

the character of such deposits in the valley of Pohangina and the neighbourhood of the Manawatu Gorge, in the Hawke's Bay district, and along the east coast to East Cape. And the bulk of such deposits is fine, although floating pumice of considerable size found its way into the eastern sea. Near the centres of eruption, pumice, both coarse and fine, might be expected, and such actually we find to be the case. Vast deposits of finely-comminuted pumice are found along the eastern shore of Lake Taupo, but much coarser pumice occurs here than anywhere south of Ruapehu, and the same has to be said of the area of the Kaingaroa Plain and the slope generally from Lake Taupo district to the shores of the Bay of Plenty.

Granting a depression that would thus facilitate the distribution of pumice to the south through the Manawatu Gorge and along the East Coast, as already described, the district to the west and north of the northern part of the Taupo zone must also have shared in the depression of the land, and been fitted to receive pumiceous deposits in like manner to the southern and eastern districts, and accordingly we find the Middle Waikato basin and the Waitoa Plains to the shore of the Firth of Thames covered with pumice.

There can be no doubt that the pumice over these districts belongs to the same period, even if it did not emanate from the same vents as of that which was carried to the south. As the earlier eruptive vents become inactive or exhausted, fresh ones appeared, and these latter generally to the south of the former. And now we must suppose that the land began to rise, and there was no longer water-connection between the Bay of Plenty and Cook Strait. Denudation would proceed rapidly where it affected such loose and easily-moved material as unconsolidated pumice-sands. The highest lands that now are within the region affected would probably be the first to appear, would be the most rapidly acted upon, and necessarily, for the longest period. Thus, as might be expected, the area constituting the water-parting between the rivers flowing south to Cook Strait and north to the Bay of Plenty would, or might, become completely denuded of its pumice; and as to the south lay, not hard Palæozoic rocks, but comparatively loose Tertiary sediments, these also being strongly denuded, the escarpment or slope of younger Pliocene rocks containing pumice-sands would recede rapidly to the south and leave a broad area over which pumice was only to be found in the river valleys, as is the case at the present day.

While this was going on on the southern slope of the great dome, the northern slope towards the Bay of Plenty was rising also. But besides being the much longer slope, volcanic cones situated on it were still yielding pumice, and the lower marine deposits as they emerged into dry land received additions as terrestrial deposits.

The continued upheaval of the land to the south of Lake Taupo did not result in the production of a flat dome, as might be inferred from the section drawn from Cook Strait to the Bay of Plenty. The section at right angles indicates rather the elevation of a broad side or plateau proceeding west from the southern and middle parts of the Kaimanawa Range to the present coastline between the mouth of the Mokau River and Kawhia Harbour. (See section west to east from near mouth of Mokau River to Hawke's Bay, and section from Albatross Point across Tongariro to Cape Turnagain, neither of which convey the idea of a dome-shaped elevation on the higher part of which the great southern volcanoes have been built up.)

APPEARANCE OF TERRESTRIAL VOLCANOES.

On the denudation from this of the pumiceous products of the earlier volcanoes, and while these were too distant, or perhaps in a quiescent state, the more basic volcanoes of the south part began to be built up. It were perhaps vain to speculate as to which of these are the earliest, but it might be not unreasonable to assume that Ruapehu was the first. Its greater height and mass and apparent extinct state would seem to favour this assumption, as would the present activities of the volcanic cones situated farther to the north. Be that as it may, they do not appear to have been erupted through or to rest on a pumice cone of prior production, or the result of the earlier eruptions from their southern vents.

The purely acidic eruptions of the district north and east of Lake Taupo were continued or began afresh, and spread vast quantities of pumice over the high lands to the south of the Middle Waikato and west of Lake Taupo, the southern edge of which being eaten into by the Mokau and northern tributaries of the Wanganui, the valleys of these rivers received large deposits of drift pumice, which terrace the sides of the valleys at the present day, and are gradually being carried forward to the sea. None of this pumice, however, can be referred to the Tongariro or Ruapehu group of volcanoes; nor can that which is found along the high valley between the volcanoes to the west and the southern part of the Kaimanawa Ranges, or on the Kaimanawa Mountains themselves.

There seems to have been a tendency of the pumice-producing volcanoes to appear progressively in a south-east direction, and finally to make a tremendous display to the eastward of Lake Taupo, and it was here, and over the area of all but the western part of Lake Taupo, that the last great eruptions of pumice took place. From volcanoes so situated sub-aërial deposits of pumice were accumulated over the lands already emerged from the sea—*i.e.*, those to the west of the lake and south and south-east as far as superficial pumice now extends. The higher lands to the north-west and west seem also to have been elevated prior to the eastern part occupied by the Kaingaroa Plain, and the continuation of that south to where the table-lands terminate along the Tauranga River.

This eastern side of the northern slope from Taupo to the Bay of Plenty being the latest to emerge from the sea explains the appearance noted by Hochstetter—that the Kaingaroa Plain presented an appearance of having been washed, and, presumably, its surface arranged, by heavy currents of water. Undoubtedly such appearance is due to the sea. The western margin of the plain has been much eaten into by the tributaries of the larger streams flowing towards and falling into the Waikato, and probably a considerable part of the plain has thus been destroyed. In this destruction of the west side of the plain the streams were aided by numerous hot springs and