

Forestry in Relation to the Tussock Grasslands

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To many, if not to most people, the forests and the tussock grasslands must seem very different things; but the truth of the matter is that the links between the two are very close. If we are to obtain a thorough understanding of tussock grassland ecology, we must study the history of these grasslands. We then find that many present types of tussock grassland occupy sites and soils previously occupied by forest; and that the type of tussock grassland on any particular site depends partly upon the type of forest displaced, partly upon the time that has elapsed since the forest was destroyed, partly upon the method of forest destruction, and partly upon whether or not climates remain true forest climates. Further, both the forests and the grasslands have been profoundly modified by introduced exotic mammals which move freely between the two habitat types. The behaviour of the animals cannot be understood without an understanding of all portions of their habitat. The forest and the tussock grasslands cannot be separated for study purposes. The animals are an indissoluble bond between the two.

The third link is this: the forests and the tussock grasslands, together, comprise the vegetation of the high mountain watersheds. Most of us are fully conscious both of the usefulness and of the destructive capacity of mountain-derived rivers. Management of the tussock grasslands and forests of the mountains must be integrated management with the one prime objective, sustained yield of useful water in controlled flow. It is no use pastoralist and forester pursuing diametrically opposed objectives. The units of land management are the river catchments with all their types of vegetation, tussock grassland and forest. There must therefore be complete mutual understanding between the tussock grassland and forest specialists. All must work to the one end, balanced land use, with a single yardstick used for the evaluation of results, river behaviour.

There is ample scope for tree-planting and other forestry activities in the tussock grass-

land country, but no forester would ever claim that the correct solution to tussock grassland problems would be to do away with the tussock grasslands altogether with replacement of them by forest. The research and management problems of tussock grasslands are more nearly related to those customarily dealt with by foresters than to any encountered in management of the lowland grasslands. I believe, therefore, that foresters can usefully contribute certain of the concepts of the discipline of forestry.

The tussock grasslands and the lowland exotic grasslands are very different things. In both forest management and tussock grasslands management we deal with natural assemblages of wild, undomesticated plants. We are concerned with management of complex associations and communities of plants, many of the species themselves being of great genetical complexity. But the lowland grasslands are made up of relatively simple, artificial assemblages of domesticated or part domesticated species.

Again, the lowland grasslands are greatly modified by cultivation of the soil, manurial treatment, and stock management; but the tussock grasslands and the forests cannot be dealt with, to any significant extent, in this fashion. Some improvement of tussock grasslands is possible in these ways, particularly with the advent of the aeroplane as a land management implement. But it is beyond the capacity of land occupiers and even the State to extend this improvement over the greater part of the tussock grasslands, especially in the high mountains.

And again, in management of the lowland grasslands there is seldom more than one simple management objective, maximum production of palatable grass. For most forests and great areas of tussock grassland, however, management objectives are multiple. Production demands, soil and water conservation requirements, even scenic and recreational needs, must all be met. Conflicts in demand must be resolved. Management priorities must be decided and enforced.

In the case of the forests this broad approach is made automatically. It will be more difficult in the case of the tussock grasslands where there is fragmentation of responsibility and divided control, but it is none the less essential. The South Island tussock grasslands are at least as important in the field of soil and water conservation as the mountain forests.

The very first requirement in management of any wild crop is a thorough ecological survey and stock-taking. This would be the first thing done by any forester responsible for management of a forest, but for the tussock grasslands no inventory has yet been made. We do not even yet know how many types of tussock grassland there are, or the precise extent of one of them. For every forest, also, the forester responsible is called upon to make an early decision with respect to the objects of management, timber production, control of water yield, recreational development, and so on. In the management of tussock grasslands there has been but the one objective for all lands offering a promise of grazing at an immediate profit, wool production.

Our national thinking on this subject has been grossly illogical. The public, including most scientists, condone exploitative grazing of tussock grasslands, even in critical river catchments where they would promptly veto any attempt at exploitation of forest re-

sources. The forester might be certain that he can grow a second crop as good or better than the first, while the grazier can promise nothing. But this makes no difference.

If we are to be logical we should look at both the forests and the grasslands of the mountains from the one standpoint, control of water yield. Only after this is assured should we seek wool, timber, or game production. Logging of the high mountain forests is at least as justifiable as grazing of the high altitude tussock grasslands. The resource inventory must be the first step in management. Multiple use and sustained yield must be the principles of management. These terms are part of the alphabet of all foresters, and should equally be part of the thinking of all who deal with tussock grasslands.

Foresters and rangeland specialists have much in common. Management objectives overlap, management and research techniques are closely comparable, philosophies of land use are, or should be, identical. In many countries of the world these facts are recognised by placing both forests and rangelands under the one administration. No claim is made that this should be done in New Zealand. The discipline of forestry can supply clear-cut philosophies of land use, tried, tested and proved. The science of rangeland management is, after all, an historical daughter of the science of forestry.

Discussion

H. E. CONNOR, in opening the discussion, said it was apparent there was a big field of tussock-grassland research in front of us. The views of the speakers lead us to take a long-term view of the development of tussock grassland. Mr. Raeside had described three cycles—one warm and wet, one cool and dry and the latest phase out of equilibrium. An elaboration of the effect of the changes in climate and vegetation in the tussock grasslands would clear the way for any discussion on their utilization. The pre-European history seems more important when we consider treatment of these grasslands today. Perhaps some of the recent carbon 14 techniques, or pollen analyses could be of use. Also, what has happened

to species of plants in the tussock grassland flora following the migration of the tussock grassland into new ecological niches? A full understanding of the early history and development is needed before the question of present use can be brought into the major discussion.

MR. RAESIDE said that we have no absolute evidence to illustrate these cycles, but many small items all point in the same direction. A cool, dry grassland cycle in early European time was preceded by a warmer, wetter cycle, supporting a mixed podocarp-broadleaf forest. The temperature was at least 3°C warmer, and the rainfall on the coast was probably 46-ins. where it is now 25-ins. Three samples of wood from pre-