

This region of volcanic activity extends from Ruapehu on the east side of the Wanganui watershed fifty miles from the shore of Cook Strait in Wanganui Bight, north to the shores of the Bay of Plenty and through this to White Island, a total distance north and south of 150 miles, and if the younger acidic rocks of Cape Colville Peninsula are to be considered as of this age the distance of these at Mercury Bay would be 170 miles. East and west fragmental ejecta, chiefly pumice, extend from the sources of the Waipa and Mokau Rivers over the southern part of the volcanic zone and the Kaimanawa Mountains to the eastern watershed and almost to the shores of Hawke's Bay. Pumiceous deposits abound in and cover the greater part of the Middle Waikato basin as far as the Taupiri Gorge and are spread over the extensive plains along which the Waihou (Thames), Waitoa, and Piako Rivers make their way to the Firth of Thames—the inner portion of the Hauraki Gulf. The pumice found within the Lower Waikato basin must be considered as drift pumice carried forward by the river.

The pumice-covered highlands between the sources of the Mokau and Wanganui to the south, and the rivers falling into the Waikato to the north, superficially appears as though it were ejecta showered widely over the land and so accumulated; but this is the case almost at all places where heavy deposits of pumice are found. Assuming for the present that the pumice of the higher plateaux unaffected by the present streams has been so accumulated, the greatest breadth over which are found volcanic rocks of young Pliocene age may be roughly estimated at about eighty miles, supposing the eastern limit to be within the Tarawera Valley four miles north-west of Tarawera Township.

Within the eastern half of the area covered by volcanic rocks, and running from Ruapehu north-north-east to the Bay of Plenty, is a belt of country designated by Hochstetter "the Taupo Zone," within which are situated the most prominent volcanic cones and the line of present thermal activity. The breadth of this is greatest towards the north, to the south it is comprehended in the base upon which Ruapehu itself stands. To the north the rocks are almost wholly of an acidic type; to the south, in Tongariro and Ruapehu, semi-basic rocks make their appearance, the rocks of which Ruapehu is built up being, according to Park, dolerite, trachy-dolerite, phonolites, porphyritic and vesicular trachytes, bosses of pitchstone, and masses of agglomerate.* No pumice seems to have originated from this southern part of the zone of activity.

Although there is considerable activity along the line, eruptions of lava seem to have ceased. The outbreak of Tarawera in 1886 was explosive and not accompanied by any fluid matter whatever. The crater of Ngauruhoe, though emitting vast volumes of steam and sulphurous gases, can hardly be said to be otherwise active. The same may be said of White Island at the opposite extremity of the line. Intermediate between these two points hot water, steam, and geyser displays are almost everywhere, and constitute the wonderland of the North Island of New Zealand.

THE ABUNDANCE OF PUMICE.

During a journey through the central part of the North Island, if proceeding from the south by way of the Rangitikei Valley, pumice first begins to attract attention on arriving at the southern part of the Murimotu Plains east of the Wangaehu River. Here pumice-sands or coarser pumice much decayed first appear in the road-cuttings; at first the pumice forms but a thin layer resting on volcanic breccias or the slates and sandstones of the Kaimanawa Range. As the route of travel is followed north to Tokaanu the amount of pumice increases, but yet is not in such quantity as excites astonishment till Tokaanu is left, and the eastern margin of Lake Taupo is followed to the Township of Taupo at the northern end of the lake. At Tokaanu there is no pumice on the low swampy levels near the settlement or over the delta of the Tongariro River. Passing the Tongariro River the swamps and low flats bordering the lake are covered with blocks of pumice, and pumice fine or coarse as sand and gravel forms the lower hills bordering the lake, or caps the trachyte or rhyolite of which these may be mainly composed.

On reaching the Tauranga River, near its inlet to the lake, the pumice-formation begins to be of importance, and beyond this point to the north-east and east the pumiceous sands and gravels form high table-lands between the different streams falling into the lake. These table-lands terminate in steep cliffs overlooking the lake, or the low flats over which the lake once extended, and the sections that are thus exposed and seen in the like precipices that bound the narrow valleys of the different rivers finding their way from the eastward to the lake show equally well the great depth of pumiceous deposit.

North, north-east, and north-west of Taupo, with the exception of the higher ranges, the whole country is covered with pumice. Generally speaking, this forms terraces along the banks of the rivers or higher flats and table-lands, from which material is supplied to lower levels and a greater distance from the source of the pumice.

To the east of the Waikato, in the Kaingaroa Plain, the pumice-deposit is of great depth, and for many miles is unbroken otherwise than by deep cañon-like gulches that run back some distance into the plain. North of Rotorua and Rotoiti Lakes, the pumice-formation is developed on a grand scale, and forms broken hilly country gradually descending to the shores of the Bay of Plenty. West of Rotorua, the Patetere plateau, in part, the extensive Waitoa Plains, and great part of the Middle Waikato basin show the presence of heavy deposits of pumice, and the volcanic plateau west and north-west of Lake Taupo is equally so characterised.

This excessive abounding of pumice is the astonishment of every traveller, and, by almost common consent, all agree that the whole of it has originated from Lake Taupo. Hochstetter, indeed, refers the pumice of the Middle Waikato basin to an older series of volcanic rocks whose vents lay along the coastward range west of the Waipa and Lower Waikato,† but this opinion is almost forgotten, and it may be doubted whether in the first instance the reference was correct.

* "Geological Reports," 1886-87, pp. 70-71.

† "New Zealand," by Hochstetter, p. 66.