half a mile to the eastward. The rocks on the eastern side of Picton Harbour, near the baths, are disturbed by faulting, probably along nearly north-and-south lines.

The faults so far mentioned are nearly parallel to the trend of Picton Bay, Shakespeare Bay, and the upper part of the Tuamarina Valley. On the peninsula between Picton and Shakespeare bays a set of cross-faults is easily detected. The most northern of these, striking east-south-east, forms the boundary between the Tertiary strata and the mica-schist previously mentioned as forming the northern part of the peninsula. It is probably a reversed fault. A nearly parallel fault, but having its downthrow to the north-east and striking almost south-east, forms the southern boundary of the patch of Tertiary strata in this locality. A third fault a little to the south of the last is almost or quite parallel to it. These cross-faults to the north-west pass under the waters of Shakespeare Bay, and probably end at the main westerly fault. Whether they affect the rocks east of Picton Bay has not yet been determined.

The Picton–Tuamarina fault-trough contains several moderately low ridges which have nearly flat crests, meeting the higher slopes at an angle, similar to that formed by the bottom of a cutting with its sides. This feature not only indicates faulting, but an ancient plane of erosion, formed when the land stood lower than it is now or when the land had much greater extent seaward. The fault-trough also contains several detached or semi-detached hills, such as that at The Elevation, a feature that in itself is usually indicative of faulting.

Prospecting-principles.

Why have the people of Picton, in spite of much discouragement from geologists and others, continued to prospect the coal-measures of the district? An answer may perhaps be given as follows:—

From time to time unexpected discoveries of coal have been made, and each new discovery has naturally raised fresh hopes. The coal occurs close to one of the best harbours in the world, and if Providence had only been so kind as to supply a coalfield to fit the shipping-facilities Picton would have become by this time the Newcastle of New Zealand, altogether free from the troubles that have harassed the Greymouth and Westport Harbour Boards. I take it that the good people of Picton could not help reasoning that so fine a harbour ought, in the fitness of things, to have a good coalfield attached to it, and that search for coal was therefore thoroughly justified. It is possible also that the conditions of life at Picton are such as to induce an invincible optimism. One other cause —probably the principal cause—of the renewal of prospecting from time to time was the fact that nearly all concerned had little or no knowledge of coal-mining or geology. The various attempts to develop coal-mines have, in truth, been instances of "the valour of ignorance." I shall now endeavour to point out some of the mistakes made owing to want of knowledge and experience, so that any future prospectors may be able to avoid, in part at least, the errors of the past.

It is a great mistake to suppose that a thin outcrop of coal a few inches thick is worth following underground, either by driving or sinking, in the expectation that it will increase in thickness till it becomes workable. Such an outcrop may be worth following on the surface. It may, in the course of a quarter of a mile, thicken to a workable seam; more likely it will thin out altogether. If it cannot be followed on the surface the proper course is to look for a thick seam above or below the thin seam, or wherever the coal-bearing rocks can be found outcropping. As a rule under New Zealand conditions not much trenching will be necessary. If thick coal-outcrops exist they will probably be detected in stream-beds or on the face of cliffs. If no workable coal can be found outcropping, then, as a rule, prospecting should be abandoned. In certain cases, if a competent geologist or a highly experienced mining engineer so advises, boring may be undertaken at selected spots.

Great caution should be exercised where the coal-measures are much disturbed by faulting. It is an axiom among New Zealand mine-managers that coal standing on end (dipping very steeply) cannot be profitably worked. In view of the present high price of coal this opinion perhaps requires a little qualification, but at Picton the coal-measures are so highly disturbed and broken that the axiom holds good.

In order to make a coalfield there must be a considerable area underlain by coal: this is not the case at Picton. The coal-seams must be fairly regular in thickness and quality: this is not the case at Picton. In the Picton Coal-mine, for instance, the seams thinned capriciously in the drifts, and varied in composition from coal to carbonaceous shale in the course of a few feet. This might be put the other way: in some places the seams greatly thickened in the course of a few feet, and in other places changed just as rapidly from shale to good burnable coal; nevertheless, the same unfavourable conclusion may be drawn. A seam that changes in a few feet from bad to good will probably—nay, certainly—change from good to bad in a short distance. Such variability is fatal to economical mining.

Though not a logical necessity, it is in a way desirable that the stratigraphical sequence of a new coalfield should be the same as or similar to that of an established coalfield; this is not the case at Picton. No strongly marked resemblance between the strata here and those of the Westport, or Greymouth, or other important New Zealand coalfields can be traced. To be sure, there is some similarity, but the differences are greater. As a rule, only a competent geologist or a mining engineer of good judgment and experience can draw reliable conclusions from rock-characteristics.

From time to time various persons have stated that limestone and sandstone are "indications" of coal. This is a fallacious mode of reasoning. In nearly all coalfields of importance one finds, besides coal, such common rocks as shale, sandstone, limestone, &c. It is not logical, however, to reason that the occurrence of any one of these rocks shows that coal is present; for there are vast