

underlaid the more productive zone hitherto worked. I listened at the various consultations, but had too slender a grasp of the conditions to venture any opinion, more especially as it seemed to me mainly a matter of what mining property should carry the works than the suitability of any one for the purposes in view; and, indeed, I may say now there was nothing of advantage to choose between them excepting the greater depth of the Queen of Beauty shaft, and the proximity of that to the untried ground of Shortland Flat. Finally, it was afterwards decided to prospect for gold at deep levels from the Queen of Beauty shaft, and a large pumping and winding plant has been installed on that property.

"Another form of prospecting had in the meantime for some years been in progress—*i.e.*, the Moanataiari Tunnel. This at or near sea-level had been driven eastward across the direction of various reef systems, in the hope of thereby intersecting gold-bearing lodes, known lodes at various levels, and yet others it was hoped by this means might be discovered. This work was prosecuted a total distance of 3,000 ft., but scarcely yielded the results anticipated. Hence deep sinking was specially favoured, and considered the more promising procedure, when this as a means of discovery was proposed.

"As mines were worked to greater depth it was found that decomposed andesite was still mainly the rock in which the reefs were contained, and on the foreshore claims east of the Beach Slide country of this class—the 'sandstone' of the miner—has continued to as great depth as has been reached—in the case of the Queen of Beauty shaft to 748 ft. from the surface of the flat at or near sea-level. As to the alterations of the rock at the surface, and at such considerable depths below sea-level, it is not necessary to inquire at this stage, but is a subject that may have to be dealt with further on.

"That part of the field within which lie clustered by far the greater number of reefs, productive or unproductive, finds its limit towards the north near the mouth of the Kuranui Creek, and towards the south on the southern spur of Una Hill, or along the valley of Hape Creek finds its extreme limit. The greater number of reef systems closely clustered together are situated about the middle or north of the middle part of the field. The general trend of the reefs is between N.N.E. and E.N.E., a few, however, having a more northerly or N.N.W. course. They thus extend inland along the valleys of Moanataiari, Waiotahi, and Karaka Creeks from one mile to a mile and a half from the shore of the Firth of Thames. Though productive reefs are found throughout the distance named, their continuity from the low grounds of Grahamstown and Shortland Flat is broken by the occurrence of a very pronounced line of fault, which is known as the Moanataiari Fault, and the country lying to the west and east of that may be considered as constituting the two principal divisions of the field. The Moanataiari Fault has been considered to have a down-throw on the west, displacing the rocks on that side to a lower level a distance estimated at from 900 ft. to 1,000 ft. The actual amount of displacement has not been accurately determined, but the probabilities are that this is not less than here stated. The hade of the fault-line is clearly shown on its eastern wall, and is at an angle of 45°. There is also a probability that some shifting of the country on the west side took place, whereby even vertical reefs are not to be found immediately opposite their western parts on the east side of the line of fault. The fault-line is supposed to begin on the shore immediately north of where Shellback Creek enters the Firth of Thames. It is continued in a curving line, gradually acquiring a more southerly direction, through the hills and across the valleys of Shellback, Kuranui, Moanataiari, Waiotahi, and Karaka Creeks to the western base of the northern part of Una Hill, along the western lower slopes of which, with a yet more southerly trend, it is continued to Hape Creek, beyond which it cannot be said to be distinctly traceable.

"At the mouth of the gorge at Karaka Creek it is joined by another line of displacement called the Collarbone Fault. This is much more obscure. It is supposed to reach across Punga Flat into the watershed and some distance along the middle course of Tararua Creek. There is a probability of two or three faults occurring along this line, none of which are directly connected with one another. Even in Collarbone Gully itself it is not certain that a true fault is present, but only a slide of the surface rocks, which gravitating down the valley has ground along the side of the range to the east, and has produced to the depth of the moving mass a polished and slickensided wall on that side. As a slide its superficial character is easily detected, whether we look up the valley from Karaka Creek or from the saddle at the head of Collarbone Creek down the valley. The Collarbone Fault, however, is not likely to influence the speculations that are to follow.

"The Moanataiari Fault has displaced and carried to 1,000 ft. lower level the strata on its west side. The rocks thus displaced, to a large extent, have been protected from denudation, while those on the eastern side of the fault have correspondingly been subjected to that influence. It follows, therefore, that the difference is greater by the excess of denudation on the east side of the fault-line. The hilly country west of the fault is not more than 200 ft. above the sea, and that immediately east of the fault not more than 100 ft. higher; but, to make sure, let it be assumed that they are 400 ft. in height (I do not speak of the southern part of the field, where Una Hill is considerably higher). On the Grahamstown Flat some 200 ft. of rock has been removed in excess of what has been denuded from the hills west of the slide, thus discounting the disparity on the two sides of the fault by so much. On the other or east side of the fault the hills are not more than 200 ft. higher than on the west side. They have therefore, on the assumption of 1,000 ft. of displacement by the fault, having 45°, lost one foot of height for every foot back from the slide, and a proportionately lesser amount as the slide is approached till the difference becomes nil at the actual slide itself, and the 200 ft. of loss on the Grahamstown Flat must be credited or discounted in the same way. Thus, by selecting a position for deep sinking east of the fault by so many feet as this may chance to be from the fault-line, this measurement has to be added to the throw of the fault, and the total would represent the advantage gained, less the height above