SECTION OF

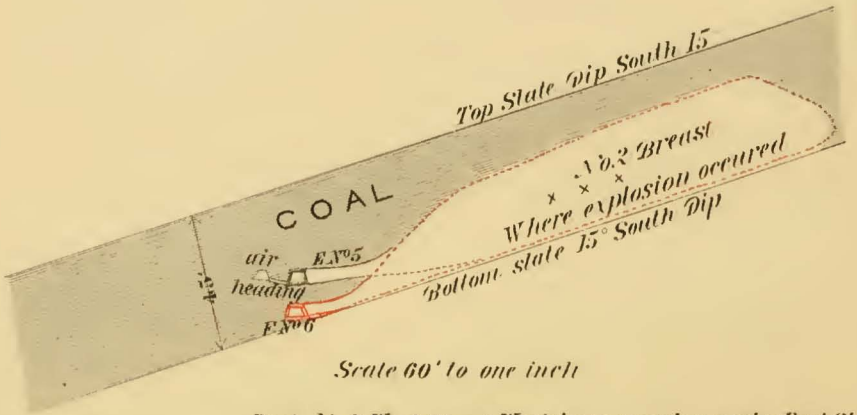
KOHINOOR COLLIERY,

Mammoth Vein Workings,

Shenandoah, Pa.

I. J. Curtrate, accident from gas No 1.

Profile of Mulhall's Breast.



Red No.6 West Slope Workings crossing under East Slope

S. A. BEDDALL,

Shenandoah, Pa., Feb. 12, 1883.

passing bumped the car down the slope. Both Mr. Richards and his assistant hearing the crash sprang off the cage, but a piece of timber struck the former and inflicted injuries from which he died when he was taken home. Cause of accident, loose discipline.

No. 4.—December 8. Daniel McAnally, aged twenty, single, a repairsman employed at the Lawrence colliery, Jacob Lawrence operator.

Daniel McAnally was fatally injured by falling down the slope. This slope is over one thousand feet deep on an angle of 50°; the coal is hoisted in a gunboat. Shortly before quitting time on the 8th of December the gunboat jumped the track about 150 feet from the bottom. The night repairsman, McAnally, and two others, were sent to put it on so as to be ready to hoist in the morning. McAnally was using a screw-jack to force the gunboat over on the track, and while turning the handle he allowed it to slip out of the hole in the shank of the jack, and stumbling, he lost his balance and fell to the bottom, receiving injuries which caused his death on the 11th, three days later.

A piece of canvass across the one track, immediately below the gunboat, would not have interfered with the air current and might have prevented this accident.

Fatal Accidents from Explosions.

No. 1.—May 24. Martin Mulhall, miner, aged fifty-five, widower, six children; James Mulhall, miner, aged twenty-four, single, son of the above; Owen Gallagher, miner, aged thirty-five, wife and three children; Samuel G. Hugo, driver, aged nineteen, single, and James McDonald, a door boy, aged thirteen, employed at the Kohinoor colliery of R. Heckscher & Co.

These persons were killed by an explosion of gas. On the day when this disaster occurred I was visiting West Lehigh colliery, where, upon reaching the surface, I was informed by telephone that forty men had been killed by an explosion of gas at the Kohinoor colliery. I rode directly to the mine.

Near the bottom of the inside slope I found a number of excited men searching over and under the heaps of fallen timber, broken cars, &c. I was told that all the bodies had been recovered except that of the elder Mulhall, in whose breast the explosion occurred.

Tracing the course of the explosion by its results, it appeared to have passed down the chute from Mulhall's place, wrecked the loaded car at his platform, knocked out the timber, and threw a quantity of debris against the lower side of the gangway, sufficient to cover several persons had they been under it. Passing outwards it blew down the door and timber on the turnout, filling it with a mixed heap of timber and loose coal. Inside of Mulhall's place I found no damage done by, or indication of, the explosion. A considerable force of men had been searching for over two hours, and every possible place had been examined. On examining Mulhall's breast I found a large quantity of coal lying several feet deep on the

sheet iron, as if it had fallen off the pillars. The place was squeezing, small pieces falling in every section of it, and had all the usual indications before or after a heavy fall. The upper part of the breast was empty Mulhall's hat and lamp being found on the sheet-iron above the fall, it was concluded the body must be under it, or have been blown into the gutter and covered by the debris piled against the lower side of the gangway.

Up to this time the search had been confined to turning over loose coal and fallen timber, looking under cars and other objects likely to hide a man's body.

I now requested that the fallen timber should be temporarily replaced or dragged out of the way, the track cleared, the heaps of coal loaded, and thus a systematic search be inaugurated. An organization was consequently effected, and the work progressed satisfactorily under the circumstances. The pillars were cracking and crazing, and falls were occurring at short intervals all over this section of the mine.

Alteration in the distribution of the air currents had to be made, owing to a very large accumulation of gas. After a great deal of labor the road was cleared as far as Mulhall's platform, from which the loading of breast coal was commenced, and the next day, about four o'clock in the afternoon, the body was found under the coal where the general aspect of the place suggested when first examined.

This accident caused considerable comment, and the coroner's jury carefully examined all witnesses who were likely to furnish any evidence in the matter, from whom the following facts were obtained :

The explosion occurred in a group of breasts worked from a gangway which was driven over the main slope some years ago. Another gangway, from the new slope at a lower level, was subsequently driven across for the purpose of taking out the coal under the first gangway, and was driven east until it reached what was supposed to be the bottom of the invert which separates the Kohinoor from the West Shenandoah collieries. The work being done was robbing and causing falls by thinning the pillars, with the exception of a counter chute intended to mine the triangular-shaped piece of coal between the invert and the next lift above. The night before the accident the breast next the counter fell heavily, closing the heading and cutting off ventilation from the upper end of the counter. To prevent the whole enclosed place filling with gas, down to the gangway, a stopping was taken out and the gas kept back to that point. The next morning the fire-boss got hand-fans and pipes, and, with proper assistance, commenced displacing the gas preparatory to the miners' driving a connection through the pillar to the gangway above, and establishing permanent ventilation. After getting the fan and pipes in position and before commencing to blow out the gas, the fire-boss supplied the men in the adjoining places with safety lamps as a precaution, although the gas had to return by the air-way over the chutes ; some, however, rather than use the lamps went home, the others staying and loading coal. The gas was nearly all out of the counter when the explosion occurred.

When the fire-boss examined the places in the morning he found Mulhall's place "working," with indications of a fall, and accordingly told Mulhall to go home. Busying himself in getting out the gas, he did not visit Mulhall's place to see if the order was obeyed. Although passing several times during the forenoon, the door at the entrance to the breast prevented him from seeing the lights.

The probability is that the elder Mulhall did not anticipate danger from gas as his place was so far from the counter, and considering himself competent to watch a squeezing place, ventured up the chute to discover, if possible, how much coal had fallen, when another fall occurred and drove the gas down on his light with the above result.

The following were probably the causes which led to this explosion:

The Mammoth seam is supposed to invert and double back on itself at the bottom of the Kohinoor workings, the deepest point of which is near the bottom of the new slope, rising gradually east. The gan ways in that direction strike it one after another in the four lower lifts. Whenever the top is broken through to the upper lap of the seam, where it doubles itself back, a mass of soft shelly coal and black sooty coal dirt generally runs out until it fills up the place; and this gives off large volumes of gas, only ceasing when the aperture from which it flows becomes choked by being filled up.

The fall which closed the heading and filled the counter chute with gas on the night preceding the accident, resulted from the pillar between the two inside breasts being broken. The fall gave off considerable gas. A split of air was passed from No. 4 lift above down through these breasts and, before the heading was closed, ventilated the counter. Another split passed down through Mulhall's breast to keep that end of the section clear. The main current passed down the slope, along the gangway, passed the breasts, up the counter chute, and into the return airway. The other two splits entered the airway further out, and all passed out in the airway above the slope. These splits, which were only passing through small openings, were intended to keep these open breasts clear, and although they were scarcely felt in such large high places, the miners, who were merely loading falls of coal, testified that they never found gas in their breasts. The air thus passing through these open breasts might be sufficient to keep them clear under ordinary circumstances, but after the fall the conditions were materially changed. The extra volume of gas given off by the fall would vitiate the air in any stagnant place between these two splits, which place, from the position of the pillar-heading, might be in Mulhall's breast. The relative height again would effect accumulations.

When the fire-boss removed the stopping brattice in the side of the counter, he reduced the resistance of the main current in the gangway, and consequently the volume in the other two splits, as they all came from and went to the same current. This aggravated the circumstances and permitted gases to accumulate in Mulhall's breast. The gas displaced from

the counter was not likely to pass into the breasts, owing to the arrangement of the currents.

If a current of fifteen thousand cubic feet per minute had been passing through this section of the colliery, the explosion might have been averted. If Mulhall had gone home when told to do so, it would probably not have occurred; or if nothing but safety-lamps in the hands of competent persons had been allowed in this district of the mine, the five lives and thousands of dollars' worth of property might have been saved.

The explosion brought on a squeeze in that vicinity, the falls increased, and the running breast became filled with debris, and the whole section with gas. The current was reversed so as to pass upwards through this lift, but, owing to the over-cast being too small to carry both this and the air from the east upper workings over the slope, the whole current failed to move the gas. The current was then turned down into No. 4 lift, and through the breasts. The whole current being now concentrated on this section, and the place from whence the gas was flowing being choked up, this arrangement overpowered the gas, and in three or four days the breasts were clear. While the lift was filled with gas, great caution had to be exercised on account of the frequent falls of top coal.

The fan being driven by compressed air, a stove was placed alongside the exhaust pipe to prevent freezing. I disliked the idea of so large a volume of gas being diverted through a fan having a light wooden covering, with a stove so close. Fearing some heavy fall might displace the gas and the concussion damage the fan-casing, we removed the stove; but the engine would not work. A small pipe was then run from the boilers, and live steam put into the valve-chest of the engine, which kept it to the required temperature.

It is difficult to convey distinctly an idea of these openings, owing to the gangways being driven on both the top and bottom sections of the seam, causing them to cross over each other as the change of dip affects their directions, and cannot be minutely described within the limits of a report. The accompanying map and diagram No. 6 will assist the reader in forming an idea of the scene of this disaster.

No. 2.—July 31. Thomas Robertson, aged forty-one, wife and five children, a miner employed at the William Penn colliery of the William Penn Coal Company.

Thomas Robertson was suffocated with gas while attempting to displace an accumulation from his working place.

The scene of this accident was in breast No. 15, west gangway of new slope, which is the second level below the shaft. The Mammoth seam here is in fine condition, and at an angle of dip of from 40° to 50°. The gangways are driven in the bottom, and the air-way near the top of the seam. The air current passes down the slope, splits to the east and west sides, passes along the gangways to the last open chute, immediately outside of which a door is placed with a large wooden pipe inserted and carried in