The extent to which the harbour has been and is now being filled is shown by the shallowness of the water and the distance between low- and high-water marks, as marked on the accompanying map. An elevation of only 12 ft. would thus add several square miles to the area of the alluvial plain.

XII.—Conditions of Deposition.

The vast quantities of transported matter requisite for the formation of a thickness of slaty shales, certainly not less than 5,000 ft., sufficiently indicate the proximity of large rivers and correspondingly large masses of land in Palæozoic times. In what direction this continent lay it is perhaps impossible to definitely say. Considering, from palæontological conditions, however, that New Zealand must have been separated on the west from Australia before the Secondary period, and regard being had to the present depths of the surrounding ocean, it may be assumed that the detritus came from the east or north-east rather than from the west. Most of it was deposited in comparatively shallow water, at times at no great distance from land, as is clearly shown by the presence of coarse sandstones.

Deposition of the above beds took place in late Palæozoic times, probably in the Carboniferous period, and at the close of that period they were raised above sea-level, to suffer during long ages the onslaught of denuding agents. During the whole of the Secondary period, so far as can be at present ascertained, the beds remained above sea-level. Similar shales are, a hundred miles to the south-west, overlain by Triassic strata with *Monotis salinaria* and *Halobia lomelli*, and by Jurassic beds with characteristic Ammonites and Aucella, and it is therefore possible that contemporaneous depressions took place in the area under discussion. But, if so, all traces of these beds have been obliterated.

The dawn of the Tertiary era saw the slaty shales becoming slowly submerged, and receiving in their valleys and estuaries fluviatile beds of conglomerates and clays. With further subsidence foraminiferal limestones were deposited. At this period oscillations of the land were not infrequent, as the successive small seams of coal and carbonaceous shales show. These beds, represented now only near Cabbage Bay, are but the relics of a once widely-spread deposit that has now been eroded almost to obliteration.

Soon, however, the orogenic agencies that have modelled New Zealand came into play. A fold parallel to the great north-west protaxis of elevation of the two Islands was engendered in the Hauraki Peninsula area, the result of which was the development of that stupendous volcanic energy which, bursting through the weakened crown of the anticlinal fold, gave forth the tremendous deposits of lavas that form our volcanic series. From the general absence of tuffs and breccias among the earlier lavas, and their deposition along one direction only, I am inclined to the opinion that this early Tertiary eruption was a fissure eruption—a mighty prototype—for the fissure was probably sixty to seventy miles long—of those which have occurred within the historical period in Iceland and in the Hawaiian Islands.

With continued manifestations of volcanic activity the peninsula grew in height, both by the accretion of volcanic matter and by further raising of the anticlinal summit. These eruptions continued during Eocene times, diminishing in activity until, in the Miocene period, they took place only along the sea-coast, where the ocean waters supplied the motive-power. The final manifestation in the Coromandel area appears to have been the fissuring of the country in many directions and subsequent filling of the fissures with dyke matter.

The later eruptive rocks differ markedly in petrological characters from those laid down at the earlier period. The earliest lavas were andesites, rather basic in character, with augite as the ferro-magnesian silicate. Later lavas contain amphiboles with somewhat acid plagioclases, and in the Miocene breccias and dykes hornblende is the only ferro-magnesian silicate, and the rock is a basic trachyte, probably on the border-line between the trachytes and andesites.

Taken as a whole, the nature of the volcanic rocks on the Hauraki Peninsula shows a marked correspondence with the sequence of rocks postulated by Von Richthofen as being characteristic of every long-continued manifestation of volcanic energy. They may be tabulated as follows in order of emission:—

I. Augite andesites II. Hornblende andesites	... Constituting the auriferous series throughout the peninsula.
III. Hornblende trachytes	... Beeson's Island beds.
IV. Rhyolites ...	... Largely developed to the south of the Coromandel district.
V.(?) Basalts ...	... The volcanic rocks of the Auckland Isthmus.

After the Miocene period all volcanic activity ceased in the Coromandel district, the foci of eruption moving along a south-east line. The only geological work carried on since that period has resulted in the filling-in of deep bays and inlets, and this work is still in progress, and will, if allowed to progress, eventually convert the Coromandel and other harbours into landlocked plains.

XIII.—Reefs, Reef Systems, and Faults.

The reefs of the Coromandel goldfields are possibly as erratic in course, dip, and gold-content as those of any goldfield in the world. No generalisations can be deduced from an inspection of the dips and strikes, and no comparisons can be made to determine when a reef shall or shall not contain gold. Two reefs may be parallel and in close proximity, yet the first may be absolutely barren and the second highly auriferous. The proximity or otherwise of the Palæozoic slaty shales does not appear to modify the auriferous character of the reefs, for while the rich Tokatea reefs are near and in the slaty shales, the equally rich Kapanga, Scotty, and Hauraki reefs are certainly ,000 ft. above the Palæozoic rocks. Further, while some reefs, as the Tokatea, contain most gold hen almost vertical, others, as Scotty's, are richest when approximating to a horizontal position.