

light is so feeble that danger from loose rock and coal could not be so easily discovered. However, if all the workmen would use the well known precautions we would have few casualties of this class to record.

With the care taken by the officials in these days the accidents from falls of roof and coal can only be averted by the care of the workingmen themselves, more especially the miners. They and their laborers are most frequently the victims of this class of accidents, and only by vigilance and care on their part can they be reduced. The same remarks apply to the other classes of casualties, so that it is not necessary to repeat them here.

A Disastrous Explosion in the South Wilkes-Barre Mines.

A few minutes after one o'clock, Thursday afternoon, October 29, an explosion of fire damp occurred in the No. 3 shaft, South Wilkes-Barre Colliery, of the Lehigh and Wilkes-Barre Coal Company, which instantly killed four men, and shortly after, the assistant foreman and one of the fire bosses lost their lives by inhaling after-damp while endeavoring to go to the rescue of the others. A map of that section of the mine is presented in this report to assist the reader to understand the conditions which existed prior to the accident.

This colliery is opened by two shafts which are sunk to the "Baltimore" seam and are 650 feet apart. The main shaft is the No. 5, through which the coal of the Baltimore seam is hoisted. Part of this shaft is partitioned off for an upcast, over which two 35-foot fans are located, which are operated on alternate weeks. The hoisting compartments are also a downcast for the greater part of the air for ventilating the Baltimore seam. The No. 3 shaft is all a downcast and is also used to hoist the coal of the Hillman seam. The accompanying map shows a section of the Hillman seam workings which was the scene of the accident. The No. 3 tunnel was driven across a basin through the top rock from the east level gangway at "D" cutting the same seam on the other side of the basin at "C." From this point the "No. 4" tunnel, a continuation of No. 3, was driven in the bottom rock, cutting the Stanton seam at "E," and is continued still further, intending to cut a still lower seam.

It is an exceedingly gaseous mine. The split of air passing in through these tunnels, when measured during the last week of October, was 27,160 cubic feet per minute. Gas feeders had been cut in the Stanton seam which charged the air current to a dangerous condition, and work in all this part of the mine was suspended for several weeks prior to the accident in hopes that the gas would become exhausted. Finally the officials decided to split this air current at "C" and send the part contaminated by gas,

over a bridge to be made across the No. 3 tunnel west gangway at "A" and down to the return airways at the bottom of the basin. The passage leading up from "H" to "A" was driven and broken through to the tunnel west gangway on the day before the accident.

They had to blast top rock down to make room for the bridge, and four men worked all night enlarging the hole and blasting the top rock down and a fire boss was with them. On the day of the accident the colliery was idle and only the men at this work and those loading and unloading the rock were working in that seam. They were using 50 per cent. dynamite to blast and were firing with an electric battery. Before blasting they were instructed to open the door at C so as to permit the air current to make a short circuit through the breasts and clear out the gas, so as to make sure that it was safe before blasting; all worked by the safety lamp.

Thomas Owens, William T. Lacey, James Herron and Robert Lloyd were working there, and Joseph Worth, fire boss, was sent to remain with them and to see that everything was safe in the vicinity before they should blast. There were two men at "H" loading the rock out. At about 10 A. M. the mine foreman, John F. Jones, visited them and found the work progressing all right.

Shortly before one o'clock they were getting ready to explode a blast and Robert Lloyd was sent around to call the two men at H back to a safe position. He did so, and the three were together at the foot of the slope when the blast was fired, and instantly they were blown about by the concussion of an explosion of gas. John F. Jones, the mine foreman, was on the surface when he saw a cloud of dust and debris blown up the two shafts. He at once ran over to the No. 3 shaft and accompanied by William R. Jones, the fire boss, who happened to be coming towards the shaft, and John D. Davies, a mason, descended the shaft. At the bottom, John D. Joseph, assistant foreman, joined them. All used safety lamps. The foreman and Davies went to examine if a wall near by had been blown away. While Joseph, followed by Jones, went in past the head of No. 1 slope to the entrance of No. 3 tunnel. Unexpectedly they encountered the after damp and Jones, feeling its effect, called for help. Just then the mine foreman and Davies were approaching and both assisted Jones back a short distance, when they also became weakened and both Jones and Davies fell. The foreman managed to reach the bottom of the shaft where the air was pure. Then the three men who were in the slope came out, and other help from surface came down and they carried Jones and Davies out; both were unconscious. Davies soon revived, but Jones died. Every effort was made by several physicians to resuscitate him, but they proved unsuccessful. The body of the assistant foreman, J. D. Joseph, was found lying in the gangway at "D."

The afterdamp filled the gangway back to the shaft and was followed by explosive gases. The explosion damaged about 400 feet of the brattice partition in the No. 5 shaft and all the ventilation found a short circuit to the fan, leaving no ventilation for the workings of either seam. Streams of water were poured down both shafts, which produced a current of air. There were about 30 men working in the Baltimore seam and they were hurried out through the No. 1 air shaft, a mile and a half southwest of the colliery. As soon as they reached the surface the top of No. 5 shaft was covered with boards and canvas and thus the air was compelled to enter shaft No. 3. The workings of both seams had by this time, filled with explosive gases. It was explosive back to "D" in the No. 3 tunnel. The air current was forced entirely into this tunnel and in a few minutes the gas was swept out from that passage, thus enabling the rescuers to follow into the tunnel. The body of William Lacey was found near the door at C and the door was blocked open, showing that they had complied with the instructions by opening this door before blasting. The bodies of the other three, viz: Thomas Owens, James Herron and Joseph Worth, were found lying on the gangway at B. Evidently, not one had moved from the position he was thrown into by the terrible explosion of the blast. They were not severely burned, but appeared to have been killed by the tremendous pressure of the explosion and its resulting afterdamp. They were all good, reliable and experienced workmen. No one can tell what the conditions were when they fired the blast nor how the gas was ignited. It was between six and seven o'clock P. M. when the bodies were recovered. It was an anxious time when such a large body of explosive gas was being forced out, while the adjacent workings of both seams were also full of gas, and no means of ascertaining whether the explosion had left anything on fire or not. Fortunately, nothing further happened.

The Serious Consequences of the Explosion at the No. 3 Shaft, South Wilkes-Barre Colliery.

The preceding article in this report describes the explosion and its fatal consequences. All felt relieved when the bodies were recovered on the night of the accident and in finding no evidence of fire. The first work required was to repair the brattice between the down-cast and up-cast in the No. 5 shaft, so that the ventilation could be restored. The effect of the explosion on the stoppings and doors of the mine could not be ascertained on account of the large volume of firedamp that had accumulated, and this could not be removed until the ventilation was re-established.

A gang of men commenced to repair the brattice in the shaft on Friday morning and the work was continued until 10 P. M. Satur-

day, October 31. Fortunately all the men were on top of the shaft preparing material for the work, when another explosion occurred, lifting the boards and canvas that covered the shaft. This was reported to the officials at once and the repair work was suspended. The fire bosses descended the No. 3 shaft and went in as far as the tunnel and found everything as it was left on Thursday night. The cages in No. 5 were damaged and could not be used. The situation was grave and exceedingly uncertain. The ventilation could not be restored without repairing the brattices in the shaft. The explosion was undisputed evidence of the existence of a fire somewhere in the mine, and the workings were known to be full of explosive gases, and if an explosion should occur when the men were working on the brattice in the shaft it would most certainly cause their death. It required more than ordinary courage to attempt to make an examination of the workings, but on November 2 the fire bosses went down the No. 3 to the bottom seam and made an examination in the vicinity of the two shafts but saw no evidence of an explosion having taken place in the Baltimore seam. From there they ascended into the Hillman seam and went into the return airway but failed to detect any evidence of fire in the air returning from the seat of the first explosion. It was too dangerous for them to stay long, so they returned to the surface and made their report. The officials and the Inspector were present, and it was decided to wait a few days for further developments. The fire boss descended No. 3 again on November 5 and found indisputable evidence that fire was burning in the Hillman seam. The return air currents coming from the region of the first explosion was highly charged with the smoke and gaseous products of the fire and it was decided to flood the No. 1 slope workings in the Hillman seam as soon as practicable, and streams of water were at once turned in.

On November 7 another explosion took place, lifting the covering on the No. 5 shaft and the smoke and dust came out through the fan. It was expected that in a few days the water would cover the region of the fire, and it was decided to wait until that was effected.

The water having filled the slope workings to the required height by November 21, the fire bosses descended to the Baltimore seam and finding that a small current of air was passing up the inclined planes, they went up and at the head of the planes they saw evidences of a terrific explosion having taken place there. The stoppings and doors were blown away and the cars were blown to pieces, and they believed that they smelled fire. It was an awful situation for men to be in and they were naturally timid. They returned to the surface and made their report. This had a depressing effect upon everybody connected with the mine. The workings of the Baltimore are very extensive and at this time they were nearly

all filled with fire damp. This could not be cleared without a strong air current and the ventilation could not be forced in unless the brattice in the shaft was repaired, and the very act of forcing air in would, most probably, carry the gas to the fire and cause such an explosion as would utterly ruin the mine and its ventilating appliances. Another examination was made on November 23. All the officials and the writer were at the colliery and indisputable evidence of the existence of fire was obtained. Seeing that it was useless to permit any more risks to be taken it was decided to flood the Baltimore seam workings with water to the necessary height for filling the whole workings and measures were at once taken to put this into effect, and no more men were allowed to enter the mine.

By December 10 the water had risen so as to seal the bottom of both shafts, so that it was safe to work at repairing the brattice. While connecting a broken pipe one of the workmen received an electric shock and noticed sparks. There being fire damp near, they ascended the shaft and reported it. Subsequently the electrician of the traction company was sent for and he found that a potential of 4 volts and a current of 12 amperes was in the pipes leading down into the shafts. This electric current was leaking from the current of the Traction company, which was regarded very dangerous for a gaseous mine. An insulator was put in one of the joints of each pipe on the surface to prevent the electric current following into the mine and this proved effective.

At this writing the workings are filled to the required height of 205 feet and the water is being hoisted out. The water is all out of the Hillman slope and the location of the fire was found to have been on the second west gangway. Both the second west and two and one-half west gangway were damaged by the explosions and by falls brought down presumably by the effect of the water on the fireclay roof.

An Explosion of Gas and Fire at the Franklin Colliery.

At 12.30 P. M., Saturday, August 15, Fire Bosses John Flynn and William Tredinnick, accompanied by Joseph Hughes, James Monaghan and William N. Thomas, went into the old workings west of No. 1 slope in the Baltimore seam to make a change in the arrangement of the ventilation. They were told to use safety lamps, but ignoring the instructions, they all carried naked lights. Flynn, taking Hughes with him, went some distance away from the others and on breaking down an old brattice stopping, he ignited a body of gas which burned him and Hughes severely and set some old timber on fire. Flynn died on August 17. They had a large force of men for about two weeks endeavoring to extinguish the fire, when it became too dangerous and it was decided to isolate the old workings west of the slope and flush culm enough in to fill it. All the