

of coal lie is considerably greater than in New South Wales, and there are likewise a far greater number of faults and rolls to contend with in New Zealand, which will always make our coal-mines more expensive to work. The great inclination that our seams or beds of coal have requires larger pillars left in cutting up the blocks in the first instance, so as to guard against a "creep" taking place. However, this is no disadvantage, as it will allow the coal to be easier taken out of the pillars when they come to be worked. The faults and rolls which occur in all manner of forms prevent our mines being worked in as regular a manner as those in New South Wales. But, at the same time, if sufficient care and forethought is taken, even with these difficulties our mines can be opened out in such a way that the whole, or nearly so, of the coal will ultimately be won. This is a subject which should receive the special attention of the Government, not only because these mines are the property of the Crown, but also because they are the most important bituminous coal-measures of New Zealand.

UNDERGROUND HAULAGE.

The system adopted in New South Wales is known as the "tail-rope," but it is a question whether this plan of haulage is superior to the endless-chain system adopted in the Westport Coal Company's mine at Waimangaroa. Each of these systems has its advantages and defects.

The tail-rope can be used more advantageously than the endless chain where there are sharp bends and curves in the road, or where there are several branches of the main tunnel; and, although the expense of machinery to work it is more than that required to work an endless chain, this is compensated for by the cost of construction of the main tunnel, which only requires a single line of rails. The first cost of a rope, from $\frac{3}{4}$ in. to 1 in. in diameter, made of steel wire, is much cheaper than the cost of a $\frac{3}{4}$ in. chain. The length of the tail-rope must be one and a half times more than the length of an endless chain, as the tail end of the rope has to be twice the length of the hauling part. The rails for the tail-rope system likewise require to be well laid and made as solid as possible, as the velocity at which the rope travels is about ten miles per hour. The wear and tear on the tail-rope, rails, and pulleys is likewise much greater than on the endless-chain system, as well as the consumption of fuel to work the machinery. Yet, with all these disadvantages I think the tail-rope system could be employed with more success in our mines than that of the endless chain, which requires straight roads, or nearly so.

The endless-chain haulage will not work well if there are bends in the roads, unless the curves have a great radius, and even then a man is required to be alongside these curves, as the chain is always liable to come out of the forks, which grip and haul the skips by its weight resting on the bottom of the fork on each end of the skip.

The following statement shows the approximate cost of each system for one mile of haulage, exclusive of the fixing in position and cost of pulleys:—

<i>Tail-rope System.</i>					£	s.	d.
Say, 16,000ft. of round steel-wire rope, 1 in. in diameter, or $3\frac{1}{4}$ in. in circumference = $9\frac{1}{2}$ tons, at £40	...	...	...	...	380	0	0
Two miles rails, 24lb. per yard = say 38 tons, at £10	...	...	...	...	380	0	0
Sleepers, say 2,640, at 2s.	...	...	...	...	264	0	0
Fastenings, &c., for rails, say	...	...	...	...	80	0	0
Total	...	...	...	...	£1,104	0	0

<i>Endless-chain System.</i>					£	s.	d.
Say, 11,000ft. of $\frac{3}{4}$ in. chain, about 26 tons, at £20	...	...	...	...	520	0	0
Four miles rails, 24lb. per yard, say 76 tons, at £10	...	...	...	...	760	0	0
Sleepers, say 1,560 double length, at 4s.	...	...	...	...	312	0	0
Fastenings, &c., say	...	...	...	...	160	0	0
Total	...	...	...	...	£1,752	0	0

The cost of the endless-chain haulage is more in the first instance; but this would be reduced by the cost of the engine, which need not be so large as that required for working the tail-rope system.

The quantity of coal that could be hauled for 1 mile per day of 8 hours by the tail-rope, allowing for stoppages and for fixing the trains, would be about 500 tons; while by the endless-chain system the quantity would depend in a measure on the elevations and depressions in the road, and the power required to do the haulage. However, the tail-rope system need not be confined to a single line of rails: the same engine could be used for four winding-drums, and thus work double lines, thereby increasing the output to 1,000 tons per day.

"Callon, on Mining," gives the cost of working these systems as follows:—

<i>Cost per Mile per Ton in Pence.</i>					Tail-Rope.	Endless Chain.
Wear and tear of ropes and chains	...	...	...	...	0.276	0.083
Maintenance of way and rolling-stock	...	...	...	...	0.462	0.468
Coal	...	...	...	...	0.558	0.256
Labour	...	...	...	...	0.583	0.572
					1.879	1.379

This allows for each system hauling about the same amount per day.

VENTILATION.

The ventilation in the mines I visited was everywhere good. Particular attention seems to have been paid to the subject. The air-courses are in the openings formerly made in working out the