

REPORT ON THE GEOLOGY OF THE TROOPER RANGE.

UNDER instructions dated the 15th December, 1898, I left Wellington *en route* for Castle Point on Monday, the 19th December, arriving at my destination on the 21st. On the following day, the 22nd, I examined the section shown by the Castle Point reef, and from the 23rd December to the 4th January I was engaged in examining the sections shown on the right and left banks of the Ngakauau Creek, on the coast, and of the bed and upper part of the same creek, where it penetrates the Trooper Range; also, the whole of the coast-line as far south as the Whareama River, a distance of ten miles from Castle Point, together with a search up the Otahome and other creeks in the south, and at their sources in the Trooper Range. On the 5th and 6th January I was engaged in packing specimens, &c., and on the 7th I left by coach for Wellington.

REPORT.

Physical Features.

The country examined stretches from the Masterton-Castle Point Road on the north and as far south as the Whareama River, its boundary on the east being the Pacific Ocean, and on its west the range known as the Trooper. The Trooper Range is the dominant feature of the whole, and is a broken piece of high country trending the whole length of the district under survey in a north and south direction. It rises to heights of 800 ft. in places, and is flanked on its eastern side by lesser hills, causing the descent on this side to be much modified. The range is terminated to the north by the valley of Whakataki Creek, while to the south its termination overlooks the Whareama, a river of considerable size, having a tidal entrance. Between these two rivers, a distance of ten miles, there is but one creek or watercourse worthy of the name—viz., the Ngakauau—which penetrates the Trooper Range in a westerly direction by a deep gorge, piercing back into it along a moderately-flat bed, the rise to near its source being not more than 200 ft.

Other than the Ngakauau, which reaches the sea two miles and a half south of Castle Point, there are no permanent creeks, the Otahome and others being for the greater part of the year dry watercourses. The country for the most part is open, or covered with a vegetation of scrub, forest land being all but absent.

General Geological Sketch.

Geologically, the country is made up of a series of rocks belonging to the Upper Cretaceous system, consisting of the coal-rocks of the Lower division, and the glauconitic sandstones of the Middle division. The coal-rocks themselves, made up of conglomerates, shales, and sandstones, with coal, are overlaid directly by limestone of Miocene age, as seen in the Castle Rock and the adjoining reef. Alluvia in the district is represented by the river-gravels of the Whakataki Creek and of the Whareama River, together with the æolian deposits at Castle Bay and on the coast-line to the southward, and marshy land in the beds of the Ngakauau and Otahome Creeks.

Table of Formations.

1. Recent	...	...	Alluvial and æolian.
2. Upper Miocene	...	...	Castle Point limestone.
3. Cretaceous	...	{ (a.)	Glauconitic sandstones, sandstones, and shales.
		{ (b.)	Conglomerates, sandstones, and shales, with traces of coal.

3. *Cretaceous.*

(b.) *Lower Division.*—The rocks of this division are the most important in the district. In extent they occupy a stretch of country from Castle Rock in the north, to a point two miles below the Otahome Creek on the south, and, in breadth, the width of the district examined. Neglecting the recent deposits, the sea-coast bounds the division on the east, a line drawn (approximately) westward from Castle Rock on the north, the limits of the survey on the west, and the foot-hills of the Trooper Range on the south. The rocks of this division form a series consisting of shales, sandstones, and conglomerates, the sandstones of which include much carbonaceous matter.

On the coast, stretching from Castle Rock southward, to a point a mile and a half below the Ngakauau, is seen the best section of these rocks, the coast-line being cut down in precipitous faces. Of the three members of this division the most important is the sandstone in which occurs the coal. This generally is a coarse, gritty rock, well bedded, in places being laminated in very thin beds. Interstratified with it as thin streaks is the coal, which is coal rather than buried plant-remains. The coal is very generally distributed throughout, occurring at times as pockets, but more often giving a laminated structure to the rock.

Invariably associated with the coal-rock (the sandstone) are beds of shales and mudstones. These vary as regards their thickness, being in places as much 4 ft. and 5 ft. thick, while at times they are but 1 in. Although the coal-rocks are never present without the associated shales and mud-stones, yet at places these latter beds only appear. With the above coal-rocks are also associated conglomerate beds varying in thickness from a few inches to 2 ft., and also in the size of the component materials, the pebbles contained varying from 2 in. to pieces $\frac{1}{4}$ in. in diameter. Belonging to this division are sandstones unassociated with either shales, coal, or conglomerates, of a grey colour, well stratified.

To both the north and the south of the Ngakauau Creek, where these coal-rocks are well exposed, they have undergone contortion to a considerable extent. On the right bank of the stream on the coast the strike is 70° west of north with the dip almost horizontal and to the westward. In this case both the dip and the strike noted is purely local. Further on, the same beds are crumpled and contorted in all directions, the plications are small and the disturbances local, and, in consequence, they assume their ordinary course as rapidly as they veered from it. The normal strike of the beds is in a northerly direction with a dip of about 45° to 50° to the westward.