TIMBERING IN COAL-MINES.

The following is taken from a report of a lecture delivered by Mr. H. W. Halbaum on the above subject before the Midland Branch of the National Association of Colliery Managers, at Derby, on the 28th November:—

The lecturer said the importance of the subject was very often overlooked. They were apt to consider that fire-damp and coal-dust were the great enemies of the miner, but that was not so. If they looked through the Inspector's reports for the last ten years they would find in that district twelve miners had lost their lives through explosions, but through falls of roofs and sides no less than 329 lives had been lost. Last year in the United Kingdom fifty-five persons lost their lives by explosions, and 426 lost their lives through falls of roof and sides. In the Midland district five persons were injured by explosions, but 570 were injured through falls of roofs and sides. In the United Kingdom 215 received serious injury through explosions, but 2,023 persons received serious injuries through falls of roofs and sides. He wanted to impress upon them that that subject was not only a very important one from the point of view of safety, but also from an economical point of view, and anything which tended towards an economical working of coal-mines—the staple industry of this country—ought to have their best consideration. The item of timbering was one of great expense in all coal-mines. It was one of the chief items of expense, and it was a fortunate colliery where timber only cost 2d. per ton of coal raised. He had heard of collieries where the cost had amounted to 1s. 6d. per ton of the coal raised. The proper and improper use of timber very often meant either paying a dividend or a serious loss. They had always to be liberal with timber, but there was no reason why liberality should degenerate into waste. He had found that economy went always hand-in-hand with safety, and waste of timber only meant increased danger to the miner. That day he only intended to deal with the subject of timbering so far as it affected the pit-prop. The first thing they had to do was to choose the timber, and the question was a very important one, because bad timber involved danger of life and limb to hundreds of their fellow-workers. They knew when they had a long wall-face, roof, and floor coming together, and what the pressure was that caused this movement. In a mine 500 ft. deep the pressure was somewhere about 1,600 lb. to the square inch, and whatever kind of timber they used could not resist that pressure. The maximum pressure and the strength of the whole body of strata were coming down; but the object ought to be not to resist the maximum pressure, but to sustain the loosened fragments which so frequently dropped out. Nothing could resist the maximum pressure. What was wanted was timber props possessing the greatest elasticity, which would bend to the maximum pressure, yet sustain the loosened fragments. Rigid creosoted props were very dangerous. Steel was the typical material for props, because it had great strength with great elasticity, because it would bend to the maximum pressure and sustain at the same time the loosened fragments. It was not unlikely that the use of steel would become common. Science had triumphed over so many obstacles that the difficulties in the way of using steel did not appear insurmountable. The main difficulty was the expense and the recovery.

Mr. Halbaum went on to deal with the various modes of propping in seams of different height, but said the system which answered at one colliery would not answer at another. Larch, fir, and the different orders of pine he recommended as the best kinds of timber, as they possessed the most elasticity. With regard to the props to be used in seams of different heights, in tall seams the maximum pressure was greater in proportion, and its effect was irresistible. In a seam 6 ft. high the roof would descend 2 in., where in a seam 3 ft. high it would only descend 1 in., and the size of the prop should be increased in proportion to the height of the seam. The strength of a prop increased with the square of its diameter, though if a 3 ft. prop, 3 in. in diameter, had to be put in a 3 ft. seam a 6 ft. prop in diameter was more than sufficient for a 6 ft. seam. If they increased their props more than was necessary they wasted timber and infringed upon safety. That part of his subject was one which he should like to see thoroughly investigated by their mining institutions. The strength of timber in ratio to its length and diameter was a very important subject; and then there was the question of knots and other details. The next question was the nature of the roof. The stronger the roof the stronger ought the timber to be. Most of the accidents which happened at the face happened under strong roofs, because they were apt to take liberties with them, and the miner trusted the roof too far. Strong roofs broke into larger fragments, and that was another reason why they required strong props. Again, strong roofs transmitted the maximum pressure more heavily to the timber. The worst roof they could have was a hard pannelled one, a strata of sandstone with a layer of soft shoal above it, which could only be supported by chocks of steel and big timber. The next point was the care of the timber, and that was also one of the highest importance. The prop was simply a collection of fibres which they could tear in pieces. The lecturer went on to explain the nature of the prop, and said their duty was to take care of every one of the fibres to preserve their strength and elasticity. They ought to be kept at the surface under cover, properly stacked and ventilated, and preserved from all vermin. The timber required protection from atmospheric forces; the floor on which it was stacked ought to be raised from the ground, and under no circumstances ought to be left lying about the yard. He was strongly against the use of creosoted or salted timber, because it was too brittle, and snapped like cast iron. Mr. Halbaum went on to explain the different modes of timbering, by means of diagrams. He said that nine-tenths of the accidents happened because they had had good roofs behind them, and they always expected good roofs in front. The majority of accidents could be prevented by putting timber in in time, and with a proper knowledge of how to put it in. The props ought always to be put in squarely and firmly in the line of pressure. That was one of the fundamental principles of timbering. If they put timber in in the direct line of pressure they put in what was known as the resultant force. They should set their timber in the same straight line as the line of gravity.