Our Cover: Irrigation, Tara Hills.
One of the planks to a ten-fold increase in production from the un-improved state in the high-country complex is irrigation, subject to capital costs being kept within working limits, and efficient use of the facility. Mr N. A. Cullen in this issue describes the role of the Tara Hills High Country Research Station, where theories are tested in practice.
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**Editor—J. Runga**
GUIDE TO POTENTIAL FROM TARA HILLS

N. A. Cullen

Director, Invermay Agricultural Research Centre, Mosgiel.

A talk given to the 1971 Pastoral Lands Seminar, Alexandra.

In 1948 Tara Hills was taken over by the Soil Conservation and Rivers Control Council as an example of a run out, depleted and deteriorated hill-country run. Rabbits were a great problem about that time.

The property is 8000 acres and when taken over there were approximately 1400 sheep, with a high proportion of wethers. Wool weights were about 5 lb. The first step was to reduce stocking and in 1950 it had about 1000 sheep but no cattle. By 1960 the stock numbers had gone up to 2600 sheep and 70 head of cattle as a result of irrigation, oversowing and topdressing. Nearly half the tussock country had been oversown and topdressed.

In 1966 Tara Hills was handed over by the Soil Conservation and Rivers Control Council to the Agriculture Department’s Research Division for detailed work on high country problems.

At that time there were 3600 sheep and 130 cattle. We have doubled the carrying capacity in the last five years and are now carrying over 6000 sheep and 350 cattle. This means that in the last 20 years there has been about a six-fold increase and this bears out what the Agriculture Department have obtained from surveys of the region — in the unimproved state the two million odd acres around Mackenzie country and Upper Wai-taki are carrying about one sheep to 4 1/2 acres while Tara Hills’ carrying capacity has been raised to nearly one sheep per acre.
With additional development by irrigation and oversowing and more intensive grazing management, I estimate the carrying capacity of this country in another ten years could be nearly doubled again — that is 14,000 sheep on 8,000 acres. In other words I consider the potential of the high country is about ten times what it is in its unimproved state. With irrigation the flat land could carry 10 sheep per acre, while the lower hills and especially the darker faces are capable of carrying more than two per acre.

There is no reason why improved tussock country cannot carry more than one sheep per acre. The dry matter produced on some of the dark faces at Tara Hills would be theoretically capable of feeding four to five sheep per acre.

Research work at Tara Hills covers all aspects of high-country farming including sheep and cattle trials, and pasture, fertiliser and soil conservation studies. While the main objective at Tara Hills is to conduct research it also has an important function to demonstrate the potential of the high country. For this reason we are increasing the carrying capacity to the state where stock problems can be expected. Our aim is to investigate problems and you don’t get many unless you are heavily stocked. For example, we want to know if there is infertility in sheep or cattle, what is the effect of a higher stocking rate on wool weights and lambing percentages, the problems of wintering hoggets, and problems of ewe, hogget and cattle management in general.

If we have 14,000 sheep or their equivalent in cattle on Tara Hills we are going to have very real problems of winter feeding. At the moment we have a fairly tidy system with relatively low stocking — we can shut up some of the sunny lower blocks in the summer then put the hoggets and ewes on those right through the winter with no additional feed. No work is involved but obviously if we have twice as many sheep we will be unable to do this and will have to use hay or grain.

The same applies to cattle. In the past cattle have been used mainly to graze the gullies, flats and swamps and if we are to switch from sheep to cattle in a big way we have to change our management completely. Tradition has to go by the board.
Packing out for the first hill subdivision fence in 1949, a year after acquisition of Tara Hills by the Soil Conservation and Rivers Control Council as a Soil Conservation Reserve. Note the depleted ground cover and the development of scabweed.

Photo: G. A. Dunbar.

Research

Over the last few years the greatest emphasis has been on livestock work, mainly because the two scientists we have had there have been primarily stock men, but recently we appointed a scientist whose primary responsibility is pastures and soil fertility so we hope to extend this side of the work. Animal research in recent years has been concerned with sheep breed comparisons, particularly Merino versus Corriedale, cattle wintering and breed trials (four breeds and crosses), rates of stocking trials on irrigation, a comparison of cattle versus sheep grazing, use of salt as an animal feed supplement, early weaning, use of selenium and use of anthelmintics.
On the pasture and fertiliser side, we have had a series of fertiliser trials on the different soils on the station and have had quite a look at lucerne over the last ten years, particularly frequency of cutting, establishment of lucerne on some of the poorer Acheron soils, work on clover inoculation and grass establishment both on the flats and the hill. We have also been interested in rainfall and micro-climate data at various altitudes.

At present one of our main investigations is to endeavour to establish lucerne on the dry sunny faces. One of the problems of successful establishment is tied up with the inoculation of lucerne. Clover is different in that there is usually some inoculant in the soil but with lucerne good inoculation is vital. If the lucerne is broadcast on the surface in hot weather it is quite likely the inoculant would be dead well before the plants are germinated. This could be a factor in favour of winter or early spring sowing in that the bacteria are not affected by the heat at that time of year. Some frost lift will help the seed to get incorporated into the ground and the better moisture supply in winter and early spring will ensure better establishment. One of the reasons for the good results in these trials is that we used 40 times the recommended rate of inoculation just to rule out inoculation failure. This may not be feasible on the normal farm. Fortunately the latest cultures have a much higher bacteria content than they had a few years ago.

It is possible to get good lucerne establishment with oversowing if conditions are right and at present we are trying to find out exactly what these are. For example, we are looking at seed pelleting, the use of several rates of lime, and particularly the different times of sowing. If we can get lucerne established I think it has got tremendous potential in a very large area. Maybe we can get reasonably good lucerne on country which is neither sunny nor dark — I don’t think lucerne has much place on the really dark faces but there is a lot of country which is neither one nor the other. Lucerne at a 3 lb seeding rate would have about 20 plants per square foot with a reasonable germination. If with 3lb of lucerne we get only 5 per cent survival this amounts to 10 plants per square yard which may be an adequate number to give reasonable cover.
"With additional development by irrigation and oversowing and more intensive grazing management, I estimate the carrying capacity of this country in another ten years could be nearly doubled again — that is 14,000 sheep on 8000 acres. In other words I consider the potential of the high country is about ten times what it is in its unimproved state."

— T.G.M.L.I. photo.

By allowing it to seed it may thicken up sufficiently for good cover. However, we know very little about the management of oversown lucerne and this is one of the problems we hope to investigate.

We have done a lot of work on clover inoculation at various places since we realised about five years ago that we were getting poor inoculation results in most areas of Otago and Southland where inoculation is necessary. Instead of getting 50 to 100 percent nodulation as we might have expected under favourable conditions we were getting, in many cases, under 10 percent.

In a series of trials at Tara Hills, Te Anau, and on coastal hill country, we showed we could expect less than 5 percent establishment in the absence of inoculation. Therefore I think it is very foolish not inoculating clover seed on hill country which has little, if any, clover naturally present. In fact I think it is foolish to consider any oversowing without inoculation. If you get poor inoculation there might be only one seed out of 10 nodulated and it is likely to take several years for the clover to establish.
In trials done last spring the results were poorer than we had anticipated so even though there has been some improvement in the quality of the inoculants, one still could not say clover inoculation is completely satisfactory. At present we don’t think pelleting is necessary where you can inoculate the seed yourself and sow within three days, particularly if you use two to four times the recommended rate of inoculum. However, if this is not possible and it could be a week or more before the seed is sown, best results are likely to be obtained from pelleted seed.

A Guide to Development

There are two points I would like to emphasise. First of all what part of the station should be developed. There is a tendency for the owner to start on the hardest country first, usually the sunny faces that were eaten out by rabbits 20 years ago. He ought to appreciate that this is his hardest country not his easiest, and psychologically I think there is a lot of merit in starting with the easiest country. This would normally be the darker faces and the higher-altitude country where there is better rainfall. I would put much of the country between 2000 ft and 3000 ft in this category. On these areas good establishment can be expected nine times out of 10 with oversowing in August or at the beginning of September provided the seed is inoculated and sown with suitable fertilisers — usually molybdenised super or molybdenised sulphur super at 1 to 2 cwt per acre.

The other point is fencing. While a certain amount of subdivision is essential, I think there is often too much emphasis on fencing initially — we can spend $15,000 on fencing and it doesn’t give you one increment of grass, except indirectly. I would suggest that the most we could expect from fencing alone is a 50 percent increase in production. In other words an increase in dry matter from about 500 lb to 750 lb per acre on unimproved country. With normal topdressing and oversowing we have raised production nearly tenfold to over 5000 lb dry matter per acre.

So I am a great advocate of development even on the relatively high country which as I said earlier has better rainfall. This higher country when developed can be used for summer grazing by sheep and cattle to spell the lower dry faces.
With the improved returns from cattle, lower labour requirements and no shearing required, we could well see stations devoted entirely to cattle in the not too distant future. By use of electric fencing, subdivision costs could be reduced considerably.

In this talk I have covered only some aspects of the work at Tara Hills. For example I haven't mentioned the results of the animal trials which I believe will have a very big impact on high-country farming in the future. I am sure the high country has a future even though the pattern of farming must change and I hope Tara Hills will continue to play its part.

ABOUT THE AUTHOR — A. L. POOLE

As chairman of the Soil Conservation and Rivers Control Council, Mr A. L. Poole is this body's representative on the Institute's Committee of Management in place of Mr A. E. Clark, who retired from the Council in March, 1971. Mr Poole served 10 years as Assistant Director-General of Forests, then Director-General from 1961 until his retirement in January, 1971. He was awarded the C.B.E. (1971) for his services as Director-General of Forests.

Mr Poole joined the State Forest Service in 1931. From 1937 to 1940 he was with the Botany Division of DSIR. As a commissioned officer with the 2nd NZEF he served in Britain's war effort as a scientific liaison officer in London from 1941 until 1945, and with the British Military Government in Germany. He returned to New Zealand in 1947 and in 1949 was Director of Botany Division, DSIR. In 1951 he joined the New Zealand Forest Service.

Notable among Mr Poole's writing was the book TREES AND SHRUBS IN NEW ZEALAND and with WILD ANIMALS IN NEW ZEALAND compiled under his direction these titles point to two distinct interests Mr Poole has. His interest in conservational forestry will be recognised in the following address, his enduring belief in the significance of forestry is clearly stated.

"... I have always maintained that some time in the future the most extensive exotic afforestation in New Zealand will take place in the South Island tussock grasslands."
SOIL CONSERVATION IN THE SOUTH ISLAND

A. L. Poole,
Chairman, Soil Conservation and Rivers Control Council.
An address to the South Island High Country Committee of Federated Farmers, June 1971.

When I was invited to address this gathering I suggested that it might be an opportunity to review soil conservation practices in the South Island high country and also hear something on this matter from those present.

Much has been said and written about early settlers and their indiscriminate burning and stocking of South Island tussock grasslands and mountainlands, about the effect of this in bringing on accelerated erosion and increased flooding of the great rivers that flow from the mountain country, about the ravages of introduced deer and rabbits, and the effects of these animals in still further increasing erosion and flooding.

That the degeneration of this large and important tract of country did take place in a short space of time is undoubted. But one of the causes, burning, had started long before European settlement began. Fires started by Maoris had, indeed, raged through this land and had even been responsible for inducing tussock grassland in the place of forest, largely beech forest. Evidence gathered as a result of research is revealing that even the plains themselves were at one time mainly covered with forest. Only the ever-changing river beds and the mountain tops carried tussock grassland.

Erosion did reach serious proportions, but determining how much was induced, how much was natural, the effects of domestic stock, and of introduced animals and of fire, is too difficult now to unravel. The important tasks were to assess the erosion and to begin to correct it.

Survey of the erosion itself was fortunately made by the Department of Scientific and Industrial Research — Gibbs and Raeside, 1944 Soil Erosion In the High Country Of The South Island. Just to remind you of the summarised findings of this
survey: “The total area is 8,617,200 acres, and at present four-fifths of this area, or 6,700,000 acres approximately, is significantly eroded with less than 90 per cent of their original depth of topsoil remaining. Moreover, one-third of the area, amounting to nearly 3,000,000 acres, has only 50 percent to 75 percent of the original depth of topsoil, whilst one quarter, or 2,200,000 acres, has less than 50 percent topsoil left. Assuming that an average acre of soil to a depth of 1 inch weighs 100 tons, the total loss is estimated at 1,500,000,000 tons of soil”.

This survey gave a base record from which to work. Of equal importance was that Government was prepared to accept responsibility for commencing the rehabilitation of Molesworth, Tarndale and St. Helens, some of the country that had got into poorer condition than any other.

The most important feature of all, however, was that many run-holders recognised the state of things and were prepared to do something about it. They were the first to call attention to the ravages of deer and rabbits and to ask for centralised and concerted Government control. The campaign against deer started in 1930, but it wasn’t until the 1940s that the technique of large-scale poisoning of rabbits were worked out. Until these animals had been controlled it was not possible to introduce any other measures for the rehabilitation of depleted country. All this story is told clearly in L. W. McCaskill’s “Molesworth”, from which the following quote is taken.

“This is a story of land, of tussock grasslands and mountain lands; it is also a story of people. It is the story of how the vegetation was damaged so that it became but a tattered umbrella; of how burning provided an environment more attractive to sheep and how they in turn helped make an environment more attractive and suited to rabbits; of how the country was laid bare over vast areas, to allow the frost and wind and rain to dissipate the soil and leave the mountain groaning to the movement of the scree and shingle fans . . . . . .

This is a story of rebuilding of land by people; a story of the use of brains and of experience, of sheer physical strength and of equipment, of staff loyalty, of scientific knowledge. It attempts to explain, albeit with many gaps, the legend which is Molesworth”. 10
Steps were taken on Molesworth to rehabilitate the land once the problems had been recognised and analysed, once rabbits and deer had been controlled and once Government was prepared to face the task. Sheep were changed to cattle, oversowing and topdressing of high country was experimented with extensively and finally carried out on a large scale. Control of animal numbers was watched and fencing undertaken to regulate grazing. Burning ceased.

Above all a series of long term trials and observation was got under way.

While all this was being undertaken at Molesworth runholders elsewhere were beginning to do something about their problems. A change in mental attitudes was required as much as anything else. While many men could see the problems and were willing to do something about them, some clung to the idea that all erosion was natural and that fire was necessary to improve the tussocks.

The passing of the Soil Conservation and Rivers Control Act in 1941 provided the focal point for those who were looking for remedial measures and assistance. It provided for the centralisation of river works, a natural step in river control in this country, bringing to bear on large river schemes all the resources possible. It did a great deal more than that, it provided the basis for examining catchments along with rivers. And for the first time in this country it voiced Government concern about the serious problems of erosion and made provisions for coping with them. The Soil Conservation and Rivers Control Council and Catchment Authorities became the focal points for the introduction of soil conservation measures in the South Island high country as elsewhere.

In the thirty years since the passing of the Act many changes have taken place, not the least of which have been changes in mental attitudes. In 1939 I was involved to a small extent with experimental work at Molesworth, and at that time there was widespread criticism in the South Island about talk of accelerated erosion and the need for soil conservation. Since then there has not only been recognition of the problems but a general anxiety to devise and apply remedial measures. I will review briefly progress made by the Council and Boards and the Waitaki Commission with these measures.
The most pleasing feature of all this work is that as skills and knowledge grow, increasing emphasis is being placed on relating river schemes to catchment schemes as provided for under the 1941 Act. To relate these things as closely as possible has become even more important with the passing of the Soil and Water Conservation Act in 1968 and the setting up of the Water Distribution Council. Water yield, water flow and the flooding are all functions of catchments and their conditions, and it is important to understand as much as possible about the inter-relationships.

Changes in land-use have been most important to achieve in rehabilitating such difficult country, subject as it is to the hazards of a rigorous climate. There is no doubt that none of the high mountains should have been grazed or browsed by wild or domestic animals. Control of wild animals on them and retirement of sheep have, therefore, been important measures. The latter could not be achieved without the erection of retirement fencing and the development of better pastures at lower elevations by over-sowing and topdressing. The rehabilitation of country at lower elevations could only be brought about by better control of stock numbers and where they graze, change to cattle, and control or elimination of fires. Access is essential. Fencing is essential to separate winter and summer country, to keep stock out of eroded areas and control stock movement and provide for a change to cattle.

It is expected that by 1975 over 400 miles of retirement fencing will have been completed. 140 miles of fencing has been erected to protect eroding gullies, and nearly 1,300 miles to control grazing. Cattle proof fencing already erected amounts to 800 miles.

The area of land retired from grazing is close to 400,000 acres and a larger area is expected to be added to this by 1975. To provide grazing for stock retired from these areas, about 130,000 acres has already been oversown and topdressed, and it is planned to do a further 85,000 acres. Over 1,000 miles of firebreak-access tracks have been formed and 500 stock-ponds built for cattle. Not strictly affecting high country, but related to the running of it, is the planting of over 500 miles of windbreaks.
The combination and correlation of these single works in run plans is a growing practice and 345 soil and water conservation plans (Farm Plans, Run Plans, etc.) have been prepared for 3.1 million acres. Not all of these cover true high country. In the present five-year period it is expected to process an additional 416 plans covering an area of 3.2 million acres.

During the first years following the passing of the 1941 Act a number of reports were written describing whole catchments and their river problems. A few of these led on to comprehensive catchment schemes. Later two regional schemes were planned, one for the Wairau North Bank and one for the Takitimu Mountains. The former is being acted on and large-scale changes in land-use are taking place there. A scheme has been written for the Waimakariri catchment but this is still being examined.

This story of progress that has been made is a fairly impressive one, but the problems are severe and there is a long way to go. Nevertheless a good foundation has been laid and progress in the future is likely to accelerate. I believe that it is about to be assisted by research that has been under way for some time and is beginning to yield results. Research has been difficult and time consuming in such country, but it has been well and carefully done. Surveys covering the same areas at intervals have given a better definition to many of the problems. The introduction of plants, the development of planting and sowing techniques, and an understanding of soils and their fertiliser requirements will allow erosion control measures to be developed for the more advanced erosion. *It is not enough just to shut country up, because once accelerated erosion commences in mountain country it often continues even in the absence of animals.* Mountain torrent hydrology is also being studied. Although this is a difficult and complex matter, some light must in the long run be shed on the movement of rock debris in mountain country.

The present is fashioning the future. Retirement of the most difficult and eroded mountain country. Increasing intensity of use of the remaining occupied country by improving the vegetation, increasing fencing and converting to cattle — all this integrated through run plans. There will be an increasing
These slopes in the Craigieburn valley are trial-plant ed in *Pinus contorta*. The bushline is approximately 4500 ft. a.s.l. and Mount Hamilton peak (left background) is 6297 ft. The trials have greater significance for conservational forestry and watershed control than for production forestry. However, there is a vast area between 3000 and 4000 ft. in the South Island that may be more viable in forest than in grassland and scree.

Photo: Forest and Range Experiment Station.—N.Z.F.S.

study of whole catchments with a view to improving land-use practices which in turn will affect water yields.

I would like to quote from the Presidential address to the last meeting of the New Zealand Catchment Authorities Association. Mr E. H. Simpson said, "There will be scope for extended tree planting on much of the eroding class VII and even class VIII land for production forestry".

I never expected to hear this statement come from a farmer, nevertheless I have always maintained that at some time in the future the most extensive exotic afforestation in New Zealand will take place in the South Island tussock grasslands. Pastoralists cannot expect to hold indefinitely land that is low producing agriculturally, but which grows large volumes of wood. However, this development is a long way off and there will have to be a protracted period of experimental planting.
"A few years ago between Pukaki and Tekapo I saw one single broom bush, four feet high and the same in diameter, on the side of the road." M.O.W. trials in this district show that aerial application of sprays and root-contact poisons can control broom. The limitation is cost.

T.G.M.L.I. photo.

COMMEN

TEED IN HIGH COUNTRY

Dear Sirs,

A few days before receiving the latest Review I had drafted a letter to you on weeds on hill country. Mr Chisholm's address to the weeds conference of course covers many of the points I had made but I had previously only read extracts of this. I agree entirely with his opinion that weeds are a greater threat than rabbits and have held (and stated) this view for many years.

Locally we have been successful in prodding our County Council to take more positive action, but with today's farming climate, results will be too slow for success. No matter how enthusiastic a local body may be for weed control, the shortage of finance, the uneconomic aspect of weeds on hill country and the Weeds Act itself prohibit worthwhile progress.

15
Nationally it is appalling to see the lack of concern displayed by those in seats of power to a menace which is reaching disaster proportions. The control of rabbits has aided the upsurge of weed spread and the trend today to replace sheep with cattle will further aggravate this. As the spread of weeds in the last 25 years has been during a boom in sheep farming and sheep are our best natural aid in control, the thought of what will happen in a time of recession and a move away from sheep is truly frightening.

We have seen in recent years a nationwide outcry at the suggestion of ruining Lake Manapouri, the same when proposals are made to harvest our beech forests, wide public support for the work of soil conservation, general acceptance that the cost of rabbit control has been worthwhile and acknowledgement of the dangers of both air and water pollution.

It is little over a hundred years ago that gorse was confined to planted hedges. Broom 120 years ago was being planted as sheep feed. Briar was probably welcomed as a pleasant sight in spring.

Since 1946 I have witnessed the spread of broom and briar over thousands of acres of good hill country and though my area of acquaintance is from as far south as Central Otago to the Marlborough Sounds, there are vast areas I do not know.

For many years broom has been gathering its forces in the Jack’s Pass area and has now begun an attack on the Clarence Valley. A few years ago between Pukaki and Tekapo I saw one single broom bush, four feet high and the same in diameter, on the side of the road. Would it be 60 or 80 years ago there was one single broom bush near Hamner.

Certainly gorse in July is a welcome sight with its splash of colour and even my biased eye will admit to being impressed with the sight of a hillside of golden broom in October. While we have weed cover we will not have soil erosion and if the weeds take over the valleys so that no stock can graze there the water will not be polluted.

Is this the answer we are going to accept?

Again, admitting to bias, I know of no lovelier sight than well grassed tussock hills giving a healthy living to good stock. In a world reputedly threatened by starvation do we allow our tussock country to go out of production, losing what is probably one of the world’s best natural environments for grazing animals.
Our weed covered riverbeds today are an eyesore and a liability, so too are those hill areas already lost to weeds. Good cultivable land will stand the cost of rehabilitation. Present indications are that outside this we are prepared to let this beautiful hill country become weed infested liabilities.

I cannot agree with Mr Chisholm's view that this task could be done by Pest Destruction Boards. I have a fair knowledge of such boards and the time required to steer the thinking of members and staff to weed control would be better utilised in more direct action.

Many county councils are already making progress, many more are trying hard to get something done, but until direction is given on a national scale we cannot win. Pest Destruction Council, Soil Conservation and Rivers Control Council, Forest Service, Department of Agriculture, can all contribute and much as I hate the idea of yet another authority directing our affairs I am sure the answer to this is a combined organisation in overall charge with local administration again under a combined committee of departments, boards and councils.

However, nothing will be successful unless money is more readily available from central Government funds for those areas where control is beyond the resources of present holders.

Whether it be grant, subsidy or deferred loan, or even confiscation of land, this in conjunction with the rewriting of the Weeds Act is essential.

As high country men you must know these problems and like myself have a love for our tussock and mountain lands. Cannot some counter be found to this threat? Is not weed control as much a part of preserving our environment as soil conservation or pollution control?

I do not write this in the belief that T.G.M.L.I. can wave a magic wand but in the hope that you may be able to do something to bring more public and political awareness to the problem.

Yours faithfully,
W. M. Dowle,
Makura,
R.D.2,
Kaikoura.

Readers who wish to contribute to Comment may do so. Please be brief. Questions that have managerial significance will be accepted too. If these can be answered they will be.—Ed.
FARM MORTGAGE GUARANTEE SCHEME

Rural Division,
State Advances Corporation
of New Zealand, Wellington

Farming, New Zealand’s largest industry, requires large and increasing amounts of capital to maintain efficiency and versatility. A number of other important industries are also expanding and make demands on the capital available. By minimising risk and other deterrents it is expected that the farm mortgage guarantee scheme will encourage lenders to offer farmers a fair share of available funds on reasonable terms and conditions.

Under the farm mortgage guarantee scheme:

The farmer is assisted to obtain essential finance for worthwhile farming purposes. Highly flexible farm financing arrangements are made possible. Embarrassment caused by temporary inability to meet mortgage payments can be alleviated.

The lender is protected against loss of capital and can obtain certain other benefits. Irrespective of amount or ranking a guaranteed mortgage can be a trustee investment.

The New Zealand economy benefits from an adequately financed, efficient, competitive agricultural industry.

Because of the protection which a guaranteed farm mortgage carries the lender is encouraged to:

Lend to farmers on medium to long terms, secured by a land mortgage.
Lend up to 80% of value.
Renew mortgages on due date.
Have regard to minimised risks when fixing interest rates and other mortgage conditions.

The information in this resume was issued by authority of the General Manager, State Advances Corporation, July 1971. Further information on working procedures may be obtained from The General Manager, State Advances Corporation of New Zealand, P.O. Box 5009, Wellington, or any branch of the Corporation.—Ed.
Borrowers who are unable to offer a lender a first mortgage can still offer equally sound second or subsequent security when a guarantee is available.

In the event of the holder of a guaranteed farm mortgage having to realise on the security there is protection against loss of principal, accrued interest and realisation costs. By arranging an extension of the mortgage guarantee, prompt payment of annual charges due under the mortgage can be assured. Individuals relying on a regular income from farm mortgage interest are expected to be among those interested in the latter provision.

By special provisions contained in subsection 6 of Section 20 of the State Advances Corporation Amendment Act 1970, a trustee is protected by the guarantee when lending trust funds in excess of normal limits and on other than first mortgages of land.

How a Lender Obtains a Guarantee

The Farm Mortgage Guarantee Scheme is designed to give the lender the protection he seeks with a minimum of inconvenience. In the normal course of his business the lender will firstly have satisfied himself of the substance of the borrower, the value of the security and the ability to service the proposed loans. (It is expected that supporting evidence will be provided in the form of a registered valuer's report or other acceptable professional documentation).

An application for a guarantee setting out the basic details of the loan, is then completed by the lender and sent to the nearest office of the State Advances Corporation. If the application meets the requirements, the lender is immediately notified of approval. As soon as securities are executed and fee paid the guarantee is operative.

A lending institution, legal firm, trustee investment company, accountancy firm, or any individual or organisation who, in the opinion of the Corporation has the facilities to grant prudent, soundly administered farm loans (or can arrange for this) may submit an application for a guarantee of a farm mortgage. Special arrangements will be made with major lenders to minimise delays.
The Corporation is anxious to assist institutions, organisations or individuals interested in lending to farmers. Those not conversant with farm financing will be given advice on such matters as the necessity for obtaining qualified legal aid, valuations and mortgage management. When a lender has funds to invest in farming but is unable to obtain either professional services or a satisfactory borrower he should discuss the position with the Corporation. Offices are located in main centres.

The Extent of Guarantee

The Mortgage Guarantee protects the lender against loss of principal, accrued interest up to two years and associated expenses should it be necessary to realise on the security.

The optional extension of the mortgage guarantee which is available for an additional fee, provides for payment of overdue instalments by the Corporation. This optional instalment guarantee is limited to an accumulated sum not greater than two years charges and is valid for five years from the commencement of the mortgage guarantee. A further period of protection will be considered on expiry.

The Corporation does not wish to be unduly restrictive but unless there are special circumstances, it is not intended to offer guarantees where in aggregate, the proposed loan plus the prior mortgages, exceeds $100,000 for any one proposition.

The sum of these loans may not exceed 80% of the value of the borrower’s mortgagable interest in land. The borrower is expected to have a personal equity of 30% in the farm as a going concern.

Interest Rates

In all aspects of operating farm mortgage guarantees the Corporation desires to interfere as little as possible between the lender and the borrower. The objective is to promote a flow of capital. It is not proposed to fix any arbitrary limits on interest rates for either first or subsequent mortgages. Bearing in mind the advantages of a guaranteed farm mortgage the borrower and the lender are expected to decide on a rate appropriate to the circumstances and in line with reasonable commercial rates.
Interest rate and associated charges must not be obviously excessive and should be clearly within the servicing ability of the property. Guarantees will not be approved when high charges jeopardise the farmer’s chances of success.

**Eligible Purposes**

*Loans being raised on mortgage for any acceptable farming purposes including purchase of land, development, working expenses and refinancing of current accounts or existing mortgages are eligible for inclusion in the farm mortgage guarantee. Mortgages raised for the purpose of non-farm assets or to cover non-farming expenditure are not eligible.*

Provided the loan is for an acceptable purpose, and is secured by a valid mortgage of land, the borrower can be an individual, partnership, company, trust or other organisation whose major undertaking is a viable farming unit. Management must be competent and the borrower creditworthy. Wherever possible the Corporation relies on the judgment of the lender in his selection of a borrower, appraisal of value and viability but reserves the right to make such further enquiries and conduct investigations, at its own expense, as it considers warranted.

Any farming unit which is considered capable of meeting all running expenses, servicing the proposed borrowing and providing an adequate standard of living for the operator is eligible. The tenure may be freehold, Crown lease or any other lease acceptable to the Crown in which the borrower has a worthwhile mortgagable interest.

Any mortgage of land, or any ranking secured on the freehold or lessee’s interest in an acceptable lease may be guaranteed.

Table mortgages to be for up to 30 years with a minimum of five years. Flat mortgages will normally be for the customary five-year term but acceptable variations may be considered. Current account and “on demand” mortgages are not acceptable.

Lenders may require collateral security for their advances and it is expected that charges on dairy farm mortgages will be payable by an operative order on the borrower’s supply.
Fees

Fees, calculated on the ratio of the guaranteed sum to the valuation of the land, are collected as one single payment at the commencement of the guarantee. The rates range from 25 cents per $100 up to a maximum of $2.00 per $100 for full protection at maximum risk.

Provision is made for the refund of part of the fee when the loan is voluntarily repaid within three years from the commencement of the guarantee and no claim has been made.

Transfer of Guarantee

If, during the currency of the guarantee, in anticipation of the transfer of the property under security to another borrower, a fresh application for guarantee is submitted, the Corporation normally issues an acceptance without a further guarantee fee. In the absence of a specific request from the lender the guarantee lapses on transfer of the property.

If the lender transfers his mortgage to another lender the Corporation's guarantee continues for the benefit of the new mortgagee without additional cost. The Corporation merely requires to be supplied with evidence of the transfer and to be satisfied that the transferee has available to him the facilities to continue the administration of the loan.

Conclusion

The purpose of the farm mortgage guarantee scheme is to improve the availability, flexibility and terms of mortgage finance available to farmers and to free prudent lenders of unnecessary worry associated with such financing.

It is unlikely that any one lender will be able to meet the entire needs of many borrowers and it is probable that clients' requirements will be drawn from several sources. Financial problems confronting otherwise sound farmers are likely to be solved by a combination of guaranteed and direct loans.

CANADA GEESE — GAME BIRD AND PEST

The Canada Goose is a game bird for which there is a restricted shooting season in the North Canterbury Acclimatisation Society district east of the north-south railway line, and also east of this line plus the riverbed downstream of the Waikai dam in the Waikai Acclimatisation Society's district. In all other areas it is unprotected except where it may harbour in a wildlife refuge, a National Park or scenic reserve.
Recent moves, now shelved, by the South Canterbury Acclimatisation Society, to declare it a game bird in that district were resisted by inland farmers who have had lucerne and pasture losses through grazing and fouling caused by geese. The birds tend to graze in flocks which makes control necessary as stated by Mr Imber in his article.

According to Mr J. Adams of the Wildlife Service in Christchurch the only liberation in the North Island is at Ngaumotu in a lagoon developed by the Wildlife Service near the north bank of the Wairoa River in Hawke's Bay. The colony was established in this refuge about three years ago. Another source states this colony may prove an embarrassment in a few years, and on the experience of the south this may well be so.

As farming must come first the goose population needs to be tightly controlled and if possible confined to areas where they cause least damage. Among the National Parks already frequented are Fiordland, Mt Aspiring and Arthur's Pass but Mr Adams says the extent to which true colonisation takes place here is unknown.

Mr E. S. Bucknell, Wildlife Service, Wellington, says farmers are more tolerant to geese than before because there is more improved pasture over which the geese spread. He says there are fewer birds now than in the pre-war period. They had increased in the war years due to lack of hunting pressure. To decrease numbers the Wildlife Service had the unpleasant job of smashing eggs and clubbing goslings, now rarely necessary because of increased hunting pressure and the flexibility possible in the length of shooting season or the hours of shooting. The normal season on Ellesmere is 15th January until the end of February plus the first Saturday in May until the end of July. For Waitaki it is May.

Sportsmen and sports club members of such clubs as the South Canterbury Game Shooters Club organise open-season shoots, sometimes with aircraft to drive the geese over the guns. The geese condition themselves against this and tend to settle on water. But here they are now hunted by shooters in jetboats that work with the aircraft. Planes must not fly below 600 ft, written permission for their use must be obtained from runholders over whose land they fly, and in terms of the Wildlife Canada Goose Notice 1970, notification made to the Acclimatisation Society that permission has been granted. Goslings, flappers or moulters hunted with jetboats are vulnerable and the method is effective in population control although it is rather done for sport than control.

Mr Bucknell says that Ellesmere is the home for the majority of birds mainly because it is a safe moulting area, but true colonies are at Lakes Forsyth and Heron and developing at Tennyson and Ohau. Waimono birds (Waimate) are not a colony but the geese do feed there.

Tekapo birds are under pressure, tend to nest in adjacent mountains and have little opportunity to moult at the lake.

Most of the nesting is done in the high country. The birds leave Lake Ellesmere about 20th September and mating begins early October. Goslings reared in the high country return with their parents about 15th January. Unoccupied birds — these are one or two-year-olds — return to Ellesmere by Christmas. Pairs that split because there are no brood-ties with the flock may also return early. It is usual for birds to remain in pairs and rear their young together and broody ganders are common. If for some reason a pair abandon their goslings these are taken in by foster parents.

Pests they may be but Canada geese are likeable for their beauty and dignity and are an attraction for sportsmen. Perhaps there is room for them, somewhere.—Ed.
At Lake Forsyth on the Canterbury coast, the goose population depends very much for its survival on four landowners who control 75 per cent of lake shore used by geese. None of these landowners admits to liking the geese though three tolerate them. But the owner of the most important section of shore for geese (he took possession in 1970) is openly antagonistic. Unfortunately, most nesting occurs on his property.

Title photo: A Canada goose nesting at Lake Ellesmere.
N.Z. Dept. of Internal Affairs photo: P. Morrison.
Lake Forsyth has a relatively large goose population on its 2½ square miles (1,600 acres) of water. Because of this, we consider that their numbers could be reduced to the advantage of the farmers without greatly affecting the hunting value of this population.

Nevertheless, I believe that too many geese are being shot by too few hunters at this lake; and especially is this so with juvenile geese at the beginning of the special season. Therefore, limit bags may have to be imposed at Lake Forsyth in the near future when the population has been reduced sufficiently.

In the 1968 breeding season 800 local geese reared 430 goslings. This resulted in over 1,200 birds for the 1969 shooting season. With increasing shooting pressure in 1969 the population was reduced to about 725 in that year's breeding season, when 400 goslings were reared. We removed 75 breeding adults early in 1970 to help reduce the numbers. These were pinioned and liberated far away. By the 1970 breeding season there were 600 geese which reared about 340 goslings, yielding some 900 for the coming hunting seasons.
Male and female Canada geese will defend their nests against stock but under pressure from shooting they will nest as a flock in remote mountainous areas. Their memory of a hazardous site is reputed to last.

N.Z. Dept. of Internal Affairs photo: P. Morrison.

Future management policy will be to allow the breeding numbers to decrease, by harvesting, to near 400. This should yield 600 to 700 for the hunting seasons. The attitude of landowners will then, hopefully, be re-assessed. Meanwhile, studies during the breeding season will continue, to measure the influence of declining numbers on reproduction.

The main feature of recent research at Nigger Creek in the Waimakariri headwaters has been the web-tagging of goslings with small numbered monel tags put on at, or soon after, hatching. We hope that most of the survivors from these will be caught at Lake Ellesmere during the annual banding operation when they are moulting at one year of age, or on some later occasion. Banding recoveries and recaptures indicate that most geese from the Nigger area spend the moult at Lake Ellesmere after a non-breeding or unsuccessful breeding season.
When caught they will be banded, and colour-banded according to the year of hatching. This is a rather devious way to obtain a number of marked birds of known age for study during nesting on the Nigger Creek study area. The widespread dispersal of families after hatching, lack of an area on which they congregate (such as Lake Forsyth), and the insufficient accuracy of techniques for ageing birds over one year old prevent the capture and marking of an adequate number of birds of known age at other times. These colour-banded birds will be studied during nesting to find out the age at which they first breed and the clutch size. The results will be compared with those now being obtained at Lake Forsyth so that we can find out why geese there lay more eggs per clutch (average 5.6) than geese at Nigger Creek (average 4.5). Much other information on breeding success is being collected at the same time.

**Giant Canada Geese**

When T. A. Caithness visited the Northern Prairie Wildlife Research Center, Jamestown, North Dakota, U.S.A., in 1969 the Center’s waterfowl biologists expressed interest in the Canada geese in New Zealand. They were shown photographs, and informed that we were collecting data to prove that ours were predominantly giant Canada geese (*Branta canadensis maxima*) but that there was still some uncertainty in this identification, particularly regarding possible interbreeding between races. The Center’s staff considered that it would be mutually beneficial to compare the development, from hatching, of goslings of New Zealand origin with those of giant Canada geese held at the Center. Accordingly, in October, 1969, 30 eggs were collected from Nigger Creek and Lake Forsyth and airfreighted to Jamestown. Only six goslings hatched but five survived to fledgling and their development was compared with that of the local stock. Harvey K. Nelson, Director of the Center, has informed us that the New Zealand goslings were heavier and slightly longer in the leg at 13 weeks old; and “generally speaking the New Zealand goslings exhibited characteristics very similar to other giant Canadas in all the comparisons that we have made to date.”
A banding and census muster conducted by the North Canterbury
Acclimatisation Society and the Wildlife Service at Lake Ellesmere,
1954. The moult lasts about a month. Banding is done in January when
the birds are almost at the flying stage.

A Lincoln College photo from a plate.

One characteristic of this race, as originally described by
Jean Delacour, which has been particularly noted in our geese
hatched at Jamestown is their light breast colour. Probably
because of this feature they have aroused a lot of interest among
wildlife organisations involved in re-stocking programmes in
that region of the U.S.A., the ancestral home of this race.

Canada geese were established in New Zealand from 50 birds
imported in 1905. There was a further introduction of ten
birds in 1920 but by then geese were well established and the
genetic contribution to present populations of the later importa-
tion is likely to have been small. We do not know exactly
where the 1905 birds were obtained but the official of the New
Zealand Government who procured these, and other game birds
and deer, spent several months in St. Louis, Missouri and also
travelled east from there. If, as is likely, he bought the geese from a game dealer during his travels, it is very probable that he obtained giant Canada geese. In New Zealand they were liberated into grassland habitats: the native range of the giant race in North America is prairie grassland. This race is much less migratory than most other races, which would favour its acclimatisation here. Thus, it appears that both ecologically and behaviourally the giant Canada goose is well suited to eastern South Island conditions, and that they established quickly is not so surprising. There may have been a small amount of interbreeding with similar, though slightly smaller, races but Nelson's words quoted are equally applicable to comparisons we have made of data on the local adult geese with published data on various races of Canada goose elsewhere.

The giant Canada goose was thought to be extinct for many years but was re-discovered in 1962 in Minnesota. H. C. Hanson in 1963 estimated that there were 55,000 wild birds and up to 14,000 in private collections in North America. In New Zealand I have estimated that in the last five years we have had an annual maximum between 15,000 and 20,000 geese. Thus the local populations represent a fair proportion of the total numbers of this, the largest of all geese.
TEKAPO SALE PRICES

by

J. L. Morris*, and J. G. Hughes**

New Zealand's largest fine-wool sheep sale is held at Lake Tekapo each year. Although high-country sheep are also sold at Cromwell, Omarama, Methven, Sheffield, Addington, and now Blenheim, the Tekapo sale of Merinos and Halfbreds from the Mackenzie Country has long been pre-eminent as the barometer of fine-wool sheep prices.

Privately-organised sales were conducted in the Mackenzie Country for many years before annual auctions were begun in 1929 but we have been unable to find any reports of these sales. Unfortunately there are a few gaps also in the records of the early annual auctions.

The Graphs

The following graphs are based on the average price received for each class of stock in each year. The prices are described as "weighted". This means that we arrived at the average price for a class after multiplying the number of sheep in each "pen" by their sale price per head. Therefore the weighted average price reflects the numbers of sheep sold at particular levels within the range of values for each class of sheep. The tables on which the graphs are based are printed as an historical record.

Breeds

Although in later years the sale descriptions usually report the breed of sheep sold by each vendor, those who know high-country flocks will realise that there are relatively few lines which could be described accurately as straightbred Merino or straightbred Corriedale or straightbred, say, Border Leicester Halfbred. In other words, sheep described as Merino grade into those described as Halfbred. For this reason we have not attempted to compare the prices of different breeds of sheep.

* Formerly Farm Management Department, Lincoln College, now University of London.
** Tussock Grasslands and Mountain Lands Institute.
Wool and Sheep Prices

In one graph we compare changes in average prices for Merino wool since 1928/29 with changes in average prices for two-tooth wethers. Older sheep are usually sold for breeding or meat production, but the market for two-tooth wethers could be expected to reflect annual changes in the confidence of runholders in the future of fine-wool productions. This confidence, of course, is likely to vary with the price they receive at auction for their wool. The graph shows how two-tooth prices relate to Merino wool prices but tend to lag behind them slightly. For actual fine-wool prices over the period see Morris, J. L., TGMLI Review 15, p.24.

Distribution of Sheep Sold

In general — Old ewes are sold down country for fat-lamb production
— Old wethers are sold to similar areas for “fattening” and slaughter over the following winter and spring
— Two-tooth ewes and ewe lambs are sold to hill country for breeding flock replacements or for flock increase
— Two-tooth wethers are sold to those few stations running “dry” flocks for wool production
— Wether lambs are sold down country for fattening on crops such as rape or lucerne then slaughter in late autumn.

Acknowledgement

We thank for their help Messrs Foote and Goodman, Timaru (secretaries to the Tekapo Saleyards Company), the Timaru Herald Company Ltd., the Christchurch Press Company Ltd., J. R. Barton, and Mrs M. Rutherford who drew the graphs.
PRICES RECEIVED ($)

YEAR

1930 1940 1950 1960 1970

COMPOSITE GRAPH

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2th Ewes
Old Ewes
Wether Lambs
2th, Wethers
Old Wethers
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<td>4.5</td>
<td>4.8</td>
<td>6.5</td>
<td>4.7</td>
</tr>
<tr>
<td>1967</td>
<td>2.7</td>
<td>4.7</td>
<td>4.3</td>
<td>3.3</td>
<td>4.8</td>
<td>3.0</td>
</tr>
<tr>
<td>1968</td>
<td>4.3</td>
<td>4.4</td>
<td>3.9</td>
<td>4.9</td>
<td>5.5</td>
<td>4.4</td>
</tr>
<tr>
<td>1969</td>
<td>5.4</td>
<td>6.2</td>
<td>5.7</td>
<td>5.6</td>
<td>6.7</td>
<td>5.3</td>
</tr>
<tr>
<td>1970</td>
<td>4.7</td>
<td>5.5</td>
<td>4.6</td>
<td>5.0</td>
<td>6.2</td>
<td>5.1</td>
</tr>
<tr>
<td>1971</td>
<td>3.8</td>
<td>4.2</td>
<td>4.1</td>
<td>3.9</td>
<td>5.5</td>
<td>3.9</td>
</tr>
</tbody>
</table>
Satisfactory wintering of weaner cattle is always a problem. Stock requirements increase steadily with age and the full utilisation of spring and summer surpluses require high stocking rates which create problems in the period of winter deficit. Low rates of gain at this time may prejudice the chance of reaching good slaughter weights in autumn. On the other hand expensive supplementation may seriously reduce the profitability of the enterprise.

One experimental approach to the problem has been the examination of compensatory growth. For the purpose of this discussion compensatory growth can be said to be the capacity of cattle to grow more rapidly after a period of restricted feeding than after a period of normal or high level feeding. The fact that the enhanced rate of growth may be the result of higher feed intake when the restriction is lifted is a theoretical rather than a practical issue as pasture is in most cases readily available during the period of compensatory growth.

Two trials on compensatory growth have been reported by Mr D. Joblin of Ruakura. In the first two groups cattle were fed at a maintenance level in winter and a third group well fed, so that their liveweight was 175lb higher after 88 days. In the next five months one maintenance group and the well fed group were fed cut pasture to appetite. The maintenance group were observed to eat more and caught up 67lb of the deficit (38 percent compensation).
The second maintenance group was fed the same intake as the well fed group and reduced the deficit by 47 lb (26 percent compensation).

In a second trial in which the winter difference due to feeding was 57 lb, compensation (39 percent) only occurred when the animals were subsequently fed to appetite. Slight and moderate restriction of intake resulted in no compensation whatsoever. This suggests that the post-winter feeding level must be sufficiently good to allow a voluntary increase in intake to occur.

Nevertheless, the percentage recovery of the weight lost by winter underfeeding was relatively low, about 40 percent. Overseas work which led to a hope that cattle fed maintenance levels in winter would, through compensatory growth, reach the same slaughter weights as well wintered cattle seem unobtainable under our conditions of rearing.

An exception appears to occur in a trial reported by Mr G. Hight of Whatawahata Research Station in which Angus breeding cows were fed different amounts of hay and autumn saved pasture for a 120 day winter period. Better fed cows gained slightly and poorer fed cows lost weight gradually throughout this time. The immediate post-calving difference in liveweight was 136 lb. From calving to weaning the rate of liveweight increase in low plane cows was about three times that of high plane cows to reduce the deficit to 18 lb. It appeared that those cows which lost the most weight in winter gained the most after calving.

The usefulness of this example of almost complete compensatory growth is confused by the fact that calf birth weight and weaning weight was reduced and the lower milk production of underfed cows may have contributed considerably to their recovery.

Trials at Tara Hills

Problems of winter cattle on tussock pastures are every bit as acute as elsewhere. The average duration of winter supplementation exceeds 100 days and considerable wintering costs are incurred if young cattle are to maintain even modest growth rates at this time.

Three trials examining the possibility of exploiting compensatory growth have been conducted by Mr G. H. Scales at Tara Hills.
In all trials home bred Galloway x Hereford mixed sex calves, born October and reared on low altitude improved tussock grassland were used. These calves grew at modest growth rates (1.5 - 1.7 lb per day) and entered the trials at 450 - 500 lb mean liveweight. The better fed group in each trial was fed good quality lucerne hay to appetite while the poorer group, an amount estimated to maintain bodyweight. In one trial, a third group was fed below maintenance to obtain a large end of winter difference. The calves were then run together on improved tussock until late autumn when they were slaughtered.

The results for the three trials are set out in Table 1.

**TABLE 1**

**1967 — 74 Days’ Feeding July-September**

<table>
<thead>
<tr>
<th>Initial Weight</th>
<th>Winter Gain</th>
<th>Post-Winter Gain</th>
<th>Total Gain</th>
<th>Hay Fed lb/Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance plus</td>
<td>511</td>
<td>52</td>
<td>334</td>
<td>386</td>
</tr>
<tr>
<td>Maintenance</td>
<td>500</td>
<td>-20</td>
<td>361</td>
<td>341</td>
</tr>
<tr>
<td>Compensation: 37.5 percent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakeven cost of hay: 50c bale.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**1968 — 112 Days’ Feeding July - October**

<table>
<thead>
<tr>
<th>Initial Weight</th>
<th>Winter Gain</th>
<th>Post-Winter Gain</th>
<th>Total Gain</th>
<th>Hay Fed lb/Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance plus</td>
<td>480</td>
<td>36</td>
<td>306</td>
<td>342</td>
</tr>
<tr>
<td>Maintenance</td>
<td>482</td>
<td>-14</td>
<td>332</td>
<td>318</td>
</tr>
<tr>
<td>Compensation: 51.0 percent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakeven cost of hay: 28c bale.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**1969 — 103 Days’ Feeding June - September**

<table>
<thead>
<tr>
<th>Initial Weight</th>
<th>Winter Gain</th>
<th>Post-Winter Gain</th>
<th>Total Gain</th>
<th>Hay Fed lb/Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance plus</td>
<td>451</td>
<td>54</td>
<td>192</td>
<td>247</td>
</tr>
<tr>
<td>Maintenance</td>
<td>454</td>
<td>-18</td>
<td>203</td>
<td>185</td>
</tr>
<tr>
<td>Maintenance minus</td>
<td>450</td>
<td>-53</td>
<td>262</td>
<td>209</td>
</tr>
<tr>
<td>Compensation: Maintenance, 15 percent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance minus, 65 percent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakeven cost of hay: Maintenance, 90c bale.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance minus 46c bale.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

39
Wide differences in winter gain (50 to 107 lb) were established, the maintenance and sub-maintenance groups losing weight. Post-winter growth rates were not outstanding, 1.8, 1.4, 0.8 lb per day respectively for the three years. Nevertheless compensatory recovery of winter loss of the order of 37.5, 51.0 and 15 and 65 percent (see Table 1) occurred by the time of slaughter.

In all the trials carcass quality was little affected by treatment. A typical comparison of carcass composition and grading from the 1969 trial is given in Table 2.

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Carcass Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M+</td>
</tr>
<tr>
<td>Slaughter weight lb</td>
<td>681</td>
</tr>
<tr>
<td>Carcass yield percent</td>
<td>55.9</td>
</tr>
<tr>
<td>Percent Meat</td>
<td>67.7</td>
</tr>
<tr>
<td>Percent Fat</td>
<td>6.4</td>
</tr>
<tr>
<td>Percent Bone</td>
<td>25.9</td>
</tr>
<tr>
<td>Grade FAQ</td>
<td>2</td>
</tr>
<tr>
<td>GAQ</td>
<td>9</td>
</tr>
<tr>
<td>YAQ</td>
<td>4</td>
</tr>
</tbody>
</table>

40
Insofar as winter deficits were not fully recovered in spring and summer and low plane cattle were slaughtered at lower weights, the practice requires justification on a cost basis.

Relative costs of supplementation have been expressed in terms of the price of hay at which winter feeding costs balance the loss of carcass weight at slaughter. Considerable variations in 'break-even' cost were observed and while restricted feeding may have been payable in 1967, 1968 and at the M− level in 1969, the economy of the M level in 1969 was doubtful.

Conclusion

Compensatory growth at Tara Hills has occurred consistently but varied in amount. Weight recoveries under conditions of moderate post-winter feeding were generally good, but fell well short of the desired complete compensation. The influence of post-winter feeding on compensatory growth has not yet been fully explored and it is here that more information is needed to support the practice.

Carcass quality was not affected by restricted winter feeding.

References


To many of the high-country runholders who read this, much of what I have to say will not be new. If I cover ground with which they are familiar they must bear with me but they will know too that today the high country scene is a changing one and that policies are still being formulated to deal with these changes. To those less familiar with the provisions of a pastoral lease, a brief statement of basic policy and of current trends may be enlightening.

The Pastoral Lease

The 1948 Land Act marked a milestone in high-country tenure. It gave the holders of pastoral licences and lessees under certain other tenures the right, on expiry, to be offered a pastoral lease for a term of 33 years with perpetual rights of renewal, but no rights to freehold. It entitled the holder to exclusive rights of pasturage over the land but no rights to the soil. It gave the Land Settlement Board the right to determine the stock numbers which might be carried on the land comprised in the lease and the power to determine what rental should be charged for the initial term of the lease. It excluded pastoral land from the provision of the same Act which required that, on renewal, rent was to be fixed as a proportion of rental value. The 1948 Act expressly stated that "a fair annual rent" should be fixed.

Pastoral land was defined as being land suitable or adaptable only for pastoral purposes. If today we are tempted to be critical of classification decisions made in the early 1950s, we must remember that then we knew little of the potential for improvement by oversowing and aerial topdressing, that the development of steep tussock country by cultivation was not considered practicable, and that in the depleted condition of much of the country, due to rabbits and overstocking, snow risk was a much more real factor than it is today.
The method adopted for fixing rent at the commencement of a pastoral lease was based on a rate per thousand sheep and assessed on the carrying capacity of the property exclusive of improvements to the native cover by the lessee. The rate was varied depending on such factors as snow risk, isolation, costs of working, and the like. It is obvious that Government policy by requiring lessees to find excessive rentals. That this policy was to ensure that the welfare of the country was not prejudiced was a sound one has never been questioned. The security given to runholders by the 1948 Land Act, followed by buoyant wool prices and the introduction of successful techniques for rabbit control during the 1950s, set the scene for the rehabilitation of much of the high country and a period of prosperity for its lessees.

Pastoral leases, some 600 in all, cover approximately eight million acres throughout the South Island. They are administered by the Department of Lands and Survey through the Commissioner of Crown Lands in each land district. To him falls the responsibility for ensuring that regular inspections are carried out, that stock limitations are being observed, and all the conditions of the lease are being complied with. He has the power to issue permits for the burning of vegetation or cultivation on certain areas where he is satisfied erosion or deterioration of cover will not occur, and his approval must be obtained before a soil conservation run plan can be entered into by a lessee.

The duties of the Chief Pastoral Lands Officer are to advise the Land Settlement Board on matters of policy relating to pastoral lands, to ensure that the policy of the Board is being correctly followed in its districts, and generally to assist liaison between the Board and its pastoral lessees.

The Land Amendment Act 1970 which became operative on the 1st January 1971 will have no effect, during present 33 year terms, on leases granted or under action for renewal prior to that date. All future leases, including renewals of those existing, will, however, provide for reviews of annual rents at 11-yearly intervals. Other amending clauses, while significant from the viewpoint of the holder of a Renewable Lease, or to the pastoral lessee who has obtained reclassification on this basis, have no relevance to pastoral leases.
The first renewals of these leases issued under the 1948 Act will not come up until the 1980s and as yet no firm statement of policy on the method of assessing rentals has been announced by the Land Settlement Board. It would seem, however, that the welfare of the land and the economics of pastoral farming must be paramount factors influencing any decisions made.

Pastoral Occupation Licence

Along with the establishment of pastoral leases the 1948 Act made provision for a second type of high-country tenure — the pastoral occupation licence. This licence could be for any term up to 21 years but carried no right of renewal. Initially it was used for land where permanent tenure was thought to be not desirable because of a possible later need to regroup this land or because of its potential for erosion which would require that the land be retired temporarily or permanently from pastoral use. These were the main factors influencing the issue of the licence and in recent years it has found a useful place as a separate tenure on parts of properties with conservation run plans. When a runholder retires class VII and VIII country he receives subsidised assistance from a catchment authority to develop lower land in exchange for the gradual withdrawal of stock from the higher areas.

Nowadays a condition of a run plan ensures that these retired areas are surrendered from the pastoral lease and placed on pastoral occupation licence until destocking is completed.

Frequently, too, a runholder may wish to retain control of such land, even after destocking is completed to ensure that unrestricted public entry does not lead to disturbance to stock on adjoining areas or to ensure no fires are lit which could endanger his neighbouring land. There has been trenchant criticism, by some sections of the public, of the system of pastoral occupation licences but it must be remembered that land can only be surrendered voluntarily from the runholder’s lease. From the Crown’s point of view he is the best caretaker obtainable. The normal clauses of a pastoral lease concerning control of noxious weeds and animals also apply to occupation licences. This, through rates or in other ways may involve the licencee in considerable expenditure.
In spite of the retirement of many thousands of acres of high country throughout the South Island, stock numbers, and in particular cattle numbers, continue to increase on the remaining land. Last season a survey of 82 runs for which stock increases were granted showed an increase of 15 percent in sheep and 109 percent in cattle numbers during the previous 12 months.

Reclassification

With the virtual elimination of the rabbit problem in many areas and the application of modern techniques for improvement, the character of certain runs has changed to the stage where they can no longer be regarded as "suitable only for pastoral purposes". While the Land Settlement Board does not consider it necessary or desirable to deliberately encourage pastoral lessees to convert to renewable leases, the 1948 Act gave the right of application for reclassification. Reclassification as "farm land" is a right not readily granted and the Board insists, where there is any vulnerability to erosion, that it does not relinquish the degree of control over management which it may exercise under a pastoral lease. If there is any suspicion that the country could deteriorate under poor farming practices it is far better for the Board, in the public interest, to retain its powers to ensure that good husbandry is observed rather than have a catchment authority step in at a later stage when damage is apparent and costly measures necessary for erosion control or the restoration of vegetative cover.

Applications are sometimes received for the reclassification of the more favoured parts of a run but the Board must be assured that the remaining portion of the property will still be a viable proposition, with adequate supporting winter country and land suitable for a homestead site, before it will consider divorcing, under different tenure, an area which could then be disposed of independently.

Reclassification may be acceptable to the Land Settlement Board where any areas considered susceptible to erosion are surrendered for retirement. In such cases the conservation authorities are consulted to ensure that the boundaries being fixed are acceptable to them. The land capability system adopted nationally by these authorities provides a valuable yardstick for ensuring that land which is potentially productive is not being closed off, nor that the Board's control of stocking over land that is potentially erodible is lost.
Recreational Development

In recent years applications have been received from a number of pastoral lessees to operate on their properties various types of commercial enterprises, usually involving tourist activity. It seems certain that the future will see an even greater swing in this direction. Recent forecasts of trends in the United States indicate that by the end of the century recreational activity in urban parks and reserves will have increased by 400 percent and in the rangelands by 4000 percent!

As previously stated, a pastoral lease confers on the holder the right to graze the land only. Specific permission must be obtained even if only for cultivation or burning. Obviously a widening of the scope of the lease is required for other enterprises centred on the property. In such cases a special lease, under a specific section of the 1948 Land Act, may be granted by the Land Settlement Board in place of the existing lease. Where it is possible to separate the area on which the particular activity takes place, as in the case of a commercial ski field, no problem is encountered. The land is surrendered from the pastoral lease and a special lease, with a rental normally based on a specific amount during the period of establishment and on a percentage of turnover later, is granted.

Where the commercial enterprise is combined with continued pastoral use, greater problems are encountered by the Board in assessing rentals under a special lease. Activities may vary from guided safari operations, sometimes high-priced and catering mainly for overseas clientele, to pony treks, the provision of holiday accommodation, perhaps with a meal and some inspection of station activities, taxi-plane services for visiting shooters, or to a combination of several of these.

These enterprises vary from large scale ones involving considerable capital expenditure and high overheads, to small scale operations where the main contribution is a domestic one by way

Opposite: At some time in their lives urban dwellers wish to rub shoulders with the wilderness. Horse trekking in the Mandamus valley.

Island Hills photo: L. Shand.
of provision of meals or lodging. The ventures fall into three groups:

(a) Where the operations are conducted wholly or almost wholly on freehold land run in conjunction with a lease. The pastoral lease will not be affected.

(b) Where the operations are carried out wholly or almost wholly on pastoral lease.

(c) Where the venture is carried out partly on pastoral lease and partly on other land.

Principles adopted by the Land Settlement Board in March 1971 were that the Board would replace pastoral leases, where other activities were significant, with special leases having no right of freehold, but containing the normal provisions regarding good husbandry. The rental would be as for a pastoral lease plus an additional rent for the tourist venture. This rent would be reviewed at five-yearly intervals and during the initial establishment period a basic or minimum rent would be charged. For the second and subsequent periods it would be based on a percentage of average gross revenue for the previous five years, this percentage to be fixed having regard to the capital investment and cost structure of the enterprise. Where the venture was wholly on pastoral lease the full percentage of return or the basic rent, whichever was the greater, would be paid. Where the activity was partly on pastoral lease and partly on other land the basic rent or percentage would be varied in proportion to the extent of use.

A head office committee will declare and fix the proportions of the activity that are applicable to the lease and review these at five-yearly intervals if necessary. If the lessee wished to discontinue the tourist venture at any time he would have the right to surrender his special lease and revert to a pastoral one.
Noxious Animal Control

Multiple use of pastoral land brings with it many problems and with declining prices for wool it is natural that runholders will wish to exploit any avenue which will supplement their incomes at such a time. Extra vigilance may be required by those responsible for the administration of our high country to ensure that such exploitation does not lead to an abuse of the good husbandry provisions contained in both pastoral and special leases. Runholders must be made aware that even under a special lease for tourist ventures the policy of the Land Settlement Board regarding noxious animal control remains unchanged. Although recognising that complete eradication is in most cases both impracticable and uneconomical it insists that animals be held at a level where their presence is not damaging or potentially damaging to the country. If there is any indication that an undue build-up is occurring, and the lessee has failed to take adequate measures to reduce it, the Forest Service will be called on to carry out appropriate operations to ensure this.

Conclusion

I feel that the future will see a gradual integration of tourist and recreational activity into the pastoral scene in New Zealand and that it will provide a valuable supplement to incomes on properties which could easily be marginally economic otherwise. The welfare of the land must always be our prime consideration and the economic health of our lessees is a vital factor in preserving this. Changing use of our high country should, too, bring greater enjoyment of this priceless asset by the public as long as sane policies of administration are pursued and tolerance and understanding is maintained between those whose living and those whose recreation come from our mountain lands.
REVIEW
JOURNAL OF THE TUSSOCK GRASSLANDS AND MOUNTAIN LANDS INSTITUTE

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The Institute has now available for sale the third edition of its popular map of the pastoral runs. The new edition has been completely revised and redrawn, properties added in the north and west of the Island and legibility improved. The map is printed in four colours with the roads, towns, etc. in dark grey, sea and rivers in blue, run boundaries in red and grid in green. A complete index of the runs is supplied to use with the grid overlay on the map. Although the map of the island is printed in three sheets, complete sets only are available.

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It is fitting that Robert Pinney's *Early South Canterbury Runs* should carry on its frontispiece a portrait of L. G. D. Acland, "whose *The Early Canterbury Runs* inspired this book". For here we have brief histories of the 40 South Canterbury runs not covered in Acland's established work.

But if Mr Pinney considers himself only as a follower completing the work begun by another, he does himself less than justice. It is not simply that he treats each run or station at greater length than Acland, but rather that he sets a new standard in keeping with the personal qualifications that he has brought to the task. As a sheepfarmer of some 30 years standing — and also, incidentally as an immigrant Englishman — he has been able to effectively comment upon and evaluate the experiences of the runholders; his training in history reveals itself in the careful recording and citation of his sources of information, a record now preserved in the libraries of the Canterbury Museum and the University of Canterbury. This training, as much as the passage of time, has made him noticeably less reliant than Acland upon information derived from private memories and family reminiscences. The quality of the work benefits accordingly.
It is a book filled with factual information, but this is carefully set against the general background of New Zealand history and blended with amusing and unusual personal incident in such a way as to make this a book for reading as well as a text for reference. It has an adequate index, and the key map, unfortunately lacking any indication of run boundaries, is usefully accessible in the end papers, but the remaining ten maps scarcely justify the space allocated to them: they might well have been replaced by additions to the sixteen pages of illustrations of persons and places already included to good purpose.

The timing of this publication is of interest. It was immediately preceded in 1970 by Miriam Macgregor's Early Stations of Hawke's Bay, and should soon be followed by the revised edition of Acland’s Early Canterbury Runs which is expected to be published in the course of 1972.

The high-country runs have made more than their fair contribution to New Zealand history and legend, and Mr Pinney’s account of those of South Canterbury must be read by the many to whom this subject is of lasting interest. We can now look forward to seeing the results of his current research into the history of the early Otago runs.

J. A. Frampton.

— Acland

— Pinney.
GRASSES IN OVERSOWING

E. W Vartha and P. T. Clifford

Grasslands Division,
Department of Scientific and Industrial Research,
Lincoln.

In the May 1971 Review we illustrated how clover-dominant herbage grown in late summer and autumn on part of a tussock block and fed prior to winter, markedly influenced the performance of ewes. We suggested that improved nutrition of stock might be prolonged into winter by the choice of appropriate grasses for sowing with the clovers. These grasses would need to be of high nutritive quality, capable of some winter growth or able to retain their feeding value into winter when conserved as ‘standing hay’.

This article describes the results from experiments in the Mackenzie country in which we have compared the performance of several grasses under sheep grazing. One experiment was at Ben Ohau Station, four miles south of Pukaki township. The site was on a fertile soil that tended to dry out in summer and provided a good test of the performance of grasses under low winter temperatures, frosts of −17°C being recorded here. Sowings of ‘Grasslands Ariki’ ryegrass, ‘Grasslands Apanui’ cocksfoot, S170 tall fescue and ‘Massey Basyn’ Yorkshire fog with alsike, red and white clovers were made on cultivated soil. Fescue tussock was first ploughed in 1962 and had been left fallow until July 1965. The seeds mixtures were sown broadcast in September 1965 with 2 cwt per acre of molybdic sulphur-superphosphate. Sowing rates of grasses were deliberately low, aiming to obtain a grass density similar to that desired from oversowing, topdressing and applying good management. Similar numbers of viable seeds were sown for all grass species, based on the rate of 8 lb of ‘Grasslands Ariki’ ryegrass per acre. Pastures were lightly grazed in the first growing season. In the second growing season they were intermittently grazed for short periods of two days with sufficient
Fig. 1.—CUMULATIVE GRASS YIELDS FROM SOWINGS ON CULTIVATED SOIL AT BEN OHAU STATION.
stock to ensure close grazing. On the experience of performance of cocksfoot and tall fescue in the second growing season, it was decided to graze these grasses less severely in subsequent growing seasons.

Cumulative grass yields only are shown in Figure I. In the 1966-67 and 1967-68 growing seasons, clovers yielded 2,400 to 3,400 lb dry matter per acre but in 1968-69 growing season, only 800-1200 lb. Growth of Yorkshire fog and rye-grass was superior to tall fescue and cocksfoot. The relative merits of these two groups of species were reversed for keeping quality as ‘standing hay’ in late-autumn and early-winter. Yorkshire fog and ryegrass herbage was rapidly decomposed when frosted, the process slower for cocksfoot and tall fescue.

In practice we did not graze after March in the second and third growing seasons and after January in the fourth growing season, summer-autumn weather in the latter season being particularly dry.

In-vitro digestibility values in June 1969 were 74 percent for cocksfoot and 77 per cent for tall fescue. By August these values had declined to 56 percent and 65 percent. At that time only 4 percent of the cocksfoot herbage was living, compared with 27 percent of the tall fescue herbage. Values were not obtained for the other grasses because these were decomposed by frost by June. The results from this experiment indicated that whilst Yorkshire fog and ryegrass have superior growth in-season tall fescue and cocksfoot were of more value for provision of out-of-season feed.

Initial Fertiliser Rates

An experiment at Dusky Station, 10 miles north of Pukaki township investigated the effects of different rates of initial fertiliser application on performance of grasses and clovers oversown into cover-depleted tussock on steepland soil. The site was of north-easterly aspect at 2,000 ft. The seeds mixture which was oversown in August 1965, contained equal numbers of viable seeds of ryegrass, Yorkshire fog, cocksfoot and tall fescue (total of 22.5 lb grasses per acre), with alsike, red and white clovers. Fertiliser applied was either 1½ cwt or 3 cwt
per acre of molybdc-sulphur-superphosphate. Subsequently, dressings of 1½ cwt per acre of that fertiliser were made at two year intervals. Pastures were lightly grazed in the first growing season. In subsequent growing seasons they were intermittently grazed for short periods of two days with sufficient stock to ensure close grazing. Numbers of grazings varied from four in the second growing season (1966-67) to two in the sixth growing season (1970-71), the latter being characterised by extremely dry weather.

_Clovers were the major contributors to herbage yield in the second to fourth growing seasons, but in the fifth and sixth growing seasons clovers gave considerably lower contributions than grasses._

The top sector of Figure 2 shows clovers established by the second year from sowing.

Provision of a higher level of nitrogen through increased clover growth with higher rate of topdressing, improved establishment of ryegrass as shown in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Lower initial rate of topdressing 0.36</th>
<th>Higher initial rate of topdressing 0.65</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ryegrass</strong></td>
<td>0.55</td>
<td>0.54</td>
</tr>
<tr>
<td><strong>Yorkshire Fog</strong></td>
<td>0.11</td>
<td>0.14</td>
</tr>
<tr>
<td><strong>Cocksfoot</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tall Fescue</strong></td>
<td>0.09</td>
<td>0.14</td>
</tr>
</tbody>
</table>

The numbers of Yorkshire fog plants include those resident because these could not be distinguished from those sown.

This experiment was sown prior to the development of coating treatment for grasses which we have shown can markedly improve their establishment (see *Review* for March 1969). Because the results from the first sowing of grass were poor (Table 1), we decided to resow, but with coated ryegrass only at the equivalent rate of 12 lb seed per acre.

**Time of Sowing**

_The normal time for sowing grass with clover in an initial improvement is late-winter. Where clovers are already established it might be easier to establish grasses from early-autumn sowing._
Comparison was thus made between late-winter and early-autumn resowings as shown in Table 2.

Table 2: Numbers of Ryegrass Plants per Sq. Ft. at Two Years from Resowing

<table>
<thead>
<tr>
<th></th>
<th>Resown late-winter</th>
<th>Resown early-autumn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower initial rate</td>
<td>1.80</td>
<td>0.89</td>
</tr>
<tr>
<td>of topdressing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher initial rate</td>
<td>2.08</td>
<td>1.82</td>
</tr>
<tr>
<td>of topdressing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The effects of time of sowing differed according to fertiliser treatment. Denser ground cover, with more fertiliser, may have given better protection of seedlings establishing from the early-autumn resowing, than was the case with less fertiliser.

The lower sector of Figure 2 shows grass established from resowing in late winter, on both fertiliser treatments.

Because of particularly dry weather in 1969-70 and 1970-71 growing seasons, clovers had almost died out by autumn 1971 and thus were resown in late winter. Results in Table 3 shows that by that time, effects of fertiliser treatments and sowing dates on ryegrass persisted. Cocksfoot was present in small amount, but presence of tall fescue and Yorkshire fog was negligible.

Table 3: Percent Frequency of Grasses in Winter 1971

<table>
<thead>
<tr>
<th></th>
<th>Ryegrass</th>
<th>Cocksfoot</th>
<th>Tall Fescue</th>
<th>Yorkshire Fog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower initial rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of topdressing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>resown with ryegrass</td>
<td>73</td>
<td>12</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>in late-winter (1967)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>resown with ryegrass</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in early-autumn (1968)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher initial rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of topdressing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>resown with ryegrass</td>
<td>90</td>
<td>8</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>in late-winter (1967)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>resown with ryegrass</td>
<td>77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in early-autumn (1968)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Fig. 2

CLOVER AND GRASS FROM OVERSOWING

Lower initial rate of fertiliser topdressing.
Fig. 2

ON FESCUE TUSSOCK AT DUSKY STATION.

Higher initial rate of fertiliser topdressing.

Photos: E. W. Vartha from transparencies.
Discussion

If the bulk of herbage grown \textit{in-season} on improved tussock grassland is from clovers, then the place of sown grasses seems basically to be for provision of winter feed.

Where winter temperatures were severe, ryegrass was inferior to tall fescue and cocksfoot.

However, the latter grasses were harder to establish than ryegrass from oversowing and where ryegrass was over-sown on warmer country, it was able to extend the growing season of herbage for early winter and early spring use. It is emphasised that these results refer to areas with 635-1016mm rainfall per year, which allowed for satisfactory establishment and growth of ryegrass. The results indicated that grass oversowing may be better done when fertility has been built-up under clovers in cover-depleted areas, but this is not conclusive.

Subsequent work has shown that use of coated grass seed in initial sowings has increased the numbers of plants established compared with the use of uncoated grass seed. That result is important because grass development is largely restricted to growth in size of the plants established, unlike white clover which can spread by growth of stolons to increase density.

Therefore the question of whether or not to sow grass with clover in the initial oversowing remains to be answered from further research.

The research mentioned in this article does not answer the question of whether or not it is desirable to oversow grasses. Rather, the results provide the agronomic background leading to the type of grazing assessment needed, similar to that we have described for clover-improved tussock grasslands in the previous issue of Review.

Acknowledgement:

Mr J. A. P. Cameron of Ben Ohau Station, the late I. H. Wardell of Dusky Station. The Lands and Survey Department provided field facilities for this work.
LAMBS OR CARAVANS

Professor J. T. Coppock

Geography Department, University of Edinburgh,
interviewed by J. Runa.

Professor Coppock I have always wondered whether the
 crofts, although inefficient in terms of output per labour
unit, are perhaps efficient when considered collectively
in terms of production per acre. Is this true or is it myth?

I think it is a myth. The situation is very variable. Many
of the occupiers are elderly, consequently some of this land is
farmed well below its potential, and the quality of much of
the land is rather poor. These are not like the intensively
farmed units of the fenland which are horticulture holdings that
can produce a satisfactory living off small acreages. Although
the problem of crofts is unique to north-west Scotland, because
of the unique system of land tenure in those parts, there is a
problem of small holdings in upland areas, particularly in Wales
and in parts of northern England and south-west England.
These are also small farms on poor land. There are two possi-
bilities here, one is the enlargement of the holdings and it is
the policy of the Government to encourage amalgamation. It
is providing grants to elderly farmers to enable them to with-
draw from farming, either a cash payment is made or an
annuity granted. The alternative is to provide a supplementary
source of income. Forestry is one possibility but the most likely
means in the upland area is to encourage tourism and outdoor
recreation, through accommodation, sale of farm produce to
visitors, and to some extent the provision of outdoor recreation
facilities and access.

The emphasis would be on amalgamation, I presume,
especially now that Great Britain is entering the E.E.C.
It would be to her advantage to rejuvenate her agriculture
so as to be competitive with continental farmers in the
supply of primary produce. She could probably do this
more quickly than her European competitors, since her
level of farm technology is higher.

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Farm technology is generally higher but Europe as a whole is a surplus area for temperate produce. British farmers occupy much larger units than most of their counterparts in Europe and are relatively more efficient. On the other hand the problem of these small farms is a fundamental one and the process of amalgamation is slow. There is evidence from some of the popular recreational areas like south-west England that sources of tourist revenue can be very important to farmers. One study in Cornwall showed that on farms under 50 acres, revenue from tourism was more than half of total farm revenue, in other words more important than the agricultural component. It has been said that a crop of caravans was the most profitable crop farmers could grow. One estimate is that an unregistered site can provide a farmer with an annual income of £200 which would make a useful contribution to farm revenue, and this was from a site for only three caravans. In encouraging crofters to provide tourist accommodation, the Crofters' Commission has made grants towards the erection of tourist accommodation.

How extensively used is this scheme of paying grants to crofters?

The grants to encourage amalgamation apply to all agricultural holdings where there is a possibility of creating economic units. Crofts are subject to special legislation where any change of occupation has to be agreed to by the Crofters' Commission. The grants scheme is an attempt to encourage a trend towards farm amalgamation which is already quite well established. This trend has been most noticed in the areas where it is least important, in the areas of arable farms which are already large. It has been least marked in the areas of marginal farming in the uplands. The problem of small holdings is exaggerated as these are largely areas of prolonged migration where occupiers tend to be elderly, and conservative in their attitudes to farming. The legislation to provide either a retirement grant or a retirement annuity came in 1967 and so far the response has been quite small, partly because people are suspicious. There is a restraint over subsequent subdivision. The area must not be subdivided for another 15 years. This was originally 25 years but was reduced to encourage farmers to accept the scheme.
Assuming the farmer is permitted to retain the homestead, would the balance be leased, sold privately or sold to the Crown?

Not the Crown. There was a proposal to create a number of rural development boards which would acquire land and recast it in larger units and make them available to farmers. These boards were to promote the integration of forestry, agriculture and recreation over these marginal areas. Only one was created, the North Pennines Rural Development Board, but the present Government abolished this when it came to power. There is no longer any question of State acquisition but there is encouragement to amalgamate. The nature of transfer depends on the status of the land. Much of this is individually owned by their occupiers and this would largely be a matter of freehold sale. There has been no real analysis of the effect of the scheme but I do know the response has been disappointing.

I believe that fewer than 27,000 of Scotland’s 56,000 holdings are large enough to support one labour unit per holding and there are about 15,000 crofters who need to supplement their farm incomes by other employment. What number of small holdings are there in the total of Great Britain?

There are about 300,000 holdings in Great Britain and only about half of these are really full-time farms. Quite a lot of holdings are parcels of agricultural land, some of which are occupied by business men and others for spare time occupation, some are accommodation fields for butchers and the like.

Why then did the North Pennines Rural Development Board fail?

In part because there was opposition from farmers. There was a proposal in Wales to have a central Wales development board but people were fearful this meant land nationalisation. The Government’s decision to abolish the North Pennines Board is, I think, a matter of political philosophy. The Conservative Government did not feel this was an appropriate role for an official agency.
Opposite: Crofts, Broadford, Island of Skye, North West Scotland. Crofts are agricultural holdings in one of the seven crofting counties and are under the jurisdiction of the Crofters Commission. They have less than 50 acres of improved land and access to common rough grazing. Dwellings often line a coastal road with their parallel strip of improved land extending at right angles to the road.

Photo: J. T. Coppock from a transparency.

Do you think similar provisions will be re-instated?

Whatever the machinery the problem exists, the problem of inadequate rural income, the problem of effective multiple use of much of this poor land. With our limited resources we can’t afford to designate large areas for one use while much of it is capable of multiple use, that is, of combining recreation with sheep grazing without detriment to either, although this may require restraint from both. I think that promotion of this kind of development is essential and whatever machinery is devised, the need for such machinery and the need for such multiple use will remain.

WOOL IS EVERYBODY’S CONCERN

If overnight wool was squeezed out of our lives we could expect to cut our living standards, not by 20 percent because of wool, but by another 20 percent as well because of mutton. In New Zealand wool stands second in earning power behind meat. However, mutton comprises about 60 percent of all meats exported and mutton and wool together account for about 40 percent of export earnings. These inseparables fetch the highest cash returns from much of our farmland and particularly so from the large areas of low arability. The only real challenge to wool and mutton is from beef in the short term and possibly venison, recreation and forestry in the long term — fruit, crop and dairy expansion over this area would suffer for efficiency and for the want of markets.

Even so, with mutton prices down, along with wool, and also dairy prices barely viable, now is the time for extensive commodity and market research, coupled with resource analysis for the eventual production of selected commodities. It is hoped that on-the-farm extension services are intensified this year, that recently announced finance-aid policies prove effective, and that the Agricultural Production Council can pinpoint specific means for diversification. The operative question is — what agricultural produce do overseas people want?
Meanwhile there is a lot of wool to be sold efficiently and the Wool Board has the solution in recommending the corporation. The mechanics of future wool disposal is not clear in detail as there is much to be decided by the corporation when it comes to power. However, the power will be real, a monopoly, with a $200 million cash flow at stake.

New Zealand farmers produced more wool in 1970-71 than any other year, with 736.1 m lb (greasy) grown — contributing 12.2 percent to world supplies — and holding easy third place behind the U.S.S.R. with 915 m lb and Australia 1,944 m lb and trailed by Argentina with 386 m lb. The average auction price per lb greasy was 24.2c, two cents down on the four years or 7.3c down on the ten years preceding.

This decline is attributed to competition from synthetic fibres, an increase in the quantity of wool grown, and an increase in per capita income of consumers able to have short-life garments alternative to woollens. Our marketing system has never risen to the competition from synthetic fibres. These derive from by-product chemicals of production fuels and it is the interdependence of the petroleum and man-made fibre industries which has strengthened their position against wool.

The Battelle report says how deficient wool is from an end-users viewpoint. It says how to sell raw wool, but is relatively mute on what could be done with it in New Zealand. The symptoms so clearly spelled out indicate that the long term problem is to turn wool into a supreme product for the convenience of the end-user. Already there is an (ironic) demand for New Zealand carpet yarn in Australia and Japanese yarn in Russia. But what processing by New Zealand spinners can most do, besides presenting a good front for wool, is to elevate the raw wool price by competitive buying against overseas spinners. This may presuppose temporary subsidisation of the processing industry, or the alternative of foreign investment in New Zealand spinning, less risk, lower return.

The Wool Commission has shown that wool on a greasy basis has been disposed of in 1970/71 in the following form:

<table>
<thead>
<tr>
<th>Thousand metric tons</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greasy</td>
<td>270.3</td>
</tr>
<tr>
<td>Scoured</td>
<td>11.5</td>
</tr>
<tr>
<td>Slipe</td>
<td>52.2</td>
</tr>
<tr>
<td>On skins</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>335.5</td>
</tr>
<tr>
<td>Less stocks</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>334.0 approx.</td>
</tr>
</tbody>
</table>

Although many people are talking wool, the one sector that is not comprise the yarn and fabric manufacturers that potentially have the power to secure a footing for our wool even if it had to work around the clock for ten years to do it. In 1960-70 it used 30 m lb of greasy wool or 4 percent of the clip and is estimated to have exported one-fifth of this, mainly as yarn and carpets. The sale of carpets is unlikely to save the industry but the sale of yarn (and bulk staple) could — basically by removing most of the deficiencies the end-user objects to, and through the auto-dynamics of the trade, create demand.—Ed.
SUMMARY OF BATTELLE CONCLUSIONS

The Battelle Memorial Institute of Columbus, Ohio, was commissioned in December 1970 to make a detailed study of all aspects of the wool industry both within New Zealand and overseas. The Battelle investigation defines three problem areas for wool. While there is some overlapping of aspects of these problems, the areas can be described generally as:

Problems for the Wool User

Wool users feel wool has good characteristics in the end product, but they have problems getting it there. Many say they can use a competing fibre more easily and sell the end product just as readily. The problems specified include greater losses in processing wool compared with synthetics, the yarns are weaker and not so well suited to high speed machinery, delivery is uncertain, price fluctuates, the quality is inconsistent and there is no quantity discount.

Problems of the Auction System

Auction selling has some advantages. It simplifies the valuing of different types of wool and enables large volumes to be handled reasonably effectively. However, its disadvantages are many. They include a tendency to introduce price fluctuations and a tendency to encourage large numbers of wool types. Auction rules our discounts for large purchases, and creates a considerable delay in payment to the grower.

Problems of the Handling System

At present wool moves to the market through a system of relatively disjointed agencies. For the most part, each is striving to do a good job, but is constrained by size, scope, lack of capital, and competition. There is no central direction or decision-making so there are few co-ordinated programmes and few efforts at marshalling strengths to combat competition.
These observations were drawn from the following conclusions of the Battelle investigation:

**Markets**

None of the existing markets for New Zealand wool is vigorous.

The situation is weakest in the United States where the recent recession has severely depressed wool markets. There are signs of recovery and long-term trends for textile products are favourable, but wool may not share in this growth unless its competitive posture is improved.

In the United Kingdom, the use of wool is slowly declining and it appears this will continue through the next decade.

In Europe trends are mixed, with wool use declining in France and the Netherlands, levelling in Italy, showing a slight increase in Belgium and an increase in Germany.

In Japan, wool use has increased over the last decade, is down in the past year but may increase gradually in the future.

Carpet production, the largest end use, will increase in most parts of the world, but wool may not take part in this increase.

Wool use in carpets in the United States will probably continue to decline, although carpet production is expected to resume growth at a moderate pace.

The use of carpet wool in the United Kingdom is expected to decrease as production trends away from woven constructions.

In Europe the picture is somewhat brighter, with projections indicating increases in wool use in France and Germany, and wool holding its own in other countries.

The Japanese now use little wool in carpets, but carpet production is expected to increase dramatically in the coming two decades.

The second largest end use for New Zealand wool is woollen-system fabrics. Production of these has levelled out or declined in all countries except Japan, and wool as a percentage of all fibres has also declined.

The use of New Zealand wool in knitwear is relatively small, but significant and is tending to increase.

From its survey of the markets, Battelle concludes that despite an eroding market position, there is still latent consumer demand for wool.
Competition

Synthetic fibre competition continues to be strong. New wool-like products are being introduced, such as the third generation nylos.

New competitive devices, such as integration into the textile industry, are being advanced.

Promotion, advertising and other marketing techniques are still being strongly pursued.

However, price cutting seems to have slackened, especially in Europe.

But the actual prices at which synthetic fibre transactions take place are very difficult to determine.

The economies of scale of production still exist. New plants will be larger, demanding larger markets to assure higher throughputs.

Costs of synthetic inputs have increased, but the majority of these are by-products of other processes that would have little or no value except as inputs to the plastics industry.

So while synthetic prices have firmed, and the rapid price decreases have probably levelled out, it is unlikely that actual price increases will occur in the long run.

Marketing System

The grower is the first link in the wool marketing chain. His net income from wool continues to decline, he is becoming gradually more meat than wool oriented, he is less interested in wool preparation, he has little direct knowledge of existing marketing conditions. The delay in receiving his cheque for wool put through auction, together with his flagging interest in wool, is turning him increasingly to private selling.

The brokers are fragmented, quite insulated from the user marketplace, and very conservative. They are making changes to promote efficiency of handling and they do move a large volume of wool.

The auction has both advantages and disadvantages. It is an equitable system of valuing a large volume, diverse product such as wool and it makes price and volume information readily available. However, it makes prices fluctuate, it introduces supply timing and delivery problems, it creates conditions in which larger purchases tend to cost more per unit than smaller
purchases, and it serves as a barrier to communication between buyer and seller on other than price and volume information.

The wool trade is fragmented, made up mainly of relatively small firms compared with synthetic competition, highly conservative and oriented mainly to traditional wool users. It is not generally attuned to the technology of the textile industry, but is highly skilled in the traditional complexities of wool. It is highly skilled in the logistics of wool shipping and is the major contact of New Zealand with the textile industry, but is not generally highly skilled in using modern marketing techniques.

The International Wool Secretariat can be viewed as part of New Zealand's wool marketing system. It is engaged primarily in consumer promotion of wool and secondly in wool research and development. However, it is not involved to any great extent in the advertising and promotion of wool at any levels other than the consumer and is not involved in raw wool marketing.

Handling and Distribution

The handling and distribution system effectively moves a large volume of wool, but the current system has no central control, so changes are slow and difficult to effect.

Costs are increasing at virtually all stages. Some efficiencies are being introduced but will have a relatively minor effect on the overall cost picture.

Private selling is increasing, threatening the proper functioning of the auction. It offers some advantage to grower and buyer but the private selling system may incur many of the costs and problems of the auction system if it expands much beyond current levels. The fact that private selling has increased substantially in recent years is an indictment of the auction system.

The current system is responsible for wool availability and delivery problems experienced by mills.

Wool Pricing and Price Levels

Wool prices are fixed at auction, but many factors existing before that time are actually responsible for bidding strategies and limits. Consumer incomes and purchasing decisions are a very important factor in prices, as are fashion changes, which are becoming more volatile.
Synthetic competition has been depressing prices at all market levels, and the textile industry has been tending to discount wool for its difficulty of processing and manufacturing, its delivery problems, its quality inconsistency, its price variability, its lack of customer services and its lack of volume discount.

Changes in the structure of the textile industry will make the actual price paid less important to the user than a stable price and consistent quality.

Analysis indicates that under the current system wool prices are likely to increase very gradually over the coming decade, but by 1980 will still not have reached levels favourable to growers.

**BATTELLE'S FINDINGS**

The Battelle report summarises its findings in eight points:—

1. Wool is being severely threatened in its marketplace. New Zealand wool tends to be faring better than the wool industry in general, but this may be largely a result of the current low price levels.

2. Wool is not responding to the threats, and the current marketing system is mainly responsible for this lack of response. The fibre does have some technical problems, but it also has some advantages over its competitors and some of the problems can be overcome. There appears to be a latent demand for wool products among consumers even in the United States where wool is in its most depressed state.

3. Wool is being presented to the textile industry in a manner that places it in a poor competitive position. Compared with synthetics, it has no price stability, poor delivery schedules, high product variability and no volume discounting. The wool trade offers the industry little technical service, little assistance in end product marketing, product development or market development, trade financing that is often less competitive, and little in the way of product guarantees.

4. Changes are taking place in the current system, but both the using industry and the competition are moving much more rapidly.
(5) **Strong changes in the marketing system are necessary to make wool into a more competitive industrial fibre.**

(6) The changes needed include reduction of the fragmentation in the system with more centralised decision making; more direct contact with the marketplace for wool to give the New Zealand wool industry a marketing orientation and provide information to utilise in effectively meeting change in the marketplace; more price stability and volume discounting which undoubtedly means replacement of the auction system and will make for more effective planning by wool suppliers, marketers and users; and more centralisation to provide the New Zealand industry with more bargaining power in dealing with a more centralised using industry.

(7) The types of reforms in wool marketing already discussed in New Zealand and elsewhere will not solve the major problems of wool quickly enough. Continuing the programme of reducing valuing and handling costs is too slow, misses many of the major problem areas and can effect only small savings. Changing the wool selling system to an acquisition scheme will change the timing of payments to farmers and can be a focal point for effecting some handling and shipping changes, but it misses dealing with the key marketing problems, and cost saving potentials are not great enough to make up for market threats.

(8) A system is therefore called for that preserves the good features of the current system and replaces the bad features with more direct marketing that is highly oriented to the requirements of users.

Since the Wool Board announced its marketing plan on 26th August this has met with little valid objection to broad principles. Growers approve, buyers and merchants are wary and worried. None are yet optimistic about wool's future but all see the establishment of a marketing authority as necessary. The Meat and Wool Council of Federated Farmers on the 12th October accepted the scheme subject to the corporations' chairman of the directorate being appointed by the Wool Board, in agreement with the Minister of Agriculture instead of "appointed by the Minister of Agriculture in agreement with the Wool Board". Government on the 26th October announced that a company would be set up by the Wool Board under the Wool Industry Act 1944 to study how the corporation is to work and to produce a draft of its legislation. The company will not have powers to trade but it is expected that the corporation will be operative early in 1972. Until then, status quo.—Ed.
NEW ZEALAND WOOL BOARD MARKETING PLAN

Preamble

This plan for New Zealand wool marketing was unanimously approved by the New Zealand Wool Board at an ordinary meeting on August 26, 1971. A summary of the proposals was released to the press the preceding day; this plan supersedes the summary.

The Board will be discussing the plan with Government, woolgrowers and the wool trade. It hopes that the proposed Marketing Corporation will be constituted as soon as possible.

Over recent years, a number of organisations and many specialists in wool, economics, statistics and other fields have contributed to the study of wool marketing. The Board acknowledges their assistance and most recently, that of the Battelle Memorial Institute and Dr. Ivan Kinne, of its Columbus staff.

J. ACLAND, K.B.E.,
Chairman.

Introduction

The Wool Board in 1970 engaged the Battelle Memorial Institute of Columbus, Ohio, to investigate the marketing of New Zealand wool, including:

(1) The organisational structure and financial needs in New Zealand.

(2) The relationship and the effectiveness of communication between wool marketing and wool production.

(3) The pricing mechanism of New Zealand wool.

(4) The marketing processes after wool is sold by the growers, including the role of the international merchanting houses (up to the point at which wool loses its identity).

(5) Alternative courses of action to effect improvements.

The Board has considered and accepted Battelle's findings.

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Recommendation

The Wool Board recommends the establishment of an organisation with broad powers to improve the marketing of New Zealand wool throughout the world.

Title

The title of the organisation will be the New Zealand Wool Marketing Corporation.

Objectives

The Corporation’s objectives will be similar to those stated in the report of the Wool Marketing Committee, November 1968.

(1) To obtain optimum long-term returns for New Zealand wool growers and the New Zealand wool industry in general.

(2) To do this by marketing New Zealand’s wool to the best advantage in competition with other textile fibres.

(3) To develop a marketing system attuned to the requirements of the world’s textile industry.

(4) To bring about efficiencies in handling and distribution and to keep these and related costs to a minimum consistent with objectives (2) and (3).

(5) To provide a flow of information on market requirements to help guide the planning of wool production and preparation.

Functions

The Corporation will be directly involved in:

(1) Wool marketing from the woolshed to the end user.

(2) The development of greater efficiency in wool preparation, handling, selling and shipping.

(3) Transport negotiations.

(4) The development of existing and new markets for New Zealand’s wools.

Nature of the Organisation

The title of the Corporation has been chosen to suggest its nature: commercial in outlook, flexible in its planning and operations, “marketing oriented” and profit seeking.
It will be a statutory organisation acting on behalf of woolgrowers and Government. It will have adequate Government financial backing but operate “at arms length” from Government. Through the Wool Board growers will have adequate representation on the Corporation.

The Corporation will have a policy-making directorate. Its staff will have considerable flexibility in operational decision making.

The Corporation will have wide statutory powers for use when necessary in the fulfilment of its objectives. But it will, so far as possible, attain these objectives through normal commercial operations, testing and proving procedures against competition. It will have the capability of enforcing change where change is needed, but will preserve and strengthen existing institutions where appropriate.

Statutory Powers

The Corporation will require new legislation since neither the Wool Industry Act nor the Wool Commission Act encompasses the concept of a marketing organisation.

It must have considerable autonomy. Its powers should be broad and few operational procedures should be specified. The legislation should include normal safeguards of the public interest and also safeguards in the use of public funds. But at the same time, the legislation should recognise the need for the Corporation to make quick and independent decisions.

The Board suggests the Corporation should have power to:

(1) Purchase all classes of shorn wool, slip or pulled wool.

(2) Market and/or process the wool in any manner thought to be in the best interests of New Zealand's wool.

(3) Engage in any preparation, handling, disposal, transport, processing or marketing activity considered appropriate, and ensure that other parties carry out these functions in accordance with its directions, including the right to license certain agencies to carry out any or all of these activities.

(4) Take over any classes of wool as it feels appropriate.

(5) Take over any or all operations from preparation through to marketing as may be required.
These powers should be tempered by requiring:

(1) Mutually acceptable bargaining procedures to establish pricing schedules for wool if the Corporation is to procure or acquire it.

(2) The establishment of a mechanism for equitably determining values for commercial operations should they be appropriated by the Corporation.

(3) Ministerial and/or Wool Board approval for certain types of major action.

Establishment of the Corporation

A Pro Tem directorate will be set up as soon as possible to initiate the establishment of the Corporation.

It will consist of a chairman and at least two, but not more than three, other members. They will be nominated by the Wool Board and approved by Government and will be responsible jointly to the Board and Government.

Its duties will be:

(1) To establish a liaison with the wool trade and the industry in New Zealand and overseas and to consult on operations that would be beneficial to the marketing of New Zealand’s wools.

(2) To finalise plans for the establishment of the Corporation and to present them to Government and the Wool Board.

(3) To assist in drafting legislation.

(4) To initiate the appointment of the directors and senior staff of the Corporation.

The Chairman must be able to give considerable part of his time to the work of the Pro Tem Directorate and must be experienced in organising and operating significant commercial enterprises. Ideally, he should be acquainted with New Zealand wools and textiles. The other members should also have appropriate stature and experience.

The Pro Tem Directorate will have the services of a full-time secretary and such other staff as are needed.
Organisation and Structure of the Corporation

The Directorate of the Corporation will be:

1 Chairman—Independent; appointed by the Minister of Agriculture in agreement with the Wool Board. He shall be ex-officio a non-voting member of the Board and shall have appropriate business experience.

3 members—Sitting woolgrowers' representatives on the Wool Board, appointed by the Board.

2 members—With appropriate business experience, appointed by Government.

1 member—A public servant, appointed by Government.

1 member (non-voting)—Nominated by the Directorate of the Corporation and approved by Government to provide specialised expertise as deemed appropriate.

The term of each voting member of the directorate shall be five years, some original members accepting shorter terms so that a regular rotation is established. This will be determined by the Pro Tem Directorate.

The Directorate of the Corporation should be responsible for policy. Its members should have experience in evaluating business operations and making business decisions.

The chief executive of the Corporation will be designated general manager. He will have overall responsibility for the entire operation and specific responsibility for the international and marketing operations of the Corporation. A deputy general manager will handle New Zealand operations.

The general manager will have demonstrated his ability to organise and manage a commercial operation that could achieve more than $200 million in annual sales. He should have knowledge of export operations and preferably—but not necessarily—of the textile industry and wool. He should be dynamic, and should have demonstrated ability in establishing good relationships with people of different nationalities.

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Relationship to Wool Board and Wool Commission

The Corporation will be separate from the Wool Board but will co-ordinate its activities with the Board.

It could take over some of the operations of the Board, such as shipping activities, and raw wool promotion operations; i.e., technical promotion and service to manufacturers overseas.

The Wool Board will continue to promote wool in New Zealand through advertising and merchandising, technical service and research. It will continue to represent New Zealand at the I.W.S. Board and will be the principal liaison between the Corporation and the I.W.S. Its functions will be re-oriented to give greater emphasis to promoting efficient wool production and directing it in ways that best conform to the requirements of the marketplace. It will be concerned with the economics of wool production and the general interest of wool growers, and will advise Government on these matters. It will also, when necessary, represent their interests in negotiations with the new corporation.

The Wool Commission will be amalgamated with the Corporation when the Corporation is operating.

Liaison with other New Zealand Operations

It is highly desirable that the Corporation develop close working relationships with all New Zealand wool marketing groups. If all work more or less together to further the interest of the New Zealand wool industry, more can be accomplished in less time.

Operations

The Corporation will itself determine the pattern of its operations. These could include: Reducing the cost of wool handling, spreading the offering of selected types of wool over a greater part of the year, the licensing of those who buy direct from growers, the establishment of overseas offices and the enlargement of market intelligence activities.

All are matters for the Corporation. The following project is described as an example of the way in which the Corporation could use its powers to obtain and market wool in order to test direct sales methods in the United States.
The Wool Board suggests; that immediately on becoming organised and obtaining finance, the new Corporation should proceed to the establishing of a marketing unit and a mechanism for obtaining wool to supply it.

The unit would carry out direct marketing operations in the United States and possibly Canada, especially in the carpet and knitwear industries. It would select and supervise the operations of other marketing agents to handle New Zealand wool on a contractual basis as representatives of the New Zealand wool industry. It would set up and operate a small end-market inventory of selected New Zealand types to be used in market development activities and to bridge any gap between regular shipments to mills. It would co-ordinate technical service to mills, technical development and market development with the Wool Bureau (the United States branch of the International Wool Secretariat).

The objective of this unit initially would be to develop marketing techniques providing sufficient added value to users so that an increased net return from this market is possible. Through this unit, the Corporation would also gain experience in end-market warehousing and in working out suitable relationships with an I.W.S. branch.

It is suggested that the Corporation should initially obtain wool from some or all of four sources: The stocks held by the Wool Commission, from the auction system (especially at the peak of the season), through the private selling route, or by direct purchase from growers of selected lots at an appropriate value.

The manager of the marketing unit should be an American with proven skills in managing a marketing operation directed towards the U.S. textile industry. It is not necessary that he should be a wool man. He should be fairly young and dynamic.

It is suggested he should be supported by two staff members with special knowledge of the carpet and knitting industries respectively and at least one man with intimate knowledge of New Zealand wools. This latter position, which could be assigned on a rotating basis, might be filled by a man from a New Zealand buying or processing firm.
The exercise has been investigated by the Battelle Memorial Institute for the Board. The Institute considers there is scope for increasing the price of New Zealand wool in the United States by providing the type of service discussed.

**Wool Transactions**

The Wool Board’s plan for marketing is directed towards establishing a system of sale which provides better communication through the market than the auction system at present, more stable prices, better control of the timing of sales and delivery and other advantages. The Corporation will work towards achieving these improvements without disrupting the orderly marketing of the clip.

There will be no change in the established pattern of sale during the 1971/72 season. Thereafter the Board believes that changes in the pattern should come about through the development of alternative methods of sale by the Corporation and their testing in competition with the established methods.

The options initially available to growers will be:

(a) Through auction.
(b) Sale to an approved and licensed private buyer.
(c) Sale through the New Zealand Co-operative Wool Marketing Association.
(d) Delivery to an approved wool store; appraisal and sale to the Corporation.
(e) Direct shipment overseas (not through a New Zealand trader).

These options should remain open to growers as long as the Corporation believes they are viable and beneficial to the marketing of New Zealand wool.

The Corporation should investigate a method of direct purchase, making prompt or even immediate payment. The method of setting purchase prices should be determined by the Corporation, but the growers’ interest should be represented by the Wool Board. It is envisaged that the purchase of such wools by the Corporation should be through existing facilities, although for purposes of supply it might be desirable to purchase wools on some occasions in farmers’ sheds. As stated earlier, the Corporation should be as free from constraint as possible in working towards the most efficient marketing of the clip.
Finance

The initial financial requirements of the Corporation are dependent on the pattern of operations which will be determined in the first place by the Pro Tem Directorate, and then by the Corporation itself. Preliminary estimates will be prepared by the Pro Tem Directorate for consideration by Government and the Wool Board.

The funds of the Wool Commission were set aside for the purpose of operating a wool marketing scheme which would be beneficial to the wool industry. The current assets of the Commission are approximately $48 million, of which $21 million is in wool stocks. This would be the fund from which the wool growers' contribution to the Corporation would be drawn.

The Corporation will require capital backing for a number of purposes—apart from continuing the price support and supplementation functions of the Commission—and it will also require reserves against emergencies. A tentative estimate is that the total funding necessary could be twice the Commission's present assets.

The Pro Tem Directorate will estimate the likely requirements and initiate discussions with Government on the means of providing it.

In addition to its own operating costs, the Corporation will assume those of the Wool Commission and the costs of some Wool Board operations. It will be expected that the Corporation will strive to operate with the greatest possible efficiency, limiting expenditure so far as possible to those activities which are most likely to yield returns to the New Zealand wool industry.

Timing

The Corporation should be functioning with the minimum of delay. The Wool Board is accordingly asking the approval of Government for the immediate establishment of the Pro Tem Directorate so that it may undertake preparatory work while the main plan is negotiated and legislation passed. The Board expects the Corporation to be installed and its initial planning completed by the middle of 1972.
CHAIRMAN'S COMMENTS

The following remarks by the Chairman of the Wool Board, Sir John Acland, were made in an address to the Electoral Committee on August 24 in which the Board's plan for wool marketing was announced.

Perhaps some of you will be disappointed that the Board has not come down in favour of complete acquisition or some other reform. I assure you the plan is the stronger for that. We have declared our general intention, which is that there should be a system of sale which provides better communication through the market, more stable prices, better control of the timing of sales and delivery, and other advantages of modern marketing. We have set up a commercial organisation to work this out in the marketplace. You will say that by implication this means the end of auction. Certainly the Battelle Institute finds that the disadvantages of auction outweigh its advantages and this finding is accepted by the Board. But the auction is the method of sale operating at present, and handling three-quarters of the shorn clip. It depends on confidence, so if it is to be changed it must be changed decisively, not allowed to run down. That will be the responsibility of the new Corporation. It may be that the Corporation, working with the trade, may remedy some of the defects of the auction or give it a new lease of life by confining it to certain classes of wool.

The Corporation will be a thoroughly commercial organisation, placed into the market situation to make its own way, to earn a profit (which is important) to earn respect (which is more important), to fight its own battles. Its task will be to demonstrate improved methods of marketing, and to prove them by its success against ordinary commercial competition.

It must have all the necessary powers to ensure the accomplishment of its important task, and in day-to-day affairs to act with commercial speed and decisiveness. But at the same time, the intention is that the powers should be used with discretion. We all know how the best and most enduring reforms are made.
We need prompt and united action. We agree with Battelle that developments in the textile market are threatening for wool, and that time is running out. As soon as possible we must secure acceptance, enact the legislation and complete the preliminary work.

The Wool Board is quite a diverse group . . . businessmen and farmers, geographically scattered. This plan has the unanimous support of the Board. It is a practical solution we are offering, and that, I believe, will be its strength and appeal to farmers.

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**METRIC UNITS**

**Length:**
- millimetre (mm)
- centimetre (cm) 1 cm = 10 mm
- metre (m) 1 m = 100 cm
- kilometre (km) 1 km = 1000 m

**Area:**
- square centimetre (cm²)
- square metre (m²) 1 m² = 10000 cm²
- decares (daa) 1 decares = 1000 m²
- hectares (ha) 1 ha = 10 decares

**Weight:**
- gram (g)
- kilogram (kg) 1 kg = 1000 g
- tonnes (t) 1 t = 1000 kg

**APPROXIMATE CONVERSIONS**

**Length:**
- 1 inch = 25.4 mm
- 1 foot = 304.8 mm = 0.3048 m
- 1 yard = 0.914 m
- 1 mile = 1.609 km (1 kilometre = 0.621 miles)

**Area:**
- 1 sq. ft = 0.093 m²
- 1 sq. yd = 0.836 m²
- 1 sq. mile = 2.590 km² = 259 ha
- 1 acre = 0.405 ha (1 hectare = 2.471 acres)

**Weight:**
- 1 lb = 0.454 kg
- 1 ton = 1016.05 kg (1 kilogram = 2.204 lb)

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N.Z. Meat and Wool Boards' Economic Service

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The feeding of hoggets in winter is costly and time-consuming. Hay, root crops or concentrates are used on some runs, while others use extensive improved-tussock blocks for wintering hoggets. Supplements are fed to try to maintain liveweight gain throughout the winter.

High country wintering systems have been studied, and are discussed in this article. The Hogget Survey (Thompson 1971) discussed in the May Review has been continued with the same 200 hoggets on each run being weighed during the winter. An additional flock has been recorded to highlight a different winter-feeding system.

**Winter Growth Rates**

The 1970 winter in North Otago was mild, without snow lying for any long periods but all hoggets lost liveweight during the winter.

<table>
<thead>
<tr>
<th>Flock</th>
<th>Feeding System</th>
<th>Time of Weighing</th>
<th>Liveweight Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>May L/wght</td>
<td>September L/wght</td>
</tr>
<tr>
<td>1. Merino</td>
<td>No supplement - improved tussock block</td>
<td>64</td>
<td>60</td>
</tr>
<tr>
<td>2. Merino</td>
<td>No supplement - improved tussock block</td>
<td>60</td>
<td>52</td>
</tr>
<tr>
<td>3. Merino</td>
<td>Lucerne hay</td>
<td>67</td>
<td>59</td>
</tr>
<tr>
<td>4. Corriedale</td>
<td>No supplement - improved tussock block</td>
<td>71</td>
<td>66</td>
</tr>
<tr>
<td>5. Halfbred</td>
<td>Grain and hay</td>
<td>73</td>
<td>67</td>
</tr>
<tr>
<td>6. Halfbred</td>
<td>Turnips</td>
<td>57</td>
<td>53</td>
</tr>
<tr>
<td>7. Halfbred</td>
<td>Hay and nuts</td>
<td>71</td>
<td>63</td>
</tr>
</tbody>
</table>

Our recording showed that hoggets kept growing during the autumn until mid June. Liveweight loss occurred throughout the winter until late September, then fast growth rates were measured in the spring.
Grain is easily spread on frozen ground from a hopper or direct from bags. In this case the hopper contains three days’ feed. The spread of grain should be kept to a minimum.

Photo: K. F. Thompson, from a transparency.

FEEDING SYSTEMS

No Supplements

Three flocks had no supplementary feed but had the advantages of warm, sunny, and improved tussock-blocks. The warm nature of blocks facing the north and west are an important factor in reducing the extent of liveweight loss, with little cost.

Flocks 1 and 4 are the Tara Hill Merino and Corriedale flocks. These hoggets were wintered on one improved tussock block stocked at three per acre.

The mainmob hoggets (flock 2) had two improved tussock blocks, and were shifted from one block to the other every three to four weeks. Stocking rate was about two hoggets per acre. For comparison a small mob was wintered on tussock. As expected the stocking rate was much lower at 0.25 hoggets per acre, or four acres per hogget. Liveweight loss for each group was similar.
TABLE 2 Winter Liveweight Loss for Hoggets on Improved and Native Tussock

<table>
<thead>
<tr>
<th>Type of Feed</th>
<th>Time of Weighing</th>
<th>Liveweight Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>May</td>
<td>September</td>
</tr>
<tr>
<td></td>
<td>Liveweight</td>
<td>Liveweight</td>
</tr>
<tr>
<td>Improved Tussock</td>
<td>60 lb</td>
<td>52 lb</td>
</tr>
<tr>
<td>Native Tussock</td>
<td>61 lb</td>
<td>53 lb</td>
</tr>
</tbody>
</table>

Although these hoggets lost 8 lb liveweight this compares favourably with other supplementary feeding systems.

Lucerne Hay

Lucerne hay was used to supplement the grazing of hoggets on partly improved hill blocks stocked at three to four hoggets per acre. These were shifted about every three weeks between blocks. Hay feeding started in mid July with one bale per 100 hoggets. Feeding out was at the bottom of the blocks and the ration increased as hoggets became accustomed to hay. A full ration of three bales per 100 hoggets was fed daily until mid September. By this time hoggets had been fed 1½ bales each, and lost 8 lb liveweight.

Grain and Meadow Hay

Oats and meadow hay feeding started in early June with flock 5. By late June full rations of 1 lb of oats per head, and 1½ bales per 100 hoggets were fed every second day. Supplementary feeding was continued until the end of September. These hoggets were fed 2 lb of oats per head every second day. They eat quickly but show little sign of gorging or discomfort.

Photo: K. F. Thompson, from a transparency.
Two bushels of oats and 1¼ bales of meadow hay per hogget were fed and yet 6 lb liveweight was lost.

**Turnips**

A crop of turnips, chou and ryegrass is sown each year for Flock 6. Some 1,500 hoggets have four hours daily on a five acre break. The rest of the time they spend on a large run-off with a very small amount of hay. A new break is opened each 10-14 days.

The daily on/off system of feeding turnips requires a considerable labour input and growth rates have not been particularly high. Set stocking was considered the best alternative. A group of 100 hoggets were locked on one-third acre and were given a new break every 10-14 days at the same time the break was changed for the main mob. The stocking rates of approximately 30 hoggets to the acre were the same for each group. The locked on hoggets had no run-off and were not fed hay yet their growth rates were far higher than expected.*

| TABLE 3 Winter Liveweights for Hoggets on Turnips either Locked or On/off Daily |
|----------------------------------------|--------|--------|--------|
| Type of Feeding | Time of Weighing | May | September |
| On/off | 57 lb | 53 lb |
| Locked | 56 lb | 64 lb |

The locked on hoggets did not appear to eat any more, in fact they did not clean up their break as well as those hoggets that were on/off daily.

*It is suggested that growth is limited by the stress of waiting each day to be hunted on to turnips, and after eating as much as possible, being hunted off, after four to six hours.*

When root crops are being fed to any group of animals they should have continuous access to a break. If a run-off is being used as well, there should be continuous access to this also.

The 1,600 hoggets consumed 45 acres of turnips.

*There may be cohabitation problems in a large mob not presented in small mobs run separately. Mr Thompson has reported that 1,600 hoggets in this flock were locked on turnips this season and gained 9 lb over the winter. Labour-savings in this practice are another advantage. —Ed.*
Hay and Nuts

Sheep nuts were fed to complement hay as a winter feed in flock 7. Hay feeding commenced in early July, with full rations of two bales per 100 hoggets fed by mid July. Sheep nuts were introduced at the beginning of August, and before the end of the month hoggets were being fed 0.1 lb nuts per head daily. Feeding finished in early September when hoggets were shorn. They had 1½ bales of hay and 2 lb nuts per head but lost 8 lb liveweight.

RELATIVE COSTS

Comparative costing of these wintering systems is difficult owing to the value each runholder places on different feeds. Costs differ when feeds are re-sold items or harvested by the run-holder or contractor. For balanced comparison two methods of costing are considered. The production cost is the cost to the runholder who makes and harvests winter feed with his own machinery. For the purpose of study "commercial value" of feed is the price that these feeds can be purchased or sold by the runholder.

TABLE 4 Comparative Cost of Feed Used in the Different Wintering Systems

<table>
<thead>
<tr>
<th>Type of Wintering</th>
<th>Amount of Feed per Hogget</th>
<th>Cost per Hogget</th>
</tr>
</thead>
<tbody>
<tr>
<td>No supplement</td>
<td></td>
<td>Production Cost</td>
</tr>
<tr>
<td>Lucerne hay</td>
<td>1½ bales</td>
<td>17c</td>
</tr>
<tr>
<td>Grain plus hay</td>
<td>2 bus. oats</td>
<td>25c</td>
</tr>
<tr>
<td></td>
<td>1½ bales</td>
<td>74c</td>
</tr>
<tr>
<td>Turnips</td>
<td>53c</td>
<td>58c</td>
</tr>
<tr>
<td>Hay plus nuts</td>
<td>1½ bales</td>
<td>46c</td>
</tr>
</tbody>
</table>

An annual cost of 17c per hogget for topdressing tussock blocks is charged against “No Supplement.” The value of grazing in the other cases has not been considered. Proprietary feeds have been charged at their retail price.

Sunny improved tussock blocks are the cheapest and easiest method of winter feeding. The liveweight loss measured in this survey is not excessive, and is quite acceptable where there are facilities for growing hoggets well in summer.
Turnips and swedes are excellent hogget winter feeds as they are accessible to them and well liked. Where there is a risk of snow lying for several days chou moellier should be included in the crop mixture.

A root crop is the cheapest form of supplementary feed and is the most likely to give liveweight gains. A maintenance ration can be cheaply fed and give satisfactory results. Scott and Kelson (1970) showed that swedes and turnips, compared with mangels, fodder beet, and chou moellier, gave the best hogget growth rates in recent trials at Invermay.

Lucerne, if purchased, is expensive. It's greatest value as a hogget feed is in summer for growing weaned lambs or two tooths.

Concentrates are expensive, and should be used only to complement other feeds, or in cases of emergency. Introduction of hoggets to sheep nuts can be difficult. The best system I have seen is to place the nuts in the salt boxes used by many runholders. In this way ration feeding can commence after two weeks.

Discussion

The general liveweight loss by the groups of hoggets is surprising, especially when the cost of winter feeding is considered. Two explanations are offered for the lack of growth among the hoggets fed supplements:

The level of feeding the supplement was inadequate.

Additional stress was inflicted either by the method of feeding the supplement, or by temperature where the feeding was in a
cold situation. This stress increased the feed requirements for maintenance.

**Level of Feeding**

Hoggets lost weight from mid June until mid September. The feeding systems reviewed did not reach full ration feeding until mid July or later, so hoggets were half way through winter before a full ration was fed.

A 75 lb hogget requires $1\frac{3}{4}$ lb lucerne hay per day for maintenance, and when weather conditions are cold or wet the feed requirements will be higher. To feed a maintenance ration of hay over the winter period, 160 lb or three bales per hogget is needed. It is obvious that feeding levels recorded in this survey were below maintenance for most of the winter.

To make winter feeding efficient, feed levels should be either increased to maintenance level, or reduced to a minimum level to prevent excessive weight loss. The extent of the weight loss that can be accepted without adversely affecting production is uncertain. The 8 lb loss measured in this survey has not had an extreme effect on subsequent production. However, the question should be answered shortly by Mr G. Davis, Scientist, Tara Hills High Country Research Station, who is studying hogget wintering.

**Stress**

Methods of feeding often impose stress on hoggets that prevent them from making satisfactory liveweight gains.

This was clearly shown in the comparison between hoggets locked on turnips and those going on and off daily. The only difference between these mobs was the shifting of the on/off hoggets. By leaving hoggets locked on with continuous access to the turnips they were able to eat as much as they wanted when they wanted to.

Hay feeding methods have been studied by other workers. Lewis (1968) showed that weekly feeding of hay to ewes, compared with daily feeding, did not affect production. The same total quantity of hay was fed to both groups. This system of feeding hay could be adapted for hogget feeding.

The feeding system used should provide minimum stress to hoggets, and allow full opportunity to grow. Wintering systems with less stress usually have the lowest labour input.
For convenience, winter feeding on runs is often on areas adjacent to the homestead and farm facilities. Feeding is usually in paddocks where there is a colder climate than on sunny blocks. This temperature difference affects hogget growth more than is generally appreciated. A lot of the value of winter feed can be lost as hoggets in the colder conditions on the flat will eat a considerable amount of the winter feed just to keep warm.

Both the methods of feeding and the local temperature placed stress on the hoggets and caused them to stop growing. This type of stress can be greatly reduced by changing their management.

**Drenching**

The hoggets in the survey were drenched regularly through the winter. Worm drenching, started at weaning, should be continued through the winter to July or August, to maintain health in the animals until they have developed their own immunity.

**Summary**

In this survey of seven high country flocks, hoggets lost weight between mid June and mid September. This general weight loss was unexpected as the wintering systems used were planned to maintain growth rates.

Levels of winter feeding were generally below maintenance, and full rations were not fed until halfway through the winter. Hoggets had already lost weight at this stage.

Stress from the method of feeding, and feeding in cold areas have been discussed as factors limiting hogget growth.

Wintering hoggets on sunny and warm improved tussock blocks is the cheapest system. Although some weight loss will occur this is the most satisfactory method of wintering when there is no snow risk.

A root crop of turnips and Chou moellier is recommended when there is snow risk, or where no suitable hill block is available.

Lucerne is best used as a grazing feed to grow big hoggets and two tooths, instead of as an expensive conserved winter-feed, when little hogget growth can be expected.
Acknowledgments

Assistance and interest from the managers and staff, Ribbonwood, Omarama, Otamatapaio, Otekaike and Mt. Dasher stations are gratefully acknowledged. Also, the practical field assistance from Mr W. Richards, New Zealand Department of Agriculture, Oamaru, is appreciated.

References


POINTS FROM REVIEW — PASTURE OR SUPPLEMENTS

Inflation will this year tempt many farmers to economise on supplementary feeds and for some who do so, severely, it will probably prove unwise. But most properties have an infinite capacity to do stock well on permanent pastures and where these are utilised properly the need for supplementary feed is correspondingly less. Some points from recent articles in Review are:

i. Ensure the flock enters winter in forward condition. (Russel, 21: 66-7; Vartha, 21: 38; O’Connor, 21: 17.)

ii. Make maximum use of pasture as standing conserved forage. (Vartha, 21: 40, 22: 51.)

iii. For wintering choose a micro-climate and soil type where an extended season of pasture growth can be expected and cold stress minimised. (O’Connor, 19: 117; Vartha, 22: 62; Thompson, 22: 87.)


v. If the flock cannot be wintered on the above guidelines or stocking rates are high, grow a forage crop for hoggets — turnips if no snow-risk, turnips plus choumellier if there is; and choumellier for ewes** (Thompson, 22: 86-93).

Keep hay, ensilage or concentrates on hand for emergencies and flexibility.
— Ed.

* Timothy is another good winter grower and for cattle, prairie grass where suited. Lotus major is a bloat preventive and should be undersown or hayed on damp lightly grazed tussock wastes in proximity to clover-based pastures and in any pasture laid down where management and locality suit the species. There are other bloat inhibitors — to be described in later issues of Review.

** Greenfeed cereals grow well in winter but should be undersown with red clover to spread costs— red clover and adventive grasses are excellent for hoggets in the following autumn. For the wintering of cattle, readers are referred to the Institute’s “Beef Cattle on Tussock Country” to be released soon.
Genepool Ltd is a company co-ordinating the efforts of many individuals to improve the efficiency of beef production in their Hereford herds. Our objects are to produce structurally sound animals capable of growing quickly, and of producing a maximum amount of top quality beef.

To achieve this we are applying the principles of population genetics to large numbers of Hereford cattle. We are screening cows from many parts of the South Island and pooling superior cows from among these in a nucleus herd. This policy capitalises on the advantages of scale in the programme, which are:

(a) Large numbers of cattle to select from. This gives us more opportunity to obtain higher selection differentials, and for traits associated with growth which are highly heritable we can expect rapid progress.

(b) Reduction in in-breeding, lowering the chances of unwanted recessive genes coming to the fore.

(c) Ruthless selection based on performance records. In small herds the rate of culling is reduced because of lack of numbers, whereas with a large pool of breeding stock there is plenty of room for it.

Title photo shows 15-month heifers of above average growth rates on the flats, Haldon Station. The large areas of flats have potential for irrigation. Photo: J. I. S. Innes, from a transparency.
The Nucleus Herd

The nucleus herd is being run at Haldon Station, which is in the heart of the Mackenzie Country on the Canterbury shore of Lake Benmore. Altitude varies from 1200 ft at the homestead to 6,200 ft at the back. The rainfall averages are between 11 and 20 inches a year. Winters are cold and the summers long and droughty. The 35,000 acres carries 10,000 Merinos and 500 head of cattle, at a carrying capacity of .33 ewe equivalents to the acre. There are adequate facilities at the station to handle 500 cows. These include an efficient paddock system, and yards specially designed for artificial breeding.

At present the nucleus herd consists of 220 cows, all selected on their weaning performances. These come from 14 contributing herds with a total of some 6,000 cows. The herds have been screened for cows that wean the heaviest calves and are themselves 100% structurally sound. In future cows will require to have several years of very high performance before being accepted for the nucleus herd.

The nucleus herd is intensively managed during calving and at mating. It is grazed in a number of small paddocks that to save enough feed are shut up well in advance of use. From here the herd spends the remainder of the year on the hill and after weaning they are used to break in rougher country but their body-weights are restored four to six weeks before calving. Bulls and heifer calves are run in their respective mobs at all times to ensure they all get the same opportunity for growth. These are fed the best grass on the station.

The nucleus cows were inseminated to progeny-tested bulls from Britain, Australia and New Zealand through an AB service conducted by the company's own technician.

Every year the company will continue to screen herds from throughout the country. We are sure that superior cows will always be discovered in outside herds, especially as semen from all bulls used to service the nucleus herd will be made available to participating breeders in the same year. In this way superior genetic material will reach the outside herds in as fast a way as possible.
Typical hill country where the nucleus herd will be run except at calving and AB servicing when paddocks are used.

Photo: courtesy J. I. S. Innes.

How the Nucleus Herd Operates

When cows come for selection to the nucleus herd they spend two years in the nucleus testing herd during which they must produce two consecutive calves in the top 200-day-weight group before being considered for company purchase. This two-year period also gives us time to take a 15-month corrected weight on each cow’s first calf which should have attained a minimum of 600 lb at this age. If a cow produces two calves in the top bracket the company will purchase the cow from the owner who is paid $100 worth of shares in the company plus a percentage in cash, depending on the cow’s rating in the herd.

In this way a cow is valued on her production.

While cows are in the testing herd, they and their progeny are still the property of their contributors who pay the company $100 per cow annually to cover grazing, management, insemination and overhead costs associated with the rearing of calves to 15 months of age. We intend to review this service charge every year.

Nucleus bulls will be mated at 15 months of age, either through natural service or artificial breeding. All bulls used over the nucleus herd will be progeny tested, and the carcass data analysed from all the male progeny at slaughter. Bulls will probably be used over the nucleus for only one year.
As I have said already, if a nucleus sire is bred from a tested cow, the company will have the right to purchase it. However, the company aims to use as wide a range of proven sires as possible for the near future until it is able to breed its own bulls. Even then it will continue to search for high-performance proven bulls from any outside source, provided they can make a genetic improvement to the nucleus herd.

**Distribution of Bulls**

We aim to get the genetic material that is bred in the nucleus herd quickly diffused into contributing herds. We therefore emphasise the use of semen from bulls being used over the nucleus herd in contributing herds as well.

Bulls bred on the property will be selected on their corrected 15-month weight which is the corrected 200-day weight added to the gain from weaning to 15 months. Structural soundness will also be taken strict account of. Bulls surplus to the nucleus herd will be sold to participating breeders. Prices will depend on the bull's ranking in the herd and the amount of capital the company requires to function.

We propose to keep prices to members as low as possible. Bulls are to be distributed on a roster with first pick going to breeders with cows in the nucleus herd, second pick to breeders with cows in the testing herd, and third pick to breeders with cows in any testing herd in New Zealand that is associated with Genepool.
Selection of Heifers

Heifers are selected for both growth rate and mothering ability and must produce a calf as a two-year-old. First culling is on their corrected 15-month weight and second culling is of any 15-month heifer not getting in calf. All heifers must spend two years in the testing herd before being considered for entry to the company herd. Hence they enter the testing herd before their first calving and are compared to the rest of the herd during that period.

The bull (facing) was from a two-year heifer. He weighed 835lb at 10½ months, a daily growth rate of 2.6lb. If he continues to grow well he will be used at 15 months to service part of the testing herd. The other two Herefords are the same age.

Photos: J. I. S. Innes.
Recording Systems

All calves are tagged at birth with Ritchie ear tags. Every animal has a punch card which shows individual performance on the front and progeny performance on the reverse. Data is printed onto these cards from the New Zealand sheep and beef cattle survey computer programme which calculates weaning weights corrected to 200 days. The average corrected weights for the Haldon run herd for the 1971 season were bulls 540 lb and ranging from 526 lb to 659 lb, heifers 495 lb and ranging from 473 lb to 610 lb.

Calves at weaning are registered on the Gower Beef Computer (Hamilton) for comparative growth recording to 15 months of age. This is an efficient service and ideal for the purposes of Genepool. Heifers at Haldon last year averaged 620 lb at 15 months.

Any progeny not up to standard or that are below average will be culled.

Genepool is a large scale co-operative scheme set up to apply all the resources that are today available to breeders, in the hope that participants in the scheme will benefit through better quality Herefords.

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