

"The absence of trachytic rocks up the Matawai Creek is rendered very obvious by comparing it with the Waiau, which flows direct from the trachytic district, of which Castle Rock forms part. The gravel in the Waiau is chiefly composed of a porphyry, consisting of grey felspathic base, with large crystals of hornblende. Half a mile up the river from its junction with the Matawai, it flows over solid ledges of this trachyte porphyry, and, although the valley has been well prospected, no gold has ever been obtained. From this circumstance, I think it probable that the trachyte will be found to cut off the auriferous rocks to the south, just as the volcanic agglomerates bound them on the east and west. The reefing district will therefore be limited at Coromandel to the range of hills that extends from the Matawai on the south to some little distance beyond the Tokatea Peak. Two bands of the auriferous formation appear to cross this range obliquely, as shown in the accompanying map [illustrating Dr. Hector's report]. The first of these extends from Preece's Point (which consists of the decomposed greenstone tufa), through Keevin's Point, Driving Creek, Tokatea, and on to Waikawau Bay, where traces of gold are reported to have been discovered. The second extends from the Tiki Diggings, by the old Whangapoua Diggings, to the Haratuhunga Creek, which flows to Kennedy Bay from the south.

"At a low estimate, this district must be held to include an area of not less than five square miles, but in which gold has only been obtained in notable quantity at the Kapanga."*

In the first part of this report Sir James Hector makes an extract from Hochstetter's "New Zealand," pointing out what were the determinations made by that geologist, and the opinions he had arrived at, and then goes on to say:—

"Professor Hochstetter thus clearly expresses his opinion that the more recent volcanic rocks of the district, to which he alone refers in the above passage, would not prove to be auriferous, a view which I think is fully borne out by our extended knowledge of the field. The gold is not, however, as he supposed, derived only from quartz veins in clay slates, for, as Captain Hutton very justly points out in his report on this district, the area of these exposed at the surface is very limited. On the other hand, Captain Hutton, in the same report, does not distinguish between the comparative modern breccias and agglomerates, which he describes as containing blocks of variously-coloured scorïæ and lavas, and the more ancient formation of green tufaceous sandstone and porphyry in which most of the auriferous lodes occur."†

Sir James Hector visited Coromandel in 1864, and the report from which the above extracts have been made was written in 1870, and, as in the meantime great discoveries were made in the district farther south (at the Thames, Tapu Creek, &c.), the opinion formed in 1864 may be considered expressed in his writings prior to 1870, and subsequent to the discovery of gold at the Thames.

Introductory to Captain Hutton's first report on the Thames Goldfield, at page 2 of the report as printed, is an extract from Dr. Hector's instructions to Captain Hutton, in which, evidently referring to the visit made to Coromandel in 1864, or to a subsequent examination of other parts of the Peninsula, he says:—

"The range which separates the Thames Valley from the Bay of Plenty I found to consist of a nucleus of aphanite slates, interbedded with green brecciated and greywacke slates, being part of the Upper Palæozoic series. Flanking and capping this nucleus is a great development of the following members of the Tertiary series: (a.) Brown-coal formation, very local. (b.) Quartzose gravels cemented, so that they break away in large blocks. (c.) Waitemata series (Pliocene). (d.) Trachytic tuff. (e.) Trachytic breccia.

"The Palæozoic rocks are cut by dykes of trachyte (granite of the miners), which is charged with auriferous and cupreous iron-pyrites. They, moreover, contain quartz veins, which are also pyritiferous and auriferous. The older rocks decompose very freely to laterite, and the fissures then contain secondary deposits of silica, manganese, &c., especially when near the supposed trachyte dykes, alongside of which in some cases there would seem to have been fissures that were only gradually filled up by deposits from thermal waters, giving rise to the banded, irregular, and crystalline structure of the lodes, which is so characteristic of Coromandel.

"The composition of the several reefs in the vicinity of the lodes at Coromandel shows this singular character, arising, I suspect, from all the soluble matter of what was once a basic rock having been removed and replaced by silica, and partly by iron-pyrites containing gold. That this mineral is the main source of the gold is shown by a section of the lode ground I made in 1864, when I found that the so-called quartz reefs were contained between two varieties of pyritous rock, the sulphurets having been removed from the overlying rock, but still remaining in the lower, the reef itself being a band of mullock containing kernels and geodes of quartz and carbonate of lime, and evidently formed by infiltration. A third manner in which quartz occurs in the district is in the trachytic tufas, but it is then more chalcedonic and crystalline, and associated with jasper and chert, and is non-auriferous, as proved by the numerous trials at Keeven's Point, Coromandel.

"The older rocks present too limited an area in the Coromandel district to form the source of much gold by direct denudation, as in the south of New Zealand; still, where they have been decomposed to form the red clay or laterite and secondary minerals thereby formed, gold may be among these. The gold in the case of Patawai Creek, Coromandel, must have had a different source from the gold got in Driving Creek, as its value was £3 17s. 6d. per ounce; but such deposits seem to be very small and patchy, as only two hundred pounds' worth was got, I believe, by Mr. Turner in 1862. I would not, therefore, recommend as a guide in forming an opinion as to the prospect of gold the mere presence or absence of Palæozoic rocks, without at the same time taking into consideration their peculiar association with the pyritous rocks above referred to. The same Palæozoic rocks occupy a large area in Otago, without a trace of gold; but on the west coast of Nelson, where they are associated with pyritous felstones and porphyries, they are then auriferous."

* Geological Reports, 1870-71, pp. 88-95.

† Geological Reports, 1870-71, p. 89.