

Occasionally the mountain is more active. In 1889 and 1895 clouds of volcanic dust were thrown from the summit of the mountain thousands of feet into the air. This activity is short-lived, for in 1890 the lake had its normal condition, and only the black covering of volcanic dust on the snow remained in evidence of the spasm of activity. Ice fills the upper parts of the larger valleys and forms small hanging glaciers.

The mountain-slopes are covered with loose scoria and into this the snow water sinks, and on reaching more solid rock on the lower flanks often issues as leaping springs. Sometimes the water dissolves iron or other material whilst soaking through the ground, and when it issues as a spring it deposits this as yellow ochre on the rocks and banks of its course. Springs like these are close to the Chateau, and others, with beautiful surroundings, are found at its northern base at Waihohonu.

Curious features are the conical hills at the junction of the Taupo and Chateau roads. These are relics of a phase of activity that has often been witnessed in Java, and is there termed a *lahar*. From time to time the crater becomes filled with water, and as activity increases it is forced out of the crater, and, sweeping down the league-long slopes of the mountain, becomes a huge avalanche of rocks, stones, and water. Near the base of the mountain the velocity of the flow decreases and some of the larger rock masses come to rest. Other material collects around them, while the main mass of the *lahar* moves on. The parts left behind are the conical hills. They are similar in all respects to the "thousand hills" of Java, while in New Zealand they may be counted in hundreds, reaching up the lower slopes of Egmont from Parihaka.

*Ngauruhoe*.—Ngauruhoe, with its stark symmetrical cone, is perhaps the most interesting of the volcanoes, for it often exhibits much more activity than the others. First ascended by Bidwill in 1839 and by Dyson in 1851, the slopes seem then to have had the same features as now, though the crater seems to have been wide and deep with steep sides. Hill, in 1891, found two craters on the western side. In 1890 the greater part of the main crater had a flat floor from which steam jets issued in large numbers, each from the summit of a small sulphur cone 2 ft. or 3 ft. high. On the north-west side there was a small cup-shaped crater steaming vigorously about 50 yards wide at the top. In 1891 explosion had taken place and a vertical-sided crater of 30 yards diameter had been formed on the south-west side, where a year before the ground had been level. Since that time conditions have remained much the same, but the dimensions of the inner south-west crater have increased a good deal.

Activity varies greatly. There were some explosions in 1839 at the time of Bidwill's ascent. In 1869, and a year or so later, it is said that black clouds of volcanic matter were ejected from the mountain. In 1905 continuous series of small explosions were throwing fine material 3,000 ft. above the mountain's crest. Standing on the rim of the crater at that time one found that explosions were not violent and there were no detonations—only a dull muttering roar. This condition lasted for some time, and was succeeded by greater activity. In 1911 white-hot incandescent rock could be seen in crevices at the bottom of the south-west crater. From time to time the steam that issued from them carried the fragments high into the air. Detonations of shattering violence occurred from time to time. In 1913 the white-hot lava could still be seen, and detonations were more frequent and violent.

In October, 1917, activity was a good deal greater, and red-hot boulders were thrown out in large numbers, and, rolling down the mountain-side, gave observers the impression that streams of lava were flowing down the cone. In December of that year the western mountain flanks were found to have numbers of recently ejected boulders throughout their length. When the crater was reached white-hot rock was again seen, but during the stay on the mountain there were no detonations.

Relative quiescence succeeded for some years, but in 1925 there was another phase of activity, and again numbers of red-hot boulders were ejected and careered down the mountain-flanks. It is evident that the activity at that time was almost sufficient for the emission of a lava-flow.

Since 1925 the activity of Ngauruhoe seems to have been less, though lately (June, 1934) newspaper reports once more indicate another relatively active phase.

*Mount Tongariro*.—Mount Tongariro, 6,428 ft., is a flat-topped mountain. Some maintain that its slopes once tapered up like those of Ngauruhoe and that after the ejection of large lava-flows the upper part of the cone subsided. Others believe that an immense explosion shattered the upper portion of a former cone. At any rate the mountain is now truncated and its present summit is mainly a plain in which several distinct craters may be seen. One of these has a beautiful blue lake within it. From another a lava-flow has issued which extends over a portion of the flat ground. On the south side close to Ngauruhoe there are two little craters with red-coloured steaming walls. One of them contains a small lake of green water, the other a blue lake. There is no record of any great activity of these little craters. On the northern flank of Tongariro there is the crater of Te Mari, which in 1892 was the most active point of the whole system. This, however, soon dwindled, and even a few months after its main outburst there were nothing but roaring steam-jets in the crater. Two years later the steam-jets were small, and now all sign of activity has gone.

One of the most interesting spots on Tongariro is Ketetahi, 1,500 ft. below the northern crest of the mountain. Here steam-jets and hot springs issue in bewildering numbers and a hot stream is formed which courses down the mountain-side. The waters are strongly sulphurous. One often sees statements that the springs at Ketetahi have become unusually active. It seems, however, in fact, that their activity varies but little. The springs are visible from many places on the shores of Lake Taupo and are often observed. When the hygrometric state of the air is high, large clouds are formed from the escaping steam: when the air is dry little steam can be seen. If allowance is made for such conditions, it is probable that the variation will be found to be small, if any.