

As to their condition, I found it good in many instances, especially among the larger mines. It was not unusual to find more than the standard amount of air in the main entries, yet a deficiency at the working places, owing to neglect in the matter of turning the current up into the rooms. I have made constant effort to have this remedied, though with only partial success. I found miners frequently suffering from carbonic oxide immediately after blasting, and subject to long delays waiting for the smoke to be carried off from working places, while there might be a good enough volume of air in the main passages; and of course this state of things was proportionately aggravated where the volume was deficient everywhere. My observation and experience have convinced me that the legal standard of air should be increased from 30 to 50 per cent. Mines which are extensively worked, and have long and tortuous air courses, generate so many deleterious gases that a more powerful current is required to dissipate them than in newer mines. All authorities agree that mines, under the most favorable conditions, require at least 100 cubic feet of air passing per minute for each man, in order to maintain a good sanitary condition, and that, under certain circumstances, such as indicated, the necessity is equally great for as much as 400 or 600 feet per man per minute. I have measured the volume of air in some main entries where over 150 feet were passing per minute, or 50 feet more than the law in this State requires, yet it was so impregnated with noxious gases that it was not fit to work in. When it is considered that in 156 mines in this district over 40,000 kegs of powder are annually consumed, the combustion of which exhausts over 700,000,000 cubic feet of atmospheric air, which must be replaced, and that a large percentage of carbonic oxide has also to be diffused and rendered harmless, the necessity of increasing the amount of air required by law is apparent.

My attention has also been called to the evils of the company or truck-store system. Miners complain that they are compelled, directly or indirectly, to trade in them, at a disadvantage to themselves. I have endeavored to obtain lists of prices from these and other stores, in order to make comparisons, and upon which to base some statement as to the actual workings of the system, but have failed to obtain the necessary facts. Mine owners who have no stores also regard the system with disfavor, as the profits from the sale of supplies to the men enable their competitors to undersell them in the market. This is a matter of importance to many men, though it is entirely outside of the jurisdiction or cognizance of the inspector.

As a result of my labors in this field during the year, there have been nine ventilating fans constructed at important mines, which makes twelve in all now in operation in this district, there having been only three when I came on duty. More will be introduced shortly, as their manifest advantages over the furnace, both for their economy and efficiency, are being more fully recognized. They were objected to mainly, at first, on account of their costliness, but some trials have been made of a fan manufactured at Brazil, Indiana, combining good service with comparatively small cost, which have proved eminently satisfactory. I have also effected the construction of three improved furnaces for the better ventilation of mines.

In the matter of escapement shafts, I have ordered the sinking of 55 in different parts of the district, 30 of which have been completed, and perhaps more—the facts in regard to the remainder not having been as yet ascertained.

During my term in this district I have applied for four injunctions against mine-owners to compel compliance with the law, but have only carried suit into court in one instance. The others having complied with the requirements of the law, I suspended legal proceedings, my object being to secure the desired improvements with as little injury to the business of the operator, and as little loss of time to the men, as possible.

Upon entering on my duties I notified the miners to comply with the law in regard to the use of copper needles and copper-tipped tamping bars. Many of them did so, but others objected, and neglected to provide themselves with the safer implements, on the ground of their inability to buy them. When satisfied by personal enquiry that men could not purchase the new tools without suffering privations or incurring debt, I did not insist upon it, though I am in favor of the law, and regard it as a measure wholly in the interest of safety to miners.

There have been but three strikes in my district during the year, of which I have had knowledge. One was at Petersburg, Menard county, for an advance in wages, which lasted 27 days, and resulted in the company's conceding the demand. One in Athens, in the same county, was adjusted by arbitration. The other was in Peoria, and lasted four or five weeks. It was against a reduction of a half a cent a bushel, and the men finally yielded, though they did not at once resume work. An effort was made on the part of the owners to prevent certain of the strikers resuming work, which led to a good deal of ill feeling, and resulted finally in the organization of a co-operative company by the discharged men. About forty of them opened a drift in the vicinity, and if they succeed in securing railroad facilities, will doubtless do their share of the business in that section this winter. This strike did not affect the coal production of the district materially, as the supply was kept up by other mines in the vicinity.

Although it does not properly belong in this year's report, I will take occasion to mention here a serious explosion of fire-damp at the No. 5 shaft of the Grape Creek colliery, Vermilion county, on the 17th of August. The mine is just being opened, and the working places were consequently near the bottom of the shaft. The works below were well laid out, the connections all perfect, and a 7-foot Murphy fan in position at the top. Owing to the limited area below, and the ease with which ventilation could be established, it had been the practice to stop the fan when the men came out Saturday night, and start it again Monday morning. Sunday, the 17th of August, R. S. Cotton, in charge of the pumps, observing that the discharge of water was unaccountably muddy, determined to go down the shaft to look into the matter, and asked a friend, C. A. Morrison, to go down with him. They descended by the ladders, and while proceeding along the entry, at a distance of about 175 feet from the bottom, their open lights ignited the gas,



causing an explosion which instantly killed Cotton, and inflicted injuries upon Morrison from which he died on the third day thereafter. A trace of fire-damp had previously been observed by the pit-boss, but it was so slight that it was not considered a cause for any uneasiness. The presumption is that a discharge of gas from some crevice in a fault through which they were mining, had taken place, filling the spaces after the suspension of work Saturday night. If the fan had been kept running continuously, no such accumulation could have taken place; but unless a mine is known to generate fire-damp, which is exceptional in the mines of this State, or has been worked so extensively as to require a constant current to save delays in resuming work, no fans or furnaces are kept going during Sunday. Moreover, it was not expected or required of Mr. Cotton that he should go through the mine, though men with a similar charge frequently do so.

Mr. Beattie, the manager, is an intelligent, careful man, who takes a professional pride in correct mining, and in exact compliance with the law, and he has a class of efficient subordinates, of whom Mr. Roberts, of No. 3, is especially competent.

This accident, however, should establish the importance of maintaining a constant current, by fan or furnace, in all mines where fire-damp may be expected.

I present the following statistical summary for the district:

COUNTIES.	Number of mines.	No. of MINERS		No. of other employees.....	No. days worked.	No. kegs of powder used.....	No. men killed.....	No. men injured.....	No. tons of coal produced.....
		Summer.....	Winter.....						
Cass.....	2	1	28	7	500	196	2	2	3,425
Strippings.....	3								
Fulton.....	34	375	725	129	4,806	6,989	5	5	298,431
Logan.....	4	110	184	57	823	6,060	1	1	118,800
McLean.....	1	225	225	75	394	75	3	3	125,000
Menard.....	6	196	361	64	1,937	5,889	1	4	151,749
Peoria.....	64	565	1,108	150	8,700	15,583	4	4	444,915
Tazewell.....	8	40	98	13	1,307	1,255	2	2	33,590
Strippings.....	13								
Vermilion.....	35	832	1,194	233	3,765	11,803	9	16	620,808
Woodford.....	2	215	230	108	455	170	1	5	129,000
Totals.....	156	2,572	4,253	836	22,797	41,960	12	42	1,925,718
Strippings.....	16								

Output for 1883..... 1,684,108  
Increase..... 241,610

One man killed for every 160,476 tons mined.

One man injured for every 45,850 tons mined.

One accident for every 35,611 tons mined.

Some of these accidents were clearly unavoidable. Others were the result of carelessness, and a disposition to take too many risks on the part of the victims. This is a matter difficult to control, and to prevent which requires the utmost vigilance on the part of underground managers.

I submit herewith memoranda from my note-book in regard to the condition of individual mines, and my action in regard to required improvements.

Very respectfully,

JAMES P. CUMMING, *Inspector.*

#### FULTON COUNTY.

Fulton county has had 34 mines in operation during the year, whose total output has been 298,431 tons of coal. The following are some of the more important and better managed mines:

#### EMERSON & Co.—ASTORIA.

The mines of this firm are in excellent condition; have two escape-ments, straight, well-driven entries, and 152 feet of air per man, and 600 feet for each mule in the workings. The only suggestion made was to have the air kept well up to the working faces by the use of additional screens or doors.

#### TAYLOR WILLIAMS—ST. DAVID.

This mine was lately purchased by the present owner, in poor condition, but permanent improvements were at once undertaken. A second hoisting shaft and new escapement has been sunk, and a small fan, which was only furnishing 40 cubic feet of air per man per minute, has been replaced by an 8-foot fan, which will doubtless afford abundance of air to the men employed.

#### THE WYMAN COAL Co.

This place was in fair condition as to ventilation in winter, but in summer no circulation was obtained at all. Directed a furnace to be constructed, which was promised. The slope was strongly timbered, but instead of setting the timbers perpendicular to the pitch, they had placed them so as to incline up hill, so that their power to resist pressure was very much diminished. The foreman's attention was called to the fact, and I should have ordered a change in the timbering had there not been several other places of egress to the men.

Heald's mine was in good condition.

#### JAMES STIRRAT'S MINE—CUBA.

This place is in good condition. The top works were burned down in the summer, but have since been rebuilt.

#### UNION COAL Co.—CUBA.

This mine had the required amount of air in circulation, but owing to the defective manner of laying out the works, with wide entries and long air-courses, the air was strongly impregnated with fire-damp. They had a furnace in the air-shaft, and their buildings