lowest level at 1 in 3½ (or 16°). The dip is also much steeper where the coal is exposed in the creek north of Isaac's Camp, which is still further to the eastward, for there the same seam dips at 35°, and the strike is changed from N. 10° W. as it is in the mine, to N. 12° E.

Two tunnels were suggested by the late Mr. Burnett (who originally planned out the works for the Company), for the purpose of cutting the coal seam at a lower level than the present workings:

A—From the bottom of the perpendicular fall.

B—From the top of the fall, or nearly the head of the present tramway.

The tunnel selected should be driven at right angles to the strata, and according to the angle of dip would be the length of tunnel required, and their position is shown on section , which is from rough measurements I made with an aneroid in 1866, and therefore only an approximation.

In the case of the lower tunnel A, by taking the dip of the coal at 16°, as observed in the mine, the length to cut seam No. 3, or the lower seam that is worked, would be 970 feet, but if the steeper dip at 25° were taken, about 720 feet. Of this about 100 feet is schist, and 300 feet would be in the breccia, conglomerate, and gray sandstone; after which the lower sandstone with shale partings would be reached, and in this the work would be comparatively easy.

Tunnel B, allowing for the positional advantage it gains by the erosion of the gulley, and calculated on the least dip observed, would have a length of 450 feet, and at the greatest dip a length of 350 feet. In this case the whole of the lower beds would be avoided, and the drives would all be in the upper brown sandstones, or proper coal-bearing beds, and the lowest or No. 6 seam should be cut after driving about 130 feet.

The calculation of the quantity of coal that would be "won" by these drives respectively, may be founded on the experience in the present mine. The total area of the mine is about one acre in extent, from which some 5,000 tons of coal have been obtained, 3,200 tons being the quantity sold by the existing Company, the rest being allowed for former working, waste, and consumption at the works. Rejecting the ground that has been considered unworkable, and taking each seam respectively, we find—

	Tons.
In upper or 2½ feet seam, ground worked ¼ acre	1,050
In lower or 3 feet seam, ground worked ¾ acre	4,440
This gives per acre for upper seam	5,000
„ for lower seam	5,550
Total per acre for both seams	10,550
But as more than half of the ground hitherto opened has been too thin to work, deduct say	5,550
Available per acre	5,000

Taking the dip at 20°, the distance, following the seam from the end of tunnel A to the level of the present working, would be 8 chains, and for tunnel B 3½ chains; so that by excavating the coal by levels for a distance of 5 chains each way from the tunnel, the amount of coal obtained would be—

	Tons.
By tunnel A	40,000
„ B	17,500

To this must be added all the coal that can be extracted from the hill spurs between the creeks, which must be a very considerable amount. I have taken five chains as the length of drives each way merely as an illustration, as, if the mine was found to pay, with a proper system of ventilation, the galleries might be extended to a very great distance.

The only data I could obtain for estimating the probable cost of the tunnels are from the cost of a heading in the lower level that was driven for 90 feet in "dead rock,"—*i.e.*, not in coal. This cost 30s. per foot, and was in the brown gritty sandstone that forms the roof. A main tunnel for carrying the whole traffic of the mine would, however, require to be of much larger size. The excavation of the upper tunnel I should expect to cost less per foot, as it is a shorter distance, and is in better ground.

In order to compare the cost of the two tunnels, I will assume that the upper will cost 50s. and the lower 70s. per foot, in which case the former will require £1,125 and the latter £3,395, or in the proportion of 3 to 1, while the amount of coal won is in the proportion of 2¼ to 1. Or, if the advantage gained by the drive be valued at about 1s. per ton on the coal, it will take 22,000 tons to pay off the cost of the upper tunnel, and 68,000 to pay off the lower.

It is necessary to point out, in the case of the lower tunnel being adopted, an additional expense would be incurred for the remaking of the tramway from the mouth of the tunnel to the incline. How much that would amount to I am unable to say; but as the valley at the level of the fall is narrow and rough, I believe it would be very considerable.

On the other hand, the present tramway and incline, as they stand, will serve for working the mine from the upper tunnel, the only part of the plant now in use which would be rendered useless being the shoot, which is a most objectionable feature in the existing arrangements. But the greatest objection I have to recommending the lower tunnel is founded on the clear indication that the strata dip at a less steep angle as they pass into the hill, and that the distance required to be driven may in that case not only be greatly in excess of the foregoing estimate, but even that the coal may not reach so low as to be cut in the tunnel A.

From the foregoing considerations, I have therefore no doubt that if either tunnel is made, it should be the upper one; and that if mining operations are to be resumed, there is no better plan to be suggested. It may be thought that a good deal of coal should be won by pumping and hauling by an incline from the present workings; but that would add more per ton to the cost of getting the coal out