards wide, with 8 yard pillars.

Gangways.—The east gangway is in 450 yards; the west do., 395 yards,

with 2 schutes to each breast; section area of gangway, 7+12=19÷2=$9\frac{1}{2}\times 8$=76 square feet.

Ventilation.—Observations by instruments: Outside temperature, 40°; inside do., 60°; difference, 21 grains per cubic foot, and expansion 6 per cent. Barometer, $29\frac{8}{10}$; inside, $19\frac{12}{20}$=400 feet; velocity not known. The slope is used as a down-cast; the air is split in east and west; it passes in the gangways and passes up the breasts by a door; thence returns to the gangway; thence by a monkey air course, and returns to the out-cast at the fan; ventilation is fair.

Engines.—Three engines=105 horse, with 7 good boilers; 300 feet flat chain in use. The condition of these mines is good; the air was found to be 4 times slow and smoky.

Remarks.—A stepped traveling road is made in the slope; some complaints are made of a want of good ventilation; this is to be improved in a short time; 125 hands are employed; shipping capacity, 65 cars per day; this colliery will receive our particular attention.

No. 43.—*Inspected November* 22, 1870.

Description.—Althouse & Focht's Boston Run colliery, situate 4 miles west of Mahanoy City, on the estate of the Philadelphia company. It consists of 2 openings; a drift is open on the upper level, and the coal mined out. The slope is sunk 390 feet deep, on a 39° dip of the E vein; the coal is 25 feet thick. The character of mining done here is extending gangways and breast work, which is considered a safe operation so far as the mode of working for safety, etc.

Gangways.—The east gangway is open in 700 yards, with 10 breasts working, each 12 yards wide, with 6 do. pillars; the west do. is open 780 yards in, working 10 breasts; 14 of these breasts are worked 15 yards wide, each worked by 1 schute.

Ventilation.—A manway is open in the pillars, 6 yards above the gangway to each breast; the air traverses in east and west; thence up the breast to their face, returns from east and west to the fan; no gas, but a large body of smoke.

Engines.—Two 40-horse engines at the slope; 10-horse fan; a 60-horse steam pump and a 40-horse breaker engine, with 11 boilers, whose condition is not reported=5 engines=190 horse. The condition of the engines and machinery is good.

Remarks.—Observations made by the instruments as follows: Outside temperature, 40°; inside, 60; difference, 21 grains per cubic foot. Barometer at $29\frac{6}{10}$; outside at $29\frac{1}{10}$; difference of altitude, 500 feet, or 5 lines; 100 cubic inches will weigh $29\frac{1}{2}$ grains. The modes used to effect ventilation are good enough, but not well applied, else smoke would not be annoying to the miners.

No. 44.—*Inspected November* 24, 1870.

Description.—Pomroy & Rickert's Hill Side collery is situate at Mahanoy City, on the estate of Kear & Patterson. It consists of a drift opening and slope. The slope is sunk 170 yards deep on the south dip of the (so-called) Black vein, the coal of which is 8 feet thick, at an angle of 25° Gangways are just opened in east and west; a second out-let will be open.

west of the slope for a traveling road. The character of mining doing is opening gangway. A tunnel will cut to the Primrose vein. This enterprise will be started as soon as the gangway reaches a point to suit the tunnel.

Gangways.—The east gangway is open in 8 yards; the west do., 10 yards; the work is done in a proper manner.

Ventilation.—The slope will be used as a down-cast and split at the bottom of the slope, and will pass in east and west.

Engines.—A 60-horse engine is used at the slope and a 20-horse engine used at the breaker; 4 boilers supply these engines; the slope engine is 100 yards from these boilers; 2 engines=80 horse.

Remarks.—This is a new slope sunk by the present firm; the drift level was formerly worked by other parties. I desired an out-let to be opened, and to communicate with an out-let on the water level, by making a plank battery on the east side of the hole, which will also be used for an air-course.

No. 45.—*Inspected November* 24, 1870.

Description.—Nevills & Bro.'s Mahanoy City Primrose colliery is situate north of Mahanoy City, on the estate of Kear & Patterson. It consists of a drift opening on the Primrose vein. The vein splits off to the south and east 950 yards from its opening, and both gangways gradually curve, as the basin extends eastward, until finally it meets at its eastern limits near Bowman's drift. A new slope is sunk 75 yards deep to the water level, and 50 yards additional to its bottom=125 yards, on a 35° north dip; the character of mining done here is opening gangways and breast work.

Gangways.—The drift gangway is open in 2,000 yards; the branch do., 1,100 yards; their condition is much improved.

Ventilation.—A furnace ventilates these mines at present. Breasts Nos. 5 and 9 are used as out-lets. The slope is used for a down-cast. Both airs in the drift and slope pass in eastward, and pass up into the breasts by a door, return through the breasts to the furnace out-let. The air was found to be five times slow. Ventilation was not adequate.

Engines.—A 50-horse engine is used at the slope and a 25-horse breaker engine; 6 boilers, in 3 nests; 80 pounds of steam used. Uses 175 yards of 1½ inch wire rope. The condition of the machinery, engines and boilers is favorable.

Remarks.—The slope is used for an inlet for the north dip works; the area of its section is 120 square feet. I directed a door to be placed in where both gangways meet, which will improve the air, and to open headings every 15 yards up the pillars, to improve ventilation, for at present very little can be said in its favor.

No. 46.—*Inspected November* 25, 1870.

Description.—Focht, Whittaker & Williams's East Mahanoy colliery is situate in East Mahanoy, on the estate of the Delano land company. The colliery consists of drift opening. The character of mining done is gangway and breasts.

Gangway.—The top drift gangway is open in 1,500 yards and the other 1,070 yards, working 10 breasts in coal; the coal dips from 17° to 35°; the breasts are open 10 yards wide; the pillars are 5 yards thick.

Ventilation.—The mine is ventilated by the drift, and air-holes open out to the surface every 150 yards distant; as no gas is found to generate the colliery is much safer.

Engines.—A 50-horse engine is used at the new shaft, the drum of which is not secured by flange or break; a 40-horse engine runs the breaker; 4 boilers in use, the condition of which is not reported.

Remarks.—A new shaft has been sunk this year 56 feet deep to the Buck Mountain vein, the area of its section is 19×13=247 square feet. The colliery is now 8 years in operation. 100 hands are employed in about the mines; shipment at 25 cars per day.

No. 47.—*Inspected November* 26, 1870.

Description.—Rumel, Hill & Harris's colliery is situate at Mahanoy City, on the estate of the Philadelphia and Mahanoy coal company. It consists of a slope and drift opening; the slope is sunk 122 yards deep, on a 25° dip, on the south dip of the E vein. The tract contains five workable coal veins. The coal is known to be the best in the region. The E vein coal is 20 feet thick; the G vein is 10 feet thick; Red Ash is 4 feet thick; the J vein 8 feet, and North dip is 12 feet thick. Three water level drifts are in operation.

Gangways.—The slope west do., is open 700 yards in; the south dip do., 2,704 yards in on the Six Feet vein; the top level is in 550 yards. The character of mining done is gangway and breast work, which may be considered safe with a little care.

Ventilation.—A steam fan ventilates these mines. An air-hole is open from the bottom lift to the face of the old lift gangway, which forms an out-let; one breast inside the out-let; a door and brattice change the air. The gangway is open in 100 yards inside this door. The condition of ventilation is slow.

Engines.—One 80-horse hoisting engine in use at the slope, a 10-horse fan engine; a 50-horse steam engine runs the breaker. The condition of the machinery is good, but that of the boilers is not reported.

Remarks.—The breaker was accidentally destroyed by fire last April. I desired schutes and headings to be opened up to the face of the gangway and close the bottom of the out-let, and bring the air in by the gangway to the inside heading, and return the air by the headings and breasts to the out-let, do away with this brattice and door, drive out an air-hole and use a furnace thereon to ventilate the works of the Six and Seven Feet veins. The drum has no flanges or break on. 75 hands are employed, and ship 35 cars per day. Observations made by instruments found the outside temperature 53° and inside do. 63°=10° difference. The new slope is sunk 40 yards below water level and will be sunk 60 yards. Uses 160 yards of 1½ inch good wire rope.

No. 48.—*Inspected December* 2, 1870.

Description.—Bowman & Lence's Copley colliery. It consists of a drift opening, situate east of Mahanoy City, on the estate of the Delano land company. The drift is open in 140 yards south; opened two veins of coal. The Seven Feet vein in coal 14 feet thick, and of very good quality. The

colliery is nine years in operation. It is intended to open another drift on the Buck Mountain vein.

Gangways.—The drift gangway is open 2,800 yards in, working 19 breasts, each 8 yards wide, with 6 yards pillars. The upper level gangway is 230 yards in, with a run of 800 yards to the boundary line.

Ventilation.—This is produced by air-holes and furnace. The lower lift drift is used as an inlet air-course and passes into the upper level, ventilating both gangway works by the same air. No gas in is generated, which makes it safe; but powder smoke prevails incessantly. A change is to be made soon which will effect a better ventilation.

Engines.—A 15-horse engine is used at the breaker, with 4 boilers, the condition of which is not known.

Remarks.—There are 5 workable veins on the tract; the Seven Feet and Buck Mountain veins are the only ones worked at present. It is contemplated to use a large furnace on the upper lift. The 15th breast will be open for an out-let. When this out-let is open the lower level will also have an out-let. Mine water is used in the boilers in place of better sort. I directed these boilers should be examined *every week* so as to ascertain their condition. 166 hands are employed.

No. 49.—*Inspected December* 2, 1870.

Description.—Robinson's West Lehigh colliery is situate north of Mahanoy City, on the estate of the Delano land company. It consists of a drift opening. The company are engaged in sinking a slope. The coal is tolerably good and the improvements are in good condition.

Gangways.—The Seven Feet gangway is open in some distance to a fault; so is the Skidmore gangway in a fault. The Mammoth gangway is in 300 yards; the vein dips 15° south; the coal is improving.

Ventilation.—This is not very well established at present.

Engines.—A 25-horse engine runs the breaker and a 35-horse engine is used at the slope; 5 boilers, 30 inches by 26 feet long; the condition of these boilers is not known. An incline plane, 75 yards long, at an angle of 23°, is used to get the coal elevated to the breaker; 225 yards of 1¼ inch wire rope are used on this plane; 100 hands are employed; intends to ship 50 cars per day.

No. 50.—*Inspected December* 8, 1870.

Description.—Mays & Lewis's West Shenandoah City colliery is situate west of Shenandoah, on the estate of Messrs. Gilbert & Sheafer. It consists of a new slope, sunk 100 yards deep, on an 18° south dip of the Primrose vein; the coal is 11 feet thick. Just opening gangways; a drift is open 600 yards in and has a run of 1,400 yards to the boundary line; 4 veins of coal are open on the tract.

Engines.—A 35-horse engine is used at the slope and a 45-horse do. at the breaker; 4 boilers, whose condition is not stated. No brake or horns attached to the drum; this improvement I have ordered for the better safety of the hands. The coal is transported by the P. & R. R.

No. 51.—*Inspected December* 9, 1870.

Description.—Geo. Johnson & Dovey's Turkey Run colliery, situate east of Shenandoah City, on the estate of Bowers and others. It consists of a drift tunnel 156 yards to the vein. The west water level gangway is open in 184 yards; area of its section is 6+12=18÷2=9×8=72 square feet. The breasts are open 10 yards wide, with pillars 7 yards thick, and are working 8 breasts in this gangway. The east gangway is in 198 yards, working one breast in this gangway.

Engines.—A 40-horse engine runs the breaker and a 10-horse engine runs the fan. The fan is located at the drift mouth; a brattice from this tunnel mouth to where the vein is open and then collected; this tunnel is used as an inlet; the air passes up the breasts and returns back to the fan by the brattice. Ventilation is effected at present in this way, but a change is to be soon made to effect a better way for ventilation. No gas is to be met with; a large body of smoke prevails. I found the air too slow. The condition of the boilers is not known at present; however, instructions are given to improve. The air is too slow and requires a correct plan to ventilate the mine and dilute and remove the powder smoke.

No. 52.—*Inspected December* 10, 1870.

Description.—William Patterson's Hartford colliery is situate at Mahanoy City, on the estate of the late Burd Patterson and Richard Kear. It consists of drift openings, some 1,200 yards west of the breaker; one open in west and the other in east, with counter gangways open on these again; these openings are on the E vein. The tract contains several veins; the present openings are some 80 feet higher than the water level. The breasts are worked by 2 schutes each; an out-let is open on the counter gangway, 80 yards from its face between the first and second counter, to the surface; a furnace is used on this level, the drift being an inlet air-course.

Gangways.—The west gangway is over 900 yards in; the east counter do. is 900 yards in; the vein dips north 29°; the west gangway on lower level is 850 yards in; a tunnel is now in progress east of the breaker, to open the Buck Mountain vein.

Ventilation.—This is supplied by air-holes and furnaces; the air passes in by a monkey air-course to the face of the east gangways; returns thence west through the breasts to a door; thence up to the counter gangway and through these breasts to the out-cast; smoke prevails to some extent in portions of the mine; no gas is to be met with; the drainage is very good.

Remarks.—The colliery is in operation ten years. I find the air-course 7 feet too small; this obstructs ventilation; but defect is to be remedied by increasing the area of the air-courses, which will admit of a more liberal supply of air, as the colliery is above water level; pumps and engines are not necessary, which greatly diminishes the expenses of the colliery; the only engine necessary is a 40-horse breaker engine, the condition of which is very good; the condition of the boilers is not reported; an examination of their condition will soon be made and reported for record.

No. 53.—*Inspected December* 12, 1870.

Description.—George H. Potts's Locust Dale colliery is situate west of Ashland, on the estate of the Locust Dale coal company. It consists of one

slope sunk on the E vein; on its second lift a new pump slope is about to be open; the coal is found to be 26 feet thick; the colliery is 11 years in operation; a fire has done some damage to a portion of the upper works, which still encroaches on other portions of the mine. The slope is 305 yards deep on a 50° south dip; the section area of the pump slope is 7+13=15÷2=10×8=80 square feet. The colliery is one of the best producing mines in the region, and has been successfully worked from its commencement.

Gangways.—The old west gangway is open 1,800 yards; the east gangway is open 900 yards, (this gangway is on fire;) breasts are open 12 yards wide with 8 yard pillars, and run up 90 yards; in coal, 26 feet thick; the chain pillar is left 25 yards thick.

Ventilation.—This is produced by a steam fan; the slope is used for a down-cast; the air passes in east and west, in splits along the gangway; thence up into the breasts, returning through them to the fan out-cast.

Engines.—Two 80-horse engines are used at the slope; a 500-horse Bull engine is used for drainage; cylinder 50 inch+16 feet stroke; a 50-horse engine runs the breaker; a 60-horse engine is used at the dirt plane; in all 5 engines=770 horse, with 22 boilers, which is considered safe; 9 of which have been in use 11 years; 1,075 feet of 1¼-inch wire rope is used in the slope; is soon to be re-placed by a 2-inch rope.

Remarks.—This colliery is remarkable for the large amount of coal produced; the condition of all the machinery is good; it is intended to improve on the plan in use, to hoist out the coal; the coal is transported over the old Mine Hill planes; the Locust Dale basin is one of the best and most regular ones in the region, and might, by proper management, last for a number of years; 75 hands are employed at present, and has facilities for shipping 160 cars per day.

No. 54.—*Inspected* ——— 13, 1870.

Description.—William Kendrick and John Dovey's Keystone colliery is situate at Locust Dale, two miles west of Ashland, on the estate of John P. Brock & Brother. It consists of a new slope, sinking on the north dip of the E, or Mammoth vein, at an angle of 55°. In addition to this a pump slope is also sunk for draining. The coal is 28 feet thick. Area of slope section is 26+30=56÷2=28×8=224 square feet. The character of mining done is robbing out pillars in the old levels above water level.

Gangways.—The top level gangway is open 1,650 yards in; the water level gangway is 1,600 yards in; the north gangway 550 yards and the 6 feet vein do. is 130 yards. The 4 gangways are 3,930 yards. All these levels are nearly worked out and located on the west side of the creek.

Ventilation.—A 30-horse steam fan in use to effect this purpose where the slope is sunk and mining operation commenced. At present the drift is used as an inlet to supply the works and passes up in the breasts, returning by the headings to the fan out-cast. Considerable amount of fire-damp is generated in the mine, but its influence will be controlled by the large steam fan.

Engines.—A 60-horse engine is used at the coal plane; a 30-horse do. at the breaker; a 60 do. at the dirt plane; 20-horse feed pump, two 8-horse steam fans and a 40-horse steam pump; 7 engines=226 horse. 13 boilers in use. Their condition is not reported, but the engines and machinery are

kept in good order. 700 feet of 2 inch and 1,400 feet of 1½ inch wire ropes are used.

Remarks.—The new slope will, it is supposed, be sunk and in operation in July next. This will make one of the best collieries in the region, from the great deposit and character of the coal. The great extent of east and west territory belonging to the tract will warrant it to be a large producing colliery for years. The drum is secured by a break. 100 hands are employed at present. Are shipping 40 cars per day. Their facilities are such as to be able to ship 200 cars per day.

No. 55.—*Inspected December* 14, 1870.

Description.—Myers's Drift colliery is situate two miles west of Ashland, on the estate of John P. Brock & Brother. It consists of a drift, open at the Locust Dale gap, on the Western run of the Pioneer colliery, with its gangway open in east. The character of mining done here is opening gangway and breast-work at present. The gangway opens into Bancroft, Lewis & Co.'s old level. The coal is disposed of in the neighborhood.

No. 56.—*Inspected December* 15, 1870.

Description.—J. R. Cleaver's Excelsior colliery is situate at Ashland, on the estate of John P. Brock & Brother. It consists of a drift, opening on the 6 feet vein, dips 36° south. Its gangway is open some 1,200 yards in; the mine is ventilated by air-holes out to the surface. The second drift is open on the Big vein, on its south and north dip. The colliery is small. The coal is supplied to the town, but shipped by railroad when necessary. Some 30 hands are employed.

No. 57.—*Inspected December* 15, 1870.

Description.—Isaac Burkhard's Black Diamond colliery is situate at Ashland, on the estate of John P. Brock & Brother. The colliery is small and consists of a drift, open on the 8 feet vein. The breaker was destroyed by fire some time ago, after which Mr. B. died, and since his demise the colliery is idle and the premises unoccupied.

No. 58.—*Inspected December* 16, 1870.

Description.—George S. Repplier's Locust Run colliery is situate on the north of Ashland, on the estate of the Locust Mountain coal and iron company, one mile south of Centralia. It consists of drift and slope openings. The slope is sunk two lifts on the south dip of the E, or Mammoth vein, at an angle of 45° to 32°. The area of its section $14+18=32+2=16\times8=128$ square feet. Are opening gangways east and west. The slope is sunk to the basin of the vein 285 yards deep. The section of the air-course is 36 square feet. The outlet is 42 square feet area. The colliery is in opera-

tion 16 years, and has been one of the most productive in the region. The coal is 25 feet thick.

Gangways.—The west gangway is open in 1,800 yards; the other gangways are not described.

Ventilation.—An 8-feet steam fan ventilates the mine, using the slope for an in-take; the air is split at the bottom of the slope and passes in east and west in these gangways; a branch gangway turns off south-west of the slope; the air is again split here and turns to the out-cast.

Engines.—A 150-horse engine is used at the slope; the drum is not secured by a brake or horns; a 20-horse engine runs the fan; a 30-horse engine runs the breaker; a 25-horse do. is used at the dirt plane; 16 boilers are in use; their condition as to safety is not reported, but the condition of engines and machinery is very good; 2,000 feet of 1¾-inch wire rope in use at the slope, and 750 do., 1¼-inch, at the dirt plane.

Remarks.—The steam fan is not adequate to ventilate properly; a steam gauge is used on the boilers; a 16-inch pole pump and a steam pump effects the drainage of the mine; it is intended to use a 12-inch pump too; a self-acting plane is used at present to convey the coal to the breaker; it is intended to do away with this structure and construct a railway in its place, on which a locomotive will be used. I will report more extendedly on this colliery in my next; 100 hands are employed at present, and ship some 25 cars per day; 4 miles of T rail are used outside.

No. 59.—*Inspected December* 21, 1870.

Description.—John Phillips & Co.'s Suffolk colliery is situate near St. Nicholas, on the estate of the Philadelphia and Mahanoy coal company. This colliery consists of some 5 drifts. The G, F and E veins are open in this colliery; 600 yards in on the G, or Primrose gangway, a tunnel opens the F, or Holmes vein, and E, or Mammoth veins. A switch-back gangway is used in a breast on the G vein, in its north dip, and open 200 yards in, working 6 breasts in it. The character of mining done is breast work and opening gangway, which, in this flat mine, is a considerable safe operation.

Gangways.—There are 5 principal gangways, with some branch gangways, in operation; their aggregate length will exceed 5¼ miles; the breasts are generally open 10 yards wide; the pillars are 6 yards thick.

Ventilation.—The modes used to ventilate the mines are by air-holes, open out to the surface. At the centre of the tunnel there is an out-let; a monkey air-way is used on both sides of the tunnel; the area of its section is 60 square feet. Doors change the air up the breasts, etc., and returns by a monkey air-course to the plane; thence along the split gangway to the tunnel, where it splits and passes into the Primrose and Holmes vein works, and to the E gangway, and there goes in east and west and returns to the out-cast. A change will soon be made which will improve the present ventilation.

Remarks.—The colliery is 10 years in operation; the veins run nearly horizontal, and the works are quite extensive; drainage is effected by the natural grades of the vein gangways; the only engine needed is a 30-horse, which is so combined as to run the breaker and saw-mill; the veins dip in some places from 0° to 15°; mining is considered a safe operation in the whole colliery, and I found the management, etc., satisfactory; 175 hands are employed, shipping 35 cars per day; the capacity and ability of the colliery far exceeds this amount.

No. 60.—*Inspected December* 21, 1870.

Description.—Thomas & Co.'s Keely Run colliery is situate north of Shenandoah City, on the estate of Girard heirs. It consists of a slope, sunk 143 yards deep, on a 45° south dip of the E vein. Its coal deposit is unlimited. Several other veins are on the tract. The mine is free from noxious gases. The character of mining done here is breast work and extension of gangways, which, with ordinary care, is considered safe, as the works are well laid out and satisfactorily worked and managed.

Gangways.—The east gangway is open 766 yards in, working 10 breasts each 12 yards wide, with 6 yards pillars, and the breasts worked with 2 schutes to each. The west gangway is open 833 yards in, working 12 breasts same as above. Two gangways are used, one on the top and the other on the bottom slates; the lower gangway is used to open schutes and breasts; the upper one is used for an air-course. This is well laid out.

Ventilation.—The mine is ventilated by a 20-horse steam fan, (16-feet diameter fan.) The slope is used as a down-cast. This out-let is located 12 yards west of the slope, of an area of 72 square feet, and a good traveling road is open 40 yards west of the slope. Breast 18 is used as an inlet; the air passes in through the breasts to the face of the works; thence returns by the top air-course to the out-cast. Breast 20, east, is used as an inlet from the old level and passes up in breast 22, and passes up to the faces of these breasts to the end of the gangway; thence returns by the top air-course to the fan out-cast. By the use of double doors on these gangways the air-current is constantly in motion.

Engines.—Two 60-horse engines are in use at the slope, a 30-horse engine runs the breaker and a 20-horse engine runs the steam fan—3 engines =170 horse; a steam pump of 126-horse, and a 20-horse dirt plane engine. Thus the aggregate steam power is=316 horse, with 9 boilers, whose condition is not reported. The condition of the engines, machinery, tackle, &c., is good.

Remarks.—By way of improvement, a new dirt plane, 150 yards long, has been erected, and a 20-horse engine in use, with 1,500 feet of 1-inch steel rope, with several other improvements made since my first visit, which effects safety for men and property alike. I heard no complaints made by the hands of any want of ventilation and safety. The character of mining done is opening and extending gangways and breastworks. 175 hands are employed. The colliery at present ships 80 cars per day, and has facilities to ship 200 cars per day. Mr. Jonathan Wasley, superintendent and local member of the firm, is a practical manager.

No. 61.—*Inspected December* 28, 1870.

Description.—William Grant & Lee's Plank Ridge colliery is situate east of Shenandoah City, on the estate of White, Jourdan, Bowers & Lloyd. The colliery consist of a shaft opening 100 yards deep, and also a slope open 75 yards east of the shaft, 120 yards deep from the shaft level, with two levels on the slope, each 60 yards apart; dip of vein, 9°; the up-cast is eight yards east of the slope, of a section area 54 square feet. The character of mining done is extension of gangways and breast works, which is considered tolerably safe.

Gangways.—The east shaft gangway is open 600 yards in and now working out the pillars. West gangway is open in 350 yards to a fault, and

are working out the pillars. The first lift east gangway is open in 400 yards, with a run of 200 yards, with slant gangway every 100 yards its length, working five breasts, each 10 yards wide, with eight yard pillars. East gangway bottom lift is 375 yards in, with a run of 300 yards, working branch gangways and breasts as above. The west gangway is open 270 yards in; the wagons are hauled in these flat breasts; the dip increases to 19°, which will necessitate schute works. An immense body of coal is deposited here and will require the operation of years to exhaust it.

Ventilation.—This operation is produced by a steam jet thrown up the shaft in a section of it divided off for that purpose. The shaft is used as a down-cast. The air is divided into splits, passes down the slope to the face of these gangways, passes up the slant gangway workings, returns through these works and thence to the shaft level and out by the up-cast. The steam pump exhausts into this up-cast shaft. The temperature was found by observation thus: Fahrenheit, outside 30°, inside 61°; barometer, outside at 28³ lines, inside 28³ lines=00. Difference of Fahrenheit, 31°; showing the weight of outside air at 569 grains, whilst inside at 525 grains per cubic foot; difference per cubic foot in grains=44 grains; this favored ventilation the depth of the shaft at 300 feet=24.137 pounds per square foot; the area of its section=10×16=160 square feet=3,862 pounds avoirdupoise, while the expansion or ascending power was but 275 pounds avoirdupoise, leaving an exces of 3,587 pounds against ventilation in the shaft alone. The action of the steam in opposition to atmospheric gravity is very palpable. Here the barometer, by observation, was even at a depth of 300 feet. This circumstance is attributed to the presence of carbonic acid gas, which counterpoised the expansive force of the air.

Engines.—A 60-horse engine, used in the shaft; a 30 do. (Duplane) engine on the dirt plane; a 40-horse engine, used at the breaker, and a 40-horse do., in slope; 4 engines=170 horse, with 10 boilers, whose condition is considered safe. 3,200 feet of wire ropes are in use. The appearance and condition of these engines and machinery is very good.

Remarks.—The colliery is 10 years in operation. The coal is 26 feet thick. Quite a large amount of improvements have been made this year. Ventilation is not as satisfactory as should be. Powder smoke prevails to some extent. Promises are made of an improvement and will put the ventilation on a satisfactory footing. Some 250 hands are employed, shipping 90 cars per day.

No. 62.—*Inspected December* 30, 1870.

Description.—Neal Trustee's Shenandoah City colliery is situate at Shenandoah City, on the estate of White, Lloyd, Jourdan & Bowers. It consists of a slope opening on the E vein sunk 772 feet deep, on a 20° dip, and used as a down-cast air course. The coal is 300 feet thick from state to state on this angle. The yield of coal is immense. Three gangways are open on this level.

Gangways.—There are 6 main gangways open on the colliery, with numerous branch gangways run in the breasts; the lower slant gangway is in 172 yards, and another 150 yards; top do. 70 yards in; the back do. 1,100 yards, and a top 200 yards; the east bottom slant do. 1,100 yards, working 45 breasts; the top level do. is in 600 yards; No. 4, water level gangway 1,200 yards in a fault 200 feet; No. 3 drift is 775 feet in. The character of the mining done here is opening gangway and breastworks.

Ventilation.—This is produced thus: The slope is used as a down-cast, and a steam fan=15 horse, which is also used to pump by; a series of air-courses have been opened to remedy the defects in ventilation, which is at present tolerable, though some powder smoke prevails.

Engines.—A 60-horse double acting steam pump is used in drainage; two 50-horse connecting engines are used in hoisting, and a 40-horse engine is used at the breaker; 12 good boilers, with all their attachments, are in good order; the engines, machinery and rope attachments are in good order.

Remarks.—It is proposed to visit these last collieries soon, in order to make a more full investigation of their condition, and ascertain to what extent the improvements have progressed, as ventilation and other needed reforms must be continued to completion; for the present, we will confine our remarks to the above.

No. 63.—*Inspected January* 11.

Philadelphia Coal Company's Colorado colliery, situate east of Girardsville, on the Girard estate. It consists of drift openings operated under the general superintendence of David P. Brown, Esq.; Gen. H. L. Cake, principal member of the firm. A tunnel 120 yards long opens the Mammoth vein; also the Primrose vein; the character of mining done here is opening gangway and breastwork, which is considered to be in a safe condition.

Gangways.—The west lower gangway is still continued; also the east do.; with other different gangways, in all some 7 do.; these 7 gangways measures some 2,000 yards long; a slant gangway is open into the breasts, as back switches into the breasts; this is the principal way coal is mined; a drum operates on the plane; the breasts are open 10 yards wide; the pillars are 7 to 8 yards thick; these veins run flat, so that the wagons may be run into the breasts; the coal is conveyed to the breaker from these drifts by a self-acting plane; the western division of these mines are open to the tract line.

Ventilation.—The tunnel is used for an in-take; the air is split at the end of this tunnel, and works in east and west, forced into monkey air-courses to the face of the gangways; thence up the slants to the breasts, and through them back to the out-casts; a 30-horse engine is the only one used, with 4 good boilers. The colliery is some 9 years in operation, and is one of the best collieries in the county. This company has successfully carried on the works without cessation throughout the year, and its shipping capacity is very extensive; its great advantage over others, it has no gas.

No. 64.

Philadelphia Coal Company's Lost Creek colliery is situate east of Girardsville, on Girard's estate. It consists of a slope opening, sunk on a 65° south dip of the Mammoth vein. A stepped ingress road is located in the slope. The condition of these mines is satisfactory. The coal is 40 feet thick; use a 2¼-inch wire rope in the slope. The mines are worked by gangways running east and west and counter-gangways in the upper lift. The character of work done is opening gangways and breastworks, which is satisfactory. A tunnel is open in one of the breasts and opens the vein on its north dip.

Gangways.—This tunnel gangway is in 1,400 yards, with 23 breasts open, with headings open, each 25 to 50 yards up, and is open into every third or fourth breast on the counter; some panel work is open here; this west gangway is in some 900 yards; are now robbing out pillars.

Ventilation.—A steam fan is erected on the colliery, but a difficulty has arisen which stopped the operation of this fan, so the mine must be ventilated at present by a furnace, which greatly destroys the means of proper and lawful ventilation. Breasts that are open out to the surface act as air-holes. The air traverses the breast workings, but not as satisfactory as might be.

Remarks.—The headings are to open every 15 yards up the pillars to force the air up to the face of the breasts by doors on the gangways. This is an extensive colliery and one that is well governed. Its shipping capacity exceeds 80 cars per day. This colliery is also under the superintendence of D. P. Brown, and the principal agency of Gen. H. L. Cake. No gas is generated in this mine, which is remarkably favorable, and as a productive colliery cannot be easily excelled in the region. No gas is generated in the mine, which is a matter greatly in its favor. Its engines and machinery, engines and boilers are kept in proper order. It is classed amongst the first collieries in the county.

No. 65.—*Inspected* ———.

S. E. Griscom's William Penn colliery, situate west of Shenandoah City, on the Girard estate. The colliery is in operation some six years. It consists of drift and shaft openings. The drifts are nearly worked out and closed. The shaft is quite new; it went into operation last year; it is sunk on the Mammoth vein, 250 feet deep, on a 48° south dip. The workmanship of the shaft cannot be excelled. An ingres and egress traveling road is nearly open to the surface. There are 15 breasts open, each 10 yards wide, with 10 yards pillars. The shaft is protected by a 60-yard pillar on each side for its support on any occasion. The character of the work done is satisfactory, and is done under the immediate supervision of Mr. Griscom. The gangway and openings are well conducted and give me satisfaction.

Ventilation.—This is produced by a 20-horse power steam fan. The shaft is used for an intake air-way. The air is split at its bottom and traverses the gangways to their face; thence into the working breasts and returns through headings in pillars to the up-cast; this up-cast shaft is partitioned off in the shaft which connects the headings air-way with the fan. No gas is generated in this mine, which makes it the more safe and secure. I have given such needful instructions for improving ventilation as seemed proper, the execution of which was to be commenced at once.

Remarks.—I found these works, engines, boilers, ropes and machinery in proper order, with nothing whatever to embarrass the operator. The drift gangways are well ventilated by surface air-holes, and the arrangement for furnishing timber and conveying the coal to the breakers is advantageously planned. Few casualties ever occurred here. The government of the works warrants a security to the employees.

No. 66.

Gideon Bast & Co.'s Big Mine Run colliery is 17 years in operation; is situate east of the town of Ashland, on the estate of the Locust Mountain

coal and iron company. It consists of drift and slope openings. The slope is sunk on the south dip of the Mammoth vein, 525 feet deep. The drift levels are nearly exhausted of coal. The character of mining done is generally robbing out pillars. This was one of the most successful mines in the district, having but few interruptions since its commencement. The colliery is ventilated by a steam fan, which has proved a success in its way.

Mr. Bast is now one of the oldest operators in the county, and always was found able to cope with the difficulties that attend mining business in this section.

A detailed description of this present colliery is unnecessary, as arrangements are making to sink the present slope deeper, and open it into what may be called a new colliery.

The present steam power in use consists of 6 steam engines; aggregate power, 260-horse, with 17 steam boilers, all of which are not reported as to their safe condition, with the water so arranged as to appear safe; 4,482 feet of wire ropes are used. No casualties have occurred about this colliery for a long time.

Few men are so fortunate as Mr. Bast in his line of business as an operator. His works are always managed with safety and care, always enjoying the reputation of having in his employ prudent and practical managers, and commonly a force that highly respects his councils.

No. 67.

Gen. H. L. Cake & Huntzinger's Beehive colliery, formerly known as the Mammoth, operated by Wm. L. Williams. It is situate west of Shenandoah City, on the estate of John Fry. It consists of 2 drift levels, which are nearly mined out. At present the new company is sinking a slope, 65 yards of which are finished, and are opening it to a depth of 110 yards. The section area of the slope, when completed, will be $20+25=44\div2=22\frac{1}{2}\times13=292$ square feet, which will be supplied with two tracks, 1 pump-way and 1 traveling road. This ingress road is partitioned off by planking, to make it safe for miners. The slope is sunk on the E vein, the coal of which is 45 feet thick. This colliery, when completed, will constitute one of the very best in this region. The workmanship of the slope cannot be excelled; the timbers are 14 inches square. Its dip at 45°.

Engines.—A 90-horse power engine is used in sinking, a 20-inch by 48 do. cylinder; one 11-feet drum, with suitable attachments; 1,100 feet $2\frac{1}{4}$-inch steel wire rope, of 75 pounds strain, the balance weight of car and coal=6 tons, with a brake and flange attachments for drum when needed. A new breaker is now in course of construction, whose shipping capacity is equal to 120 cars per day.

No. 68.

Kendrick, Davis & Dovey's Shenandoah Shaft colliery is situate east of Shenandoah City, on the suburbs of the town, on the estate of Bowers and others. It consists of a new shaft, still in progress of sinking, and is at present sunk 250 feet deep, of a section area of $20\frac{1}{4}$ feet by 11 feet=222 square feet. The shaft timbers are 12 inches square and 3 feet asunder, but

the upper 30 feet of the shaft is timbered edge to edge, which imparts to its structure great strength. Two steam pumps are used in the shaft, while sinking; 5 boilers are used at present; 350 feet of 1-inch galvanized wire rope is used, the appearance of which, and the sheave, is unfavorable. The Mammoth vein will be open by this shaft, after which the colliery will then constitute one of the best in the region. No gas is met with in the Shenandoah basin as yet, and this alone is in favor of operating these collieries.

P. S.—The Mammoth has been just opened to-day, January 18, 1871.

No. —.

The Hannon & Farrell colliery is situate near Ashland, on the estate of John P. Brock & Bro. It consists of a drift opening on the Red Ash vein, near Germantown, with east and west gangways opening north and south; in the basin the vein dips at an angle of 18°. The gangways are open 80 yards each; uses a 15-horse engine with one boiler. The colliery is small and new, and much cannot be said of it in connection with this report at present.

No. 69.

Koh-i-noor Shaft colliery is situate on the western confines of Shenandoah City, on the estate of John Gilbert & Sheafer. Leased and operated by Messrs. Richard Heckscher & Co. This firm have successfully operated the Heckscherville and Forestville collieries for a number of years; all of which, of late, have changed hands. Their present colliery consists of an entirely new planned shaft which was adopted from the most approved English plans in all its dimensions, and is claimed to excell in finish and style even anything of its kind in England or Belgium; even the modes used for preparing coal are altogether on a new and approved plan. The E or Mammoth vein was found to be 49 feet thick, and the coal of a superior quality; the angle of dip does not exceed 12°. The shaft is sunk to the basin of the vein, 420 feet deep. The area of its section is $22 \times 12 = 264$ square feet. In sinking, two veins were cut through, one which is 10 feet thick. East and west gangways, 80 feet long each, are open on the Ten Feet vein; the east and west do. on the Mammoth vein are open 140 feet, and are opening air-shafts on each side of the shaft as required by law. The present ventilation is favorable, and from all the plans and facts furnished will continue a proper supply of air, and ingress and egress traveling roads permanently secured for any occasion to the final closing of the colliery. 1,120 feet long of a flat 6-inch broad wire rope is used to hoist both water and coal at the same time; no pumps used. The steam power consists of five steam engines=211-horse power, with eight boilers of new pattern in use, the condition of which is reported as good. In the absence of further details concerning the superior facilities afforded for preparing coal and handling the same, in economy of labor and curtailing expenses, a more extended report cannot at present be furnished, although the firm promised, but failed to forward in time, but must beg to confine ourselves with the present.

Names of collieries not yet examined are as follows:

No. —, Honey Brook, No. 1, of John B. M'Creary & Co.
No. —, Honey Brook, No. 2, of John B. M'Creary & Co.
No. —, Honey Brook, No. 3, of John B. M'Creary & Co.
No. —, Silver Brook shaft, of Hosea & Longstreet.
No. —, Girardsville drifts, of Col. J. J. Conner.
No. —, M'Michael drifts, of Col. J. J. Conner & Sons.
No. —, Girard Mammoth drifts, John Donaldson.
No. —, Maple Dale drifts, Frank Daniels, agent.
No. —, Knickerbocker drifts, Fowler & Co.
No. —, M'Neal slope and drifts, M'Neal Coal Company.
No. —, M'Neal drifts, M'Neal Coal Company.
No. —, Barry slope, M'Neal Coal Company.
No. —, New Boston slopes, New Boston Coal Company.

The above collieries have little or no noxious gas, and are amongst the safest and most extensive in my district. The few complaints made of these collieries compelled me to put off their examination to the latest part of the season, and will be the first to be examined this season.

VENTILATION IN THE SECOND DISTRICT.

20 collieries have adequate ventilation.
30 collieries have moderate ventilation.
14 collieries have inadequate ventilation.

64 collieries have been examined.

19 collieries have not been examined in full in consequence of the suspension in my district, as an examination under such circumstances would be of no avail.

NEW SLOPES SUNK THIS YEAR.

11 new slopes or lifts were finished.
3 new shafts completed.
3 new land sales were opened.

17 new works.

ABANDONED.

4 collieries were abandoned or partly ceased operations, except pumping water.
35 letters were written on official account.
40 letters recorded on official account.
1,650 miles were traveled—520 do. by railroad and 1,130 miles by common roads.
Expenses incurred to date, $1,179 35, in my official capacity.

JOHN ELTRINGHAM,
Inspector of mines.
Per P. F. M'ANDREW, *Clerk.*

EXPENSES.

Inspector John Eltringham's expenses as inspector of Schuylkill county mines from January 1 to May 31, 1870, and Ashland district from 20th September to 31st December, A. D. 1870. 5 months in 1870.

To 1 horse, $200; 1 carriage, $200	$400 00
To 1 set horse harness, $50; stable rent 5 months, at $50 per annum, $20 83	70 83
To 5 months' office rent, at Pottsville, at $85 per annum	35 42
To 5 months' water rent, at $6=$2 50, and $25 gas rent	27 50
To 5 months' horse feed for 2 horses, $450 per annum	187 50
To 5 months' horse shoeing and stable litter, at $45 per annum,	18 75
To sundry expenses, amounting to not less than	50 00
To 3 months' inspectorship, from Sept. 20 to Dec. 31, 1870.	
To 1 anemometer, $50; to 1 barometer, $12 50	62 50
To 2 Davy lamps, $10 00; 1 thermometer, 85 cts	10 85
To 1 $3 tape line and 1 head lamp, 50 cts	3 50
To $16 worth of stationery and printing notifications, &c., $19 00,	35 00
To 3 months' horse feed, $58, and 3 months' office rent, $51	109 00
To incidental expenses incurred	80 00
To coal and fuel, $20; office fixtures, $56	76 00
To letter stamps and letters	4 50
To office books, &c	8 00
	1,179 35

The above is correct to the best of my belief.

JOHN ELTRINGHAM,
Inspector of Mines.

REPORT

OF THE

COLLIERIES OF THE THIRD, OR SHAMOKIN, DISTRICT, FOR THE YEAR 1870.

By David Edmunds, Inspector.

To His Excellency John W. Geary,

Governor of the Commonwealth of Pennsylvania:

Sir:—In compliance with the requirements of an act of General Assembly, approved the third day of March, Anno Domini one thousand eight hundred and seventy, "An Act providing for the health and safety of persons employed in coal mines, &c.,"

I have the honor herewith to submit a detailed report of the result of my inspection of the collieries of the Third or Shamokin district, for which district your Excellency conferred on me the honor of inspector of coal mines, my commission bearing date September 20, 1870.

It was with considerable diffidence and an apprehension of my inability to be able to discharge my responsibilities to the satisfaction of the requirements of the law, that forced on my mind a deep feeling of my sense of duty as inspector of the coal mines of the Third district, at that late period of the year.

Having received but a limited education in youth, excepting that afforded by the school of the mine, I felt the importance of the position more arduous than perhaps my humble capabilities would warrant, and it became still more apparent, if it be considered that the qualifications of the inspector should not only be such as to enable him to enforce the provisions of the law, but that he should also be a person well versed in all the sciences applicable to mining, in order to enable him to give proper information whereever needed, in regard to plans or methods of working coal veins, ventilation, sewerage, machinery, &c., and all with a view to economical mining, and the safety and comfort of persons employed in the mines.

There is no branch of industry which requires and claims the assistance of persons of well trained scientific and practical education, than that of managers in the mining of our anthracite coal. Millions of tons of coal have been lost, and millions of money have been squandered in Schuylkill region, for want of the requisite qualifications in the managers of mines, and, what with the increase of mining, and the augmentation of difficulties encountered in working deep mines, this want is not less felt to-day than twenty years ago.

Resource and Labor.—To waste labor and destroy resources, is a loss to the State, and how to provide for the better qualifications of persons to-

manage the great and costly collieries, which our future wants will inevitably demand before many years, is worthy of profound consideration.

And all parties interested in the wealth of our anthracite coal fields cannot but feel a deep concern for its welfare in the future. It has been estimated and generally conceded that the annual maximum production will not exceed thirty millions of tons. This estimate I believe to be erroneous. Should the flourishing condition of manufacture and the progress of prosperity demand it, with the collieries working steadily, twenty millions tons could easily be produced 1871. In view of the vastness of this trade in future, and its importance as a source of wealth to the State, I am obliged to assume, at a risk of an apparent immodesty, that the "Act providing for the health and safety of persons employed in coal mines," and the appointment of inspectors of mines under that act, is a step in the proper direction. No matter how humble their qualifications and different their scientific training, clothed with authority and impelled by a sense of honor to discharge their duties in accordance with law, the inspectors become, as it were, teachers of mining, and though they may not be capable of imparting to others that necessary instruction, they cannot fail but to have that influence which will cause others to think of and study the principles of mining, and which, eventually, will result to the benefit of all.

I deem the opposition manifested by some persons towards the present mining law to be unjust and unwise. All proper precautions adopted to lessen the danger of the miner has more than proportionately profited the operator of the mine. The source of this opposition is found in that culpable ignorance from whence springs the necessity of the mining law. If there is any class of persons more than others that must need positive legislation for protection of health and safety of life, it is that class who work our mines and dig our coal. I found many collieries in Northumberland county in a deplorable condition as regards ventilation, and those that were employed there did labor in pain and suffering, to the great detriment of health and impoverishment of their families. The subject of ventilation has drawn the attention of modern architects to the subject of supplying fresh air to public and private buildings, and how much more important it is to those whose avocation destines them to labor in deep mines, amid gases, smoke and destructive noxious air and vapor. The frequent cries of these poor miners met me on all sides: "For God's sake afford us relief in providing us better ventilation; we care not so much for other needed reforms as we do for fresh and healthy air; and protect us from the unwarrantable ignorance of those who manage ventilation for us."

I found the collieries in that portion of Schuylkill county which forms part of my district in a much better condition generally, as regards ventilation, than I expected to find them. Among the best of this class was found the Diamond, Otto's, Lower Rauch Creek and the Colket. In the Northumberland county collieries I found the Monitor, A. S. Wolf, Stewartville and Daniel Webster in good condition.

Owing to the short period of time that I have been on duty, and the large number of collieries distributed over a detached and diversified territory, I have not been fully able to ascertain as to what extent of benefits my instructions have resulted. Another circuit of visits of examination will correctly demonstrate how far I succeeded in my efforts to carry out the provisions of the law and extend relief to the sufferings of the miners.

Although I am not without hope, encouraged as I am by some of the most influential amongst the operators, that the requirements and obligations demanded by law will be respected and a compliance with its provisions harmoniously submitted to by the operators and the people at large.

Before another year closes much of the cause of complaint, i. e., inadequate ventilation, which has been justly complained of, will be abated. The glaring statements of casualties claims the friendly consideration of all parties, and a resort to a more prudent course of mining, ventilation and reforms in mine management ought to be resorted to, which would soon remove much of the causes of the present complaints.

DAVID EDMUNDS,
Inspector of mines.
Per P. F. M'ANDREW, *Clerk.*

COLLIERY REPORTS.

FIFTY-FOUR EXAMINED—SHAMOKIN, NORTHUMBERLAND COUNTY, PA.

THIRD MINING DISTRICT OF SCHUYLKILL.

A descriptive and statistical report of the subjoined collieries, their working condition and other information connected thereto, for the three months ending December 31, A. D. 1870.

DAVID EDMUNDS,
Inspector.
Per P. F. M'ANDREW, *Clerk.*

No. 1.

Description.—Enterprise Coal Company's Enterprise colliery, situate near Shamokin, on the estate of Fulton coal company, operated by Wm. James, superintendent and mining boss. It consists of two openings—first, a drift on water-level; a new breaker built for its use. This drift opens the Franklin vein for 420 yards in on its north dip; the coal is 7 feet thick, of a red ash quality. Section area of its gangway is $10+6=16+2=8\times7\frac{1}{2}=60$ square feet. It is intended to tunnel to another vein and work both by this breaker. The character of mining done here is breast work, which is considered safe for miners.

The slope is sunk on No. 10 vein, 1,000 feet north of the drift, dipping 47° north, 100 yards deep, having 2 tracks and a pumpway; its section area is $18+21=39+2=19\frac{1}{2}\times6\frac{1}{2}=126$ square feet. Its breaker is situate 900 feet north of slope. I found a large amount of machinery, etc., exposed, which I directed to be forthwith secured from danger, and make it safe for those employed there.

The location is well adapted for doing a thriving business, under practical results.

Gangways.—The east slope gangway is in 2,925 feet; to its boundary limits, 450 feet more; the coal is 9 feet thick. A slant gangway runs up the pitch 120 feet outside the face, has been started; 71 breasts are open on this division, 12 of which are at present working. The west gangway is in 3,300 feet, having 80 breasts open on it, are now working 8, and has a run of 1,500 feet west; total feet of gangway open is 7,485 feet.

Ventilation.—The modes of ventilation adopted are furnaces, located 30 feet below the surface. The east gangway air-hole is 690 feet from its face, 308 feet in length, from gangway to surface, with a section area of 36 square feet. A brattice on the gangway, to conduct the air in, is found to be inadequate. The same plan has been adopted on the west side. I find all this attempt at ventilation a failure. I found the quantum of air outside the doors to equal that required by law, while the inside of which had no ventilation, and, therefore, I find the fault arises from a want of sufficiency of area of air-courses, leakages on brattices, and a want of its proper application. In a few days a new air-hole will be open to the surface, which is expected to remedy this evil in a measure. I have given absolute instructions how to remedy this evil in future, and will insist on its accomplishment.

Remarks.—The general condition of work done is favorable; quality of coal good; veins regular, with but little faulty ground; a traveling road on the west of slope, and 2 escape roads out by the air-holes; riding in the slope is prohibited.

Engines.—One slope hoisting and pumping engine, 50-horse power; a 14-inch pole pump used—300 feet column attached; an 80-horse steam pump in slope; a 30-horse breaker engine, with 3 boilers, each 30 inches×20 feet; a 30-horse at new breaker, with 3 boilers, 30 inches×20 feet long; 4 slope boilers, each 34 inches×28½ feet long; steam gauges used—pressure at 75 pounds; area of grate surface, 198 square feet; at old breaker, 45 do.; at new breaker, 45 do.; total grate surface, 298 square feet; first engineer, Daniel Hartline.

My second visit on the 12th to investigate the cause of John Devitt's injuries. I found some of the improvements ordered were yet unattended to, and that the new air-course was then nearly through.

No. 2.—*Inspected September* 29, 1870.

Description.—J. B. Henry's Daniel Webster colliery, situate near Shamokin, on the estate of B. A. G. Fuller, trustees. It consists of a slope, sunk 576 feet deep on the Luke Fidler vein, dipping 62° south, of two lifts. Its section area 18+21=39÷2=19½×6½=127 square feet, of 2 tracks and a pump-way, with self-dumping cages used in the slope.

Gangways.—On west side first lift is 261 feet in; the east do. 516 feet in; all nearly worked out. The west gangway on lower level is now idle; is in 573 feet; the east do. is in 1,723 feet, with coal 6 feet thick. Area of these gangways is 9+6=15÷2=7½×5½=43 square feet. A counter gangway, 663 feet long, is open 222 feet above the east gangway; the coal conveyed by a schute to lower level; thence to foot of slope. The land north of boundary line has been leased to allow the extension of the gangway. 13 breasts are working in this division, each 25 feet broad, with pillars 15 feet thick. The character of work done is generally breast work.

Ventilation.—The slope is an intake. The air traverses the main gangway, a portion of which passes up into the counter by the old breasts to

remove the fire-damp evolved there; from the face it is passed through the breasts; thence to an air-hole at face of counter-gangway; thence along the top of these breasts to the main air-shaft and out to the surface. This sort of ventilation is effected by a natural current, or rather by action of the difference of temperatures, there being neither furnace or fan used, and the consequent result is there is very little ventilation effected, though well and judiciously managed.

I instructed Mr. Thomas, superintendent, and Mr. Lewis, boss miner, to enlarge all cross-headings in breast pillars; that should the mining be increased and a larger force employed, a fan or furnace should be substituted to supply sufficient air.

Remarks.—The colliery has been in operation six years. Its boundary runs 1¼ miles. Has a good traveling road for men. Its general condition appears favorable. I have caused prohibitory notices to be posted at the slope to prevent persons from riding up or down while a safe traveling road is available. Temperature outside was 68°; do. inside, 68°; both atmospheres being in equalibrio, hence no ventilation by atmospheric action.

Engines.—S. S. Vaughn, machinist and engineer in charge.—One 80-horse engine used to hoist and pump by; a 16-inch pole pump (old style) in use; 576 feet of column pipe; 2 self-dumping box cages, estimate weight being 4 tons; 725 feet of 1½ inches diameter wire rope in use, and 750 do. 1½ inch do; a 15-horse breaker engine in use; 5 boilers, 32 inches×30 feet long; area of fire grate 60 square feet.

Recapitulation.—One slope, 576 feet deep, south dip 62°; section area 127 square feet; 24 feet tracks; 1,475 feet wire ropes in use; 3 gangways working=2,959 feet; 3,144 feet T rail, of 25 pounds per yard; 2 engines, of 95-horse power; 5 good boilers in use; 13 breasts working; 64 men and 13 boys employed; 7 mules and 15 wagons in use; shipping capacity 60 cars per day; present capacity 30 cars per day; 7 per cent. of fire-damp evolved and 3 per cent. of choke-damp; 2 per cent. of acidulated water.

No. 3.—*Inspected October* 6, 1870.

Description.—William Montilius's Stewartsville colliery, situate east of Mt. Carmel, on the estate of Locust Mountain coal and iron company, 12 years in operation. The colliery consists of one opening, i. e. a slope, sunk 165 feet deep on the E, or Mammoth vein, on its south dip, which touched the vein at its basin, the angle being trifling on the south dip. An adit has been driven in a southerly direction 600 feet, partly in rock and coal, the vein being under the adit in that portion driven in rock, and striking the E vein on the north dip, on which gangways east and west have been driven on the E vein, and by a tunnel, 150 feet long, to the D, or Skidmore vein.

Gangways.—The east and west gangways on the Skidmore vein are each 360 feet long=720 feet, working 18 breasts in them; coal 8 feet thick. The breasts are 30 feet broad; pillars 18 feet thick; coal dips at 45° north. The E vein west gangway is in 2,500 feet; the east do., 1,500 feet, now open, with breasts 30 feet wide and pillars 18 feet thick; dip of coal at face 28° north. The character of mining done here is breast-work and robbing. 17 breasts working. The coal in the east gangway is 18 feet thick, and dips from 3° to 7°; also 2 counters are worked on the E vein on its north dip. The east counter is in 1,050 feet, and has 8 breasts working on it, each 30 feet wide, with 18 feet pillars, its angle dipping 40°. The west counter is

in 825 feet; has 1 breast working in it. The surface hugs this gangway too close to be of much importance, but increases as the extension of the gangway advances westward. The coal is conveyed by a self-acting plane to the main, or E gangway, at a dip of 28°. Mining operations here are—

Ventilation.—The mine is ventilated by a furnace erected 78 feet from the surface, on an air-hole 478 feet long, from the gangway to the surface; its section area=24½ square feet. The means furnished to ventilate the D works are not sufficient to furnish the supply of air required by law, but sufficiently so to gangway face and inner works; a better plan is adopted, and efforts are making to effect good ventilation, which will soon be in practice. The west gangway is ventilated by another furnace on an air-hole 441 feet to the surface, at within 225 feet of the top; the air is conveyed through an air-course, down on lower side of gangway to its face, and thence back to an air-hole; the east gangway works are ventilated by a connection with the east counter gangway, which is aired by a furnace, in an air-hole on its gangway to the surface; excepting the discrepancy referred to in the D vein, I found the mine to be well supplied with good air, scientifically and practically applied.

Remarks.—A large amount of coal is annually mined in this colliery, and with still a large amount to be mined in the E vein, on present levels of both veins, with a long range and breasts ranging some 300 feet. With the care evinced from good practical work, mining here is considered a safe operation.

Engines.—A 50-horse engine is used for hoisting, pumping, and running the breaker, with all their machinery; attached is a pole pump; drum power applied by cone gearing; 4 boilers each 36 inches×30 feet long; a steam gauge in use, measuring from 60 to 75 pounds; area of grate surface, 42 square feet.

Recapitulation.—One slope, 165 feet deep; 4 gangways, 5,595 feet long; 1 plane, 225 feet long; 14,350 feet T rail in use, 25lbs per yard; 3 ventilating furnaces in use; 38 breasts and 6 other places working; inside temperature, 58°; 50-horse engine in use, with 4 boilers; 42 square feet grate surface; 495 feet 1⅛-inch wire rope used inside; about 400 feet of slope rope; 160 men and 75 boys employed; 70 wagons and 12 mules in use; one 16-inch pole pump used, its column 165 long; two coal veins worked, the E and D veins; thickness of coal mined, 26 feet; shipping capacity, 105 cars per day; 4 per cent. carbonic acid gas evolved; 6 per cent. of acidulated water.

No. 4.—*Inspected October* 6 *and* —, 1870.

Description.—F. Rhoades's Coal Mountain colliery situate at Mt. Carmel, in Northumberland county, on the estate of Wilson & Able, in operation 16 years; the water levels and first lift has been worked out and abandoned. It consists of a slope on the E vein, dipping 37° south; its section area is= 135 square feet; is down 2 lifts of 300 and 252 feet deep; its present capacity is 40 cars, and can be run up to 60 cars per day.

Gangways.—The east gangway is in 2,400 feet; the coal good and no timber used; its section area 66 square feet; 9 breasts are now working, of 30 feet width and 18 feet thick pillars; the west do. is in 2,450 feet, with 4 breasts working in it; 6 feet thick of coal at face, dipping 40°; each 32 feet wide and 18 feet pillars, with 6 openings made in every third breast, connecting with water level for the purpose of ventilating 9 gives; a tra-

veling outlet east of slope, with several openings to the water level gangway and thence to the surface by that gangway; distance to the boundary line 1 mile, and from face of west gangway to its supposed termination, 450 feet; 7 per cent. carbonic acid gas is evolved in the west side, to the quantum of air in circulation. The east gangway generates both carburetted, hydrogen and carbonic acid gases; its percentage will average 5 per cent.

Ventilation.—Ventilation is effected here by means of a steam fan with an open periphery, 10 feet diameter, 3½ feet draw-holes=9.621 square feet each=19.042; 8 paddles, 3.75×3 feet each=11.25 square feet—total area =90.20 square feet; revolves at 125 to 150 per minute. The air is brought down the slope; thence by the gangway to a door 450 feet from its face; thence by a brattice to within a 100 feet from its face. A door at this point turns it up into the first lift gangway; thence to the water level and out to the fan out-cast course. The brattice being too small, a sufficient supply is not furnished the workings. All other places have a good supply of air. I ordered this evil to be instantly remedied. The west gangway is ventilated by a natural draft, by means of holes driven from the breasts to the water level gangway. I found this air insufficient, but when properly secured will suffice for the small number of hands employed there. I directed all air-courses to be made not less than 24 square feet area.

Remarks.—This colliery has been in operation 15 years; 120 men and 30 boys are employed. Its present condition is favorable. Thirty-five wagons and —— mules in use.

Engines.—One 40-horse hoisting engine, 11-feet drum used; 2,000 feet wire rope, 1¼ in. diameter; one 40-horse pumping engine, a 14-inch pole pump, with 550 feet columa; one 25-horse breaker engine and a 15-horse fan engine, with 6 boilers each, 34 inches by 30 feet long; area of grate surface, 81 square feet.

Recapitulation.—One slope, 550 feet deep, of 2 tracks; 1 pump and 1 traveling road; 4 engines=120 horse; 1 steam fan; 2,000 feet 1¼-inch wire rope in use; 2 gangways, 12,400 feet long; 4,900 feet of T rail outside; 13 breasts working; 120 men and 30 boys employed; 35 wagons and — mules in use; shipping capacity 40 cars per day; outside temperature 66°, inside do., 59°—difference 7° in favor of ventilation.

No. 5.—*Inspected October 7, 1870.*

Description.—Boughner, Shepp & Co.'s Frank Gowen collieries, situate near Shamokin, Northumberland county, on the estate of the Hugh Bellas heirs. It consists of 2 drifts on the Black Heath vein, one of which is on its south dip and the other on its north dip; the capacity of its breaker is 35 cars per day. No. 2 colliery is situate on the estate of Mr. Wm. Marshall, and consists of 1 drift on the same vein, in the next basin north of No. 2, with breaker capacity of 15 cars per day. Its present business is at 8 cars per day.

Gangways.—Drift No. 1, on No. 1 colliery, is in 2,100 feet, with a mile to run to boundary line; the vein is a little faulty, but in good condition above the gangway, with 5 feet of good coal, dipping 50° south, with 3 breasts working, each 24 feet wide and 18-feet pillars. The gangway on drift No. 2, No. 1 colliery, is in 1,200 feet. Its coal is good, with $5\frac{8}{12}$ feet of coal, dipping north 53°, with 4 breasts working in it. Measures same as above. No. 2 colliery is in 1,134 feet and about 150 feet from boundary

line, coal 4 8/12 feet thick, dipping 30° south, working 4 breasts same as above.

Remarks.—The owners are to open a new drift on a vein north of drift No. 1; also one or two south of drift No. 2, on the Bellas heirs lands; and also sink a slope on a vein worked at No. 2 colliery, on the estate of Mr. Marshall. The general character of things in these collieries, excepting ventilation, is favorable.

Ventilation is effected by natural draft, when, unless the outside temperature is very low, ventilation in the mines may be looked for as deficient; but the character of mining done is safe, there being but few persons employed in each drift and they have no complaints.

Engines.—One breaker engine of 20-horse power, with 2 boilers of 30 inches by 20 feet long, and one 8-horse engine at No. 1 drift, with 1 boiler, 30 inches by 20 feet long; grate surface=13¾ square feet and 25 square feet; 8,868 feet T rail in use.

Recapitulation.—3 drifts=4,434 feet long; 2 engines=28-horse power; 3 boilers in use; area of grate surface, 36 square feet; 900 feet of T rail outside=9,768 feet; 150 feet ⅞ inch wire rope in use; 71 men and 27 boys=98 hand employed; with 20 wagons and 5 mules in use; shipping capacity 35 cars per day.

No. 6.—*Inspected October* 8, 1870.

Description.—Burnside Coal Company's Luke Fidler colliery, situate near Shamokin, on the estate of E. M. Eastwick. Many years in operation. It consists of a slope sunk 60 feet through a rock seam, on an angle of 33°; thence by a rock tunnel north, cutting veins Nos. 11, 10, 9 and 8, its length being 2,118 feet from bottom of slope to its face; it constitutes a water level colliery, and drained by a drift on No. 12 vein.

A 30-horse engine runs the breaker and hoists the coal. The chief workings are now on No. 9 and 8 veins, called the Twins or E veins.

Gangways.—Main one east on No. 10 is 450 feet in from tunnel, and robbed back; the west one is in 2,100 feet, idle. An inclined plane 75 yards long, at a dip of 25°, to reach the counter workings, 450 feet from the tunnel. The east counter is in 600 feet from this plane with coal five feet thick, dipping 35° south; working 3 breasts, each 30 feet wide, with 18 feet pillars. The west counter is in 450 feet; one breast working in it; only a little worked. West gangway on No. 9 is in 1,350 feet; only two breasts working in it; its course at its face is due north apparently sweeping around an anticlinal; its east gangway is in 1,200 feet; its coal 7 feet thick, dipping 7° south; a slant gangway is commenced on its pitch 150 feet outside its face with 10 breasts open on it. East on No. 8 vein is in 750 feet with coal 8 feet thick, dipping south 25°, working 13 breasts on it; its west one is in 750 feet; coal five feet thick with 9 breasts open on it.

Ventilation is effected by the operation of a steam fan of 25-horse power, of an open pattern. The tunnel is used as an in-take to the east gangway, on No. 9 vein; thence by a cross-cut in to east gangway on this vein to No. 8; out through that gangway and in to its west one; thence through a cross-cut to and along of east gangway of No. 9 vein to its face, and return below a brattice erected on lower side of gangway, and by a bratticed opening in the tunnel to vein 10; thence through old works to an air shaft on that vein to the fan out-cast shaft. The fan power is adequate to ventilate the mines properly, but the narrowness of the openings destroys

its influence, with a waste by leakages which makes ventilation bad. I find by measurement the motion of air to be 10 times slow. With a view to improve this defect a shaft of 36 square feet area has been opened on No. 9 vein 600 feet long to the crest of the anticlinal; at this point a vertical shaft is sunk to connect it; the shaft is 6 feet in diameter, is sunk 60 feet, the estimated distance to the vein. When this connection is made its effects will be important to the proper ventilation of this colliery.

Remarks.—This is an old colliery which did not yield much coal until veins Nos. 9 and 8 were open. The one from 5 to 7 feet and the other 5 feet thick; it is estimated that those veins have a range of 1,500 feet from the point where they were cut in the tunnel to their out-crop on the mountain side. Shipping capacity at present is —— cars per day; —— men and —— boys employed, with —— wagons and —— mules in use; —— feet of T rail in use.

No. 7.—*Inspected 13th October*, 1870.

Description.—Mount Carmel Locust Mountain Coal Company's Reliance colliery, situate 8 miles east of Shamokin, on the company's lands, and has been four years in operation. The colliery consists of two openings; a slope on the E vein and 1 drift on its water-level, with 650 feet of an incline plane; 1,350 feet of 1-inch wire rope in use; 150 persons employed; 21 mules and 80 wagons in use; its shipping capacity is 75 cars per day.

Gangways.—The west drift gangway is in 8,750 feet, working 9 breasts, each 30 feet wide, with 12 feet pillars; coal 13 feet thick, dipping 35° north. A slant gangway open on this 450 feet in from drift opening, running in 3,075 feet, with 7 breasts working, with measures as above; with 2 other slants, each 600 feet long=1,200 feet; these are robbed out; total length of opening, 8,025 feet.

Slope.—The slope is 207 yards deep, 87 yards of which is below water-level; its section area is $22+26=48\div2=24\times6=144$ square feet; dip 20° north. Its east gangway is 1,350 feet long, with 1,350 feet of a run to the boundary line, working 8 breasts; its do. is 1,200 feet long, with 5 breasts working in it, with 825 feet of a slant gangway, having 3 breasts on it; in all 16 breasts and 3,375 feet of gangway openings; these breasts and pillars measure as above.

Ventilation, I find, is very defective, particularly so in the west side; 2 furnaces are in use; one on the drift west gangway; the other on the east slope gangway. I find the quantum of air supplied by this means to average one-third the minimum required by law.

Remarks.—I directed the mode of supplying the needed quantum of air, and how to distribute it in each district, as required. The E vein is found in some places separated. Its upper division is that which is generally worked, the other having a large mixture of impurities; the quality of its coal is best above water-level; it evolves about 14 per cent. of carbonic acid gas; inside temperature, 58°; outside do., 65°; difference against natural ventilation of 7°.

Engines.—A 60-horse hoisting and pumping engine, with 4 boilers, each 36 inches×26 feet long; 112 square feet grate surface; no steam gauge used; 1 14-inch pole pump, with 300 feet long column; 1,800 feet 1½-inch wire rope, on drum; a 20-horse plane engine gets its steam supply from slope boilers; here 1,350 feet of 1-inch wire rope is used; a 30-horse breaker engine, with 4 boilers, each 36 inches×28 feet long; area of grate surface, 54 square feet; no steam gauge used.

Recapitulation.—One drift level; 1 slope, with 2 tracks; 3 steam engines=110 horse power; 8 good boilers, with 166 square feet of grate surface; 1,800 feet of 1½-inch wire ropes and 1,350 do., 1-inch do., in use= 3,150 feet; 1 plane, 650 feet long; 150 hands employed; 21 mules and 80 wagons in use; shipping capacity, 75 cars per day; outside temperature, 65°; do. inside, 58°; difference, 7°; 12 per cent. of carbonic acid gas evolved, with 4 per cent. acidulated water.

No. 8.—*Inspected 14th October*, 1870.

Description.—John Gable's Lancaster colliery, situate east of Shamokin, on the estate of N. C. R. R. Co., sub-leased from the Shamokin coal company. It consists of 3 drifts, open on the Twin veins of E vein, working the out-crops which are not worked from lower levels, which are at present abandoned; present shipments 25 cars per day.

Gangways.—The first, on No. 9 vein, is 1,200 feet long, with 5 feet of coal, dipping 23° south, having 5 breasts working; do. No. 2, on new No. 9 vein, is 90 feet in; do. No. 3, on No. 8 vein, 450 feet in; its coal is 6½ feet thick, dipping 14° south.

Remarks.—Ventilation in the first drift is satisfactory, but in the latter two entirely inadequate; there are 40 hands employed; 5 mules and 18 wagons in use; working 9 breasts; I consider the character of the work done to be safe. A 15-horse engine runs the breaker; its boilers are tubular, and considered safe; 4 breasts are working, each 30 feet wide, with 15 feet pillars.

No. 9.—*Inspected October* 19, 1870.

Description.—Henry Schmoley's Black Diamond colliery, situate 5 miles west of Tremont, in Schuylkill county, on the estate of the Schuylkill and Dauphin improvement and railroad company, in Foster township. The colliery is now three years in operation, and under the superintendence of ——— Osterman. It consists of a slope sunk on the E vein; dip 70° north; 145 yards deep; an ingress and egress road is open west of the slope, but its ascent is difficult and unsafe for man to travel in; the vein forms two branches; its east gangway is in fault, some 150 yards in from the slope; the west gangway is in 400 yards; its coal 4 feet thick; working 4 breasts on its bottom bench, while 3 do. are idle, from being charged with fire-damp; map of this colliery must be furnished.

Engines.—Two steam engines of 95-horse power; 2 8-inch pumps in use; these engines are used to hoist, pump and break coal; 6 boilers in use; their condition is not known now; 2 years since they have been examined; 240 yards of 1¾-inch wire ropes are in use.

Ventilation.—In fact, no ventilation at all. I found the instructions of inspector Eltringham were not heeded, and the condition of the mines as bad as he reports; I therefore ordered such improvements as are eminently necessary for the ventilation of the mines, and the health and safety of the men requires.

Remarks.—This mine is badly managed, and find the methods used for making it unsafe. Inspector Eltringham gave the proper instructions which would effect the desired result, but were neglected. I learn that eight persons lost their lives in this mine, from causes which are complained of;

the openings in the counter gangway are left still unprotected, and men are constantly in jeopardy from these mere man traps; an air-course is in progress in the east counter gangway, and up 30 yards, and has to be driven up 30 yards more to the surface. I hurried its completion, and its section area to be not less than 36 square feet, and to place a steam fan on it to ventilate the mine with. I instructed the boss miner in the proper way of mining the work and getting out the coal, and convey a current of air through his works, which will relieve his men greatly. I have notified the owner of my instructions, regarding the necessary improvements needed for the safety and health of his men as required by law, and forbid men ride in the slope, and ordered a safe and convenient traveling road to forthwith commence from the bottom to the top, &c.

No. 10.—*Inspected October* 21, 1870.

Description.—Bechtel, Kulp & Co.'s Ben Franklin colliery, situate a little south of Shamokin, on the estate of Douty & Bumgardner. It consists of two openings above water level. No. 1 drift, open on the Furnace vein, dips 75° north. Its coal is 5 feet thick; are working 5 breasts on it, each 24 feet wide, with 15 feet pillars. No. 2 drift is open on the Bonney vein. Its coal is 2½ feet thick; dip 45° south. At present idle. I find by its maps that this is a large tract covered by its lease.

Gangways.—No. 1 gangway is in 400 yards, working 5 breasts, as described above. The lengths of the remaining gangways are not given.

Ventilation is effected by an air-shaft to the surface, 55 yards long and 125 yards from its face. The condition and quantity of air furnished is not adequate. I directed this want to be remedied for the health, &c., of the miners.

Engines.—An 8-horse engine runs the breaker, with 1 boiler, 30 inches × 20 feet long. Its condition not known. No steam gauge used. Apparent pressure on valve 40 pounds per inch. Its shipping capacity 10 cars per day, employing 30 hands. 4 mules and 15 wagons in use.

Remarks.—Its condition favorable. Ventilation natural, with little regularity. The new air-shaft will improve it, which will be completed in 10 days. I directed it to be of an area of 36 square feet, and cut headings through all the pillars, and directed all the dangerous places to be safely secured; and gave the necessary instructions with regard to opening of breasts, &c., and do all other necessary things which are needed for the health and safety of men.

No. 11.—*Inspected October* 21, 1870.

Description.—David Telleck colliery, situate near Shamokin, on the estate of Douty & Bumgardner. This colliery consists of a drift, open on the Furnace vein, 150 yards in, its coal 5 feet thick, dipping 40° south. This colliery is constituted a land-sale drift, and ships 4 tons per day. Has 4 persons employed. A map of this colliery is to be furnished.

Remarks.—This is a new colliery but not in full operation. A siding from the Enterprise railroad is now made to the mine, and a breaker to be soon built for its use, and afterwards to take its place as a shipping colliery.

No. 12.—*Inspected October* 22, 1870.

Description.—Aucker & Bower's Shamokin colliery is situate near Shamokin, on the estate of Hays & Co. Is in operation one year. It consists of drift, open on the Diamond vein. Its gangway is 150 yards long, with 2 working breasts open and in good condition.

Engines.—One 15-horse engine runs the breaker. Its boiler is considered safe.

Remarks.—Four hands employed; 1 mule and 12 wagons used. The colliery is new, with a new breaker building. Its ventilation effected by natural draft. I directed the air-hole and its courses to have a section area of not less than 40 square feet, and the pillar headings should be of like dimensions, and to secure every dangerous place and keep the mines in a safe working condition.

No. 13.—*Inspected October* 24, 1870.

Description.—The Excelsior colliery is situate near Shamokin, on the estate of the Fulton coal company; is six years in operation. The colliery consits of six drifts open above water level on the Twin veins of the E or Mammoth vein.

Gangways.—Drift A, No. 9 vein on upper branch of the Twin, is in 500 yards, working 11 breasts; drift B, No. 8 vein on lower branch of Twin, is in 400 yards, with 5 breasts working; drift C, on No. 9 vein, is in 800 yards, no breasts working; drift D, No. 8 vein is in 1,000 yards, working 10 breasts; drift E, No. 9 vein, is in 950 yards, working 7 breasts; drift F, No. 5 vein, is in 950 yards, working 6 breasts; in all 6 drifts, with an aggregate length of gangways of 4,600 yards, working 39 breasts; its average thickness of coal, 6½ feet; its quality good; and from the character of the work, mining is considered a safe operation.

Ventilation is supplied by a natural draft. From such a method proper ventilation cannot be produced, though the condition of the atmosphere, as shown by the thermometer and barometer, was favorable at the time, but found the quantum of air required was much below the standard needed for ventilation.

Engines.—1 engine in use; 4 boilers, in two nests of 30 inches×30 feet long, and the other nest of 30 inches×25 feet long; their condition is not known.

Remarks.—This colliery is well conducted in other respects than ventilation; there are many yards of brattice work used to convey air in, but there are good objections to this mode in all well regulated collieries, as they are constantly subject to leakages and derangements. I gave directions to improve this method, and will secure a better ventilation when finished, as the openings are too small; so are the headings. I directed the use of a fan on the E drift, connected with the surface; the distance I judge to be 40 feet; with a good fan or furnace located at this point ventilation then would be an easy matter, as all the gangways and workings of drifts E, D, C, B, and A, could be under its influence. I instructed the opening of double gangways, with 18 feet thick pillars between them, in drifts D, C, B and A, as each alternate gangway might be used as an in-take, whilst the others could be used as outlets. I have examined the dangerous places about the machinery and breaker, and ordered these places to be secured, and other needful improvements made.

No. 14.—*Inspected October* 25, 1870.

Description.—R. B. Douty's Ben Franklin colliery, situate in Helfenstine, on the estate of C. T. Helfenstine, is one year in operation. It consists of one opening on the Lykens Valley vein, approached by a tunnel 108 yards long, from Lower Mahantongo valley. Its west gangway is in 400 yards; its coal is 8 feet thick, dipping 8° north, working 8 breasts; its east gangway is working in faulty coal.

Gangways are as above described, &c.

Engines.—2 steam engines=45 horse power, with 3 boilers 30 inches×20 feet long at the breaker engine; steam at 60 pounds on the valve; no steam gauge in use; their condition is not known; and a 10-horse fan engine, with 1 boiler of 30 inches×25 feet long; diameter of fan 12 feet; its draw-holes 3½ feet in diameter=19.042 square feet area; running at 80 revolutions per minute.

Remarks.—Ventilation is produced by a fan at the tunnel opening; its in-take being along it and the west gangway, to within 200 yards of its face; thence by a brattice along the gangway to some 40 yards of its face; thence by this gangway to the end of the brattice on its return, and turned thence up a schute by a gangway door; thence through headings connecting with a brattice on a side of the tunnel leading to the fan. All these contrivances are altogether to small and inadequate for their purpose, and the quantum of air to be but ¼ the required amount. I directed the door to be moved further in; to shorten this brattice; to take the air through the gangway top pillar; to enlarge the air-courses and distribute the current in splits to the workings. I forbid the mining of coal from both sides of the slant gangway, running in a small basin which would naturally result in crushing in the gangway. Maps of this colliery required.

No. 15.—*Inspected October* 26, 1870.

Description.—The Henry Clay colliery, situate one mile south of Shamokin, on the estate of the Henry Clay coal company, is now 11 years in operation. It consists of 3 openings, i. e., 2 drifts and a slope, sunk on the E Twin veins, dipping north. Its west gangway runs in 650 yards, working 9 breasts in it. Drift No. 1, on bottom bench—its gangway is worked to its boundary line and finished; gangway on its top bench is cut by a tunnel from the bottom gangway, 800 yards, working 7 breasts in it. Drift No. 2, on top bench, upper level, 1,200 yards in, working 9 breasts in it. I find, by information, there are 3 gangways in use=2,650 yards long, working 25 breasts, each 30 feet wide, having 16-feet pillars.

Engines.—Two steam engines=60 horse power; 4 boilers, 2 of 32 inches and 2 of 30 inches×28 feet long; their condition not known then, but uses a steam gauge. Shipping capacity 50 cars per day; 126 hands employed; 25 mules and 110 wagons in use.

Remarks.—Ventilation defective in all the working places, but more especially in the gangway and what is called the jugular gangways. I ordered all the air-courses and headings to be enlarged, and drive double gangways six yards apart and use each alternate one for intakes; the others for out-comes; also to use a fan or furnace, which would produce a current of air sufficient to supply all the working places, and thereby relieve the miners from the unhealthy influence of sluggish air and smoke, which they truthfully complain of. The condition of the mines, in other respects, is good. Ingress and egress roads are numerous.

No. 16.—*Inspected October* 26, 1870.

Description.—Guiterman & Gorman's Greenback colliery, situate three miles east of Shamokin, on the estate of Brady coal company, is 4 years in operation. It consists of 3 openings, i. e., one slope sunk 65 yards deep, on the E vein, dipping 47° north. Drainage effected by a 30-horse engine steam pump. Its gangway is in 200 yards, working 6 breasts. No. 1 drift, on the same vein, is worked to the boundary line. No. 2 drift, on the Red Ash vein, is in 150 yards; coal 3½ feet thick; dipping 15° north; working 4 breasts in it.

Gangways I find are 3 in number, working some 10 breasts. By examination, mining is a safe operation here.

Engines.—Three steam engines in use; aggregate power=90 horse, with 2 steam pumps—1 of 30 and 1 of 5-horse power, with 6 boilers each, 30 in. ×26 feet long; their condition is not at present known; shipping capacity 25 cars per day; 87 hands employed; 11 mules and 34 wagons in use.

Remarks.—The works are new and disadvantageously planned for ventilating the slope workings. The headings are too small to allow of a sufficient supply of air to circulate in them. I directed their enlargement and suggested a plan to open breast differently, by which a commodious return air-course may be made 6 yards above the gangway. I desired a fan or furnace be put in operation by which the slope workings would be ventilated, as I found it necessary in consequence of the condition of the air. I forwarded a written notice to the owners requesting them to have the mines properly ventilated by the first of December next, and also forbid persons riding in the slope on any pretence, as I deemed this precaution necessary for the safety of the hands.

No. 17.—*Inspected October* 12 *and* 28, 1870.

Description.—Burnside colliery, in operation —— years, situate near Coaltown, Northumberland county, on the estate of Big Mountain improvement company, 2½ miles south of Shamokin. The colliery consists of one slope, sunk on the E or Mammoth vein, 80 feet deep, dipping 30° north. I desired to be furnished with a map of this colliery.

No. 18.—*Inspected October* 28, 1870.

Description—Huin & Goodwill's Bear Valley colliery, situate in Coal township, Northumberland county, on the estate of the Bear Valley coal company; is in operation 6 years. The colliery consists of one tunnel, driven south to the E vein, 400 yards, opening veins 9 and 10 and some of the underlying veins. A map of this colliery to be furnished me.

Gangways.—The east gangway on No. 10 is in 275 yards, working one breast. The west do. is in 50 yards and idle. No. 9 west gangway is in 1,000 yards; the inner part is now abandoned; two branch gangways are working north of west E gangway. Branch No. 1 is in 500 yards, dip south, with three breasts working in it, and No. 2 do. is in 500 yards, dip north, working 3 breasts. The east do. on No. 9 vein, on the north dip, is in 1,500 yards, working 10 breasts. By examination I find 6 gangways open—their aggregate length=3,825 yards long, working 17 breasts.

Engines.—Their aggregate power=65 horse; 2 boilers; the condition of the boilers is not known.

Remarks.—The general condition of the colliery is favorable. The character of the works is satisfactory. The coal in the E vein is from 13 to 30 feet thick, and uniform east of the tunnel, but irregular in the west side. Ventilation is produced by grates placed in the air-holes a short distance under the surface; and though the ventilation is good, and better than in most collieries visited, it still is far below the required amount called for. By measurement it is found the quantum to be 8 times slow in its course. A monkey gangway, in the east gangway, is made to convey the incast current to its face. I found this contrivance too small, and, therefore, desired its enlargement, and also to have a new air-shaft driven from the face of the gangway to the surface, and to have a fan or good furnace used in it. This done, much relief would be afforded by it.

No. 19.—*Inspected October* 28, 1870.

Description.—George Fall's colliery, situate two miles south of Shamokin, on the estate of Bear Valley coal company. It consists of a slope on the No. 10 vein; dips 20° north; sunk 215 yards deep; a map of this colliery to be furnished.

Gangways.—The east and west gangways are in 40 yards each; the coal is 6½ feet thick; an air-course is on the east side of the slope pillar.

Engines.—Two steam engines and a steam pump, having an aggregate power of 115 horse; their boilers were not examined for some time, and their condition is not satisfactory.

Ventilation.—The steam from the pump is exhausted into the air-shaft, by which means its influence tends to assist ventilation, but this is quite inadequate for that purpose.

Remarks.—Sixteen hands are employed here; one mule, with 3 wagons. I directed the company to drive double gangways, with 6 yard pillars between them, and to make each alternate one an intake, while the others may be used as out-casts; and that an air shaft be driven on the west side, of an area not less than 48 square feet. The character of the work on the slope and mines is satisfactory; but ventilation is inadequate; it receives its present power or force by the rarifying process of the steam exhausted in the air-course, but it is in contemplation to use a steam fan for all purposes in a short time.

No. 20.—*Inspected November* 1, 1870.

Description.—Zack Boyer's Phœnix No. 2 colliery is situate west of Llewellyn, on the estate of the Phœnix Park company. This colliery is 20 years in operation; it consists of a slope opening, sunk 300 yards deep, in three lifts on the south dip of the Primrose vein or G vein; the slope is the only available road for ingress and egress at present; the coal is ten feet thick; the mines have been operated by several persons within this period, and in consequence of such pernicious sub-leasing and re-letting often, is a ruinous system of mining.

Gangways.—The east lower left gangway is opened 150 yards; the vein dips 30°; the air produces 1,050 cubic feet per minute; the west gangway is in 80 yards, working 2 breasts; the volume of air supplied is 2,000 cubic feet per minute; the west counter gangway is in 600 yards, working 4

breasts; the volume of air supplied is 1,650 cubic feet per minute; temperatures and atmospheric pressures, thus: Outside temperature 49°; inside 68°; difference 19°; this favors ventilation by 19°; barometer outside $29\frac{3}{10}$ inches; inside $29\frac{7}{10}$; difference=500 feet.

Ventilation.—A steam fan produces ventilation, and in addition the difference of temperature of 19°, greatly increases the volume, and promotes the increase of supply of air.

Engines.—Four engines with an aggregate horse power of 180 horse are used, with 13 boilers in use, the condition of which is reported to be safe; the mines are drained by 2 pole pumps, with 10 and 8 inch columns.

Remarks.—The Primrose vein, at this point, forms a saddle under the slope engine house; the upper portion of the slope was driven through the rock overlying the vein, a distance of 150 feet, which cut the vein at a point where it made a south dip; thence on the course of the vein to the first lift; here the vein forms an upthrow of several feet; this overlap being opened by a tunnel; from this point the slope is continued to the lower lift; an engine works the lower lift from the tunnel; from thence the coal is conveyed to the first lift, and out to the breaker; this engine receives its steam from the slope boilers, and are laid in the upper lift; by this means the temperature is increased to 70°, but reduced 65° in its passage down the lower lift; the temperature, as increased by the engine, is deleterious to health and unfavorable to reduction of fire-damp. The colliery employs 100 hands; 3 mules and 18 wagons are in use; shipping capacity 35 cars per day; 6 per cent. of carburetted hydrogen is evolved.

On the 8th inst. I made a second visit, accompanied by inspector Smeltzer. I directed air-courses to be open on the lower side of the gangways, to supply sufficient air in the working places; to timber the slope as to make it safe; to attach a brake on the drum, and to proceed forthwith to open a second out-let for the miners.

Recent and valuable developments have been made at Phœnix Park mines, by which the value of these coal lands is greatly enhanced by boring with M. Leshot's diamond drill, under the superintendence of Gen. Henry Pleasants, C. and M. Engineer for the company, (the same engineer who planned and executed the famous Petersburg mine.) Many were the opinions as to the depth the White Ash veins lay below the surface at this place. The company adopted the plans and counsel of Mr. Pleasants, and decided to demonstrate the distance by boring to the veins, which resulted highly satisfactory, both to the company and to their engineer, as the changes or thickness of strata did not materially deviate from the plans and surveys furnished by the engineer.

The following is a profile of the borings passed through the different seams of rock, slate and coal veins:

Seams.	Feet.	Inch.	Seams.	Feet.	inch.
1. Sandstone	2	8	27. Blue slate	0	5
2. Blue shale	6	6	28. Conglomerate	13	9
3. Coal, (Orchard vein,)	4	1	29. Blue slate	7	2
4. Blue shale	13	2	30. Coal seam	1	10
5. Coal	1	8	31. Sandstone	1	0
6. Slate and rock	63	2	32. Blue slate	21	2
7. Slate and coal seams	3	4	33. Coal seam	1	6
8. Sandstone	17	6	34. Coal mixtures	1	10
9. Dark stone	42	0	35. Coal seam	0	7
10. Coal	2	0	36. Conglomerate	52	9½
11. Sandstone	68	6	37. Upper seam of E, or Mammoth vein	7	8
12. Hard blue rock	24	6	38. Blue slate	2	0
13. Sandstone	13	6	39. Lower seam of E, or Mammoth vein	18	6
14. Blue slate	11	6	40. Black slate	7	8
15. Coal, (Primrose vein,)	11	0	41. Conglomerate	90	7
16. Bluish slate	42	3	42. Hard blue rock	6	8
17. Yellow sandstone	30	6	43. Conglomerate	6	4
18. Black slate	1	0	44. Blue slate	7	6
19. Blue slate	21	0	45. Conglomerate	17	9½
20. Black slate	3	8	46. Coal, (Skidmore vein,)	5	1
21. Coal, (Holmes vein,)	5	0	47. Blue slate	8	11
22. Blue slate	8	0			
23. Sandstone	38	8			
24. Blue slate	2	4			
25. Hard slate rock	21	6	Total strata and depth	750	10
26. Coal	2	0			

This is the deepest boring in the county. However, this did not penetrate the Lykens Valley vein, which is estimated to be some 500 feet deeper than the Skidmore vein, or 545 feet below mid-tide at Philadelphia.

No. 21.—*Inspected November* 2, 1870.

Description.—Henry Heil's Franklin colliery is situate in Fraley township, Schuylkill county, on the estate of Charlemagne Tower, et. al., 2½ miles west of Tremont. It consists of two slopes, sunk on the E vein. Slope No. 1 is 230 yards deep, and drained by a 60-horse steam pump. Slope No. 2 is 120 yards deep. 460 yards of a flat chain are used in this slope. This slope is sunk on the Black Heath vein. The seam dips 35° north.

Engines.—Four steam engines are in use. Their aggregate power is= to 220 horse, with 12 boilers. Their condition is reported to be good. No steam gauge used, but run at 60 to 70 pounds of steam. 5 pole pumps are in use. The columns are 3 of 18 inches, 1 of 16 inches and 1 of 8 inches.

Ventilation is effected by up-cast air-courses, which communicate with the boiler stack, and the air traverses the mine by means of check-doors and cross-holes.

Remarks.—One slope is sunk only 111 yards, from which a tunnel has been open to the Black Heath vein. The mining in both veins will soon be completed. The other slope is down two lifts 230 yards deep. These lifts are also worked out, but the sinking of the third lift is continued, which will be sunk some 125 yards deeper, which mining will be conducted by two main and two counter-gangways, leaving a 30-yard pillar on the east side and a 40-yard pillar on the west side, which will prevent the water of the upper lifts to pass down to the third level. A drift may be open so that the water of the upper lift could be drawn off at the surface, which would dispense with the upper lift of pumps. The cost of such opening

would not exceed $10,000, and would save at least $5,000 per annum in this item alone. I instructed the boss miner in the size of the required air-courses; to use a steam gauge on the boilers; to attach a brake on the drums, and do such other necessary improvements as were needed. 75 hands employed; 12 mules used.

No. 22.—*Inspected November* 3, 1870.

Description.—Owens & Long's Colkett colliery is situate near Tremont, on the estate of the Tremont coal company. Has been 3 years in operation. It consists of a slope (new) sunk 270 yards deep, 51½° south dip on the Black Heath, or E vein. It is expressly used for a hoisting slope. Two slopes are used for pumping, which will be abandoned as soon as a new pumping slope is finished to that purpose and for traveling use.

Gangways.—The west gangway on the Black Heath vein is in 250 yards; the coal 3 feet thick; east do., 150 yards, 6 feet thick, but faulty; west counter do., 75 yards above the bottom of slope; the west do. is in 300 yards; coal 12 feet thick, working 2 breasts; east do., 300 yards in; coal 14 feet thick, working 3 breasts. The E vein is opened by a tunnel, driven north from the Black Heath. Its east gangway is 100 yards in; coal 20 feet, working 6 breasts; the west do., 100 yards in; coal 14 feet and working 4 breasts. Thus 6 gangways, 1,200 yards long, working 15 breasts.

Ventilation.—This is effected by two steam fans; the first is used to ventilate the Black Heath works, and the other do. the Mammoth works. The slope is used as a down-cast; the air is split at the bottom, going in east and west, with a third split in the tunnel to the M vein; except the M vein gangway, the mine is well ventilated; this is in consequence of the crush referred to; a sufficient supply of air is furnished had it been properly distributed. The temperature outside at 56°, inside 66°; difference in favor of ventilation, 10° by atmospheric action; barometer outside at $28\frac{6}{10}$ inches, inside $29\frac{3}{10}$ do.; difference=$\frac{7}{10}$, or a pressure of 700 feet; 5 per cent. of fire-damp and 10 do. choke-damp.

Remarks.—The general condition of the mine is good. The hoisting slope is new and substantially built. The engines and ropes are adequate. The mine is well managed except the Mammoth gangway, which suffers from a squeeze, the effects of bad timbering. No regular outlet road, but several outlets in case of necessity. I suggested a better system of opening breasts and instructed a better plan for ventilation, and to have a brake applied to the hoisting drum; to fence off the slope head at counter gangway, and at the sump-hole, to prevent accident. 139 hands employed. 18 mules and 59 wagons in use.

No. 23.—*Inspected November* 3, 1870.

Description.—Nutting & Lewis's Eckert colliery is situate west of Tremont, on the estate of Swatara coal company; 4 years in operation. It consists of a slope sunk 97 yards deep on the south dip of the Mammoth vein, at an angle of 66°.

Engines.—Three steam engines in use—aggregate power, 160 horse. The boilers were pronounced to be in good condition last spring; 2 pole pumps of an 18-inch and a 9-inch column.

Ventilation.—A 20-horse steam fan produces ventilation. The slope is

used as a down-cast, the air traversing to the faces of the gangways; thence through the breasts and by air-shafts on the bottom bench to the water level gangway, and along it to the fan, which is located at its opening. The quantum of air produced would be adequate if properly applied. The air-courses being too contracted causes this effect.

Remarks.—The E vein is separated by parting rock; both seams must be worked separately. The gangways on the top and bottom benches are open in 1,200 yards each, working 12 breasts in the top bench and do. 7 do. in the bottom bench. The Seven Feet vein is open by a gangway driven north from the Mammoth vein. The extension of this gangway and three breasts were working. It requires good judgment and industry to carry on this colliery in a pecuniary point. I found the slope ropes in a bad condition, and thereupon served a written notice on the proper officer, forbidding persons to ride up or down in the slope, and directed the securing of machinery, belting and all dangerous places in and about the colliery, by fencing and partitioning, that the employees may not be jeopardized.

No. 24.—*Inspected November* 4, 1870.

Description.—Tremont Coal Company's Middle Creek colliery is situate north of Tremont, on the estate of the Tremont coal company. These mines are in operation over 20 years. It consists of two openings—the first a slope sunk 160 yards, on the south dip, 37° on the Mammoth or E vein. Its east gangway is in 380 yards, working 2 breasts in coal 7 feet thick. A drift on the Skidmore.

Gangways.—Slope gangway is in 380 yards, working 2 breasts; in coal 7 feet thick; west side is idle; the drift gangway is in 1,300 yards, working 12 breasts, in coal 6 feet thick; 2 gangways=1,680 yards long, with 14 breasts open, with 75 hands employed.

Ventilation.—A steam jet is used to ventilate the slope workings; the quantum of air furnished by this contrivance is about 1,500 cubic feet of air per minute. The drift is aired by atmospheric action; the quantum supplied is 1,200 cubic feet per minute. It is intended to erect a steam fan, or furnace, on this gangway, before spring.

Engines.—Three steam engines and a steam pump; aggregate power, 80 horse; 13 boilers (new) examined and put in order last spring; no steam gauge in use; the condition of the engines and machinery is good.

Remarks.—The Mammoth vein is irregular here, and faulty. The Skidmore vein is rough and slatety. An air-course is to be made, which will pass out to the surface, where a fan, or a furnace, will be erected. I directed a sufficient brake to be attached to the drum, and to increase the supply of fresh air in the slope workings, and to secure, by fencing, all dangerous places in and about the breaker and machinery, to aid in preventing accidents to the hands employed.

No. 25.—*Inspected November* 10, 1870.

Description.—Whittaker & Co.'s Diamond Slope colliery, at Forestville, Schuylkill county, on the estate of the Manhattan coal company and others. A statement and remarks of this colliery may be found in inspector Eltringham's report, on page ——, which I desire to corroborate, with my re-

marks on the condition of things as I found them: 669 feet of 1½-inch wire rope is in use since July, 1869; the drainage is performed by a 14-inch pole pump; 2 ingress and egress roads for miners; 57 hands employed; 23 wagons and 5 mules in use; the firm intends to sink a new lift; I directed the re-timbering of the weak places in the slope, and also to attach a sufficient brake to the drum.

No. 26.—*Inspected November* 10, 1870.

Description.—John C. Northall's Phœnix, No. 3, colliery, is situate at Phœnix Park, west of Llewellyn, in Schuylkill county, on the estate of the Phœnix Park coal company. It consists of a slope sunk 195 yards deep, on the south dip of the J, or Diamond vein, at an angle of 18°. The colliery is new, with some 750 yards of gangways open; a traveling road is located in the slope.

Gangways.—The west gangway is open 220 yards in; the vein, so far, is in faulty coal. The east do. is open 530 yards in; coal 6 feet thick, and very good. The character of mining done is extending gangways and breast work.

Ventilation.—This is, in a measure, effected by a steam fan. The quantum of air supplied in the east gangway is 2,500 cubic feet per minute. This is mostly lost before reaching the working places. The miners truthfully complain for want of proper supply of air in the inside breasts, etc.

Engines.—Four steam engines, of an aggregate power of 115 horse, with 6 good boilers in use, running at 50 pounds steam. In August these boilers were examined, and found in good condition. The engines and machinery are in good order.

Remarks.—I found the gangway tracks very dirty; the air is not properly conducted; is suffered to leak in batteries; the mine is drained by a steam pump, located in the slope, which receives its steam from the surface; the temperature of the intake air is increased by the heat of the steam pipes, which is deleterious to health, and acts contrary to the true principle of ventilation. The practice of placing steam pipes in the intake may be severely condemned, although it may be a convenience; yet its deleterious and repulsive effect is censurable and detrimental to health, and to the surrounding strata of either coal, timber or rock. I have given instructions for remedying this evil, and also to have all the dangerous places about the machinery, etc., securely fenced off; 80 hands employed; 6 mules and 19 wagons.

No. 27.—*Inspected November* 11, 1870.

Description.—Swatara Coal Company's Pyne colliery is situate 3½ miles east of Tremont, on the estate of the Manhattan coal company. In operation 19 years. It consists of a drift and two slope openings. The drift is open 800 yards in on the lower bench of the E vein, working one breast in coal 6 feet thick. The White Ash slope is sunk 137 yards deep on the top bench of the E vein. The Primrose slope is sunk 168 yards deep. This whole level is worked out and abandoned. A tunnel, west of this slope, opens the E vein, a lift under the White Ash slope. The west side is fin-

ished; the east side is still worked. No work done on either side of the bottom bench.

Gangways.—The west gangway on top bench of E vein is open 1,000 yards in and mostly finished. The east do. is crushed and idle. A counter gangway opens the coal which lies inside this crush, from the Primrose vein slope level. The lower bench of the E vein is open by a tunnel, open west of this slope. Its east gangway is 500 yards in, working 9 breasts, in coal 4 feet thick; the west do. is idle. The west gangway, on the Red Ash slope, is 1,300 yards in, and nearly finished. The east do. is 600 yards in, working 4 breasts, in 12 feet of coal. The west do. on lower bench is 100 yards in; the east do. is 75 yards in; all idle. The east gangway on the counter top bench is 200 in, working 6 breasts, in 10 feet of coal; the second counter on top bench of E vein east is 200 yards in, working 10 breasts, in 10 feet of coal. The total number of available gangways is 8 gangways= 3,975 yards long, working 29 breasts.

Ventilation.—A steam fan is used on the White Ash division. The condition of the air is good. Other causes assist its influence, and the general condition of ventilation is good. The colliery appears to be well conducted. The condition of ventilation in the Red Ash division is not satisfactory. Considerable suffering is experienced by the miners in the counters for want of good air. The quantum furnished here is only one-fifth the proper amount.

Engines.—Six steam engines are in use. Their aggregate power=200 horse. The condition of the boilers was not made known, but the engines and machinery appeared in good order.

Remarks.—The mines appear to be well managed under existing circumstances, excepting the ventilation of the above counters. I would suspend mining in these counters were it not that the close of the shipping season was so near. I directed a full supply of air to be distributed to all parts of the mine; that proper and sufficient brakes be attached to the drums; that the broken wheel at the White Ash slope be re-placed, &c., and all dangerous places so secured as to insure the safety of those employed.

No. 28.—*Inspected November* 12, 1870.

Description.—Leor, Miller & Co.'s Lincoln colliery, situate 3 miles west of Tremont, on the estate of the Swatara coal company. In operation 4 months. It consists of a tunnel, run in west 172 yards to the B, or Buck Mountain vein. This colliery is a new one, at Old Lorberry mines, on the upper level. The Old Lorberry works are nearly abandoned. The Buck Mountain vein is opened on this tract for the first time.

Gangways.—The east gangway is open 400 yards in, working 7 breasts, in 5 feet of coal; the west do. 400 do., working 17 breasts, in 5½ feet of coal. The character of mining done is extending gangways and breast-work.

Ventilation.—There is no proper ventilation. The air-courses are too contracted to admit a sufficient supply of air. No fan or furnace used, and in the absence of either mode the miners suffer.

Engines.—A 40-horse engine runs the breaker, with 3 boilers, the condition of which is new, and the machinery in good order and generally well secured.

Remarks.—I find the gangway tracks in a bad condition and scarcely any sort of ventilation, the air-courses being entirely inadequate to supply sufficient air for the miners. I directed the enlargement of the air-courses and other needed improvements as seemed to be necessary for the health and

safety of the men; that all exposed machinery and dangerous places be well secured, so as to insure the safety of the hands employed. I asked a map of the mine to be furnished me. 80 hands are employed.

No. 29.—*Inspected November* 15, 1870.

Description.—Cain, Hacker & Cook's Otto, No. 1, colliery is situate near Muddy Branch, Schuylkill county, on the estate of the Manhattan coal company. It consists of 1 slope, sunk 219 yards deep, on the Primrose vein, south dip 31°, and a slope on the Mammoth vein, 250 yards deep, south dip 25°, and a slope sunk on the north basin of the Primrose vein, 300 yards deep. These openings are named as Nos. 1, 2 and 3. No. 3 is idle, but will be eventually used to extract the coal that still remains in the trough of this basin. The engine for this purpose will be located 200 yards inside and east of the slope.

Gangways.—West gangway on the Red Ash slope, or No. 3, is 600 yards in, working 19 breasts, in 10 feet of coal. The east do. 550 yards in, working 15 breasts, in 10 feet of coal. Slope No. 2, or White Ash slope, west gangway is 700 yards in, working 14 breasts, in 8 feet of coal. The gangway on the underlying vein (20 yards north) is 600 yards in, working 10 breasts, in 5 feet of coal. The east gangway is 300 yards in. It has been driven over the axis of the anticlinal, dipping east and changing to west. The coal is faulty, but it is supposed the gangway will soon open the vein in good condition.

Ventilation.—This is effected by a 20-horse engine running a 14-feet fan. The slope is used as an intake. The air is split at the bottom of the slope, and passes in east and west; returning through the breasts, crosses the slope and down to the west gangway to its face; thence through these breasts to where it passes into the water level and out to the fan. The east and west gangways in the White Ash slope are ventilated by the same split of air, which is prohibited by law. There being no excuse of the number of men working as prohibited by law. I have instructed the boss in the manner most necessary to effect better ventilation.

Engines.—14 steam engines are used at these 3 collieries—their aggregate power=550 horse. The 16 boilers are said to be in good condition.

Remarks.—The general condition of these collieries is much better than I anticipated, notwithstanding that in both mines more men are employed than is required to work in each split. I directed the air to be so divided in quantity as required, and that the necessary outlets be put in proper condition as may be safe to be used in case of an accident; that the drums be supplied with sufficient brakes, and that steam gauges be affixed to the boilers for the better safety of men and property.

No. 32.—*Inspected November* 16, 1870.

Description.—Savadge & Althouse's Tower City colliery is situate near Tower City, in Williams valley, Schuylkill county, on the estate of Messrs. Munson & Williams, of Utica city, York State. Statements in Inspector Eltringham's report of this colliery will be found adequate to further explain the condition, etc., which I find is sufficiently explicit to explain its condition and resources, etc., and his plan of breastwork and air-courses

being adopted, I do approve of the same. I directed the attaching of sufficient brakes on the drum as to make it safe for all purposes, and to use a steam gauge on the boilers.

No. 33.—*Inspected November* 16, 1870.

Description.—Savadge, Bro. & Kauffman's Brookside colliery is situate west of Tower City, on the estate of Messrs. Munson & Williams, of the city of Utica, New York State; the colliery is two years in operation. It consists of one slope sunk 150 yards deep on the north dip of the Lykens Valley vein, on an angle of 35°. The different dips of the slope made hoisting troublesome, but the top and bottom rock has been removed by blasting so as to make the inclination gradual and easy, which makes it at present one of the best constructed slopes in the region.

Gangways.—The west do., in to the synclinal axis, is 201 yards; thence eastward, south dip°, 274 yards, working 11 breasts in 6 feet of coal. The east do. is 540 yards in, working 3 breasts, in 7½ feet of coal. A good manway is made each side of the slope.

Ventilation.—A 10-horse engine ventilates the mine, of which no complaint is made me.

Engines.—4 engines, of an aggregate power=150 horse, are in use; the condition of the boilers is not made known.

Remarks.—The condition of the colliery is favorable, and the well arranged facilities at the breaker and slope are such as to enable a large amount of work to be performed with little difficulty and expense. I am impressed with an idea that a conjoint tunnel, driven at a suitable point, which would open the vein to each colliery, would ultimately result in a large profit to both firms, and would greatly reduce the cost of engines, machinery, ropes, &c., which would be a large item in the out-lay, and would enable them to supply and manufacture more coal, with less labor and at less expense, than can be done by the present plan. 63 hands are employed; 2 mules with 14 wagons are used. Its shipping capacity is=to 20 cars per day.

No. 34.—*Inspected November* 17, 1870.

Description.—Miller, Graff & Co.'s Rauch Creek collieries are situate west of Tremont, on the estate of George B. De Keim; the mine is 16 years in operation. It consists of two slope openings on the south dip of the Mammoth vein, at an angle of 22°. The east or old slope is sunk 140 yards deep, the west or new slope is sunk 375 yards deep, both on the E or Mammoth vein. The character of mining done is extending gangways and breast work.

Gangways.—The east gangway on the old slope has been abandoned. The west do. is 3,250 yards in, working 15 breasts, in coal 18 feet thick. The east counter gangway on the new slope is 415 yards in, working 12 breasts, in 10 feet of coal. The west do. is 514 yards in, working 8 breasts, in 6½ feet of coal. The main east do. is 150 yards in, working 6 breasts, in 15 feet of coal. Do. west do. 150 yards in, working 7 breasts, in 15 feet of coal. Two good accessible traveling roads are in both lifts, one each of the slope, out to the surface.

Ventilation.—A steam fan ventilates the new slope, and an air-hole which is used as a traveling road to the Lorberry slope gangway; these outlets are safe and well conditioned.

Engines.—6 steam engines and 2 steam pumps are used on this colliery, together with two 18-inch, one 16-inch and one 8-inch pole pumps, and, also, one 14-inch pump and a 16-inch steam pump; the aggregate power is=470 horse, with 14 boilers, which are reported to be in ordinary condition.

Remarks.—The drainage of the mine is very creditable, and I found the whole mine well conducted and well ventilated. The hoisting machinery at the new slope is not in keeping with the inside work; its plan and construction does not do justice to this fine colliery. I directed that brakes be attached to the drums, and steam gauges be put on the boilers. The management and workmanship of the mines reflect great credit on Edward Moore, boss miner; 281 hands are employed; 47 mules are in use, and 130 wagons.

No. 35.—*Inspected November* 22, 1870.

Description.—J. Langdon Heirs' Big Mountain colliery, situate 1½ miles south of Shamokin, is 25 years in operation. It consists of 5 drifts, on water-level, on the Twin veins of the E, or Mammoth vein. Drift No. 1, i. e., with runs eastward on the bottom seam, south dip, rounding the synclinal axis, 140 yards; thence westward 5° on north dip, 300 yards, to its face, working 7 breasts, in 5½ feet of coal; by a fall of the roof, this drift is closed 260 yards from its mouth. Drift No. 2, on bottom seam; north dip is nearly finished. Drift No. 3, on the upper seam, is 200 yards in; working 5 breasts, in 6 feet of coal. Drift No. 4 is 140 yards in, on the same seam; working 7 breasts, in 4½ feet of coal; the seam is horizontal. Drift No. 5 is 300 yards in; working 9 breasts, in 4½ feet of coal.

Ventilation.—The No. 3 drift is poorly ventilated, and no out-let for men. The 4th drift is open in a flat seam, and ventilated from the 5th drift, which is very good. The 5th drift is well ventilated.

Engines.—A 40-horse engine runs the breaker, with 2 boilers, whose condition I did not learn.

Remarks.—An out-let is now opening on No. 3 drift, with 2 shifts for an out-let traveling road and ventilation purposes; 40 yards of No. 5 drift gangway is dangerous from being badly timbered. The same I directed to be sufficiently secured for the safety of men. I desired a steam gauge to be used on the boilers as soon as possible. One hundred and twelve hands are employed; 21 mules are in use; shipping 30 cars per day at present.

No. 36.—*Inspected November* 25, 1870.

Description.—May & Patterson's Buck Ridge colliery is situate 1 mile south of Shamokin, on the estate of Renshaw & Johnson. The colliery is 7 years in operation. It consists of 8 drifts on the Twin veins. No. 0 drift is 800 yards in, on the water-level of the bottom seam, working 8 breasts, in 8 feet of coal; a slant gangway open on the pitch, 700 yards in, working 9 breasts, in 6½ feet of coal; the above are ventilated by the action of the atmosphere, the current passing in the lower drift, and traversing the workings to the slant gangway, and out, by an air-hole, through finished work-

ings. No. 2 drift, on bottom seam, has been worked in 1,260 yards, to its boundary, and through the Greenback working, too; working 10 breasts, in 7 feet of coal; poorly aired by action of the atmosphere; this gangway will afford only one season's mining; 100 yards of the works near the opening is crushing heavily, and is subject to close at any moment. No. 3 drift has 4 working breasts, in 6½ feet of coal; this is poorly aired. No. 4 drift has 4 working breasts. The Langdon's drift is 650 yards in, working 10 breasts, in 7 feet of coal. There are several openings by holes in the pillars, between the 4th and 5th gangway, which are irregularly ventilated, under the influence of the atmosphere. No. 3 drift, top seam, is 150 yards in, working 6 breasts, in 5½ feet of coal. No. 4 drift, top seam, is 300 yards in, working 1 breast, in 5 feet of coal; this is well aired, though abandoned, owing to its great distance in.

Engines.—Two steam engines, of 60-horse power, in use; the condition of the boilers is not known.

Remarks.—The position and thickness of the coal seams, the solidity of the rock stratas and regularity and uniformity of the coal over all the tract, gives this colliery a title amongst one of the best in the Shamokin region. The upper and lower seams are separated by an 18-foot rock bench. It would have been of pecuniary interest to the lessor and lessees, had both seams been worked simultaneously; a danger is imminent in the falling in of the lower seam, which would disturb the superincumbent strata and bring down the upper seam, by which the coal would become a loss.

The efforts made to ventilate these mines were not as successful as might be, and it requires more diligence and economy to produce the necessary supply of air needed. The lower level drifts and No. 3 drift have no second outlet. I directed the opening of such needed outlets within reasonable time. A notice to this effect has been served and its transcript recorded. 150 hands employed; 22 mules and 80 wagons in use; shipments 70 cars per day.

No. 37.—*Inspected November* 28, 1870.

Description.—J. B. Douty's Brady colliery is situate 2½ miles east of Shamokin, on the estate of Fulton coal company. These mines are 6 years in operation, and consists of 4 drifts; 2 drifts on the Twin veins and 1 do. on the Red Ash, or No. 7 vein, in that basin. No. 1 drift, on Twin vein, has 2 gangways, each 1,400 yards in, working 4 breasts in each, in 5 feet of coal. No. 2 drift is 44 yards above the first drift; has 2 gangways, each 1,300 yards in, working 4 breasts in each, in coal 5 feet thick. No. 3 drift is 200 yards in, working 4 breasts, in 6 feet of coal. No. 4 drift is 80 yards above No. 3 drift, and 200 yards in, in 6 feet of coal. The quality of the coal is excellent.

Gangways.—Four gangways=5,800 yards in length, working 20 breasts, in coal ranging from 5 to 6 feet thick.

Ventilation.—This is effected by action of the atmosphere and air-holes out to the surface, first from drift 1 to No. 2 and out to the surface, in about every fourth and fifth breast, and the system is effective, though lacks the quantum required by law. Hereafter other means will be effected to produce the needed supply of air for the miners.

Engines.—A 25-horse engine runs the breaker, with 2 boilers in use. Their condition is not reported.

Remarks.—The colliery is in good order, except the method used to ven-

tilate the mine, although there are considerable currents traversing the mine, yet this must be increased and made permanent. 90 hands are employed; 14 mules and 59 wagons are in use. Shipments=50 cars per day.

No. 38.—*Inspected December* 9, 1870.

Description.—S. P. Longstreet's Coal Ridge colliery is situate 8½ miles east of Shamokin, at Roaring Creek township, in Columbia county, in Second district, on the estate of Coal Ridge improvement company. Being delegated by inspector Eltringham, as a favor, to inspect this mine and report on its condition, &c. It consists of a slope opening on the E vein, 280 yards deep on its north dip; 100 yards of it is sunk below the water level.

Gangways.—The west gangway is 400 yards in and in fault; the character of mining done is robbing pillars and breastworks; the east do. is 400 yards in, and is also in rock fault, and robbing pillars; only 3 places working; much cannot at present be said of the mine in this connection.

Ventilation.—An air-hole to the old water level gangway, some 70 yards outside the face of the gangway; an air-way and manway is open 15 yards east of the slope; the air traverses the gangway eastward, returning through an air-course below the gangway, to and across the slope, and connecting at the air-hole, where the steam pump exhausts and impels the air in the outcast, which causes a direct current to traverse the mine.

Engines.—Three steam engines and two steam pumps are in use; their aggregate power is=455 horse; the condition of the boilers is not reported.

Remarks.—Both gangways are in fault; the working of the mine extends into the territories of Northumberland and Columbia counties; it has been classed in coal statistics, as belonging to Shamokin district, and by request of inspector Eltringham, have included it in my district, which appears to be sufficiently satisfactory to us, and hope it may be so to the parties otherwise interested.

No. 39.—*Inspected November* 29, 1870.

Description.—Haas, Fagelly & Co.'s Cameron colliery, is situated 1 mile west of Shamokin, on the estate of Cameron, Packer & Co. It consists of four drifts all above water level, i. e., a drift on the D or Skidmore vein; a new drift on the Lykens Valley vein, and drift on the E or Mammoth vein, and the 4th drift on the No. 10 vein; thus the nomenclature of the veins in this basin.

Gangways.—The D vein east gangway is 350 yards in, working 7 breasts, in 5½ feet of coal; a counter gangway on the same is 100 yards in, but idle; the east gangway on new drift is 125 yards in, working 2 breasts on north dip, in 5 feet of coal; the west gangway on the E drift is 2,200 yards in, working 7 breasts, in 5 feet of coal; its counter do. is 90 yards above it, is 2,100 yards in and idle; the underlying gangway is 1,750 yards in and idle; in coal 5 feet thick; the second underlying gangway is 700 yards in, working 6 breasts, in 4 feet of coal; the gangway on No. 10 vein is 800 yards in, working 12 breasts, in 6 feet of coal; total number of gangways open are 8; their aggregate length is 8,125 yards, working 34 breasts.

Ventilation.—These gangways are ventilated by atmospheric action; the air traversing the gangways and breasts; thence up into the counter levels and out by air-holes to the surface.

Engines.—Two steam engines, combined power=60 horse; the condition of the boilers is not known; all things else appears to be kept in good order.

Remarks.—General condition of the colliery is favorable; ventilation by natural action is of course deficient, and directed a resort to better means of ventilation, &c., and served a written notice on the managers to that effect; gave such necessary instructions on the state of the mine and safety of persons employed as seem proper; 300 hands are employed; 28 mules and 67 wagons in use; shipments at 100 cars per day.

No. 40.—*Inspected November* 30, 1870.

Description.—Shamokin Coal Company's Hickory Swamp colliery, situate 2½ miles east of Shamokin, on the estate of the Northern Central railway company. The colliery consists of 4 openings, i. e., a tunnel, 2 drifts and 1 slope, all open on the Twin veins of the Mammoth. The drainage is accomplished by a small steam pump.

Gangways.—No. 8 (new) gangway is 125 yards in, working 4 breasts, in 6 feet of coal; No. 7 gangway, on No. 9 vein, is nearly finished, in 5½ feet of coal. The tunnel west gangway is 1,250 yards in, working 3 breasts, in 6 feet of coal. The east do., on No. 8 vein, is 300 yards in, on the south dip, working 2 breasts, in 7 feet of coal. The east do., on No. 9 vein, is 456 yards in, its south dip is 60°, working 3 breasts, in 6 feet of coal. The advance do. on No. 8 vein, as opened by a tunnel, is 52 yards in, working 2 breasts, in 7 feet of coal. The west do., 400 yards, on the 8 vein, in coal 6 feet thick; its south dip is 70°, working 3 breasts. The west do. on No. 9 vein is idle. The slope is sunk 180 yards deep, on the south dip of No. 9 vein, at an angle of 15°. It is just completed and are now opening in gangways, etc.; total gangways, 6; aggregate length, 2,593 yards, working 17 breasts.

Ventilation.—This is effected from old workings and some by action of the atmosphere, etc., and air-holes, at intervals, out to the surface. The ventilation was not adequate, but a sufficient quantum of air traversed the mine for the small number of hands employed therein.

Engines.—2 steam engines, of a combined power=100 horse, are in use. 1 small steam pump is used at present. The condition of the boilers is not known or reported to me.

Remarks.—The mine is well managed, excepting ventilation, which is not reliable, and often insufficient to be effective. It is contemplated to use a steam fan in connection with the working of the slope level, and I directed the employment of better means for present ventilation; 145 hands employed and 28 mules in use.

No. 41.—*Inspected December* 1, 1870.

Description.—J. Langdon & Co.'s Hickory Ridge colliery is situate 3½ miles east of Shamokin, on the estate of the Northern Central railway company. It is one year in operation. It consists of two tunnels, open

south. The first is open on the north dip of No. 10 vein. Its east gangway is 180 yards in, working 3 breasts, in 5 feet of coal. Its west do. is 150 yards in, working 3 breasts, in 5 feet of coal. The lower tunnel is 200 yards in, with no gangways opened, and suspended for the present.

Engines.—Two steam engines, each 30-horse power, are in use.

Remarks.—The colliery is new, and the breaker building is capacious enough to do a large business. The lower tunnel has opened the No. 10 vein, though not in as good condition as is found in the upper tunnel. This tunnel is still continued to the Nos. 8 and 9 veins, which are expected to be found in a warrantable condition to remunerate the operators for their heavy outlay.

No. 42.—*Inspected December* 2, 1870.

Description.—John Bartholomew's Locust Creek colliery is situate near Mount Carmel, on the estate of the Locust Summit improvement company. The colliery is 8 years in operation. It consists of two slopes opening on the E or Mammoth vein. No. 2 slope is about to be abandoned. No. 1 slope is sunk two lifts, (166 yards,) the upper lift of which is worked out.

Gangways.—The west gangway is 600 yards in, working 14 breasts, in from 16 to 20 feet of coal. The east gangway is in 300 yards, (worked up to the limits of the boundary,) working 10 breasts, in 16 to 20 feet of coal.

Ventilation.—This is effected by the operation of a steam fan. The air supplied to the western division passes in a monkey gangway to the face of the main gangway, and on the east side by means of a brattice. Some of the inner workings are in advance of the air, but will be remedied in a few days.

Engines.—4 steam engines=150 horse power, are in use. The condition of the boilers, as to safety, was not reported. The engines and machinery were in good order.

Remarks.—The use of a steam fan improves the condition of ventilation The defect experienced in the inner workings will be attended to at once. The colliery was then idle, but, on the 7th inst., I made another visit, and found the operator proceeding to abandon No. 2 slope by removing the pumps, &c. I requested him to furnish me a map of the surveys of the mine. I was shown a map of the colliery and was promised to be furnished with a copy in a few days' time. 180 hands employed, with 18 mules and 150 wagons in use.

No. 43.—*Inspected December* 3, 1870.

Description.—Graber, Kemble & Co.'s A. S. Wolf colliery is situate at Locust Gap, near Mt. Carmel, on the estate of the Locust Gap improvement company; this colliery is 6 years in operation. It consists of one slope sunk 100 yards deep on the south dip of the E vein, at an angle of 48°. The coal in the west side is a little irregular, and at present is idle. The south gangway is running eastward with a north dip, thence westward with a south dip. The coal is good; in 25 feet thick. The south-west gangway is open in the basin, and its coal is very good.

Gangways—The east gangway is 250 yards in, working 2 breasts in 22 feet of coal. The west do. is 125 yards in, working no breast, in 22 feet of

irregular coal. The south do. runs in 58 yards, on south dip, and thence west 50 yards, working 3 breasts in 25 feet of coal. The south basin gangway is 69 yards in, working 4 breasts, in 25 feet of coal. The south-west do. is 67 yards in the basin, working no breasts, in 25 feet of coal; total gangways open is 5; aggregate length in yards, 560, and 9 breasts open.

Ventilation.—This is effected by the operation of a furnace. Its mode of ventilation was explained and was satisfactory, excepting that the air-courses were too contracted to admit a sufficient supply of air to pass through; this defect was to be remedied in the future.

Engines.—2 steam engines=100 horse power, in use, with 4 boilers, all reported in good condition.

Remarks.—A map of these mines is to be furnished me. The colliery was not in operation when visited. I found the air-courses and headings too small and ordered them to to be enlarged wherever necessary. That all dangerous places in and about the colliery and machinery be secured so as to be safe for the hands employed, and to be particular to improve ventilation as soon as the resumption of work is needed.

No. 44.—*Inspected December* 3, 1870.

Description.—Graber & Kemple's Locust Gap colliery is situate at Locust Gap, Northumberland county, on the estate of the Locust Gap improvement company; it is 10 years in operation. It consists of a drift opening on the North vein of the Mammoth, on its south dip 55°.

Gangways.—The gangway is in 1,850 yards, working 3 breasts, in 26 feet of solid coal.

Ventilation.—This is effected by the action of the atmosphere. The last air-hole to the surface is 60 yards from the face of the gangway. An air-course is made on the lower side of the gangway; its section area is too small to be of any great use.

Remarks.—A small locomotive engine is used to convey the coal to the breaker; 1 steam engine runs the breaker; their combined power is=40 horse; 137 hands employed. 15 mules and 60 wagons are in use. I ordered the air-courses to be enlarged and an outlet be made at the face of the gangway, which would improve ventilation, and could be used as a second outlet for men to travel in for safety in case of an accident.

No. 45.—*Inspected December* 5, 1870.

Description.—William Brown's Lambert colliery is situate near Shamokin, on the estate of the Shamokin coal company. It is in operation 16 years, and mining operations are conducted on the lands of E. M. Eastwick & Will, as on the estate of the Shamokin coal company. It consists of one slope sunk 100 yards deep on its first lift, on the No. 11 vein, as named in this region; its dip is 31° south; the present lift is finished, and the lessee is now sinking a new lift on the same slope.

Engines.—Two steam engines of an aggregate power=80 horse are in use; their machinery is in good order; the condition of the boilers is not yet reported.

Remarks.—The appearance of the veins as they are sinking, is very favorable, and a profitable field of mining is anticipated. I directed the re-

moval of a defective pinion wheel, and that a proper break be attached to the drum, and also that horns or flanges be put on it to secure the rope in its position, and to substitute a better chain or rope for the west side of the slope.

No. 46.—*Inspected December* 6, 1870.

Description.—Locust Dale Coal Company's Mariam colliery is situate west of Locust Dale, on the estate of the Locust Dale coal company. It is in operation three years; it consists of a slope opening 133 yards deep, on 58° south dip on the Mammoth vein.

Engines.—There are 5 steam engines in use, with 12 boilers 32 inches + 30 feet long each; pressure generally used is 80 pounds.

Remarks.—I directed the boilers to be examined, and their condition reported; the colliery was idle, and no proper officer of the company present. I deferred my examination of the mine. I directed horns and a proper brake to be attached to the drum; that the safety of the hoisting cages be ascertained; that the slope mouth be protected by fences as well as the trestle work, and that all exposed machinery and attachments be safely secured; 200 hands are employed; 17 mules in use.

No. 47.—*Inspected December* 7, 1870.

Description.—George John & Bro.'s Monitor colliery is situate west of Locust Dale, in Northumberland county, on the estate of the Locust Gap improvement company. It consists of one slope, sunk 110 yards deep, on the south dip of the E or Mammoth vein.

Gangways.—The west gangway is 180 yards in, working 5 breasts, in coal 16 to 20 feet thick. The east gangway is 180 yards in, working 5 breasts, in coal 16 to 20 feet thick. The coal in this colliery has no superior in the region.

Ventilation.—A 20-horse engine runs a 14-feet fan. The condition of ventilation is good, but to be perfect it requires to have the heading open larger, as there is no obstacle or hindrance to interfere in doing so, and it would be favorable to the future ventilation.

Engines.—Four steam engines and one small steam pump are in operation; their aggregate power is=130 horse; 8 boilers in use, 4 of which supply the slope engines and 4 do. the breaker and saw mill engines. Their condition is reported to be good.

Remarks.—I directed the enlargement of the headings, which will greatly benefit the future ventilation of the mine, which is anticipated to become an extensive one, and this timely precaution is necessary. I found the general condition of the mine to be satisfactory. An air-course is opening on the bottom of the gangway. This should be hurried on so as to convey the air sooner to the face of the gangway, and this system continued will greatly increase the supply of air and deliver it in the proper working places.

No. 48.—*Inspected December* 14, 1870.

Description.—Summit Railroad Company's Williamstown colliery is situate at Williamstown, Dauphin county, Pa., on the south side of Big Lick mountain, on the estate of the Summit railroad, 40 miles north-east of Harrisburg and 28 miles west of Pottsville. This is the most productive colliery in the anthracite coal region. The colliery is opened by a tunnel, driven northward $14+12=26\div2=13\times8=104$ square feet in area of section, and 347 yards long, to where the Lykens Valley vein is opened, and laid with a double track. On the east side the main gangway is open 2,200 yards in. The first counter gangway is open from the head of the gravity plane a distance of 1,200 yards; the second counter gangway is open from the head of the longer plane a distance of 1,200 yards. On the west side of tunnel the gangways are extended 2,050 yards. The coal seam dips at the west end at 30°, and gradually decreases its dip eastward at the east end to 10°. The quantity of coal mined and shipped from this colliery has been unprecedented in the whole region, being 67,643 tons in 1866, the first year, and 297,000 tons last year. The total shipments since the colliery has been opened amount to 869,227 tons, all of which was prepared coal. The use of heavy machinery has been lately brought in requisition to facilitate the conveyance of the coal and its preparation, and preparatory to sinking a slope. The slope opening will be 100 yards west of the tunnel.

Ventilation is produced by a forcing steam fan through the tunnel; thence through the workings, and appears to render full satisfaction.

This very productive mine is operated under the efficient and successful management of Major Jos. Anthony since its opening, to whom is due the credit for its great productiveness.

No. 49.

Description.—Big Lick colliery is elevated on the south side of the Big Lick mountain, about 2½ miles west of Williamstown, on the estate of the Lykens Valley coal company, and is opened on the same vein by a slope 400 yards deep and by another 200 yards deep. A gangway from the bottom of the deep slope has been driven eastward 750 yards, and a counter do. open from the head of a plane, a distance of 375 yards. On the west side a counter gangway has been opened a distance of 500 yards. The main west gangway had been previously operated by the Lykens Valley colliery previous to the sinking of this slope. The short slope was sunk to the level of the drift, worked eastward by the same colliery, and coal is at present being mined on east side of short slope only, the west side having been worked out through the drift gangway. The gangway has been extended east of slope a distance of 975 yards, and a counter do. from head of a plane 410 yards. All the coal from these two gangways is hoisted up the short slope.

Ventilation is effected at this mine by an exhaust steam fan, the slope being used for a down-cast air-course. The elevating machinery consists of two 90-horse power connected engines used for the deep slope, and a 60-horse single engine used at the short slope.

In consequence of the gangways having been open from the Lykens valley collieries to where the slopes are located, the water flows westward 4,340 yards, to Lykens Valley slope, where it is pumped to the surface from

the deep slope mines, and all of the short slope workings discharge the water out of the drift at the same locality.

The velocity at which coal is being elevated is at a rate of 25 miles per hour, which led to the adoption, by the superintendent, of absolute regulations prohibiting persons from riding on the slope wagons, except at morning or evenings, at which time they are conveyed in and out at the prescribed rates of speed for that purpose. No accidents have occurred, nor has there been any reported of this colliery, and any that had occurred had been attributed to their own negligence.

Since the property upon which this colliery is located has changed hands and placed under its present management, there have been many alterations and improvements, as well in the machinery as in the workings of the mines. This colliery is also under the superintendence of Mr. Anthony. At Williamstown colliery alone Mr. Anthony employs over 450 hands; the largest monthly shipment, 30,770$\frac{7}{20}$ tons; 202 mine wagons and 64 head of stock are used; 5,300 kegs of mining powder have been used; no casualties occurred; aggregate steam power, 85 horse; 1 breaker; annual shipments for 1870, 297,000 tons; aggregate steam power at Big Lick colliery, 239 horse.

No. 50.—*Inspected December* 15, 1870.

Description.—J. E. Rathbun's Trevorton colliery, situate in Zerbe township, Northumberland county, 8 miles west of Shamokin, on the estate of the Trevorton's. It consists of 3 drift openings and a slope. The slope is sunk on vein No. 1, (Red Ash;) the coal 11 feet thick; dip 67° south; slope west gangway, 266 yards in, working 3 breasts; the breasts are open 10 yards wide, with 8 yard pillars; east gangway, 363 yards in, working 2 breasts; same measures as above; their average lengths, 70 yards; the character of the works appears to be satisfactory.

Remarks.—At the time of my visit I found the colliery idle, owing to a difference between the employer and employed. I thereupon postponed my examination until the works would resume operation, so as to correctly ascertain the state of ventilation, otherwise it would be a futile attempt, but confined my investigations to the condition of affairs, and include these facts in this report, though to myself such a result is unsatisfactory. For casualties see Northumberland county lists.

No. 51.—*Inspected December* 17, 1870.

Description.—S. John & Sons' Green Mountain colliery, situate near Mount Carmel, on the estate of the Green Ridge iron and coal company.

Remarks.—This colliery was idle on the above date, and the probability was it would not resume operation for some time to come. There being no proper officer on the premises, I deferred my examination, and even failed to collect any further information than the above.

No. 52.—*Inspected December* 19, 1870.

Description.—Henry Saylor's Caledonia colliery is situate in Mt. Carmel township, Northumberland county, on the estate of Henry Saylor. I found

this colliery idle, and was informed it remained so for some time past. There being no proper officer present, I deferred making an examination until the resumption of operation, as it would be a futile attempt to investigate the state of ventilation and the condition of the colliery.

No. 53.—*Inspected December 24, 1870.*

Description.—Messrs. Murry & Winlack's Straw colliery, situate 2½ miles east of Tremont, Schuylkill county, on the estate of Judge Helfenstine. It consists of a slope, opening on the Spohn vein, 105 yards deep, on an 80° north dip, in coal 6 and 7 feet thick.

Gangways.—The east gangway is 300 yards in; the west do. is 200 yards in=500 yards gangway. The character of mining done is opening gangway and breasts. I made no general examination, as other engagements claimed my services. I will call at a more favorable time.

No. 54.

I visited this colliery of Messrs. Philips & Sheafer, on Fishing creek estate, 7 miles west of Tremont, Schuylkill county. It consists of a tunnel, open in south on Stony mountain, opening Lykens Valley vein. This colliery is just new and about to commence shipping coal. The prospects are very favorable. The vein is good and the location very desirable. It commands a full view of Lykens and Paul valleys.

No. 55.

Short Mountain colliery, situate west of Williamstown, Dauphin county, Pa. Imperative duties called me away before any extended examination could be effected, and only make mention of it in connection with the collieries of my district, which will be resumed in a short time. The colliery is in operation 15 years, on the estate of the Short Mountain coal company, in Dauphin county. It consists of a slope, sunk 200 feet deep on the Lykens Valley vein, on its north dip, at an angle of 30°. The coal of the Ben Franklin mines and the Short Mountain mines was prepared at this breaker. The drainage of both mines is effected by a Cornish engine, of 300-horse power, and a double steam pump, of 300 horse. These pumps are located in the pumping slope, situated mid-way the two collieries. 375 hands are employed at these mines; 94 head of mules are used at the works. In November 11,000 tons of coal had been shipped. 6 steam engines are in use, including the steam pumping engines, making an aggregate power of 745 horse. The colliery was idle at the time of my visit, and no principal officer at the mines. I deferred my examination of the mines until in operation. The present lift is about being worked out. Preparations are making to sink the Short Mountain slope another lift, of 200 yards, which will increase its length to 400 yards, after which the Short Mountain colliery will have few superiors in that region.

This closes the report of the collieries of my district.

VENTILATION.

List of Collieries that generate fire-damp.

Dauphin county—Franklin, West.
Franklin, East.
Schuylkill county—Black Diamond, Forestville.
Colket, Donaldson.
Eckert, Rauch Creek.
Franklin, Rauch Creek.
Lower Rauch Creek, Rauch Creek.
Middle Creek, Md. C.
Pyne, Swatara.
3 Otto's, Muddy Branch.
Diamond, Forestville.
2 Phœnix Park, Phœnix Park.
Northumberland county—Daniel Webster.
Coal Mountain.

CONDITION OF VENTILATION.

16 collieries are adequately ventilated.
24 collieries are moderately ventilated.
17 collieries are inadequately ventilated.

DISTANCE TRAVELED.

By railroads, 1,198 miles.
By common roads, 297 miles=1,495 miles.

NEW SLOPES SUNK.

1 new slope on Black Heath vein, Frank Gowen colliery, Shamokin, by Buchner, Shepp & Co.
1 do. at Helfenstine, on Lykens Valley vein, by Thos. Rees & Co.
1 sinking at Wiconisco, Short mountain.
1 new slope at Pyne colliery, Swatara, J. C. White, superintendent, who is boring to the Mammoth vein by a steam drill; a statistical description of its progress will appear in our next.
1 inside slope at Otto Red Ash colliery.
1 at Lambert colliery, Shamokin, and sinking for a second lift on No. 11 vein, by William Brown, Esq.

ABANDONED COLLIERIES.

The works at Bell's Tunnel Coal Ridge colliery, the upper lifts are exhausted; slope No. 2, at Locust Gap, John Bartholomew, operator.

LAND SALES.

The number of land-sale collieries in my district is about 7, employing about 10 hands each=70, and mining about 3,000 tons per annum.

Letters written, 90; letters recorded, 40.

DAVID EDMUNDS,
Inspector of Mines.
Per P. F. M'ANDREW,
Clerk mining district Schuylkill.

EXPENSES.

Office rent, 8 months, at $8	$24 00
1 table	6 00
4 chairs	10 50
Water pails and broom	1 28
Framing commission	2 25
Wash sink	6 00
Fixing shelves	2 80
Office desk	40 00
Water pitcher	62
Wash bowl and pitcher	1 75
Office lamps	4 84
Oil can	45
Duster	75
Stove, pipe, coal bucket, &c	29 92
Coal, 2 loads, at $2	4 00
1 set draughting instruments	15 00
1 parallel ruler	6 50
1 tape line	5 75
1 barometer	12 50
3 thermometers, at 45c	1 35
1 two-foot rule	1 75
1 pair calipers	45
1 inkstand	1 00
Litmus paper	10
Post office box rent	75
Post office stamps	2 00
Revenue stamps	50
Magnifying lenses	2 50
Cleaning office	2 00
Suit mining clothes	30 00
Mining boots	9 00
B. Bannan, advertising, books, &c	18 36
500 letter heads	5 00
Boarding bill	67 00
Traveling expenses	53 00
2 loads of coal	4 74
Advertisement, (estimated,)	5 00
Sundries	3 00
	382 31

DAVID EDMUNDS,
Inspector of mines.
Per P. F. M'ANDREW, *Clerk.*

In view of the casualties that occur from missing blasting in coal mines, and the many contrivances presented to the mining, all of which, more or less, are defective, partly owing to their rude construction and damp or wet in mines and convenience for miners' use, we would recommend Daddow & Beadle's new safety fuse, as being the most safe and economical ever offered to the miners, in being perfectly safe. Blasting is one of the most dangerous employments of the miner. This new invention for discharging

blasts consists of a small brass tube, filled with powder, impervious to damp, and ignites by a quick match. The match may be fired in the usual way, by the lamp; but where gas exists the match may be fired by friction, thus preventing or obviating the dangers of using blazing lamps, in an atmosphere of carburetted hydrogen gas, (fire-damp,) thus rendering the handling and operation of the touch, and firing of blasts safe and very reliable.

In view of the necessity of a safe mode of blasting in mines, we think it proper, in this part of our report, to call the attention of miners to this new and safe invention, having no other ulterior object in view than that which we believe it to be our duty, in informing the miners generally of the safety and economy of this new mode of blasting.

REPORT

OF THE

INSPECTION OF COAL MINES FOR THE MIDDLE DISTRICT OF LUZERNE AND CARBON COUNTIES, STATE OF PENNSYLVANIA, FOR THE YEAR ENDING DECEMBER 31, 1870.

T. M. WILLIAMS, INSPECTOR, WILKESBARRE, PA.

To His Excellency, JOHN W. GEARY,
Governor of the Commonwealth of Pennsylvania:

SIR:—In compliance with the requirements of an act, entitled "An Act providing for the health and safety of persons employed in coal mines," and creating the office of inspector of coal mines, &c., I, as one of those inspectors appointed, have the honor to submit a report of my labors, and the results obtained, together with a tabulated report of the accidents producing death, or serious injury to persons, giving some brief sketches of the most difficult of the many obstacles that have presented themselves in the way of carrying into execution the provisions of the new mining law, giving in a general way, an account of the work accomplished, and in the same manner some suggestions, calling attention to those places where danger exists, or apparently so, &c. My reason for giving my report, most part of it in a general way, is this: Having to make a monthly report to the clerk appointed under an act, entitled "An Act for the preservation of records of mines, &c.," which takes much of my time, such time might (in my opinion) be devoted to a better purpose, than in giving dry details of each colliery visited by me, it would, at least have enabled me to have presented to you a fuller report of my proceedings. The intention or purpose of this new mining law, (as I understand it,) is this: To ascertain the number of persons killed or injured, in or about the coal mines; also to ascertain as near as may be, the cause of the same; and further, to use all the precautions necessary to prevent the occurrence of such accidents as have happened in the past, for want of that proper care on the part of the employer and em-

ployee. The law provides for many changes from the old system of carrying on mines; to guard against accidents, for instance, the clause providing for, and that each mine shall, after a certain time, have at least two places, or openings to the surface, for the ingress and egress of the men employed therein, and that the same shall always be available. The minimum size of air-ways; the minimum amount of air that shall travel through the working places of any mine; the speaking tube; safety catches; bridle chains and covers over carriages; the maximum number of persons allowed to ride upon any mine car or carriage; the prohibition of any person riding upon any loaded car or carriage; the requirements of maps and plans of all mines; the prohibition of boys under twelve years of age working under ground; the inspection of all steam boilers in and about the mines and a report of their condition, &c.; the requirement of competent men as inside foremen (mine bosses) and firemen, where the mine gives off carburetted hydrogen gas, (commonly called fire damp,) and the requirements of a monthly report from each inside foreman, of the quantity of air circulating through the different sections of the mine in their charge, to be ascertained weekly; the strict attention required to be paid to all accidents and deaths therefrom, &c.

The law further provides for the appointment of an inspector, whose official duty (as I understand it) is to see the requirements of the new law faithfully and impartially observed and obeyed by all parties concerned, and if any apparent or threatening danger exists, from any cause, to recommend the most available and effective means to remedy the same; also, whenever the law gives the inspector discretionary power it should be used with great care and prudence, and when the law is clear upon any point, stating that a certain thing shall or shall not be done, then I think an inspector is not justifiable (if in his power to prevent) in permitting any violation of the same, especially where the lives of so many persons may be endangered thereby, and producing, perchance, another such a catastrophe as that of Avondale.

There may be some minor matters wherein a violation of the law may be excused—where it may serve the employer and employee, and where there is no danger to life or property, then only for very good reasons and to be simply *pro tem.*

There may be advanced powerful arguments for allowing certain things to be done. For instance a mine owner may plead that he would be much injured unless he was allowed certain privileges; and on the other side the men may plead poverty, &c., &c., and that they would be willing to run certain risks if they could get permission to act in contravention of the law and thereby make more money; but if any accident should happen, those reasons would not satisfy an indignant public, for they would make the law their guide and render judgment accordingly. Better lose many dollars, and the enjoyment of many luxuries, than to sacrifice one life or limb in risks that can be avoided, as a great many accidents and deaths will happen in mining with all the care and precautions that can be given.

Four months or more elapsed from the passage of the mining law before the inspectors of Luzerne and Carbon counties were examined and commissioned, the court of Luzerne having decided against appointing the board of examiners until after the matter had been referred to the Supreme Court and a peremptory *mandamus* issued by the Supreme Court, directing the court of Luzerne to appoint, &c., as directed by the mining law.

On the 21st of July, 1870, I had the honor to receive my commission for the Middle district, took the oath of office on the 23d, (Saturday,) and began my official duties on Monday the 25th day of July, 1870. From that

time to the present I have made two visits to each mine, and traveled through the principal part of their workings, except a few mines which, on my second visit, I found had suspended. Those mines were owned by the Delaware, Lackawanna and Western railroad company, and the Delaware and Hudson coal and canal company.

This (the Middle) district is about 26 miles long by about 4 miles wide, equal to an area of 104 square miles, and embraces the following different kinds of openings, through which the coal produced reaches the surface:

Tunnels and drifts above water-level, penetrating to the coal, and in working order at present	23
Slopes in working order	29
Shafts in working order	20
Total surface openings	72

Underground slopes operated by steam power	9
Self-acting planes	13
New shafts, not yet producing coal	10
Shafts re-opening	1
New slopes, not yet producing coal	2
New tunnels, not yet producing coal	1

Of the 14 surface openings now in the act of opening, 4 or 5 only can ship any coal in 1871.

There are 50 coal breakers in this district, in good working order, exclusive of 2 new ones, nearly ready for operation, and 1 not at work, the mine having been abandoned for the present.

The large corporations own about two-fifths of the above, as follows:

The Delaware and Hudson coal and canal company, at present	7
With other 2, owned by other parties, which will come into their possession, and a new one, in 1871.	
The Wilkesbarre coal and iron company	7
With 1 leased from the Lehigh coal and navigation company	1
The Delaware, Lackawanna and Western railroad company	3
The Lehigh Valley railroad company	1
The Lehigh coal and navigation company	2
Total	21
Balance	29
	50

Twenty-nine in number are operated by different firms and contractors. The following is the total production of coal in this district, during the months of August, September, October, November and December, 1870, as near as I can learn: 1,400,000 tons.

At the time I commenced my duties as inspector, much to my surprise I found nothing had been done, comparatively speaking, towards complying with the new mining law. There were 11 shafts working that had but one means of ingress or egress, all except 2 having large coal breakers attached, and one of these has an immense large building over head, called a head house, with an engine house and trestling connecting it with a breaker, and

were employing their full hands inside the mine, entirely disregarding the law in this matter. The other one, owned by the Delaware and Hudson coal and canal company, called the Pine Ridge shaft, was working according to law in this particular.

By the 22d day of August, 1870, those parties owning or working mines, having only one mode or means of ingress or egress, were duly notified to suspend operations or comply with the law, by reducing the number of persons working inside the mine at one time to 20, and to put all the force they could of this number to work for the second opening or means of ingress or egress, not confined to any number of shifts, in 24 hours.

Some operators complied with the notice, while others would have worked on had not the men refused to work under the circumstances. However, some 4 or 5 claimed that they had been driving for the second opening or means of ingress or egress; some to surface in coal which did not out-crop on their lands; others to connect with adjoining mines, and at the same time they had not even made a survey to know the distance required to be driven to make the second means of ingress or egress to their mines, but were working the mines in the best manner they could to secure work in future and to facilitate the getting of coal, irrespective of the time it would take to make a second means of ingress or egress to their mines.

Shortly after the notices were served, the parties interested held a meeting, the proceedings of which were not made public. Soon after this surveys were made by most of them, and they began in good earnest to work according to law and make the second opening or means of ingress and egress an accomplished fact, while about this time two shafts stopped altogether for the present. One of them was owned by C. S. Maltby, a small shaft, 108 feet deep, it being nearly worked out, and had a severe breakage of machinery from over-winding. They did not deem it worth while to repair the shaft and machinery, as the new mining law required so many improvements to be made for the safety of the miners employed. It is therefore abandoned until a new shaft is sunk at some future time.

The Wilkesbarre coal and iron company owned and operated the other shaft, and had commenced to work for the second mode of ingress or egress according to law, with twenty men; but after a survey had been made, the distance was found to be so great, the shaft was stopped and has not since resumed. This shaft is 340 feet deep, but has no breaker attached to the head house; the seam they worked has an out-crop on the mountain side, many hundred yards from the shaft; there is also another abandoned shaft to the west of this, where there is but 125 feet from that to 140 feet to sink through, to cut the same seam of coal with about 1,000 feet to drive through coal to connect the two passes.

THE PINE RIDGE SHAFT, SINGLE OPENING.

Owned by the Delaware and Hudson Coal and Canal Company.

This shaft is 400 feet deep, has a large breaker attached to the head house of shaft; this mine gives off a large quantity of gas or fire-damp. It has been on fire several times, but has been fortunately extinguished without much damage. They have been driving to connect with their adjoining Mill Creek mines for the purpose of a second mode of ingress or egress, but have had a rock fault to contend with, or they would have made the connection

some time ago; they are now suspended, like the whole of this company's mines. By looking at the plan, only 1,500 feet appear to be between the two places.

THE HENRY COLLIERY SHAFT, SINGLE OPENING.

H. W. Burroughs, Operator.

This shaft is 384 feet deep, has a large breaker attached to the head house, and the mine gives off a considerable quantity of gas or fire-damp. After being restricted to twenty men in the mine at one time, they decided to sink a second shaft 9 by 12 feet in size, and are entitled to especial commendation for the energy displayed since they began. Four months ago they commenced cutting upwards and sinking from the surface, and are now within 40 feet of being through. Had it not been that they met with large feeders of gas fire-damp in the place they were cutting up from below, compelling them to abandon this mode of completing the work, it would have been through this year, thus showing what can be done where there is a will.

WEST PITTSTON SHAFT, SINGLE OPENING.

The Lehigh Valley Railroad Company, owners.

This shaft is 280 feet deep, giving off considerable gas or fire damp. This company having only lately become the owners, the state of the works being very bad, and this change in the ownership being looked for, little work has been done during my term of office, until lately; they are sinking a slope, prospecting as to the proper location for a new shaft.

THE EAST BOSTON SHAFT, SINGLE OPENING.

The Consumers' Coal Company of New Jersey, owners—Chas. Hutchinson, lessee.

This shaft is 160 feet deep; has a breaker attached to the head house; was not working for some time, the lessee and lessors being in dispute about divers matters and things, amongst others, the question of the second mode of ingress or egress to the mines. The matter was finally settled, and Mr. Hutchinson is now sinking another shaft on the adjacent property, intending to make a connection with the East Boston shaft and mines, thereby making a second means of ingress or egress for each mine. This shaft is expected to be completed early in the spring, and Mr. Hutchinson's lease expiring in April, he will then work the newly leased tract from the new shaft.

THE WATERMAN AND BEAVER SHAFT, SINGLE OPENING.

Situated near Kingston—Messrs. Waterman & Beaver, owners and operators.

This shaft is 347 feet deep, with a very large breaker attached to the head house. They have been driving for a second mode of ingress or

egress since July last, and they are driving from 185 to 195 feet per month, through coal; they had done some work in this direction prior to July last, but it had been made a secondary consideration; they had then about 250 feet, more or less, of vertical height to overcome, in reaching the surface. At this time the company did not own the land upon which the seam of coal cropped out, the nearest point to which was about 3,600 or 3,700 feet from the shaft, and about 3,000 feet from the face of their workings. Since then they have made arrangements for the adjoining land, where the seam crops out, and have lately commenced to drive a slope to meet the one coming up from the shaft. At the present time they have 2,300 feet to complete the second mode of ingress or egress, and contemplate being through by July or August, 1871.

THE NORTHERN COAL AND IRON COMPANY—NO. 1 SHAFT, SINGLE OPENING.

The Delaware and Hudson Coal and Canal Company, owners.

This shaft, situated a short distance east of Plymouth, is 295 feet deep; they are working two seams of coal, neither of which had a second mode of ingress or egress. I served them with a notice to comply with the law in regard to the second mode of ingress or egress, since which time they have succeeded in making a connection with their No. 2 shaft, in one of the seams of coal worked, and but for disputes about wages with the men, in consequence of which work was suspended, a connection would have now been complete in the other seam of coal, and the law complied with; as it stands they have now about two weeks' work to complete the connection, through coal, but there some irregularities in the seam that have retarded their progress.

THE LANCE SHAFT, SINGLE OPENING.

William L. Lance, owner.

This shaft is located in close proximity to the borough of Plymouth; is 175 feet deep, and has a large breaker attached to the head house. In August they began to sink a small shaft to connect with the old working in an upper seam; the same is now near completion, having only 140 feet to sink, and the second mode of ingress or egress will be complete.

THE FELLOWS, DODSON & CO.'S SHAFT, SINGLE OPENING.

This shaft is operated by the above company, located almost if not quite within the borough of Plymouth, is 220 feet deep, and has a very large breaker attached to the head house. It is not long since this mine was opened, and now they have but very little gangway driven on either side of the shaft; they have about 900 feet to drive through coal, and about —— feet through rock to complete the second mode of ingress or egress. This is according to a proposed plan of connecting with the worked out seam at the Lance shaft. The rock work could be done from the Lance mines, while the Fellows & Dodson could continue in the coal towards the point of connection, thus making a second mode of ingress or egress.

THE NOTTINGHAM SHAFT, SINGLE OPENING.

Messrs. Broderick & Conyngham, lessees.

This shaft is located in the borough of Plymouth, and is 376 feet deep; has a large breaker attached to the head house, which has been on fire once since the Avondale disaster; 55 men were in the mine, but, fortunately, the fire was extinguished before it got any headway. This shaft is sunk through about 50 or 60 feet of quicksand before reaching solid rock; this would rush into the shaft like water could it have a small opening, which may be caused by any disturbance of the shaft cribbing, (wooden lining,) either from accident to the pumping or hoisting machinery, decay of the timber or the slightest movement of the strata upon which the foundation of the shaft rests.

The seam worked in this shaft is worked, also, by the same company in a slope, from which they are driving to make a connection with the shaft for the second mode of ingress or egress, and thus assisting the same operation going on in the shaft towards the slope; this has been going on since early summer but without accomplishing much; they have had stoppages from breakages of machinery, from disputes with their employees. Two shifts only working where three should have been employed, to have secured, at the earliest possible date, a second mode of ingress or egress. There has been no exertion or energy in the matter until very recently. The place or point started from was not, in my opinion, the proper place to commence to make the connection with the slope workings in the shortest possible time. From the face of the west gangway in the shaft to a point in the slope was, in the spring, about 2,000 feet in a direct line, but to go square up to the pitch of the seam, required that the shaft west gangway, or the slope east gangway, be driven 700 feet; there then remained 1,600 feet to complete the connection, making a total distance of 2,300 feet; there is an anticlinal axis where the seam of coal comes nearer to the surface than at other places. I should have preferred the determination of this anticlinal, and then have sunk a small shaft to the seam, and the work could have been going on in both places, and would have secured a second mode of ingress or egress in the shortest possible time. I do think that in a case of so much importance the second opening, or means of ingress or egress, should be made a matter of primary consideration, and carried through to its completion with dispatch, and as the law directs.

Shortly after my notice to all the operators working mines with only one mode of ingress or egress, &c., calling their attention to the law on that matter, they all stopped or proceeded to work, complying with the law, and employing only 20 men in each mine, &c. I was much pleased to meet with little or no difficulty in this matter, but it was not very long before my attention was called to the fact, that the Lance shaft, William Lance, owner, the Nottingham shaft, Thomas Broderick & Co., lessees, and the Henry shaft, H. N. Burroughs, operator, were violating the law, having their mines running nearly full handed. I made special visits to some of them in regard to this matter, and received fair promises, but the mines still continued at work, with more than the stipulated 20 men inside at one time, when I was finally compelled to apply for an injunction, which I did on the 17th day of November last, employing H. W. Palmer, of Wilkesbarre, as counsel for the Commonwealth. On this day, the Lance shaft stopped work from local causes. The case of Messrs. Broderick & Co., was postponed until the 19th day of December, when they said they should test the constitutionality of the new mining law, &c. Since which time nothing

has been done in the case, and I have questioned my counsel several times, but can find no reason why it is not attended to, more than that is in the hands of the court.

In the case of the Henry shaft of H. N. Burroughs, an injunction has been granted. I make these things known to you, because many persons are wondering why these parties can continue violating the law with impunity, as well as to relieve myself from responsibility, should any serious accident happen at those mines from those violations. I shall have performed my duty as far as it was possible for me to do. I have tolerated many things which the law requires should be improved, knowing as I did that these improvements could not be made at once, needing some time and money to accomplish them; not wishing to make either myself or the law obnoxious to the operator, I have had no law suits only in the cases before mentioned.

I am pleased to state for your information, that a great deal has been done in preparing plans and surveys of the mines, of which I have a copy, except in about a dozen instances, where they are not quite completed.

Great improvements have been made in the proper distribution of the air through the various working places by enlarged air-ways, increasing the ventilating currents by the more general use of the fan as a means of increasing ventilation, and in many other ways. Was I to describe the condition of many of the mines in this district as they were twelve months ago, it would be no credit to this Commonwealth. But befor another year passes great changes will have been made, not the least of which will be in the ventilation of the mines, as by the monthly reports of air measurements each mine foreman will be enabled to judge if any improvement has been made, or where any losses of the current take place; in fact, he will know just what he is doing, if he understands his business as he ought to do. These air measurements are required to be made weekly and reported to me monthly.

Before the passing of the present mining law it was not known at one mine in fifty how much air passed through the intake of the mine or what proportion was utilized. At the present time many of the mine foremen have some idea of what amount of air they have in the whole and in the separate currents of their mines. There are also some places mines that are so completely riddled and cut up that no kind of ventilation could be adopted until such time as an (air-tight) air-way can be made through the old workings, which can only be done at the expenditure of much time and money. During my first visits I found many mines at work with insufficient air in the workings to even move the anemometer (an instrument used to measure the velocity of air-currents.) Brakes have been put into many of the hoisting drums, and some of them not answering the purpose intended have been condemned and changed. Bridle chains and covers over the carriages used in hoisting men up shafts, many speaking tubes, &c., all of which have given great satisfaction.

The condition of steam boilers I am not able to speak very positive about, further than to state that I have ordered examinations and reports of them to be made as the law directs, and have communicated with each company or individual operator requesting reports for this month, but many of them have failed to comply with such request. I am of opinion that some boilers are used which, if properly tested, would be found wanting and condemned accordingly. Nearly all boilers were at work, with a common lever safety-valve, and the attendant in many cases had no idea of what pressure he was carrying, some of the safety-valve levers not having any visible figures or marks to denote the pressure of steam, some levers carrying weight of any kind beside the original weight made with the valve.

I have had steam gauges put upon them all, without exception, and am of opinion that before another annual report shall be made quite another state of things will appear, and any feeling now existing will have entirely vanished, and the improvements which at present may be disliked will by that time be considered indispensable.

Some of the men employed in the mines appear to think that they should not be prevented risking their lives at pleasure in riding upon loaded cars, coming up slopes or shafts, oftentimes in such places as are known to be unsafe, and otherwise endangering their lives to obtain greater remuneration or saving of time, though in time I hope they will see the wisdom of those provisions in the new mining law made for their benefit.

In the forthcoming year it is my intention to be stringent, having given ample time for all concerned to bring their mines into that condition which the law requires, and it would be neglect on my part to allow anything to pass undone which is required to be done for the better preservation of life and limb. For this reason I have for the third time called the operators' attention to this fact, by different notices, &c.

I wish to call your attention to what might end in the sacrifice of many lives at any time. It is the great number of massive breakers, containing thousands of feet of lumber, built one after the other, each one adjoining the frame work of the head house. The question asked is, what can be done to make the second mode of ingress or egress (which is indispensable to give any chance of safety to the miners under ground) more safe than many of them are at present? I will endeavor to show you how most of the shafts are ventilated. All mines have at least one down-cast air-way, with an up-cast return air-way to the surface. Most of our deep shafts are using fans as a ventilating power, which, in many instances, are placed near the top of the shaft, with a portion of the shaft partitioned off from top to bottom as an air-way for the return air of the mine in connection with the fan, while outside this partition, and in the main hoisting way, is the down-cast air-way. Others again make the return air-way on the crop of the seam, or some other distant point most convenient, making the main shaft a down-cast air-way as before. Others again have the up-cast at the main shaft, partitioned off as before, but have a down-cast at another point. This I think the safest plan of them all, for should the engine house, breaker or any other portion of the superstructure take fire, the men would be secure from the dense smoke of the burning structure. And should the fan be consumed or the mines give off a large quantity of gas or fire-damp, the heat of the fire would cause a ventilating current of great power in the right direction for the security of men in the mines. In the other cases the smoke would go into the mines with the down-cast current, and would soon cause the death of every man therein, unless there were some means of changing the current by doors or otherwise, when, should the mine generate much gas, another danger would thus present itself, thus showing that workers under ground, with even two modes of ingress or egress, still run great risks, while those huge piles of lumber surround the shafts on all sides. If at all possible, the main shaft should not be the down-cast, but if this cannot be avoided, the breaker and other structures should be located at such a distance that in case of a fire the shaft would be in no immediate danger, which, with the precaution of having a good supply of water on hand, would render the mine comparatively secure.

In some instances I have found steam boilers located much too near the shaft and breakers for safety, many of them being located immediately under the breaker, where there may be from 30 to 70 men and boys employed in the operation of cleaning coal. I can just imagine six old, dilapidated steam

boilers placed in the lower story of one of our high schools, with the same number of scholars in the story above, as I look upon it. This would not be allowed to continue one day, and certainly our breaker men and boys are entitled to the same consideration, and should be prohibited from working under such condition of things by law.

One other matter I wish to call attention to is. There should be a minimum size fixed as the thickness of any pillar of coal left between any two working places going parallel with each other. Many accidents arise from men working too close to each other, not knowing exactly how thick the pillar is between them, in consequence of which men have been injured and killed from a blast fired in an adjoining chamber, from which he had considered himself safe. Inspectors would then have some power in the matter, and it would have a tendency to make all mine foremen more careful to see that the men kept a proper thickness of pillar between every working place. This, in my opinion, is much needed.

ACCIDENTS.

In the accompanying form I have tabulated the serious accidents and deaths. Probably some dozens of others of minor importance have happened which have not been officially reported to me. Many of these accidents might have been avoided with that care and knowledge of the business which all connected with mines ought to possess. Accidents have resulted from want of proper care on the part of those in charge of the place. It will be observed that the greatest number of accidents have arisen from falls of coal, falls of roof, mine cars and explosions of gas; and many arise from want of care on the part of the miners themselves, particularly those accidents from falls of coal or roof, from which causes 7 men lost their lives and 14 were seriously injured. Accidents from mine cars, killed 3 and injured 8, and 16 met with serious injury from explosions of gas, (firedamp;) 1 man was killed by falling down a shaft; 1 was killed on an underground slope; in other ways under ground 3 were killed and 5 injured; 1 man was injured by an explosion of powder in the mines; machinery on the surface killed 3 and injured 2; from other causes on the surface, caused the death of 2 and injury to other 2; a total of 20 deaths and 48 injuries from all causes.

Five of those injured have since died, increasing the deaths to 25, and decreasing the list of maimed to 43; total from all causes of 68. A loss of one life for every 56,000 tons of coal mined, and an injury to one person for every 32,558 tons of coal mined.

REPORT *of the number of accidents and deaths therefrom in the Middle district of Luzerne and Carbon counties, from the 1st day of August, to the 25th day of December*, 1870.

OWNERS OR LESSEES OF THE MINES.	FALLS.				IN SHAFTS.				UNDERGROUND.								ON SURFACE.				TOTAL.		
	Explosions of gas or fire-damp	Falls of coal	Falls of roof	Total	Falling part down shafts	Over winding	Breakages, rope, &c.	Total	Explosion of powder	Suffocation by gases	Irruptions of water	Falling into water	On slopes, &c.	By mine cars	By machinery	Sundries	Total	By machinery	Sundries	Boilers	Total	Injured	Killed	Grand total
The Wilkesbarre coal and iron co	4	2	5	11										5		3	8	1	4		5	17	7	24
The Franklin coal company	2			2																		2		2
Messrs. Fellows & Dodson	1	1		2	1			1								1	1					2	2	4
Messrs. Albrighten & Roberts		1	1	2														1			1	1	2	3
The Delaware and Hudson C. C. Co	6	2		8										1		1	2	1			1	10	1	11
Mr. Wm. Lance			1	1										1			1					1	1	2
Mr. James Hutchinson														1			1						1	1
The Mineral Spring coal company	3	1		4					4								1					5		5
Messrs. Waterman & Beaver			1	1																		1		1
Mr. A. J. Davis			1	1																		1		1
Del., Lackawanna & West'n R. R. co														1			1					1		1
Mr. H. N. Borroughs			1	1																		1		1
Mr. H. W. Wertz														1		1	2					2		2
Messrs. Broderick & Co		1	1	2									1				1	1			1	1	3	4
The Lehigh coal and navigation co																1	1	1			1	1	1	2
The Susquehanna coal company														1			1						1	1
The Wyoming coal and trans. co		1		1																		1		1
The Mocanaqua coal company			1	1																			1	1
																1	1					1		1
	16	9	12	37	1			1	1				1	11		8	21	5	4		9	48	20	68

Five of those herein given as injured have since died, increasing the number of killed to 25, and reducing the list of injured to 43.

T. M. WILLIAMS, *Inspector of Coal Mines, &c.*

REPORT

ON THE

INSPECTION OF COAL MINES IN THE SOUTHERN DISTRICT, COMPOSED OF A PART OF LUZERNE COUNTY, TOGETHER WITH CARBON COUNTY, FROM JULY 19TH TO DECEMBER 31ST, 1870.

JOHN T. EVANS, INSPECTOR OF COAL MINES.

To His Excellency JOHN W. GEARY,

Governor of the Commonwealth of Pennsylvania:

SIR:—On the 19th of July, 1870, I had the honor to receive from you an appointment as inspector of coal mines in the afore-mentioned district, and in obedience to the twenty-second section of "An Act providing for the health and safety of persons employed in coal mines,"

I now beg leave most respectfully to submit the following report of my proceedings, up to the 31st day of December, 1870:

Whenever I received notice of an accident or other event pertaining to my duties as inspector of coal mines, I immediately made it my business, at the first opportunity, to visit such places, and to make an examination into the cause and place of accident. If loss of life were the result of such accident, a coroner's inquest would be held after I had examined the working place where the accident occurred. We have had three instant deaths by accidents, and a driver was found dead in the ditch by the side of his trip of cars. The cause of his death, according to the attending physician's opinion, was disease of the heart. Four more lived some time after the accidents occurred, making eight deaths in the this district, from the 19th of July, 1870, to the 31st of December, 1870. They may be classed as follows: Three deaths by explosion of fire-damp, 3 deaths by cars, 2 inside and 1 outside; 1 death by a fall of coal, 1 found dead in a ditch.

There were also 25 accidents not resulting in loss of life. Some of those injuries are very severe; others were not so, as the tabular report will show. Never has the list of accidents been so small in number, in proportion to the hands employed, and to the steadiness of work, as at present. This shows that the ventilation bill works well.

I have not found much serious opposition to the law. Most operators show a willingness to comply with its provisions in a reasonable time. The ventilation is fast improving throughout the district, though some parties are not so active as others in remedying defects in this part of our workings. Such places take a great portion of my time. I have made four visits to some of those slopes, where the ventilation is most imperfect, and nearly two visits to all other places, besides attending to accidents.

Speaking tubes are in use in nearly all slopes that are not too deep for the words to be heard or understood through such a length of pipe. Our

slopes are generally sunk to a great depth. We have one at Hazleton 755 yards in length from surface to bottom of slope, and from surface to engine house about 12 yards more, making in all 767 yards, and several others are from 300 to 500 yards in length.

All the slopes in this district are driven down in the vein intended to be worked. In some of them there are tunnels driven through rock and slate to other veins.

The average dip of the veins, as near as I can ascertain, is about 30°, except in the mines of the Lehigh coal and navigation company, at Summit Hill and Nesquehoning, where the dip will average about 50° or 60°.

The latter property is a portion of the first, or southern anthracite coal field, which crosses Schuylkill county in an easterly direction from Pottsville, and extends thence to Tamaqua, Summit Hill, Carbon county, and Nesquehoning, and terminates in the Mauch Chunk mountain, about 3 miles from Mauch Chunk borough.

The Beaver Meadow, Hazleton, Black Creek, Little Black Creek and Upper Lehigh basins are generally entitled the Middle coal field, or Lehigh coal basin. The most of these veins, in this region, are of great thickness, as is shown by my tabular report. This great thickness makes the mining of them dangerous, especially when the miners are unaccustomed to such work. In some instances I have been invited to examine collieries where danger was apprehended, but where no actual injury to persons had occurred; and while I have, on such occasions, given to those who solicited it, such advice and suggestions as seemed reasonable and applicable, I have cautiously abstained from even the semblance of dictation, or of unauthorized interference in the mode of conducting the works, unless it was asked for by the agent or workmen, or unless I foresaw danger to the employees in the existing method of carrying on operations.

We have restricted 5 slopes and 1 shaft, four of those slopes are new works. They are restricted for the want of proper outlets, according to law. All of those works will have their outlets completed by the end of January. I will here give the names of those works that have been restricted: Beaver Creek coal company's slope, No. 1; New York and Lehign coal company's slope, No. 4; Stout coal company's slope, No. 4; Pardee & Co.'s Diamond slope, No. 3, or south Sugarloaf slope, and Slope No. 1, at Nesquehoning. The latter is restricted to 20 men, and locked safety lamps are used in it, to load the coal which has already been mined. When all this coal has been taken out this work will be abandoned. It gives off great quantities of explosive gases, but there is sufficient ventilation to clear all the new workings. There would not be any danger in working this place with naked lights, were it not for the falls in the face of the breasts, by which openings are made into old workings above such falls, from which gas may come down with the wind, and be ignited by the naked lights. A shaft in Nesquehoning is also restricted for the want of a second opening and of proper ventilation, but these difficulties will be overcome in a short time.

The veins are faulty in this shaft, in consequence of which the work has been prevented from being completed. The last two places belong to the Lehigh coal and navigation company.

In all places I have to act with prudence and judgment, suggesting points that in my estimation would be most beneficial to working men and operators, but at all times keeping the honor of the law in view, so as not to violate it, and endeavoring to give general satisfaction. My endeavors on the whole have been as successful as could be expected in so short a term of office. I have almost seventy mines in my district, nearly all of which

are large operations, besides the coal breakers and machinery for hoisting coal out of the mines, the pumping and breaker engines and screens, and all other machinery connected with breaking and cleaning coal. All these I must examine as often as the inside workings, in order to see that all such machinery is properly fenced off, so as not to be dangerous to men and boys. The boilers for generating the steam to drive all this machinery are also under my particular notice.

The boilers are at present being inspected by competent persons, according to law, and a report of each inspection, under oath before a justice of the peace, is to be furnished me at my office. This must be done every six months, and oftener if required.

The wire ropes and chains for hoisting out of mines and to the top of the breakers, also receive their share of my attention, especially when men are hoisted in and out of the mines. No single link chain is allowed to be used in mines where the men are hoisted in and out; a few are used where there are good traveling ways for the men. On the whole, the machinery and ropes are in good order at present.

Several old ropes have been taken off, and re-placed by new ones. Since I am in office, new cars have been built for hoisting the men in and out of the mines, (they are called passenger cars,) where bridle chains are not in use for hoisting coal. Bridles are two or three chains attached to the end of wire ropes. A portion of the works are also ventilated by machinery. There are in operation at present, six suction fans, and several other places are ventilated by exhaust steam from steam pumps, which are placed at or near the bottom of slopes.

The exhaust steam is conveyed to the up-cast to heat the air. In some works this is not powerful enough to give the air required for a proper ventilation of the mines. In such places we have two or more returns, with a furnace in one of them, to overcome the difficulty. Some works are ventilated by furnaces altogether, others again are ventilated by the natural weight of the atmosphere, (or natural ventilation.) This is caused by the natural heat of the mines. This mode is not to be trusted in summer when the air is hotter outside than in the mines; in winter it works well in drifts and tunnels when they are not too long.

I enclose, with this report, a tabular statement of the condition of the mines, as prescribed by the act, and a tabular account of the accidents which have occurred since I have been in office. The importance of the mines in this district is shown by the amount of their shipments of coal during the year 1870, a summary of which is here given:

	Tons.	cwt.
Lehigh coal and navigation works	268,091	00
Bever Meadow region	575,972	12
Hazleton region	2,031,799	04
Upper Lehigh region	157,478	13
Total	3,033,341	09

CONDITION OF MINES.—*December*, 1870.

No.	Name of colliery.	Situation.	Land owners.	Operators.	Agents.	No. of slope....	Drift or tunnel	Shaft.....	Dip.....
1	Upper Lehigh	Luzerne county	Upper Lehigh Coal Co	Upper Lehigh Coal Co.,	Wm. Powell	1			S.
2	Do	do	do	do	do	2			S.
3	Cross Creek	Drifton, Luzerne county	Estate of Tench Coxe	Coxe, Brother & Co	D. L. Powell	1			S.
4	Woodside	Woodside, Luzerne co	Jeddo Coal Company	Jeddo Coal Company	Wm. M'Donald	1			S.
5	Highland	Highland, Luzerne co	G. B. Markle & Co	G. B. Markle & Co	Peter Brown	1			S.
6	Jeddo slope	Jeddo, Luzerne county	Union Improvement Co	do	John Turnef	1			N.
7	Pink Ash	do	do	do	do	2			S.
8	Oak Dale	do	do	do	do	3			S.
9	Buck Mountain	Buck mountain, Carbon and Luzerne counties,	Buck Mountain Coal Co	Buck Mount. Coal Co	Wm. Spencer	2			N.
10	Do	do	do	do	do	4			N.
11	Council Ridge	Eckley, Luzerne county	Estate of Tench Coxe	Sharp, Weiss & Co	S. Bateman	1			S.
12	Do	do	do	do	do	3			S.
13						4			N.
14						2			N.
15	Ebervale	Ebervale, Luzerne co	Union Improvement Co	Ebervale Coal Co	A. Nesbit	1			N.
16	Do	do	do	do	do	2			N.
17	Do	do	do	do	do	3			S.
18	Harleigh	Harleigh C. Co	Big Black Creek Imp. Co	Harleigh Coal Co.	Daniel Reed	1			S.
19	Do	do	do	do		2			S.
20	Do	do	do	do	do	3			S.
21	Latimore	Latimore, Luzerne co	Blk. Improvement Co.	Pardee, Brother & Co	Wm. Williams	1			
22	Millensville	Millensville, Luzerne co	Portef's estate	Stout Coal Company	Paul Winters	1			S.
23	Do	do	do	do	do	2			S.
24	Do	do	do	do	do	3			N.
25	Do	do	do	do	do	4			S.
26	Do	do	do	do	do	5			N.
27	East Sugarloaf	Stockton, Luzerne co	Smith, Packer & Co.	Linderman & Skeer	Wm. Carr	1			N.
28	Do	do	do	do	do	2			
29	Do	do	Estate of Tench Coxe	do	do	3			
30	Do	do	Smith, Packer & Co	do	do	4			
31	Do	do	do	do	do	5			
32	Old Sugarloaf	do	do	do	do	1			S.

33...	Old Sugar Loaf.....	Hazleton, Luzerne county,	Diamond Coal Company,	Pardee & Co.....	Thomas Dickerson	2	.....	S.
34...	South.....do.....	.....do.....	.....	.....	.....	3	.....	N.
35...	Cranberry Slope ...	.....do.....	A. S. & E. Roberts.....	.....do.....	.....do.....	1	.....	S.
36...	.....	.....do.....	.....do.....	.....do.....	.....do.....	1	.....	N.
37...	Crystal Ridge S'pe	.....do.....	.....do.....	.....do.....	.....do.....	2	.....	N.
38...	Hazleton Slope.....	.....do.....	Lehigh Valley R. R. Co.,	.....do.....	.....do.....	1	.....	S.
39...	Hazl'n Mine, No. 3	.....do.....	.....do.....	.....do.....	.....do.....	.....	.....	S.
40...	Old Lau'l Hill S'pe	.....do.....	.....do.....	.....do.....	.....do.....	.....	.....	N.
41...	..... Do	.....do.....	.....do.....	.....do.....	.....do.....	.....	.....	N.
42...	Mt. Pleasant Slope	Mt. Pleasant	C. Koons & Co.....	Taggart, Butler & Co..	John Platt	1	.....	N.
43...	Ashburton	Ashburton, Luzerne co.. ...	Lehigh Valley R. R. Co.,	Linderman & Co.....	.....	.....	.....	N.
44...	Tresckow	Tresckow, Carbon county..	German Penn'a C. Co.....	German Penn'a C. Co.,	Owen Evans	2	.....	S.
45...	..... Do.	.....do.....	.....do.....	.....do.....	.....do.....	4	.....	N.
46...	..... Do.....	.....do.....	.....do.....	.....do.....	.....do.....	5	.....	S.
47...	..... Do.....	.....do.....	.....do.....	.....do.....	.....do.....	6	.....	N.
48...	Colerain	Beaver Meadow, Car'n co.,	Wm. F. Carter & Co.....	Wm. F. Carter & Co....	John Martin	2	.....	W.
49...	.....	.....	.....	.....	John Weir.....	.....	1	.....
50...	.....	.....	.....	.....	.....	.....	2	.....
51...	.....	.....	.....	.....	.....	.....	3	.....
52...	Jeanesville.....	Jeanesville, Carbon and Luzerne counties,	Spring Mount'n Coal Co.,	Spring Mt. Coal Co.....	S. M'Farland.....	1	.....	S.
53...	..... Do.....		.....do.....	.....do.....	.....do.....	3	.....	S.
54...	..... Do.....		..... .do.....	.....do.....	.....do.	5	.....	N.
55...	..... Do.....		.....do.....	.....do.....	.....do.....	.....	1	.....
56...	Yorktown	Yorktown, Carbon county,	Lehigh Coal Company ...	A. L. Mumper & Co....	Thomas John	1	.....	S.
57...	..... Do.....	.....do.....	.....do.....	.....do.....	.....do.....	2	.....	N.
58...	.....	.....	.....	.....	.....	4	.....	N.
59...	Frenchtown	Luzerne county.....	French Coal Company ...	Beaver Brook Coal Co.,	Jonah Reese.....	1	.....	S.
60...	.....	.....	.....	.....	.....	2	.....	S.
61...	Room's Run	Nesquehoning, Carbon co.,	Lehigh Coal and Navigation Company.	Lehigh Coal and Navigation Co.	James Smithan	.....	1	.....
62...	..... Do.	.....do.....			.....do.....	1	.....	S.
63...	.....	.....	.....	.....	.....	3	.....	S.
64...	Summit Hill.....	Summit Hill, Carbon co....	.....do.....	.....do.....	Mr. Powell.....	4	.....	N.
65...	.....	.....	.....	.....	.....	.....	5	.....
66...	.....	.....	.....	.....	.....	.....	6	.....
67...	.....	.....	.....	.....	.....	.....	9	.....
68...	Black Creek	Black Creek, Luzerne co.,	West Lehigh Coal Co	West Lehigh Coal Co..	Phil. Geodecker....	.....	1	.....
69...	..... Do.....	.....do.....	.....do.....	..... do	.....do.....	.....	2	.....
70...	Robert's Run	.....do.....	Roberts Coal Company...	Roberts Coal Company	A. Witchey	.....	1	.....
71...	.....	.....	.....	.....	.....	...	2	.....
72...	.....	.....	.....	.....	.....	.....	3	.....

CONDITION OF MINES—*Continued.*

No.	Depth	Name of seam	Size of seam...	Condition of air-ways	Meas're of air—cubic feet per minute...	Condition of air	Direction of gangway.....	Shipments of coal for the year 1870	Remarks.
								Tons. cwt.	
1...	320	Buck Mt...	12	Good ..	18,840	Good ..	E. W...	157,478 13	D. Bertsches, superintends, and Wm. Powell and Son, manage all inside of the mines. This work is kept in good condition, inside and outside, with first class machinery. This operation employs 60 miners, 43 inside laborers, 12 boys inside, 73 outside men, 44 breaker boys; total, 232. These works are ventilated by furnaces.
2...	450	... .do.....	12	...do....	22,500	...do.....	...do.....	....	
3...	360	.....do.....	12	...do.....	16,000	...do.....	...do.....	86,131 18	Eckley B. Coxe, Esq., superintendent of these works. These works and machinery are in good condition. Three drifts in this place, owned by the same company, are abandoned for the present. This work is ventilated by a furnace on east side, and the exhaust of steam pump on west side. Employees: Miners, 56; laborers, —.
4...	300	.....do.....	12	Tol'ble	.....	Tol'ble	...do.....	33,592 02	Mr. Fuller, superintendent. These mines have been very faulty. The coal looks well at present, and a prospect of a better future. Machinery is good. This work is ventilated by exhaust of steam pump. Men and boys employed, 63.
5...	661	.....do.....	12	...do.....	5,700	Weak..	...do.....	76,339 17	G. B. Markle, Esq., superintendent, and John Turner, principal mine agent. These works have good machinery, and a great improvement in ventilation has taken place since I am in office. There is still room to improve, which they seem willing to make, and are making. Employees in these works are as follows: Miners, 167; inside laborers, 210; boys, 34; outside men, 217; boys, 120; total, 748.
6...	350	Big vein ...	27	Good ...	3,000	Good ..	.....	257,225 01	
7...	546	Buck Mt...	12	...do. ...	3,500	...do.....	.....	....	
8...	645	Big vein	27	...do.....	3,900	.....	.....	.. ..	
9...	235	Buck Mt...	9	...do.....	13,500	...do.....	...do.....	100,859 07	No. 1 and No. 3 slopes abandoned. This operation works the top bench of Buck Mountain vein, the dividing slate being too thick to admit of working both benches together. Top bench, 9 feet; bottom bench, 6 feet. There is an inside slope on east side of No. 2, of 85 yards to bottom of basin. The boilers are on surface; the steam is conveyed down air-way through pipes, to work the engines. The ventilation has improved much in these works. There is still room for improvement, especially in No. 4 slope. Employees: Miners, 108; laborers, 71; boys, inside, 20; total number inside, 199; outside men, 90; boys, 24; total, 114—313, sum.
10...	.....	.....	9	Tol'ble	.....	Tol'ble	...do.....	....	

11...	600	Buck Mt...	12	Good..	.....	Good ...	....	167,149	12
12..	750	.....do	12	Tol'ble	.....	.....	.....	.....	.....
13...	300	.....do	12	Good ...	16,510	...do	.....	.....	.....
14...	680	.....do	12	...do	.....	...do	.....	.....	.....
15...	690	Big vein ...	27	...do	5,000	...do	E. W...	220,655	05
16...	690	.....do	27	...do	.....	.....	.....	.....	.....
17...	720	.....do	27	...do	6,000	...do	...do	.....	.....
18...	461	.....do	27	Tol'ble	3,575	Tol'ble	...do	146,859	15
19...	279	.....do	27	.....	.....	.....	.....	.....	.....
20...	709	.....do	.....	...do	.....	...do	.....	.....	.....
21...	489	.....do	30	Small..	4,000	Weak..	E. W...	98,728	11
22...	144	.....	30	Good ...	.....	Good ...	....	81,223	17
23...	437	.....	30	...do	.....	...do	.....	.....	.....
24...	501	.....	30	...do	.....	...do	.....	.....	.....
25...	433	.....	30	...do	.....	...do	.....	.....	.....
26...	285	.....	30	...do	.....	...do	.....	.....	.....
27...	840	Big vein ...	27	...do	4,950	Tol'ble	E. W...	276,344	11
28...	1,200	.....do	.....	...do	3,500	...do	...do	.....	.....
29...	855	.....do	.....	...do	4,000	...do	...do	.....	.....
30...	.....	.....	.....	.....	.....	.....	.....	.....	.....
31...	621	.....do	.....	...do	4,250	Weak..	...do	.....	.....

Slope No. 1; taking pillars out; soon to be abandoned. Slope No. 2 has strong divided air; the seam not dipping enough to carry coal; it is worked in counters from the level gangway; air is good, but not easily measured. Slope No. 3, taking pillars out; this will soon be over. Slope No. 4 is nearly a new work, with good ventilation caused by steam and furnace power. The gangways start east and west; the east gangway has curved around the end of basin and is now advancing in a westerly direction on the opposite or north side of basin. Men employed, 243; boys employed, 72; total, 315.

Wm. J. Harris, Esq., superintendent. These operations are kept in a good condition; machinery and breakers are also in fine order; No. 1 slope is kept to draw men and water out of the mines of No. 2. There are a good many employees, as follows: Miners, 98; laborers, 74; company men, (inside, 53,) outside, 77; boys, (inside, 34,) outside, 37; total number of men and boys employed, 373.

Morgan Silliman, Esq., superintendent. In No. 1 and No. 2 there are inside slopes to reach bottom of basin. The air in these works is weak, but much better than it was when I first visited them; there is still room for improvement; No. 2 slope is kept for pumping. Mr. Silliman has had several new boilers and new wire ropes to re-place old ones, so that the machinery is now in good conditon.

Mr. Cooper, superintendent. This work is undergoing an improvement in air-ways, which, when completed, will give first class ventilation, and they will soon be finished; machinery is in good condition; employees—men, 155; boys, 32; total, 187.

Wm. J. Harris, Esq., superintendent of Ebervale, superintends these works. The coal here lies close under the surface, with very little covering to it, so that the air is good here. Slope No. 4 is a new one that will be deeper than the other three. Machinery is good.

No. 1 is the slope where the great crush took place on the 18th of December, 1869. This part of the mines has been abandoned ever since. A block of two houses went down with the families in them at fifteen minutes before five o'clock A. M. Names of those now in are James Rough, wife and child, Mr. Rough's mother, George Swank and William Swank; taken out, Mrs. Swank and baby, George and Rosannah, children of Mr. and Mrs. Swank. This work is improving in ventilation. It will be better ventilated soon. No. 4 slope is used for pumping.

CONDITION OF MINES—*Continued.*

No.	Depth	Name of seam.	Size of seam.	Condition of air-ways	Meas'e of air, cubic feet per minute	Condition of air	Direction of gangway	Shipments of coal for year 1870.	Remarks.
								Tons. cwt.	
32...	1,755	.....	...	.....	.....	.....	.....	.....	C. Pardee, Esq., superintendent. The old Sugarloaf slope to the bottom is about 500 yards long. The present workings are about 100 yards from the bottom, which were worked at some previous time, so that the present workings are above the old ones. The vein lies at an angle of 40 degrees. The boss was able to give me but little account of the lower workings. I examined some of the old workmen as to which part of the lower workings were worked out, and found that the west side was safe. The inside part of east side was thought to be unsafe, so I stopped that portion. South Sugarloaf is a new work and well ventilated, but is restricted for want of a proper second opening.
33...	1,165	Big vein ...	27	Good ...	.....	Good ...	E., W.	438,242 17	
34...	606	.....	27	...do	7,920	...do	...do	.....	
35...	833	Big vein....	26	Tol'ble	... .	Tol'ble	.....	.....	The air is good in these slopes, but the current is so divided that it is difficult to measure it. Machinery and breakers are in a safe condition. A new lift at present opening in the bottom of this slope, with a little explosive gas in it.
36...	444	.....do	26	...do	.....	...do	.....	.....	
37...	240	.....do	26	...do	.....	...do	.....	.....	
38...	2,265	.....do	26	Good ...	4,765	Good ...	E., W.	.....	
39...	.....	.....do	26	Tol'ble	3,000	Tol'ble	...do	.....	This is not a large work. Machinery and breaker good at present.
40...	.....	.....do	26	Good ...	.....	Good ...	...do	.....	This is an old work, and will soon be abandoned. Machinery good.
41...	.....	.....do	26	...do	4,520	Weak..	...do	.....	This work is safe, with good machinery and breaker.
42...	.....	Wharton...	7	Tol'ble	4,000	...do	...do	47,155 19	Wm. Taggart, Esq., superintendent. The ventilation of this work has improved much, and will improve if well managed in the future. The machinery and breaker are in a tolerable condition.
43...	540	.....do	9	.....	.....	.....	.....	1,290 12	This work has been idle nearly all summer. Messrs. Linderman & Co. have started to re-open it ready for spring trade.
44...	450	.....do	8	Good ...	7,110	Good ...	...do	88,016 13	Thomas Patterson, Esq., superintendent. This work will soon be well ventilated. They are taking the pillars out of Number 4 slope. It will soon be abandoned. In Number 6 slope they are sinking a new lift.
45...	450	Big vein....	25	...do	.....	...do	...do	....	
46...	240	.....do	25	...do	6,615	...do	...do	....	
47...	120	Wharton...	8	.....	.....	.....	.....	....	
48...	999	Big vein ...	25	...do	....	Tol'ble	....	146,000 00	Wm. T. Carter, Esq., superintendent. A new slope is now being driven up on north dip to cut off this slope. The air tolerable but divided. This slope is ventilated by a suction fan. The drifts are ventilated by furnaces, and have tolerable good air. Machinery is old, but of late has been kept in good condition. The same is true of breaker.
49...	.....	.....do	25	.....	.....	.....	.....	.. ..	
50...	.....	Wharton...	9	.....	.....	....	.. ..	.. ..	
51...	.....	.....do	9	.....	.....	.....	.....	.....	

52...	880	Big vein ...	25	Good ...	4,000	Tol'ble	E. W..	177,581 16	J. C. Hayden, Esq., superintendent. These works have no gangways driving at present, but a great many pillars and blocks of coal to take out. The air is improving in these old works. Machinery in good condition. There are two fine breakers here. The drift on Wharton vein looks well. It has two gangways driving.
53...	420	.....do	25	...do	.....	...do	East ...	....	
54...	771	.....do	25	...do	4,020	...do	...do	....	
55...	.....	Wharton...	8	...do	3,000	...do	...do	....	
56...	.....	Big vein, 25 / Wharton 8	25	...do	4,960 / 4,600	...do	E. W..	164,374 03	No. 1 slope works the Big and Wharton veins. The air is weak in some parts of this work, but the present driving and repairing of air-ways will soon make it good. In No. 2 slope they are taking out the pillars; it will soon be abandoned; air is good. No. 4 slope is restricted to twenty men per shift for want of a proper outlet, which will soon be completed.
57...	348	Big vein ...	25	...do	.....	Good...	.....	....	
58...	720	Wharton...	8	...do	2,990	Tol'ble	West...	....	
59...	300	Big vein ...	25	.....	.....	....	E. W..	....	This is a new work, under restrictions until second opening is out; not shipping coal yet. Wharton slope newly started.
60...	.....	Wharton...	8	....	.....	....	....	....	
61...	350	....	.....	...do	.....	Weak ..	E. W..	27,614 00	Wm. Zehner, Esq., sup't. There is not much work in the shaft at present. It is under restriction until air-ways and proper openings are completed and a new fan in operation. This will soon be completed. This work emits explosive gases in large quantities. No. 1 slope is also restricted, and working with safety lamps to get the coal which has already been mined; this work makes great quantities of explosive gas; the slope will soon be abandoned; it is well ventilated; No. 3 slope emits but little explosive gas; it has good ventilation; the machinery and breaker are in good order, except a locomotive, which is old and of which I am rather doubtful, although it works outside. Hands employed—miners, 61; laborers, 73; boys, 14; outside men, 50; do. boys, 64; total men, 184; boys, 78.
62...	128	.. ..	18	...do	17,000	Good...	.....	....	
63...	5,119	....	10	...do	7,400	...do	....	....	
64...	450	Big vein ...	40	Small..	6,000	Tol'ble	E. W..	240,477 00	Wm. Zehner, Esq., superintendent. The air in No. 4 slope is mending; will be better before spring; it has good machinery and breaker. No. 5 tunnel has good ventilation, caused by a pair of fans, which are intended to ventilate this tunnel and No. 4 slope. The work of this tunnel is a long way underground, so they have a locomotive working for about a mile of road inside to meet the mules that bring the coal from the miners. No. 6 tunnel has good air in the outside portion of the works, but in the face of west side it is weak, but it will soon be good, as a new air-way is being driven near the face of this gangway to the surface, and an air-way is also in progress alongside of gangway. This work is also a long way in, and a locomotive is working nearly a mile of this road to meet the mules, as in No. 5 tunnel. No. 9 is the longest tunnel in my district, crossing several veins to the Big vein.
65...	.....	....	40	Good...	12,400	Good...	...do	....	
66...	.....	....	30	...do	10,000	...do	West...	....	
67...	.....	....	60	Small..	3,035	Tol'ble	East ...	....	

CONDITION OF MINES—*Continued.*

No.	Depth	Name of seam.	Size of seam.	Condition of air-ways....	Mean'e of air, cubic feet per minute	Condition of air	Direction of gangway....	Shipments of coal for year 1870.	Remarks.
								Tons. cwt.	From entrance to 1st seam of coal, 150 ft., 3 ft. seam, angle perpend'r. 1st.....do 2d.....do..... 41 do. 3.....do.....do.....do. 2d .....do 3d.....do..... 50 do. 2.....do.....do...80 deg. 3d .....do 4th.....do..... 850 do. 3.....do.....do...75 do. 4th .....do 5th .....do..... 150 do. 11.....do.....do...75 do. 5th .....do 6th.....do..... 430 do. 10.....do.....do...40 do. 6th .....do 7th .....do..... 450 do. 10.....do.....do...40 do. Total length of tunnel, 2,151 feet, nearly all rock. The air in the face in west side is weak. Hands employed—men, 232; laborers, 338; boys, 40; outside men, 158; do. boys, 381; total men, 728; boys, 421.
68...	.....	Big vein ...	16	.....	.....	.....	.....	.....	This is a new work opening out ready for a new railroad from Danville to Hazleton, called the Danville and Hazleton railroad.
69...	.....	Wharton....	14	.....	.....	.....	.....	.....	
70...	.....	Buck Mt...	15	.....	.....	.....	.....	.....	This is also a new work, on the side of the same road, with a new breaker, built ready to ship coal to the western market, *via* Danville.
71...	.....	Wharton...	14	.....	.....	.....	.....	.....	
72...	.....	Big vein	16	.....	.....	.....	.....	.....	

LIST OF ACCIDENTS AND DEATHS.

Date. 1870.	Names.	Age.....	Married or single,	Children,	Nature of accident.	Location.	Slope.....	Date of inquest,	Remarks.
Aug. 31,	Owen Crossin.....	45	M.	5	Explosion of fire-damp caused instant death of these two men.	Nesquehoning	1	Sept. 6,	Verdict of the jury, explosion of fire-damp through carelessly exposing the naked light by taking the gauze off the safety lamp.
	Hugh M'Donald....	20	S.	.....		Nesquehoning.....	1	Sept. 6,	
Sept. 9,	Charles Kisthart...	18	S.	.....	Struck by car on bottom of slope, while car was going down—bridle chain broke—instant death,	Harleigh.....	1	Sept. 14,	Examination by me, J. T. Evans, assisted by Charles M'Curren, Esq.—result, accidental death.
Sept. 9,	Patrick Sweeney...	14½	S.	.....	Fell under car—lived two days after accident.	Stockton	3	Sept. 14,	Henry Mears, Esq., acted as coroner—result of inquest, accidental death.
Sept. 26,	Thomas Hilcox	.....	.....	.....	These men were burnt, and badly bruised.	S. Sugarloaf slope..	.....	.....	By a premature blast while tamping a hole.
	Francis Floyd.....	.....	.....	.....					
Sept. 27,	John Brislin.	10	....	.....	This boy fell under car on dirt bank road on the 26th, and died on the 27th.	Lattimore.....	.....	....	I, John T. Evans examined this case, and found it to be accidental death by three witnesses and six jurors.
Sept. 27,	Thomas M'Leny.....	.....	M.	.....	Squeezed between cars and gangway timber—not badly.	S. Sugarloaf slope..			
Sept. 28,	Neil Brown	24	S.	.....	Fracture of leg.	South Sugarloaf....	.....	.....	While timbering, coal fell on his leg.
Oct. 9,	Hugh Kelly.....	.....	S.	.....	Burnt hand and face.	Hazleton slope.....	.....	.....	Explosions of fire-damp.
Oct. 11,	Robert Williams...	19	S.	.....	Leg and arm broken.	Drifton.....	1	....	By a fall of dividing slate.
Oct. 24,	D. Thomas, (boss)..	.....	M.	.....	Bruised badly all over the body,	Yorktown.....	1	.....	Fell under car on slope.
Oct. 31,	Dorn Manelous.....	26	S.	.....	These men were injured by top coal falling on them, caused by a blast in bottom coal; Manelous had a fracture of the ribs, splinter of which penetrated the lungs, causing death in six hours. M'Glochlin doing well.				I, John T. Evans, examined five witnesses in this case, who came to the conclusion that the death of Munelous was accidental.
	Condy M'Glochlin,	30	M.	.....					
Oct. 14,	Conrad Went.....	.....	.....	.....	Fracture of leg.	Stockton	5	....	Fall of coal in breast.
Nov. 4,	Stephen Charles....	32	M.	1	Badly bruised.	Frenchtown.....	1	.....	While riding on slope car.
Nov. 7,	James Costule.....	35	M.	.....	Injured badly on back, and cut on head.	Lattimore.....	1	....	Met a car on grade in east side.

LIST OF ACCIDENTS AND DEATHS.—*Continued.*

Date. 1870.	Names.	Age.....	Married or single,	Children,	Nature of accident.	Location.	Slope.....	Date of inquest,	Remarks.
Nov. 7,	Wm. M'Laughlin..	.....	.....	...	Injured on back, not badly.....	Stockton.....	3	.....	Injured by a fall of coal in breast.
Nov. 14,	John Magee.....	14	S.	.....	Amputation of left arm.....	Summit Hill.....	4	.....	Fell under cars in west gangway.
Nov. 18,	James Carr	30	.....	.....	Fracture of right thigh	O. Dale slope, Jeddo	.....	.....	Started a pair of timbers by sinking ditch.
Nov. 30,	Thomas Fauld	18	S.	.....	Bruised on back and head.....	Ebervale.....	3	.....	By a fall of dirt and slate.
Dec. 1,	James Nichols.....	40	M.	3	A slight fracture of head.....	Ebervale.....	1	.....	By a fall of coal in breast.
Dec. 1,	Gilbert Smith.....	21	S.	.....	Arm broken.	Stockton	3	.....	By jumping off a car.
Dec. 5,	Philip Coyle.....	25	M.	.....	Burnt face and hand.....	Nesquehoning:.....	1	.....	Explosion of fire-damp.
Dec. 8,	James Shugart.....	...	.....	.....	Burnt face and hands slightly...	Hazleton, old slope,	.....	.....	Explosion of fire-damp.
Dec. 10,	Patrick Campbell..	.....	.....	.....	Fracture of ribs.....	Upper Lehigh.....	1	.....	Fall of roof.
Dec. 13,	Frank Naid	.....	.....	.....	Burnt badly but not dangerously,	South Sugarloaf.....	.....	....	Explosion of powder.
Dec. 13,	Patrick M'Cary	.....	.....	... ..	Bruised.....	South Sugarloaf.....	.....	.....	Jammed between cars.
Dec. 13,	Michael Magee	50	W.	2	Burnt and bruised—lived five hours after accident.	Nesquehoning.....	1	Dec. 19.	Inquest held by W. E. Frisbie, Esq.—verdict of jury, fall of something in upper gangway, causing an explosion of fire-damp—no blame to any one concerned.
Dec. 15,	Richard Hodges....	23	S.	.....	Found dead in Oak Dale.....	Slope, Jeddo.....	.....	Dec. 16,	Inquest by C. M'Curren, Esq.—verdict, died by visitation of God.
Dec. 15,	Edwin Gedley	.....	M.	.....	Fracture of both legs.....	Yorktown.....	.....	.....	Fall of top slate, family in England.
Dec. 16,	Philip Sax.....	19	S.	.....	Had his breast injured.....	Stockton	5	.....	By cars.
Dec. 23,	Patrick Higgins....	.....	M.	.....	Injured severely on back	Drifton.....	.....	.....	Fall of dividing slate.

RECOMMENDATION.

Having examined the self-lubricating car wheel and axle, the invention of William A. Christian, of Ashland, Schuylkill county, and manufactured by Garner & Christian, of that town. As an oil lubricating and time saving piece of mechanism it is a want long needed and earnestly felt in and about coal mines.

I have no doubt it will fully sustain the merit it claims amongst the many other car wheels at present in use. A trial of this improvement is already under experiment by many neighboring operators, and proves highly satisfactory.

P. F. M'ANDREW.