

SHEEP • PRODUCTION ON THE MOUNTAIN COUNTRY OF ASHBURTON COUNTY.

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THE sheep-runs of the Ashburton County cover roughly 500,000 acres of river-flat, foothill, and high mountainous country bounded on the south by the Rangitata River (with the exception of the Mesopotamia run of Butler's "Erewhon" fame). On the northern side the boundary is formed by the Rakaia River, and a straight line from the Rangitata through Mount Somers and Staveley Townships to the Rakaia roughly demarcates the plains land from the hills on the east, while westerly the runs extend back thirty and forty miles to the main ranges of the Alps.

On account of the extreme roughness of the country and the lack of suitable vegetation, the sheep do not graze on the high faces of the main range. Nevertheless, the Merino is mustered from the summer country at levels between 7,000 ft. and 8,000 ft., and within the shadow of the glaciers.

An important feature of the hill country of this county is the abrupt commencement of the high hills and the small amount of foothill country--i.e., there is very little of that type of country which is sufficiently good and free from snow to maintain a ewe flock the year round and to dispose of wether lambs and surplus ewes for fat-lamb production on the plains-q., between the Rakaia River and Mount Somers Township, which is roughly the northern half of the run country joining the plains, the total grazing capacity of the country that is able to carry only ewes and ewe hoggets and no wethers does not exceed 3,000 acres. Two-thirds of this number are on small grazing-runs leased by men who winter their ewes on farms within a few miles of their runs. Between Mount Somers and the Rangitata River a little more foothill country is present. The carrying-capacity of this area is roughly 28,000 ewes and ewe hoggets, and of these about 17,000 are on pastoral-run country. The remainder are on freehold runs. The total number of sheep grazing the whole area, including the foothill mountain country mentioned above, is about 173,000, of which only about half are ewes and ewe hoggets. The figures given serve to emphasize the point that the ewe country is small in area. This will again be seen when the importance of the runs as a source of surplus wethers and wether lambs for fattening and surplus ewes for fat-lamb production is discussed.

VEGETATION, RAINFALL, AND TOPOGRAPHY.

The runs of the Ashburton County lie behind, and are a modified extension of, a belt of brown-top country which has been depicted in Dr. Hilgendorf's map of the South Island showing the distribution of the various plant associations that are to be found. The aggressive nature of the brown-top is plainly seen throughout the run country, where it is a common exotic grass, and, together with fescue tussock, forms the chief members of an association formed by Yorkshire fog, sorrel and catsear, and the two previously mentioned grasses. Cocksfoot and suckling clover are found on the better areas. The heath, Leucopogon,

P. Colensoi, and sweet vernal are found on the drier sunny parts. The snow tussock, *D. Raouli*, is common. The aggressive nature of the brown-top is also plainly seen in the cultivated areas, where a paddock which has been sown down with perennial rye-grass and clover three to four years previously is a sod-bound mass of twitch, while old paddocks are seen which have been laid down for many years and show no signs of reverting to the native tussock. Not only in the cultivated areas, however, which are a very small portion of the total, does one find this grass, but throughout the tussock flats and slopes. The successful establishment of brown-top is undoubtedly due to many factors. The soil is silty, not rich in quality, and inclined to be sour. The north-west showers make eradication difficult, while burning affects it less than the other grasses present.

The rainfall of this area is extremely variable, and unfortunately the rainfall gauges in existence are mostly situated at points around the edge of the hill country. It is a fact, however, that the north-west showers are very local and fall off rapidly as one travels from west to east. At Double Hill, for example, the average is 61 in. and the annual fall was 70 in. in 1934, while at Mount Somers the average is 38 in. and at Alford Forest 46 in., a distance of about 40 miles as the crow flies. As one travels east to the plains, so also the south-west rains become greater, but it is the summer nor'westers that frequently delay shearing and promote the survival of brown-top.

With the exception of the Alford Forest, situated on the edge of the hill country, the bush is confined to a few beech gullies, often insufficient to supply fuel.

The country consists of hills and high ranges lying between the gorges of the Rakaia and Rangitata Rivers. There is not, however, any definite arrangement of main range with subsidiary spurs leading to the plains. On this class of country the aspect of the land is all-important. The slopes facing north or north-east determine the amount of winter country--i.e., country on the lower slopes of which the flock can be maintained during the period May-August reasonably safe from snow, or where the snow does not lie deeply for a long period. Flat land in this class of country has not the significance as when it is good agricultural land, since a run may have a large area of flat consisting of worthless river-bed or silt-flat which, with a slight slope, from the sun, will be colder and wetter than a high slope facing to the sun.

CARRYING-CAPACITY OF THE HILL COUNTRY.

The carrying-capacity of the runs surveyed varies considerably both in sheep per acre and the proportion of ewes to wethers. It is possible to grade the country into four main types and to indicate what variations exist. They are as follows :-

(a) *Half-bred Ewe Country*, which comprises downs and the best of the foothill country and covers about 11,000 acres, and which carries one sheep to the acre, and winters the hoggets with supplementary crops, hay, &c.

(b) *Half-bred Ewe Country with little or no Ploughable Land*.-This grade of country winters the ewes and carries one sheep to from 1 acre to 3 acres, except during the winter months, when the hoggets are sent to the plains. This type of country is slightly higher and rougher, and

the hoggets are wintered away, either because there is not the shelter country for both ewes and hoggets, or because there is not a suitable area for growing turnips. This grade comprises about 40,000 acres, and carries about 19,000 sheep.

(c) *Half-bred Ewe and Wether Country*.—On this grade there is a considerable area of rough country suitable only for wethers. The hoggets are wintered away, but exceptions occur where there is good turnip-country and the hoggets are retained. The country runs one sheep to from $2\frac{1}{2}$ acres to 4 acres. This country comprises about 159,000 acres, with a total of 59,000 sheep, of which 20,000 are wethers, the proportion of wethers to ewes varying from about one-third to one-half.

(d) *Merino Country*.—This comprises the roughest area, liable to snow and bounds on the unused country. The barren areas are large and have to be mustered for stray mobs of wethers. The carrying-capacity is not, however, below that of the half-bred country when calculated on the area of grass only. The number of wethers is about 31,000, with a total of all sheep of 81,000 on an area of about 233,000 acres—i.e., one sheep to from $2\frac{1}{2}$ acres to 4 acres. The hoggets and two-tooth ewes are wintered on the plains in all cases.

The following table gives the number of sheep of each breed or type, &c., and where a change is in progress the flock has been placed in that type which it is hoped to attain :—

Breed or Type.	Number of Sheep.	Number of Flocks.	Range of Size of Flocks.	Number of Ewes and Hoggets.	Number of Wethers and Rams.	Acreage of Grass.	Lambing Percentage.
Merino	81,300	7	5,000-25,000	50,000	32,000	233,000	70
Corriedale	26,301	2	4,000-22,000	18,000	7,000	68,000	69
Romney-Merino half-bred ..	42,500	14	300-10,000	39,500	3,500	66,700	80
English Leicester - Merino half-bred	29,750	6	100-17,000	20,000	7,800	92,800	75
Totals	179,851	29	..	127,500	50,300	460,500	..

The lambing percentages on this type of country are variable from year to year both on and between runs. The variation is in the neighbourhood of 10 per cent. This has a direct effect on the number of surplus stock disposed of in the following autumn in order that stock numbers may be maintained.

METHODS OF MANAGEMENT.

The management of this class of country is governed by the following matters : (1) Proportion of winter and summer country previously mentioned ; (2) subdivision fences and natural boundaries such as creeks, high ridges, rock-bound gullies, &c. The importance of adequate fencing for the spelling of winter country, complete grazing of summer country, and the separation of wethers, ewes, and hoggets in order that the fullest use may be made of the country, deserves greater attention than it receives in many cases. It is true that runholders are still recovering from the effects of the slump, and that fencing on this type of country is a costly business—£80 to £100 a mile—yet the advantages of fencing are many. The sheep and cattle make the fullest use of the summer country and are prevented from drifting back on to

the winter country. The wethers can be kept back on the roughest areas, lambs can be weaned on to a clean spelled block, while a snow fence, preventing the sheep from drifting up into higher basins in the late autumn at the time when snow is due, is a valuable means of preventing mortality and the expense of snow-raking and mustering.

A further point with regard to fencing is the very limited use of cattle on these runs. In many cases the grazing of cattle as a means of control of rank growth in the gullies and flats instead of indiscriminate burning would be a better practice. The objection usually put forward is that the existing fences are not suitable, and the cost of erection of barb wire prohibitive. It appears desirable that some modification of the present system of owners erecting fencing subject to the right of compensation should be introduced. This system tends to hamper the man with a small capital. The reduction in mortality alone would, in many cases, pay the interest and sinking fund on a substantial amount of capital advanced for fencing.

Fencing is also the chief cost in the establishment of plantations and shelter-belts, and, while one usually finds a well-grown belt around the homestead, it is rare to find one elsewhere on the property. As these lands are extremely subject to the north-west winds, crops of hay and oats are often difficult to harvest, while cultivation in the spring may be hampered by the danger of the paddock "blowing." Again, as a way of providing a future source of timber and a shelter for stock, the establishment of shelter-belts and plantations is desirable.

SUPPLEMENTARY CROPS, HAY AND CHAFF.

The area subject to cultivation is very small in comparison with the total areas of each run. In some instances no cultivation is carried out. Under both sets of conditions the hoggets are, with exceptions, wintered on the plains by farmers who grow turnips especially for this purpose. This aspect of sheep husbandry will be discussed in a subsequent section. Where cultivation is carried out, supplementary crops consist solely of the various types of turnips, but usually the white-fleshed variety is raised since the growing-season is short. The ruling practice is to plough out of grass in the late autumn or early winter, fallow until spring, and cultivate the seed-bed for sowing in December and January. The land is left in the roughest possible manner through the winter, as a fine surface lifts with the frost and "blows" with the drying north-westers. Turnips are usually sown alone the first year, fed-off during winter, and the land ploughed again the following spring. This time turnips, perennial or Italian rye-grass, and red clover are sown, and in this way the paddock is grassed down again, forming a source of hay the following year.

Oats are grown as necessary feed for the team, hacks, and pack-horses. The usual oat variety is Garton's, and the crop is spring-sown. Autumn sowing is not satisfactory, owing to the severe winter. The oat crop is sometimes sown with grass as a means of getting the land back into pasture again.

It is probable that the establishment of cocksfoot would meet with success: one or two instances of excellent cocksfoot stands have been seen. It can be said that there is need for better pasture-establishment and pasture-management, and use of hay.

The small area of turnips grown on the run country (about 1,000 acres) is, of course, quite inadequate for the needs of such country, but climatic factors are involved which may have serious consequences. For example, where turnips are relied upon in winter the paddocks are liable to be covered with snow or at least frozen hard for days, and turnips under these conditions are of little value, especially for hoggets, which are extremely difficult to handle in snow under extensive conditions where sufficient hay or chaff to feed over a period to a large number of sheep is not carried. On most runs the amount of winter country which is "safe" is inadequate to carry hoggets and ewes without a reduction of the flock or risk of serious loss. This difficulty is surmounted by migrating the hoggets to the plains from May to August, where they are placed on turnips in various localities. This can be said to be a specialized aspect of sheep-raising. Suitable areas for turnip-growing exist where farmers produce this crop and sell at so much per acre, or per week, the farmer tending the hoggets and moving them to a "run-off" when required. In a few instances a runholder has his own farm on the plains. There are some points in connection with this migration which require consideration :-

(1) The Cost : The average cost of grazing on turnips is about 2d. per head per week for hoggets and 3d. per head for ewes. The buying of turnips on the plains means a considerable cash outlay-e.g., with a scarcity of turnips through crop failure the runholder will pay about £5 per acre, and 2,000 hoggets will require about 50 acres. In addition, a certain amount of hay is usually bought, while droving may cost £25 or thereabouts--i.e., roughly, £300 is incurred, or 3s. per hogget. This is a conservative estimate.

(2) The tussock hogget is healthy and apparently not infected with parasites to any extent, while losses on turnips are sometimes considerable, and in wet weather sufficient hay is not on hand to maintain the sheep without turnips. Some runholders maintain that, providing a tussock block sunny and free from snow is available, it is better to send to the plains two-tooths and older ewes, which have a better resistance to parasites, and keep the hoggets on the sunny blocks of the run. Against this is the argument that the hoggets thrive better in the comparatively mild plains climate. In all cases, however, the winter migration allows a higher carrying-capacity, or, what amounts to the same thing, less mortality. As an example of this, a case is known where all sheep were wintered on the run, and the death-rate was 20 per cent. to 30 per cent. With a change in ownership the country was adequately fenced and the hoggets taken out to the plains. The death-rate is now 4 per cent., the same number of stock go into the winter but a large surplus is sold, and by adequate winter feeding of hay, &c., the wool clip has been doubled. The increase in wool clip may be correlated with the introduction of excellent sires, but no Merino flock will clip an average of 10½ lb., which is obtained in the case quoted, without attention to all factors concerned. It is the general opinion that stock numbers would have to be reduced one-fifth or more if the hoggets or ewes were not away for the four winter months. The small area of turnips grown on the run is fed to hoggets before going away to the plains or fed to the rams during winter. Again: in some cases they are conserved over, winter for the hoggets in early spring when they return from the plains. It is estimated that about 22,000 hoggets and ewes are migrated annually, and some of these travel for a week in order to reach their new pasture.

THE MOUNTAIN AREA OF ASHBURTON COUNTY AS A SOURCE OF SURPLUS SHEEP.

The type of sheep carried on the plains farms of the county is largely the half-bred and fine three-quarter-bred which are mated to the English Leicester and Southdown ram for fat-lamb production. The run-country ewes are in keen demand for this purpose, coming from the hard hill country. They improve greatly in condition and have a sound constitution. The following figures indicate approximately the number and class of surplus sheep which are disposed of each year :-

Ewes (mainly full-mouth)	16,000
Wethers, store lambs (mainly wethers).. .. .	8,500

The ewes are disposed of at the Methven and Tinwald ewe fairs in March. Wethers are sold soon after shearing to private buyers. Similarly, the store lambs are drafted out at weaning-time in March and go to the plains for fattening on turnips.

BREEDS OF SHEEP FOUND ON THE RUNS.

On such country as that of the Ashburton tussock land personal likes for any particular breed are restricted by the vigorous environment to the Merino and its derivatives. There is, however, sufficient variation in climatic conditions to warrant the variations found within the area surveyed, -although the method employed in obtaining a desired type may give rise to a good deal of undesirable variation, and instances occur where a run has fallen into the hands of men ignorant of the prevailing conditions who have introduced unsuitable types, with subsequent heavy mortality and disaster.

The following is a list of the types found, together with the number of flocks of each type :-

Breed or Type.	Number of Flocks.
Merino	7
Romney Marsh half-bred	14
English Leicester	6
Corriedale	2

Included in this list are four small grazing-runs which carry a few hundred ewes for eight months of the year and are grazed in conjunction with plain lands. These are situated between Mount Somers and the Rakaia River, close to the Alford Forest. The land is sour and wet, and Romney half-breds are carried on three of the runs.

In some instances a change of type is now in progress—*e.g.*, the Romney Marsh half-bred ram is being introduced into an English Leicester half-bred flock. Other instances are seen where the Merino ram is being mated to the half-bred ewe, which produces a come-back type of lamb. These in turn will be mated to the Merino ram, and so on. The production of a half-bred with certain desirable characteristics found in the Romney strain or the production of a Merino flock being the end in view. The mating of the coarsest-woolled half-bred ewes to the Merino ram, the progeny of which cross would be sufficiently fine in the

wool to be mated back to a half-bred ram, is also a means whereby the breeder endeavours to obtain a type with the characteristics he considers suits his conditions yet gives him the maximum cash return. It is important to note, also, that in a very few cases does the farmer with the half-bred flock breed his own rams. He purchases them from a local breeder, who in turn has bred them from cast Merino ewes which he purchases from some Merino breeder.

Consideration of these breeding practices brings into prominence the variations which from genetic considerations must occur and in actual practice are known to appear, and which, by means of scientific methods, could be selected for and established in desirable types. The production of a polled type of Merino and the standardization of suitable types of half- and three-quarter breeds are examples of problems which will possibly be encompassed with the aid of scientific methods in the future.

Most of the stations have large areas of barren country; shingle, and rocky tops; &c. On this type of country it is desirable to select a type possessing a close fleece, which will prevent the ingress of sand. Here the half-bred is at a disadvantage compared with the Merino. The whole problem is, of course, bound up with the value of surplus stock for fat-lamb raising. The Merino ewe or wether lamb is not as valuable as the half-bred, and the lambing percentage of the Merino is usually about 10 per cent. lower than that of the half-bred. In addition to this: the slower-maturing Merino is not put to the ram until she is a four-tooth. The half-bred ewe in some cases is put to the ram as a two-tooth, but the ruling practice in the county is to draft off for mating the well-developed two-tooths, which on the harder country will be about 50 per cent. of the total.

The Merino is, however, a better sheep for the snow than the half-bred, and musters off the high country better. Slightly more Merinos can be carried on the same area. The man utilizing half-breds has, however, the satisfaction of knowing that if the price of wool fails seriously he still has a second string to his bow in the superior half-bred carcass.

The preference for the Romney half-bred is on those runs which, although not the roughest, tend to face from the sun and to be wet and sour. These conditions arise on the front country around Mount Somers, and on such country the Romney half-bred is hardier and, gives a slightly better lambing percentage, and it is favoured by store-lamb buyers and the purchasers of mature ewes for fat-lamb production. This conclusion has been arrived at not only by the comparison of different flocks on different runs, but by the experiences of men who ran the English Leicester half-bred and have since changed to the Romney strain on the same country.

CONCLUSIONS .

(1) There is considerable variation in existing types of sheep and breeding methods employed. Improvement by selection and fixation of suitable types would be an advantage.

(2) In many instances fencing is inadequate, and there is need to facilitate the following points of management :-

- (u) The use of summer and winter country, with the conservation of winter feed, and to reduce the risk of stock losses through snow .

- (b) That a depleted area be spelled, and the seeding of existing vegetation be allowed.
- (c) To extend the use of cattle as a means of control of rank growth rather than indiscriminate burning. Burning once every three to four years, except where growth is rank, is considered sufficient.
- (d) That the establishment of plantations and shelter-belts be extended to provide timber, to shelter stock, and to facilitate cultivation under adverse conditions.

DISCUSSION.

Mr. *McGillivray* : The importance of a greater amount of fencing is shown by the increasing of the carrying-capacity and general improvement of the runs, but the cost is very high. I think that it is accepted generally now that there should be more cattle on the runs than there are, but that is bound up with fencing. We can agree that a good many more shelter-belts are required. Success has been very great in the surface-sowing of grassland on the hill country. Grasses like cocksfoot, *Poa pratensis*, &c., have taken very well. In the country mentioned by Mr. Ballinger there is a certain amount of cocksfoot, *Poa pratensis*, and a little white clover.

Mr. Chamberlain : Some of the back country of Marlborough has been improved of late years. On a station about sixty miles from the front, when taken over by the present occupiers one sheep to 3 acres was carried on 1,000 acres which having been improved subsequently is now carrying one sheep to the acre. This was done by surface-sowing in the spring. The mixture being used was rye-grass of certified origin, lucerne, and clover, and a certain amount of cocksfoot. This was broadcast on very steep faces at a height between 3,500 ft. and 4,000 ft. The take has been wonderful. The resultant pasture is allowed to reseed. The practice is being extended to steep country which has nothing on it except scab weed.