

## OTAGO.

## No. 11.

Dr. HECTOR to Mr. COOPER.

SIR,—

Geological Survey Office, Wellington, 15th March, 1872.

I have the honor to forward, for the Hon. Mr. Gisborne's information, a preliminary report by Captain Hutton on the Coal Fields of the Southern District of the Otago Province, together with my letter of instructions to him.

Captain Hutton has not completed the examination of the whole district, but I consider I have sufficient information to warrant practical recommendations as to the best method of opening up a mine for the supply of the railway, and Captain Hutton can resume his examination at a future date.

I am making inquiries as to the best way of getting the exploratory drive at Nightcap Hill executed, and will report the result. In the meantime I would particularly beg Mr. Gisborne's attention to the suggestion that rewards should be offered for the discovery of coal seams, in which I concur.

The Under Colonial Secretary.

I have, &amp;c.,

JAMES HECTOR.

## Enclosure 1 in No. 11.

Dr. HECTOR to Captain HUTTON.

SIR,—

Geological Survey Office, Wellington, 22nd December, 1872.

I have the honor to request that you will devote the next four months to the geological survey of that portion of the southern district of the Otago Province which extends from the Takitimu Mountains in the west to the coast between the Maitava and Molyneux Rivers, and including the Wairaki and Taungatara Downs, the Hokanui Hills, and the Kaituka Ranges.

The special object of your survey will be to ascertain the extent and value of the coal seams which occur in the district, but for this purpose it will be necessary for you to examine the general structure of the district on several lines of section. The lines which I recommend from my own knowledge of the district are marked on the attached plan.

Section I., in a north and south direction up the valley of the Otapi Creek, is the first to which you should direct your attention, as there you will find the lower formations well displayed.

Section II., north-east from the Takitimu, the Mount Hamilton District, will give you a greater expansion of the middle part of the series.

Section III. is the section from the Takitimu south to the Morey Creek District, and on to the Yellow Bluff, on which line you will find the older and newer formations best developed.

Section IV. will intersect or approach several valuable seams of brown coal at the eastern extremity of the Hokanui. In the district east of the Maitava you will find very good sections on the lines marked, avoiding the heavy bush.

The coast section can only be reached by land as far north as Waikawa, and again at Catlin River and the Nuggets.

The following is a list of the localities where fossils have been gathered:—

Section I., Forest Hill limestone, with marine fossils. In this limestone are caves with fine moa-bone deposits, which I should like you to examine if you have an opportunity.

Otapir Creek at *a*. Astarte sandstone above the *pecopteris* beds at *a*, which have been explored by a drive from a bush gully; *b*, a low cliff of dark sandstone, in which I got *glossopteris*; *c*, *d*, *e*, are the calciferous shales (Kahiku series), with wide-winged *spirifer*, &c., under the conglomerates, which form the base of the Maitava series.

Section II. Fossil plants occur in the Mount Hamilton sandstones, followed by *septaria* clays, also with fossils. I think the supposed coal at Coal Hill must be serpentine, but I have never been there.

Section III. Older part of the Maitava series with fossils *a*, *b*, *c*, also the brown coal with fossils at *d*, followed by greensands, marls, and limestones, all fossiliferous.

Maitava Falls.—Sandstones and shales with fossil plants.

Waikawa.—Fossil plants at the localities marked on plan.

Tautuku.—On the coast, green sandstone with plants and *ammonites*.

Catlin River.—Fossils at places marked on plan.

Shaw's or Roaring Bay, and the Nuggets.—Fossils in limestone, and indurated sandstone.

Kahiku Gorge.—Fossil shells.

Popotuna Gorge.—Fossil shells and plants.

Waipahi Creek.—Fossil shells.

The localities where coal seams are worked or have been looked for are Mount Hamilton, irregular seams of good quality; Otapir Creek, irregular seams; also brown coal nearer Forest Hill. The neighbourhood of this coal to the Winton Railway Station makes it desirable that you should report on the best place where a supply could be obtained for the use of the locomotives. Morey Creek, a good seam of brown coal, much of it burnt out, however.

The Maitava River.—From the Falls up to McNab's there are several seams of brown coal exposed, also at Hill's Station and the Hokanui. Below the Falls, a thick bed of lignite is worked.