

and then from projections in the roof of a low, short cut, along which one is trying to make headway, by the feeble lamp glimmer, with one's back almost at right angles to one's legs, is trying to say the least, and I remember with a pang that if I had been with the workmen I could have boarded the train of empty cars, which conveyed them so comfortably along the No. 1 north level to their work. The electric motors traverse this level for a distance of about two and a half miles from the pit to a long heading known as Boyce's Incline (named after Tully Boyce—for it is usual to give the name of the leading contractor to a gangway which his party has put through.) When carrying men the motor only runs at about five or six miles an hour, but on returning with from forty to sixty laden cars, each containing from thirteen to fifteen hundredweight of coal, it travels at a very much greater speed.

THE ELECTRIC MOTORS. There is a meeting place and sidings where the motors go in opposite directions can pass (very much as

they have on street car lines). The system has been in use for several years and no mishaps of any consequence have occurred, which is a very excellent record. Mr. H. F. Bulman, of England, was recently conducted through the mine; he was much interested in and closely examined this system of underground hauling by electric motors, and declared his unqualified approval of the mode of construction and operation adopted, adding that there was nothing of the kind as yet in all England. There they still adhere to endless rope and tail rope systems. Mr. Bulman is one of the authors (with R. A. S. Redmayer) of a treatise just published, by Crosby, Lockwood & Son, 7 Stationer's Hall Court, London, on the Colliery Working and Management of Mines.

The levels, inclines and slopes are from ten to twelve feet wide, with an average height of six and a half feet, are substantially timbered where needed, and are flanked by solid pillars of coal of as many as forty yards in width which form a grand support to the superincumbent mass, measuring at some points 600 and in others 1,800 feet to the surface. The inclines, levels and slopes are the great highways and with the airways driven alongside them form the lungs of the mine; similar wide pillars also bound the airways or counter levels, and behind the pillars roadways are driven, off which the miners open up stalls or rooms, out of which the coal is mined. In this pit the system of working is called the

THE "PANEL AND STALL" SYSTEM. The panels are limited areas of the seam which are sub-divided into pillars and stalls which are worked from twenty-five

yards centres, and when the stall is worked to the end of its limit or panel varying from 200 to 350 yards in length, there remain in the mine solid coal pillars of fifteen yards in width on each side of the empty space (or worked-out stalls) and the result, generally, is that from three-fifths to two-thirds of the original coal seam is left standing in the mine awaiting the time when the extreme limitations of operations of the pit have been reached, and the order is given to draw the pillars, the execution of which commences at the farthest distance from the pit (to the "rise" or "dip" of the seam according to circumstances), the pillars are withdrawn, letting the roof come down behind, so that the life of a pit is a long and lingering one, and many

years elapse before an extensive one is worked out. The "levels," while they are graded systematically, follow the contour of the seam transversely, as we would grade a road round a hill side, and therefore the levels are not straight. The workings off the main levels are separated by means of the inclines and slopes of the seam, which are driven in right lines, some inclines running up from 1,000 to 1,500 yards. The coal is brought from the stalls to the inclines in cars by mules wherever they can be worked, and otherwise by the pushers, who have also to keep the miners supplied with empty cars. The cars are let down the inclines by rope rolls or drums regulated by brakes, the full cars descending by their own gravity, the empties being drawn up at the same time, the track generally being double. At the foot of the inclines the cars are taken away by the motors, in return for empties brought in. I am now alluding to what is called down the mine the inside levels in distinction to the main slope, to be shortly noticed.

The ventilation is upon what is known as the separate split system and the mine is divided into districts entirely independent of each other. The fresh air is taken in from the Protection Island shaft which is connected with the workings of No.

THE MINE VENTILATION. I shaft, and if necessary all the miners could be hoisted up to the Island.

As to fresh air, I have enjoyed good air all the time of my stay and have even felt cold and as if in a draught now and then, although the natural temperature of the mine is—according to depth—several degrees warmer than at the surface. After having noticed the self-acting inclines, heard the rumble, and seen the rush past of the mule trains, I enter several of the stalls, and here there is a—well, a pit(iful) smell, arising from powder smoke and from the fish oil used in the lamps, as well as from the oily stuff with which the car wheels are lubricated; there is also dust in the air—coal dust—and I become aware that I am gradually becoming what is known as "blackened up". The air is conducted into the "stalls" (often called "rooms") and a miner is attached to his stall, as many a lady is to her drawing room. All the miner wants is a good face of coal and fair wages, and in this pit he appears to have both at command, and fair play as well. Pure air is continually passing from the brattice or partition which leads the air as near the face as it is possible and at the same time avoid the breakage of the partition (formed of inch rough lumber) by coal blown out by "shots." The miners seemed happy enough at their work, and I could not help noticing the immense size and weight of the lumps of coal which the miners by some knack and mode of bringing thighs to the assistance of arms, managed to lift and place in the cars. Surely, is gravity more easily overcome in the depths of the mine than on the surface?—or is it the knowing how and having the strength to do it?

Besides the overman—Mr. Joseph Randle, Jr.—who appeared to be here, there and everywhere all through the mine, and must travel many miles in the course of his duty, there are shotlighters, who examine the position and loading of the holes which the miners purpose firing and, on approving, pass them, then firing can take place, in safety. This is a necessary safeguard against "blown out shots" which send many yards of flame out among the unavoidable deposits of coal dust, and possibly deal out death and