

CONSUMER'S COAL COMPANY'S SHAFT, KINGSTON, PA.

East Boston Shaft.—No. 1 carriage dropped, first trial, $13\frac{1}{2}$ inches; second trial, 6 inches; third trial, $9\frac{1}{2}$ inches. No. 2 carriage not used for hoisting or lowering persons.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY'S SHAFTS.

Avondale Shaft.—No. 1 carriage dropped, first trial, 2 inches; second trial, $1\frac{3}{4}$ inches; third trial, $1\frac{3}{4}$ inches. No. 2 carriage dropped, first trial, $1\frac{1}{2}$ inches; second trial, $1\frac{1}{2}$ inches; third trial, $1\frac{1}{2}$ inches.

Boston Shaft.—No. 1 carriage dropped, first trial, $1\frac{1}{2}$ inches; second trial, $1\frac{1}{4}$ inches; third trial, $1\frac{1}{2}$ inches. No. 2 carriage dropped, first trial, $1\frac{1}{2}$ inches; second trial, $1\frac{1}{2}$ inches.

RIVERSIDE COAL COMPANY'S SHAFT, PLAINSVILLE, PA.

Enterprise Shaft.—No. 1 carriage dropped, first trial, 4 inches; second trial, $\frac{3}{4}$ inch. No. 2 carriage not used for hoisting or lowering persons.

LUZERNE COAL AND IRON COMPANY'S SHAFTS, PLAINSVILLE, PA.

Henry Shaft.—No. 1 carriage dropped, first trial, 2 inches; second trial, 2 inches. No. 2 carriage not used for hoisting or lowering persons.

Prospect Shaft.—No. 1 carriage dropped, first trial, 2 inches; second trial, 2 inches; third trial, 2 inches. No. 2 carriage not used for hoisting or lowering persons.

DELAWARE AND HUDSON CANAL COMPANY'S SHAFTS.

Pine Ridge Shaft.—No. 1 carriage dropped, first trial, 2 inches; second trial, 2 inches; third trial, 2 inches. No. 2 carriage dropped, first trial, 2 inches; second trial, 2 inches; third trial, 2 inches.

Conyngnam Shaft.—No. 1 carriage dropped, first trial, 12 inches; second trial, 14 inches; third trial, 8 inches. No. 2 carriage not used for lowering or hoisting persons.

NORTHERN COAL AND IRON COMPANY'S SHAFTS, PLYMOUTH, PA.

No. 1 Shaft.—No. 1 carriage dropped, first trial, 2 inches; second trial, 2 inches. No. 2 carriage dropped, first trial, 2 inches; second trial, 2 inches.

No. 2 Shaft.—No. 1 carriage dropped, first trial, 3 inches; second trial, 2 inches. No. 2 carriage dropped, first trial, 3 inches; second trial, 2 inches.

No. 3 Shaft.—No. 1 carriage dropped, first trial, 3 inches; second trial, 2 inches. No. 2 carriage not used for hoisting or lowering persons.

No. 4 Shaft.—No. 1 carriage dropped, first trial, 6 inches; second trial, $2\frac{1}{2}$ inches. No. 2 carriage dropped, first trial, 6 inches; second trial, $2\frac{1}{2}$ inches.

WILKES BARRE COAL AND IRON COMPANY'S SHAFTS.

Dodson Shaft.—No. 1 carriage dropped, first trial, 6 inches; second trial, 6 inches; third trial, 6 inches. No. 2 carriage dropped, first trial, 6 inches; second trial, 6 inches; third trial, 6 inches.

Lance Shaft.—No. 1 carriage dropped, first trial, 5 inches; second trial, 4 inches; third trial, 6 inches. No. 2 carriage dropped, first trial, 6 inches; second trial, 6 inches; third trial, 6 inches.

The New Jersey Coal Company has had a small fan 10' 0" dia built to ventilate the workings on the Red Ash seam. It has greatly improved the ventilation of said mine.

The Lehigh Coal and Navigation Company has had a large fan 24' 0" dia erected at the Washington colliery, near Plymouth. This fan ventilates the workings on the west side of the slope, two lifts, and the whole of the workings in the Nottingham shaft. I have not yet learned what amount of work this fan is able to do, as it has not yet been fully tested. There are about 85,000 or 40,000 cubic feet of air circulated through the shaft workings, and about 18,000 or 20,000 cubic feet for the slope west side.

The workings in the slope tunnel are being well ventilated by another fan 15' 0" dia.

The Susquehanna Coal Company has had the following fans erected: At No. 3 slope, old Harvey mine, West Nanticoke, one fan 17' 0" dia, which exhausts about 45,000 cubic feet of air per minute, and is capable of much more when required.

At No. 3 or Grand Tunnel one fan was taken from the old M'Farlane shaft, and placed upon the side of the mountain near the outcrop of the seam, to ventilate the workings of the back basin. This fan is 15' 0" dia, and does very well when being run to an ordinary speed, say 75 revolutions; but there has been some difficulty in getting a sufficient quantity of water to make steam at times, hence the fan has not had a fair trial, although very much needed at times.

The Riverside Coal Company has had a double fan built at the **Enterprise** shaft. This fan is built different to any other in this district, being two distinct fans, each 15' 0" dia, with the usual proportions, their shafts being so arranged as to allow of their being coupled or uncoupled at pleasure. Hence these fans can be run together, or either may be run independent of the other, allowing, if need, ample time to repair the one while the other keeps the mine clear of gas. When they were run together at 111 revolutions per minute, they discharged 69,600 cubic feet per minute, with a water gauge of 1.8 of an inch; a very heavy drag area, $48 \times \text{velocity } 1,450 = 69,600$, no allowance for friction of the instrument.

NEW SHAFTS COMPLETED SINCE MY LAST REPORT.

Waterman & Beaver's No. 2 shaft, located north-east of their old shaft, near Kingston, Pa. Coals have been hoisted from this shaft for several months past, which were sent through their new breaker.

Luzerne Coal and Iron Company's new shaft, near West Pittston.—This shaft has been completed, and coals are being hoisted from the opening. They are now driving so as to connect the new and the old shaft. The water having been taken out of the said old shaft, an opening between the two will be completed early in the next year, the driving being done at present from both sides.

Northern Coal and Iron Company's No. 3 shaft, near Plymouth.—It has been completed, but no coals have as yet been shipped therefrom. A new shaft is being sunk to form a second opening for the former at present.

D. and H. Cannal Company's Gunyngham shaft.—It has been completed to the Hillman seam, from which coals are now being hoisted from their gangway driven eastward. It is intended to drive for a second opening from the said gangway at some favorable point, yet to be decided upon, either to the surface or otherwise into Young's slope. One of the five separate compartments of this shaft is being occupied at present by a drilling apparatus for the purpose of testing the coal bearing strata below the present bottom of the shaft.

are evolved become rather too indifferent to the ventilation, and allow the air to return on the gangways without passing the faces of the breasts, where, as is well-known, it is mostly wanted. The only reason for this is that, to keep the current at the faces, it requires check-doors, and a few air-stoppings. These, of course, cost a small sum of money, but the delay caused by having smoky passages for drivers and others to work in, costs fully as much, besides the increased danger to their lives and limbs which arises therefrom. I find a tendency to be thus indifferent to a proper distribution of the air through the faces in some of the Delaware and Hudson mines on the west side of the Susquehanna river, more especially in those mines where no fire-damp is emitted. The same carelessness is extant in a number of the mines operated by the small companies. Still, in viewing the mines generally, a rapid progress is being made in the ventilation and general condition of the mines, the producing capacity is increased, and to accomplish that, wider passages, better and cleaner roads, larger quantity of air, and better and more rigid discipline are required and maintained, and these, together, produce far cheaper, safer, and better system of mining coal.

A Cave at the **Enterprise** Colliery.

During the night, September 4, 1884, the workings of the Enterprise colliery suddenly, and very unexpectedly, began to squeeze. The pump-runner, who was the only person in the mine, heard it, and ran out to inform the officials. A gang of men were soon set to work to bring the mules out, but, while this was being done, and while a number of the mules were yet in the mine, the whole extent of the workings below the level of the shaft to a point some distance above that closed in, and, simultaneously, the atmosphere of the mine became explosive. The pillars, by being crushed, relieved all the occluded gas, which was emitted in such quantities that it caused the air to become explosive everywhere from the top of the upcast down to the mine.

The abandoned workings of the Hillman seam, directly over this portion of the Enterprise workings, were full of water, which, in a week or two after the cave, was discovered to have run down through the crevices and filled the space caved below the level of the shaft. In this time, gangs of men were employed to re-open the gang-ways leading to the plane and to the slope, but, upon discovering the water filling, their efforts had to be concentrated on pumping and hoisting the water out. Both cages and pumps were employed for that purpose, and have been so employed to the date of this writing, and this means appears, at present, to prove inadequate. The company, in the meantime, has concluded to put in more powerful machinery for both pumping and hoisting. The present old single hoisting engine is to be changed, and a pair of direct-acting hoisting engines of much greater power is to be put in its place. When the new machinery is set to work, they think that the upper portion of the mine can, in a short time, be opened and a considerable quantity of coal obtained. In the

meantime, the lowest seams will be opened and prepared to put coal out. The suddenness of the cave is rather a mystery, and is explained only on the presumption that the distance between the seams worked, viz: the upper and lower split of the Baltimore, was small, and the pillars in both, perhaps, not being directly over each other, the intervening rock gave way in those portions of the old workings where the props had rotted away. Consequently, when the crush began, it naturally spread very rapidly over the excavated parts until some point strong enough to stand the pressure of breaking the superincumbent strata was reached to stop its further progress.

This colliery gave employment to about three hundred and fifty persons, who all resided in the vicinity of the colliery, and the closing of the mine has been a great loss to them and their families. It is hoped, however, that ere long the mine will again be in operation, and that all can return to work in the immediate vicinity of their homes.

The Application of Theoretical Knowledge to the Practice of Coal Mining.

It is evident that the theoretical knowledge of the principles governing the various branches of work, and the laws governing the ventilation of mines, is not appreciated, or at least is not valued so highly as it should be by the proprietors of coal mines. It is also evident that those foremen who possess such knowledge, coupled with practical experience, are the most progressive. They are the persons who advance new methods, devise new applications, and are best prepared to cope with new emergencies. The methods and appliances used in the mining of anthracite coal have been greatly improved during late years, but all these improvements are the product of persons who possess both practical and theoretical knowledge of the laws relating to the requirements of this industry. A man's life is too short, and his practical experience too limited, to obtain therefrom the requisite knowledge and qualities necessary to cope successfully with the varied difficulties and dangerous situations liable to be met in a coal mine. The mine foreman, then, should read and learn from the experience of others. The operators and proprietors of coal mines should choose men for such positions who not only are practical, but who also read and study the laws relating to the working of mines. A persistent study of the principles of all matters connected with coal-mining ought to be encouraged and appreciated more than it appears to be at present. There are bosses of twenty years' experience who have never seen fire-damp, have not seen a division of air-currents, and have not seen any method of circulating the air-currents besides that exercised in their own mine, and their knowledge of mining is thus limited to what they have learned in their own very limited experience as foreman. Yet they have such unlimited confidence in their own system of working that it is impossible to impress them with anything new as being an improvement; they have no confidence in "book-learning," and believe they have acquired all