

uniform character and considerable thickness of special rocks prevent faults being readily traced, and the dense forest growth on what is otherwise a rough country, difficult to explore geologically, yet further adds to the uncertainty in this respect.

Brunner No. 1 Fault.—This is met with in the main drive, 22 chains from the entrance to the mine. At the top of the dip drive there is little or no displacement of the strata, and the down-throw, where it exists, being to the westward, the coal beyond the fracture was reached by driving along the line of fault till the displacement became *nil*. From this point the fault extends in a south-south-west direction, nearly parallel to the Grey River, the amount of throw is found to increase. From the top of the incline, a distance of 577ft. along the line, the displacement was found to be 93ft. In the lower workings of the Coal-pit Heath Mine the throw of the fault continues to be augmented.

Kimberley Fault.—This trends west-south-west, 4 to 6 chains from the southerly boundary of the Coal-pit Heath lease, and is met with in the workings of that mine. The fault has a down-throw on its southern side of 180ft. It extends to the east-north-east across the Grey River, and is continued through the northern part of the Wallsend freehold in the direction of the junction of Stillwater Creek with the Grey. The down-throw of the Kimberley fault, together with the south-western dip of the strata, involves the presence of the coal at a very considerable depth over the southern part of the Wallsend lease to near Dobson's Bluff and under Taylorville Flat.

Dobson's Fault.—This, so far as can be determined, trends north-east and south-west from the western side of the slate belt, reaching the Grey River a little south of Stillwater Junction, along the lower slopes of Mount Buckley to the Grey River, near the northern base of Dobson's Bluff; thence the line, continued south-west, crosses the river to the foot of the low spur cut by the road-line along the right bank of the stream to Coal Creek.

The upthrow of this fault is on its southern side, and, from the evidence of the strata seen on the bank of the river, the displacement at this point is so considerable that the coal might be reached at a depth, probably, not exceeding 200ft. The fault continues to the north-east till it either cuts into the slates showing on the northern slope of Mount Buckley, or, slightly changing its direction, it is seen to separate the old slates from the beds—probably the upper part of the soft sandstone—at the further end of the tunnel on the Midland Railway line.

Taylorville Fault.—This runs N.N.E. from the deep workings of the Wallsend Mine in their prolongation under and across the river, or in the direction of the lower end of Mine Cliff. The down-throw is to the westward, and estimated at 250ft. It is thus roughly parallel to the Brunner No. 1 fault, and, like it, is probably a hang-fault, having its maximum throw towards the south, and gradually lessening in the amount of its throw as it extends northwards. This is shown by the fact that there is no trace of such a fault known above the Brunner Bridge. Mr. Bishop indicates a fault nearly in this line between the foot of Mine Cliff and the river, between the Coal-pit Heath shaft and the upper end of Taylorville Flat. This is said to have a down-throw on the west side of 80ft.

Other Faults on the East Side of the Brunner Gorge.—In the east workings of the Tyneside Mine the measures are reported to have acquired a westerly dip, giving indications of an up-throw fault. This might be due to the fault last described, or to a fault running in the same direction and on the western side of it, which would supplement the amount of up-throw due to the Dobson fault. But the amount of displacement due to both these faults would not account for the great displacement which has resulted in the carrying up of the grit beds over the coal at the river-level, or their occurrence in the Wallsend Shaft 600ft. below the river-level, to the top of Mount Buckley, 1,140ft. above sea-level. To account for the presence of the grit on Mount Buckley, a gigantic dislocation and displacement of the strata on its western side must be considered as having taken place. Minor faults there are, but these are of no serious moment as affecting the working of the coal. The various thinnings of the coal at different places in the mines are not regarded as faults, though in some cases they may indicate the near presence of faulting, facilitating the removal of carbonaceous matters from the seam.

FUTURE DEVELOPMENTS.

1. In regard to the future development of the field, we would recommend that the dip heading in the Brunner Mine to the westward of the No. 1 fault should be pushed ahead, as, although the coal is only 2ft. in thickness at the present face, it is of good quality, and it is very probable this thinning out will disappear and the coal resume a workable thickness. This heading would also be of service as a return air-way, and second outlet, in the event of this lower part of the Coal-pit Heath lease being worked, and the expense of a second shaft, otherwise absolutely necessary, would be thus avoided.

2. A level should also be continued from near the bottom of the present dip towards the north-west, where the line of thinning will probably not be found. And if a dislocation or No. 2 fault be met with, a cross-measure drift should be continued sufficiently far to determine the position of the seam.

3. As the rib of coal which has been left along the lower side of the Brunner main level not only prevents the water from the rise workings getting into the dip, but also preserves the means of making a road, whereby the coal in the back portion of the lease can be worked, should it become of workable thickness beyond the line of thinning, on no account should this rib of coal be taken out until the field is proved in that direction.

4. That a couple of bore-holes should be put down on the back portion of the Brunner lease, some 20 chains ahead of the face of the stone drift: one of these to be in the line of the main level, and the other to the dip. Also, a bore-hole should be put down in the lower portion of the Coal-pit Heath lease, to the westward of the Brunner fault, to prove the coal in that direction. And in regard to the Wallsend lease, a bore-hole should be put down on the Wallsend side of