GEOLOGICAL REPORT ON THE LOWER WAIKATO DISTRICT.

THE author of the following Report on the Geology of the Lower Waikato District, (Captain Hutton, F.G.S.,) though not on the staff of the Geological Department, was appointed to make the survey by His Honor the Superintendent of Auckland, at my suggestion; and as a means of preserving and circulating the very interesting and useful details he has obtained respecting the structure of the district he examined, it has been considered desirable that his communication should be printed along with the reports of the department.

JAMES HECTOR.

Geological Survey Office,
Wellington, 3rd June, 1867.

REPORT.

BEFORE commencing my Report I think it but right to state how far the accuracy of the accompanying map and sections may be relied on, for it is evident that until a regular trigonometrical survey of the country has been made, and a map prepared showing all the mountains, streams, and other physical features, it will be impossible to make a geological map that shall show correctly the position of the lines of outcrop of the various rocks.

The map furnished to me by the Survey Office was most complete in the country on the right or east bank of the Waikato, and along the West Coast, and here, therefore, my map may be looked upon as tolerably correct. Next in point of accuracy comes the position and extent of the coal fields, for, as this was of the greatest importance, I spared no pains in taking the bearings of the principal mountains, &c., to lay down this part as exactly as possible, but as the position of the mountains were not shown on my map, and the bearings were only taken with a prismatic compass, strict accuracy must not be expected.

To obtain correctly the extent of the coal fields would require a regular survey, which would take a month or six weeks at least to complete.

The greater part of the country between the West Coast and the Waipa and Waikato Rivers, is as yet quite unexplored by Europeans, and no survey, further than cutting a line or two across it, has been attempted, therefore, in this portion of my map the lines must be taken as indicating only the probable general direction of the boundaries of the various strata, and not by any means as their exact line of outcrop.

It is also just possible that the brown coal formation may be intermediate in age to the Whaingaroa clay and the Aotea sandstone, in which case the coal fields would be much more extensive, and might be found north of the Wangape Lake. I could, however, obtain no evidence of this, and I incline much more to the opinion that they are as I have here placed them, anterior to the Whaingaroa clay.

The following table shows the relative order of the different rocks found in this district:—

Recent	... ...	Blown Sands.
Pleistocene	... ...	River loess. Basaltic boulder formation. Plastic clays and sands.
Pliocene	... ...	Waitemata beds (?).
Miocene	... ...	Kawhia limestone. Aotea sandstone. Whaingaroa clay.
Eocene	... ...	Papakura limestone. Brown coal formation.
Neocomian	... ...	Putataka beds.
Palæozoic	... ...	Slate clays and sandstone.

PALÆOZOIC ROCKS.

A chain of mountains composed of primary slates and sandstones, rising to 900 feet in the southern part, but with several breaks in the northern, forms the eastern boundary of the district. This strip, not much more than two miles wide in the broadest part, is the only place where these rocks are found, and consequently the only place where there is any chance of finding gold *in situ*.

As far as my observations went I saw no signs of quartz veins, and I cannot, therefore, think it probable that they contain gold. Their extent is much too small, even supposing they contained gold, to afford sufficient materials for a payable alluvial gold field of any extent, and I have not, therefore, the slightest expectation that one will be found here. As I wish to be clearly understood on this very important point, I will repeat that I think it possible, but not probable, that auriferous quartz veins will be found in the range running from behind Waikare Lake, through Pukemore, Rangiuru, Taupiri, Pukewhau, and Hakarimata, to Te Kapamahanga, but it is quite hopeless ever to expect to find any alluvial gold field in this district.

SECONDARY ROCKS.

Next in order to the palæozoic slates comes a highly complex series of sandstones, gritstones, clays, and slates, containing fossils of secondary age.