

areas without coal, but possessing abundant deposits of shale, sandstone, limestone, &c. It would be more logical to consider the presence of coal proof of the presence of shale and sandstone. A very common fallacy among coal-miners is to suppose that a dark-coloured clay, or even a light-coloured clay, is evidence of the presence of coal. The clay, without proof of its refractory nature, as a preliminary begging of the question, is called "fireclay," which in most cases it is not. Ordinary clay is no indication of the presence of coal. Even if the clay is refractory to heat, that is no evidence that it is associated with coal. There are many refractory clays that do not occur in coal-measures. Some fireclays, however, have such characters as to be *prima facie* evidence of the presence of coal. In that case all one has to do is to look just above the clay for the coal. In general, the coal will be found before the clay. To call an ordinary clay or claystone a "fireclay" is quite a useless proceeding; it will not help one to find coal.

From my recent investigations and the information supplied to me it appears that the greywacke and argillite of Trias-Jura age that form most of the country near Picton, especially to the eastward, possibly contain small coal-seams. As I have already pointed out, it is no use prospecting small coal-seams except along the outcrop. Since the Trias-Jura rocks have steep dips, every bed forming them, including any coal-seams, must outcrop somewhere, unless an almost impossible combination of adverse conditions takes place. Hence prospecting other than by surface examination and trenching is needless. Driving, shaft-sinking, and boring are not required. In a hilly country, well dissected by streams, outcropping coal-seams of any thickness will reveal themselves by means of abundant pebbles of coal in the stream-beds for some distance below the outcrops. It may be pointed out that any coal in Trias-Jura rocks will be of such a quality (bituminous or near bituminous) as not to weather rapidly. Hence the coal, where it reaches the surface, will afford good outcrops, which, as stated, will supply abundant pebbles of coal to the neighbouring streams. The fact that the Trias-Jura series in the Picton district does not contain a typical coal-bearing series of rocks—i.e., conglomerate, grit, sandstone, shale, &c., followed perhaps by marine strata such as calcareous sandstone and limestone—tells considerably against its coal-bearing possibilities. This is a logical though not conclusive argument. Against it, to some extent, is the fact that coal does occur in Trias-Jura strata in several New Zealand localities, including, it would seem, Picton itself. Since, however, the Trias-Jura rocks are widespread, and the seams are nowhere, so far as known, workable, and since, moreover, the Picton district has been well explored, it is highly unlikely that any coal profitable to work will be found in the rocks in question.

When fault-crushed the argillite and greywacke of the Trias-Jura rocks are apt to assume a black colour, and broken fragments may exhibit a polished lustrous surface superficially like some coal, and possibly due to an extremely thin coating of graphite. The surfaces, however, when scratched yield a light-coloured powder. Black shining rock of this kind is no indication of coal.

Lastly I may refer to the mistake made by those interested in Picton coal in not obtaining competent advice and following it. To be sure, the services of the Geological Survey have been requisitioned on many occasions, but the reports supplied have not been studied to advantage. Some of these reports, it is true, seem to be lacking in lucidity and in plain straightforward expressions of opinion, thus needlessly lessening their value to the prospector or the miner.

Even more valuable than the advice of a competent geologist would be that of a capable mining engineer. The ordinary coal-miner, whose experience is confined to the hewing of coal, timbering, &c., is useless as an adviser, but a qualified mine-manager, with good experience in directing actual mining operations, after a short inspection would certainly be able to state whether coal can be profitably mined at Picton or not. Some prospectors are also capable advisers on mining matters, but many men of this class are blinded by an invincible optimism, which leads them to exaggerate the possibilities of every find. Doubtless, however, a sanguine hopeful temperament is part of the mental equipment of every real prospector, leading him to follow up the slightest indication and to persevere in his search to the utmost.

FUTURE PROSPECTING FOR COAL.

On the ground and at a later meeting I stated orally to Messrs. Allport and Webster that a little prospecting, if it could be carried out inexpensively, at the old Picton Coal-mine (Fell's) might not be amiss. I also thought that fresh search for the outcrops of coal found many years ago in the first, second, and fourth branches of Laymont Creek might be made. This advice is the same as that given by me in 1914. I must, however, make it clear that there is no prospect of more than a few hundred, or perhaps thousand, tons of coal being extracted at either locality. Picton coalfield is not a coalfield in the proper sense of the term; it contains irregular faulted patches of coal only, not continuous seams. I am not at all sanguine that further prospecting will disclose anything of value, and perhaps I ought to withdraw even the qualified advice just given. Long adits, if not on coal, are hardly worth while, and shaft-sinking below water-level must be emphatically condemned. Nor can I see that boring is advisable; in former days at least two bores were drilled to a reported depth of 200 ft. without success.

Unfortunately, no plans of the underground workings of the Picton Coal-mine were ever made, and the want of knowledge concerning the exact position and extent of the old workings must seriously embarrass the modern prospector in deciding on a scheme of operations.

MINERALS OTHER THAN COAL.

Graphite.—Graphite (plumbago, or black-lead) occurs in the ancient rocks of the Picton district. About 1882 Mr. John Renfrew forwarded a sample of graphitic slate to the Colonial Laboratory. In 1900 the Hon. Mr. Reeves forwarded a soft black shale from Picton, which contained—water, 18·24