# SOME NOTES ON PAST FORESTS IN THE TOKOROA DISTRICT

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*Summary*

*The charred materials to be found in Taupo pumice are mainly podocarps, but* Knightia excelsa, Wintera colorata, *and* Olea lanceolata *have been identified. A charred log with soil of pre-Taupo origin attached to roots has been found. The author considers this to have been charred while still standing, and that mass movement of the pumice uprooted it and transported it to its present position. Three egg cup podsols in Taupo pumice are considered to be evidence that a forest has grown on the Taupo pumice which in recent years has only carried scattered tussock and stunted manuka. From this it is assumed that soil and climate were suitable to forest growth and that other causes must be found for the presence of the tussock and stunted manuka associations.*

The soil in the Tokoroa district is derived from the Taupo pumice shower which overlies the earlier, well weathered Tirau ash shower. The Taupo pumice is, on an average, two feet thick on rolling country to over ten feet thick in valleys. It is relatively unweathered and is considered to have been deposited 1700 ± 150 years ago (Ferguson and Rafter, 1953).

Until recently it was not believed that there had been forest growing on the Taupo pumice soils even though there was no ecological reason to support this view. It was generally assumed that the tussock, heath, and fern associations were primitive and controlled by the undeveloped nature of the soil (Druce 1952, Van't Woudt 1953, Poole 1953), and a theory of slow invasion by arboreal species was favoured.

The author, in a recent paper (Henry 1954), considered that these associations were secondary induced associations and that the area had supported forest since the Taupo eruption. The purpose of this paper is to support this view with evidence to show that, at the time of the Taupo eruptions 1700 years ago, the climate was suitable for the growth of forest and that since that time there has been forest growing on the Taupo pumice.

There are many records of charred logs being found in Taupo pumice (Grange 1937). The large logs are mainly podocarps, but in addition, *Knightia excelsa, Wintera colorata* and *Olea lanceolata* have been identified. Recently a large charred podocarp log was found in the Taupo pumice, with the roots partly intact, and these were surrounded by a section of soil of pre-Taupo origin. The log was lying in a horizontal position and was completely surrounded by fine

grained Taupo pumice. It was charred to a point about eight feet above the apparent original ground level, and above this point it was rotted but not charred, indicating that charring probably took place while the tree was still standing, after which mass movement of the pumice uprooted the tree and the soil embraced by the roots, and carried the whole to its present position five feet above the level of the Tirau Ash.

Adjacent to this log are a large number of other charred logs lying in much the same plane and all pointing in much the same direction. At first sight it appeared that these may have been blasted over on the site on which they grew, but here again the depth of Taupo pumice lying beneath can only be explained by some form of mass pumice flow.

In many places the buried surface of the Tirau Ash is a series of sharp undulations suggestive of a land surface from which a forest has been uprooted. This unevenness could not have existed for even a short period before the Taupo pumice fell, as erosion would have very rapidly eased these sharp undulations. It is therefore reasonable to assume that it was caused at the time of the Taupo eruptions. In places, sections of Tirau Ash, one to two feet in diameter, are to be seen surrounded by Taupo pumice and up to two feet above the general surface level of the Tirau Ash. The uprooting of trees with soil on their roots during the eruptive period seems to be the most likely explanation of the uneven surface, and to provide the mechanism by which sections of Tirau Ash could be lifted above the lower portions of the Taupo pumice. There is therefore strong evidence that a forest was growing on the Tirau Ash land surface at the time of the commencement of the Taupo eruptions.

Recent investigations in areas of Taupo pumice have located one well developed egg cup podsol and two partly obliterated podsols in an area that until recently carried only scattered tussock and stunted manuka. This is considered to be definite evidence that this area has carried forest since the time of the Taupo eruptions. It is firmly believed that detailed investigations in other areas will locate further evidence to support the view that the whole of the Taupo pumice has supported forest at some time since the Taupo eruptions.

From this, it can be assumed that the climate 1700 years ago was suitable for the growth of forest and that since that date, a forest climate has existed, as evidenced by the podsols found and by the presence of small remnants of forest scattered over the area. We know, from the growth of exotic pine forests, that the climate is still suitable for forest growth.

Ecologists can therefore eliminate both climate and soil from their reckoning when trying to understand why the tussock, heath, and fern associations formed the main vegetation of this district, as both these factors are favourable for the growth of forests.

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