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

Hillman & Sons' Colliery.

This colliery is located about two miles east of Wilkesbarre, between the Mill Creek and the back road. It is a slope upon the Hillman vein, so called because this firm worked it on the plank road for many years. This vein is being very extensively worked along the plank road at present.

Condition.—This mine gives off a small quantity of fire-damp, but its general condition is good.

Ventilation.—There is plenty of pure air in this mine. It is a new and very shallow mine, and has a fan 12 feet in diameter, which discharges about 25,000 cubic feet of air per minute. Number of persons employed inside, 40.

H. B. Hillman, general superintendent; George Ferteig, mining boss.

Lehigh Coal and Navigation Company's Mines.

Slope No. 3.—This slope is located a short distance west of Wanamie, on the Ross vein. It has been lying idle for many months this year.

There is a small quantity of fire-damp generated in this mine; however, there should not be any trouble in ventilating the same, as there is a fan 15 feet in diameter there which exhausts at present about 28,700 cubic feet of air per minute and may be increased when needed.

The mine is tolerably well arranged at present. The fan has been put up in a very good style and will give good results when put to the test. It was built in the company's shops in this place, under the superintendence of Mr. C. Calvin, master machinist. Number of persons employed inside, 87.

J. Smith, general superintendent; Jas. Waddle, mining superintendent; Evan E. Jones, mining boss.

No. 2 *drift.*—This drift is located west of Wanamie and near the No. 1 breaker, on a vein called the 7 feet. The measures being somewhat confused in this end of the valley to what they are elsewhere, few persons make any pretensions at locating these veins geologically. Hence I may state that this vein overlies the one worked in the No. 3 slope, called the Ross vein.

Condition and ventilation.—This drift is in better condition at present than it had been. It is a small place, not many persons employed, and in such cases it is often difficult to have the same attention paid to them as to larger ones. There is no fan or furnace used to create a draft or current, but two small sections or rings of an old steam boiler, 2½ feet in diameter each, with a grate placed in the bottom, are put in one of the old chambers that has been worked out, having a small hole to the surface. Ventilation report for December, 6,000 cubic feet at face of mine. Number of persons employed, 16.

J. Smith, general superintendent; Jas. Waddle, mining superintendent; J. C. Edwards, mining boss.

No. 1 *slope.*—This slope is located west of Wanamie, and near foot of plane at No. 1 breaker. It is supposed by many that the vein worked in this slope is the same as that worked in the 7 feet drift. The slope has been sunk another new lift this summer, and they are only just opening out the same for ventilation.

The following is the report for December: 7,600 cubic feet at face of mine. Number of persons employed inside, 14.

J. C. Edwards, mining boss.

No. 1. *tunnel.*—This tunnel was first opened into the vein worked in the slope, and since has been driven through what is supposed to be the Ross vein, and into the measures where it is claimed the Red Ash vein should be; but the ground seems much confused and the seams which were found are small, hence it is difficult to identify the measures or veins at this point. No coal is being taken out of this tunnel except what little is taken from the top vein.

J. C. Edwards, mining boss.

No. 1 *drift.*—This drift is opened on the same vein and adjoining the No. 1 slope.

Condition and ventilation.—There has been a little improvement made in this mine this year, by forcing the air-current more to the face of the mines. A furnace is used to create circulation, which moves 22,000 cubic feet of air per minute.

J. Smith, general superintendent; Jas. Waddle, mining superintendent; J. C. Edwards, mining boss.

No. 2 slope.—This mine is located at the eastern end of the village of Wanamie, and near the No. 2 breaker. It is opened into a vein supposed by some to be the same vein as that in drift No. 1; others differ and claim it to be an overlying vein.

Condition and ventilation.—This slope has been worked but a short time this year. Early in the spring a fan 15 feet in diameter was put up there, which exhausted a considerable amount of air; but having been put up in haste, and not having the proper arrangements, such as large air-ways and cross-cuts, it could not be expected to give the desired relief to the persons employed, or satisfaction to the bosses, that it would if it was well put up, and otherwise well provided for. The interior part of the mine was in very great need of better ventilation. The cross-cuts were too small, not as many doors as there should be to force the air to the face of the mine, and the old ones badly constructed; the stoppings were very badly made up, where they were made, and the whole mine was in a very unsatisfactory condition. The most of the above deficiencies having been pointed out, and ordered to be remedied on several occasions; but it seemed as if there was great indifference or inability on the part of the officers in charge.

J. B. Smith, general superintendent; James Waddle, mining superintendent; George Sager, mining boss.

Slope No. 4.—This is a new slope, located north of Wanamie a short distance. It has not been worked since the first part of the year.

Smith and Waddle, general superintendents.

Nottingham Shaft.—This shaft is located within the borough of Plymouth. It is sunk into the Red Ash vein, and is about 400 feet deep.

Ventilation and condition.—The ventilation of this mine has been improved within the past year, by having a 15 feet fan, instead of a 10 feet fan, which exhausts more air from the mine. The same was put at so great a distance from the workings, which were very badly opened, that the amount of air put into circulation, about 25,000 cubic feet per minute, is very much reduced before it reaches the face of the mine, as a great deal of the same leaks out before it can be used, nevertheless there are some hopes of having things better in the future, as the superintendent, H. C. Brodhead, and the mine boss, J. Johns, are endeavoring to have those complaints remedied. There has been a great many of the old wooden stoppings re-built with stone and mortar, and all the new ones are being built of this material. Many new doors have been put up, some as double doors, and others as check doors; in this way they are improving things gradually, and will be much better after the 24 feet fan is erected and connected to this mine, which will be done early next spring. Number of persons employed 103.

John Johns, mining boss.

Washington Colliery.

This colliery is located a short distance north-west of Plymouth, and consists of a slope and a tunnel. The tunnel workings are above water level, and are adjoining the old workings that have been worked out in all directions to the crop of the vein. The vein pitches about 35 or 40°.

Ventilation in this mine has not been satisfactory to the Inspector up to this time.

There is a small furnace built under the supervision of Mr. Charles Smith, in the employ of Broderick & Co., which is located close to the gangway side, to create circulation. It is difficult to decide which is the worse, the construction or location of the same.

The whole of the mine shows evidence that it has been badly managed up to the present time. Whatever may be done under the administration of the present firm and its officers remains to be seen.

Slope No. 1.—The slope is located near the entrance of the tunnel. It is sunk upon the same vein that is being worked in the tunnel and shaft—Red Ash. There are two lifts being worked in the slope. On the first lift eastward a large fault was met, through which a tunnel has been driven into the vein north of the fault.

That part of the mine opened north of said fault is being ventilated by a current of air that passes through it from the Nottingham shaft workings, towards

a fan 15 feet in diameter, which is placed on an old lift 300 feet above this level. Said air is not healthy for persons to breathe after having traveled said (Nottingham) mine. The whole amount of air circulated is about 25,000 cubic feet per minute, and it has to ventilate the shaft workings and those north of the fault, whereby it has to do for about 140 persons between both places.

The two lifts working on the west side of the slope have been ventilated by a small iron-cased exhaustion fan 4½ feet in diameter, and running at a very high speed, which has been removed preparatory to having the 24 feet fan put up in its place.

The air has not been quite so bad in this part as in the tunnel workings, although it was poor enough. There have been some improvements made in the slope workings on both sides, since the present firm has had possession of the place; such as the building of good stone and mortar stoppings in many places and putting up main doors anew with heavy frames and built around with stone and mortar. All the stoppings between the main gangways and air-ways are now being built in this substantial manner.

There will be plenty of pure air in this mine after the new fan above mentioned is erected. It is to ventilate the Nottingham shaft workings and the workings of this slope.

H. C. Brodhead, general superintendent; A. Reese, mining boss.

Slope No. 2.—This is a new slope located a short distance west of the breaker of the Washington mines and near the foot of the Jersey mines' plane. This slope is being sunk through rock and is down at present about 350 feet. It may reach the Red Ash vein in about 200 feet more. It is being done under the supervision of H. C. Brodhead, general superintendent over all the Lackawanna Coal and Navigation Company's mines on the Plymouth side of the Susquehanna river.

Hutchison & Co.'s Shaft.

This colliery is located about a mile and a quarter north-east of Kingston. It is sunk about 170 feet on to the same vein that is being worked in the next shaft west of them, and is called by some the Cooper vein. This mine is considered tolerably safe; roof being good and no fire-damp discovered as yet.

Ventilation.—This is produced by a fan 15 feet diameter. The mine has been opened in such a manner that it will always be difficult to properly ventilate it, and up to this time, although comparatively a new mine, no satisfaction has been given to the inspector in the matter of ventilation. The fan is large enough to exhaust at least 60,000 cubic feet of air per minute, while being driven at about 100 revolutions, while at present there is only 22,000 cubic feet per minute passing into the return near foot of shaft; how much is being lost in the shaft I know not; and about 8,000 cubic feet per minute traversing the face of the mine. The vein is about 6 or 7 feet in thickness, works rather hard, and requires much powder to loosen the same, and must necessarily make a large amount of powder smoke. Number of persons employed, 60. Charles Hutchison, general superintendent; James Hutchison, mining boss, successor to Mr. William M'Culloch, who had charge of opening the mine.

Hillside Coal and Iron Company.

Enterprise mines.—This colliery is located on the Plank road, Plainsville township, and consists of one slope on the Hillman vein, and a shaft about 150 deep to the Five Feet vein.

Slope workings, their condition and ventilation.—These workings are not as safe as many of our other mines. In the first place there is very bad roof, requiring a great deal of care on the part of the miner and his boss; however the mine is well timbered, and all precautions are being taken to secure the safety of the men. Very few accidents occur, which must be attributed mostly to the great care and vigilance of the parties above mentioned. There is a small quantity of gas generated in this mine, but it has not given much trouble so far. The venti-

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.×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 sank to form a second opening for the former at present.

D. and H. Cannal Company's Cunyngham 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 seperate compartments of this shaft is being occupied at present by a drilling aparatus for the purpose of testing the coal bearing strata below the present bottom of the shaft.

section of Pine Ridge colliery. Wyoming colliery has two fans, one fifteen feet diameter and one twenty-five feet diameter; the former is, ordinarily, being used in exhausting dust from the coal-breaker, but may, at any time, be used in an emergency to substitute the other fan. There are two fans at No. 5, Delaware and Hudson Canal Company, Plymouth, one sixteen feet diameter and one twenty feet diameter. Nottingham and Washington collieries have three fans between them, one fifteen feet diameter and two twenty-four feet diameter each. At Avondale colliery there are two fans, each twelve feet diameter. Also, there are two fans at No. 2 slope, Nanticoke, each twenty feet diameter; and at the Kingston Coal Company's Nos. 1 and 2, they have three fans, one twelve feet, one twenty-one feet, and one twenty-five feet diameter. There is but one colliery in the district not having one or more fans, which is the Waddell or Ellenwold drifts, operated at present by Honorable Thomas Waddell and F. T. Walters & Co., except the Chauncey old mine, which is about being abandoned.

In view of the great change suggested in the above as having taken place in our mining operations, it is highly necessary that our mine officers, from the lowest to the highest, improve in their administrative, as well as executive, abilities. To cope successfully with the difficulties and dangers of our present mining, it requires considerable more skill, tact, and general knowledge than it formerly did, and this cannot be had without some practice and theory blended together. No one person is supposed to know everything about mining more than it would be in any other branch of business. Hence, we should study out what others have done, and how it was done. This may be learned in various ways, which I need not here refer to. I will here insert an abstract of the mining law adopted, in England, in 1872, relating to management of mines.

I am fully convinced that such an enactment by legislation is much needed here, and, further, am just as confident that it must be had in this or some other form, within a short period, and I should say the sooner the better for all parties interested. The law is titled "the coal mines regulation act, 1872," being the act regulating mines of coal, stratified iron-stone, shale, and fireclay.

Certificated Managers.

"SECTION 26. Every mine to which this act applies shall be under the control and daily supervision of a manager, and the owner and agent of every such mine shall nominate himself or some other person (not being a contractor for getting the mineral in such mine, or a person in the employ of such contractor) to be the manager of such mine, and shall send written notice to the inspector of the district of the name and address of such manager.

"A person shall not be qualified to be a manager of a mine to which this act applies, unless he is, for the time being, registered as the holder of a certificate under this act.

GAYLORD COAL COMPANY.—This company has begun the sinking of the new shaft located near the slope, and which had been commenced by the Lehigh and Wilkes-Barre Coal Company several years ago, and operations suspended during the panic. The said new shaft is to be continued to the red ash seam, which will be reached about the same vertical depth as that of the Nottingham shaft, where the same seam is being worked, and it is probable that the second opening, required by law, may be secured by driving to and connecting with the said Nottingham workings, which have already been driven a long distance eastward from the Nottingham shaft. The same company is erecting a large and convenient coal breaker at the said colliery, on the site of the old one which was destroyed by fire. The new breaker is intended to clean and prepare the coal from the slope and the shaft, and will be a great assistance to the already large and thriving business of the town of Plymouth.

KINGSTON COAL COMPANY.—The most interesting part of their improvements, has been the sinking of a new shaft, located near No. 2 shaft, which is to penetrate the red ash seam, and is to be used as hoisting and ventilating shaft. This shaft is down at present below the Baltimore seam. both splits, and from present indications will be completed early next year, A large fan, twenty-five feet in diameter, has been partially erected at the head of said new shaft. The writer endeavored to have the superintendent, Mr. Daniel Edwards, to erect a larger fan—not less than thirty feet diameter—but for reasons best known to himself, decided upon the size above mentioned, which no doubt will answer all purposes for a few years at least, unless a very large quantity of explosive gas should be met with there. The same company contemplates the sinking of another shaft soon, near the No. 1 shaft, also to the red ash, when a connection will be made between the same and the one at No. 2 shaft.

WADDELL, OR RAUBVILLE COLLIERY.—What was formerly known as the Ellenwold colliery, has been divided into two parts, and is being operated by two separate parties. The western part, better known as the drifts, has been leased by Messrs. Waddell & Walters. At the said drifts a small breaker has been erected to prepare the coals from the same. There being four of them, two on the red ash and two on the Ross seams.

The new company commenced to ship coal in June, and shipped about thirty thousand tons.

I did expect to have been able to report the erection of one or two fans at this colliery, as the officers and operators had promised to do so faithfully; but I am sorry to say, that they did not live up to their promise, although the condition of the workings required it, and only through the tolerance of their workmen, could they expect to work, together with the promise of improvements to the inspector, which he, like the workmen, depended upon, to be once more disappointed. It would appear that fair promises, to be disregarded at these drifts, are contagious. I hope we may soon have a change, and that by the time another report is due a better state of

600 feet in length. This opens to a large tract of coal, which will be extensively mined as soon as a second opening can be effected. The old No. 2 shaft, whose workings were connected with the upper Red Ash tunnel in this mine, was arranged as an escape for the men, in case of emergency, by having good accessible ladders erected up through it.

At the Stanton shaft, a force of men were kept at work through the year re-opening the mine and restoring the ventilation of the old workings. A gangway has been driven a long distance, from which a series of chambers will be opened as soon as connection can be made with the new air-shaft. The latter is now sunk to the Baltimore seam, a depth of 840 feet, and they expect to have it connected with the Stanton workings by the middle of April, 1883. A 35-foot fan was erected on top of this shaft, ready to set to work when the connection is made, which will produce splendid ventilation upon the starting of the operation. The new breaker is completed, ready for operation, as soon as the connection with the air-shaft is made.

At the No. 9 shaft Sugar Notch, the two tunnels reported in last year's report were completed—one from the Ross to the Red Ash seam was 7x12 feet area and 705 feet long, the other, not on the same level, but from the Ross to the Red Ash vein, also was 7x12 feet area and 560 feet long. A new fan was also erected on this colliery, which has improved the ventilation and made the colliery much more comfortable to work in.

At the Lance colliery a new air-shaft was sunk, which is 10x18 feet area and a depth of 520 feet, and its connection with the main shaft effected. A new 35-foot fan was erected, on top of the air-shaft, to ventilate the colliery, when ready for operation. The old breaker was pulled down, and a new one is in progress of construction, which they expect to have completed by the beginning of next May, when the mine will begin to ship coal again.

At the Nottingham shaft a new tunnel was driven from the Red Ash seam to work the Ross, none of which has yet been mined. The tunnel was 7x12 feet area, and 1,075 feet in length, and they are, at this writing, working to effect a second opening to it.

At the Reynolds slope a tunnel is in progress from the Red Ash to work the Ross seam, 7x14 area, and had been driven, at the close of the year, a distance of 300 feet. Another tunnel was driven through a large fault, which opens a large tract of coal hitherto untouched; it was 360 feet long, and has an area of 96 square feet.

At the Wanamie colliery a new tunnel was driven from the Ross to work the Red Ash seam, which has an area of 72 square feet, and is 390 feet long. A new fan, 15 feet diameter, was also erected at this colliery, which has been the means of producing much improvement in the ventilation.

The South Wilkes-Barre shaft is completed to the Hillman seam, a depth of 700 feet, and have found the vein proving better than their expectation. This has opened a large tract of hitherto solid territory of coal, and

seventy-five. This is low enough to ensure a healthy condition of the air which the said number would have to respire, and at the same time the volume required by law would have sufficient speed or velocity to sweep the smoke away in a short time after it is produced.

The volume of air in the Boston mine became insufficient, and the company erected a new fan at the No. 3 shaft to remedy this. This change was effective and produced satisfactory results.

In the Nos. 2 and 3 shafts of the Delaware and Hudson Canal Company, at Plymouth, the air currents were divided into a larger number of splits, and the change has proved very beneficial. Both mines are now in conformity with the requirements of the law, having limited the number of persons employed in each split below seventy-five.

At the Nottingham mine of the Lehigh and Wilkes-Barre Coal Company, at Plymouth, the quantity of air was approaching the minimum allowed by law, and too many persons were placed to work in some of the splits. On December 13, the inspector requested the foreman to make preparations to increase the quantity of air and reduce the number of persons employed in each split to the lawful number. The company at once concluded to sink a new air-shaft, to provide an additional intake and upcast, upon which a fan will be placed as soon as the shaft can be completed.

The foremen of the Lance and Reynolds collieries were also notified that too many persons were employed in some of the air-currents, and they were distributed properly in a few days thereafter.

In the No. 1 shaft, Nanticoke, there were more than the lawful number of persons employed in the "main west gangway split," and after receiving a letter from the inspector, requesting compliance with the law, it was immediately complied with by adding another split of air.

In many instances, the provisions of the law are overlooked, until the inspector requests compliance. In underground slopes, and particularly where the pitch is small, the second openings are frequently not effected or driven until the inspector pushes the matter. There were several instances during the year under consideration where the inspector had to request such work to be done; but generally, upon requesting, the work is promptly started and pushed to completion.

I find that the operators are generally disposed to have their collieries worked in such a manner that the inspector will have nothing to say, but the foremen have a tendency to delay costly preparations in cases where no imminent danger is threatened, and where the law is not strictly complied with I find that the fault generally lies with the foreman. Naturally, he desires to make the business of his employer as profitable as he can, and sometimes he is tempted to economize unwisely by aiming to do that.

Automatic speed recorders have been attached to a number of the fans on the gaseous mines, and they are working very satisfactorily.

Colliery Improvements During 1886.

The desire for improvement was not very active during the year 1886. The demand for coal and the price received for it were not such as would encourage expensive outlays to obtain it. The improvements, therefore, were confined chiefly to what was necessary to maintain the existing production.

Susquehanna Coal Company.

At the No. 1 deep shaft of this company a new fan was erected, twenty-five feet diameter, and of the Guibal pattern. This was found necessary to ventilate the workings of the red ash seam, which are becoming extensive and require a large volume of air.

In the George seam of the same shaft a slope is being sunk to reach the coal lying below the shaft gangway. The hoisting engine will be located on the surface and the rope passed down through a bore-hole already made for that purpose.

At the Newport shaft a second opening was effected for the upper seam, and another is being driven for the lower seam. The second openings for the tunnel seams and also for the slope were completed.

Lehigh and Wilkes-Barre Coal Company.

The new shaft which is being sunk by this company at South Wilkes-Barre, and which is named Tillinghast shaft, was at a depth of eight hundred feet at the close of the year, having passed the Hillman vein a short distance. It is a large shaft, fifty-two by twelve feet, and located a short distance south-west of the old South Wilkes-Barre shaft; was started in 1884, and operations have been going on continually since.

At the Nottingham colliery a new shaft was started for the purpose of improving the ventilation. It will be divided into two compartments, one an upcast and the other a downcast. It will be used chiefly to ventilate the workings of the Ross vein, which are now spreading extensively.

At the Hollenback colliery an underground slope was completed. The hoisting engine is located on the surface and the rope passed down through a bore-hole. It works admirably. Signals are given by electric bells, and conversation between the engineer and inside men effected by telephone.

Delaware and Hudson Canal Company.

Work is continued in the Baltimore shaft of this company, driving passages toward the No. 2 Baltimore shaft. The latter was standing idle until the close of the year, having been stopped upon sinking it to the rock. It was walled with a thick, cement-laid stone from the rock to the surface, and was left to stand idle for several months after, but preparations are being made now to complete its sinking.

At the No. 3 colliery, at Plymouth, a new fan, eighteen feet diam-

Examination of Applicants for Mine-Foreman's Certificate.

The annual examination of applicants for mine-forman's certificate in the Third district was held in the Central school building, Wilkes-Barre, Pa., June 21 and 22.

The examiners were G. M. Williams, inspector; Charles Conyngham, operator, both of Wilkes-Barre, Pa., and James Fisher, miner, of Nanticoke, Pa.

Forty-five applicants for certificates of qualification appeared for examination, and the following thirty-two were successful:

John W. Joseph, William T. Evans, Daniel P. James, A. J. Gallagher, Andrew H. Weir, John Heycock, Jonathan Weir, William P. Howells, Richard Martin, Jacob D. Jones and Samuel Griffith, of Wilkes-Barre, Pa.; R. M. Williams, Samuel R. Morgan, William E. Howells, T. M. Rees, Edward Roderick, Thomas Cross, John I. Williams, H. G. Willams, Benjamin Richards and John R. Williams, of Plymouth, Pa.; Mordecai Dando, John D. Williams and William A. Jones, of Edwardsdale, Pa.; Henry R. Jones, John Winters and John I. Absalom, of Nanticoke, Pa.; Rees Morgan and John R. Morris, of Sugar Notch; Richard Faull and Griffith G. Roberts, of Ashley; W. S. Williams, of Peeley, Pa.

A. Rees, Nanticoke, Pa., applied for certificate of service, and was recommended to receive one.

Mine Improvements During 1887.

Lehigh and Wilkes-Barre Coal Company.—At the Stanton mine air-shaft this company is erecting a new fan thirty-five feet diameter to duplicate the present one, so that one may be used while the other is undergoing repairs. They have found it dangerous to allow the ventilation to cease traversing, because in such a gaseous mine blowers of gas may be burning which cannot be detected by examination, and yet would ignite the gas when the mine would be filled to the point where the burning blower might be.

At the No. 9 colliery, Sugar Notch, a new fan twenty-four feet diameter is in course of erection to ventilate the upper seams. The workings have extended so that this was found necessary.

At the Nottingham colliery, Plymouth, a new air-shaft 12′x30′ was sunk from the surface to the Ross seam, where it will be connected to the Red Ash seam by a tunnel now being driven for the purpose of improving the ventilation. A fan twenty-four feet diameter is being erected in the shaft which is expected to effect material improvement.

The new shaft at South Wilkes-Barre is sunk to a point twenty-four feet below the Baltimore seam, a total depth from surface of 1,064 feet. The coal was found in its usual thickness of sixteen feet and of excellent quality. They are now at work putting up partitions and linings preparatory to opening the gangways, etc. The indications are favorable for an unusually productive colliery.

LEHIGH AND WILKES-BARRE COAL CO.

which has been idle since 1878. The gangways were retimbered and the tracks relaid, so that the mine is now in shape to produce coal. It is to be hauled to, and shipped through, the No. 18 breaker.

At the Nottingham colliery, in Plymouth, the new air shaft was completed to the Ross seam, and a twenty-four foot Guibal fan was erected thereon to ventilate the workings. A cage and an engine adapted to hoist the workmen was also placed thereon, which proved a relief to both employés and company.

Delaware and Hudson Canal Company.

The new Baltimore shaft of this company was completed to the Red Ash seam, which was cut at a depth of 655 feet. It opens an extensive field of this seam, and the other shaft (No. 2), already working that seam, will be connected to effect a second opening.

At the Boston mine a new seventeen and a-half-foot fan was erected, which improved the ventilation of the mine to some extent. It was located at the No. 3 shaft—too far away to be of much effect as a ventilator of the Boston workings; hence, the result is not quite satisfactory.

The No. 2 shaft of this company, at Plymouth, was sunk from the Cooper to the Bennett seam, and opened an extensive field of that seam.

At No. 3 colliery a slope is being sunk underground in the Cooper seam. The hoisting engine is located on the surface, and the rope passes into the mine through a bore-hole made for the purpose.

Susquehanna Coal Company.

A number of minor improvements were effected at the mines of this company, but I shall note only a few. At No. 1 shaft, in both the Forge and Red Ash seams, underground slopes were sunk, extending to lower levels. The hoisting engines of both were located on the surface, and the ropes pass down through bore-holes.

The No. 4 slope was graded and thereby made to work much more satisfactorily. It is now being extended through the rock into the Hillman seam.

Red Ash Coal Company.

The No. 1 slope of this company was extended and a new pair of direct-acting hoisting engines were placed to hoist therefrom. The cylinders are 28x48 inches, and they work admirably.

At the No. 2 colliery a new slope was made to a length of 750 feet, and a pair of direct-acting hoisting engines were furnished, having cylinders 28x48 inches.

A new sixteen-foot fan was also erected on this mine, which has improved the ventilation to an appreciable degree. The collieries of this company are now in good shape for producing coal for a number or years.

great and then it was abandoned. The men who were underground escaped through the second opening, and soon after an explosion occurred. In about six hours after the cyclone had passed, they had the steam pipes repaired and the fan running again. Soon afterwards the bosses and some workingmen descended into the mine and succeeded in extinguishing the fire before it had done much damage. They considered themselves exceedingly fortunate since the danger had been so great. No one was injured, although there were many narrow escapes. The colliery was idle for about seven weeks until the damage to the tower and breaker had been repaired.

THE CAVE-IN AT THE CONYNGHAM COLLIERY.

On the first day of January, 1890, the workings to the southwest of the No. 1 plane in this mine caved in and completely closed that portion of the mine. They were working the Baltimore seam from a small local basin right under the Lehigh Valley railroad shops; the pillars were fully as large as they were in other parts of the mine, but, notwithstading that, they began to crumble and yield under the weight, so that in a few days the workings collapsed. A large volume of fire-damp was released and filled the region of the cave; but the officials of the mine were looking for this and had provided for it.

That portion of the mine was not re-opened and, with the exception that provision was made to have the fire-damp removed, nothing has been done since.

THE CAVE-IN AT THE NOTTINGHAM COLLIERY.

On the second day of January, 1890, a portion of the workings of the third and fourth lifts east of the underground slope in the Red Ash seam in this colliery caved in breaking clear up to the surface and causing the track of the Lackawanna and Bloomsburg railroad to sink about two feet below its former grade. An unfortunate feature of this cave was that it opened crevices under the sandy flats west of the Susquehanna river and admitted a large increase of water, which had to be pumped from the lower workings. It has also left a break in the strata, only a short distance from the river, which for all future time will be a weak point, inasmuch as the coal is being mined from under the river in the fifth and sixth lifts adjacent to these caved workings.

This colliery is the property of the Lehigh and Wilkes-Barre Coal Company, and it is the largest producing mine, from one opening, in the anthracite coal region. In the year 1874, when Mr. James B. Davies took charge of the mine, they were not able to produce more than 250 mine car loads per day, but he went to work and re-arranged the foot of the shaft and the tracks leading thereto; made gravity planes to run the coal down from the upper workings, and sunk an underground slope to mine the coal below the shaft level, and made it practicable to produce

1,800 car loads per day, at the bottom of the shaft, but the hoisting capacity of the shaft not exceeding an average of about 1,200, the production was limited to that number. It is indisputably the finest colliery in the region. They are working the Red Ash and Ross veins, the former 21 feet and the latter 7½ feet in thickness. The territory is large, and the veins are lying regularly, and are comparatively free from geological faults and from explosive gases. The workings are distributed so that it is easy to keep the shaft supplied with loaded cars under all circumstances. About 300 miners are employed in the mine who could produce an average of six cars each per day, but since the capacity of the shaft is limited to about 1,200 they are only producing about two-thirds of a full day's work each day, because they cannot be supplied with the required cars. Thus fully one-fourth of the miners could be dismissed without causing any loss or reduction in the quantity of coal produced. It is claimed that the excess of miners is needed in order to produce the required number of cars of coal when for any reason a number of miners are absent from work, or when a part or section of the mine is made non-productive by an accident. An excess of two or three per cent. would be ample to make up the loss from absence, and accidents of the kind referred to should be rare occurrences if the management was of the proper kind. The extent of this cave-in was not large, affecting only the two gangways mentioned, and up to the present date they have not been fully re-opend. Had the energy, usually displayed in other cases, been applied in repairing this, the colliery could have been producing the usual quantity of coal in two or three weeks afterwards.

The pillars began to show the usual indications of the commencement of a squeeze early in September, 1890, in breasts where the top coal had been mined, but although the attention of the officials was called to that frequently, no efforts were made to check its progress, until it had reached a point where efforts to that effect would be useless. Its progress was finally arrested, only when the overlying rocks were broken by large reserve pillars previously left for the purpose of preventing caves-in from taking place. Provisions were made just prior to this trouble to work the large reserve pillars, but, fortunately for the owners, the squeeze commenced while pillars were still in existence to arrest and stay its progress.

Explosive gases appeared in the air at a number of points immediately after the caving took place, and on January 4 the mine foreman and district superintendent, while making examination together, fired it with their naked lights in one of the breasts in the fourth lift. Fortunately neither was seriously hurt, and nothing else was set on fire.

A SECOND CAVE AT THE NOTTINGHAM COLLIERY.

On the afternoon of January 24 another large cave-in took place in a remote part of this mine in the workings of the No. 6 plane. This was a long distance way from the cave-in described in the preceding article,

and it appears to have occurred wholly unexpectedly, in falling; it drove the air away with such force that it was felt at the bottom of the shaft, a mile and a quarter away from the seat of the cave. The coal in this part of the mine was nearly exhausted, and only a few persons were employed there, chiefly in robbing pillars or drawing back the gangways. The pillars adjacent to this cave continued to crumble, so that the squeeze spread and extended over a very large area of workings. On February 1 a body of firedamp was ignited from the naked lamp of one of the fire-bosses, causing a terrific explosion, killing eight men and injuring several others. (See article on Disasters.) The squeeze continued to spread until March 7th, when the rocks broke and the whole region caved-in, covering an area of about 1,600 feet square.

CAVE-IN IN THE JERSEY NO. 8 COLLIERY.

At 9 o'clock a. m., May 15, the workings of the first, second, third and fourth lifts west of the main slope in this mine suddenly and unexpectedly caved-in. In each of these lifts the Baltimore seam was mined in two splits, separated by about 15 feet of rock. The workings of the second, third and fourth lifts were nearly exhausted. There being only three parties working in the fourth, and one in the third lifts, but a large number of miners were employed in each of the splits in the first lift. At 9 o'clock word was sent into the mine that work was suspended for want of railroad cars, and at the same time the workings described above caved and cut off the escape of the persons employed in the top split in the first lift. (See description of accidents.) The bottom split gangway was not closed, and if the persons inclosed in the top split had gone down through the airway at the face to the bottom split gangway before the fire-damp had accumulated they could have walked out, but this opportunity was lost, and through a fatal mistake of an official the fire-damp was ignited, and all the men, except two, were killed. It is claimed by the officials of this company that this cave-in came so suddenly that no time was given to warn the workmen of their peril, and this is undoubtedly true as to its effects in the vicinity of the gangways where the workmen were employed, but it is not probable that a cave-in of such a large extent as this was, occurred without first crushing the pillars around the point where the squeeze originated for a considerable time. The origin of all caves-in is a squeeze on one or more pillars at a weak point in such pillars, and from thence it spreads, crushing every pillar in its path, until a point of sufficient strength to stay it and break the overlying rock is encountered, then the whole of the crushed region caves-in. During the few hours just prior to the collapse, it generally spreads very rapidly, because the weight, having become so great, causes the pillars to give way quickly. Undoubtedly it did so in this case, when it spread over the gangway in which the workmen were closed in at the Jersey colliery. The fire-bosses at this mine were all strangers, having

etc., which are generally looked upon as a dangerous method which jeopardizes the safety of a gaseous mine to an unwarrantable extent.

Whenever the provisions of the mine law were disregarded, the mine inspector interfered and demanded compliance with them, but he endeavored to do so in a courteous and inoffensive manner, yet although the law made it his duty to see that their provisions were complied with, he felt that his efforts in that direction were regarded as an intrusion and he did not receive the respectful treatment usually received from the officials of the companies of this district. However the provisions of the law had to be complied with in all matters pertaining to the condition of the mines, in all the cases that came under his notice, but the law is not, and cannot be effective in preventing men from committing grave blunders in cases of unexpected emergency, whether such men are competent or not. In all the disasters of 1890 in this district grave errors were committed, and in each case the errors were committed by officials who did not exercise the care and precaution which might have been reasonably expected if they had the necessary experience. The evident want of experience on the part of the officials of this company caused many to predict trouble, and although we are satisfied that the disasters were the natural sequences of their conduct in general, it would have required a greater power than is bestowed on man to foresee and prevent them by any system of inspection.

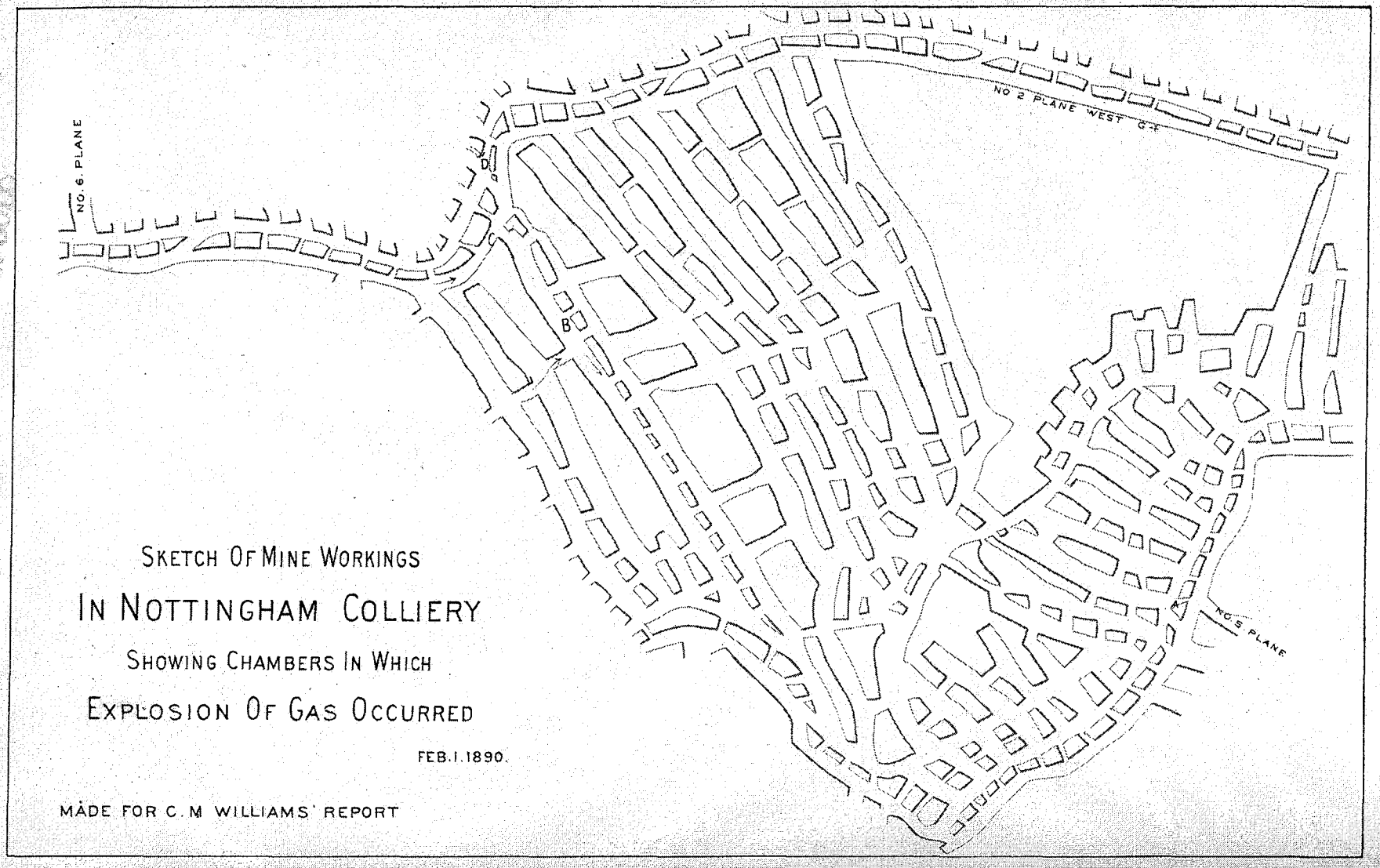
DISASTER AT THE NOTTINGHAM COLLIERY.

About 9 o'clock a. m., on the first day of February, when James Dunston, a fire-boss, was walking up through a passage-way leading from the No. 5 plane workings to the next gangway above which was driven from No. 2 plane, he unexpectedly entered a body of fire-damp with his naked light and caused a terrible explosion in which he was fatally burned, seven other persons were killed and several others, more or less injured. Reference to the accompanying sketch of that portion of the workings may assist the reader to understand the situation. All the workings west of the seat of the explosion were squeezing and showing positive evidence of an approaching cave. A gang of men consisting of David Fox, Joseph Jones, David J. Williams, John E. Davies, Edwin Parry, Paul Schultz, John Crossing and John Dennis were at work timbering on the No. 2 plane west gangway at the point marked D on the sketch. Another party of men consisting of John D. Humphreys, Thomas Lake, John J. Thomas, Peter Lynn and David Garland were engaged at similar work at the head of No. 5 plane, the point A of the sketch. Mr. Dunston visited the latter party at about 9 o'clock, and after giving directions regarding the work, he left to go up to the other party on the No. 2 plane gangway. When on his way up through the passage, B on sketch, and on reaching the point B, he noticed an enlargement of the flame of his lamp and instantly the whole surrounding atmosphere

burst into a fierce rolling flame. It left him in a poisoned atmosphere of after-damp severely burned and in eight days thereafter he died. He himself gave the account of the occurrence as stated above. The force of the explosion was such that every movable thing was blown from its place for hundreds of feet from the point where it occurred. Five of the gang of men working at D, on the No 2, plane gangway were instantly killed and the other three were severely injured, and one of the three died in a short time after being taken home. All the gang at the head of No. 5 plane were more or less injured; John D. Humphreys was fatally hurt and died an hour afterwards.

The writer was informed of the accident at midday and immediately started for the scene and arrived there at about 2 o'clock. There were hundreds of excited people at the shaft waiting anxiously for tidings from the mine. Five men were still missing. After descending the shaft, I found the mine foreman sitting in the fire-boss station, evidently afraid to go in to the scene of the disaster which was fully a mile and a quarter away. After making a few hurried inquiries I went up the No. 2 plane and on to the scene of the explosion, where I found Mr. Leckie, the district superintendent, the fire-bosses and Mr. Iago Jones, the mine-foreman of the Lance colliery, and several workmen busily engaged in searching for the bodies of the missing five men. The gangway road for a distance of about three hundred feet was covered with rock and out to a depth of from two to three feet. All the air stoppings had been blown away leaving the air-currents to make short circuits, and leaving an extensive area of workings unventilated. Work was continued until shortly before 8 o'clock p. m., before finding any bodies. Then the bodies of John Crossing, Paul Schultz and Edwin Parry were found under a large mass of *débris* at D. Having been covered up instantly at the place where they were at work. After clearing the largest part of the gangway, search was made in the airway, and at 10 o'clock the bodies of David H. Williams and John H. Davis were found lying on their faces at C, in the airway. If the mine-foreman had done his duty, and had gone in to help in the search, the last two bodies could have been found hours sooner. It was not known by the rescuers that the missing men were working in the airway until about 9.30 o'clock when one of the workmen stated that one of the injured men had told him so. Then search was immediately made and the bodies were found at C, shortly after.

Mr. Dunstan, who fired the gas, was an old fire-boss at this mine, but had been employed chiefly in that part of the mine where no fire-damp had been seen. He had been in the workings of the Ross seam on this morning before going to the men at the head of the No. 5 plane, and was evidently going to give directions regarding the timbering. No examination of the workings, intervening between the squeeze and the points where the men were at work, was made. The mine-foreman had not yet



SKETCH OF MINE WORKINGS

IN NOTTINGHAM COLLIERY

SHOWING CHAMBERS IN WHICH

EXPLOSION OF GAS OCCURRED

FEB. 1. 1890.

MADE FOR C. M WILLIAMS' REPORT

become familiar with that part of the mine, and evidently engaged the fire-boss to do the foreman's duty of directing the repair work, and so omitted his own important duty of making proper frequent examinations of the airways in the vicinity of the squeeze. It was known that a squeeze had been in progress for over a week, but no precaution was taken to ascertain its effect upon the air-currents returning from that section. It is claimed that no gas was ever seen in this part of the mine before, as an excuse for the neglect to make proper examinations at this time. On January 4, in the vicinity of a squeeze, in another part of the mine, where it was also believed that no fire-damp issued, the mine-foreman and district superintendent together, while making examination, ignited a body of gas and both were more or less hurt. Again, on the night of January 6, Thomas Richards, a workman, was burned by an explosion of gas in the vicinity of the same squeeze.

On January 24 a cave-in took place on the No. 6 plane, west of the point where Dunston fired the gas, the concussion of air from which was forcibly felt at the bottom of the shaft. An examination was attempted to ascertain the location of this cave-in, but the pillars were crushing so that it was not safe to approach nearer than the foot of No. 6 plane, a thousand feet or more back from the face. Now, with the experience they had with the other cave-in a few weeks before, and the knowledge of this squeeze and its recent cave-in, it was fair and reasonable to expect that a careful watch would be kept of the effects on the air-currents of a squeeze of such a large extent as this for fear they again might become explosive from the presence of fire-damp. The inspector visited the mine on the 7th, and again on the 27th of January, and saw that none but safety-lamps should be used in the vicinity of the cave of January 2, but although the mine-foreman accompanied him in the inspection of the work of that part of the mine, he said nothing about the trouble on the No. 6 plane, and yet he knew that an extensive squeeze was in progress there. But it has been brought to light since that he did not visit the region of that squeeze during all the time that it was in progress except once. The superintendents went up there nearly every day to examine the squeeze and to listen to its progress, but they went there with naked lights, and took no precaution to ascertain whether there was fire-damp present or not. On Monday morning, February 3, the second day after the disaster, the writer accompanied the superintendents in an examination of the No. 5 plane gangway, and we found the workings filled with explosive gases back to a point 500 feet from the face, proving that an enormous volume of gas was released from the strata or pillars during the squeezing and crushing of the pillars. The air-current from this region was passing the point where Mr. Dunstan fired the gas, and evidently a section of this current having been charged with gas to an explosive mixture reached that point just when he was approaching with his exposed light, and consequently the explosion

followed. The concussion of this explosion killed and injured the workmen at the points mentioned, and did the other damage. The colliery had not been in operation since the other cave-in on January 2, and only repair-men were in the mine when the explosion occurred.

It has been well known here for several years that when a squeeze or a cave-in occurs fire-damp is also liable to appear in the air in sufficient quantities to make it explosive, and every man who assumes charge of a mine should know this, and exercise the necessary precaution when such trouble comes upon him, but in this instance every official, from the superintendent down, seemed to be ignorant of this fact, and acted in conformity with their experience in other very different regions.

DISASTER AT THE NO. 3 SHAFT SOUTH WILKES-BARRE.

A map of the workings of this mine is here presented in this report which shows the workings and their connections with the Stanton mine. To enable the reader to understand the situation, the conditions just prior to the accident is explained. The No. 3 shaft was the hoisting way for both coal and men. This shaft was also the inlet for the ventilation. The air-current after descending this shaft, passed in through the tunnel and in the gangway to the point "P" where it was split, a part going up the outlets and down the rock plane to the Stanton fan, and the other split passing into the face of the gangway and returning through the air-way as indicated by the arrows, to the fan at the No. 5 shaft. This shaft also had a cage in to hoist the coal worked from the Baltimore seam 300 feet deeper than the Hillman, which was worked from the No. 3 shaft. Thus it may be seen that there were three available openings for No. 3 shaft working; one leading down the rock plane into the Stanton mine; one in the No. 3 shaft; and one in the No. 5 shaft. It was a gaseous mine and exceedingly so at some points. The rock plane was driven from the Baltimore seam in the Stanton mine on a rise of 18 degrees for the purpose of working the Hillman seam above the level of the point "B" on map, but it proved so gaseous that it was found impossible to conduct sufficient air up through one opening, and to avoid driving another passage through the rock from the Stanton, connection was made to No. 3 working of South Wilkes-Barre, undoubtly a costly error. On February 2, after making this connection, the inspectors had to notify the company to suspend operation in both the Stanton and South Wilkes-Barre mines, because in consequence of the opposite effects of the ventilating fans of South Wilkes-Barre and Stanton mines. The air-currents became unreliable and fluctuated so that they became explosive at frequent intervals making both mines dangerous. In a few days this was remedied so that a reliable system of ventilation was established in the manner indicated on the accompaning map.

On the third day of March, a party of men consisting of Frank Cull, Hugh Dugan, Thomas Williamson, James O'Donnell, Michal Ferry and

At the Empire colliery several short tunnels were driven from the top split of Red Ash to Ross seam and through a fault on the west side.

A new pair of hoisting engines 20″×36″ were put up at the No. 2 shaft to hoist from the underground slope.

At the South Wilkesbarre shafts, the damage that was done by the fire of 1890 was repaired, and a much more reliable system of ventilation was effected by driving new passages. A new fan 35′×12′, having an engine 20″×48″, is also in course of construction. The experiment of trying to ventilate this gaseous mine by a twelve-foot Cappell fan has not proven satisfactory, and the new fan is expected to effect a much desired improvement.

At the Stanton colliery the damaging effects of the cave of 1890 were repaired, and so was the effects of the South Wilkesbarre fire on the rock plane connecting the two collieries. This plane is now in working shape and openings are being driven to connect with the air-shaft, which when effected, will place the Hillman vein workings of this mine in good condition for work.

A tunnel was driven across the basin in the Baltimore seam, near the bottom of the underground slope, a distance of 456′, which has enabled them to ventilate a very gaseous portion of workings which has been idle for more than four years, owing to the prevalence of an unusual quantity of explosive gas.

A new air-shaft was also sunk for the Red Ash seam a depth of 318′ upon which a ventilating fan 24′ diameter, an engine 20″×36″, and two batteries of Babcock & Wilcox boilers were erected.

At the Jersey No. 8 colliery a new air shaft was sunk, having an area of 12′×12′ and a depth of 57′, upon which a new fan 24′ diameter, having direct acting engine 30″×36,″ were erected. Several other minor improvements were also made at this colliery.

At the No. 9 colliery, Sugar Notch, the underground slope was re graded and a new lift opened. The hoisting engines were taken out and new ones erected on the surface to do the work. These engines are 24″×48″ direct-acting on a parallel drum 9′ diameter. This has made a very agreeable change in the ventilation. Three tunnels were driven at different levels to work the Twin, Shaft and Top split seams.

At the Lance No. 11 colliery a new tunnel was driven from the Bennett to the Cooper seam, a distance of 222′. They have also improved the ventilation by enlarging the airways at contracted points through the mine. They also put in a system of water pipes in the gaseous gangways to be ready for extinguishing fires in case the gas-feeders should be ignited. A 100-horse power Dimmick & Smith high-pressure boiler was added to the plant on the surface.

At the Nottingham colliery the third and fourth east gangways closed by the cave of last year were reopened, and the standing gas removed by driving airways around the cave.

A short rock tunnel for ventilating purposes, 43 feet long and 7×12 feet area from the top to the bottom split of the Red Ash seam, was driven.

At the No. 8 Jersey colliery two new tunnels were driven from the Baltimore to the Ross seam, one in each of the two lower lifts of the new slope, and they are continued to tap the Red Ash seam. Size of each is 7×12 feet, and their lengths will probably be 600 feet each when completed. They are now at work driving second openings for the Ross seam.

At the No. 9 colliery, Sugar Notch, the underground slope is being extended, and a traveling way has been completed 900 feet in length on a grade of 20 degrees.

At the No. 11 Lance colliery a new air shaft is in progress of sinking, 12×30 feet area, and it will be about 600 feet in depth when completed. At the close of the year it was at a depth of 40 feet. Three new gravity planes of various lengths were completed, to run coal down from elevated workings. A new Guibal fan thirty-five feet diameter was erected as an auxilliary to the old one. It exhausts 229,630 cubic feet of air per minute when running fifty revolutions. This also has a self-recording pressure meter connected to the return air and an automatic alarm attached to give alarm in case the ventilation is reduced.

At the Nottingham colliery a new air shaft has been sunk to the Ross seam. It has an area of 12×30 feet and a depth of 175 feet.

A new fan 24 feet in diameter is in progress of erection and will be operated by a horizontal direct-acting engine 20×36 inches.

At Wanamie Nos. 18 and 19 two new tunnels have been driven at different points from the Baltimore to the Cooper seam. Each is 165 feet in length and 7×12 feet area.

The No. 19 slope is being extended to open another lift.

Beside improvements recorded above, a number of new steam boilers were added to the plants of several of the collieries, and several other minor improvements were effected.

Improvements by the Delaware and Hudson Canal Company.

At the Baltimore Tunnel colliery, the underground slope on the Red Ash seam was extended a distance of 500 feet, making the total length of the slope equal 900 feet. The average grade is 18 degrees. At the Boston colliery a new fan has been erected on the foundation of the old one which was torn down. This is 20 feet diameter and running 100 revolutions exhausts 50,000 cubic feet of air per minute under a pressue of 0.75 inch water gauge. The size of the engine is 14×48 inches, running the fan by a belt transmission.

At the No. 2 colliery, Plymouth, an underground slope has been sunk to a length of 500 feet on a grade of 12 degrees, which is the inclination of the seam. It opens a lift of excellent Baltimore vein coal. The engine to hoist from this, is located on the surface.

and at the end of the year it was driven to a length of 440 feet on grade of 20 degrees.

This will also open some coal for the Maxwell breaker in addition to the production of the shaft.

The woodwork of the Maxwell breaker is completed ready to be equipped with machinery. It will be ready to prepare coal for the market by the time the shaft is completed.

At the No. 9 colliery, Sugar Notch, the underground slope was extended a distance of 300 feet where a new lift was opened. A rock tunnel was driven on a rise of 45 degrees, having an area of 12½x8½ feet, and a length of 104 feet, for the purpose of improving the ventilation.

At the Lance No. 11 colliery important improvements are in progress and some were completed. A new underground slope was sunk, extending farther south than the bottom of the old slope. It is 800 feet long on a grade of 8 degrees and opens a considerable area of coal which has been hitherto unavailable.

An air passage was driven, also, through rock a distance of 200 feet, having a sectional area of 84 square feet.

A new air shaft is in progress of sinking for this colliery for the purpose of enlarging the volume of air. Its size is 12x30 feet, and it was at a depth of 300 feet at the end of the year.

At the Nottingham colliery a great improvement has been made by the introduction of compressed air to run the underground pumps, instead of steam. There are 8 pumps used in this mine, and the steam necessary to run them heated the air to an almost intolerable degree. The two duplex Ingersoll air compressers, with Corliss engines, were located on the surface. Their size is 28x34¼x48 inches, having a capacity for producing 11,000 cubic feet of free air per minute. One pair furnishes sufficient air to run the 8 pumps and one is operated during the day and the other during the night. The farthest pump is at a distance of 7,200 feet from the compressors. The air pipe to the first pumps is 14 inches diameter, and from there to the other pumps 12 inches. They are working satisfactorily, and the temperature of the mine ventilation has been greatly reduced.

At the Wanamie, No. 18, colliery a short tunnel was driven from the Baltimore to work the Cooper seam. Its size is 7x12 feet, and its length 175 feet.

Improvements by the Delaware and Hudson Canal Company.

At the No. 2 Baltimore colliery a new underground slope was driven a distance of 450 feet on a dip of 20 degrees to work the coal of the red ash seam below the level of the shaft.

At the No. 3 Baltimore they are sinking an underground slope on the red ash seam and it was down a depth of 600 feet at the end of

Lehigh and Wilkes-Barre Coal Company.

Hollenback No. 2 Colliery—

Return airway in rock from the Diamond basin; 12x8x400 feet.
No. 2 Red Ash slope being sunk in coal in the bottom split vein.
Annex on east and west side of breaker for the preparation of stove and chestnut coal.

South Wilkes-Barre No. 5 Colliery—

No. 1 airshaft has reached the vein; 37x12x650 feet.
Tunnel has been driven from Stanton to Hillman vein.
Rock slope finished from Hillman to Baltimore veins and second openings in rock finished to same.
New fan, 35 feet diameter, has been erected at No. 5 shaft.
Erected 250 horse power Stirling boilers.
Erected 500 horse power National boilers.
Erected 470 feet of 8-inch steam line to fans.

Sugar Notch No. 9 Colliery—

Main airway enlarged to 90 square feet; 1,050 feet in length.
Ross slope extended in rock 120 yards.
Tunnel, Twin to Ross veins.

Lance No. 11 Colliery—

Rock slope to Ross veins finished; sunk a distance of 400 feet this year.
No. 2 airshaft completed to Ross vein, and second openings are now being driven to connect with the rock slope workings.
No. 12 plane partly in coal and partly in rock has been finished.
No. 2 slope in coal has been finished.
Erected 250 horse power National boilers.
Erected 430 feet extra steam line to fans.

Nottingham No. 15 Colliery—

The Ross slope is being extended in rock through the anticlinal.
The Red Ash No. 3 slope is being extended in coal.
Erected one 24 feet by 8 feet Guibal fan on No. 1 airshaft.
Erected 300 horse power Stirling boilers.
Erected 4,000 feet 8-inch steam lines to fans.

Wanamie No. 18 Colliery—

No. 5 slope is being sunk in coal in the Ross vein.
Two bore holes, 200 feet deep each, have been put down for hoisting and pumping purposes.
No. 19 slope has been sunk in coal almost to the basin.
Erected one pair geared engines, 18x30-inch, with 8x10-foot drums.

increased as the water raised. By April 20 the water in Avondale had reached a height of 150 feet vertical above the dams and the leakage into the Nottingham had filled their entire workings below the seventh lift.

At this time it was apparent that the inflow of water had been materially reduced and the D., L. & W. Company decided to instal the pumps and make energetic efforts to control the water. It continued to rise in the Nottingham until May 8. The Lehigh and Wilkes-Barre by this time had installed more pumps than were needed at the fifth lift to hold it. The number of pumps necessary to hold it were started and it was kept at this height until September 13. The workings of six lifts were submerged. On this date they started to reduce the water and have unceasingly pumped day and night in both mines ever since. At this time it has been pumped down to the eighth lift in the Nottingham and to the level of the dams at bottom of No. 1 slope in the Avondale mine. The quantity of inflow has very materially decreased, being not more than one-half as much as it was when it broke into the mine, and it is confidently expected to decrease as much again as the crevices in the top works become filled with clay, etc.

The production of coal had to be suspended in both mines. One of the hoisting compartments in the Nottingham shaft had to be utilized for additional steam and column pipes required for the extra pumps, but after an idleness of two and a half months that part of the mine which was not occupied by the water was put in operation and the coal was hoisted by one cage. They have been hoisting about 400 mine cars per day. On October 7 work was resumed at the Avondale mines and they are working in the No. 2 slope and that part of the Ross seam workings lying to the rise from the shaft level. It is a question of only a few months before both mines will be producing their usual quantity of coal.

In the breaking in of the water at Avondale there is an ominous warning to all who mine under the flats of the Susquehanna river, of the possibility of enough water breaking into one of the mines to flood and ruin all the mines that are connected together. All the mines are connected from West Nanticoke to Edwardsville except the Woodward, and it behooves all to exercise extraordinary care in mining. The outcrops of all the seams are buried under the sandy flats between Nanticoke gap and the upper end of Plymouth, and to mine the coal in the approaches to these outcrops needs more than the ordinary care and even with the exercise of all possible care, a pot hole or deep crevice in the rock may be struck at any time to the ruin of all these mines.

Nottingham

The board of examiners was G. M. Williams, Mine Inspector; Edward Mackin, superintendent, and Frank Mills and David L. John, miners. Seventeen applicants for mine foreman certificates were examined, and the following named were recommended to have certificates: William T. Davies, Charles A. Brown, Harry Gaughan and Thomas E. Edwards, of Wilkes-Barre; William S. Davies and Oliver Rhydderch, of Edwardsdale; James Wilson and Gomer Evans, of Plymouth; John Rousing and James Stirling, of Westmore.

The following named persons received certificates of qualification for assistant mine foreman: James Coughline, Luzerne; Peter Tully, John Dietz, John C. Parry, Lewis Lewis, William E. Thomas, Edward H. Williams, Thomas W. Jones and Ivor Davies, of Wilkes-Barre; Michael Nork and Thomas Morgans, Glen Lyon; David Morris and James H. Davy, Wanamie; William Newland, Alden Station; John P. Evans, Illtyd Evans, William H. Faust, Benjamin A. Waters, Arthur D. Evans, Lewis B. Lewis, William E. Bowen, Llewelyn Williams and Ivor T. Phillips, of Nanticoke; John Whittington and David Roberts, Sugar Notch; John Abrahamson, William A. Roberts and John Boyer, of Parsons.

Improvements by the Lehigh and Wilkes-Barre Coal Company in the Year 1900.

Hollenbach Colliery.—Tunnel from bottom to top split Red Ash, 49 yards. Return airway in rock, 19 yards.

South Wilkes-Barre Colliery—Bore hole to drain water from Kidney to Hillman Vein. Tunnel Hillman to Stanton, 159 yards. No. 4 tunnel extended 50 yards. Tunnel Baltimore to Five-Foot, 63 yards. Fuel conveyor breaker to boiler house.

Stanton Colliery—Rock plane Hillman to Kidney vein, 60 yards. One pear 24x48-inch first motion engines erected at Stanton air shaft for operation of No. 4 rock plane. One thousand horse power. Babcock & Wilcox boilers to replace cylinder boilers at breaker plant. Additional 6-inch steam line from breaker plant to air shaft.

Sugar Notch—Tunnel from bottom to top split, Baltimore vein. Tunnel from Ross to Red Ash vein, 70 yards.

Lance Colliery—Tunnel Five-Foot to Hillman, 189 yards, partly finished. Tunnel bottom split to top split, Baltimore, 57 yards. Annex to breaker to prepare buckwheat coal.

Nottingham Colliery—One pair 24x48-inch first motion engines for operation of new slope in Ross vein. An 8-inch bore hole, 280 feet long, to conduct rope from surface to head of slope.

Reynolds Colliery.—Rock plane Red Ash to Ross, 50 yards. Partly finished.

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance Colliery

Outside.—Duplex air compressor, simple steam, compound air; forced fan draft system for boilers, and addition to new boiler house.

Inside.—No. 18 tunnel, Red Ash to top Red Ash, 15 yards. No. 19 tunnel, Red Ash to top Red Ash, 15 yards. No. 20 tunnel, Red Ash to top Red Ash, 15 yards. No. 21 tunnel, Cooper to Five Foot, 50 yards.

Nottingham Colliery

Outside.—Started erection of new breaker; shaft hoisting engines; No. 1 slope engines and No. 2 slope engines placed on new foundations, and new houses erected for the same; colliery supply store; colliery shop; extended brick compressor house, for accommodation of three stage air compressors.

Inside.—Eighteen inch by 30 inch hoisting engines and engine room in rock, on No. 2 slope anticlinal. Pumping plants on 5th, 7th and 9th, Red Ash levels, remodeled with the addition of two simple duplex pumps and two bore holes for water from Ross to Red Ash, thereby concentrating all pumping in Red Ash vein.

Reynolds Colliery

Outside.—Five hundred H. P. battery B. & W. boilers.

Inside.—No. 8 Rock plane, through Red Ash fault, 125 yards.

Wanamie

Outside.—Five hundred H. P. battery B. & W. boilers.

Inside.—Pumping plant No. 6 Red Ash slope; extending No. 6 slope through rock, 100 yards; No. 11 tunnel, Baltimore to Red Ash across basin No. 2 drift, 190 yards.

PARRISH COAL COMPANY

Parrish Colliery

One 8 inch bore hole for flushing; one crusher for crushing slate and bone, for flushing; one pair breaker engines; No. 6 slope extended 300 feet; intake air shaft, concreted from surface to rock; one 30,000 gallon water tank; one 20,000 gallon water tank.

Buttonwood

Tunnel driven from Kidney to Abbot vein about 560 feet; one 35 foot fan, also fan engine 22x36; one saw engine, etc., for cutting prop timber, etc.; outside railroad, plane and engine, for handling timber, etc., from railroad to head of shaft; concrete wall erected around coal shaft head, also around boiler house; one 30,000 gallon water tank.

high water in the Susquehanna river, which has resulted so disastrously to this colliery heretofore.

Woodward Colliery

New steel tower over No. 1 shaft, installation of endless rope haulage on breaker trestle and to convey empty cars to No. 2 shaft, new brick and concrete pump room, lamp room and fire-boss shanty near the entrance of No. 1 shaft.

Breaker repairs consist of the installation of mechanical pickers, elevators, rollers, etc., together with a new 12 foot dust fan, which has been quite an improvement in this breaker.

Haulage roads and return airways were enlarged and widened, increasing the area of some of these openings from 48 square feet to 90 square feet.

No. 2 shaft was retimbered during the year to within 250 feet of the surface. A brick partition has also been erected between the air shaft and hoistways in this shaft for a distance of 212 feet from the bottom. This work will be completed as weather conditions will permit.

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery

Outside.—Colliery shop.

Inside.—Rock plane airway Cooper to Five Foot for No. 21 tunnel return, 20 yards; 10 inch bore hole Stanton to Red Ash for pumping plant; No. 22 tunnel Cooper to Cooper, 26 yards; rock plane airway Stanton to Hillman for No. 14 tunnel return, 40 yards; No. 11 tunnel extended to Cooper, 95 yards.

Nottingham No. 15 Colliery

Outside.—Oil house; three stage air compressor; 2,000 H. P. water tube boilers; fuel conveyor.

Inside.—Compressed air haulage motor for shaft level haulage.

Reynolds No. 16 Colliery

Inside.—Tunnel turnout on No. 8 plane, 36 yards.

Wanamie No. 18 Colliery

Outside.—Supply store; 24 foot ventilating fan No. 2; locomotive house; 24x48 inch hoisting engines, No. 6 slope; 10 double dwellings.

Inside.—Rock plane airway Red Ash to surface, 175 yards; No. 12 tunnel Ross to Baltimore, 105 yards; No. 13 tunnel Ross to Ross.

of the shaft, in the breaker, after the car was dumped, he gave the signal to the engineer to lower. It was presumed that after he had given the signal for the cage to descend that he made an effort to take the ticket off the car, and in so doing lost his footing, and was precipitated to the bottom of the shaft.

CONDITION OF COLLIERIES

LEHIGH AND WILKES-BARRE COAL COMPANY

Nottingham colliery, Reynolds colliery, Wanimie No. 18 and Wanimie No. 19.—Condition good as to safety, drainage and ventilation.

DELAWARE AND HUDSON COMPANY

Plymouth No. 2, Plymouth No. 3, Plymouth No. 4, Plymouth No. 5, and Boston.—Condition good as to safety, drainage and ventilation.

WEST END COAL COMPANY

West End in good condition; drainage good; a very notable improvement in regard to ventilation, especially in outside drifts.

Ross vein in long drift, is only in fair condition in regard to ventilation, but expect to have this vein well ventilated in short time.

PLYMOUTH COAL COMPANY

Dodson.—Condition good as to safety, drainage and ventilation.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward and Avondale.—Condition good as to safety, drainage and ventilation.

PARRISH COAL COMPANY

Parrish and Buttonwood.—Condition good as to safety, drainage and ventilation.

KINGSTON COAL COMPANY

Kingston No. 2, Kingston No. 3.—Condition safe, drainage good, ventilation good; special mention should be made as to the good ventilation now existing in the orchard vein, since the installation of a new fan.

GEORGE F. LEE COAL COMPANY

Chauncey.—In safe condition, drainage good, ventilation fair.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery

Outside.—Supply store, brick oil house, re-inforced concrete retaining wall, 500 H. P. water tube boilers.

Nottingham No. 15 Colliery

Outside.—Complete new breaker and surface improvements, 500 H. P. water tube boilers.

Inside.—Two bore holes from surface for steam pipes, two car hoists at foot of shaft, two compressed air motors for haulage.

Wanimie No. 18 Colliery

Inside.—No. 7 rock slope Baltimore to Ross, No. 12 tunnel extended, Baltimore to Cooper.

DELAWARE AND HUDSON COMPANY

Plymouth No. 2

No. 10 plane, Top split Red Ash, extended 800 feet.
No. 6 slope, Stanton, extended 300 feet.
No. 8 slope, Hillman vein, extended 150 feet.
No. 12 Rock plane, Stanton to Kidney vein, driven 330 feet.
Eight inch rope hole for No. 7 Stanton vein plane, 246 feet deep, and 12¼ inch x 15 inch engines installed.
Eight inch culm hole and crusher plant for flushing refuse into the mines.

Plymouth No. 3

Crusher plant installed, to break up refuse from breaker to be flushed into the mines.

Plymouth No. 4

No. 10 plane, Ross vein, extended 150 feet, and 10 inch x 12 inch engines installed for operation of same.
No. 9 plane, Bennett vein, driven through old workings 600 feet, and pair of 10 inch x 13 inch engines installed for operation of same.
Crusher plant installed for flushing purposes.

Boston

No. 12 Rock plane, from Upper to Lower Ross, 250 feet.
No. 9 plane, Top split extended 315 feet.
No. 10 plane, Top split extended 100 feet.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Avondale

Extensive breaker improvements made at this colliery. When repair work was begun on this structure it almost became necessary to rebuild the entire building, costing a large amount of money, with the result that the company has what might be considered a modern breaker on a small scale.

The work of changing the location of steam boilers from the Ross shaft to the main shaft will be completed early during the year 1906.

Connection is being made with the colliery to the Nanticoke Power Station, which will generate electric current for operating locomotives and hoists in this mine.

A 7x12 rock tunnel connecting Red Ash and Ross vein, 743 feet long on a 5 per cent. grade has been completed.

Boston

No. 9 Plane, Top Split, Red Ash vein, extended 600 feet.

No. 13 Plane, Bottom Split, Red Ash vein, graded and driven 1000 feet, 600 feet of which was driven through fault cutting the Top and Bottom Splits of the Red Ash vein.

8 inch rope hole for No. 13 Plane drilled 225 feet and pair of 14x20 engines installed.

Air return in rock driven from Ross vein to Top Split of Red Ash.

Steel tower erected to take the place of frame structure over main shaft.

Condition of colliery is good.

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11

Outside.—Fuel conveyor.

Inside.—Compound condensing pump and rooms.

Condition of colliery is good.

Nottingham No. 15

Outside.—Colliery office.

Inside.—Duplex pump, 9th East.

Condition of colliery is good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Avondale

The appearance outside at this colliery has been considerably improved by the erection of a concrete retaining wall extending along the hillside from the breaker to the fan house.

The installation of feed water regulators, etc., in boiler room is a decided improvement over the old method of feeding the boilers.

Inside.—Two 7x12 short rock tunnels were driven on No. 4 East Gangway Ross vein, through fault.

The installation of a double motor electric hoist on No. 7 Slope, Ross vein, is a decided improvement over the old steam engine.

The erection of concrete piers, or props, in several places in this colliery might be worthy of mention.

Condition of colliery is good.

Woodward

Outside.—New steam lines from the boiler plant to ventilating fan, hoisting engines and power station have made a decided improvement in the outside appearance and efficiency of this colliery.

The breaker has been improved by the installation of mechanical pickers, rock crushers, etc., together with two Phillips steam dumps.

The brick partition separating hoist way and air way No. 2 Shaft was partly completed during the year; it is now completed. It has been a source of improvement to the ventilation of this colliery.

The erection of a steel bridge under this breaker over railroad tracks adds strength to the building and will prevent the building from getting on fire from sparks from locomotives passing under it.

Inside.—Two rock tunnels were driven connecting Cooper vein with 5 Foot vein and Red Ash with Ross vein.

A rock slope is being sunk from the surface to the Abbott vein. This work will be completed in 1907.

The erection of a concrete and iron air bridge, No. 2 Slope, Red Ash vein, has made a decided improvement in the ventilation of this section.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery, Inside.—No. 25 Tunnel, Cooper to Baltimore.

Nottingham No. 15 Colliery, Outside.—New wash house.

Inman No. 21.—Sinking shaft. Continued sinking Baltimore and Red Ash shafts.

KINGSTON COAL COMPANY

Kingston No. 2 Colliery.—A new washery, capacity 1,000 tons per day, has been completed midway between No. 2 breaker and No. 4 breaker, said washery complete with duplicate shakers, rolls, elevators and conveyors and Jeffrey crushers.

Three bore holes driven so that all waste from the breaker is flushed into the mines.

Shipment began from the washery in the month of May.

A new brick boiler house equipped with 600 H. P. water tube boilers, feed pumps and water heaters.

A wet addition was completed to the breaker equipped with duplicate shakers, elevators, rolls and Jeffrey crushers.

The dry part of the breaker is being entirely remodeled, work on which will be completed in the fore part of 1909.

All circular screens are being substituted with shakers.

The old plane has been abandoned and a new location made away from the breaker and at a much easier grade, which removes the unsafe condition.

A new brick office and retail scales complete.

The tracks on the loaded and empty sides of the breaker have been changed and new railroad scales set in place.

A new steel concrete bridge has been completed over Jackson avenue dispensing with the old wooden structure.

Special attention has been given the remodeling of the emergency hospital in the Nos. 2 and 3 Shaft districts; also a brick combination hospital and foreman's office built at the old slope.

The equipment has been increased with two new locomotives and cars for the Mountain tunnel development.

Gaylord Colliery.—A new washery, with a capacity of 1,000 tons per day, was completed and operation begun in March; the washery is completed with duplicate shakers, rolls, elevators and conveyors and Williams crushers, and also acts as a wet side or mud screen adjunct to the breaker.

Two new Goyne pumps 28 x 10 x 36 pump silt through 8 and 10 inch culm lines 3,000 feet to bore holes, so that all the refuse from the washery and breaker is flushed into the mines.

Series of six holes have been completed for flushing purposes.

Two bore holes for steam exhaust and culm pipe and a new pump outfit completed in Bennett vein.

During the months of July and August the breaker was remodeled and all circular screens dispensed with, shakers being substituted, also modern rolls, crushers, etc.

EXPLOSIONS OF GAS AT NOTTINGHAM COLLIERY

On the twenty-third of June an explosion of gas occurred at Nottingham No. 3 Slope, 11 East, Red Ash Vein, by which two miners, Alexander Koproski and Jacob Dramanski, were killed. On the day of the explosion they had gone up to 10 East airway with the intention of going as far as breast 15 to rap on the pillar to determine how great a distance breast 15 would have to proceed before tapping the above airway. A fall of rock had taken place on 10 East airway that left a cavity in the roof. The men had passed over the fall, had made the rapping and were returning to their working places. While on the top of the fall their naked lights came in contact with a small body of gas that had collected, due to the fall, and an explosion resulted by which the two men were burned about the heads and bodies. Dramanski died the same day and Koproski the next day. The inquest failed to disclose how the gas had accumulated as the evidence and record book both showed that the place had been examined according to law. The verdict further states that the men went into old workings where their work did not call them and failed to use their safety lamps. The company and the officials were exonerated from blame.

On the tenth of September another explosion occurred in No. 3 Slope, 11 East, Red Ash Vein, by which Phillip Dinko, a miner, was fatally burned and two other workmen severely burned. At the time of the accident Dinko was engaged with others in timbering the face of the gangway. The place had struck a fault and the vein was about 22 feet high. The fire boss on his rounds in the morning found the place in a safe condition and free from gas. In order to facilitate the work a platform had been erected directly in the mouth of the cross-cut deflecting the air from striking the roof and thus allowing a small body of gas to accumulate. The men were working with naked lights although they had safety lamps in their possession and orders had been given that those working near the roof should use safety lamps only. The verdict exonerated the company from blame.

CONDITION OF COLLIERIES

KINGSTON COAL COMPANY

Kingston No. 2.—Ventilation, drainage and general condition as to safety, good.

Gaylord.—Ventilation, drainage and general condition as to safety, good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward.—Ventilation, drainage and general condition as to safety, good.

Avondale.—Ventilation, drainage and general condition as to safety, good.

"An era in the history of mining anthracite in the Wyoming coal field has been inaugurated by the success of the Dundee Coal Company in reaching a superior vein of eleven feet in thickness at a depth of nearly 800 feet below the surface.

From a distance we have watched the progress of this shaft with anxious eyes, and we are sure that the pleasure to us of their success can very little be less than to the members of the company. Much credit has been thrown on our coal field by the partial and unsuccessful exploration for coal in Hanover and Newport. Borings have been abandoned at a depth of three or four hundred feet, leaving doubt about the existence of coal, in the minds of strangers, and, indeed, in the minds of some of the less sanguine of our own citizens.

The Dundee Coal Company, composed principally of our own citizens, resolved to sink its shaft to a depth of 1,000 feet if coal could not sooner be obtained. The largest vein cut had been but four feet, with many smaller ones. Still, without hesitation, yard after yard was cut. Mr. F. Koerner, an intelligent and energetic man, had charge of the work, which progressed as rapidly as the hard rock would permit, until 780 feet had been passed. Then indications of coal appeared and an auger was put down three feet to a small eight-inch seam of slate below which was a vein of fully eight feet of beautiful coal. To the bottom of the vein is 792 feet, and to provide for the dropping of the water from above the shaft was sunk a few feet deeper, probably 800 feet in all."

The story is continued with a narrative of the personal experiences of the editor in a descent of the shaft. A large stream of water entered at a depth of 250 feet, but was cared for by pumps. The editor mined a few specimens of coal at the bottom with illumination furnished by a few gas jets pouring forth from the vein itself. He says, in his story, that the vein was supposed to be the Mills vein, found at Nanticoke, and that other veins of greater thickness were believed to be underlying it. This belief was well founded, for the territory in which this vein was located is now considered the richest in the Wyoming coal field, and the lower veins are found at a depth of from 1,800 to 2,000 feet. The ancient chronicler also tells of the gas found in the vein, for it was the presence of this gas in large quantities and the lack of knowledge of proper ventilating methods in those days that caused the subsequent abandonment of the mine.

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery, Inside.—Tunnel, Cooper to Five Foot, No. 1 Slope, 5th West.

Nottingham No. 15 Colliery, Outside.—Corliss breaker engine.

Reynolds No. 16 Colliery, Inside.—Rock plane, Ross to Ross, No. 4 tunnel East.

DELAWARE AND HUDSON COMPANY

Plymouth Nos. 1 and 2 Colliery.—A return airway was driven from No. 14 plane, Abbott vein to No. 1 shaft.

An air shaft was sunk 55 feet from surface to Lance vein workings and 300 feet of return airway was driven in vein.

A 50,000 gallon water tank was erected and pipe connections made for boiler supply.

Plymouth No. 3 Colliery.—Extensive repairs were made to breaker and the timbering in main shaft was replaced by concrete from top to bottom. A new 8-inch rope hole was drilled 425 feet from surface for No. 6 plane, Red Ash vein.

Plymouth No. 5 Colliery.—No. 7 plane, Bennett vein, was driven 1,200 feet and an inch rope bore hole was sunk 290 feet from surface.

No. 3 plane, Bennett vein, was driven 250 feet.

Boston.—No. 14 plane was driven from the Boston Split Red Ash 250 feet through rock to the Top Red Ash and 600 feet in the latter vein.

No. 15 plane, Bottom Red Ash vein, was driven 1,100 feet.

The Boston breaker was torn down and the coal is now being prepared at No. 5 breaker.

FATAL ACCIDENTS

Explosion of Gas at Nottingham Colliery

On January 11, 1910, at about 7:30 p. m., an explosion of gas occurred in No. 6 Slope, Ross Vein, Nottingham Colliery, whereby the following persons lost their lives: Joseph Masetis, Miner; Joseph Litz, Miner; Michael Duchinski, Miner; David Roberts, Slope Engineer; Anthony Asposkis, Laborer; Wassil Duchinski, Laborer; Michael Seposki, Driver.

The following persons received slight injuries: Simon Berato, Simon Dunda, Andrew Smith, William Vanshepski, Joseph Katskin, and David Jones, and suffered more or less from shock. The majority of them, however, walked to their homes unaided.

A number of men were cleaning up a fall and retimbering at the foot of No. 6 Slope, which is a continuation of 9 East airway, driven from No. 2 Slope extension, Ross vein, as by reference to map hereto attached and made a part of this verdict the same will more particularly appear. The purpose was to facilitate haulage by No. 6 Slope, which would be very convenient for No. 2 Slope, by the way of No. 7 East gangway, thereby dispensing as far as the haulage was concerned with 9 East gangway and the extension of No. 2 Slope from this lift. A number of men were also mining coal on the north side of an anticlinal, which runs in an easterly and westerly direction, to make connection with chambers which had been driven from No. 9 East gangway and abandoned.

The persons who escaped injury and who had been at work in the immediate vicinity of where the explosion occurred, after recovering from shock, could not advance any definite statement as to the initial point of the explosion, or as to how or where this body of gas had originated, or from which lamp it had been ignited. It was thought at first that during the interval between the work of the day men and night men a fall had occurred at the foot of No. 6 Slope, where the roof was known to be very high, that had possibly liberated a quantity of gas, an occurrence that frequently takes place in many of the gaseous mines in this district. This, however, proved not to be the case.

Each miner was provided with a safety lamp, and no gas was discovered in any of their working places. An abundance of air was flowing uninterruptedly in two separate currents, one distinct current in No. 9 East airway, and the other in No. 9 East gangway. Those who survived were employed in the former current of air; those who were suffocated were employed in the latter current, showing conclusively that the explosion took place somewhere on this gangway.

A large volume of air was traveling in this section of the mines, which shows that after the explosive force was spent the terrific speed at which the air traveled to fill up the partial vacuum brought the after damp so suddenly upon the victims that escape was almost

impossible, although one of the laborers employed on the airway current stated that his miner insisted upon going up the slope, at which place the rescuers discovered his body.

The officials of the mine in making an investigation of this portion of the workings discovered a very large fall in a chamber on No. 9 East gangway, which led them to believe that possibly a body of gas had been liberated by this fall and was conveyed by the current, and coming in contact with an open light created an explosion. It is well known that in a very gaseous mine, a fall of such an extent will generally give off a certain amount of gas spontaneously, while others open up or expose a feeder of gas that will not become exhausted for sometime afterwards. It was also known that a check door situated on the gangway had been destroyed by a local fall, and on account of the nature of the roof it was decided that the door should be removed and erected between chambers Nos. 22 and 23. After the day shift was over, a bratticeman and his helper commenced to build the check door and it was nearly completed when the explosion took place, supposed to be at No. 6 Slope, a distance of 2,500 feet further inside and upon the same current.

It was known that chamber No. 23, parts of which were inaccessible was making some gas. This chamber, due to a check being destroyed, had been deprived of the usual amount of air, and sufficient time had elapsed that a body of gas could have easily accumulated. Chamber No. 23 was accessible in the face, where, according to the evidence of the fire boss he had detected a small body of gas. The remaining portions of this chamber had fallen leaving large cavities in the roof, and therefore could not be examined by him. It appears that in the construction of the check door, its purpose had been accomplished in the deflection of sufficient air to keep these two chambers free from any standing gas, and again joining the main current at the foot of chamber No. 23.

The fire boss spent considerable time with the bratticeman while the door was being erected and claims with much stress that the small quantity of gas that was being removed was insufficient to adulterate so large a body of air as was traveling on the gangway and towards No. 6 Slope. He must have been thoroughly convinced as to this, as he was on his way to No. 6 Slope when the explosion occurred, but was not quite within the explosive range and therefore suffered no injury except that he was forced to the floor of the mine.

In order that the persons employed in this part of the mine would be able to throw more light as to the cause of the accident, I instructed Dr. D. W. Dodson, Coroner, to hold an inquest, which inquest was held on the 26th day of January, 1910, at Plymouth, Pennsylvania, and the following verdict was rendered: "David J. Roberts came to his death on the 11th day of January, 1910, at Nottingham Colliery, L. and W. B. Coal Company from injuries received as the result of an explosion of gas. Six fellow laborers perished at the same time and from the same cause. The evidence shows: First, that the men were working in 9 East No. 6 Slope of said colliery, and that the explosion occurred about 7 p. m.; second, that a body of gas had accumulated in either chamber No. 22 or No. 23, abandoned workings. This accumulation of gas was due to the breaking down of a check door by a fall of roof which took place about 16

hours before the explosion occurred; third, that the rebuilding of the same check door was begun without first notifying the men who were working in farther on the same split of air. This repair work was ordered by, and was in charge of, John E. Richards, Assistant Mine Foreman, and David W. Jones, Fire Boss.

We find that the said Fire Boss, David W. Jones, was negligent in his duty in not notifying the men in the same split of air to go out before the air current was tampered with. We also find that the Assistant Mine Foreman, John E. Richards, was negligent in his duty in waiting so long to have the said check door repaired. We also find that the certificates of competency of two of the deceased miners were fradulent and were irregularly issued. This fact we deplore and hope that a remedy will soon be found to eradicate the evil.

W. R. WOODS,
THOMAS OWEN,
MICHAEL DEVEY,
ANTHONY BATT,
AUGUST WISHNEFSKI,
GEORGE RYSCAVAGE,
Jurors."

CONDITION OF COLLIERIES

KINGSTON COAL COMPANY

Kingston No. 2.—Safety, ventilation and drainage good.
Gaylord.—Safety, ventilation and drainage good.

DELAWARE AND HUDSON COMPANY

Plymouth No. 5.—Safety, ventilation and drainage good.
Plymouth No. 3.—Safety, ventilation and drainage good.
Plymouth No. 2.—Safety, ventilation and drainage good.

LEHIGH AND WILKES-BARRE COAL COMPANY

Nottingham.—Safety, ventilation and drainage good.
Lance No. 11.—Safety, ventilation and drainage good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward.—Safety, ventilation and drainage good.
Avondale.—Safety, ventilation and drainage good.

PARRISH COAL COMPANY

Buttonwood.—Safety, ventilation and drainage good.
Parrish.—Safety, ventilation and drainage good.

PLYMOUTH COAL COMPANY

Dodson.—Safety, ventilation and drainage good.

GEORGE F. LEE COAL COMPANY

Chauncey.—Safety, ventilation and drainage good.

LEHIGH AND WILKES-BARRE COAL COMPANY

Nottingham No. 15 Colliery.—Outside: Wash house at Reynolds.
Feed water system.
Inside: New manway for No. 1 slope.
One compressed air locomotive installed.
No. 5 tunnel, Ross to Top Ross.
Started remodeling pumping plants, No. 1 slope.
New rope hole for No. 2 slope.
No. 8 tunnel, Ross to Surface.
No. 9 tunnel, Surface to Baltimore.
One compressed air locomotive installed.
Lance No. 11 Colliery.—Outside: Wash house.
Five hundred H. P. boiler.
Inside: 12 by 16-inch hoisting engines provided for No. 19 plane.
Three compressed air locomotives installed.
No. 12 plane extended from Baltimore to Cooper and 12 by 16-inch hoisting engines provided.
Double-tracking No. 4 tunnel.
Inman No. 21 Colliery.—Developing in Baltimore vein.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward Colliery.—The No. 3 shaft connecting with Nos. 1 and 2 main shafts has been equipped with two Jeffrey multi-blade 20-foot ventilating fans, which are now in running order and are capable of producing 420,000 cubic feet of air per minute.

In No. 2 shaft there is also under way and almost completed a multi-blade, Jeffrey 20-foot ventilating fan, which will take the place of two 16-foot fans now operating on this shaft.

The breaker building has been equipped with galvanized or iron dust boxes, connected to a 14-foot direct driven fan installed in a brick and concrete building.

A large exhaust steam generator is now being installed, housed in a brick and concrete building, near the No. 1 shaft ventilating fan, which will generate considerable power for this colliery.

No. 17 slope from Surface to Snake Island or Abbott vein, has been connected by parallel tunnels for second openings and return.

Two rock tunnels have been driven from Cooper vein to Lance vein for development and ventilation.

The work of erecting concrete arches and of grading a main haulage road to Woodward No. 3 is under way, and they expect to have the same finished during the early part of 1912.

A large triple expansion pump, 3,500 gallon capacity, has been installed at the foot of shaft, Red Ash vein, to pump water to the surface. It is housed in a concrete and steel building lighted with electricity.

During the year the colliery has been equipped with four Draeger helmets, known as "Life-saving Apparatus," and men have been trained in their use.

The work of rebuilding pump-rooms, engine houses and mule barns with incombustible material is about completed.

The condition of the colliery's workings from a safety standpoint is receiving the attention of the officials, and every effort is being made to reduce the number of accidents.

LEHIGH AND WILKES-BARRE COAL COMPANY

Nottingham No. 15 Colliery.—Inside: Built fireproof mule barn. Remodeling pumping plants, No. 1 slope. Completed rock manway from surface to Ross vein at Reynolds.

Outside: Completed mule barn at Reynolds, steam line to River pump and bore hole.

Lance No. 11 Colliery.—Inside: Completed fireproof mule barn. Installing concrete and steel timbering in No. 4 tunnel and shaft landing and also in small engine and pump rooms. 12-inch bore hole for steam line to shaft level pump; Tunnel for air return, Stanton to No. 2 air shaft.

Inman No. 21 Colliery.—Finished development in Baltimore vein.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward Colliery.—Completed the installation of, and put in operation the 20-foot ventilating fan on No. 2 shaft to take the place of two 16-foot ventilating fans. The new fan is giving much better results than the old ones gave. The work of sinking a slope on the Five Foot seam is under way, and a rock tunnel has been driven for a second opening from No. 3 East lift, No. 1 slope, Lance vein to Cooper vein.

Avondale Colliery.—The work of reopening this colliery after the squeeze of 1910 in the Red Ash vein is about completed. The Ross vein, however, is still under water. Completed the work of installing large capacity centrifugal pumps, electrically operated, in Red Ash vein. Preparations are now being made for the installation of larger capacity pumps in the Ross vein, by which this seam will soon be unwatered.

Loomis Colliery.—The work of development is going on as fast as circumstances permit. Gangways are being driven east and west of Nos. 1 and 2 shafts in the Mills and Hillman veins. The work of installing and electrically operated plunger pump at the foot of No. 2 shaft is under way. The buildings for the housing of the shaft hoisting engines, mule barns, store room, boiler house, etc., are under way and will be of fireproof construction.

Along the old river road they are erecting large and commodious houses as residences for the foreman and their assistants.

This Company made special effort during the year to reduce the number of accidents in and about the mines. Notices have been posted at the mines calling attention to the fact that "safety is the first consideration," and the pay envelopes have also been printed with the inscription "Safety First Consideration."

PARRISH COAL COMPANY

Buttonwood Colliery.—Inside: Completed 3 concrete engine houses. Built new pump room at foot of shaft, also repaired and concreted the other two pump rooms. Built concrete barn in Abbott vein and one in Stanton vein. Drove 2 rock tunnels through a fault in Stanton vein, each 100 feet long, for production. Extensive work on No. 11 slope in Stanton vein to shorten haulage and place engine. Silting in Abbott vein to strengthen pillars near shaft.

Outside: Washery was completed.

GEORGE F. LEE COAL COMPANY

Chauncey Colliery.—Safety conditions, ventilation and drainage good.

WEST NANTICOKE COAL COMPANY

West Nanticoke Colliery.—Safety conditions, ventilation and drainage good.

BRIGHT COAL COMPANY

Hillside Colliery.—Safety conditions, ventilation and drainage good.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Nottingham No. 15 Colliery.—Inside: Completed remodeling of pumping plants on No. 1 slope.

Lance No. 11 Colliery:—Inside: Completed concreting of shaft walls and installed fire doors at top of hoisting shaft.

Outside:—Completed power house.

Buttonwood No. 22 Colliery.—Completed No. 1 tunnel from Stanton to Baltimore vein; also tunnels from Hillman to No. 1 tunnel and No. 1 tunnel to Stanton, for haulage. Completed concrete walls at top of hoisting shaft.

Inman No. 21 Colliery.—Inside: Completed tunnels on both sides of Baltimore shaft to Hillman vein for landing.

DELAWARE AND HUDSON COMPANY

Plymouth No. 3 Colliery.—Completed outlet of G or Stanton vein to Plymouth No. 3 shaft, 7 by 12 by 80 feet, on 14 degree pitch.

Completed tunnel 7 by 12 by 280 feet, light car road, to G or Stanton vein; tunnel, 7 by 12 by 320 feet, light car road, to Cooper vein; plane, 7 by 12 by 60 feet, on 18 degree pitch, for car haul; also car haul, 60 feet, on 18 degree pitch.

Plymouth No. 5 Colliery.—Completed tunnel 7 by 12 by 400 feet, G or Stanton vein, to Plymouth No. 5 shaft; also tunnel 7 by 12 by 90 feet, G or Stanton vein, through fault.

Concreted car haul, G or Stanton vein, 145 feet on 8 degree pitch.

Installed electric hoist on No. 2 plane, Cooper vein, operated by Flory 150 H. P. engine.

Installed 16 by 20 inch Flory steam hoist engine to operate No. 13 plane in Red Ash, in Boston section.

Completed pump room in Red Ash vein 11 by 18 by 38 feet, of concrete and steel; also bore hole, 16 inches by 325 feet, Red Ash vein to surface for pumping.

Plymouth No. 2 Colliery.—Completed air return and outlet from Snake Island to surface 7 by 16 by 170 feet long; air return Abbott to Snake Island 7 by 12 by 130 feet on 35 degree pitch; air return Lance to Abbott 7 by 12 by 130 feet on 30 degree pitch; also tunnel 7 by 12 by 300 feet G or Stanton vein to Plymouth No. 2 shaft.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodard Colliery.—Are installing a 20-foot multi-blade ventilating fan on No. 2 shaft, a duplicate of the one installed in 1912.

Driving rock tunnels from Cooper to Lance vein for development and ventilation.

CONDITION OF COLLIERIES

LEHIGH AND WILKES-BARRE COAL COMPANY

Nottingham No. 15, Lance No. 11, Parrish No. 23, Buttonwood No. 22 and Inman No. 21.—Safety conditions, ventilation and drainage, good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward, Loomis and Avondale.—Safety conditions, ventilation and drainage, good.

DELAWARE AND HUDSON COMPANY

Plymouth Nos. 3, 5 and 2.—Safety conditions, ventilation and drainage, good.

KINGSTON COAL COMPANY

Kingston No. 2 and Gaylord.—Safety conditions, ventilation and drainage, good.

GEORGE F. LEE COAL COMPANY

Chauncey.—Safety conditions, ventilation and drainage, good.

WEST NANTICOKE COAL COMPANY

West Nanticoke.—Safety conditions, ventilation and drainage, good.

PLYMOUTH COAL COMPANY

Dodson.—Safety conditions, ventilation and drainage, good.

BRIGHT COAL COMPANY

Hillside.—Safety conditions, ventilation and drainage, good.

PLYMOUTH RED ASH COAL COMPANY

Red Ash.—Safety conditions, ventilation and drainage, good.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Nottingham No. 15 Colliery.—Inside: Completed 21-inch bore hole, surface to Red Ash for 14 inch compressed air pipe. Outside: Reconstructed the breaker and supply store and placed a steel head frame at the shaft.

CONDITION OF COLLIERIES

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11, Nottingham No. 15, Inman No. 21, and Buttonwood No. 22 Collieries.—Safety conditions, ventilation and drainage, good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Avondale, Loomis and Woodward Collieries.—Safety conditions, ventilation and drainage, good.

DELAWARE AND HUDSON COMPANY

Plymouth Nos. 2, 3 and 5 Collieries.—Safety conditions, ventilation and drainage, good.

KINGSTON COAL COMPANY

Kingston No. 2 and Gaylord Collieries.—Safety conditions, ventilation and drainage, good.

GEORGE F. LEE COAL COMPANY

Chauncey Colliery.—Safety conditions, ventilation and drainage, good.

WEST NANTICOKE COAL COMPANY

West Nanticoke Colliery.—Safety conditions, ventilation and drainage, good.

PLYMOUTH RED ASH COAL COMPANY

Red Ash Colliery.—Safety conditions, ventilation and drainage, good.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery.—Completed No. 30 tunnel, Hillman to Stanton; tunnel, Baltimore to Baltimore off No. 4 slope; and No. 31 tunnel, Baltimore to Cooper vein.

Nottingham No. 15 Colliery.—Completed No. 6 tunnel, Top Ross to Ross. Installed a 14 by 48 inch pump on shaft level, and a new pumping station on 11th East.

Inman No. 21 Colliery.—Completed East tunnel from Hillman shaft level.

Buttonwood No. 22 Colliery.—Installed an electric pump on No. 3 slope, and an electric hoist on No. 13 slope.

In the Parrish mine an electric haulage was installed on No. 13 slope, also two electric locomotives. Completed No. 10 tunnel, and

nel was driven from Cooper to Lance vein; distance 100 feet. Built 250 feet of concrete walls and steel I beams for roof and side supports on Cooper vein haulage road, and 300 feet on Baltimore haulage road, No. 3 shaft.

Installed two electric locomotives, one in Hillman vein, No. 2 shaft, and one in Baltimore vein, No. 3 shaft.

Outside: Installed one generator set, switchboard, etc., complete. Erected new steam lines from steam plant to the several hoisting engines.

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery.—Extended No. 8 slope, Cooper to Baltimore; No. 31 slope, Baltimore to Cooper; rock plane airway, Bottom to Top Red Ash; No. 22 plane, Stanton to Hillman; and rock plane airway, Hillman to Kidney vein.

Nottingham No. 15 Colliery.—Completed No. 7 tunnel, Ross to Ross vein.

KINGSTON COAL COMPANY

Kingston No. 2 Colliery.—Drove a new traveling way and airway in Cooper vein through culm-filled district and connected with Lance vein tunnel. Two short tunnels were driven from Cooper to Bennett vein.

In No. 3 shaft, a second opening was made from East Red Ash to the Ross tunnel on the west side. Forty-six shafts were driven from Ross to Ross Split vein. Completed a short tunnel through roll from Eleven Foot vein to Eleven Foot vein.

In the slope, a 2-inch bore hole was drilled from Eleven Foot to Ross vein, for drainage.

Installed a 5-ton Jeffrey storage battery locomotive in lower lifts of Ross and Red Ash veins.

Outside: A concrete and steel foot-bridge has been erected over main tracks, with concrete and steel passageways, foot-paths, fences, etc., for the safety of employes.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held in the High School Building, Plymouth, June 6 and 7. The Board of Examiners was composed of D. T. Davis, Mine Inspector; Harry G. Davis, Superintendent, Kingston; William H. Chappell, Miner, Plymouth, and Lewis R. Thomas, Miner, Edwardsville.

The following persons passed a satisfactory examination and were granted certificates:

MINE FOREMEN

Philip Callender, Daniel R. Edmunds, David T. Morgan, Frank B. Davenport, Clarence E. Rosser, Kingston; Fred B. Hicks, Henry Hosey, Isaac J. Thomas, Robert J. Tischler, William J. Hobbs, Milton Jones, Thomas H. Lewis, Joseph R. Thomas, Plymouth; Gwilym Jones, Dorranceton; Herbert Morris, William R. Roberts, William Price, Alfred Hazell, John Morris, Albert G. Wilczock, Michael A. Putera, Edwardsville.

The entire mine has been equipped with the Koehler type safety lamp replacing the Davey and Clanny safety lamps.

Installed an overwinding device on No. 3 shaft hoisting engine.

Completed a 7 foot by 12 foot rock tunnel, 700 feet long, from the Lance to the Five Foot vein, No. 1 shaft.

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery.—Completed No. 32 tunnel, Cooper to Five Foot vein and No. 33 tunnel and plane, Stanton to Hillman vein.

Nottingham No. 15 Colliery.—Completed extension of 14 inch compressed air line to 11th east and installed a 75 H. P. electric hoist on Nos. 1 and 6 slopes.

Outside: Installed a 100 H. P. electric hoist on No. 4 slope.

KINGSTON COAL COMPANY

Kingston No. 2 Colliery.—The cribbing between the surface and the solid rock in No. 2 shaft has been removed and replaced with reinforced concrete. Installed two storage battery locomotives in the Lance and Cooper veins and an electric hoist on the new plane in the Bennett vein.

At No. 3 shaft, the cribbing between the surface and the solid rock in the shaft has been removed and replaced with reinforced concrete. Fifty short shafts or rock holes were driven to the Ross split vein from the Ross vein. Installed two storage battery locomotives complete with charging station for each locomotive.

Installed three storage battery locomotives complete with charging panels, and two electric hoists, one in the Ross vein and one in the Red Ash vein.

Outside: One corrugated iron waiting station for miners was constructed at the head of No. 2 shaft and one near the head of No. 3 shaft.

Four Dutch ovens were added to the grate space of four boilers at No. 2 boiler plant.

Installed a cross compound Corliss engine 16 inches and 30 inches by 42 inch stroke, direct connected to a 300 K. W. Westinghouse generator as an auxiliary for generating power required for the new additional storage battery locomotives at No. 2 colliery.

Gaylord Colliery.—Completed boiler plant pump house and 17 K. W. lighting set. This machine furnishes power to all of the arc lights on the property and for the lighting of buildings; the hospital, ambulance room and electric shop; a brick and concrete mule bath, and a brick colliery office building, 27 feet by 50 feet.

Installed several chemical engines and fire extinguishers and a 44 foot, 150 ton track scale and also a 22 foot Barker 25 ton truck scale for retail coal. A new motor driven ambulance was purchased, as required by law.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held in Plymouth, May 7 and 8. The Board of Examiners was composed of David T. Davis, Inspector, Wilkes-Barre; Henry G. Davis, Superintendent,

CONDITION OF COLLIERIES

HUDSON COAL COMPANY

Plymouth No. 5 Colliery.—Condition as to safety, ventilation and drainage, good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

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

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 and Nottingham No. 15 Collieries.—Ventilation, drainage and condition as to safety, good.

KINGSTON COAL COMPANY

Kingston No. 2 and Gaylord Collieries.—Ventilation, drainage and condition as to safety, good.

PLYMOUTH RED ASH COAL COMPANY

Plymouth Red Ash Colliery.—Ventilation, drainage and condition as to safety, good.

SHAWNEE COAL COMPANY

Shawnee Colliery.—Ventilation, drainage and condition as to safety, good.

IMPROVEMENTS

HUDSON COAL COMPANY

Plymouth No. 5 Colliery.—Remodeled the breaker. At Plymouth No. 3, rock plane was completed from Top Red Ash to Ross bed, a return airway 39 feet long, and tunnel from Five Foot to Stanton vein, 625 feet long. At Plymouth No. 4, a rock plane was driven from Top Red Ash to the Top Ross vein, 500 feet long. In the Boston section, No. 8 tunnel was extended to Top Split of Ross bed, and return airway was driven. Also rock plane from Top Split of Red Ash to Bottom Split of Ross bed was completed, and return airway was driven 54 feet long.

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery.—Completed No. 22 plane from No. 15 tunnel east, Stanton to Kidney vein; No. 21 plane from No. 14 tunnel east, Hillman to Kidney vein; No. 9 slope Hillman from No. 14 tunnel east to basin; No. 11 slope, Stanton, driven to the south line of No. 20 plane.

Nottingham No. 15 Colliery.—Installed a 75-hp. electric hoist at Nos. 1 and 6 slopes.