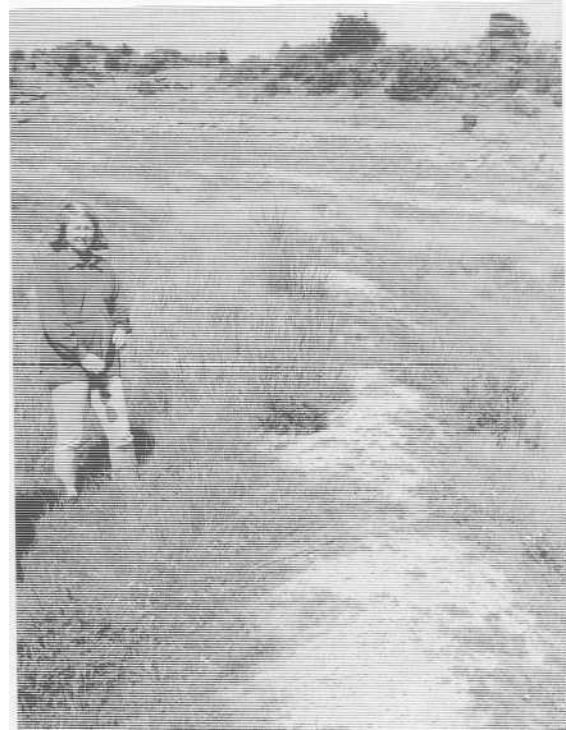




29(a)



29(b)

**Figure 29(a), (b) Bendigo goldfield, structural instability and stability. (a) Flat-faced rocks interlocked to revet a terrace; on architectural advice, these have had kanuka of some 10-15 cm d.b.h. removed to prevent destabilisation of the structure. (b) The bank of a ditch and bank fence at Logantown (downhill from Welshtown), showing sheep erosion of unvegetated crest. Mary Wallace, Field Centre manager, at left.**

fires, sheep and rabbits eliminated silver tussock from the lower slopes and in its place grew vast expanses of grey-blue-green scabweed, *Raoulia australis*. Once the grazing and rabbits ceased to be epidemic and the gold-miners (hungry for fire-wood) left, wherever rainfall was sufficient, the open ground germinated *kānuka*, seeding from scattered remnant trees on the shady sides of rocky slopes. Today kanuka forest dominates the mid-slope of the Dunstan Range, with a lower band of scabweed still prominent in places above the agricultural lowlands. The *kānuka* at Bendigo has yet to achieve its full coverage and the open woodland that prevails consists of a few multi-trunked trees 100 years or so old, many about 50 years old, and succeeding generations, right through to the current crop of seedlings. Although the natural succession would be Hall's totara, the current paucity of seed sources means that *kānuka* will remain the "climax" vegetation and involve a gradually shifting mosaic of young and old trees. The pattern has been rejuvenated by selective removal of kanuka, a management procedure designed to expose the gold workings and roads and stabilise the built structures for historical tourism. There is the opportunity to encourage a dense sward of silver tussock, thick enough, as in early Polynesian time, to largely exclude *kānuka* regeneration.

The *kānuka* woodland is associated with a few forest shrub and vine species. Matagouri and *Coprosma propinqua* are sparsely scattered and the dominant shrub is *Corokia*

*cotoneaster*. A snowberry (*Gaultheria antipoda*), *Olearia odorata* and *Myrsine divaricata* are rare shrubs; there are a few vines of *Muehlenbeckia complexa* and bush lawyer (*Rubus schmelidioides*).

At ground level, silver tussock and scabweed are dominant natives, the former in fact relying on the latter to provide regeneration sites on the otherwise leached, infertile soil. Silver tussock is common on only disturbed ground, such as roadsides and settlement areas, where more fertile soil is exposed (Fig. 30(a)). In fact, the colonisation of human-made surfaces by native plants is a feature of interest, small grasses (*Poa* sp.), sedges (*Luzula* sp.), cushion plants (*Colobanthus* sp.) and mat plants (*Raoulia* aff. *?parkii*) illustrate the well adapted nature of the ground flora. However, the impact of rabbits reduces the capacity of these species to recolonise. A point of some interest with respect to the potential of silver tussock and fescue (*Festuca novae-zelandiae*) to recover the area, is their seeding and regrowth in the centre of mature, sometimes senescent, *Raoulia* (Fig. 30(b)). This appears to be a natural ecological stepping stone that could be enhanced, especially on eroded north-facing slopes where *Raoulia* dominates, and *kānuka* is sparse, and where bare soil is maintained by freeze-thaw cycles during winter.

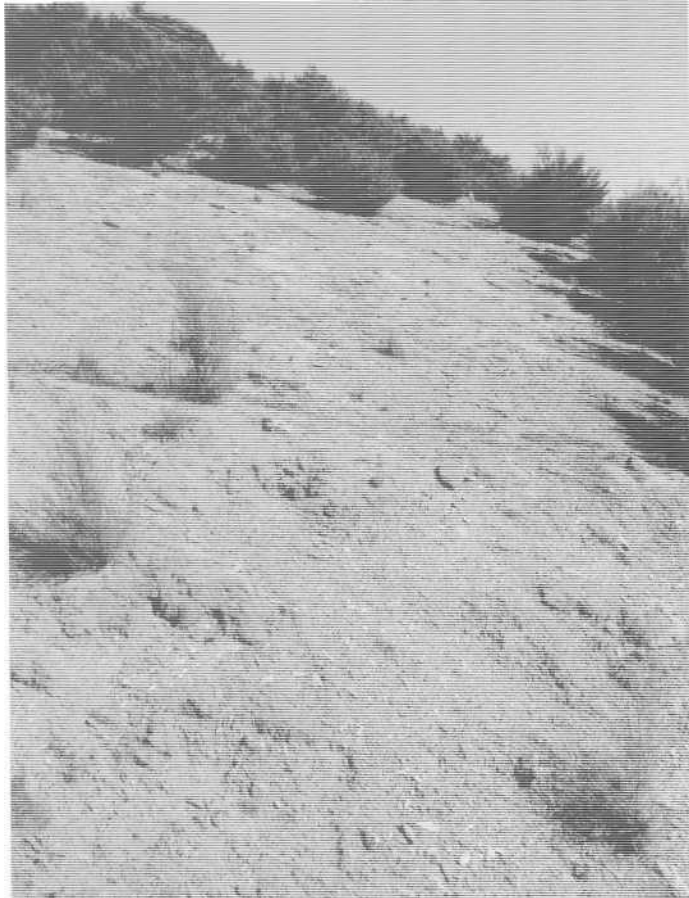
Introduced plants play a significant role in covering bare ground. Brier is uncommon, probably because the area is too arid. In the few moist areas, there is a rabbit-browsed grass sward. Annuals (e.g., *Anagallis arvensis* - pimpernel) and biennials (Vipers Bugloss, and the mulleins, *Verbascum thapsus* and *V. virgatum*, the last rabbit-browsed) are the only conspicuous weeds. St John's wort is uncommon. The browsing of these few palatable plants by rabbits suggests that a richer and more conservative ground cover would be achieved if the rabbits were excluded.

The floristic composition and vegetation pattern is very simple in this area, a result of almost complete eradication of forest cover in recent time, and the harsh conditions of aridity and cold that prevail over alternate seasons. These processes facilitate the establishment of a few dominants and slow the pace of recovery. However, these same factors are useful for management and it is obvious that the interaction of *kānuka* and silver tussock will be the cornerstone of management for the foreseeable future. The few brier could be eliminated.

Silver tussock could be propagated and planted wherever vegetation cover is needed. There is little need to actively encourage *kānuka* (although fire would be a tragedy). However, an experimental understorey planting of Halls totara is likely to be successful. Because several of the shrub species are rare in this area (e.g., *Myrsine divaricata*), the clearance of woody vegetation should be done with care and knowledge.

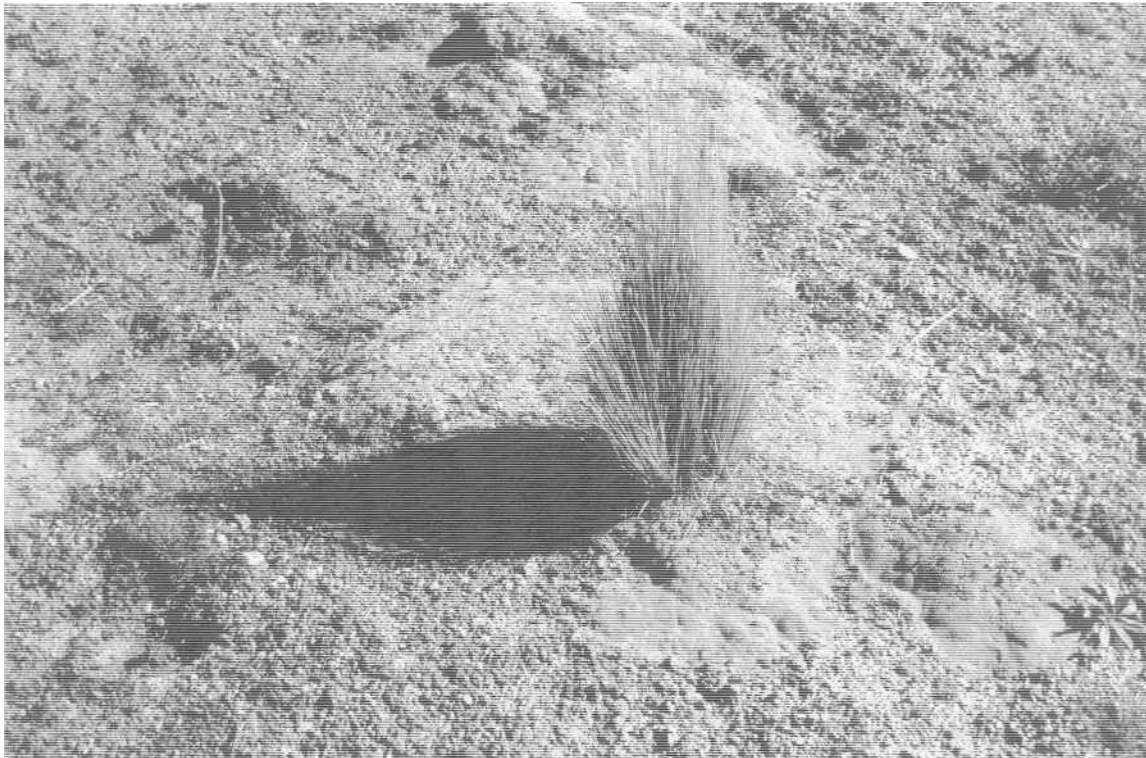
### ***Former townships***

The former Bendigo township occupied the valley floor at the base of the hillslope. While most of the standing dwellings have gone, there are still many archaeological signs and many of the plants remain: lilac, rosemary, rambling roses, grape, blackberry and fruit trees (plum, peach, apricot). Some of these may be significant genetically, having survived for nearly a century without care in a relatively extreme environment.



30(a)

Figure 30(a), (b) Bendigo gold-field. (a) Kānuka woodland covers most of the area but open areas occur where soil is thin. These are dominated by scabweed (*Raoulia australis*) and regeneration of other species is discouraged by rabbit grazing. (b) Scabweed (*Raoulia australis*) provides a site for the germination and growth of silver tussock.



30(b)