

eruptions, now and then a fiery shine is said to be visible over the mountain. . . . The Ngauruhoe does not reach the limit of perpetual snow, yet the Natives assured me that, in winter-time, when the lower parts of the mountain are covered with snow, the latter would not stick to the Ngauruhoe, so that the whole cone seems to be heated from within.

"The Ngauruhoe, however, is not the only crater in the Tongariro system. Bidwill mentions that, from the top of Ngauruhoe, towards the north, he noticed, upon another part of the Tongariro, a circular lake. This remark most probably has reference to the truncated peak immediately north of the Ngauruhoe, which the Natives designate as Ketetahi, the crater of which acts periodically.

To the north-west of the Ketetahi there is a third cone, likewise truncated, and nearly 6,000 ft. high. Concerning the condition of its top, I am unable to give any positive information. I merely suppose that it also contains a deep crater. On its northern side, at a height of about 4,000 ft. above the level of the sea, a fissure is to be seen, from which, as from the Ngauruhoe crater, dense clouds of steam are continually streaming forth. This seems to be a great solfatar.

A fourth cone north of the Ketetahi, or north-east of the last-mentioned cone, shows on its north-western slope, at a height of about 3,500 ft. above the level of the sea, a crater apparently entirely extinct. From the east shore of Lake Taupo to the right of the Pihanga, the dark black hole can be plainly seen. Although this grand volcano, with its various craters, has, within the last centuries, as far as it is known, not had any eruption of lava, yet I would not venture to assert that such might not suddenly recur again.

"South of Tongariro rises the Ruapahu. The feet of the two mountains gently slope together, forming a plateau about ten miles wide and about 2,200 ft. above the level of the sea. Upon this plateau four lakes are said to lie, two of them about three miles long, the other two smaller. . . . [pp. 375-377.]

"The Ruapahu has the shape of a truncated cone, towering up into the regions of perpetual snow. No one has ever ascended or explored it. [This was prior to 1867.] Nevertheless, there can be no doubt as to its volcanic nature, but it seems to be perfectly extinct; there is no trace of a solfatar to be discerned in the distance, either at its sides or at the top; and it is totally unknown whether the broad summit forms a plateau, or whether it contains a crater. The mountain is but rarely free from clouds; and if once the weather happens to be clear, large snowfields are seen covering the summit, and running down along the fissures by which the slope of the mountain is channelled, as though they terminated in glaciers. The limit of perpetual snow in the latitude of Ruapehu ($39^{\circ} 20'$), is at a height of 7,800 ft., and to judge by the colossal extent of the snow-fields even in midsummer, the mountain appears to reach a height of 9,000 ft. to 10,000 ft. above the level of the sea. At any rate the Ruapahu is by far the highest mountain of the North Island. A portion of the mountain bears the name of Paratetaitonga. At the eastern declivity of the Ruapahu rises the southernmost source of the Waikato. It forms a waterfall, according to the statement of the natives; and fifty yards from the source of the Waikato, the source of the Wangaehu is said to lie, which flows south and empties into Cook Strait east of the mouth of the Wanganui River. Its water, the natives say, has a milky colour and a bitter astringent taste.

"The pumice-stone plateau, upon which the Tongariro and Ruapehu rear their colossal heads, assumes on the south-east side of the Ruapahu, where it forms the watershed between the Waikato and the Wangaehu, the character of a sandy desert. The natives call the plateau Rangipo, and the sandy desert Onetapu. The road from Lake Taupo to Wanganui leads over it, and the Natives have driven pegs into the ground in order to point out the direction of the road.

"From the southern foot of the Ruapahu, the country slopes gradually towards Cook Strait in the same manner as from the north end of Lake Taupo towards the Bay of Plenty. It consists on both sides principally of pumice-stone tuffs* and rhyolitic lavas, and it can be justly said that the foot of the two volcanic colossi reaches from sea to sea.

"Consequently the Taupo volcanoes arise upon a huge flat cone, which was formed by the first submarine eruptions, and rose only gradually by the upheaving of the land above the sea. In close connection with this rising is the terrace-formation in all the river-valleys of that cone, a phenomenon which is very characteristically marked on the shores of Lake Taupo. The first terrace is at Pukawa, about 100 ft. above the present level of the lake. It is covered with sand and boulder alluvium of the lake, and so characteristic that even the Natives could not help noticing it. They say that in former times, before the breaking-through of the Waikato to the north, the lake had stood at that height. The second terrace is 300 ft. to 400 ft. above the lake, and forms extensive plains round about the lake. Yet it is only the third stage that leads on to the pumice-stone table-land 700 ft. to 800 ft. above the lake. The formation of the terraces is most perfect in the Kuratao and Waikato upward from the lake, and along the eastern side of the lake. [pp. 378-380.]

"From the table-land, upon which, on the north shore of Lake Taupo, the picturesque Tauharu arises, there extends in a north-easterly direction, with a gentle slope towards the Bay of Plenty, the Kaingaroa Plain, an extensive plain, fifteen miles wide and channelled by numerous valleys. Vast quantities of pumice cover the almost treeless plain, the scanty soil of which produces only a meagre growth of grass and low shrubs. It appears as though in olden times a powerful stream had taken its course over the plain to the sea. On the east side the plain is bordered by the Te Waiti Range, striking in the direction of East Cape; on the west side by a volcanic table-land cut up and broken by faults and dislocations into a thousand hills and mountains, which separate the sterile pumice-stone plain from the wood-clad Patetere plateau. . . .

"The whole distance from Lake Taupo to Maungatautari the river is innavigable on account of its numerous rapids. The land on both sides consists of trachyte tuff, of pumice-stone, and of partly vitreous, partly crystalline rhyolitic lavas, the flow and extent of which is to be traced to

* It has been shown, and will further be, that the superficial pumice on the southern slope is confined mainly to the Rangipo plateau, the plain on the west side of Ruapehu and the river valleys.