

(6.) *Spelling.*

Equally important as surface-sowing, and a corollary to it, is spelling the ground. Even without surface-sowing at all, spelling is a most powerful weapon in the hands of one wishing to improve his upland pastures. How can a pasture grazed year in and year out, even at the time of seeding, be expected to remain at its best? It must deteriorate. Witness in this regard the constant grazing for nearly seventy years of the mountain tussock-grasslands. No wonder they have deteriorated—the marvel is they are not worse!

Nowhere can the good effects of spelling be better shown than in the absolutely depleted lowlands of Central Otago. Here there are numerous small areas which have been enclosed by rabbit-proof netting for a number of years, such enclosures, except in one instance, having been made for purposes not connected at all with spelling. Within these enclosures, as seen by ourselves in the plantations at Galloway and Omarama, and in the Agricultural Department's experimental area near Clyde, there has been truly remarkable regeneration. A recent article in the *New Zealand Journal of Agriculture* (Vol. xx, pp. 82–94) deals specifically with these regenerated areas, and is illustrated with eleven photographs which bring out most clearly what nature will do on the very worst denuded lowland areas if stock and rabbits are eliminated. In one case, even in the presence of fairly heavy stocking by sheep, cattle, and horses, there was distinct regeneration, but in this case there was an irrigated area which generally kept the stock away from the regenerating portion. Of all these enclosed areas, that of the Cromwell Development Company is perhaps the most interesting. This has been kept free from rabbits for between five and six years. About two years ago the regenerated grassland was burned in the summer, but, all the same, at the present time there is a close covering of grasses. A very early arrival after shutting up a piece of land from stock and rabbits is blue-grass (*Agropyron scabrum*), which forms large tussocks. Other palatable species which were in are red clover (*Trifolium pratense*), rye-grass (*Lolium perenne*), tall blue-tussock (*Poa intermedia*), sorrel (*Rumex acetosella*), cocksfoot (*Dactylis glomerata*), plume-grass (*Dichelachne crinita*), and meadow-grass (*Poa pratensis*).

The exact time it takes to regenerate a piece of this lowland desert is not known: possibly three years will bring about a fair result. Even if so long a time is required, this is no excessive period for restoring absolutely worthless ground to an equal, or more likely a better, state of palatability than existed in any primitive pasture of Central Otago. How much more rapidly the pasture could be rejuvenated by surface-sowing, in addition to excluding rabbits and sheep, is abundantly demonstrated by the spelling of the Earnseleugh experimental area near Clyde. Leaving out of consideration that part of the hillside which has been cultivated, and considering only the steep slope where a certain amount of surface-sowing was carried out, some of it by first "scuffling" the ground, there is abundant evidence that cocksfoot, catsear, meadow-grass, and Yorkshire fog can be firmly established, and that, without sowing at all, blue-grass and tall blue-tussock will reappear in plenty on the darker faces, and to some extent even where fully exposed to sun and wind. On this area, too, without irrigation, the lucerne sown on the cultivated ground in 1911 has grown vigorously year by year, notwithstanding its extraordinary dry station; so, too, with the cocksfoot, the tall oat-grass (*Arrhanatherum elatum*), and the Chewing's fescue.

Coming next to those better-grassed pastures which make up the bulk of the pastoral lands, the evidence before us, and our own experience, lead us unhesitatingly to declare how necessary it is for the mountain pastures to be spelled. The seeding, and spreading by means of their creeping stems, of the palatable grasses is thereby greatly facilitated. A pasture which is not naturally regenerating is going back, and natural regeneration can only be induced by spelling. Hand in hand with such spelling comes in surface-sowing. It is next to useless to sow after burning the tussock, and not to spell the ground till such time as the seedlings are able to resist the attack of stock. This stands true, especially for a grass so palatable as cocksfoot.