Report

OF AN

INVESTIGATION INTO THE CONDITIONS AND PRACTICE OF SHEEP FARMING

IN THE

FALKLAND ISLANDS

BY

HUGH MUNRO,

Principal District Inspector

OF THE

Department of Agriculture, New Zealand.

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THE QUARTERS,
STANLEY,
3rd October, 1924.

SIR,

I have the honour to submit, for the information of the Government, the enclosed report regarding the investigations which I have carried out in connection with the sheep-farming industry of the Falkland Islands.

I arrived in Port William in company with Mrs. Munro and Mr. R. W. Carter, Chief Inspector of Stock, by the s.s. " Kia Ora," at 3 p.m., on the the 5th April last, and landed at Stanley by 4.30 p.m.

Mr. Carter and myself left Stanley for Fitzroy South, on our first tour of the camp, on the morning of the 9th April, and returned to Stanley by H.M.C.S. " Afterglow " from Fox Bay via Speedwell Island, on the 7th May. During this tour we visited the following stations :—

Fitzroy South, Teal Inlet and Douglas on the Eastern Island and Port Howard, Hill Cove, Roy Cove, Chartres, Port Stephens, Fox Bay West and Fox Bay East on the Western Island—also the Islands of Weddell and Speedwell.

On the 7th June we proceeded from Stanley to Darwin by the s.s. " Falkland," and from there to San Carlos North and San Carlos South, returning to Stanley on the 19th June via Darwin and Hillside.

On the 23rd June we proceeded to Port Louis by H.M.C.S. "Afterglow," and returned by the s.s. " Falkland " on the 29th June. During this tour we visited the following stations :—

Port Louis North, Port Louis South, Johnson's Harbour and Rincon Grande.

Statistics and past history in connection with the industry have already been dealt with in a very comprehensive manner in the recent publication, *Sheep Farming Industry in the Falkland Islands*, and I have not, therefore, in the report, touched on those subjects further than has appeared necessary in connection with my remarks on conditions as I found them.

In submitting this report I desire to express my great appreciation of the assistance which I have received so freely from all connected with the farming industry during the course of my investigations. On no occasion have I experienced the slightest disinclination on the part of owners or managers to supply information for which I have asked, or to render any other service which was likely to be of assistance.

On behalf of Mrs. Munro and myself, I desire also to express our gratitude for the unbounded hospitality which has been extended to us during our stay in the Colony.

I do not expect that farmers will accept all that I have written as incontrovertible by any means; but I hope and believe that a great deal of it will eventually bear very good fruit.

Research work on sound lines and a change in the present system of farming cannot fail to prove of great benefit to the Colony.

I am, Sir,

Your obedient servant,

(Sgd.) H. MUNRO.

THE HONOURABLE,

THE COLONIAL SECRETARY,

STANLEY.

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INVESTIGATION INTO THE CONDITIONS AND PRACTICE OF SHEEP FARMING

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FALKLAND ISLANDS.

PASTURES.

Importance of indigenous grasses.

The year 1864 may be taken as the dawn of the sheep-farming industry in the Falkland Islands, and during the period of 64 years which has elapsed those engaged in the industry have given their undivided attention to the growing and marketing of wool. They have, I know, always recognised that the indigenous grasses on which the prosperity, and, in fact, the very existence of the industry depends, are their greatest asset.

Cultivation of main areas not practicable.

Areas will no doubt be cultivated in the future, but these will be relatively small under the existing system of big holdings, and the pastures on the great areas where the main flocks range must be maintained without the aid of the plough.

Sound knowledge of indigenous grasses essential.

Different classes of pasture require different treatment, and in this country, as elsewhere, a manager cannot work to the best interests of a property unless he possesses a sound knowledge of its indigenous grasses.

Great diversity of opinion on management of pastures.

Notwithstanding the importance of the subject and the accumulated experience of nearly 70 years which should be available regarding it, great diversity of opinion still exists on essential points in connection with pasture management among the capable men who are in charge of the various stations. Some hold that the country has always been overstocked, while others maintain that their properties are understocked, and that stock would do better, and the lambing percentage would be higher, if more were carried. Some hold that burning is essential and does no harm, provided it is carried out at the proper time, while others contend that it is harmful at all times, and a few go to the length of suggesting that it should be prohibited by law. The majority do not hold any pronounced views regarding the necessity for periodically resting of pasture; but two managers with whom I discussed the question were opposed to the principle—holding that they obtained better results by having their camp well stocked at all times.

Overstocking highly injurious to tussock pasture and spelling essential.

The indigenous grasses which comprise the pastures of these Islands are practically all of a decided tussock forming nature, and it is well recognised that overstocking is highly injurious to such pasture. Moreover, while periodical resting is highly beneficial to any pasture, it is essential, in the case of tussock pasture, in order to maintain the carrying capacity of the country.

Great damage done by overstocking and burning.

Very great, if not irreparable, damage has already been done to the pastures of the Colony as a result of injudicious burning and overstocking; but unfortunately the process of decay has been so gradual, and has spread over such a long period, that it does not appear to have given rise to serious uneasiness until quite recent years.

Reduced carrying capacity of the land.

Reference to the official returns shows that during the year 1898 the country was carrying 807,000 sheep, whereas by the year 1923 the number was reduced by 159,915 to 647,085.

Judging by the condition of pastures during my tour of the camps, I am of opinion that the number of sheep carried during 1923 was greater than should have been carried in the interests of the country. Assuming that the country was similarly overstocked during 1898—doubtless a safe assumption—the difference between the number carried in 1898 and that carried during 1923 probably fairly represents the extent to which the pastures have been exhausted during the intervening period of 25 years.

If the foregoing fairly represents the position—and I believe it does—it means that the Colony's only asset has been reduced in value to the extent of more than one-fifth during the past 25 years, which should be sufficiently serious to make those who have most at stake consider seriously whether there is not something wrong with the system of farming that has brought this about.

The causes which have been responsible for reducing the carrying capacity of the country have also, no doubt, detrimentally influenced the nutrition of the remaining pasture, and it will probably be found that this has a strong bearing on the extraordinarily heavy mortality among young stock—but this aspect will be dealt with later in this report.

Destruction of large tussock without replacement.

The extent to which the large tussock has been destroyed, particularly on the Western Island, and the total absence of any serious effort to replant the old bogs appears to me to be very regrettable. In view of the fact that this can probably be classed as one of the most nutritious grasses in the world, it is quite remarkable to see it so much neglected in a country where nutritious vegetation of any kind is all too scarce. I can assure Falkland Island farmers that, had we similar tussock points and islands in our country, we would value them sufficiently to take very good care of them.

OVERSTOCKING.

Danger of overstocking.

Of all errors of judgment to which managers are prone, overstocking is probably at once the easiest to commit, because it is the most tempting, but the most dangerous, since, when practised, it generally gives rise to many and varied sources of damage and loss.

The carrying capacity of pasture is rather a difficult matter to decide, and any estimate, to be reliable, must be based on an intimate knowledge of the country over a period of both good and bad years, in order that the law of average may be applied.

If country is stocked according to its carrying capacity during favourable seasons, as is often the case, it follows that overstocking, with all its attendant evils, must be practised during lean seasons, and, to a lesser extent, even during average seasons.

Immediately on taking over control of a property the wise manager sets to work to ascertain its maximum carrying capacity, and by the time this is accomplished he is also in a position to decide what margin of safety the local conditions require, and stock accordingly.

Necessity of ascertaining maximum carrying capacity of land.

While an extended knowledge of country is necessary to enable a person to form a reliable opinion of its carrying capacity, an experienced man does not require such knowledge to enable him to recognise when country is overstocked, particularly when it has been overstocked for an extended period.

In all parts of the Falkland Islands the pastures provide abundant evidence of overstocking over a long period, and, judging by the present condition of large areas of country, as well as by the gradual decline in its carrying capacity—as instanced by the official records—it is safe to say that the country has been subjected to overstocking for a period of at least 30 years.

Country has been overstocked for at least 30 years.

There are still areas of dry camp where the pastures have been well maintained as a result of good management, and from these, as well as from the horse paddocks at many settlements, one has little difficulty in forming a reliable opinion as to what the greater areas of what is now more or less exhausted pasture were once like, and what they would still be like had they not been subjected to overstocking and other forms of injudicious management in the past.

Unfortunately, the best of the country has suffered the greatest damage from both burning and overstocking—from burning because, being dry camp, the fire has been able to burn into and destroy the roots of the grass as well as to damage the surface soil—from overstocking because, being dry, sweet country, sheep have been able to crowd on to and eat it out in the absence of sufficient sub-dividing fences to keep them properly spread.

Injurious effects of burning and overstocking dry camp.

Nature insists that soil shall be protected by a covering of vegetation of some kind, and the experience of all countries has been that when man destroys the indigenous vegetation, and fails to replace it immediately with some other, nature will provide one of her own choosing, which is usually very inferior to that which man destroyed.

The great areas on these Islands on which the indigenous grasses have been replaced by nature with inferior vegetation, such as diddle-dee, Christmas bush, small fern, etc., is only another illustration of this great natural law.

Great areas on which indigenous grasses have been replaced by inferior vegetation.

A number of managers have informed me in all seriousness that this form of vegetation is quite as good for sheep grazing as the ordinary native pasture, apparently quite overlooking, among other things, the gradual drop in the carrying capacity which has kept pace with and been the natural result of the change of vegetation.

There is strong evidence that when stock was first introduced to these Islands practically the whole of these areas were carrying grass, and that they were the eyes of the country from the pastoralist's point of view. There are many instances, particularly on the Western Island, where the different conditions of the pasture on either side of a boundary fence provide striking illustrations of the result—to pasture—of different forms of management when followed consistently over a period of years. In one such case a boundary fence for several miles divides an area on which diddle-dee, etc., has completely replaced the native

Evidence of destruction of pasture.

grasses from another area which is quite free from diddle-dee and still carrying very good native pasture—the diddle-dee growing right up to the fence on one side and the tussock pasture doing likewise on the other side. In this instance the difference in the camp on either side of the fence is so pronounced and so sharply defined as to enable a person strange to the locality to trace the line of the boundary from a distance of several miles. On some properties where severe overstocking has been practised the condition of the camp on either side of a sub-division fence provides similar lessons: areas which have been reserved for horse paddocks and for holding stud stock and consequently not overstocked, are still carrying good, mixed native grasses, whereas on the other side of the fence the pasture has been completely exhausted by overstocking and burning and replaced by diddle-dee, Christmas bush, moss and other inferior vegetation.

Weddell Island used as an illustration.

The Island of Weddell probably provides as good an illustration of the evils of burning and overstocking as it is possible to find either in this Colony or elsewhere. This island is typical of the best camp in the Colony, and in the virgin condition its carrying capacity was no doubt quite equal to any other area of similar size. During the year 1897 Weddell was carrying 23,400 sheep, whereas at the present time it is fully stocked with 8,500. The original carrying capacity of this island was probably in the vicinity of 16,000 sheep, and, had this number not been exceeded, it would have maintained that capacity indefinitely under reasonable management.

This island has recently changed hands, and there is every indication that it will be given every opportunity to recover some of its lost glory. The system of farming which has brought Weddell to its present deplorable conditions has also left its mark on about 90 per cent. of the remaining pasture of the country, and although in most localities the process of decay has been considerably slower than at Weddell, it will nevertheless achieve the same result eventually, unless overstocking and injudicious burning is discontinued.

Damage caused by retention of useless old sheep.

Not only is overstocking still practised extensively, but on a large number of stations the excess consists of dead old sheep that cannot possibly pay their way, while at the same time they are consuming the grass which is required to maintain the younger sheep in that condition which is necessary to enable them to produce their maximum weight and quality of wool and to enable the ewes to rear their lambs.

Sheep of this class are robbers at any time, but when they cause an excess over the true carrying capacity of the country they become a menace.

The condition of a lot of these old culls during April and May, when I had an opportunity of seeing them in different localities, was such that the managers must have known when turning them out after shearing that a large percentage of them had no chance of surviving the winter.

Thousands of these hopeless culls are being turned out annually to consume, in the period from shearing up to the time of their death, during winter, the grass which otherwise would be available and which is required to carry the profit-earning portion of the flock through the winter in proper condition.

The managers quite realise the error of hanging on to these old sheep, but on account of the poor lambing percentage and heavy mortality among hoggets a number of them are forced to keep the culls in order to comply with communications which practically amount to instructions from absentee owners or company directors as to the number of sheep that should be carried. It apparently does not occur to these owners and directors that the exhausted condition of the pastures, which is, to a great extent, the direct result of overstocking with these old culls, is in turn the principal cause of mortality among their lambs and hoggets. Pressure brought to bear by absentee owners on managers to keep up numbers of sheep.

A great number of people who are financially interested in sheep, without having had any experience of their management, appear to think that the income from their wool clip depends on the number of sheep they carry—apparently overlooking the fact that both the flesh and wool are products of the soil and that the weight and quality of the latter will depend to a great extent on the condition in which the sheep are maintained during the year.

Any competent manager knows that a flock of 15,000 good, young sheep that are carried in healthy condition right through the year will give better results than an inferior flock of 20,000, more particularly when the feed is insufficient to carry the latter number through the winter without a check. I took advantage of opportunities at different settlements to examine wool from last season's clip, and the very large percentage of tender fleeces (not peaty) bore ample testimony to overstocking on an extensive scale.

It would appear that absentee owners and company directors are a great deal more to blame than managers for the overstocking of pastures. When discussing carrying capacity with managers during my tour of the camps, the majority agreed that the country has been seriously damaged by overstocking and stated that their owners—or directors, as the case might be—insisted upon a given number of stock being carried. No reasonable person would question the right of owners or managing directors to issue any instruction they may think fit to their resident manager, but the wisdom of doing so can well be questioned, unless the person issuing the instruction knows at least as much about the subject as the manager. Absentee owners apparently to blame for the overstocking.

The condition of the pasture in this country has altered so steadily and so much during the past twenty years that even those who may have been quite capable managers a number of years ago—but have failed to keep in close touch with the progress of events by regular and prolonged visits to the country—are no longer in a position to say what number of stock a block of country is capable of carrying, or yet to issue instructions regarding many other details of management. Alterations in conditions of pasture in last 20 years.

After looking carefully into the matter I am of opinion that company directors and absentee owners, who are either not fully conversant with station management or have not kept in close touch with the progress of events by regular visits to the Colony, would best serve their own interests, and those of the country, by relying a great deal more on the judgment and advice of their resident managers than they have done in the past. Reliance on managers desirable.

BURNING.

Probably burning has been almost equally responsible with overstocking for the exhausted condition of the pastures, which has resulted in the reduced carrying capacity and other evils which are so seriously Effect of burning on carrying capacity.

affecting the sheep-farming industry. The land in this country can be roughly divided into three classes, as follows :—

Three classes of land in the country—Good land.

The first is the country which is dry and hard as a result of good sub-soil drainage. The soil on this country is light and usually black, but occasionally chocolate in colour, and varies in depth from 10 to 18 inches, according to locality, with a sub-soil of yellow clay of very open texture, varying in depth according to locality—the maximum being about 10 feet with probably pervious rock underlying. In some localities a few inches of rubble separate the soil from the sub-soil, and in other localities rubble is mixed with the sub-soil.

This class constitutes the eyes of the country from the pastoralist's point of view, for it grows the most nutritious grasses, and stock can feed in comfort and find a dry camp on it at all seasons. In its virgin condition this was very good country and quite equal to average good tussock pasture in other countries.

Second class land.

The second class is the medium dry country which retains the moisture to a greater extent than is desirable during about nine months of the year as a result of indifferent sub-soil drainage. Here the soil is of a more peaty nature, with a stiffer sub-soil, and probably a less pervious rock underlying.

Wet camp.

The third is the wet camp, the bulk of which is represented by the high country. This is a wet and peaty soil varying in depth from 6 inches to about 2 feet 6 inches, often with no sub-soil and apparently impervious rock underlying.

I am informed that this camp dries to such an extent at times during summer that fissures appear in the soil—due, of course, to the same cause that makes the surface a bog during winter, viz., the impervious rock which lies so close to the surface.

Effect of burning on well drained dry country.

As has been previously indicated in this report, the first class is unfortunately that which has suffered the greatest damage from both overstocking and burning. The fact of its having a well-drained and consequently dry surface has enabled fires to burn below the surface and into the roots of the grass, or when they do not actually burn below the surface, sufficient heat is conveyed below to either destroy, or, at least, considerably weaken the roots of the grass. Each time an area of pasture is fired a certain percentage of the fine grasses and herbs, which grow between the white grass tussocks and which provide the real sheep feed, is destroyed, and others are weakened, and seed that has either recently germinated or is in the process of doing so is completely destroyed and the surface soil itself, which is the main cog in the wheel of the pastoral industry, is damaged to a greater or lesser extent.

I have seen areas of similar land in other countries where the surface soil has been reduced by constant burning to a condition at which it would no longer produce grass until fresh soil was brought to the surface by the plough.

The evil of burning this class of country does not end even with the damage that is due directly to the fires, for the reason that stock crowd on to burned areas and graze the succulent young grass so hard, that further extensive damage is due to this factor.

Some managers contend that any class of country can be burned without injuring the roots of the grass, provided it is done when the surface soil is damp; also that sheep eat the young growth of white grass which follows a fire and thrive on it. This is correct up to a certain

point only—no dry camp can be burned at any time without doing some damage, and although sheep eat the young growth of white grass that follows a fire and thrive on it, this is only a temporary advantage, proving to be an ultimate source of loss in place of gain, when compared with the damage that is done to the fine grasses which grow between the white grass tussocks, and which provide the real sheep feed and the foundation of the pasture. It is the gradual elimination of these fine grasses, among other reasons, that is directly responsible for the pastoralist's troubles in this country, including the drop in the carrying capacity, the mortality among young stock, and the slow maturing of young stock.

Chief value of white grass is for the protection of fine grasses.

White grass is not a sheep feed in the ordinary sense of the term, and its principal value on good country, from the sheepman's point of view, is to provide shelter for the fine grasses and weeds which grow on the spaces between. If a manager is determined to burn dry camp, certainly the best time to do so is when the surface soil is wet and a strong wind blowing; but even under these favourable conditions some damage will certainly result.

Effect of burning second class country.

The second class country has not been damaged to the same extent as the first class, owing to its wet surface making it more difficult to destroy the roots of the grass or damage the surface soil, and also because stock have not crowded on to it to the same extent. However, the second class is now subjected to a great deal more burning than the first, because there is more left to burn, and if the practice is continued its tussock pasture will eventually be destroyed over extensive areas as surely as this has already been accomplished on the first class country.

Poorest country has suffered least from overstocking and burning.

The third class country, which matters least, is that which has suffered least damage from either overstocking or burning—from overstocking because it has not been possible to crowd stock on to it, and from burning because there has been less temptation to burn it, and when it has been fired its very wet surface has prevented extensive damage to the grass roots and surface soil.

Process of exhaustion of pastures by burning.

There are some areas of first-class camp which in themselves provide excellent illustrations of the effects of burning on all three classes in so far as it is controlled by the moisture in the surface soil. On these areas the tussock pasture has been completely destroyed and replaced by inferior vegetation over the greater portion, whereas in the valleys and depressions the tussock pasture is still in possession, more or less, according to the amount of moisture in the surface soil, which varies according to the depth of the different depressions.

So the process of exhaustion has proceeded slowly but surely for many years, until now, in many localities, all that remains to be done in order to completely destroy the productivity of the surface soil is to fire the deep rooting and very inflammable diddle-dee which has already replaced so much of the valuable tussock pasture as a result of overstocking and burning.

There are some who dispute the statement that the spread of diddle-dee, small fern, etc., is so largely the result of burning and overstocking, but those with an open mind on the subject who care to travel and observe, will find ample and indisputable evidence of the fact.

Burning justifiable in some cases.

It is not suggested that burning is wholly bad on all classes of country, or that it should be prohibited entirely. There are no doubt occasions when the coarse vegetation on wet camp reaches a stage when burning is justified; but it should be confined to wet camp and resorted to even there only when considered essential and under the most favourable conditions.

Action necessary for restoring pastures.

Leaving the past for a moment and giving some thought to the future, the matter which presents itself as requiring first consideration is as to what action must be taken in order to stay the decay of the indigenous pastures and to enable them to recover as much of their former glory as existing circumstances will permit.

Regrassing.

The regrassing of the more or less waste areas of first-class country with introduced grasses should not present any insurmountable difficulties, and it will eventually more than justify any expenditure that may be wisely incurred in carrying it out.

Not practicable on large areas of wet camp.

With the great areas of wet or even moderately wet camp, however, the position is different, for here the soil conditions are such as to render regrassing on an extensive scale—excepting by the seeding of the grasses already growing there—so difficult as to be almost impracticable.

Sub-division of camp.

Reduction of stock.

Restriction of burning.

Those who agree with the foregoing will readily realise the necessity for departing in any way that may be deemed necessary from the system of farming which brought the pastures to their present condition, and the departures which immediately strike me as likely to be most effective are further sub-division, reduction of stock to a stage which will permit of the resting and seeding of all pasture at regular intervals, and the confining of burning to wet camp, having resort to this very sparingly even there. Pastures cannot last indefinitely unless they are permitted to seed at regular intervals, and unfortunately the best varieties of grasses are those to disappear first, particularly so on sheep country, for the reason that, being palatable and nutritious, they are kept fed close to the ground until finally exhausted, whereas the less palatable and nutritious varieties are permitted to seed and replace them.

This process of replacement has been in operation in the Falkland Islands for at least 40 years, and failure to rest the pasture has been one of the principal contributing causes, but unfortunately the process of elimination has been so insidious that it has reached an advanced stage without any action being taken to stay it.

Advantages from further sub-division.

In all great sheep countries it has long been recognised that the sub-division of areas into paddocks as small as may be found consistent with economical farming greatly improves the carrying capacity of country, while at the same time it prevents exhaustion of the pastures by enabling blocks to be rested, particularly at a season which will permit the grasses to seed without seriously inconveniencing the management. The sub-division of areas into paddocks which will enable the pastures to be rested periodically so that the best grasses may seed, provides a much better insurance against exhaustion than does much lighter stocking on large undivided areas.

Unfortunately the result of exhausted pasture does not end with the drop in the carrying capacity, for there is also reduced lambing percentage, reduced weight and quality of wool, delayed maturity of young stock and increased mortality, all of which this country is already experiencing.

Nor does the advantage of close sub-division end with the protection of the pastures, for it also gives a much better spread of the stock, enables inferior country to be put to full use during suitable seasons of the year (which applies particularly in the case of wet camp in this country), helps to guard against inbreeding, and enables wool of different classes to be kept separate at shearing. Sheep running on small blocks are much quieter than those on large blocks, and anything that will quieten Falkland Island sheep—more particularly the breeding ewes—

must be of great advantage. A change from paddock to paddock is also very beneficial to sheep when they become accustomed to it, as they quickly do under the rotation system of grazing. What will constitute reasonably sized sub-divisions depends to a great extent on the carrying capacity of the country, but on the average good camp in this country, between 4,000 and 5,000 acres for breeding ewes and hoggets and 7,000 acres for main flock, would not be aiming too high. Areas of sub-divisions recommended.

When the value of close sub-division is fully realised managers often carry it further than was originally intended or thought possible, and in such cases it is a great advantage to have the original fences so situated as to be most favourable for further sub-division. Consequently, before any new sub-division fences are erected, it will be found a wise plan to prepare a rough plan of the property showing all existing fences as well as lines where there is any possibility of others being erected in the future. Plans of stations showing existing fences necessary.

CATTLE

It would be very beneficial to pastures to carry many more cattle than is done at present, more particularly on properties that are sub-divided into areas which will enable them to be used to the best advantage as scavengers to clean up the coarse vegetation as well as for the purpose of consolidating the surface soil. Cattle beneficial to pastures for reasons shown below.

The coarse vegetation must be kept in check in order to give the fine grasses and herbs, which provide the principal sheep feed, a chance, and for this purpose either cattle or fire must be used. Coarse vegetation kept in check.

When dealing with soil of a pronounced peaty nature, such as it is in this country, it is well recognised that consolidation of the surface is extremely favourable to the growth of grass and more particularly of the finer varieties, and here this consolidation can be secured to any appreciable extent only by the more extensive use of cattle. Soil consolidation.

The paddocks in the vicinity of most settlements provide excellent illustrations of the benefit that may be derived from consolidation of the surface soil. The splendid sward of fine grass which is to be seen on a number of these paddocks, and which is the result of crowding stock on to them principally during shearing and dipping, is due not so much to the extra dressing of animal manure they receive, but principally to the consolidation of the surface as a result of constant treading by large numbers of stock. Sheep can effect this when they are crowded on to limited areas in great numbers such as at shearing time, but their weight is insufficient to have much effect on the open camp, where the average is one sheep to four or five acres, and where they avoid as much as possible the softer ground, which is that most in need of consolidation. Excellence of pastures in vicinity of settlements.

It is of course not suggested that any portion of the main camps can be brought to anything approaching the condition of the settlement paddocks by using cattle, but they will assist very materially if kept in sufficient numbers and handled judiciously. Unfortunately there are no means of marketing surplus cattle at the moment, but if the number were carried that is necessary for the benefit of the pasture they would materially hasten the time when the country will be in a position to support a small freezing works. Even should it not be found profitable to grow turnips to top them off they could be marketed in the form of boned beef, for which there is always a ready sale.

Unfortunately the existing fences were erected with a view to holding sheep only, and they are not sufficient for even quiet cattle. I recommend that all fences erected in future should be constructed to hold cattle also. New fences should be cattle proof.

Low standard of cattle now in country.

The standard of quality of the cattle in the Colony is extremely low, which is due no doubt to the fact that under existing conditions there exists practically no incentive to improve them. They are very much inbred and extremely small, weighing only from 3½ to 5 cwt. when fat, in place of the usual average of 7 to 9 cwt. which one expects elsewhere.

The Colony is indebted to those owners who have imported fresh blood during the past few years.

MORTALITIY AMONG YOUNG SHEEP.

Heavy mortality among young sheep.

The heavy mortality among sheep under the age of one year, which has been steadily on the increase for about 10 years, but has been much more pronounced during the past 5 years, presents one of the most serious difficulties with which the pastoralists of this country have to contend.

A few stations are still able to rear sufficient young sheep to enable them to cull, to a limited extent, for both quality and age; but on the majority of properties the trouble has reached a stage at which the annual increase is barely sufficient to maintain the flocks without any culling excepting for dead old age, while on a few even that stage has been passed, and sheep must be imported from outside to maintain the flocks.

Standard of quality of flocks on the decline.

As a result of this condition the standard of quality of the flocks on the majority of stations has been steadily on the decline for several years, and they have now reached a stage from which the decline will be more rapid in the future unless prompt and effective action is taken to remedy the conditions that are responsible for the trouble.

Statistics of mortality.

During the course of my investigations I gave particular attention to acquiring information regarding lambing and mortality among young sheep during stated periods throughout the year, but owing to the very indifferent manner in which the records are kept on most stations it was difficult to get reliable figures. However, as a result of careful enquiries, I believe that the following figures, which are based on the number of ewes to the ram, fairly represent the position during the past few years :—

Lambs born, 90 per cent.

Born dead, or died before marking, 28 per cent.

Died between marking and dipping, 10 per cent.

Remaining at dipping, 52 per cent.

Low vitality of lambs.

Apparently more than is usual are born dead, but the principal mortality appears to be due to lambs being very weak at birth, this being followed by failure of a normal development in their vitality after birth. A number are lost in creeks and ditches, but this does not appear to be one of the principal contributing causes of the mortality.

Fallacy of blaming Romney ewes.

The steady increase in the mortality which has been experienced during recent years has been credited to various causes, but that which is most generally accepted, on the Western Island at least, is that ewes in which Romney blood predominates are shy breeders and bad mothers; and unfortunately in some cases action based on this theory has already been taken with a view to overcoming the trouble by introducing other breeds of sheep not nearly so well suited to the country as the Romney.

I am satisfied that there is absolutely no justification for this theory, and any changes of breeding that may be based upon it will result only in injury to the flocks by the further mixing of the various breeds, of which there has already been altogether too much in this country, without in any way mitigating the trouble.

Confusion between "inbred" and "pure bred."

It has also been suggested that the trouble is due to the fact that Falkland Islands sheep are now too well bred. If "inbred" had been used in place of "pure bred," the suggestion would deserve serious consideration, for it would be difficult to find any other country where inbreeding and mixed breeding has been practised to such an extent. The idea that the remedy for the trouble lies in a change to a hardier breed of sheep is a fallacy. What is required is a change to a different system of farming the breeds already in the country.

Romney most suitable sheep for the country. Fallacy of belief that they make bad mothers.

I am of opinion that the Romney is the most suitable of all breeds of sheep for this country, and it is desirable, therefore, that nothing should be permitted to pass unchallenged which is likely to turn breeders against them, and for this reason I beg to submit the following extracts regarding their breeding and milking qualities from most authoritative sources :—

In *Sheep Farming in New Zealand*, which is the recognised handbook in that country, William Perry, one of that country's leading breeders and exporters—who owns studs of Lincoln, English Leicester and Romney Marsh sheep, and is a recognised authority—writes as follows (page 45) :—

> "Romney ewes make excellent mothers, and are noted for their milking qualities, which enables them to rear two lambs as successfully as a single lamb reared by most other breeds; thus increasing the percentage of good lambs. For breeding fat lambs by Down rams they cannot be beaten."

Again, on page 68 of the same publication, he writes as follows :—

> "In the North Island ewes of the Lincoln-Romney cross are eminently satisfactory for lamb raising. The ewes of this cross are prolific, make good mothers, and are possessed of good constitution."

In *Live Stock in New Zealand*, which is the result of the combined efforts of several of the country's leading stock breeders, the following appears on page 24 :—

> "The Romney Marsh is a prolific sheep, lambing of 100 and even 110 per cent. being quite common. The ewes are good mothers and milk freely."

Unfortunately the stock literature at my disposal is extremely limited, as otherwise I could no doubt quote other authorities on similar lines to the foregoing. This is the first occasion in my experience on which I have heard the Romney ewe—pure-bred or otherwise—charged with being either a shy breeder or a bad mother. The extracts quoted represent the opinions of the great bulk of the pastoralists of Australasia, the combined flocks of which number 108,000,000 sheep.

One of New Zealand's principal exports is frozen lamb, of which that country is the largest exporter in the world. There are 13,000,000 breeding ewes in the country, of which approximately 8,000,000 are either pure Romney or with Romney blood predominating.

The New Zealand pastoralist has to pay too much for his land, and knows his business too well, to keep ewes that are shy breeders or bad mothers from which to produce fat lambs.

Cheviots.

There is one large flock of practically pure bred Cheviot sheep and at least two other flocks showing as much Cheviot as Romney in this country, and the lambing percentage in these are certainly not greater than in flocks in which Romney blood predominates.

Contagious abortion.

Contagious abortion also has been blamed for the unsatisfactory animal increases; but there appears to be no good ground for believing that this trouble has existed here at any time, and I am of opinion that this theory also may be safely discarded.

Exhaustion of pastures is the cause of increased mortality.

It is my opinion that the original and main cause of the increased mortality is the gradual process of exhaustion to which the pastures have been subjected as a result of overstocking and injudicious burning over a long period, and that the more rapid increase in the mortality which has been experienced during the last few years has been to some extent due to the fact that older and still older ewes have been retained for breeding purposes as the pressure from the original cause has been increasingly felt. A defective nutrition is most harmful to the very young, and it may materially affect the embryo during the period of gestation, with the result that a large percentage would be born lacking in vitality.

No doubt the in-and-in-breeding which has been carried on promiscuously for years, and the wildness of the ewes due to indifferent shepherding, have provided the second and third contributing causes, while dangerous creeks, ditches and holes have also taken some toll, and I shall make further reference to each of these in due course.

In order to realise the extent to which pastures at various stages of exhaustion will influence the mortality among young stock—and for that matter all other branches of the sheep-farming industry—it is first necessary to recognise the extent to which they all depend on a healthy and well-conditioned flock, and also, in its turn, the extent to which such health and conditions depend upon a sufficient and well-sustained nutrition.

Deficiency of soil nutriment.

In the majority of countries there are areas where the soil is lacking to a greater or lesser degree in a sufficient supply of one or more of the ingredients which are necessary for rendering plant life capable of either developing the young animal body in a normal manner or of maintaining the mature animal in perfect health.

Grass, in the main, contains only those ingredients which it draws from the soil, and when animals are wholly dependent for their sustenance on the grass, they, in their turn, can obtain only that quantity of the essential ingredients which is contained in the grass.

It follows therefore that when there is a deficiency in the soil, the whole system of the animals that obtain their sustenance from it will be affected according to the extent of such deficiency.

In some affected areas the deficiency is not sufficiently pronounced to seriously affect the health of stock while the pastures are still more or less in their virgin condition or even later, provided they are not subjected to treatment which will result in exhaustion to an undue extent. Should the pastures and soil of such areas be subjected to undue strain for an extended period, however, the ingredients that were originally in short supply will in time become exhausted to the stage at which the deficiency will exert quite an apparent influence on the general wellbeing of the stock.

There is strong evidence that the soil of the Falkland Islands was originally deficient in one or more of the essential ingredients, and that a stage of exhaustion—as described in the last paragraph—has already been reached in most localities.

The elimination from the pastures of the most palatable and nutritious grasses and herbs has also contributed substantially to the exhaustion of the pastures. The mixed pasture is very important from the point of view of variety of food, and, besides the loss of their superior nutrition, their elimination from the pastures has upset the balance of ration and rendered the remaining plants still less palatable.

Slow maturity of stock evidence of deficiency in soil.

The strongest evidence that the soil was originally deficient in certain essentials is provided by the length of time which young stock have always taken to mature, the steady decrease in size of matured animals from one generation to another (unless maintained by importing breeding stock periodically from other countries) and the extent to which stock running on the country develop depraved appetites.

Strong evidence that the deficiency has become more pronounced during recent years is provided by the increased mortality among young stock as well as by the increased extent to which the other disabilities mentioned have been noticeable during recent years.

In this country young sheep require from six to nine months longer to reach maturity than they do elsewhere, and it is held that if even the best developed ewes are used for breeding purposes when 18 months old it permanently interferes with their development to an appreciable extent. Besides which, the percentage of lambs obtained from them is extremely small.

Illustration from locally bred horses and cattle.

The fact is well recognised that after breeding from local mares and stallions for a few successive generations the progeny become reduced to the size of ponies, and for this reason horses must be imported regularly from South America for breeding purposes.

Cattle also which are the progeny of several generations of locally bred animals are very small, averaging only about 500 lbs. when fat. They have the dry coat and hidebound appearance which is so typical of cattle suffering from malnutrition. Cattle grazing on country where there is a deficiency quickly develop a depraved appetite, which is evidenced by the chewing of bones, wood and other articles for which they would evince no desire on healthy country. Here both sheep and cattle have developed depraved appetites to an unusual degree.

Depraved appetites of cattle and sheep.

Cattle eat up all the old skeletons of sheep, and sheep have a great appetite for the excrement of penguins and wild geese.

Early during the course of my investigations I was surprised at seeing practically no skeletons of dead sheep, notwithstanding the heavy annual mortality, and on making enquiries I was informed that they were all cleaned up by the cattle. Later I learned that this applied to all camps where cattle are running. On camps where cattle have not been grazing—Weddell Island for instance—skeletons at all stages could be found. On one occasion reference was made, in my hearing, to the fact that sheep eat the excrement of wild geese, and, as a result of further enquiries, I am satisfied that they eat the excrement of both wild geese and penguins extensively. The great flocks of the latter which exist here should certainly be able to supply the demand. Further, what appears most convincing evidence that defective nutrition is exerting very considerable influence on the mortality among young sheep, is provided by comparing the mortality and extent of maturity

Comparison of extent of effect of defective nutrition on the East and West Falklands.

among Western bred lambs during the first six months of their lives with that of Eastern bred lambs during the same period. An estimate which is based on very reliable information indicates that the mortality among lambs up to six months old is approximately 10 per cent. greater on the West than on the East. During my investigations I made a point of seeing the hoggets on all properties visited on both islands, and I am quite satisfied that at six months old the Eastern bred hoggets are on the average 15 per cent. better developed than the Western bred hoggets. I may say that in New Zealand we have several areas—some of them fairly extensive—on which stock are affected by defective nutrition due to soil deficiency; some of these areas were grazed for 40 years before the pastures reached the stage of exhaustion at which the stock feeding on them were materially affected.

Stock that are removed from a healthy area to that which is deficient in some way may not be expected to show any ill effects for a considerable period following the change. I mention this fact in order to guard meanwhile against hasty conclusions being arrived at and acted upon in event of imported ewes giving better results than the locally bred ones at the first lambing following their arrival.

Rowett Institute Researches.

The investigations which are now being carried out by the Rowett Institute on behalf of the Colony must eventually prove of great value, and, among other services, will no doubt throw considerable light on the question of nutrition from the point of view of soil contents.

Should the investigations disclose any serious deficiency of one or more of the essential ingredients, it may be possible to supply them to stock in the form of a chemical lick, but nothing should be done in this way excepting as may be advised by the Institute as a result of the investigations. Salt, however, will provide a very valuable, and at the same time a perfectly safe lick meanwhile, and I am confident that its extensive use here would prove very beneficial, even quite apart from the question of serious soil deficiency.

Reason for sheep feeding on kelp.

I have been informed that a lot of sheep hang about the coast to eat the kelp, but what they really are after is the salt and other valuable chemicals that are always associated with salt in small quantities.

Provision of rock salt recommended

Why not prevent these sheep congregating to an undue extent on the coast pasture and at the same time supply the requirements of the main flocks by placing suitable boxes containing rock salt at suitable intervals all over the camp. Salt is beneficial to sheep in almost any country, but here—where such a large proportion of the country is marshy and sour—it should prove particularly beneficial.

I am informed that rock salt has been tried on one station and that the sheep did not take to it. This was the result to be expected if it was placed out once among sheep not accustomed to its use. It is necessary to educate a flock to the use of rock salt and a start should be made with breeding ewes and hoggets.

Meantime, however, the principal remedy for the ills that are besetting the sheep-farming industry must be sought through improvement of the pastures, first attention being given to the country on which the breeding ewes and hoggets are depasturing.

Breeding ewes.

Flushing breeding ewes for two or three weeks before turning out the rams is one of the very old customs the advantage of which has never been challenged.

Good condition at and before lambing essential.

A rising condition is highly favourable to pregnancy, because a change on to fresh and abundant pasture stimulates the whole system including the breeding impulse. The necessity also for breeding ewes being in good condition at lambing time cannot be too strongly stressed. If the ewe is in good condition she has in her body a reserve of milk

producing material to supplement the food supply for a period, in the event of it being insufficient at the most critical period of the lamb's life, whereas if she is in poor condition the milk supply must depend wholly on the food she can get from day to day, and if that is below requirements so also will be the milk for the lamb.

In New Zealand our great dairy herds have provided exceptional opportunities for confirming this theory. The most successful dairyman is he who brings his cows through the winter and up to calving time in big condition, because the surplus condition goes to increase the milk supply during the early spring while the pastures are still barely sufficient, and the value of such increase is many times greater than the cost of creating the conditions which made it possible.

Proper provision only possible where sub-division is ample.

These things are only possible on properties that are well sub-divided.

Sufficient of the best camp should be set aside for the breeding ewes and hoggets and sub-divided into areas which would permit of the stock being changed, and the paddocks rested at frequent intervals. All fences should be constructed to hold cattle, and these should be used to a greater extent in place of sheep to clean up the coarse vegetation and consolidate the surface soil.

Experiments in grassing and cultivation necessary.

Experiments should be undertaken to determine which grasses are most suitable for surface sowing to adopt particularly with a view to regrassing the great areas of dry camp which are at present carrying inferior vegetation. Experiments should also be carried out with a view to growing roots, particularly turnips and swedes, on the extensive scale, which in some other countries has proved a mine of wealth and a very effective method of improving land. I shall deal more comprehensively with these matters later in my remarks regarding State experiments.

ROUGH HANDLING OF STOCK.

Handling of Stock.

Wildness among breeding ewes is a great disadvantage at all times and usually a source of mortality too, even when lambs are born strong and other conditions are favourable for them; but here, where a large percentage are weak for several days after birth and so many dangerous creeks and ditches have to be negotiated, the wild condition of the ewes must be taken seriously into account when considering the various causes which contribute to the heavy mortality among young lambs.

Rough handling.

Unusual wildness of sheep is invariably due to one or more of the following causes:—The breed, running on large sub-divisions and rough handling with inferior dogs.

Romney blood predominates in the Falkland Islands flocks, and the Romney is certainly not a wild sheep by nature.

Inferior dogs.

They are certainly running on large sub-divisions, but after making allowance for this, the main cause of the trouble is reached, viz., rough handling with inferior dogs.

The rough handling to which all classes of stock are subjected here, and which is probably a relic of the historic Gaucho, would not be tolerated in any other country where I have seen stock handled.

Excessive number of dogs allowed.

Among other abuses shepherds go about their ordinary duties with any number up to five dogs following them when one would be ample, and often none would be still better. The great majority of these dogs are very badly trained and not under proper control and a great deal too much use is made of them.

Dogs badly trained.

It was not at all an uncommon occurrence to see a dog collecting and working a point of sheep on his own initiative without being seriously checked by his master.

When a well trained dog is sent round a mob of sheep he collects the lot quietly and holds them together when collected—sheep that are used to this style of handling are quiet and easy to gather into a mob, because they are used to proper control and know they cannot escape from the dog in any case.

The average Falkland Islands dog is not at all particular about collecting the whole of a mob, or yet about holding them when collected. It is quite usual to see sections of a mob break away after being gathered without the dog in charge showing any concern. When dogs were sent some distance to collect a mob it was quite usual to see them cut through and collect a portion only, the remainder making fast time for safety. I have seen dogs commence working any number up to 200 sheep and finish with about a dozen, being apparently quite satisfied so long as they had some. During one day I saw three sheep drop exhausted and die from apoplexy as a result of rough handling. I do not desire to convey the impression that this last is a usual occurrence, but I mention the fact to illustrate the wild condition of the sheep and the extent to which they are hunted at times.

Killing sheep by dogging.

Rough handling of any kind tends to make sheep wild, but probably nothing else contributes to this condition to the same extent as the habit of breaking away from the control of inferior dogs. Quiet ewes will desert weak lambs at times when disturbed, and it is quite reasonable to conclude that wild ewes such as one sees here will do so fairly extensively. During my tour of the camps I saw only about four dogs that could be considered good average workers, but I saw many which were quite unfit to be let loose after sheep.

Dogs should be imported.

Managers would be justified in taking a very first stand against this abuse, and it would pay owners well to import Border Collies liberally for breeding purposes in order to provide their shepherds with decent material to work on. It would also pay to organise dog trials as an incentive to men to train and control their dogs properly.

Dog trials.

CREEKS, DITCHES AND HOLES.

Losses in creeks and ditches.

Managers and shepherds blame creeks, ditches and holes for a great deal of the mortality among lambs and hoggets, and a few go to even the length of contending that these provide the main source of loss. In some localities they certainly are a menace even to strong sheep, and one can readily realise that they will account for a very large number of weakly lambs and hoggets. However, I found no one who was prepared to state that these creeks, ditches and holes have been in a more dangerous condition during the last few years than was the case 20 years ago, and consequently any portion of the increased mortality for which they may be immediately responsible will be due primarily to the fact that during recent years lambs have been much weaker than those of 20 years ago, and therefore not so capable of negotiating such places.

Creeks should be opened and bridged.

This is a source of mortality which requires neither investigation nor advice, and which could have been tackled years ago with great advantage. The narrow creeks, into which stock blunder because they are hidden by vegetation, could be uncovered and opened so that stock may see them; crossings could be made in many places, and where these are not possible owing to the creeks being narow and deep, light bridges could be placed over them at intervals, at small cost.

The majority of these dangerous creeks are from two to five feet wide, and the only material required for most of the bridges would be three eight-feet stringers, six piles, and some two-inch planking and nails, while a number would require only two stringers (strong fencing posts would do), four piles, and some two-inch planking and nails.

In view of the importance that is attached to these as a source of loss, it is remarkable how little has been done to make them more safe. Even creeks and crossings, which have been in regular use by horsemen for years, have, apart from being dangerous for stock, been tolerated for years when they could have been made convenient and safe at the expense of a small bridge or a little labour with a spade. This work would not necessitate the employment of additional labour. All that is necessary is to make the best use of the permanent hands during the slack season.

BREEDING.

Fundamental principles of breeding.

The fundamental principles of breeding, which are now accepted by both scientists and breeders in all parts of the world, are based on the results obtained by the most successful breeders of the past and on careful observation of life in all its forms. These include:—

(1) Breeding from parents (particularly males) that have been bred for a long period without any infusion of alien blood.

(2) Breeding from parents that are true to the type of their breed.

(3) Breeding only from animals of good constitution and a high standard of excellence.

(4) Breeding persistently to a standard on which the breeder must already have set his mind.

(5) Breeding from selection, by mating animals so as to correct defects and render desirable qualities more permanent in their progeny.

The principles are all based on the first law of heredity, viz., that like begets like.

It was the careful study and close application of these principles that enabled the great husbandmen of the past to bring the various kinds and breeds of domestic animals to their present high standard at which they are of such great service to humanity, and it is only by the same means that the husbandmen of to-day can hope to still further improve them, or even maintain something approaching the standard that has already been reached.

While the most thorough knowledge of these principles and the results that are likely to be obtained by adhering to them will not make a man a successful breeder unless he has practical experience and sound judgment, it will nevertheless enable him to avoid many serious errors and work along those lines most likely to lead to success, without indulging in costly experiments which so often result in extensive damage being done to flocks.

The men who occupy responsible positions in connection with the sheep-farming industry of this country have experience and sound judgment, but it can hardly be claimed that the system of breeding which the great majority are following is either in accordance with recognised principles or that which will raise the flocks to a high standard of

excellence. Certainly one handicap under which they are labouring is that they have not at their disposal the facilities which will enable them to apply better methods.

Cross-breeding practised extensively and aimlessly.

Cross-breeding is practised extensively and in an aimless way. Mongrel sires are used extensively, and in-and-in-breeding is practised indiscriminately by the use of sires selected from within the flocks and by running breeding ewes and rams of all ages up to 11 years together.

Value of pure breeding.

To the average breeder the term pedigree, as applied to stock, indicates animals whose lineage can be traced back by a line of pure breeding for an extended period. The benefit which stud animals derive from such a long line of pure breeding lies in the added prepotency, or, in other words, the great power which it gives them of transmitting their type and individual excellence to their progeny. The cross-bred sire rarely possesses this power in any marked degree, and when he does he is only a happy chance and seldom transmits the power to his progeny.

Nothing provides such good proof of the value of a long line of pure breeding as the increased price which the careful and experienced breeder will pay for a pedigree animal, as compared with a cross-bred of *equal individual excellence*, when both are available. Say he buys the pedigree animal at £60 in preference to the cross-bred at £10 (which is quite a common occurrence). Under the circumstances he pays £10 for the animal's individual excellence and £50 for the pedigree, which provides the guarantee that the animal possessing it will have the power of transmitting his type and other desirable qualities to his progeny, as a result of the long line of pure breeding that lies behind him.

On more than one occasion when being shown cross-bred rams in this country men have remarked that some of them were better than a lot of the imported pure-bred animals, but when considering them as sires the foregoing simple facts should be kept in mind.

Effect of using mongrel sires.

The flocks on two stations which I visited provided particularly fine illustrations of the result that may be expected from using mongrel sires or sires bred within the flocks. In each of the cases referred to, the flocks will pass as half-bred Cheviots, although the Managers informed me they had been endeavouring for 25 years to change over from the Cheviot to the Romney type, and that during that period no Cheviot rams had been used.

In both cases further enquiries elicited the information that the majority of the sires had been selected from within the flocks, and that those introduced were local cross-breds, and no doubt even those had Cheviot blood in the mixture flowing through their veins. In any case the prepotency of these ewes, which had been in-bred to one strain for over 30 years would be much stronger than that of mongrel bred rams collected from different sources. Had pure-bred Romney rams been used and the principles of breeding respected in other ways, very little trace of the Cheviot would have been discernible in the fourth generation following the change. These flocks average about 5½ lbs. of wool, whereas good quality Romney sheep would easily have averaged 7½ lbs. The value of the difference during the period referred to would have been sufficient to provide for all the fencing and other improvements of the properties.

Benefit of using pure-bred sires.

Each pure breed of sheep has been gradually evolved for some special purpose or to suit some special set of conditions, and when the purpose for which they are kept can be attained by keeping them pure, substantial benefit is derived by doing so. That the standard of a flock or herd can never be raised above that of the sires that are used in it is an old saying that breeders in this country would do well to keep in mind.

The chief advantage of cross-breeding sheep is the production of dual purpose animals with a view to obtaining at once a suitable carcass for the butcher as well as a profitable fleece, and in countries where both branches of the industry must be considered, cross-breeding on approved lines is practised extensively and with great advantage. Usually, however, the cross-breeding in any one flock is confined to two breeds which will blend readily, and while it is continued only pure-bred sires of one or other of the foundation breeds are used. At times these cross-bred ewes are bred to Down rams for the purpose of producing fat lambs, but in such cases none of the progeny is retained for breeding purposes. When the production of wool is the only consideration, evenness and quality in the clip are matters of first importance, and these can be attained only by avoiding the unnecessary confusion of type in the flock, which always results from haphazard crossing or the use of cross-bred sires.

Nondescript flocks and wool of many types result from cross-breeding.

While cross-breeding is carried on without having some well defined aim and purpose and the blood of many breeds is mixed indiscriminately and mongrel sires are used extensively, the result will be nondescript flocks producing wool of many types and a wide range of quality, without any compensating advantage being gained.

All of these abuses have been practised extensively on the majority of stations in this country, with the result stated. In all flocks seen by me, with the exception of three, the Romney Marsh type predominates to the extent of giving them at a distance the general appearance of Romney flocks, but in all cases a closer inspection usually discloses a wonderful mixture of breeds. I had a particularly good opportunity of examining the whole of the hogget flocks on two stations as they passed through the dip, and in each case, besides the Romney type, which predominated, the following also were strongly in evidence: Lincoln, Cheviot, English Leicester, Merino and some of the short-wooled breeds. The sorting of a clip from a flock bred in this way would keep a capable classer very busy, but when it is sold without any serious attempt at classing, it presents great opportunities for profit to the speculator at the expense of the grower.

Many good sheep in the country.

In the foregoing remarks I do not desire to convey the idea that there are no good sheep in the country; on the contrary, I have seen a lot of very useful sheep indeed, and if breeders will only apply modern methods of breeding, the flocks can be rapidly improved from the local ewes, for of all domestic animals the sheep is the most plastic in the hands of man.

There has been some diversity of opinion regarding the suitability of the local sheep for the freezing trade. I can only say that they would be accepted quite readily by freezing works in Australia and New Zealand; their chief disadvantage would be unevenness.

Romney sheep further recommended.

As a result of my long experience with Romney sheep, and considering the environments in which the breed was evolved, I would expect them to be more suitable than any other for the climatic and soil conditions of this country, and this opinion has been confirmed as a result of my inspection of the flocks. The superiority of the Romney was particularly noticeable among the young sheep—those showing the strongest Romney characteristics being invariably the strongest looking and best developed, whereas those showing the strongest Merino characteristics were usually the smallest.

The Cheviot breed also appear to be well suited constitutionally to the conditions here, but they are in no way superior to the Romney in this respect, while at the same time the latter are quite superior from the point of view of wool production. In fact, the Romney, when well bred and well fed produces the most marketable and best paying fleece of all long-wooled breeds of sheep.

When wool is the only product to be considered, it is, of course, unwise to carry more breeding ewes than may be necessary to maintain a high standard in the flocks, but it is still more unwise to carry less than is necessary for this purpose.

Proportion of breeding sheep could be increased.

At the moment the standard of even the best flocks falls considerably short of what is necessary in order to get the maximum return which the conditions will permit, and I suggest that the proportion of breeding ewes to dry sheep could be increased with great advantage, according to to the individual requirements of the different stations, until such time as their flocks are raised to a standard comparable with the maximum return for wool.

Heavy culling necessary.

Heavy culling is necessary, and the extent to which it can be carried will depend on the annual increase.

Method by which flocks should be improved.

The only way in which the flocks can be brought up to the standard which is desirable and at which they will provide the maximum return which the conditions existing in the country will permit, is to grade them up by using successively pure-bred sires of one breed or type, and selected ewes. The prepotency of the average pure-bred ram is so superior to that of the average ewe of mixed breeding that in this way a common flock can quickly be improved to a standard approximately that of the pure breed selected and they may even excel them in vigour.

The breeder should select the breed which his country is best suited to develop, and when this is done he should never be turned from his purpose by the fads of others or by the changing fancy of the day. Those who periodically change their breed of sheep in order to cater for the market of the moment rarely succeed, while at the same time they can never attain that uniformity in their flocks, which, particularly in the case of wool, is so essential to the production of the most marketable commodity.

Advice of wool-brokers.

When fine wools are in demand wool-brokers are naturally anxious to increase the supply, but they are business men, and when advising their clients to put a dash of Merino into a Romney slip, they rarely realize what the ultimate result of such advice may be, if acted upon. Experience will tell a man what class of wool his country is best adapted for growing, and if he persists in growing that class, he will come out right in the long run.

High priced rams should not be mated with low grade ewes.

When grading up from nondescript flocks it is a mistake to purchase high priced rams to start with. In this country I have seen rams which cost in England from forty to seventy pounds mated with very ordinary ewes of very mixed breeding, and I am informed that others costing up to one hundred and fifty pounds each have been imported and used in the same manner. Infinitely better value would be obtained by purchasing pure-bred flock rams at about £10 each (New Zealand price, for the reason that, when mated with this class of ewe, they will give equally good results and more can be imported for the money. There is no short cut to the improvement of a nondescript flock. They must be graded up by each successive generation, becoming better than the preceding one by careful selection of the breeding ewes and the use of pure-bred rams of a higher standard of quality than the ewes.

Flocks should be graded up gradually.

Method of breeding to be followed.

A breeder is justified in paying from thirty pounds upwards for rams only when he has well-bred, good quality stud ewes to mate them with. Besides keeping pure-bred rams of one breed, it is also necessary to keep to rams of one type of that breed in order to secure and maintain uniformity in a flock. With this end in view, intending importers should first decide from which country they can secure the type best

suited to their purpose, and when this is done, confine their importations to sheep from that country and of the same line of blood, so far as this can be done without excessive inbreeding. The reason for this is that in different countries different types of the same breed have been evolved gradually, as a result of environment and breeding with different aims in view. For instance, the most important consideration in determining the type of Romney sheep in England has been to secure a good mutton carcass, whereas in New Zealand great attention has been given to improving the value of their wool, with the result that there is now a marked difference in the type of this breed in the countries mentioned. I am of opinion that of the two, the New Zealand type is most suitable for this country, particularly on account of the superior quality of their wool.

New Zealand Romney suitable.

The fashion of the moment in this country is to put a dash of Merino through the flocks in order to get increased density and fineness in the wool, and on some stations rams of any breeding and quality are used for this purpose, provided their wool has the desired quality. While fully appreciating fineness in wool, from the point of view of market value, I am confident that the injury which the flocks will suffer by the present system of using mongrel Merino sires for this purpose will quite outweigh any advantage that may be gained as a result of the increased fineness in the wool.

Fallacy of endeavouring to fine up wool without discrimination.

When considered solely from the point of view of value of wool the Merino is the most profitable of all breeds where the environment suits them. But graziers here should move slowly in the matter of their introduction until they are able to observe results. Earlier in this Report I referred to the fact that all breeds of stock mature slowly in this country, and if bred for a number of successive generations without any infusion of imported blood they become much reduced in size. It may be found that the Merino breed will be more affected than any other in this respect for the reason that even under favourable conditions they of all the principal breeds are the slowest to mature. Moreover they are indifferent mothers, with a poor milk supply. If it is generally accepted—and I believe it is—that the pure Romney breed of sheep is suitable to the conditions here, and that the pure Merino breed is unsuitable, then it can only be expected that the advantage the former possesses will be reduced by crossing with the latter, according to the extent to which the cross is carried.

Merinos.

What is known locally as Coast Corriedales have recently been imported rather extensively from the vicinity of St. Julian, on the coast of South America, for stud purposes, with a view to securing the increased density and fineness that is desired in the local wool. I saw a number of the rams at different stations, and I maintain that none of them have any claim to the distinction which the name Corriedale implies. Those seen by me were uneven and weedy, and could only be described as inferior Merino comebacks. I saw one line of stud ewes that had been imported under the same alias and for the same purpose. These were inferior and undesirable from every point of view, and cannot but injure the flock into which they have been introduced. If the sheep referred to above are a fair sample of the best that can be imported from that locality, then breeders will be well advised to leave them alone; breeding from such animals can only result in an uneven combination of weeds, and in any case they already have much better sheep in the country.

Coast Corriedales.

The prospective buyer should be chary of touching anything under the name of Corriedale unless he has proof that its breeding entitles it to the distinction which the name implies.

True Corriedale breed.

In view of the interest which local pastoralists are taking in the Corriedale breed, and that little is known regarding their origin or breeding, the following information on the subject may probably be of interest.

The name Corriedale was adopted because the first successful experiment with a view to establishing such a breed was carried out on the Corriedale Estate, Otago, New Zealand.

Extensive experiments were carried out by a number of leading breeders over a term of years with a view to determining which of the long wooled breeds would blend best with the Merino for the purpose of evolving a new breed to suit a particular class of country and set of conditions. English Leicester, Border Leicester, Romney and Lincoln were all tried out extensively, and eventually this last breed was accepted as most suitable for the purpose. Unfortunately I am unable to quote the definition of pure bred Corriedale for the purpose of entry in the New Zealand flock book, but it differs little from the Australian definition, which is as follows :—

(*a*) The foundation stock must be pure-bred Lincolns and Merinos.

(*b*) The sheep must be inbred half-breds for 20 years.

(*c*) In the event of a breeder starting his flock with pure-bred Corriedales on one side it would only be necessary for the progeny from the half-bred Lincoln-Merinos to be subsequently inbred for 15 years.

Good Corriedale sheep on average good country will clip about 10 lbs. of wool ranging from 48 to 58 quality.

Under New Zealand conditions where the surface is always dry and hard they have proved very hardy, thriving at altitudes ranging from 4,000 to 7,000 feet, where the winters are very cold and snow is common. The pure-bred Merino also thrives remarkably on the same country.

Caution necessary before introducing Corriedales.

If neither the pure-bred Merino nor the pure-bred Lincoln sheep are well suited for this country, it would be wise management to go slow on the Corriedale, which has been evolved from these two, until results demonstrate that their introduction on a larger scale will prove safe and profitable.

Pure-bred Merinos advisable for fining wool.

I quite agree that what is known as hard camp in this country will carry either Merino or Corriedale sheep, but all stations have large areas of wet camp also, and the sheep that is carried on the former must be suitable for the latter also. Those who have definitely decided to increase the Merino strain in their flocks will be working on much safer lines by importing a few pure-bred Merinos than they will by importing Merino cross-breds of even good quality but doubtful origin.

The tendency in the leading sheep countries is to breed more and more to one or other of the pure breeds, and I am satisfied that the pastoralists of this country will be studying their best interests by doing likewise.

Fineness of wool produced by selection.

The increased density and fineness which pastoralists here aim to secure by cross-breeding has already been secured in the fleece of the New Zealand sheep to a marked degree as a result of selection in breeding, and although this is a slower process than cross-breeding, it is safer and the benefit will be more permanent.

If cross-breds must be kept, confine the crossing to two distinct breeds, which will blend—and use pure-bred sires of each breed alternately as may be found necessary. In Australia and New Zealand many breeders continue crossing two breeds in this way for long periods with quite satisfactory results. The breeding flocks are divided into two classes—strong and fine wooled—the strong wooled ewes going to the fine wooled rams, and the fine wooled ewes to the strong wooled rams.

INBREEDING.

Principles of breeding in detail.

The terms that are commonly used to indicate different degrees of the breeding together of related animals are line-breeding, in-breeding and in-and-in-breeding.

The extent of related breeding which each term should indicate has never been clearly defined, but the following may be taken as substantially correct :—

Line-breeding means breeding within the members of one family, but not closer than the third generation.

In-breeding means the breeding together *at intervals* of closely related animals, such as father and daughter, mother and son, sister and brother, etc.

In-and-in-breeding means the breeding together of animals of the relationship mentioned in connection with in-breeding, but *for a number of successive generations in place of at intervals.*

The two first mentioned systems are practised by expert breeders, with great advantage, for the purpose of intensifying and rendering more permanent some highly desirable quality in their stock.

Line-breeding when applied in moderation and under careful management can be practised with great advantage in any flock of good breeding and quality.

In-breeding can be practised with advantage and safety only by very experienced and careful breeders and with animals of good constitution and a high standard of excellence.

In-and-in-breeding is decidedly dangerous, and is rarely practised to any extent, excepting inadvertently.

Local practice.

It is in-and-in-breeding that most concerns this report, for the reason that the present unsatisfactory condition of the flocks in this country is due in no small degree to the fact that it has been practised on them for many years in the most intense form and without discrimination.

Sires are selected from within the flocks, animals of very inferior quality and weak constitution, but of the closest relationship, are bred together, and breeding ewes and rams of all ages up to 11 years are run together.

There is no need to go into details regarding the intensity of in-breeding which such a system permits.

On those stations where the paddock accommodation would enable breeding ewes of the same age to be run in separate flocks, even this precaution is not always taken.

Money expended on the purchase of valuable stud rams for use in this way is largely wasted.

What is required to remedy this evil is stud flocks separate from the main flocks, and to have paddock accommodation which will enable breeding ewes to be kept in flocks according to age, so that if old rams must be kept they shall not be bred to their immediate relatives including their own progeny.

Evils of indiscriminate in-breeding.

The evils to which in-breeding give rise are many and important, among them being delicacy of constitution, loss of reproducing power, and delayed maturity.

Wild animals can breed among themselves without deterioration because they are of the original type of their kind and because of the great law of the wild kingdom—the survival of the fittest—as a result of which only the most vigorous survive to reproduce their kind. Domestic animals, however, are an artificial production which must be constantly guarded by the influence which brought them into being, in order to prevent their deterioration.

Only about one-half of the lambs that are born in this country survive to reach maturity, and it can be accepted that these are the most vigorous. Hence the fact that the flocks have not suffered even more than they have, as a result of in-breeding, is due quite as much to the law of the wild kingdom as to good husbanding.

The most vigorous ewe lambs are those that develop and fatten most rapidly, and in countries which cater extensively for the fat lamb market, a very large percentage of these find their way into the freezing works in place of into the breeding flocks, and graziers have to rely on the second best for breeding purposes.

When it comes to a question of breeding there is a great difference between the best and the second best, and when the latter must be relied upon for the purpose, constant vigilance is necessary in order to prevent deterioration of the flocks. This is only made possible by using pure-bred rams, and by respecting the fundamental principles of breeding in other respects.

In this country, as a result of the heavy mortality among young sheep, only the most vigorous ewes reach the breeding age, and consequently, if breeders will only use pure-bred sires of good quality and respect the recognised rules of breeding to a reasonable extent in other respects, they cannot help but bring their flocks to a high standard of excellence. Had they been forced to practise the present system of breeding with the less vigorous ewes, the flocks would probably have disappeared.

The majority of Managers realize that the present system of breeding is wrong, but they have not the facilities at their disposal which will enable them to alter it. It is in the interests of owners to see that these facilities are provided with the least possible delay.

There can be no doubt that loss of reproducing power, and weakened constitution, as a result of intense in-breeding over a long period, has contributed very materially to the unsatisfactory natural increase, which condition is causing such inconvenience and loss to the pastoralists of this country.

WOOL.

Average yield of wool.

An estimate which is based on the most reliable information available regarding the matter indicates that the average yield of wool per sheep over the flocks of the Colony is approximately 6½ lbs.

In view of the fact that the proportion of breeding ewes is under 40 per cent., and that none of the light clipping breeds of sheep have to be carried in order to cater for mutton or fat lamb trade, it would be quite possible to raise this average to 8 lbs. by replacing the sheep that have passed the profitable age by younger ones, and by applying more approved methods of breeding, particularly to those flocks that are now yielding an average of 5½ to 6 lbs. of wool.

This extra 1½ lbs. of wool from 647,000 sheep at the low value of 1s. per lb. would produce an additional forty-eight thousand, five hundred and twenty pounds sterling (£48,520) per annum for development purposes.

Wool classing.

Judging from the information I have been able to obtain on the subject, the classing of clips into attractive parcels of uniform quality is not seriously undertaken, one station only employing an expert classer.

Australasian practice.

In Australia and New Zealand, where there is nothing approaching the variety of type in single flocks that one sees here, great importance is attached to this branch of work, and the clips from all flocks of a size similar to those of the Falkland Islands stations are handled by professional classers.

A large proportion of small clips also, *i.e.*, those under 30 bales, for which the service of a professional classer cannot be secured at shearing time, are unpacked and classed at the brokers stores, prior to sale, for which service brokers charge clients ½d. per lb.

Interlotting also is practised extensively. This means putting together a number of small lines of the same value and quality, but belonging to different clients, in order to get the benefit of competition from the principal buyers.

Those buyers who matter most want big lines, and only one class of wool in each parcel, and when it is presented to them in this way they can afford to bid to its uttermost value, because they have been able to gauge accurately its greatest yielding capacity.

When they do buy mixed parcels they either base their value on the poorer fleeces in the parcel, or, at the least, they will allow ample margin for the trouble of sorting and disposing of the portion they do not require for their own use.

Usually, however, parcels of very mixed wool are purchased by speculators who own works where they sort and scour it for resale.

I quite realise that under existing conditions an expert classer cannot be secured by many of the local stations, as the country does not offer them suitable employment during the remainder of the year. The foregoing remarks are made with a view to stressing the great value of classing clips into parcels as even as may be possible under the circumstances.

Already, earlier in this report, I have referred to the necessity for keeping to one type of sheep in order to get evenness in the clip.

MAINTENANCE.

Permanent improvements of stations not carried on.

With very few exceptions, most of the things that matter in the way of permanent improvements on the stations were done by the pioneers of the sheep-farming industry during the period between 1860 and 1890, and those who have been responsible for the welfare of the industry since have not only failed to carry on the work of development at a normal rate, but they have actually failed—some woefully—to maintain that which was accomplished for them.

Sub-division inadequate.

Not only are the sub-divisions wholly insufficient to provide for the efficient management of stock and pasture, but a large proportion of the fencing that does exist is in a very bad state of repair—in fact, some of it has reached a stage when it is a misnomer to call it "fencing," for it has long passed the condition at which it was capable of filling the purpose of fencing, even to a minor degree.

Fences bad.

Modern practice.

On a well-managed station there is always on hand a good supply of posts, droppers and fencing wire at the homestead, and elsewhere small depôts of posts and droppers neatly stacked at convenient centres on different parts of the property, ready for repair work to be carried out when the hands are not otherwise employed, or at any other time should circumstances demand it.

Many local fences not even sheep-proof.

It is unusual to find any fencing material whatever, either at the homestead or elsewhere, on Falkland Islands stations. Some stations do not even possess sheep-proof paddocks in which to hold rams, with the result that a lot of lambs are born out of season and have little or no chance of surviving.

It is not possible to manage either stock or pasture to any advantage without good fencing, and I have known many capable Managers who would decline to take over the control of some of the properties here, unless funds were placed at their disposal for fencing and other repairs.

The old adage, "a stitch in times saves nine," is very applicable to fencing, for when once animals commence breaking through a weak spot in a fence they strain the wires and make further weak spots in other places. They also acquire the habit of fence breaking, which, when once learned, they do not readily forget.

Funds must be provided for recurrent repairs.

Quite apart from the annoyance and loss for which defective fencing is directly responsible, it is bad management from every other point of view to let maintenance work accumulate, unless when compelled to do so during periods of low prices for produce when funds are not available.

When funds are provided for repairs which have been allowed to accumulate, those that are responsible for its expenditure are apt to rush the work, with the result that material is often not bought to the best advantage, extra labour has to be engaged for work which could have been done by the regular hands, and a great deal more requires doing than would have been the case had the defects received prompt attention.

To enable a Manager to work to advantage, he must have a supply of material for maintenance work on hand at all times, and he should have an approximate idea as to the amount that is likely to be available for development and maintenance from year to year, in order that he may make his arrangements well in advance and to the best advantage.

The standard of homestead conveniences, other than dwellings, is low as compared with those on stations running flocks of similar size in Australia and New Zealand.

Wool-sheds unsuitable on majority of stations.

The internal arrangement of the great majority of wool-sheds is inconvenient and in a few cases very much so. The lighting, as well as the accommodation on the wool floors, is usually insufficient to enable the wool to be handled to any advantage. Some sheds are so small as to be out of proportion to the size of the flocks that have to be passed through them. There is also not sufficient accommodation in the way of homestead paddocks to enable sheep to be held during shearing without suffering a serious check. Stabling accommodation for horses has been very much neglected, and only at one station did I see reasonable provision made in this respect. Horses are geared and ungeared outside in all weathers, and when they reach a settlement hot and tired after a long day, in place of being able to rest and cool off under cover in comfort, the gear is pulled off and they are turned adrift without either a feed or a rug, nowithstanding that good oaten sheaf can be produced cheaply. It is not surprising, under the circumstances, that each shepherd requires about fifteen horses with which to do his work.

Stabling accommodation neglected.

Treatment of horses.

Shelter hedges.

Shelter hedges of any kind are valuable in any country, but in a country with a climate such as that of the Falkland Islands they are extremely so. In New Zealand shelter fences in the agregate run into many thousands of miles, and even in localities where the climate is semi-tropical they are planted extensively, with a protecting fence on either side, until they reach a stage of growth at which stock cannot do them serious damage.

Gorse forms a large proportion of our hedges, and it also grows quite well in this country, but the only gorse hedges I have seen are those planted by the Gauchos and pioneers, and in most cases even these are sadly neglected.

Gorse hedges can be planted to great advantage, particularly on the windward side of homestead paddocks and paddocks where stud flocks are kept.

The condition that exists in the vicinity of a station homestead is usually a very good index to what one may expect to see elsewhere on the property, and Falkland Islands stations do not fail in this respect.

Although development has not proceeded at a normal rate, even in the vicinity of the homesteads, the improvements that do exist are well cared for in most cases. The condition of a few homesteads, however, is certainly not a credit to the management, and in such cases the condition of the outside fences, the pasture, and the flocks is much on a par with that around the homesteads.

Fair proportion of profits must be devoted to development and maintenance works.

The average price received for wool during the past 25 years has been very satisfactory, and, had a fair proportion of the profits which have been obtained from the pastures of this country during that period been invested in development and maintenance work, it would have provided substantial progress and security of income in the future, but unfortunately this has not been done. There certainly have been periods of depression, but these have been more than balanced by others of exceptionally high prices.

Funds are urgently required to catch up arrears of maintenance and also something for development on practically all stations, and owners will be studying their best interests by making available for this purpose, for a number of years, all profits outside the amount required for reasonable personal expenses. Unfortunately those who own the land in this country, with very few exceptions, live elsewhere, but besides protecting their own interests, it is their clear duty to the Colony to do more in the future than they have done in the past to protect its assets from which they derive their livelihood.

EXPERIMENTS.

Fallacy of assumption that conditions in the Falkland Islands are unique.

I have met a number of people, including farmers, who contend that the conditions existing in these Islands are so different from those of some other countries, that the methods which are followed with such great success in the latter cannot be applied here. This statement has been made by people who have never seen the countries referred to and know little regarding the conditions existing there.

I am informed also that there are those who hold that all the progress that is possible in connection with the sheep-farming industry in this country has already been accomplished, and that all that now remains for farmers is to do the best possible with things as they now are.

Before dealing with the experimental work which I believe to be necessary in the interests of the Colony, I wish to give a few reasons for differing emphatically with these statements, taking them in the order in which I have referred to them.

In New Zealand we have approximately 6,000,000 acres of tussock pasture, the bulk of which has about the same carrying capacity per acre as the Falkland Islands, but which is much more precipitous and some of it colder during winter and infinitely more dangerous owing to snow. The total area of the Falkland Islands is approximately 2,900,000 acres.

The result of injudicious burning and overstocking of such pasture in New Zealand is even more disastrous than here, for the reason that the surface is much drier than the average camp in this country.

The use of mongrel sires and mixing the breeds promiscuously, if practised in Australia and New Zealand, would have precisely the same result as here. Indiscriminate in-and-in-breeding, if practised, would be quite as injurious to the flocks of Australia and New Zealand as it has been to those of this country. Rough handling of stock, if permitted on Australian and New Zealand stations, would do quite as much harm as it does here.

Details of management may differ, but the fundamental principles apply in all countries alike. A successful manager of hill country in New Zealand would experience little difficulty in taking over the management of a property in this country.

With reference to the statement that everything possible has been accomplished, I can only say that I have been disappointed with what has been accomplished, and surprised that so little effort has been made to accomplish.

Paramount duty of owners of farms.

In place of keeping their principal intact and living on the interest so that something will be left for posterity, the people who have owned the country during the past 60 years have been drawing steadily on their principal as represented by the soil and pastures and now that it shows pronounced signs of exhaustion it behoves them to get to work and replenish it. To enable this to be done on a large scale and at the same time economically, experimental work on a small scale is necessary in order to determine the lines which the major operations should follow, as well as the cheapest and best methods to adopt in following them. In order to avoid waste, experiments should not be duplicated, and in order to obtain conclusive results they must be carried out by or under the control of a practical agriculturist who is capable of both directing the work and arriving at reliable conclusions regarding the results obtained.

In this country this will be made possible only by the State undertaking the experimental work, and I strongly recommend this and suggest that a suitable area be provided for the purpose forthwith, so that operations may be commenced with the least possible delay. Experimental work should be undertaken by the Government.

I have inspected various Government reserves in what may be termed the Stanley district, but none of these are suitable for the purpose, the principal reason being that the soil conditions are unlike those of the areas on which both regrassing and agricultural operations are most urgently required elsewhere, *i.e.*, the hard camp which is now growing diddle-dee and other inferior vegetation. There is also the fact that rock lies so close to the surface in practically the whole of the Stanley district as to seriously hamper extensive agricultural operations should such be deemed advisable at some future date.

It is nevertheless highly desirable that the experimental area shall be as convenient to Stanley as circumstances will permit, so that farmers from all parts may visit it and that a market shall be available for surplus products.

The country in the vicinity of Port Louis is typical of the areas which are most in need of regrassing elsewhere and on which any agricultural operations also which may be found profitable will be conducted. In order that the experimental farm may be self-supporting and that a small flock of stud sheep and a herd of stud cattle may be carried, the area provided for the purpose should be not less than 6,000 acres. Each of the stations in the Port Louis district includes an area which would be suitable for the purpose, but that which I consider most suitable is Block 5 of the Falkland Islands Company's property known as " Green Patch," approximately 6,000 acres. Area suitable for experimental work.

This is not by any means the best block of land in the Port Louis district, and my reason for recommending it is that it presents a variety of conditions which makes it very suitable for the purpose.

It includes an area of light and very stoney camp, an area of camp covered with small fern, an area covered with diddle-dee, an area densely covered with balsam bog, and an area which is still carrying fairly good native pasture.

The native grasses have almost completely disappeared from the greater portion of the block.

It is also particularly well situated from the point of view of accessibility, as it can be reached equally well from either Port Louis or Port Salvador, and one of the main overland routes to and from Stanley passes through it.

The greater portion is exposed to the prevailing wind, which will ensure that experiments will not be carried out under unduly favourable conditions. All stations in the Colony possess areas as good as this, and the majority have much better.

The following are the experiments which I consider should receive first attention :—Regrassing hard camp by surface sowing; growing roots and other forage crops on an extensive scale giving first attention to turnips and swedes, rape and the different varieties of oats, not forgetting Algerians and Gartons. Carrots and parsnips also grow well in this country, but these require a great deal more attention than those mentioned in the preceding paragraph. Experiments to be undertaken at Government experimental farm.

Experiments could be carried out with stock licks also, if such is advised by the Rowett Institute.

Drainage.

Drainage is another matter requiring attention, and the area recommended offers facilities for limited experiments in this direction also.

I believe that a very large proportion of what is known as wet camp is undrainable from a practical point of view on account of the rock lying so close to the surface and the retentive nature of the peat, but I am nevertheless convinced that great benefit would be derived by draining much of the low lying country. Many of the valleys that are at present in a waterlogged condition are naturally great stores of humus, but waterlogged land of any quality will not produce any of the more palatable and nutritious grasses, and it would only be a waste of money to apply either grass seed or fertilisers to them until the physical conditions are altered as a result of drainage.

Reclamation of waterlogged valleys.

The first step towards the reclamation of such areas is to drain them so that the air may be admitted, that the peat may decompose, and that the rains may pass through the soil in place of lying on the surface until removed by the process of evaporation.

I certainly think that an area of such country should be effectively drained and later, when it settles, portion should be surface sown and portion cultivated.

REGRASSING.

Regrassing.

The first step towards regrassing is to ascertain which grasses will thrive and give the best results under the conditions existing in the country, as well as the most favourable season for sowing, and the best method to adopt. It is unwise to endeavour to establish on any country grasses that are not suited to the environments simply because they are more palatable and nutritious than others that are suitable.

The habit of growth of all vegetation including grasses differ under different environments, and whether any grasses that are sown will establish themselves and persist, depends on the suitability of the environment, and, to some extent, on their respective abilities to adapt themselves to fresh environments.

At two of the stations visited I was informed that considerable sums had been expended on grass seeds (cocksfoot, rye, etc.) which had been surface sown with disappointing results. This is not at all surprising, for in the first place the seed was selected without sufficient knowledge as to its suitability, and in the second place it was sown on country so heavily stocked with sheep that any varieties that may have been suitable had no chance to establish.

Expenditure on regrassing without method useless.

Not only is the money expended on experiments that are carried out in this way wasted, but the failures which are inevitable under the circumstances serve to discourage further effort in this and other directions. In order, therefore, to avoid disappointment and waste of money, as well as to select in the shortest time possible, the grasses which can be sown with the greatest advantage, all that are likely to suit the different soil conditions should be tried out separately in plots of about six acres to each variety.

The area or areas comprising the plots should be securely fenced so that the stock that will have access to them may be properly regulated.

In this country, where the soil conditions cannot be considered favourable to the growth of the most palatable and nutritious grasses,

the road to success is most likely to be travelled by exploiting those best fitted for the environment without giving undue consideration to their nutrition. The following are the grasses which I recommend should be given first attention :— Grasses recommended and method of sowing.

For surface sowing, hard camp.—Danthonia Pilosa, Chewings fescue, Lotus Corniculating, White Clover and Yorkshire fog.

On moist camp (not wet camp).—Brown top, Meadow fescue, Lotus major, crested dogstail, Yorkshire fog, White Clover and Suckling Clover.

For laying down pasture after cultivation.—Cocksfoot, Timothy, crested dogstail, Perennial rye-grass, brown top, Lotus major, Red Clover, Suckling Clover and Subterranean Clover.

In order to determine the most suitable season for surface sowing it will be advisable to sow a portion of each plot at different seasons, say half during Autumn at about the time the seed of the native grass falls, and the remaining half during early spring at the time the first growth is usually experienced.

The class of country which is most in need of re-grassing, and which will pay best for re-grassing is the hard camp, and this class should have first attention, and land growing diddle-dee and small fern should form the major portion of the experimental area for surface sowing. The diddle-dee, etc., should be burned off a portion of the area, and the land immediately harrowed and the seed sown immediately the ground cools. The remaining portion should be pulled about with strong harrows or some other implement that may be devised for the purpose. Probably the latter method will be found most suitable, as the diddle-dee and small fern remaining will protect the young grass until it becomes established. Immediately the sowing is completed a mob of sheep should be turned into the area to trample the seed into the surface soil and consolidate it.

The different varieties of grass seed which I have recommended for trial vary greatly in the number of seeds per pound, and therefore the number of pounds that should be sown per acre will also vary accordingly.

It is desirable that a relatively heavy sowing should be applied in the case of the experimental plots, and I recommend that the following quantity per acre (in pounds) of each variety be sown.

Surface sowing.—Danthonia pilosa, 30, Chewings fescue, 24, White Clover, 15, Yorkshire fog, 14, Brown top, 16, Meadow fescue, 35, Dogstail, 23, Lotus major, 16, Suckling Clover, 16.

For laying down pasture after cultivation.—Cocksfoot, 25, Timothy, 18, Dogstail, 20, Perennial rye, 35, Brown top, 16, Lotus major, 20, Red Clover, 35, Suckling Clover, 15, Subterranean Clover, 15, White Clover, 15.

The grasses mentioned in the foregoing all provide permanent pasture, and such grasses are usually slow to establish themselves. For this reason too much should not be expected from them nor should hasty conclusion be arrived at regarding their respective merits as a result of the first year's growth.

These plots, if once established, will continue to provide information for many years, and it is quite possible that some of the grasses which make the poorest showing during the first year may eventually prove the most valuable.

The different plots should be carefully marked before the seed is sown, by driving stout stakes of an endurable timber firmly into the ground on the boundaries. A small notice board also should be erected on each plot bearing the name of the grass sown.

Danthonia.

If Danthonia can be successfully established on the hardest of the camp it will prove the most valuable grass which it is capable of producing. Danthonia is a native grass of New Zealand, where it thrives on the poorest, driest and most stormy country, and through its agency great areas that were once looked upon as of little, if any, value—because they were incapable of carrying English grasses—have been brought into very profitable use. It is also one of the very few grasses that can be burned periodically without injury, and for this reason it has proved extremely valuable in reclaiming land from inferior vegetation, such as bracken, scrub, etc.

The seed is particularly well adapted for carrying in sheep's wool, which accounts for its very rapid spread in New Zealand, since its value on poor country has been fully recognised. There practically the whole of the sowing of this grass is done by removing sheep, after the seed falls, from areas where it is already established on to areas where it is desired to introduce it. It is also carried by the wind for a considerable distance.

There are two varieties—Danthonia semiannularis and Danthonia pilosa—the latter being much the better of the two. Danthonia is a perfectly permanent grass, but is slow to establish itself.

SWEDES AND TURNIPS.

Swedes and turnips.

In New Zealand soft turnips and swedes are grown on an extensive scale, and to great advantage for stock food, the average area in this crop being half a million acres per annum.

All classes of country are used for the purpose, including considerable areas on which it is not found possible to establish grass without first cultivating it. The ground is usually ploughed from three to five months before the season for sowing and immediately prior to sowing it is disced and harrowed to the extent necessary to prepare a good seed bed. The seed and artificial manure are sown at one operation by a horse drawn machine, which has a sweep of about nine feet wide.

The usual sowing is about 14 ounces of seed and from three to four cwts. of chemical manure to the acre.

When sowing is completed the crop receives no further attention until it is ready for feeding off by the stock. When the crop is ready for feeding a section is divided from the main crop by a temporary fence, and when the stock finish this the fence is moved back and they are given a fresh section. When the stock are shifted on to a fresh section, the shells and roots of the turnips on that which they have left are brought to surface either by grubbing or discing, and other sheep, usually flock breeding ewes, are turned in to clean them up.

Turnips are used extensively for wintering flock sheep, including hoggets, for flushing breeding ewes before mating, and for fattening stock for slaughter. Fed in conjunction with hay, they also provide about 90 per cent. of the food, other than pasture, for wintering dairy cows. Stock running on turnips are always given access to rough pasture adjoining.

It is estimated that 20 acres of an average crop of turnips will feed one thousand sheep for one month. In New Zealand a crop of turnips grown in the manner described in the foregoing is worth from five to ten pounds per acre according to the season and weight of crop. Rape and other fodder crops also are grown extensively for fattening lambs and carrying hoggets and breeding ewes, through the winter in good condition.

Chemical manures.

In New Zealand we have a great variety of soil conditions ranging from areas that will carry one dairy cow or eight sheep to the acre, down to extensive areas poorer than any portion of these Islands, and we use chemical manures on all.

In fact great areas of our poorest country could never have been brought into profitable use without them.

We have inexhaustible supplies of lime in the country and we import various other chemical manures from all parts of the world to the value of approximately half a million pounds sterling per annum.

I do not mention the foregoing facts in connection with my own country simply for the purpose of advertising what we are doing, but to support my recommendation that action should be taken with a view to determining what can be done economically on similar lines in this country.

Different soil conditions require different kinds of chemical manures, and while the result of the soil analysis which is at present being carried out by the Rowett Institute will provide a valuable guide as to those which are likely to be most advantageous in this country, finality in the matter can only be reached as a result of practical experiments.

Lime is one of the fertilisers indicated, but this may be required in such bulk that others such as basic slag, superphosphate, Kainit, etc., may be found more profitable.

Methods of cultivation.

The best methods of cultivation to apply also, can only be determined by practical experiments. Our experience with land of a peaty nature in New Zealand has been that deep ploughing encourages the growth of sorrel and other weeds, and that it pays to keep the sweetened surface soil as near the top as possible, particularly during the early stages of development.

Consolidation of surface soil essential.

In laying down pasture in country of a peaty nature consolidation of the surface soil is of vital importance, and this can best be accomplished by grazing young pastures, as much as possible, with cattle in place of sheep. This also gives the young grass a better chance to establish.

When a crop of turnips have been eaten off by stock the ground is already fairly well consolidated, and if this crop is to be followed by grass and a seed bed can be prepared by discing and harrowing and harrowing in place of ploughing, this method should be adopted. When laying down pasture, turnips or rape seed is often added, and this would certainly be worth a trial here, as feeding off either of these crops with cattle would greatly hasten consolidation of the soil which is so essential to success when dealing with this class of country.

It would be beyond the scope of this report to go into greater detail in connection with experiments at this stage, but if the Government decide to proceed with such a scheme, I shall be pleased to forward, immediately on my return to New Zealand, printed matter which

will provide the fullest possible information on all matters relating to stock and agriculture in that country, including particulars regarding experiments, which will no doubt be of assistance in connection with experimental work in this country also.

Recommendations respecting Government experimental farm.

Should the Government acquire the area referred to, I recommend that the boundary fences should immediately be made secure and all sheep removed, and that it should not again be stocked with sheep for at least twelve months.

During that period it would be beneficial to carry any number of cattle up to one hundred and fifty on the block, although all or even any of them, might not be the property of the State. Initiatory operations, such as fencing, could proceed during that period.

Before any expenditure is incurred on sub-division fences and other improvements a full plan of such should be carefully thought out, inserted on a large scale plan of the block, and rigorously criticised in order that everything may be done to the best advantage, and that alterations, which mean waste, shall be avoided. The provision of shelter for stock is a matter of first importance in connection with the working of the farm, besides being one of the matters in which the remainder of the Colony requires a lead.

The places where it is intended to plant shelter should be shown on the plan, and if a narrow strip can be ploughed at such places before the fences are erected it will save a great deal of manual labour later. Besides planting shelter along the windward side of sub-divisions strips, a few chains in length should be planted at intervals over the camp and protected with double fences.

At the moment gorse is the only shelter than can be relied upon, and I suggest that should the Government take over the block, one of the first activities should be to cultivate and securely fence about one acre of dry ground (not peaty) and sow it with gorse, which will be available for planting out later as required. A good dressing of chemical manure applied to both the nursery plot and the young hedges when planted out should be of considerable advantage.

STOCK.

Whatever class of stock it may be found necessary to carry during the first few years, the ultimate aim should be as large a flock of pure-bred sheep as the property is capable of carrying, and a herd of pure-bred cattle of one of the beef strains. Personally I would prefer Romney sheep and Aberdeen Angus cattle.

I suggest that a start should be made with two separate flocks—No. 1 comprising a small flock of imported ewes, and No. 2 a larger flock of the best ewes that can be procured locally. Sufficient imported rams would be required to start both flocks, but thereafter importations would be for No. 1 only, which would provide the rams for No. 2. In this way the standard of No. 2 would be steadily improved, and right from the start the greater proportion of the surplus increase would be of better quality than the majority of stations are now using for breeding purposes, so that a ready market should be available for these as well as for surplus rams from No. 1 flock.

A similar system could be adopted in connection with cattle. Six heavy horses would be required (four for a team and two spares). I suggest that five should be mares and one a quiet stallion, which could be used for dray work, etc., as well as for stud purposes. Ordinary medium draught mares of good quality would be more suitable as well as much cheaper than very heavy and well-bred ones.

FENCES.

All fences should be erected to hold cattle as well as sheep. In New Zealand the usual general utility fence consists of six plain No. 8 wires with a barbed wire above, straining posts 10 chains apart, four posts to the chain and two droppers on standards between each post. Fences are usually about 3 feet 9 inches high.

I suggest that the fences should be constructed on the contract system, the Government providing the material and laying it on the lines.

LABOUR.

The labour that may be required from time to time will depend largely on the development that may be considered advisable as a result of the initial experiments, but basing my estimate on our method of working such a property in New Zealand, I suggest that in the original estimates provision should be made for four regular hands as follows :—

No. 1.—A stockman with a sound general knowledge of sheep-breeding to act as Manager. Salary, say, four hundred pounds per annum (£400) and found.

No. 2.—A farm hand possessing a sound knowledge of practical agriculture, who would be capable of conducting all agricultural operations. Salary, say, three hundred pounds per annum and found.

No. 3.—A station hand who would assist in any direction required. Wages according to the highest local rate of pay for such work and found.

No. 4.—A male cook who would also attend to odd jobs about the settlement. Wages according to the highest local rate for such work and found.

An experimental farm can be either a great asset or an expensive luxury according to the efficiency of the management, including the control of its finance as well as the actual farming operations. I am speaking from experience in recommending the Government of this country, should it proceed with the scheme, to instal a sound system of accounting and rigorous control of Government property including the products of the farm right from the start.

Even the smallest quantity of produce should not be removed without being recorded in the farm books, and no service should be done, either for private persons or other departments, without either payment or an account credit.

What may appear trifling slackness in such matters to start with have a habit of developing into extensive abuse, whereas efficient control in such matters encourages a Manager and tends to efficiency in other directions also. While guarding against waste, however, care should be taken not to starve development or experimental work that may benefit the Colony.

IMPLEMENTS.

The cost of the agriculture implements required would not amount to much, and their selection would be best left to the Manager.

HEALTH OF STOCK.

Diseases among stock.

Judging both by my own observations and impressions gained in the course of conversation with Managers during my tour of the camps, it would appear that all classes of stock are very free from diseases of a contagious nature.

Footrot and internal parasites are two troubles which, from the nature of the environments, one would expect to find very prevalent among sheep.

I have not had sufficient experience with the local sheep to express a definite opinion regarding the extent to which they are affected with internal parasites, but it would not appear to be at all serious.

The total absence of footrot in such environments, however, is quite remarkable and would lead one to believe that the soil may possess some property that is deadly to the bacteria which causes this trouble in other countries.

I am informed that sheep have arrived in this country suffering from footrot and recovered without any treatment.

I can assure owners that they have a lot to be thankful for in this respect, for in other countries I know it would be almost impossible to carry sheep on an extensive scale on what is known in this country as wet camp.

Risks of importing stock from South America.

The risk that the Colony may run and the advantage that is likely to accrue from importing stock from South America are questions on which I am not prepared to express definite opinions with my limited knowledge of the conditions existing there.

I am informed by some in this country who have seen flocks in the coastal area of South America, that good sheep can be procured there, but I can only say that any advantage the local flocks are likely to derive from *stud* sheep such as I have seen, which came from there, does not warrant any risk being taken in order to introduce them.

Judging from information which I have gleaned from the official records, however, as well as from statements made to me regarding the prevalence of various diseases of a highly contagious nature by persons who are conversant with the conditions existing there, the importation of stock from the coast entails considerable risk, and great care would require to be exercised in order to guard against the introduction of highly contagious diseases.

Young flock ewes urgently required.

However, young flock ewes are urgently required in fairly large numbers even now, and unless the present very unsatisfactory position regarding the annual increase can be remedied in the immediate future, a stage will be reached at which this class of sheep must be imported from the cheapest and most convenient source, even at no small risk.

In the event of such a position arising, I suggest that the safest procedure to adopt would be to define the area or areas from which stock can be procured with the greatest safety, and to appoint some reliable person having a good knowledge of such areas, as well as a knowledge of stock, whose duty it would be to certify as to the correctness of health certificates and keep the Government advised regarding outbreaks of disease.

STOCK INSPECTION.

I am of opinion that under normal conditions one officer should be able to attend comfortably to all duties in connection with stock inspection in the Colony. The temporary employment of more than one officer might be necessary in the case of a serious outbreak of disease or other unusual conditions.

STATISTICS.

In view of the serious position which has developed in the Colony in consequence of the heavy mortality among young sheep, I am of opinion that, in order to keep in sufficiently close touch with the matter, the Government requires more detailed information than the annual return form at present in use provides for. I have drafted and submit herewith a form (Live Stock Form No. 1), which should provide all information required meanwhile.

CONTROL OF WILD GEESE.

I am of opinion that a substantial reduction in the number of wild geese is highly desirable and would be very beneficial to the farming industry. While fully appreciating their value as a supplementary food, as well as from the point of view of a sportsman, I am convinced that when considered in their relationship to the sheep-farming industry of the Colony they constitute, in their present numbers, a pest and that they should be treated as such.

Reduction in number of geese highly desirable.

I suggest that the money which Government is at present paying for the destruction of wild geese would be more advantageously expended on experimental work, and that in place of continuing the present system legislation should be enacted providing that farmers must destroy wild geese on their land to the satisfaction of the Chief Inspector of Stock.

Farmers can destroy wild geese at little cost and without Government assistance, whereas they cannot carry out the experimental work which is necessary in their own interests to any advantage. In any case a large proportion of the geese for which Government pays under the present system would be destroyed in the ordinary course of events for food and sport. I recommend that experiments be carried out with a view to destroying geese with poisoned grain. I am of opinion that this can be done effectively and with practically no danger to stock, provided reasonable care is taken. I consider phosphorus the most suitable poison for the purpose.

BIRDS OF PREY.

During my tour of the Western Island I had several excellent opportunities of realising the loss for which the various birds of prey can be responsible, particularly in respect of sheep that are rendered temporarily more or less helpless from any cause, and there can be no doubt that they are responsible for considerable loss of both ewes and lambs during lambing season.

Government should increase efforts to destroy birds of prey.

I consider that, from various points of view, birds of prey present quite a different problem to wild geese, and I am of opinion that Government could substantially increase the royalty for destroying them with great advantage, and I therefore recommend accordingly.

LIVE STOCK MARKS.

The present system of registering and recording live stock marks is not quite satisfactory, and I suggest that the existing ordinance governing the matter could with advantage be replaced by rules on the lines shown in Appendix "A" to this report.

Stock marks.

Even should it not be deemed necessary to apply the whole of the proposed provisions meanwhile, I suggest that it will be advisable to obtain the certificates as provided in section 4. The best and safest method of filing these is to procure a strongly bound book with dummy leaves in which to gum them.

The purpose of obtaining the certificates of registration in duplicate is that copies may be kept in different offices so that in the event of one lot being destroyed the other will be available.

SHEEP BREEDERS' ASSOCIATION.

Sheep breeders' Association.

Three things of which the sheep-farming industry of this country stands very much in need are: combination, co-operation and competition among those who are responsible for its welfare, but unfortunately each and all of these are conspicuous at the moment only by their complete absence.

The three "C's."

In all leading stock countries these three "C's" are considered almost as essential to the farming industry as the three "R's" are to primary education, and although this is, relatively speaking, a small country, each and all are quite as essential here, proportionately, as they are elsewhere.

Practice in New Zealand.

In New Zealand each pure breed of sheep is represented by an Association which, among other activities, has complete control of the flock book relating to the breed in which it is interested. Above these are the North Island and the South Island Sheep Breeders' Associations, which look after the interests of the industry as a whole in their respective spheres, and above all there is the New Zealand Sheep Breeders' Association which deals with matters of importance concerning the industry as a whole.

The same system of combination and co-operation prevails in all other branches of the farming industry also, and it is beyond dispute that the principles for which these three "C's" stand are largely responsible for the proud position which the Dominion holds in the farming communities of the world.

Co-operative Associations of farmers own the dairy industry of New Zealand, the exports from which amount to approximately fourteen million pounds sterling per annum. They also own practically the whole of the bacon curing industry, the majority of the freezing works, and a few of the largest commercial concerns.

When their accredited representatives approach shipping companies in connection with shipping, or commercial houses in connection with other business, their representations receive every consideration from the principals, because they represent in the aggregate big business, whereas an individual on a similar errand would be likely to receive a prompt refusal from a subordinate and sometimes not too much civility with it.

Besides working in the interests of their own industries, such Associations are of great value to the Government of a country and to the various Departments of State that are concerned with their industries, for the reason that either can act promptly and with confidence in most matters when the accredited representatives of an industry speak for the majority in place of having to hesitate and delay action on important matters as a result of conflicting opinions received from individuals possessing different outlooks, or conflicting personal interests.

A number of those with whom I have discussed the proposal to form a Sheep Farmers' Association in this country have stated that Falkland Islands farmers will not co-operate, but personally I am convinced that this is not correct, and that they can do this and all other things quite as well as the farmers of New Zealand or elsewhere, provided business methods are followed.

In my own and some other countries we certainly possess the advantage of having grown up among such organisations, but our forefathers had to lay the foundations, and I am sure the farmers here are sufficiently broad-minded to be able to do a like service for their country. Did I think otherwise I certainly would not waste time in dealing with the matter in this report.

Odd individuals are to be found in any country, who are small enough to allow personal feeling or petty spleen to weigh against the general interests of the community—in fact I have met a number—but if I have met one such among the Owners and Managers here I have failed to pick him.

A few of the things that are essential to the success of an Association of this kind are, strict adherence to the recognised procedure in connection with the conducting of public meetings, prompt compliance with the ruling of the chair, loyal adherence to the decision of the majority on matters of general interest, and to refrain absolutely from anything in the way of aggressive or offensive remarks during meetings.

The services which such an Association could render to the sheep-farming industry of the country are many and important, among which are the following :—

Fencing material will be required in large quantities even to put the existing fences in a proper state of repair, and if progress is to be the order of the day, it will be required in greater quantities still. Under the conditions that exist in this country the best can be secured at the least cost and with least trouble to individual farmers, by purchasing and shipping it in large quantities through an Association.

Stud sheep are required, and these also can be procured to great advantage by pooling orders in order that a reliable firm will give its best attention to their selection and purchase and that they may be delivered in the country without transhipment.

Competition is, figuratively speaking, the life-blood of any industry, and the forms of competition which the farming industry of this country stands most in need are stock shows and dog trials, both of which can best be organised and controlled by an Association.

A race meeting provides a pleasant day's outing and an opportunity for farmers and their families to meet, but its advantages end there, whereas stock shows and dog trials, while providing similar advantages, are of substantial benefit to the industry upon which the prosperity of the country depends.

Many interesting and amusing competitions are included in the show programmes of small centres in other countries, which makes the day bright and enjoyable even for those who are not interested in stock, and there is no good reason why this could not be done here also.

Literature on stock breeding and management.

Another matter that has been very much neglected in the Colony is literature dealing with agriculture and stock breeding and management.

There are a number of valuable publications from which the most experienced husbandman can derive some benefit, because they contain in condensed form the accumulated experience of 200 years on these subjects.

In all other callings, such, for instance, as medicine, chemistry, engineering, and navigation, practically the whole of a student's early studies are based on the accumulated experience of the past, which is recorded in books and periodicals.

The most experienced breeders and Managers I have known have been students of Mendel and the successful practical husbandmen of the past, and they have not been above quoting them as their authority on many points, particularly in connection with the art of breeding.

I am convinced that a circulating library of such literature would be of great advantage to the farming industry of this Colony, and this also can best be organized and controlled by an Association.

In the event of a move being made to form such an Association in this country, it will no doubt be helpful to have something in the way of Articles of Association and Bye-Laws available which will act as a basis for discussion. For this purpose I have prepared draft Articles which are given in Appendix " B " to this Report. Certain of the provisions of the bye-laws are unusual, but so also are the conditions for which they are intended to provide, and they will at least act as a basis for discussion.

STATION BOOKS.

Farm costing and accounting essential;

The system of book-keeping which is practised on stations is an important matter, to which I have inadvertently omitted to refer earlier in this Report.

With few exceptions, the system of book-keeping practised on the various stations is extremely lax, and the absence of any system of costing as well as efficient and reliable records in connection with the stock must prove a great handicap to some Managers.

On a number of stations I was unable to obtain information regarding comparatively recent operations which should be considered essential in connection with the management of a large estate.

This condition is no doubt due to the fact that the majority of Managers are expected to do the books and look after the store as a side line, usually during the evening, when they would be much more profitably employed in discussing matters with their men and planning their work.

The most capable station Managers often have practically no knowledge of accounting—in fact, it is the exception to find one who has.

Elsewhere, stations of a size similar to those in this country employ an accountant who attends to the books, stores, and moveable property, and gives a hand in the shed or yards at a pinch.

A man can be employed for about one-third of the usual Manager's salary, who can do this class of work much better than the average Manager.

The most experienced Managers require information to guide them in their operations, which often can only be obtained by being able to study the financial results through a sound system of accounting.

Reliable records in connection with stock also are most essential.

Not many of the Managers in this country enjoy these advantages.

SUMMARY OF RECOMMENDATIONS.

In conclusion, I wish to summarize my recommendations as follows :—

(1) Confine burning to wet camp and practise it sparingly even there.

(2) Limit the number of stock strictly to what the pasture will maintain in good condition through the year. This will represent the true carrying capacity of the country which it will continue to maintain under judicious management.

(3) Sub-divide more extensively with a view to resting pasture periodically, making more use of wet camp during suitable seasons and running sheep in flocks according to age.

(4) Construct more substantial fencing. That on wet camp should be capable of holding cattle.

(5) Give much greater attention to the maintenance of permanent improvements, particularly fencing.

(6) Reserve the driest and most nutritious pasture for the breeding ewes and hoggets and sub-divide such areas into paddocks which will enable these flocks to be moved to fresh pasture at intervals.

(7) Provide a suitable area on which to carry out experiments under State control, particularly in connection with regrassing and growing fodder crops.

(8) Discontinue in-breeding, including the use of sires which are the progeny of ewes selected from the main flocks.

(9) Do not import mongrel stock for stud purposes—better animals can usually be procured locally at much less cost.

(10) Discontinue the use of mongrel sires of any kind.

(11) When cross-breeding is considered necessary, confine the crossing to two breeds.

(12) Do not import high-priced sires for mating with ordinary cross-bred ewes.

(13) Carry more cattle on wet and medium wet camp.

(14) Organise with a view to taking joint action on matters of general interest.

(15) Institute. a proper system of farm accounting and the keeping of stock records, employing an accountant for the purpose on all stations carrying over 15,000 sheep.

(Sgd.) H. MUNRO,
Commissioner for Investigation into Sheep Farming Industry of the Falkland Islands.

STANLEY, FALKLAND ISLANDS,
3rd October, 1924.

APPENDIX A.

DRAFT LEGISLATION FOR LIVE STOCK MARKS.

1. Mark means:—

(*a*) In the case of cattle an earmark made by punching the ear with pliers so that in no case shall more than one-fourth of the ear be removed, or a distinct or plain mark not less than two inches in length burnt with a branding iron into the skin, or both in conjunction.

(*b*) In the case of horses, a distinct and plain mark not less than two inches in length burnt with a branding iron into the skin.

(*c*) In the case of sheep an earmark make by punching the ear with pliers, provided that in no case shall more than one-fourth of the ear be removed, to which may be added in conjunction one or more of the following marks:—

(1) A registered wool brand made with paint, ruddle, or lamp black mixed with oil or tallow or made with other approved material, in plain or distinct letters, figures or otherwise, not less than three inches in length, on the side, back, shoulder, hip, or rump of sheep.

(2) A metal clip with a distinctly registered mark stamped thereon.

(3) A registered fire mark distinctly and plainly made on the face.

2. The Chief Inspector of Stock for the time being shall act ex-officio as Registrar of Live Stock Marks.

3. Every owner of stock who neglects to register a live stock mark shall be liable to a fine not exceeding five pounds.

4. Every owner who applies for a live stock mark shall deposit with the Registrar of Live Stock Marks two correct copies of his mark on the forms supplied for the purpose.

5. The registration of a mark shall be considered to be complete when the forms referred to in the preceding section have been duly signed and dated by the Registrar of Marks and such forms shall not thereafter be altered in any way.

6. There shall be paid by the owner of a brand to the Registrar of Marks, prior to completion of the registration, a fee of ten shillings in respect of the registration of such brand.

7. All lambs shall be distinctly and legibly marked with the registered mark of the owner before the thirtieth day of April in each year and for every sheep not so marked the owner shall be liable to a fine not exceeding two shillings.

8. Any person having a mark registered may, by writing addressed to the Registrar of Marks, relinquish his right to such mark and nominate some other owner of stock in whose name it shall be registered on payment of the prescribed fee.

9. The registered mark for sheep shall be on the off ear for males and on the near ear for females.

10. When it is proved to the satisfaction of the Registrar of Marks that any registered mark has not been used by the owner thereof or by his authority for at least two years previously, such mark shall be considered to have been relinquished and shall be cancelled forthwith.

11. After any owner of stock has registered a mark, no other person shall, without the authority of such stock owner, mark any stock with the same mark, or one so nearly similar as in the opinion of the Registrar to be not distinguishable therefrom.

12. The mark or impression of a registered mark on any stock shall be *primâ facie* evidence of the ownership of the said stock by the person in whose name such mark is registered.

13. Every person who destroys, defaces, or alters the mark on any stock, or is party to the destruction, defacement, or alteration thereof, unless he is the lawful owner of such stock, is liable to a fine not exceeding fifty pounds and not less than five pounds for each head of stock in respect of which such offence has been committed, or, at the discretion of the convicting magistrate, to imprisonment with hard labour for a period not exceeding two years.

14. Every person who wilfully removes more than one-fourth of the whole ear of any stock, whether his property or not, is liable to a fine not exceeding ten pounds and not less than two shillings in respect of each head of stock so treated.

15. Every person who marks any stock with a mark which is not registered, or of which he is not the registered owner, without the authority of such owner, is liable to a fine of ten shillings and not less than sixpence for each head of stock in respect of which such offence has been committed.

16. In the case of stragglers or stray sheep not the property of the occupier, notwithstanding anything in this Ordinance to the contrary, every owner on whose land or in whose shed any stragglers or stray sheep have been shorn shall forthwith distinctly and legibly marked such sheep on the head with his registered mark, or, if he has no registered wool mark, with a distinguishing mark of paint or tar.

17. It shall not be lawful for any person:—

(*a*) To cut off, remove, or destroy any ear on the skin of any stock or carcass; or

(*b*) To cut out, burn, or otherwise destroy or deface any brand upon any such skin; or

(*c*) To be in possession of any such skin from or upon which the ear or brand has been cut, removed, burnt, or otherwise destroyed or defaced; or

(*d*) To knowingly purchase a raw hide or skin from which any brand has been cut or burnt out or destroyed or otherwise defaced, unless in every instance he is able to give a satisfactory account thereof whenever called upon so to do by any Inspector, Justice, Police Officer, or Court.

18. Every person who commits or attempts to commit, or is concerned in committing or attempting to commit a breach or violation of the provisions of this Ordinance for which no special penalty is provided is liable for every such offence to a fine not exceeding one hundred pounds and not less than one pound.

The attached Live Stock Forms are proposed in connection with the foregoing:—

(1) Live Stock Form No. 2, "Certificate of Registration of a Live Stock Mark," for which provision is made in section 4.

(2) Live Stock Form No. 3, "Notice of Allotment of a Live Stock Mark."

(3) Live Stock Form No. 4, "Index to Earmarks and Brands and Register of Owners."

APPENDIX B.

DRAFT ARTICLES OF ASSOCIATION AND BYE-LAWS FOR A SHEEP BREEDERS' ASSOCIATION.

Articles of Association.

The name of the Association shall be "The Falkland Islands Sheep Breeders' Association."

The objects for which the Association is formed are:—

(1) The improvement of stock in the Falkland Islands.

(2) The importation of stock on account of members in order that the most suitable may be obtained from the safest source at the minimum cost.

(3) The conservation and improvement of the native pastures and the introduction of other grasses.

(4) The organization and control of experiments.

(5) The purchase and shipment in bulk of fencing material and other stores on account of members.

(6) The promotion of education in connection with husbandry, by the purchase and circulation of suitable books and other literature.

(7) The organization of stock shows and dog trials.

(8) To carry out negotiations in connection with matters of general interest such as shipping legislation, etc.

(9) To provide rooms and other facilities for holding and conducting meetings in connection with the business of the Association.

(10) To receive suggestions and arrange meetings to discuss these and other matters of general interest.

(11) To purchase, lease, hire, receive by way of gift, and also to sell, let, or otherwise dispose of any real personal property on behalf of the Association, and in accordance with the provisions of the law in such matters.

(12) To borrow from time to time any monies required for the purpose of the Association, on such security as may be determined.

(13) To do all other such legal acts as may be deemed conducive to the attainment of the above objects.

Bye-Laws.

1. It shall be contrary to the policy of the Association to take, or for any member or members to take in the name of the Association, any part whatsoever in business or disputes as between employer and employee.

2. The management of the Association shall be vested in an Executive Council comprising three (3) representatives elected by members of the Association on the Eastern Island, and three (3) representatives elected by members of the Association on the Western Island.

3. For the purposes of the Association, the Islands of Lively, Bleaker, Barren, George, Speedwell and Great, shall be considered to form portion of the Eastern Island, and the Islands of Weddell, Beaver New, West Point, Carcass, Saunders, Keppel and Pebble, shall be considered to form portion of the Western Island.

4. Meetings of the Executive Council shall be held when considered necessary and shall be called by the President.

5. Separate meetings may be held by the Members of the Executive Council on each Island as may be arranged by the President or Vice-President, but no decisions arrived at in connection with the business of the Association at such meetings shall be considered binding on the Association in any way, nor shall they be acted upon in any way, unless and until they have first been approved by a majority of the whole Council.

6. At least one general meeting of the members of the Association shall be held in each year at a place and on a date to be arranged by the Council.

7. A general meeting of the Association shall also be called by the President at any time such may be required by a majority of the members of the Association.

8. In the event of an equal number of members voting for and against a motion, either at a general meeting or at a meeting of the Executive Council, the Chairman shall have the right to a casting as well as a deliberative vote.

9. Anything done at a meeting of the Executive Council within the scope of its authority shall not be deemed to be irregular or illegal if four members of the Council are present, or afterwards confirm the proceedings of such meeting.

10. The Executive Council may expel from the Association any member whose conduct is, in their opinion, improper or injurious to the Association.

11. The Executive Council may employ a Secretary and other assistance that may be deemed necessary for the efficient conducting of the business of the Association.

Fees.

12. The entrance fee shall be..... and shall be payable to the Secretary at the time the application is made for membership.

In addition to the entrance fee, members shall pay an annual subscription of ....., which shall be payable on the first day of January in each year.

13. The entrance and annual subscription may be altered by the Council at any time as may be found necessary.

14. Money required by the Association for administrative purposes only, other than that provided by the entrance fees and annual subscriptions, shall be collected from owners by the Executive Council on the basis of a charge on each thousand or part of a thousand sheep owned by them at the time such charge is imposed.

15. The decision of the Executive Council regarding the amount of such fees and the necessity for collecting them shall be final and binding upon all members who are liable for the payment of such fees.

Election of Executive Council.

16. The first election of the Executive Council shall be held on a date to be fixed by the promoters and they shall at the same time appoint a place on each Island where members may record their votes.

17. The Secretary for the time being shall act ex-officio as Returning Officer for the first and all succeeding elections, and he shall appoint some suitable person who will act as his representative for the purpose of conducting the election on the other Island.

18. The number of votes that may be exercised by any owner on any matter connected with the Association during any one year shall be computed on the basis of the number of sheep owned by him as shown in his official annual return of stock, and shall be regulated as follows:—

(*a*) If the number of sheep is more than 500 and less than 5,000, he shall have one vote.

(*b*) If the number of sheep is not less than 5,000 but less than 10,000 he shall have two votes.

(*c*) If the number of sheep is not less than 10,000 but less than 20,000, he shall have three votes.

(*d*) If the number of sheep is not less than 20,000, but less than 30,000, he shall have four votes.

(*e*) If the number of sheep is not less than 30,000 but less than 50,000, he shall have five votes.

(*f*) If the number of sheep is over 50,000, he shall have six votes.

19. No owner shall have the right to exercise more than six votes.

All sheep owned by any company, body, society, or person, whether depastured on separate properties or otherwise, shall be deemed to be one lot for the purpose of determining the number of votes that the owner may exercise.

20. In the case of a partnership, company, body or society, one person should be appointed who shall exercise the votes to which such partnership, company, body, or society are entitled.

Any owner may by writing addressed to the Secretary appoint some other person named in such letter to represent him for the purpose of the Association, and the person so appointed may exercise all the rights of such owner in connection with the business of the Association.

21. Only those owners who are financial members of the Association may exercise the right of voting.

22. When a date is appointed for holding an election, the Returning Officer shall prepare separate lists of all persons who are entitled to vote, and also eligible for election to the Executive Council, on each Island, and he shall communicate such list to all such persons and invite them to vote for any number from one to three to fill the positions on the Executive Council.

23. He shall at the same time advise them on the following matters:—

(*a*) The number of votes which they are entitled to exercise.

(*b*) The place at which their votes shall be recorded.

(*c*) The date on which the election shall close, which shall be not less than 21 days following that on which such advice was despatched on each Island.

24. Votes may be recorded in either of the following ways:—

(*a*) By letter addressed to the Returning Officer.

(*b*) By telegram addressed to the Returning Officer.

25. As early as possible after the closing of an election the results shall be checked and certified correct by a Justice of the Peace, and immediately thereafter all voting communications shall be destroyed in his presence and no information whatsoever in connection therewith shall be divulged.

26. Members who are entitled to vote may record the whole of the votes which they are entitled to exercise for one candidate or they may distribute them between two or three.

27. In the case of two candidates receiving an equal number of votes, any issue that may arise in consequence shall be decided by a casting vote by the Returning Officer.

28. Following the first election, further elections shall be held during the same month in each succeeding third year thereafter on a date to be arranged by the outgoing Council.

29. Members elected to a Council shall continue to hold office until the election of their successors.

30. If any member of the Executive Council dies or by writing addressed to the President resigns his office, or ceases to reside in the Colony for a period exceeding one year, or absents himself from four successive meetings of the Council without the permission of the President, or otherwise becomes incapable of acting as a member of the Council, his seat on the Council shall be deemed to have become vacant, and shall be filled during the unexpired residue of the period for which the Council was elected by another member, who shall be selected in accordance with the provisions hereinafter provided.

31. Members of a retiring Council shall be eligible for re-election to an incoming Council.

32. Should the office of President become vacant it shall be filled by the Vice-President during the unexpired residue of the period for which the Council was elected. Should the position of Vice-President become vacant, it shall be filled by the member who recorded the greatest number of votes on the Island not represented by the President. Should the position of any other member or members become vacant, it or they, as the case may be, shall be filled by the available unsuccessful member or members who recorded the greatest number of votes at the most recent election, but if such member or members are not available, an election shall be held of a person or persons, as the case may be, to fill the vacant seat, or seats, on the Council.

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