

(2.) NATURE OF DETERIORATION.

The deterioration complained of and markedly in evidence consists largely in a dying-out or in a replacement of the grasses and clovers sown, by various classes of fern, herb, and scrub growths—namely, bracken fern, hard fern, soft fern, wineberry, manuka, fuchsia, tutu, and hutiwai. The growth of these plants on the country does not necessarily indicate that the land is too poor to grow grass, but rather that there is a strong natural tendency for that country to revert back to its natural forest cover. The fern and scrub growths that make their appearance in the clearing soon after the forest has been felled and burnt constitute really the first phase in the succession back to forest. Nature all the time is endeavouring to win back the area to forest, and in a district of fairly good soil and heavy rainfall the advantage is all with the secondary growth. On areas where an intensely hot fire of the felled forest is secured the germ of the forest is entirely destroyed, and it is not until such time as seeds migrate on to the area that we see on these areas evidence of the forest re-establishment. In these latter areas it will be obvious that the grass-seeds sown on the forest-burn will have an almost undisputed reign, whereas that seed sown where the germ of the forest has not been killed will have immediate competition, and unless special judicious management is meted out the grasses sown have no hope of successfully competing with the uprising secondary forest growth. Very few forest-burns within the above counties are sufficiently hot to kill the germ of the secondary forest.

According to the heat of the burn and subsequent stock manipulation, the class of the secondary growth varies:—

- (a.) With a light burn and virtually no stocking, bracken, soft fern, wineberry, fuchsia, and lacebark predominate.
- (b.) Where the conditions are wet and the soil loose, usually carrying a mass of pukahu, and generally at higher elevations, soft fern usually predominates.
- (c.) Where the conditions are somewhat dry and the soil light and friable, and where only light cattle-stocking has been the rule, bracken and hard fern predominate.
- (d.) Where the bracken-fern growth has been largely kept under for some years, mainly by sheep, and where close and continuous grazing has been practised, hard fern and hutiwai are often extremely prevalent.
- (e.) Where the soils are poor, or where the fertility has been reduced by close and continuous grazing, and where an open sward prevails, manuka asserts itself. It may reappear rapidly on country previously carrying manuka, or it may follow as a subsequent association over hard-fern areas.

(3.) EXTENT OF DETERIORATION.

In the district under review there are (excluding soldiers' lands) about 1,990 Crown holdings, with a total area of 874,700 acres. Of these holdings 75, with a total area of 42,905 acres, have been abandoned. The percentage of holdings abandoned is 3·77, and the percentage of area abandoned 4·9. It is impossible to obtain accurate information regarding the area and proportion of deteriorated lands over the whole area. The following statement is compiled from circulars returned by 310 settlers in the various counties, and may be taken as an approximate average and a fair estimate:—

Number of settlers who sent in statements	310
Total area occupied	165,220 acres.
Area felled and grassed	112,250 „
Area fairly clean pasture	68,341 „
Area in second growth	43,909 „
The proportion of the reverted country to area felled and grassed is	39·12 per cent.
The proportion of country in fairly clean pasture is	60·88 „

Taking these figures as affording a fair average over the whole of the Crown holdings in the counties under review, we estimate that the total area of reverted country is 232,500 acres.

(4.) CAUSES OF DETERIORATION.

We consider the factors most potent in the bringing about of this deterioration are as follows:—

- (a.) *The wet climatic conditions prevailing, preventing hot burns—primary or secondary—and favouring a very strong and rapid growth of fern, &c.*

Climate is a big factor in the breaking-in of any hill country in New Zealand. The wetter and the milder the climate the more difficult breaking-in operations become. In the first place, so much depends upon the initial burn, for unless a hot burn is secured the seeds and spores of the secondary growth, well and truly sown on the forest-floor long before the forest is felled, remain alive, and from these seeds and spores plants establish during the winter following the burn. In every shaded place where the heat of the fire has not penetrated, around logs, stumps, and in crevices, are myriads of young ferns, bracken fern, hard fern, and soft fern in the prothallus and young sporophyte stages, and over the burn in general wineberry, fuchsia, &c., may come up quite thickly. Thus right from the offset the grasses and clover sown have to compete with a strong volunteer growth. In a light burn, also, many logs are left on the ground, making stocking by either cattle or sheep difficult or dangerous unless very high costs are entailed in the tracking and logging-up of the burn.