

APPENDIX B

ANNOTATED BIBLIOGRAPHY OF CENTRAL NORTH  
ISLAND VOLCANIC ASH STRATIGRAPHY

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Prior to 1929 many observations had been published giving brief accounts of the volcanic ash deposits in various parts of the North Island but no detailed investigations were undertaken. With the incidence of Bush Sickness in the Central North Island mapping of the "ash soils" was undertaken as part of the investigations into the cause of this disease. The work done at this time was the beginning of our present understanding of ash stratigraphy. In this bibliography only papers relevant to the Central North Island ash-showers have been mentioned.

Grange, L. I., 1929: A Classification of Soils of Rotorua County. *N.Z. J. Sci. Tech.* 11:219-28.

The first subdivision of Holocene ash in which the following showers were named: Tarawera, Taupo, Kaharoa, Rotokawau, Mamaku, and Rotorua.

Taylor, N. H., 1930: The Relation of Geology to Sheep Sickness in Mairoa District. *N.Z. J. Sci. Tech.* 12:1-10.

The volcanic ashes of the Mairoa district are subdivided into units and differences in their mineral content noted but no names ascribed.

Grange, L. I., 1931: Volcanic-ash Showers. *N.Z. J. Sci. Tech.* 12:228-40.

This is the first major paper on the volcanic ash showers of the Central North Island. The following ash showers were described: Tarawera shower; Andesite ash from Ngauruhoe; Taupo pumice and older showers from Taupo; showers older than Tarawera shower from vents in the Rotorua district, (a) Kaharoa shower, (b) Rotokawau shower, (c) Mamaku shower, and (d) Rotorua shower; Tongariro shower; Mairoa shower; and underlying showers. A small generalised map showing the distribution of the Tarawera, Ngauruhoe, Taupo, Rotorua, Tongariro and Mairoa showers was given.

Grange, L. I. and Taylor, N. H., 1931: Reconnaissance Soil Survey of the Central Part of the North Island. *5th Annu. Rep. N.Z. Dep. Sci. Indust. Res.* 1930-31.

This is a brief account of the various soil forming ash showers, in which the Hamilton shower was named.

Grange, L. I. and Taylor, N. H., 1932: Bush Sickness. *N.Z. Dep. Sci. Indust. Res. Bull.* 32.

Brief description of soil-forming volcanic ash showers, in which the Tirau ash was named. Detailed mechanical and chemical analyses were given of the ashes that gave rise to "Bush sick" soils. There is a map showing the distribution of the Tarawera, Ngauruhoe, Kaharoa, Taupo, Egmont, Tongariro, Tirau, and Mairoa ash showers.

Taylor, N. H., 1933: Soil Processes in Volcanic Ash-beds. Pt. 1. *N.Z. J. Sci. Tech.* 14:193-202.

An elaboration of Taylor 1930, with a more detailed description of the volcanic ash beds in the King Country together with an ash column. In this paper the beds are numbered 1 to 5 with "intermediate beds" between beds 2 and 3.

Grange, L. I., 1937: The Geology of the Rotorua-Taupo Subdivision. *N.Z. Geol. Surv. Bull.* n.s. 37.

Only a brief account of the volcanic ash showers was given, but there is a large scale map showing the distribution of the showers within the subdivision.

Grange, L. I., 1938: Pumice Soils of the Gisborne District. *12th Annu. Rep. N.Z. Dep. Sci. Indust. Res.* p. 58

First note on the ash showers that cover the Gisborne district, in which the Gisborne ash is named (one of the older Taupo ashes).

Taylor, N. H., 1953: The Ecological Significance of the Central North Island Ash Showers—The Soil Pattern. *Rep. 2nd. Annu. Meeting N.Z. Ecol. Soc.* pp. 11-12.

In this brief account the volcanic ashes of the North Island are divided into six periods of accumulation. The following new names appear: Waihi ash, Whangamata ash, Gisborne (old Taupo) ashes, Maihihi ash and Whakatane shower. <sup>14</sup>C ages are given for the Gisborne and Taupo ashes. There is also a map showing the distribution of the various ashes.

N.Z. Dep. Sci. Indust. Res., 1954: *General Survey of the Soils of the North Island, New Zealand. Soil Bureau Bull.* n.s. 5.

There is the same map of the Soil Forming Ashes of the North Island as in Taylor (1953), which shows the distribution of the Ngauruhoe, Tarawera, Rotomahana, Burrell, Rangitoto, Kaharoa, Taupo, Whakatane, Gisborne, Maihihi, Whangamata, Tongariro, Waihi, Tirau, Stratford, Egmont, Mairoa, and Hamilton ashes. These ashes are discussed in terms of the soils which they give rise to.

Baumgart, I. L., 1954: Some Ash Showers of the Central North Island. *N.Z. J. Sci. Tech.* 35:456-67.

The recent ashes in the Taupo district as exposed in the Terraces Hotel Quarry are described, 26 members being recognised. Four of these are named: Taupo lapilli member, Rotongaio ash member, Hatepe, Lapilli member, and Waimihia member. These members are discussed in detail and isopach maps are used to show their distribution and source of eruption. <sup>14</sup>C age determinations are used to establish a time scale for the ash sequence.

Baumgart, I. L. and Healy, J., 1956: Recent Volcanicity at Taupo, New Zealand. *Proc. 8th. Pacif. Sci. Congr.* 2:113-25.

The Taupo ashes are further described and the bed lying above the Taupo lapilli member is named the Taupo rhyolite block member. The origin of very thick coarse pumice breccias between some of the ash members in some localities is ascribed to Nuées ardentes.

Gibbs, H. S., 1959: Soils of the Gisborne East Coast District and their Problems for Pastoral Use. *Proc. 1st Conf. N.Z. Grasslands Assoc.*

In this paper there is a brief note on the soil forming ashes and a small scale map showing their distribution in the Gisborne-Wairoa District.

Vucetich, C. G. and Pullar, W. A., 1963: Ash Beds and Soils in the Rotorua District. *Proc. N.Z. Ecol. Soc.* 10.

The effects of the great accumulation of volcanic ash in the centre of the North Island on vegetation are described. A brief account of the ash stratigraphy is given in which a number of new names appear, including a provisional subdivision of the Early Quaternary ashes. The list of ash beds is as follows: **Named beds**; Tarawera scoria (and Rotomahana mud), Kaharoa ash, Taupo pumice, Taupo subgroup—members 9-13, Waimihia ash, Rotokawau ash, Whakatanane ash, Mamaku ash, Rotoma ash, Taupo subgroup—members 16-18, Waiohau ash, Rotorua ash, Rerewhakaaitu ash. **Unnamed beds**; X beds (3 in number—ash and lapilli), "Pinkish-brown beds" (multiple), "Mauve beds" (3 in number), "Yellow-block bed", "White-block bed," "Grey-banded bed" and "Red Beds" (may equal Hamilton beds).

Ewart, A., 1963: Petrology and Petrogenesis of the Quaternary Pumice Ash in the Taupo Area, New Zealand. *J. Petro.* 4 (3); 392-431.

Results of sampling Taupo subgroup members 3 to 26 as described by J. Healy at Taupo. Of interest is the mineralogy of Taupo Pumice (members 3 to 8) the distribution of which is well known from the work of Grange, Healy, Baumgart, and Vucetich and Pullar.

Healy, J., Vucetich, C. G., and Pullar, W. A., 1964: Stratigraphy and Chronology of Late Quaternary Volcanic Ash in Taupo, Rotorua, and Gisborne Districts. *N.Z. Geol. Surv. Bull.* n.s. 73.

This bulletin is written in 2 parts.

**Part 1.** Dating of the Younger Volcanic Eruptions of the Taupo Region. J. Healy.

The beds of the Taupo Ash Sequence are redescribed in more detail and named the Taupo Subgroup, which is divided into the Taupo pumice and Waimihia formations. The members in these and intervening formations are correlated in 19 standard columns and the stratigraphy of the Taupo pumice at various localities is described. A complete list of <sup>14</sup>C specimens associated with the volcanic ashes of the Taupo region is given with their ages. This method of dating is discussed.

**Part 2.** Stratigraphy of Holocene Ash in the Rotorua and Gisborne Districts. C. G. Vucetich and W. A. Pullar.

In this section the stratigraphy of the uppermost volcanic ash deposits between Rotorua and Gisborne is outlined and correlation within this area and with the ashes of the Taupo District is established by the means of standard columns. The products of the eruptions from the Rotorua District constitute the Rotorua Subgroup. Within this Subgroup 3 new formations; Rotoma ash, Waiohau ash and Rerewhakaaitu ash are defined and other ashes are redefined. A useful stratigraphic column (Table 2, pp. 45) summarises most of the information and clearly exhibits the relationships of the ashes of the two Subgroups.

The name Arawa Group is proposed, to include both the Taupo and Rotorua Subgroups and other central North Island volcanic ash of comparable age. Isopach maps are given for the upper Taupo Subgroup and the Rotorua Subgroup showing their distribution and sources of eruption.

Healy, J., 1964: Volcanic Mechanisms in the Taupo Volcanic Zone, New Zealand. *N.Z. J. Geol. Geophys.* 7:6-23.

Figure 2 of this paper shows the location of major volcanic centres in the Taupo volcanic zone.

Ewart, A.; Healy, J., 1965: Volcanic Geology. In "New Zealand Volcanology—Central Volcanic Region". *N.Z.D.S.I.R. Inf. Ser.* 50:10-26.

An up to date account of current and little known work compiled for the International Association of Volcanology Conference in New Zealand, 1965. Particular interest is the mineralogy of Rotoma Ash, Healy's beds (b), (c), and (d), correlative of the "yellow block", "white block" and "grey banded" beds of Vucetich and Pullar.

Healy, J., 1965: Quaternary Pumice Deposit, Taupo. In "New Zealand Volcanology—Central Volcanic Region". *N.Z.D.S.I.R. Inf. Ser.* 50:61-72.

Detailed descriptions of the Taupo subgroup exposed in the road cuttings between Lake Taupo and the Terraces Hotel on the Napier-Taupo Highway.