

When first these volcanoes, in fierce wild activity, poured forth from numerous vents a constant flow of lurid molten matter over the whole of the northern parts of New Zealand, in prehistoric days, there can be no doubt that all of the timber, scrub, &c., perished under the fiery showers rained upon them far and wide. Then, later on, as the Titanic forces expended themselves and the volcanic fires slackened and finally ceased to belch forth the destroying agent, during the course of subsequent ages, tree-growth crept gradually back nearer and nearer to the mountains. By this means the extent of barren pumice lands has been gradually reduced, until in the present day the plains of Tongariro and Lake Taupo are comparatively limited in area. Such area has, of course, been varied from time to time as the eruptions of later years emitted matter in greater or less volume, force, and extent, so as to bring more or less of the surrounding forests under their devastating influence.

The plains extend from the Waimarino country west and east of the range, including the three sister volcanoes referred to: south to the forests of Waimarino and Taumaranui on the Wanganui (which takes its rise under Tongariro), north to Lake Taupo, and north-west to the Waikato River. They are dotted in places with small timber bushes or clumps—little oases attractive to the eye, and sources of more practical pleasure to the lonely shepherd and his flock. There is here, therefore, a large area, comprising hundreds of thousands of acres of Crown or Native lands, unproductive save in supplying scanty feed for the cattle and sheep of the pastoralist, and the thousands of wild horses that roam at will round the base of the volcanic range, and on the undulating country about Lake Taupo.

This pumice country is totally unfitted for agriculture, owing to the newness of the surface-deposits spread over it by Ngauruhoe, the most recently active of the fiery triumvirate above named. Age is required to develop into soil the raw pumice of these lands, and Nature effects the change by clothing them with rough, coarse grass and scrub, and mixing a detritus of decomposing pumice and volcanic sand.

Where a volcano emits mud in large proportions with the other materials of the *débris*, soil is speedily produced, and vegetation soon clothes the hillocks, ravines, gullies, and watercourses. Eruptive matter of this description was thrown out in the early throes of volcanic action over the papa cliffs of the Wanganui, Raetihi, Taumaranui, and Pipiriki. Hence these are now dotted with forests of fine timber.

I am not a geologist, therefore do not attempt a scientific argument on the causes of the interesting divergence of component parts in volcanic matter from different craters. I have, however, reasoned out the explanation I have given from close observation of the country dealt with, during a four days' trip round and about these mountains. It is singular too, that the papa or volcanic-mud country is situated at distances of twenty to fifty miles or more from the sources of volcanic action. The question naturally arises in most cases, what is the exact source of this mud? So far as the country round Auckland is concerned, the answer must be Rangitoto and his satellites; but this answer will not account for similar deposits on the Upper Wanganui. Even Mount Egmont, the Fusiyama of New Zealand, can scarcely have vented such enormous masses of volcanic mud distributed over the country round Pipiriki, nor does the configuration of Ruapehu, Ngauruhoe, and Tongariro, suggest the idea of these having been the sources from which came the stupendous deposits of papa in the upper and lower Wanganui districts. Possibly, however, observation of the effects resulting from the eruption of Tarawera, ten years ago, may help to elucidate the problem. In this instance the mud which now covers Wairoa, and miles of the country round this illfated township, undoubtedly came from Lake Rotomahana. We may look then to bodies of water as covering the sources of the papa deposits before mentioned.

Following this line of argument Lake Taupo is invested with fresh interest, and it is tolerably clear that this lake fills the huge crater, sixty-three miles long by twenty-five broad, of an extinct volcano of great activity, and the origin of stupendous volcanic eruptions in prehistoric times. Probably from the bottom of this lake came the mud which forms so curious a feature of the timber-lined banks of the Wanganui, and the dense bush around Raetihi and Taumaranui. The plains are simply deposits of pumice in all shapes and sizes mixed with volcanic sand, either thrown up with it, or by subsequent eruptions, distinct layers being formed, from which the force and volume of each eruption can be accurately gauged. The surface of pumice-lands is therefore such as the agriculturist shrinks from, and vast areas of this unpromising country (mostly Native lands), represent a difficult problem to the Government. The question arises, how can this problem be solved?

A great deal of this country is in the hands of squatters, Native and European; but though sheep manage to eke out a bare subsistence, and hordes of wild horses roam over its inhospitable surface, the grass is coarse and scanty, the situation bleak and wet.

Will such country grow timber trees? To this question, I answer, without hesitation, Yes. I have no doubt whatever that trees, both indigenous and exotic, would thrive well on these pumice plains. The pines, spruce, firs, and gums at Tokaanu; the Terraces Hotel, Taupo; at Wairakei, Rotorua, and other places, show unmistakably that timber growing in these localities can be made most profitable, provided that means of access and transit are made available. And here Lake Taupo suggests a starting-point. Timber grown on the undulating flats and on the hills for miles back from the lake could easily be conveyed to its shores, floated to Taupo, and then sent down the Waikato.

I do not regard the rapids culminating in the Huka Falls, or other obstacles in the river, as insuperable difficulties. In such places as floating logs could not be shot over the falls they could be trucked to points lower down, and then sent on their journey. It is true my trip was necessarily so hurried that I was unable to investigate thoroughly the condition of the river, but judging by the numerous parts of this fine stream which I saw, and the statements of Natives and others that the river falls gradually, I have formed the opinion expressed above. If this opinion is borne out by careful investigation, the Government have in the Taupo and Waikato districts a great area for