

REMINISCENCE

SLOPE-STABILITY AND GEOLOGICAL INVESTIGATIONS AT MANGATU STATE FOREST¹

A COMMENT

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The 1950s appear to me to have been a seminal decade for the soil conservation movement in the Gisborne district. I was not directly involved with soil conservation *per se* but watched and listened from a distance. My work at that time was the detailed soil survey of the Gisborne Plains. I was also appointed DSIR nominee to the Poverty Bay Catchment Board partly in the belief that a public servant would have better status as a statutory body member in a local community.

Geological surveys were already being undertaken in the Mangatu Forest area in the late 1800s. Even at that time field geologists had become alarmed at the number of soil and earth slips after the storms of 1893-4 and pleaded with the land developers not to cut down any more trees. By the late 1940s and early 1950s the Mangatu area had become a scientific tourist attraction. Books were written about the incidence and degree of erosion and the top man from the U.S. Conservation Service said the mass wasting was the worst he had ever seen anywhere in the world. But nobody offered any solutions to the problem until Hamilton and Kelman reported to the Poverty Bay Catchment Board in 1952. Hamilton's analysis of the types of mass movement and his cataloguing of the lithology of rock formations is a classic; but Kelman's proposals for new and modified farming methods were too aggressive for the farmers of the day. Even I became alarmed at the prospect of my redundancy as a pedologist! Nevertheless, to my mind, the Hamilton-Kelman report² is a benchmark document and should have been given much wider attention through formal publication.

Gage and Black adopted a new approach to their investigation by refusing to conduct a conventional geological survey which is really a chronology of rock formations and how they come to

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¹ By Maxwell Gage and Robin D. Black. *Technical Paper No. 66*. Forest Research Institute, New Zealand Forest Service.

² Covered the whole of the Waipaoa River catchment, a much larger area than that in the Gage-Black report.

arrive at their present position. They followed their noses like good scientists and came up with an adequate practical scheme of relating erosion to the topography and the rock formations. Their technical paper comprises a short text laced with abundant photographs, cross-sections, and two easy-to-read maps. It seems to me on long reflection that geologists and pedologists have tended to be tyrannised by the guideline 1 : 250 000 surveys of 30 years ago much as Presbyterians have been by the Reformation.

Some questions arise from my quaternary studies on the Gisborne Plains, the reception basin for the products of erosion in the Mangatu area:

1. There appear to have been earth movements at Gisborne between the time of the Mapara and Taupo eruptions of 2100 and 1800 years B.P.‡, respectively. In passing, Lake Waikaremoana was formed as a result of a landslide at about this time. No mention is made in the report of pre-Taupo fissures though I expect traces of earthquake rents would be mantled by the ubiquitous Taupo Pumice, the most easily recognisable tephra in the Gisborne district. The 1957 earthquake in this district generated undeniable fissures on Tarn-dale station land and I wonder if this kind of earth movement is allowed for in the analysis of mass wasting processes?
2. On Gisborne Plains the alluvium deposited before the Taupo Pumice eruptions is commonly more clayey than that deposited afterwards and this texture suggests bentonitic mudstones and argillites associated with the crush zone of the Waipaoa fault as sources of erosion. Erosion and sedimentation could have been related to earth movements occurring between 2100 and 1800 years B.P.
3. Catastrophic erosion and sedimentation arising from storm damage to the upland forest was noted in soil profiles on the Gisborne Plains. The storm event is considered to have occurred c. A.D. 1650. No evidence for this event was seen in the Mangatu Forest area so perhaps the storm damage was restricted to a coastal strip.
4. Gage and Black say that accelerated erosion started in the Waipaoa River catchment in 1910 when flood waters deposited raw sediment on the Plains. Hamilton and Kelman

‡ Before present = before 1950.

consider 1935 to be the commencing date and I say 1932 from an examination of soil profiles on the Plains.

5. The Gage/Black report is the best example I know of in the use of dated tephra markers in giving a time perspective during the late Pleistocene and Holocene in a geological area difficult to understand.

Small everyday things, the stuff of history, are seldom recorded in official scientific publications. The following is how the concept of the Mangatu Forest came to be translated from a resolution by the Poverty Bay Catchment Board to action by government departments.

In the late 1950s the Waipaoa River Flood Control Scheme on the Gisborne Plains was nearing completion and I often thought to myself, why don't we plant trees in the upper Waipaoa River catchment concomitantly with the stopbanking of the river on the Plains? One day on the main street of Gisborne, the late Archie Moore said to me that he thought afforestation in the upper catchment should be started at once, and that if he moved to that effect at the next meeting of the Catchment Board, would I second the motion? This I did. We were unpopular for a time but the Board came to see the wisdom of afforestation coming in earlier than had been envisaged and it put forth its best endeavours in convincing ministers and officials of the rightness of its cause. I heard it said that we had more trouble in convincing a civil engineer brought up on steel and concrete of the merits of biota and the incredible worth of a single tree in holding the ground.

If the Hamilton/Kelman report is a classic of the 1950s then the Gage/Black report is a classic of the 1970s.

REFERENCES

- Hamilton, D.; Kelman, E. H. H., 1952. Soil conservation survey of Waipaoa River catchment, Poverty Bay, New Zealand. Typescript and maps lodged with Poverty Bay Catchment Board, Gisborne.
- Pullar, W. A.; Penhale, H. R., 1970. Periods of recent infilling of the Gisborne Plains basin: associated marker beds and changes in shoreline. *N.Z. Jl Sci.*, 13: 410-34.