

THE PASTORAL LANDS OF CANTERBURY AND MARLBOROUGH AND
THEIR MANAGEMENT.

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The pastoral lands of Canterbury and Marlborough embrace a very large tract of country and within this area is to be found a considerable range of Climate. The grasslands adjacent to the great divide are within the north-west rain belt, and are subject to a high rainfall, but the precipitation lessens rapidly as one travels eastward until in some localities the rainfall is deficient at practical ly all periods of the year. The higher pastoral country is under snow for several months of the year. The lower country is also subject to snow, but falls causing loss of stock only occur at fairly lengthy intervals.

The settlement of the pastoral country did not present any great difficulty as it was found ready for occupation. Any early problems connected with its settlement were quite different from those experienced in the settlement of forest country. From an examination of the pastoral country it is evident, however, that wide stretches of it at some period carried a heavy forest covering. The early runholders found large logs present on much of the tussock country at the time it was taken up, and even to-day the remains of logs are to be seen on the grasslands long distances from any existing forests. These forest remains are in a remarkable state of preservation and in places have provided much of the fencing timber required.

The settlement of our pastoral country was effected at an early date and generally under a system of very large holdings. As the necessity for providing land for new settlers arose, suitable station properties were subdivided until we have our present system of pastoral licenses, small grazing runs, and other forms of pastoral tenure. In each and all of these cases certain problems are present and have to be dealt with if the various blocks are to prove really profitable to the holders.

Much has been written about the early condition of the pastoral lands, but one has to admit that our knowledge of the original condition of our native pastures is imperfect. We have the statement of the late Sir William Fraser, who was runholding in Central Otago in the "fifties" of last century, to the effect that while the native grasses were present in luxuriant growth there were in places, especially on the flats, bare patches which he attributed to the destruction of the grass roots by myriads of small white grubs which were present in the soil. These grubs were probably our Grass Grub (Odontria Zealandica).

In 1865 in Vol. 1. of the Transactions of the New Zealand Institute, the late Mr. John Buchanan F.L.S., in referring to the inland native pastures of Central Otago mentions the sparse covering. He does not give details but he mentions serious deterioration caused by grass fires.

In the Mackenzie Country very serious damage was done to the pastures, in the early years of settlement by indiscriminate burning, and the rabbit invasion of the "seventies" led to further severe depletion, especially in the southern part of that district, but the earlier signs of denudation of the pastures did not give any indication of what was to follow in the space of a few years. During that period both the dry steep faces and the open plains underwent serious depletion, and in many parts the soil was left bare and fully exposed to every wind that blew. Mr. T.D. Burnett, M.P., a life-long resident of the Mackenzie Country, states that in the early times the interior slopes of the coastal ranges were a shepherd's paradise. He states that the burning of the mountain pastures began as early as 1859 and continued through the "sixties" and the early "seventies" and that by 1875 almost irreparable damage had been done, and then the rabbit invasion came to complete the work of destruction.

When we come to consider the deterioration of the pastoral country we come to the conclusion that the depletion is due to four main causes (1) burning; especially at the wrong time of the year (2) general over-stocking, (3) insecurity of tenure and (4) the rabbit pest.

All those having experience of the pastoral country know the extent (in years gone by) of the practice of what might be called indiscriminate burning. At one time it was not uncommon to see fires burn for several days and on such occasions immense areas of country were swept bare. The worst and most destructive type of burning of run pastures was where fires were started during the summer or early autumn periods. In practically all such cases the natural covering was destroyed and the soil was left bare for the play of the drying winds. Under such circumstances regeneration of any kind was almost out of the question. There are examples where summer burning was carried out over 30 years ago and the areas that were burnt are still bare with the exception of a growth of Scabweed (*kaoulia lutescens*) while portions of the same block that missed the fire are still carrying a tussock covering.

It is satisfactory to note that the destruction by fire has of recent years been much less in evidence and on Crown Land authority to burn has now to be obtained from the Land Board of the respective Land Districts. This wise precaution has resulted in the gradual disappearance of the worst forms of indiscriminate burning of the runs.

In discussing the question of the burning of run vegetation, one must admit that there are occasions when burning of rank vegetation is desirable. In favoured situations the growth of tussock, etc., becomes very dense and if, for instance, any surface sowing is to be undertaken, this rank vegetation must be removed by fire. However, the contention at times put forward by some runholders that if one is to prevent the grasses being smothered out by tussock growth, and if one is to have a fresh growth of grass, burning must be carried out, will not, in my opinion, bear investigation,

In, the first place the native grasses do not thrive under burning, and the contention that burning is absolutely necessary for the welfare of the vegetation is quite unsound. A Mackenzie country runholder pointed out some years ago that if burning were necessary for the purpose of keeping our native grasses alive they would have all disappeared long before the advent of the earliest inhabitants. He also pointed out that the first runs to show advanced depletion were those where the "fire-stick" had been most in evidence,

The tussock covering gives protection, summer and winter, to the finer native grasses. It also assists in retaining moisture in the soil, especially in districts like the Mackenzie Country where the summer temperatures are high and drying winds are prevalent. As a protection during periods of severe frost the tussocks are also of importance and assist towards securing an earlier spring growth by means of the protection afforded to the finer grasses.

When one comes to review the influence of overstocking on our native grasses it must be admitted at once that much overstocking has taken place and this has had a most detrimental effect on the run pastures... Overstocking in many cases was probably unintentional. The runholders did not fully realise to what extent through burning and other causes their carrying capacity had fallen. This overstocking led to rapid deterioration of the pastures and the ultimate heavy decline of the stock-carrying capacity of the runs.

Insecurity of tenure has been pointed out by many people as the cause of depletion. No doubt it was a contributing factor but of more recent times reasonable security of tenure has been given as it was thought by those in control of the pasture lands of the State that security of tenure would encourage tenants to regrass and to take a greater interest in their runs. Pastoral lands belonging to the Crown were at one time leased by public auction, which resulted often in excessive rents being paid, consequently the runs were overstocked in a vain endeavour to obtain increased returns to compensate for high rentals.

The damage that can be done to pastures by rabbits is well known and need not be stressed. It is sufficient to say that in the Mackenzie Country where rabbits were well under control during the years just prior to 1929 the number of sheep in the Mackenzie County increased by nearly 100,000 in the course of six years and the regeneration of native grasses was most remarkable even on the open Plains where Scabweed (*Raoulia lutescens*) was thickly studded with vigorous young plants of various native grasses. Regeneration at a fairly rapid rate was in progress and in many places land formerly bare was being revegetated.

A considerable amount of work has been done by the Fields Division of the Department of Agriculture during recent years in Marlborough in connection with the investigation of the general condition and management of the pastoral country.

Pasture depletion on many Marlborough runs has advanced rapidly during the past 18 years. In places there has been an alarming decrease in sheep carried, and one station alone shows a decrease of approximately 20,000 when the present sheep population is compared with that of 20 years ago. Local observers point out that rapid deterioration has taken place since 1918 and they attribute this state of affairs principally to the rabbit pest, but are not unmindful of the damage done to the native vegetation by fire.

It can be said of Marlborough that much of the country up to an elevation of about 3,000 feet is continuously grazed. The areas above that height provide summer grazing only. In the case of the sunny more exposed faces the vegetation has practically disappeared but considerable growth is still present on the dark faces lying away from the direct influence of the sun and drying winds. It is pointed out, however, that where the rabbit pest has been successfully dealt with and there has been judicious subdivision, followed by surface sowing and subsequent good management, the results of the pasture mixtures sown has been most satisfactory. To give some idea of what surface sowing means under favourable conditions it may be mentioned that one station of 50,000 acres was carrying 7,500 half-bred sheep. A 1000 acre block of this country was fenced off and surface sown in 1929 and was not grazed for two seasons after sowing. There was an excellent take of cocksfoot, perennial ryegrass, white clover and suckling clover, and the carrying capacity of the sown area is now one sheep per acre, and the block is in good condition.

On another Marlborough station property where considerable surface sowing has been done, the cost of the pasture mixture plus labour worked out at 25/- per acre, and these sowings have resulted in a considerable increase in carrying capacity. On the high broken faces on this property tall fescue (*Festuca elatior*) has been sown and has established. In such situations this grass never becomes troublesome but the difficulty in connection with it is that the seed is carried down on to the rich flats where it takes possession and in places has overwhelmed lucerne areas. For this reason the sowing of tall fescue on pastoral country cannot be recommended, and its introduction on several station properties is going to cause trouble on the rich flats in years to come.

In most cases the soil of the Marlborough runs is of fair quality but owing to the isolation of many of the properties, the cost of carrying out regrassing and subdivision is high. On one of the runs in the Clarence district the cost of erecting subdivision fences, using iron standards, five plain and one barb wire, worked out at £1 50 per mile. The fencing material had to be 'packed in' on mules and horses, yet even under this handicap the regrassing that has been done has proved a payable proposition.

It should here be pointed out that the problem of depleted pastoral land is not confined to any one country. It is world wide and is due to many causes. The problem of our depleted pastoral country is somewhat akin, however, to that met with on the grazing lands of the Western part of North America continent: Information supplied to the writer in 1922 by American investigators showed that the question of depleted land had received considerable attention there. The question of the introduction of exotic pasture plants, principally from Northern Asia,, had received consideration but it is understood that the conclusion eventually arrived at was, that the indigenous pasture plants present in the country were of more economic importance and likely to give better results than those offering - from foreign countries.

The regrassing experiments in the Mackenzie Country undertaken in 1910 were carried out with a very wide range of plants, many of which proved quite unsuitable, while others have formed a sward that has completely covered the soil. Some of the best mixtures have proved to be Pos pratensis and English wild white clover, Yarrow (Achillea millifolium) and English wild white clover, also Chewings Fescue, Lucerne, Cocksfoot, Perennial ryegrass and Brown top (Agrostis tenuis), Australian blue grass (Agropyron pectinatum) and Crested Wheat grass are grasses worth consideration in any future experiments. The Australian bluegrass has been established on some runs for a considerable time and appears to successfully withstand very hard conditions. The Western Wheat grass is established in places, and has already proved itself suitable for situations showing great range of temperatures. Subterranean clover (Trifolium subterraneum) is also worth a trial on runs where surface sowing is being undertaken especially on the more open types of soil. In many cases the sheep on the larger runs are carried entirely on the native pastures but in all such cases the runs must be kept understocked so that the summer growth may be conserved on at least portions of the runs to provide feed for the stock during the winter period. Large areas of the pastoral country, both in soil and situation, are eminently suitable for growing supplies of winter feed. Some runholders, however, deprecate any suggestion that they should use any portion of their runs for what they term "agricultural purposes", being of opinion that pastoral lands should be used entirely for grazing purposes.

This may have been a satisfactory method of working the large station properties in remote districts during the earlier days of the Dominion's history, but with smaller holdings and thus more restricted grazing a certain amount of agricultural work is necessary if the runs are to be fully stocked. Where suitable land is available, lucerne must receive consideration as a means of providing hay for winter feeding. On many stations this valuable plant has been established for some years but there is still room for lucerne establishment on many more station properties. There is also a necessity for the establishment of good permanent pastures on runs where the rain fall is fair to good. On a large number of stations where pastures have been sown the pasture constituents have died out in from two to three seasons. This state of affairs has caused some runholders to come to the conclusion that their soils are unsuitable for the establishment of permanent pastures. The cause of failure in almost all cases can, however, be attributed to the sowing of types of pasture plants that are not of a permanent nature.

Turnips are grown in places for winter feed, and under favourable conditions are quite successful and provide much necessary feed but this crop has its limitations in times of heavy snow. Hay, on the other hand can always be reached and should be the principal standby for station properties.

The close investigation of our inland pastures, made some years ago by the late Dr. Cockayne, requires to be followed up. We need information about the recuperative powers of our native grasses and for the purpose of obtaining this information representative blocks should be securely fenced and spelled for a time and then carefully grazed. No area should be closed up indefinitely unless for purely investigational purposes. All experiments should be along the lines of good pasture management, plus the sowing of suitable pasture mixtures where conditions warrant such work being undertaken.

The matter contained in a paper of this length is necessarily far from complete. The question of pasture mixtures suitable for pastoral runs has not been touched upon. The problem of shelter belts on the more exposed runs has also not been dealt with, and there are other matters of importance that would bear discussion.

The hope is expressed that the reading of this paper will create a healthy interest in the welfare of our pastoral country and will eventually lead to a further investigation of the upland pastures, and those many problems, the solving of which means so much to the holders of our high country runs..
