NELSON.

No. 4.

MEMORANDUM by the Hon. J. VOGEL to Dr. HECTOR.

IN an agreement for the construction of the Nelson and Cobden Railway which it was proposed to make with the firm of Messrs. Brogden, those gentlemen were to have three years to decide upon whether they would proceed with the work. In the meanwhile they were to make the survey, and there is no doubt they also proposed to investigate the capabilities of the country. The agreement subsequently fell through, and the Government now propose to have the capabilities of the country investigated before opening up any further negotiations for the construction of a railway through it.

Your advice is asked on the subject. Something more definite than a merely scientific opinion would be desirable. Can you suggest any practical course for investigating the mineral wealth of the district, and in what shape and at what cost?

9th October, 1871. JULIUS VOGEL.

No. 5.

MEMORANDUM by Dr. HECTOR to the Hon. J. VOGEL.

THE only possible way of determining the mineral value of the Western District of Nelson is to make a geological survey of it, and from the analogy between the structure of the country so discovered to other regions where the same formations prevail, infer the minerals that will probably occur in sufficient quantity to be of economic importance.

Much preliminary work has already been done towards the accomplishment of such a survey, and the accompanying plans show the general results in two forms:—

A Coloured Geological map. Not printed.

Plan I. shows the general distribution of the formations.

Plan II. shows the localities in which minerals of value have been found.

The depression through which it has been proposed to take the Nelson and Cobden Railway lies between the main range of the Island on the east, and a group of isolated mountain masses that extend from the mouth of the River Grey to Cape Farewell. The mountains on the east are slate and sandstone formations, and along their western base greenstone and serpentine have reached the surface, and carry copper, chrome, and several other ores in varying quantity. There is also a well-founded expectation that gold may yet be found in this formation in reefs.

The western mountains have a much more complex structure. They may be looked on as originally formed of slate, mica-schist, and granite, and to have been covered with upper secondary strata, with coal seams.

Coal.—Large areas of these coal formations have been denuded, and only detached patches are left, generally in positions that are not easily accessible. The areas so left are approximately marked on Plan II. In some of these areas workable coal seams have been discovered, as described in various published reports. The coal varies in quality, but is on the whole of better quality than that found in other parts of New Zealand. As a rule it is "level free," or in other words, elevated above the average water-level of the country.

Gold.—Every river in the western district is auriferous, to a greater or less degree; and from the enormous deposits of fine gold dust which occur on the present and ancient coast-lines, back as far in time as the later tertiary period, there must be a large proportionate quantity of heavy gold yet to be found in the mountain valleys. From the rarity of gold in the rock-bound valleys of the eastern or main range, and the occurrence of very heavy gold (nuggets upwards of 30 to 40 oz. weight) in some of the valleys of the western range, it would appear that the latter are the chief source from which the gold has been distributed.

Prospecting between the two ranges has been very imperfectly carried on, owing to the superior attractions and easy mode of life offered by the beach diggings.

Auriferous Reefs.—Auriferous reefs have been discovered and partly explored in at least seven distinct localities in the western ranges, some of them being of a very promising character, and they will no doubt be worked as soon as the alluvial diggings decline.

Other Metals.—Ores of silver, lead, chrome, copper, zinc, massive magnetite, and specular iron ore have been found in the district; also graphite, marble, limestone, and other minerals.

In the meantime, the circumstances under which the above-mentioned minerals have been found could be collected together from various reports, so that their prospective importance might be judged of.

The very imperfect state of topographical survey of the district, and the broken nature of the country, will render a detailed geological survey a tedious and expensive matter; but a geological surveyor and party might collect a great deal of accurate information about that particular line of section which has been chosen for the railway in the course of the ensuing summer. The expense of such an examination would not be less than £600.

JAMES HECTOR.

Geological Survey Office,
Wellington, 18th October, 1871.