

fingers like dirty flour. Looking eastward from Pareheru the country presents the appearance of a series of sandhills such as is frequently seen on the coast—indeed in travelling over it it is difficult to believe that one is not on the sea-shore, the rounded shapes of the hills adding much to the delusion. Everywhere within 2ft. of the surface the sand and ashes are warm, and 4ft. down quite hot. These ashes seem to have been ejected in a dry state. Nearer Rotomahana large quantities of water have been thrown out, some of which remains in pools and ponds on the surface; and, though there is mud occasionally, no great quantity exists in this locality. It is not until the crater is left some two or three miles in a north-westerly direction toward the Wairoa Village that the great deposit of mud is found. It extends thence north-west and north, covering the whole country up to the edge of Rotorua and Rotoiti, being apparently deepest in the vicinity of Wairoa, Okareka, Okataina, and Tarawera. Its depth varies from 4in. at Te Ngae to probably an average of 4ft. at the Wairoa, though in many places it is much deeper, having been drifted by the violent wind which accompanied the outburst against any obstruction and into the hollows, these forming drift. Seven days after the eruption this mud was quite wet, with no sign of becoming at all dryer, and was extraordinarily cold to the feeling, quite as much so as snow. It is not in the least plastic. Further from the centre of eruption, the deposit appears to consist more of fine wet sand of a dark grey colour, mixed with mud: whilst at Te Teko and Galatea it is said to be formed of small stones (scoriæ is the term used, but, as far as can yet be learned, the stones are not fused). The ash appears to me to be the last ejected. Messrs. Harrow and Edwards, who accompanied the boat expedition across Lake Tarawera to search for the Ariki Village, describes the deposit near that place, as seen in a torrent-bed, to be as follows: On the bottom, large stones; next, 3ft. of mud and ashes; then 1ft. of small stones (or scoriæ), still hot; then 15ft. or 16ft. of ashes, covered by about 4ft. of mud.

The Forest.—The forest around the seat of eruption presents the most deplorable and desolate aspect. Wherever the mud has fallen it has completely stripped off the leaves, and in the deeper parts the weight of mud has broken off branches, leaving jagged stumps and stems, thickly bespattered with mud. On the north side of Tarawera the forest is on fire in several places; but, on account of the mud, this cannot extend far. The violent wind which accompanied the outburst, especially near the Wairoa, has prostrated considerable areas of forest, leaving a tangled mass of mud-covered logs. The beautiful forest on the road from Rotorua to Wairoa, near Tikitapu Lake, is a complete ruin, and, together with the village of Wairoa, presents a scene of utter desolation beyond all description. The beautiful clear waters of the lakes are now turbid with mud, and must continue so for a long time to come, as the first heavy rains will bring down vast quantities of fresh mud to add to them. Even Rotorua is discoloured over its whole area.

Wairoa Village.—At the Wairoa Village the stream of that name, which forms the outlet of Rotokakahi, is obliterated, its bed being filled with mud. The falls, so much admired by all visitors, have ceased to exist; whilst the village itself is buried in deep mud, the ruins of the houses appearing as heaps projecting above the general surface. Some three or four houses, however, are still partially standing, and serve by their appearances to make the general desolation more marked. Tarawera Lake appears to be about 3ft. to 4ft. higher than its ordinary level, Rotokakahi about the same level as usual; Rotorua is higher than it has been for some time, and is slowly rising.

Earthquake Cracks.—The heavy earthquake at 2 a.m. on the morning of the 10th June, and the constant and frequent shakes and tremors since, have caused cracks in several places. In the Waikorua Basin, on the Rotorua-Galatea Road—a place where several cracks, one of about half a mile long and twenty yards wide, have been known from the earliest times—several new cracks have appeared, but of no great extent. We counted five across the path, but only one was as much as a foot in width. They invariably take the line of the older cracks, running north-east and south-west. Mr. Morgan describes the cracks on the south side of Kakaramaea to be very numerous, and in one place a spur from that mountain is cracked and broken-up to an extent to make crossing it very difficult. The north end of Maungaongaonga is also much cracked.

Looking over the country south of Kakaramaea, where a very large number of hot springs exist, it appeared as if some of the springs were more active than usual, the columns of steam rising were of greater height and volume than I remember to have seen before.

Rotorua.—In the immediate neighbourhood of Rotorua there are signs of increased activity in the springs. On the night of the 10th June several small hot springs burst forth along the north-east foot of the Pukeroa Hill, notably one about fifty yards from the Government Agent's house, that is 10ft. in diameter, and is constantly boiling. Northwards from this steam escapes from the ground in numbers of places, sometimes accompanied by water, round as far as the Maori pa, where several small hot springs have appeared; indeed, one has broken out in the Tamate Kapua meeting-house. The locality of these new springs is in that part which is covered with blocks of sinter formed by deposits from springs long since quiescent, and, as far as I know, none have occurred in places which were not formerly active. It was noticed that, although the earthquakes at Rotorua are spoken of as very severe, no chimneys have fallen or been cracked, nor do articles such as bottles on shelves appear to have been thrown down. When we take into consideration the position of the houses where most of the people live at Rotorua, surrounded as they are on all sides by boiling springs and steam vents, it is not surprising that each earthquake as it occurs causes considerable alarm.

The Surveyor-General, Wellington.

S. P. SMITH,
Assistant Surveyor-General.