considering that between the places opened there exists virtually not a feature such as would indicate a narrow auriferous zone or streak in their line down the mountain side, whilst it would seem very improbable that just per accident the auriferous portions of the rocks were opened and exhausted, we must come to the conclusion that there is a great likelihood of the gold being generally disseminated—richer and poorer in places—through these peculiar varieties of rock as far as they extend. As the matter stands, the average results of the washings from Nos. 2 and 4 workings are certainly such that, taking into account the facilities the ground offers for mining, abundance of timber close to, &c., they should render working on a large scale, with ample crushing machinery near at hand, highly payable. Considering this, it would be really deplorable if the still lingering doubts of the reliability of the results of the trials made, *i.e.*, whether the gold really came out of the stuff and not out of the crushing machine, were not definitely set at rest by a further and more extensive trial, say of 10 to 15 tons from each of the two good places.

Strange as the occurrence of gold in such matrix, and under such circumstances, no doubt appears, it is in reality not without its alliances—at least, in certain respects—both in another part of New Zealand and in foreign countries. Captain Hutton, who is intimately acquainted with the Thames Goldfield, North Island, recognised at once a certain resemblance between the geological features of the locality under notice and those of the Thames district. He thought the greyish white trachyte of the former looked much like the gold-bearing trachyte-tufa of the Thames, though there, as well known, the gold is found in bunches and veins of genuine quartz, and does not occur finely disseminated through the mass of the rock. The hard crystalline rock of No. 4 workings, he also considered similar to a rock, of which dykes traverse the original tufa of the Thames, but which itself had not been found auriferous. As regards my own experience touching this rock, I think the latter bears considerable resemblance to certain trachytic rocks (trachyte greenstone) which I have seen on a journey through Hungary and from Transylvania, and which are there rich in auriferous silver and lead lodes. But from comparative examinations of specimens, I can also state that in mineral composition it is quite identical with, and in appearance hardly distinguishable from, the quartzose diorite greenstone of some of the dykes which in Victoria traverse upper Silurian rocks, and are themselves traversed by generally highly auriferous quartz veins. That the rock is, notwithstanding this latter close resemblance, of volcanic origin, and represents in reality "trachyte greenstone," there can hardly be a doubt, however, on account of its mode of association with the typical trachyte of the locality. For besides in the shaft, close round which the greyish white trachyte is plainly exposed, outcrops of it (the greenstone) have also been found in several places in a neighbouring gully which cuts through trachyte, and on the slope of the trachyte range. According well with this opinion about its origin, and what it lithologically represents, and further showing the importance of this find of rock, is what the celebrated geologist Von Richthofen reports from the Washoe country and other parts of America, namely, that the rock there most prolific in gold and silver lodes is a volcanic rock of the trachyte series, closely allied to diorite both in composition and appearance, and for which he proposes the name "Hornblende propylite." Considering all the foregoing observations in connection, there exists, besides what we already know of their auriferous character as such, the chance that any quartz reefs or veins found traversing the trachyte and trachyte-greenstone in the locality under notice, or in fact wherever they occur, may prove highly auriferous. And on this account not only the neighbourhood of the workings, but the whole of that part of the Peninsula is well worth a thorough prospecting, the shore line, showing the rocks generally plainly exposed, offering in this respect special advantages.

Modes of Opening and Exploitation of the Reefs.

Opening of the Reefs.—As the steeply mountainous, rugged, and broken character of the country where most of the reefs are situated affords special facilities for their being opened and worked by adits, or tunnels, as they are generally though incorrectly called*, this method has exclusively been made use of, and there are but few reefs which had by necessity to be opened by shaft (Saddle Hill Reef, near Dunedin; Criterion Reef, Arrow—lying in low flats), or for which economic reasons, obtaining of quick returns, &c., rendered shaft sinking the most advisable at the start. Touching the facilities afforded by the adits in working the reefs, they are in all cases, no doubt, more or less considerable, according to circumstances; but with regard to positive advantages in a money point of view—considering in comparison the cost of working by shaft to the depths the adits come in—they appear in some instances very doubtful, or are quite on the side of the latter method. Want of water power, and great expense connected with employing steam power for hoisting the stuff and pumping the water, as also the procuring of easy transport of the stuff to the crushing machines, formed in these cases the main reasons for driving the adits, but then some of the latter might, at a comparatively small increase in expense, have been at once put in much lower; or more careful calculation and scrutiny of circumstances at the outset would in another case have clearly shown that the length, respectively to the cost of the adit, was out of all proportion to the small height of reef overhead available for working, and that the water difficulty might at that depth have easily been overcome by horse-whim. It is not, of course, possible to lay down special rules, applicable in all cases, touching the advisability of opening reefs by adit instead of shaft, for local circumstances differ, and monetary reasons come into play; however, I may draw attention to several general or, as it were, starting points that ought never to have been left out of sight in the consideration of cases in point:

1. If adits can be driven direct in the lines of strike of reefs in which the gold occurs in such a way that they (the adits) prove productive workings from the commencement, they offer the greatest advantages as compared to shafts.

2. Where the direction of an adit would have to be at right angles, or obliquely against a reef, representing deadwork, the whole capital required in its construction must be considered as lost, or calculated as part working expenses of the portion of the reef available overhead, if, when this is worked out, a new lower adit can be driven for working the reef under foot; for it (the upper adit) is thereby

* To be tunnels, in the strict acceptation of the term, they ought to run right through the mountains, each connecting two points on the surface, which none of those under notice do.