

would seem reasonable to infer that the lake owes its origin, firstly, to eruption, which was followed by a subsidence, and that, subsequently, some of the vents within it continued active as subaqueous volcanoes, the ejecta from which now form the comparatively level floor of the lake, having been worn away from the cones by denudation. I brought down some specimens of the rhyolitic lava from Taupo, and I am indebted to Professor Thomas for the classification of it.

LAWRENCE CUSSEN, District Surveyor.

NOTES ON THE CRATER LAKE OF RUAPEHU.

MR. ASSISTANT SURVEYOR DUNNAGE, to the CHIEF SURVEYOR of Wellington.

THE report of the ascent on the 8th May for the purpose of erecting a trig. station is as follows:—The snow was in a favourable condition for climbing, but it was necessary to cut each footstep for the last 1,000 feet. The height indicated by barometer, which was very low that day, was 10,200 feet. I think the true height will be found to be about 9,300 feet. Large quantities of steam were issuing from the little lake in the centre of the crater, nearly 1,000 feet below us, but was all condensed before reaching the top of the crater. The cold was very severe.

Writing on the 5th July, from Karioi, Mr. Dunnage states:—In my report for May last, which was unavoidably late in being forwarded, I have already mentioned that on May 8th, when on Ruapehu, I had an excellent view of the lake in the centre of the crater, from which a quantity of steam was issuing. I was on the top for one hour and ten minutes, during the whole of that time the steam rose steadily; there was no commotion of the water, or great variation in quantity of steam, which was all condensed before reaching the top of the crater.

A few days after this, I think on the 15th, Mr. Wilson was at Pipipi, and saw a column of steam rise straight into the air from Ruapehu, this lasted for some time. As the crater is deep, I think the water on this occasion must have been boiling fiercely. Ngaruahoe (Tongariro) was at the same time emitting an unusual quantity of steam. The steam from Ruapehu on this occasion was seen by a good many different people.

Early on the morning of the 10th June, the reports from the eruptions at Tarawera and Rotomahana were very plainly heard here. I was camped on a hill open towards the mountains and Rotorua district, from which I heard the reports like discharges from heavy artillery very distinctly, they came in quick succession for several hours. I felt no shake whatever. I went outside, but as it was very foggy I could see nothing, and there being snow falling I was not tempted to remain out long. Until news of the disaster arrived in Karioi, it was thought that the report had come from Ruapehu and Ngaruahoe. On the night of Monday, the 28th June, I heard a sharp report in the direction of the mountains, which was followed almost simultaneously by a rather severe shock of earthquake.

On Saturday, 3rd July, I heard several rumbles from the mountains, and once or twice felt a tremor of the ground. Heavy snow was falling, and it is not an unusual occurrence for the mountains to rumble on such occasions.

There is one other thing that might be worth mentioning. The Wangaehu River has always been charged with sulphur and other minerals, but in very variable quantities. The river now, for more than a month, has been perfectly free from all minerals. I tasted the water near the mountain on June 6th, it was perfectly clear and free from sulphur. It is usually quite undrinkable in this place.

Mr. McDonnell, manager of the station here, and several old station hands tell me it is quite unusual for the river to be without sulphur, so near the mountain. The Wangaehu rises on the eastern side of Ruapehu, and evidently comes from the crater through the side of the mountain, but I have never had an opportunity of examining its source minutely. I think the outbreak at Tarawera has acted as a vent to Ngaruahoe and Ruapehu, and had the eruption taken place at the latter mountain, in full force, I think from the size of the crater, it would have been most serious.

No Maoris seem to remember having seen or heard of any previous sign of activity at Ruapehu, and from the manner in which the rocks on the mountain sides have been cut and broken, from the action of severe cold in winter, which has been the work of many years; and also the bush on the slopes, tend to show that it has been a long period of time since any serious volcanic action took place from this mountain. Should an outbreak occur again, and lava be discharged, it would probably flow in an easterly and south-easterly direction; the crater is much more open on those sides.

WALTER H. DUNNAGE, Assistant Surveyor.

TOPOGRAPHICAL RECONNAISSANCE OF TAUTUKU FOREST.

MR. DISTRICT SURVEYOR JOHN STRAUCHON to the CHIEF SURVEYOR, Dunedin.

I have now the honour to forward topographical sketch of north-eastern portion of Tautuku Bush, extending along the coast from Tautuku Bay to Catlin's River, and back to top of main range at Bleak Hill and Mount Tautuku. A good pack-horse track has also been cut and surveyed between Isa's creek, Tautuku Beach; and the Big Mill at Catlin's River. The positions of the most prominent hills are pretty accurately fixed by cross bearings taken from tops of trees, on hills along our route, and the principal streams, by explorations up their respective valleys. The sketch is on a scale of one mile to an inch and gives a very good idea of the topography of the country. The portion of main track cut this year is sixteen miles in length, many side cuttings and numerous creek crossings have been made and a few culverts put on; also some soft places have been corduroyed with fern trees, to allow of horses crossing. Near Catlin's Lake we went down on an old tramway for nearly two miles; the wood-work was in many places very rotten and cost a good deal to repair and replace, but it now forms a good and level portion of our track. The Catlin's River is broad and deep and cannot be forded anywhere near terminus of track, which I have made immediately opposite the house of Mr. Duncan McKenzie, who is a boat-