such or similar rocks that extend from the east shore of Lake Taupo to the sources of the Hinemaia on the south, and to within four miles of Tarawera on the Napier-Taupo Road towards the north-east. Whether this isolated area formed a centre of eruption or constituted the southern limit of lava-floes from volcanic vents further to the north cannot, with the information at hand, be determined; but it is clear that volcanic material, as tuffs and lava-streams, originated or did reach into the watershed of the Rangitikei, and the same may be said of the upper branches of the Ngaruroro River.

2, *a. Deposits of Pumice on Elevated and Flat-topped Areas.*—The existence of pumice fragments forming a covering more or less deep over a large area of the Hawke's Bay District, though often noted, has never yet received a full and sufficient explanation. This pumice-covered area has its southern boundary approximately along the line of the Napier–Inland Patea Road, from Kuripapanga, on the Ngaruroro River, to the western borders of the Kaimanawa Mountains. The northern limit lies beyond the Napier–Taupo Road, and the eastern boundary may be regarded as a line drawn from Pohui to the Ngaruroro at Kuripapanga. Fine pumice may extend beyond these boundaries, but within them the deposit is very noticeable. To the west the pumice-deposits of Rangipopo are not regarded as originating from the same source, and therefore may be for the present disregarded.

The Rangitikei, Ngaruroro, and Mohaka, and their tributaries, bring down great quantities of float pumice and pumice sands. Such pumice forms deposits on the banks of the rivers, or on the flood areas of the costal plains, or, as in the case of the Mohaka, where the costal plain is absent, is carried out to sea. This is the pumice that most frequently comes under observation, and will have to be dealt with under Recent formations.

The pumice now under consideration is the source of that which forms secondary deposits along the river-channels, &c. I first noted this pumice on the Maungaharuru Range, east of the Mohaka, below the crossing of the Napier–Taupo Road, and had difficulty in referring this to the same causes as would account for the pumice along the bed and terrace plains of the Mohaka River. Fragments of pumice several inches in diameter are found with smaller material at heights approaching 4,000 ft. above the sea.

During 1886–87 I reported on the eastern counties of the North Island, parts of the Provincial Districts of Auckland and Hawke's Bay, and, under the heading "Aeolian Pumice Deposits," stated what was then known of such deposits, as follows:—

"Over northern Hawke's Bay this superficial deposit is evidently derived in part from stratified beds of pumice sands in the marine Pliocene strata of the district, but by far the greater amount seems to have been spread over the district in a manner of which the late outbursts at Tarawera and Rotomahana may be said to furnish explanation and proof.

"Apart from the drift along the banks of the larger streams, this more general covering of pumice sand was first noted by Mr. Cox, late Assistant Geologist, in a report on the country between Poverty Bay and Napier, describing them thus: 'Post-Tertiary: Under this head are . . . . certain deposits of pumice sand and tufaceous beds, which attain their greatest development inland, occurring only to a small extent along the coast ranges' (Geological Reports, 1874–76, p. 97). 'Although these pumice sands overlie the marls [of Cretaceo-Tertiary age] they by no means obscure them, for the formation assumes the form of the plateaux which have been deeply cut into by the rivers which take their course from the back country to the sea' (*l.c.*, p. 98). Where they rest on Tertiary beds he describes the pumic-sands thus: 'Soon after the Taupo Road leaves the bed of the Esk River beds of tuff and pumice sand very similar to those occurring on the West Coast in the neighbourhood of Raglan appear, and cover a considerable area of country, the soil of which appears to be very barren' (*ib.*).

"Here Mr. Cox describes beds forming part of the fossiliferous Petane series of Pliocene date, corresponding with the beds 3, *b*, of the present report. Mr. Cox wrongly associates them with the drifting superficial pumice 2, *a*, and 1, *b*. of this report; but in recognising the presence of beds of tuff and pumice-sand in connection with the Younger Pliocene fossiliferous strata of Petane he noted an important fact, which some later observers have disregarded or entirely overlooked. Excluding 2, *a*, and 1, *b*, as above, it will be seen from the map accompanying Mr. Cox's report that the pumice sands described by him are confined to the area over which, according to Mr. Cox, Lower Tertiary and Cretaceo-Tertiary rocks are found—*i.e.*, Pliocene strata of this report.

"Touching this same subject Professor Hutton, writing in 1885, remarks, 'I could detect no pumice in any of these beds [belonging to the Petane series], but it occurs in abundance at Titiokura Saddle . . . and at other places in beds lying unconformably on the Petane series, as has already been pointed out by Mr. Cox.' (Trans. N.Z. Inst., Vol. xviii., p. 342.)

"In the geological reports for the year 1885, at page 191, I ventured remarks respecting the manner in which this deposit has accumulated over northern Hawke's Bay, and I considered it as a result of a wind-drift from the volcanic area to the west; but by far the most exhaustive and interesting account of the pumice-drifts covering this part of the North Island is given by Mr. Percy Smith, Assistant Surveyor-General, in a paper 'On the Geology of the Northern Portions of Hawke's Bay.'" (Trans. N.Z. Inst., Vol. ix., p. 565.)

At page 572 of the report referred to he says, "I have mentioned above the occurrence of pumice in this district. It is found nearly everywhere—on the river-terraces, the hillsides, and on the top of the highest mountains, covering the surface with a deposit of sand more or less deep, and in larger or smaller particles. During the course of the last five years it has been my duty to visit the tops of most of the higher mountains lying between Napier and Tongariro, and thence northward to the country under consideration, and in every case a deposit of pumice sand has been found, sometimes plainly showing, at others covered by vegetation. On Panikiri and neighbouring ranges around Waikaremoana it is found of a considerable thickness, whilst the lower lands along the lake are covered by it, sometimes to a depth of 3 ft. On the eastern side of the Mungaharuru