

Falkland Islands Agricultural Department



Grassland Improvement

Proceedings of a Conference

held at Stanley,

20th and 22nd July 1967.

SUBDIVISION AT PORT HOWARDD.M. Pole-Evans

I was absent on leave from these Islands last year when a hard winter was experienced. I think it will be of everyones interest to know that we received our first major set-back in our scheme of rotational grazing.

This was a loss of some 19.5% in our hoggets. These are, as reported last year, continually on the move during the winter, and their movement is approximately twice as rapid during the spring.

The explanation of this loss is I believe as follows. When large flocks of sheep, say 4-5000 are contained in small blocks of camp, varying in size from 1,300 - 2,600 acres, they have to move to survive. In other words they travel more, looking for the better grasses and at the same time eat off more of the unpalatable ones. Thus the extra treading and heavier grazing is the answer to the improvement of the herbage. This I believe was the cause of our heavy loss last year. Over 75% of this loss was unaccounted for. The camps were clean; they just disappeared out of sight into the ditches while covered with snow.

I agreed with Sir John Barlow when he mentioned in his interview with Mr. Barton, (which was broadcast by Stanley) after his visit last year, that he considered top priority should be given to the clearing of our ditches. This I think should be tackled mechanically. Sir John's second priority was the use of cattle. We at Port Howard have been using a troop of 4-500 as scavengers for a number of years. These are not only grazing out the ditches, thus making them more visible to the sheep, they also make passes and knock a lot of the banks down. This latter applies to our Peat Banks Camp.

Where camps have been stocked heavily with cattle, we have virtually no overhanging peat banks. This has reduced the peat dust in the fleece.

In our White Rock section, we have great difficulty in burning owing to the salt air from the sea. So we have heavily rotationally grazed this area with cattle in conjunction with sheep, over the last few years. The major improvements have been in the Little Mountain and Peat Banks Camps.

All the north east face of Goat Hill in Little Mountain Camp was large fern and cinammon grass. Here the cattle have killed out the fern by treading and eating the cinammon, and most of the area is now covered in fine grasses intermingled with open white grass.

Peat Banks Camp has always been soft, wet and sour ground. Since heavy stocking and spelling, the herbage has improved immensely. At the base of the peat banks, where one used to find a strip of unturfed peat, we are getting a strip of poa annua and fescue.

The whole area has hardened up, with fine grasses spreading everywhere on the top of peat banks. A few years ago, one had difficulty in riding over this camp; now one rarely has to lead one's horse.

Discussion

R. G. Vinson asked on what period the loss had been taken.

D. M. Pole-Evans said that it was from dipping to dipping and was quite exceptional as the usual loss was 3-4%.

S. Miller asked what was the state of the scavenging troop of cattle and what was the death rate. Roy Cove could take 1000 cattle during the summer to control the fog but they could not be kept alive over the winter.

D. M. Pole-Evans replied that he could not give the death rate. The cattle were split into herds of 100 for the winter and shifted half way through.

S. Miller agreed that the advantages of mixed grazing were proven but in a country with as little winter feed as this it was hard to keep the cattle alive over the winter.

D. M. Pole-Evans pointed out that they had run 100 cattle on the Mt. Rosalie section over the winter without adverse effects on the lambing.

K. Luxton wondered if the losses could not be attributed to the hoggets suffering from malnutrition due to having to scavenge too hard.

D. M. Pole-Evans agreed it could have been.

J. T. Clement enquired if there was any trouble with cattle damaging fences.

D. M. Pole-Evans said that this did not happen to any great extent. The young cattle were tamed by being tied in the shed for 3 days while the settlement youngsters did what they liked with them short of ill treatment.

R. G. Vinson asked what the increase had been due to the rotational grazing.

D. M. Pole-Evans replied that there had been an increase of 6000 over the last 6 years but a loss of 1000 this year.

L. G. Blake inquired if there was any plan to reduce the winter movement of sheep in the light of last year's experiences.

D. M. Pole-Evans replied that this had been done on the Warah with the wethers as they are put out split up at dipping and do not start rotating until August. It could be done with the hoggets but two bad bits of camp in need of improvement would not carry any sheep unless rotated.

A. G. Barton asked what the wool clip had been on the surviving wethers.

D. M. Pole-Evans said it was one of the lightest they had had but last winter affected all clips quite considerably. The Port Howard lambs were born later and only had 11 months wool at shearing.

R. Cockwell inquired if the annual loss had decreased since the subdivision was started.

D. M. Pole-Evans replied that it had dropped but this was attributed to breeding clear faced sheep.

R. Cockwell suggested that cattle would break down banks and block ditches.

D. M. Pole-Evans agreed that they did. He added that J. L. W. were interested in a New Zealand made ditcher which consisted of a scoop on a swinging arm which fitted on the rear of a tractor and could be used to fill in the old ditch as the new one was dug. It worked directly behind the tractor and you had to back or to the work.

J. T. Clement said he had a simple version of this but its disadvantage was that it would not work at right angles to the direction of travel of the tractor.

C. D. Young pointed out that you could get a MacConnell side-arm type that would work at a right angle to the tractor. A rotary disc type might have some use here.

R. Cockwell said that you would not be able to work too close to the ditch edge even with stabilisers on the tractor.

D. M. Pole-Evans thought you would need a crawler to get into some of the difficult places. The advantage of this machine was that you could back in and work on the ditch no matter how twisted it was and straighten it up as you went along.

C. D. Young suggested that it might be possible to blast out some of these ditches with dynamite provided they did not have too many twists and turns.

D. Barton asked if the statement that subdivision alone did not give a reduction in losses applied to ewes as well as dry sheep.

D. M. Pole-Evans answered that it had only been done with dry sheep.

W. Goss asked if this was the first year that the hoggets had been rotated.

D. M. Pole-Evans said that it had been done for eight years now. This year's loss was exceptionally heavy but it was also the first considerable snow for some time.

K. Luxton inquired if cobalt was used.

D. M. Pole-Evans said it had been tried but without results. 1200 ewe lambs had been dosed and kept separate till lambing with no material difference in lambing or anything else.

R. Vinson asked if the ewes were set stocked and if so why.

- D. M. Pole-Evans replied that they were, because if ewes are shifted about it leads to discontentment and they cannot find shelter. Each ewe camp was made up with 4 tooth ewes and they were not shifted unless culled.
- I. G. Blake suggested that the fact that the ewe camps were not rotationally grazed was spoiling them as they were getting exactly the opposite treatment from the dry sheep camps.
- C. D. Young pointed out that it was not the opposite treatment, Mr. Evans was just not applying any treatment to his ewe camps. In all probability the ewe camps would be standing still while the others were improving.
- D. Barton said that he did not agree that it was necessary to leave ewes on their own camp all the time. He had split a ewe camp in two and ran the ewes on one side from dipping till the end of August and on the other for the rest of the time. The loss had been reduced in that particular camp and the lambing percentage had been increased by 13% over the two years it had been subdivided. It would appear that ewes did not suffer from being completely off one side of the camp.
- D. M. Pole-Evans pointed out that the ewes did not go to a completely new camp. This only happened with his own 4 tooth ewes which had been grazed all over the farm before they were used to make up the ewe flocks.
- A. Miller said that in this case the ewe camps did not get a spell at all except for 3 weeks for shearing.
- D. M. Pole-Evans agreed and said that they were thinking of returning some of the rotationally grazed camp back to ewe camp and splitting up the ewe camps. The ewes would then be run in smaller groups.
- R. Cockwell suggested that as hoggets needed a good start in life it would be better not to shift them around too much.
- D. M. Pole-Evans replied that these hoggets came in for shearing with good legs on them and in very strong condition.
- R. Hills asked if the hoggets grazed over the same ground as they had done before subdivision.
- D. M. Pole-Evans said that they did in the Six Hills but not in White Rock.
- R. Hills inquired if the losses in the other dry sheep were in proportion to the losses in the hoggets last year.
- D. M. Pole-Evans answered that they were nothing like as high.

SILAGED. H. Pole-EvansCosts.

1964.	Field Cultivations, 1 man x 15 days @ 20/7	15.	8.	9.
	22 cwt. oats @ £5. 15. 9.	137.	6.	8.
	Harvest, 4 men totalling £4. 4. 4. x 19 days.	80.	2.	4.
	Feeding, 1 man $\frac{1}{3}$ day for 4 months = 120 days. @ 20/7 per day = 6/10d. per day.	41.	0.	0.
		<u>£273.</u>	<u>17.</u>	<u>9.</u>

Cost per ton £1. 5. 3.

1965.	Field Cultivations, 1 man x 10 days @ 22/8.	11.	6.	8.
	18 cwt. oats @ £5. 4. 4.	93.	18.	0.
	Harvest, 4 men totalling £4. 13. 0. x 17 days	79.	1.	0.
	Feeding, 1 man $\frac{1}{3}$ day for 4 months or 120 days, @ 22/8 per day = 7/7 per day.	45.	10.	0.
		<u>£229.</u>	<u>15.</u>	<u>8.</u>

Cost per ton 19/2.

1966.	Field Cultivations, 1 man x 12 days @ 23/4.	14.	0.	0.
	33 cwt. oats @ £5. 19. 9.	197.	11.	9.
	Harvest, 5 men totalling £5. 14. 10. x 14 days.	80.	7.	8.
	Feeding, 1 man $\frac{1}{3}$ day for 4 months or 120 days, @ 23/4d. per day = 7/9 per day.	46.	10.	0.
		<u>£338.</u>	<u>9.</u>	<u>5.</u>

Cost per ton £1. 2. 7.

1967.	Field Cultivations, 1 man x 15 days @ 23/4.	17.	10.	0.
	48 cwt. oats @ £6. 2. 8.	294.	8.	0.
	Harvest, 6 men totalling £6. 7. 6. x 15 days.	95.	12.	6.
	Feeding, estimated 1 man $\frac{1}{3}$ day for 4 months or 120 days @ 23/4 per day = 7/9 per day.	46.	10.	0.
		<u>£454.</u>	<u>0.</u>	<u>6.</u>

Cost per ton £1. 8. 4.

1964.	155 tons from 22 acres.	Settlement Cows & 250 Stud Ewes fed.
1965.	240 " " 18 "	" " " 450 " " "
1966.	300 " " 28 "	" " " 400 " " "
1967.	320 " " 37 "	" " " proposing to feed 700 this spring.

We started by mixing the pedigree ewes with the others until lambing, it was only a matter of days until they were all eating. We drew off a mixture of all ages from the Stud Flock for a start, they are replenished each year with 4 tooth ewes, thus always having some ready to teach the young ones to feed.

Our main object is to carry more stock by feeding from August till November. Unfortunately we made a mistake by starting to feed the Stud Flock. Although we have increased this flock by 250 ewes, we cannot increase it quickly enough without

harming the quality. We therefore have plans to feed ewes from the Rocky Ridge this spring and have increased this flock from 500 at dipping 1966 to 620 at dipping 1967, with the intention of feeding 300 from here and 400 from the Stud Flock next month.

We are using oats thus getting a very much larger tonnage per acre than with grass. If winter sown we use "Powys" but have a new variety, "Padarn", for sowing this year. For spring sowing we use "Condor". We have found winter oats must be drilled during the last week in February. March is too late. Also that spring oats make the better quality silage. Winter oats are too ripe by the time we can harvest, which unfortunately we have to leave until after peat carting and our hay and oats harvests. As silage can be made in more or less any weather, we have to finish the former jobs while the weather is finer.

We use a Danish forage harvester in preference to a chopper-blower which would mean cutting it in the field with a mower and then blowing it into the pit with the chopper-blower. (Editorial note:- the latter method is more common with tower silos.) We tried to get British firms to modify their machines slightly but with no success so we went to Taarup of Denmark and had a reply by telegram within a week giving f.o.b. price in Montevideo.

The harvester has a flail drum revolving at 1500 r.p.m. These flails cut and lacerate the oats and blow them up a chute into the peat trailers which are fitted with special high wire-mesh sides. We run two trailers with the forage harvester one tractor ferrying away the full trailers and bring them back empty. The full trailers are dumped outside the barn and the contents buckraked back into the pit and piled up. As soon as the temperature reaches 100° F we roll to keep the temperature down. After that we just pile it in and try to prevent overheating.

This year we covered it with a plastic sheet as we used to have 3-4 inches of loss on the top through not covering and thus allowing air to get in. With the sheet there was no loss. In winter it is carted out in transport boxes to the sheep which are fed in troughs thus saving most of the grain, which we lost while feeding on the ground for the first two years. We used to feed all the cows at the barn but they made such a mess that we now take it out to them and feed them in troughs as well.

One side of the pit is concrete but the other is sleepers with the idea of self-feeding the dairy cattle some day. We cannot get the sleepers sealed off and did think of a plastic sheet over them but the tractor wheels would tear it off.

Over the three years we have been feeding we have found out the following points:-

- (1) You must use a forage harvester or a chopper blower.
Sheep are fussy about eating any silage over 3" long.
- (2) Lamb-marking percentages are no higher than outside flocks. This in spite of from 120% -135% being born.
- (3) Ewe losses are lower, owing to the closer shepherding.
- (4) Wool weights are slightly lower.
- (5) The ewes are poorer and do not catch up with their mates when returned to their flock until about February.
- (6) Mis-mothering is tremendous. The ewes naturally get the taste for silage and as soon as the tractor arrives, they

will leave their lambs, even if only a few hours old, for a feed. If the mother has twins, it generally means in the end, the weaker of the two dies.

- (7) Ewes have more milk than ordinary flock ewes and consequently I think the lambs that live are in better condition than flock lambs.
- (8) One needs very small fields; 10-15 acres is too big, even with gorse hedges all round. I believe that small fenced areas of very rough white grass bog camp may be the answer.
- (9) We have been feeding all our ewes in one flock, rotationally grazing them around the settlement fields which have all been cultivated and regrassed to chiefly fescue/clover sward. This I am now convinced is wrong. We will try this spring to divide the flock in to cuts of not more than fifty ewes to each field. This will mean higher labour costs in so much that it will take half a day to feed them. On the other hand it will stop mis-mothering.
- (10) Shelter, combined with roughage, I believe might be one of the answers to the whole problem for the following reasons:-

Firstly. When a ewe knows she is going to lamb, her natural instinct is to go somewhere where she can see danger approaching i.e. quite often on top of a rise, or as in our case when in a confined small field, towards the centre of it. Here, even in say a 10 acre field, there is no shelter.

Secondly. When feeding a high protein diet such as silage, any animal needs roughage, this our ewes are not getting. Consequently, their poorer condition and lack of fleece weight.

- (11) In our second year of feeding, 1965, we were very worried. There was about 8% of premature born lambs. I began to wonder if we had some type of abortion creeping in, possibly caused by feeding a very high protein ration. Secondly, was this going on all the time in the camp? The lambs when dropped were generally one month to six weeks premature, and were devoured by gulls within an hour. The ewe then pined, lost all interest in food, and died within a week to ten days. These symptoms being identical, as any shepherd knows, to the very poor, weak scoury ewe one finds in camp in the spring. Thirdly, were the ewes getting knocked about too much when pushing for priority of place at the feeding troughs. Thank goodness we had no trouble of this kind last year but I am still at a loss to know what was the cause.

Discussion

S. Miller said that it sounded as if Mr. Evans was not very happy about the scheme. He wondered what would happen in a dry year if the crop failed.

D. M. Pole-Evans replied that the firm were going to try the scheme for 5 years and they were now in the 4th year. As regards crop failure you would know by dipping time what sort of crop to expect and proportionately reduce your stock.

C. Young suggested working a year behind with the silage as it would keep for a couple of years.

L. G. Blake wondered if the silage feeding could not be graded off so that by the beginning of lambing in October it would have dropped to nothing.

Possibly there would not be enough feed on hand to feed the ewes off grass.

D. M. Pole-Evans said that there would not be enough grass at this time of year. He planned to feed the ewes in cuts of about 50 in a paddock which

Proceedings of a Conference on
GRASSLAND IMPROVEMENT
held on 20th and 22nd July 1967
in the Council Chamber, Town Hall, Stanley.

Subdivision at Port Howard	D.M. Pole-Evans	1
Silage	D.M. Pole-Evans	4
Direct Drilling at Port Stephens	W.H. Goss	8
Concentration Grounds at Port San Carlos	A. Miller	11
Drainage at Fitzroy	J.T. Clement	14
Some Notes on Tree Planting	J.T. Clement	17
Review of last Season's Experimental Work	C.D. Young	19
Identification and grazing value of Native Grasses	S. Miller	22
Clear Faced Sheep	D.M. Pole-Evans	23
Types and Methods of fencing	Open Discussion	24
Kale as a Winter feed	A.B. Monk	25
Tussac for Winter feeding	Open discussion	28
Effect of Mowing on White Grass	C.D. Young	29
Concluding Discussion		30
Appendix I		1
Appendix II		2
List of useful Publications		5

had a lot of long rank white grass in it to provide both roughage and shelter. There was little shelter in the middle of a cultivated field.

C. Bonner suggested balancing the ration with hay.

D. M. Pole-Evans replied that they had none to spare.

C. Bonner said that it might be a good idea to keep the ewes in a large mob and part them off as they lambed as was done in low ground flocks in Britain and New Zealand.

D. M. Pole-Evans said this had been considered.

A. G. Barton asked how soon after harvest the silage was made.

D. M. Pole-Evans replied that it was ready in about 3 weeks though it stayed warm all winter. About one third of the silage right through the pit was black and overcooked though the animals ate it.

C. Young pointed out that the animals usually preferred the overcooked stuff as it was sweeter but it did not have such a high feeding value as there was less digestible carbohydrate and there was a reduction in the digestibility of the protein.

L. G. Blake asked if there were any complaints about the smell.

D. M. Pole-Evans said there had been none but the effluent was killing the gorse hedge though it made the grass grow greener. When the dairy scheme started they planned to absorb the effluent on peat mould and cart it out with the manure.

R. Cockwell thought this would be dangerous as he thought it was of poisonous substance.

(Editorial note:- only badly made silage i.e. that with a butyric fermentation instead of a lactic one, will have an evil smell. As regards effluent, this is poisonous to fish in a stream due to its high biochemical demand for oxygen but can be safely discharged into the sea. As a manure it has a similar value to urine and should be spread at the rate of 10-12 tons (2500 gallons) per acre. Ideally there should be no effluent from the silo as it represents waste. It occurs mainly when wet or sappy material is ensiled and these should be wilted in the field before ensiling)

C. D. Young suggested that it was the concentration of effluent that was killing the hedge.

D. M. Pole-Evans mentioned that the cattle liked the spurrey which went into the silage.

J. Clement added that this was one of the most sustaining crops that he had ever grown.

C. Young said that there was a cultivated variety of spurrey in existence which was grown as a fodder crop on the continent.

R. Cockwell suggested that controlled self feeding would solve the problem of mis-mothering.

D. M. Pole-Evans said that he had seen this done last summer on Bodmin Moor where heaps like a mushroom are built with a buckrake and the sheep eat around these.

C. Young suggested that vacuum silage would lend itself to this method though the heaps would not have to be too high.

R. Cockwell said that some sort of barrier, either a fence or electric wire was necessary for self-fed silage.

DIRECT DRILLING AT PORT STEPHENSW. H. Goss

Over the last seventeen years there have been four extensive fires at Port Stephens, three accidental and one intentional; all on diddle-dee camp. The most recent of these was in Cow Valley and occurred about six years ago. This land is still all black as vegetation is slow in returning; as yet there is only moss and lichen on it.

There has been a certain amount of seeding done on it from horseback and the take was quite reasonable, but when put down on ridges and hills it blew into the valleys. On Mr. Young's first visit to Port Stephens I took him out to Cow Valley to look at this ground. I had ideas of direct drilling but was reluctant to put in the drill in case it got damaged; he said he thought it would be a good idea to try a small area and he thought that the drill would stand it all right. The ground is very rough, parts are burned down quite deeply leaving half burned out balsam bogs and such like about 9 ins. to 1 ft. high. There is also quite a lot of hard diddle-dee stalk left.

We started with the Massey-Ferguson grain drill using the grain hopper with Yorkshire fog and we thought that we could get down to 20 lb per acre - it was old seed and we did not worry about the seed rate particularly. This first piece of 25 acres was sown 2 years ago this coming October and the take, in my opinion, is quite impressive. Since then we have put down 270 acres (we have only been working in spring and in the back end) and that was done this last back end; the take again is quite good but the fact that the coulter are $7\frac{1}{2}$ ins. apart means that it will take some time to cover in. I do not think coverage will be as quick as it would be if we rotovated. I have some ground in the settlement which was rotovated and drilled the same year as the first piece in Cow Valley but in the back end and that has almost covered in, whereas the direct drilled piece has just over 50% coverage now. To give some idea of the cost the rate of progress is about 3 acres an hour.

With this particular type of improvement I feel that there is a time lag between burning and drilling. I do not think you can burn and then drill right away. You will get no results; how long you have to wait I do not know, I would not hazard a guess at it. As I said this land has been burned for something like 6 years.

There is a very hard crust and about 30% of the seed is not covered because when the coulter goes along it pushes out a slice which does not come back in again. We drilled and rolled in one operation but I do not know if the roller was very effective, being only one section of a Cambridge roller I would not say that it is more than 20% effective. It might be worth while trying some with the drill alone.

I have one experimental patch on burning and drilling right away which I started this spring. It was burned in September and seeded by hand with Yorkshire fog in October. There was no sign of any take in February and it was then drilled. This particular piece of camp was near to the track, so on taking the drill up to it, before leaving the track I put the coulters in and started drilling through christmas bush, short diddle-dee, mountain berry, pigvine, etc. There was a reasonable take through this trash but on the patch of diddle-dee, which was an excellent burn off, I found with difficulty, 4 plants just before coming in to town. There is, however, a very noticeable trail from the patch back to the track again, and just past the patch there is quite a good take in some burned white camp. I will now carry on drilling in spring and about December until I manage to get a satisfactory take.

Discussion

R. G. Vinson asked at what rate the 270 acre block had been drilled.

W. Goss replied that it had been done at $6\frac{1}{2}$ pounds per acre and this still appeared to be too much unless there was something wrong with the meter on the drill. He added that where the soil was loose there was frost damage with the late drilling but in fact there was little loose soil as it nearly all had a crust due to the moss etc. growing on it.

L. G. Blake asked when the large block had been seeded.

W. Goss said it had been done in the middle of April and into May. An excellent strike had been obtained on this occasion which could be seen from about half a mile away.

L. G. Blake suggested that it might be better to wait till autumn before drilling the newly burned piece again.

W. Goss said he thought February would be late enough and in any case the experiment was to find out how soon they could drill after burning.

D. M. Pole-Evans inquired if Mr. Goss had used his "Rotaseeder" yet.

W. Goss replied that it was not yet unpacked.

S. Miller pointed out that a big tractor would be needed for this machine as it weighed 18 cwt, and going up hill it would need a compensating weight or big wheels on the front of the tractor.

W. Goss said that with the drill one could go across almost any type of country but he did not think that this would be possible with the "Rotaseeder".

S. Miller said that the machine had been altered now to put the drills in front of the rotary cultivator.

A. Miller presumed that the weight would now be closer to the tractor linkage.

D. M. Pole-Evans considered that this machine might be the answer to re-seeding out here as all the grass was not done away with at the same time. He was therefore very interested to see how the Port Stephens machine would perform.

W. Goss doubted whether he would be able to get anything done with it this summer as the camps where the "Rotaseeder" would work were some distance from the settlement and he was short of men at the moment.

S. Miller asked if burning would be part of their future policy.

W. Goss said that it would be in diddle-dee camp.

S. Miller suggested that this would be rather dangerous from the point of view of burning in.

W. Goss replied that it had not proved so at Port Stephens. Very little damage had been done though the fire in Cow Valley had burned for over a year. A very small amount of soil had been destroyed. He thought that for deliberate burning March would be the best time of year.

S. Miller considered that his men had been both careful and lucky in their burning. Despite this they had patches of peat which had burned through and left about a foot of ash.

W. Goss agreed that seed would not take easily in the ash and even if it did it was readily uprooted by grazing animals.

R. G. Vinson said that Port Stephens seemed to be unique as regards burning. There was less damage than on anywhere else he had seen and there were no deep holes. A much better seedbed for drilling into was also obtained.

W. Goss agreed that there was very little loss of soil.

C. D. Young suggested that the ash may have been blown away and the holes weathered down somewhat though the soil at Port Stephens did seem to react differently to burning off. He believed that there was a considerable acreage of burned ground on the farm.

W. Goss said there was indeed a large area of such camp but apart from the Cow Valley area it was now covered in with Christmas bush mountain berry and goose grass. The Fox point area was covered with goose grass and an attempt had been made to scratch some fog seed into this but with no result. It would appear that it might be necessary to skin rotovate when goose grass had come in. The "Rotoseeder" might get through this growth but it seemed that the goose grass competition would be too great for the Yorkshire fog.

It was surprising how well the grain drill put the seed into the ground, even in a complete mat of goose grass or diddle-dee. The spring loaded coulters were a great advantage in rough ground as they did not get damaged by rocks.

S. Miller said he had found that the Yorkshire fog suppressed the goose grass as the latter had such a short growing season. Goose grass was most useful on Roy Cove for covering in the ridges where it was difficult to get fog to grow due to the wind and lack of moisture. The fog eventually grew in through the goose grass. He thought that the only thing which would compete with Yorkshire fog was white grass.

W. Goss mentioned that the fog which had been sown on white grass by Mr. Shaw had done very well.

R. Cockwell considered that the great advantage of this system was that the topsoil was not disturbed and neither consolidation nor moisture were lost. There was a fantastic amount of evaporation here and anything that could be done to conserve moisture in a seedbed was most useful.

D. M. Pole-Evans thought that this would be one of the advantages of the "Rotaseeder" as the whole area was not cut up.

A. Miller inquired if they were planning to use the "Rotaseeder" on any soft peaty ground. Perhaps on a crawler.

W. Goss thought that it would be too heavy but they would have a try.

D. M. Pole-Evans suggested that a wave of peat would form in front of the machine on soft ground.

A. Miller said that if the machine were on the hydraulic depth control and not on its own land wheel that problem might be solved.

C. D. Young pointed out that the "Rotaseeder" was not designed for this type of work and they would be lucky to get it to function. It was meant for direct drilling into pastures which had been previously killed with a herbicide to obviate ploughing for various reasons.

CONCENTRATION GROUNDS AT PORT SAN CARLOSA. Miller.

Much of this work was done before I went to Port San Carlos so I have had to look back amongst the old diaries and records to get the information. A start was made in 1955 by fencing off a piece of a camp of 25,000 acres called the Diddle-Dee. The area fenced off was 2,150 acres and was mostly white grass on peat with some cinnamon grass on the slopes of the highest hill on the farm. The remainder of the camp was very soft peat banks over which one could only ride with difficulty. After fencing, some fog seed was scattered in the N.W. corner which was where the sheep tended to hang. All the ewes (about 6000 or 7000) were put in off the shears and stayed there till dipping time.

In 1955 an existing piece of camp of 3,500 acres was used to put the young ewes into. In 1958 another small ewe camp of 2,400 acres called Swan Pond was used as a summer ground for the ewe lambs and shorn hoggets which are normally kept on the north coast, on two camps of about 15,000 acres. The ewes which used to go into Swan Pond were absorbed into the main Cape flock, which had improved because the Cape had had this long summer rest.

In 1961 the main real division was done in fencing off two small areas of what had been the original Diddle-Dee. These two camps are the North and South Múrdos and are 2,700 acres and 1,525 acres respectively. They were made up of 90% soft peat banks, only passable on foot except in the height of a dry summer. The Diddle-Dee was also split into two parts of about 8,000 acres and 9,000 acres each, and these carried all the wethers which used to be on the original 25,000 acres. These Múrdos now took all the wethers from shearlings upwards off the shears i.e. about 6,500. This did not work too well as the feed quite simply is not there. The system has been to use the smaller south side as a collection place for the clippies as they are shorn and as soon as all were shorn they were pushed through to the north side till dipping. The young sheep suffered most as they went in before Christmas and were left in until the end of March. The results were rather disastrous as the sheep could hardly stagger to the settlement and had to be more or less helped through the dip, but they picked up immediately on going back to their rested camps. In 1965 we fenced off a small piece of a ewe ground out at the Cape where we now put our mutton wethers off the shears, and this has helped the Múrdos a bit. We have now to dip our wethers first in order to save the young ones from suffering too much and this still gives the main camps 2 months rest.

In the 4½ years I have been at K.C. I have noticed a change in the Múrdos. The soft peat banks have hardened up due to the tramping of the sheep and there are tufts of wavy hair grass beginning to show along the tracks. There is one thing about these concentration grounds, and this is that the sheep do really tramp about a lot. This is supposed to be a sign of unhappy sheep, but on the concentration areas of the ewes and hoggets they seem to gain, especially the ewes. We have about 9,000 sheep which we put into the Cerro Monte of 2,150 acres and they are in excellent condition when they come in for dipping in the middle of April.

I intend to try broadcasting seed in these soft Múrdos in January and February before the sheep come out, using a double wheeled tractor and a broadcaster. It has been done on a small scale in corners and along fences where there is a good layer of manure. It seems rather a wasteful method of planting seed as we are going to throw it on the ground and let the sheep do the rest, but it is really all we can do.

In short, we have four concentration areas which take our ewe lambs, gimmers, mature ewes, and wethers, all off the shears until dipping time. The hoggets go on in November/December, when shorn and stay until the end of March. All the sheep, except the wether hoggets are put into concentration grounds. I am putting up a new fence which will enable us to concentrate all the wether lambs and clipper hoggets, and I hope to put the shearling wethers into this piece too. The new piece will have some 6,000 to 7,000 sheep and the old wethers will have the Murdos to themselves.

All the concentration grounds are empty for 8 to 9 months of the year, except the Cerro Monte which takes flock rams from June to September, but that is a small cut and makes little difference.

The one snag with this method of grazing control is, that given good growing conditions, the grass, especially Yorkshire fog, gets too long and rank and is trodden in and wasted. Here cattle play an important role and we put them round ahead of the sheep to control the long growth.

Now a few results. In 1955 we had 26,000 sheep producing 8 pounds of wool per head. Now we have 30,000 producing $8\frac{1}{2}$ pounds per head, although we are actually down a little this year but I think most people are. In 1961-63 the wool weight per head was over 9 pounds but I seem to remember we had a lot of fine dry summers. The annual loss is lower by 3-4% in the young sheep. We have a lot of bad ditches on our young sheep ground which have hitherto accounted for much of our loss of lambs at weaning and this concentration of them in smaller areas seems to have helped. The main principle, up to now, has been to use existing small camps rather than do a lot of subdivision fencing, so that to produce the results we have, has just cost us 14 miles of fencing.

Discussion

S. Miller asked if the shearling wethers had suffered a setback.

A. Miller replied that in the third year of the scheme they had as there had been a definite break in the wool. Earlier dipping this year has helped a lot.

C. Bonner noted that all the ewes came in from the Cerro Monte in excellent condition; they had been spelling ewe camps at San Carlos for 30 years and their experience was that the 8-10 year old ewe did not do well on it.

A. Miller said they had no ewes over 6 years old but it was a fact that the old ewes were the poorest in condition. Initially the whole ewe flock used to hang the N.W. corner and have to be hefted off, but this year they had only needed some hefting in February.

The principle with the wether lambs had been to put them into one ground, and when shorn as hoggets they had gone back to the same camp. They were therefore in the same ground for two years before they started moving around and they seemed to get too used to it. It was planned to change this.

C. D. Young said he remembered Mr. Cameron saying he was not too happy with the position of the fences on the Murdo camps. He wondered how Mr. Miller had found them.

A. Miller replied that the sheep were getting used to these fences. It was a difficult piece of ground to split up and he could not decide if he would have put the fences there himself.

R. G. Vinson asked if there had been any result from the seed Mr. Miller had broadcast.

A. Miller answered that it had only just been done and there was no result as yet.

W. H. Goss said he was most impressed with the take of some seed he had sown in February on some well trodden parts of their summer camp.

S. Miller suggested that the corners and camping down spots on the Port San Carlos concentration grounds would be growing a small amount of annual meadow grass.

A. Miller said this was particularly the case with the first one to be used.

R. G. Vinson asked if it was not feasible to utilise the first grass with sheep rather than grazing it off with cattle.

A. Miller replied that it had not been necessary to do this this year.

S. Miller suggested that the grass would not be showing any growth until the end of October or beginning of November anyway.

A. Miller said that only the grounds the sheep were in after Christmas ever needed controlled.

DRAINAGE AT FITZROYJ. T. Clement

I can only tell you what we have done, and possibly, what might be more interesting for those contemplating drainage, what we ought not to have done. The equipment we use is the Cuthbertson "Water Buffalo" tractor and ditching plough. The plough is very big with large wheels for going on soft camp. It has 2 sloped disc coulters which cut out the sides of the ditch and a large mouldboard with a rounded soc at the bottom of the plough which shapes the bottom of the ditch. The ditch is 19 ins. wide at the top, 8 ins. wide at the bottom and 20 ins. deep. The idea being that this shape of ditch would not be a trap for sheep as they could get in and out again, but this is not entirely true.

We started ditching in 1952 with an operator brought out from Scotland on Cuthbertson's recommendation. I showed him the areas that I thought needed draining and, as he was a man with a good eye for country, I more or less left him to it. I think that quite a number of you have seen what these ditches look like.

We did about 1000 miles in all and I will now mention some of the things we should not have done. This system of drainage was devised entirely for peat land. You might think that between here and Green Patch we have enough peat for this sort of work but a large area of peat over the main surface of the land is not as deep as it seems. Between the large peat banks the ground is also peat right enough, but below this there is a gritty clay subsoil with small stones in it, and this is where one must be careful with the ditches.

As long as the ditch is made with a good smooth bottom all is well. Apparently one of the biggest sins the second man on the outfit could commit was to step into the ditch and make a footmark. This would alter the conformation of the ditch bottom, cause an eddy in the water and lead to erosion; and in this type of subsoil quite a lot of damage can result. This has happened in some cases and we have some ditches which have scoured very deeply. Maybe now on second thoughts the programme we carried out was too intensive. There is no indication in our figures of increases losses from this effect but nevertheless the danger is there as some of these ditches are now quite deep.

Again on the other side of the book I can give you an indication of how useful this machine can be. We have a bad ditch in one ewe camp known as the Fox Point ditch. It is about $2\frac{1}{2}$ miles long and is wide and sluggish. In its lower reaches it is too wide for sheep to jump but is just wide enough to tempt them and we used to loose 30-35 ewes in this ditch in the spring. I thought of fencing it but this would have been expensive and unsatisfactory. What we did do was to go to the source of the ditch, which is a big pond, and run a drain down each side of it to reduce the water level. On reaching the danger area the operator laid his rig as near to the main ditch as possible. The turf was then chopped into sections and tipped into the ditch to make a sort of island down the middle. The idea was that as we could not stop the sheep from crossing we were going to give them something to cross on. Bridges had been tried and were not fully effective, but this was. The loss was reduced from 35 to none most years and occasionally one.

Apart from that ditch the first area we drained was the hogg ground. This can be divided into two parts - one a face coming off a long ridge which runs to the west of the settlement, consisting of large green swamps running down to a main ditch, and the other part a dry hard area on the other side of this ditch. The sheep crowded into the dry area in winter despite being hefted out. We drained the wet north part of the camp and now the sheep lie almost equally on both parts.

They feed along the upturned turf where new growth has developed and shelter is available, and the hogs there are better overall than they were before. I cannot say that there is a return from this in actual figures - there is nothing as definite as that.

Discussion

A.B. Monk asked how soon the areas would have to be re-drained.

J. T. Clement replied that in ordinary peat land the drains put down in 1952 were still running with little apparent shrinkage. Those through a "sphagnum" moss swamp almost disappeared in 10-12 years depending on the amount of water the swamp was floating on. The swamp shrank and caused the ditch to shrink with it. As soon as drier conditions came in a different type of grass grew on the swamp.

D. Barton suggested that there was a definite advantage in draining wet swamps because sheep could get into them earlier in spring but it was hardly worth while to cut ditches where there had been neither ditch nor swamp before.

J.T. Clement agreed with this. It was well known that peat could not be drained, the surface water could only be removed.

L. G. Blake asked if a swamp had to be re-drained when the drains had vanished after 10 or 12 years, or whether the changed herbage was enough to keep it dry.

J. T. Clement replied that most swamps had a spring at the head of them but if the camp were subdivided, and hence consolidated, the effect of the drain might be felt after it had disappeared. As the spring overflowed on to more consolidated ground it might make a ditch of its own and not percolate through the loose "sphagnum" moss. However, it would eventually penetrate and re-draining would have to be done.

R. G. Vinson suggested that in areas with only a thin layer of peat the drainage would tend to aggravate the semi-drought conditions which occur on many farms in the summer.

J. T. Clement said that this had not been evident. There was one side effect which might even be beneficial. In a dry spring young sheep were lost more easily as they crept too far in to ditches in search of water and fell in. With these drains there were a lot of drinking troughs scattered about the camp which sheep could get in and out of fairly easily. Only surplus water was being removed and the water table was very little affected.

A. Miller asked if the drains were in a dry type of ground rather than in peat.

J. T. Clement said the ditches were in peat though they had drained in peat that was too shallow. What they had done was only half the battle as sheep still fell in the original ditches which had been used as main drains. The opening out of these ditches in the hogg ground alone would reduce the loss by at least 5-6%.

A. G. Barton asked if there was any area which showed an obvious improvement when viewed from the air.

J. T. Clement said that there was not. He suggested that greater results might have been produced by subdividing before draining. The heavily stocked area at the Estancia had been mentioned last year. It was very green, due to Christmas bush but it was arguable whether this Christmas bush had increased or the white grass decreased. This was one of the intensively drained areas. Drainage on its own without an adequate grazing programme to go with it could do nothing except reduce the amount of water and increase the available feeding area in big swamps.

S. Miller asked if the large amount of money spent on this scheme had been justified.

J. T. Clement replied that it had been though at the time that on some camps on the East drainage might have a very good effect. Any such project is useless unless it puts extra pounds of wool on the London market. It could not be said that the drainage scheme did this as no extra wool had been produced. The hoggets were carrying a better fleece. Drainage should be complimentary to other improvement work.

D. M. Pole-Evans suggested that it was a long term policy.

J. T. Clement agreed and added that it should have been completed by opening out the main ditches though this would be very costly.

R. Cockwell asked if there had been any drop in hogg losses and if there had been any difference in the speed or ease of gathering.

J. T. Clement said that for the reason mentioned there had been no drop in the losses. The legs of the sheep were much better but they tended to run along the tops of the turned out sods and if these did not run parallel to the direction of the gather it was rather a nuisance. One could now ride through places which were uncrossable before and this made things easier. Landrover traffic had damaged some drains and caused small swamps to develop and had this been foreseen a ditch free route might have been devised.

SOME NOTES ON TREE PLANTINGJ. T. Clement

What started interest in this was that in 1957-58 the Falkland Islands Company had several thousand tree seedlings flown out to be put into small plantations at Goose Green and Fitzroy. We prepared the land in the Forestry Commission style with drains about 4 ft. apart, using the "Buffalo" for this. Unfortunately the land was prepared about a year before the trees arrived and the turf was largely dried out by the time they were planted.

The trees arrived in September and were planted out immediately. The varieties were:- sitka spruce, macrocarpa, shore pine, mountain pine, and Scots pine. We tried two methods of planting; some we notched into the side of the turf and some into the side of the ditch, and in all we must have planted at Fitzroy about 1700 trees. During this particular job we did just about everything we could that was wrong. Firstly we laid out the trees along the bank in little bundles and this of course dried out all the fine roots. Secondly we planted them in spring as we thought that the milder spring weather might be better for them but it is not. The sad story of this is 1700 trees of which 5 have survived. They, oddly enough, are all the same and I think that is shore pine.

We have now arrived at the conclusion that the best season to plant (and I am dealing only with macrocarpa now) is October if planting from seed, and May when planting out seedlings. I think there are two reasons for this; firstly there is more moisture in the ground and secondly, unless the tree is planted when transpiration is at a minimum water loss will exceed water uptake and the tree will droop and eventually turn brown. This last is much more likely to occur if there is a cold drying wind and the tree is not sheltered.

I have used cement drums for shelter from wind (and sheepdogs). This was a failure for two reasons. The tree gets very little water as most of it is blown across the top of the drum. We tried to overcome this by cutting a recess round the outside of the drum so that the water which ran down would still be of some use to the tree. It also has a forcing effect as the tree arrives at the top of the barrel with a thin stem and starts to whip. You are then left with the alternatives of staking the tree in position or removing the barrel and staking it. If you remove the barrel they just stand still. In 1959 we planted two plantations; one in cement barrels and one in a 12 yd. square behind a shelter two sheets high of corrugated iron. The ones in the barrels are 3-4 ft. high but those behind the iron are 7ft.-7ft. 6ins high.

The system of planting we use is as follows: Weddell Island macrocarpa seed is sown in drills in a cold frame with no top in October. The following spring the frame is lifted off and the plants left to grow to 1 ft. - 18 ins. As they are planted out in May, about March we go along with a spade and cut the top root, in from the side. This gives a fibrous root system and makes transplanting easier. I found this point in one of H.M.S.O.'s publications on forestry (see appendix). They are then taken out and planted at the bottom of a three inch furrow, which is as shallow as we can make it. If there is a hard pan this is broken up and on shallow soils we are sometimes down to the clay.

What is the use of planting trees? They are a form of shelter, but of course they will not be of much use to us in our main production effort as most of these trees are edible to stock anyway and would have to be protected. As some form of windbreak in areas where crops are grown I believe they might be of some use.

Discussion

S. Miller said that he had been told by Professor Radforth that the main problem out here was lack of moisture rather than too much wind. For this reason he had thought of planting trees in valleys but that was not where the shelter was needed - it was on the ridges where they would not grow.

J. T. Clement said he was convinced that the wind was a problem out here none the less. (Editorial note: increased wind leads to an increase in the rate of evapo-transpiration and hence to water tension and drooping of the plant. High winds and lack of water are therefore interconnected)

L. G. Blake pointed out that the climate here was not extreme enough and the trees in the Hill Cove plantation made a great deal of their growth in the winter when there were long mild spells.

J. T. Clement suggested the optimum age for planting was 2-3 years.

L. G. Blake agreed with this.

S. Miller said that at San Julian the wind was stronger than over here yet there was so much scrub growth that it was used as the main source of fuel.

L. G. Blake pointed out that there was a definite summer and winter there and they did not get frosts at midsummer.

REVIEW OF LAST SEASON'S EXPERIMENTAL WORKC. D. Young

Last year's work consisted of several experiments scattered over many farms and I will deal with the experiments individually.

Establishment of various grass varieties. This was set up on ten sites. The cultivations were as follows - 2 were rotavated, 6 ploughed and disced, 2 disced only and one was surface sown. This adds up to eleven but there were two treatments on the one site. The dates of sowing were as follows:- 21st October, 26th October, 14th November, 22nd November, 25th November, 2nd December, 6th December, 14th January, 18th January, and 24th January. This gives a fairly good spread over the spring and early summer. Perhaps a sowing in early spring could have been included to advantage.

The varieties which gave the best results most consistently were:- sheeps fescue, red fescue (both S59 and Canadian) chewing's fescue and cocksfoot. S50 timothy and smooth-stalked meadow grass also showed up well on occasion. Of the annual species fodder radish and rye seemed to have some potential. It is difficult to assess the value of plants grown on small plots as these were, due to the depredations of the geese. The effect of the geese was well demonstrated at Rincon Grande where Mr. Turner fenced off some small portions of some of the plots in such a manner as to prevent the geese landing on them. The rye plot was most spectacular, as within the fence the plants were 3-4 ft. high whereas outside they could only grow to 3 or 4 inches. A similar effect was noticeable with S59 red fescue and S48 timothy, the latter growing very much better at Rincon than anywhere else.

The main limiting factor of establishment is moisture and plants grew better in hollows and in places where the consolidation was good. It was difficult to compare the different cultivation methods but in the only case where two types occurred side by side ploughing and discing proved to be superior to discing alone as far as initial establishment goes. In the case of the surface sowing it will take a couple of seasons before any definite results can be seen. It will also be some time till results will be available from the different dates of sowing as at the moment those which were sown earlier are, as a general rule, doing better.

Establishment of Legumes. This was being investigated along two lines,

- (1) Planting locally inoculated and pelleted seed.
- (2) Planting a commercially pelleted seed from New Zealand.

Neither of these lines of approach have had any outstanding results. Of the locally pelleted seed alsyke, red and white clovers and serradella have grown to a greater or lesser degree but there has been no apparent nodulation and it is not likely that the seedlings will survive the winter. Lupins have done quite well but they were not inoculated and should do better next year when inoculum will be available.

The New Zealand pelleted and inoculated seed has grown, in some cases quite well but again there is no sign of nodulation. In this case only white and subterranean clovers were used. Some success in establishing legumes has, however been achieved at Douglas Station by Mr. Reid. Last year this was mentioned at the conference and I can now say that the clovers have survived well through the winter and when I last saw them the red clover was in fact, flowering. There has also been a small take at San Carlos of clover which was surface sown the season before last. I have some ideas as to the reason for the failure of this year's legumes and hope to have better results this spring though it may be a long job.

Investigation of Nutrient Deficiencies. Nine of these were set up over a similar range of dates to the varieties trial. In two cases the nutrients were sprayed or scattered on to a sward which had just been sown specially for the purpose, in two cases they were put on to native sward and in the remaining cases they were put on to established Yorkshire fog. Results from this were very inconclusive. Nitrogen gave an increase in height and bulk but this advantage tended to disappear as the crop matured. In some cases the phosphate gave an improved growth but this was never very great. Although none of the other nutrients had a noticeable effect it cannot be assumed that there are no minor element deficiencies and I am awaiting the results of some full scale soil analyses. There was no response this year to the lime treatment but one can be expected next year when it has been washed into the ground.

Erosion Control. There were only two experiments on this line and they were both on large clay patches. The idea was to achieve some measure of temporary stability with a fast growing crop which would act as a "nurse" crop for something more permanent. Lupins and to a certain extent oats have proved successful in this. The lupins should again do better when they are inoculated. The addition of phosphatic fertiliser also made an appreciable difference to the growth of fog on a clay patch. This may not be economic on the open camp but in a case of stopping soil erosion it may be worth while. Some legumes were also tried in this work but with similar results to those mentioned earlier.

Cover crops. There was only one experiment of this type where oats, rye and fodder radish were sown as cover crops to a clover/fog mixture. The cover crops did not come away as well as had been expected but I think that this was due to the dryness of the site as the varieties trial on an adjacent plot did not do well either.

Hay Varieties Trial. Three of these were set up but one of the I have not seen. Of the two remaining, one was infested with chickweed and the other gave some interesting results but has had to be ploughed out. The trial which became weed infested adds weight to Mr. Pole-Evans' choice of Padarn as this variety grew very well although sown in the spring, in fact this and rye were the only things to survive the chickweed. In the one which has been ploughed out the best varieties were:- S143 cocksfoot, S50 timothy, S48 timothy, and perennial ryegrass. There was a slight trace of clover but not well developed.

That then is a short summary of last year's work. Next season I will follow on from this and try out some of the more promising varieties on a larger scale. I will also continue my efforts to establish legumes here as this is the key to pasture improvement, I may also do some further work on trace element deficiencies.

In conclusion I would like to thank all the people who helped my experimental work in any way. I must add that the amount of experimental work which can be done by travelling around farms is severely limited and if you have any faith in the agricultural future of this colony (and I am not very sure of this myself) you must insist that a fully staffed and well organised experimental farm is set up and allowed to flourish. Such an establishment could have very humble beginnings and need not cost much to run, but it could have a very far reaching effect on the economy of this colony.

Discussion

R. G. Vinson asked if serradella was a legume, and if it was likely to set seed.

C. Young said that it was an annual legume in the same family as lupins and was unlikely to set seed. This year no plants had grown large enough to flower.

A. Miller asked if the lupin mentioned was the same as the garden lupin.

C. Young said it was rather different. It was an annual but like the garden lupin, it did well here because it tolerated an acid soil.

S. Miller referred to the grass varieties trial at Roy Cove which was on a very dry and rough seed-bed. Because it had been a failure he did not think that this had any significance.

C. Young explained that this was the point of experimental work, all conditions had to be investigated, one had to keep an open mind and not go looking for any particular result.

D. M. Pole-Evans asked if the lupins were poisonous to stock.

C. Young replied that some were but these were a non-poisonous variety and could be fed to sheep.

D. M. Pole-Evans asked what the other legume was that had done well at Port Howard.

C. Young told him that it had been sainfoin. He was most surprised at this as normally this plant grew best on chally, alkaline soil.

D. M. Pole-Evans mentioned that Davies had shown that the lime was in the plant but not the soil.

R. Cockwell asked for more information on the trace element investigation.

C. Young explained that as different results could be obtained from soil analyses and field experiments, as well as sending off many samples, an experiment involving crossing strips of all the plant nutrients had been set up. These were: lime, nitrogen, phosphate, potash, copper, sulphur, magnesium, zinc, molybdenum, boron manganese. Iron and sodium are also essential elements but would not be deficient in these soils. The experiment had been designed so that all elements occurred alone and in combination with all the others.

R. Cockwell said that he had seen fantastic results from treating acid Australian soils with small quantities of trace elements.

C. Young did not see how it would be possible to do this here as the lime and phosphate requirement was massive and nothing could be done till this was rectified. He doubted that the pH of a peat soil could be altered in any other way than by heavy dressings of lime.

R. Cockwell said that in Australia lime pelleted seed had given good results, as without lime, nodulation had taken a long time. He thought that seed should be inoculated the day it was sown.

C. Young pointed out that the only chance at all that legumes had of growing here was for them to be pelleted (gafsa/dolomite) as seed which was merely inoculated did not grow. It was not necessary to inoculate pelleted seed immediately before it was sown.

W. H. Goss asked how Mr. Young accounted for the lime status of the plant if the soil was so deficient.

C. Young said he could not offhand but he would look into the matter (Editorial note: The lime which these soils need is not to rectify a calcium deficiency; it is to reduce the acidity. Calcium is only a secondary nutrient (i.e. not required in nearly such large quantities as N, P and K but in a greater amount than the micro-nutrients) and it is quite possible that there is enough calcium in the soil to satisfy the growth requirement of plants even though the soil is very acid. Davies has shown that all the native species are low in calcium content and it can be assumed that they also have a low calcium requirement otherwise they would not thrive under these conditions .

S. Miller asked what would be the cost of applying a trace element to a large number of acres assuming that one was found to be needed.

C. Young said the cost would be less the greater the acreage. The cheapest and easiest way would be by aircraft.

IDENTIFICATION AND GRAZING VALUE OF NATIVE GRASSESS. Miller

The grasses you can see growing in these boxes (sheep's fescue, wavy hair grass, native fog, Deschampsia antarctica one Poa sp., native carrot and small rush) are samples of what will come on when camps can be shut up and given a spell. I have not much experience of white grass camp and how extensively these grasses are found on such camp I would not know. I would assume that they are present there also, but I have found them mostly growing through diddle-dee. We are therefore planning to try out a machine for smashing up the diddle-dee in order to give these grasses a chance to flourish in the open.

I got Mr. Young to identify these grasses and having done so I realised that many of them were the same as those found on the hill pastures in Britain, sheep's fescue and wavy hair grass being two notable examples. These grasses have been established here for a very long time and there is a chance that if we got seed out from Britain it would prove difficult to establish. (Editorial note: as can be seen from an earlier paper this does not seem to have been the case with sheep's fescue.) A surer method would be to encourage these grasses to spread naturally by keeping sheep off and smashing up the diddle-dee.

I have been in touch with an agronomist friend of mine at home who says: "with regard to the list of grasses I would offer the following comments although these, you will appreciate are naturally relating to the United Kingdom and their behaviour could well be different in the Falkland Islands." As we know their behaviour is different as sheep's fescue is one of the principle ones and seed from home takes a long time to establish on Roy Cove. I was interested to get his opinions and see that Yorkshire fog is not now the cheapest thing to import. He quotes cocksfoot at 200/- per cwt. FOB and the Yorkshire fog we bought last winter was 210/- per cwt. We have ordered cocksfoot and red fescue (300/- per cwt.) for sowing on about 50 acres. I have been thinking for some time that we will have to grow something else besides Yorkshire fog as sheep do not like a diet of one thing only.

Discussion

D.M. Pole-Evans said that with rotational grazing they had found these fine grasses everywhere in white grass camp. This was the quickest way of spreading them.

S. Miller pointed out that under the old system of overgrazing they never had a chance to seed. The native carrot had grown in the conference room as usually one had to go down on hands and knees to find it.

Yorkshire fog seemed to have gone off the market and he quoted as follows from a letter from Twyford's—"There is one point which does occur to me referring to Yorkshire fog which has been very successful with you. Seed supplies of this are, as you know, very erratic and it is just possible we might consider growing this for seed on our heavy farm land if we could be assured of a regular market. As, in principle yours would be the only demand, you would appreciate that we could not consider this project unless we knew for certain that you would require a definite tonnage every year." He had written by return mail and we would soon learn if anything could be done. (Editorial note: it now appears very likely that fog seed will be grown for the colony in U.K.)

D.M. Pole-Evans asked what kind of red fescue was available at 300/- per cwt.

S. Miller said that the type was not mentioned. It would have to be sown at a higher rate than fog as there were less seeds per unit weight.

A.G. Barton asked for a description of the machine for smashing down the diddle-dee.

S. Miller said that it was the 'Junglebuster' manufactured by Wolsley Engineering Ltd. of Birmingham. Horizontal spinning chains were driven through a gearbox from the p.t.o. The machine was guarded and could be raised or lowered to give a differing height of cut. He had originally thought of using it before ploughing. It only cost £157 - 10s. and did not have a high power requirement.

C. Young pointed out that there were several different types of this machine available, some using spinning bars instead of chains. They were available in widths up to about 14 feet. The Port Howard forage harvester, if slightly modified could be used for this type of work.

CLEAR FACED SHEEPD. M. Pole-Evans

We started breeding these sheep in 1953 and have now reached the stage that this year we have not had to eyelock a sheep on the farm. Some points to note, are that the average lambing has gone up by 3% though the losses have not been reduced to the same extent.

There is a happy medium between the really wool blind sheep which clips very heavily and the really clear one which clips rather light. I think that if you clip more than $8\frac{1}{2}$ lbs per sheep you will affect the lambing. We used to clip over 10 lbs and due to less wool round the udder the lambings have increased by that 3%. We find that with blind sheep when the lamb tries to suckle it gets hold of a tag near the udder which is also very woolly. A blind ewe is always turning to sniff her lamb as she cannot see it and a very young lamb will not stand too much of this without going down.

To clear out this wool blindness we saved from the flocks at marking time any ram lamb which looked hopeful and by dipping time we had as many as 400 lambs to choose from. These of course had to be culled drastically but it did come through quickly. We still do select flock 4-tooth ewes and if they are up to standard they go into the stud flock.

Discussion

L. G. Blake asked if the total wool weight for the farm had gone down even though the individual weights had been reduced.

D. M. Pole-Evans said it had not as they were carrying more sheep.

A. G. Barton suggested that they would still get the odd bumble headed ewe.

D. M. Pole-Evans said that there had been 40 woolly ones out of 9000 ($\frac{1}{2}\%$).

R. Cockwell asked if this improvement had been achieved by culling or breeding in.

D. M. Pole-Evans replied that two rams had been bought from Tasmania but only one had been used. The biggest problem had been in the pedigree sheep as it was so deeply bred into them.

S. Miller expressed surprise that there were not more throwbacks.

D. M. Pole-Evans pointed out that they had been breeding to this programme for 15 years.

C. Young suggested that though the sheep were only producing $8\frac{1}{2}$ lbs of wool at the moment and were clear faced they might still possess the genetic potential for wool blindness and if they were fed to produce 10 lbs of wool they could become wool blind again.

D. M. Pole-Evans thought that they seemed to get wool blind when poorer.

L. G. Blake wondered if it was because the sheep was poorer that it was wool blind or whether because it was wool blind it was poorer. He suggested that the latter was the case.

C. Young mentioned that in New Zealand experimental work had shown that the wool blind sheep, quite simply, could not see to eat.

D. M. Pole-Evans added that Massey University had done an experiment with blind, half blind and completely clear faced sheep and had found a difference of 12% in the lambing between the two extremes.

TYPES AND METHODS OF FENCING.Open Discussion.

C. Young asked for comments on the use of 12½ guage high tensile steel wire.

L. G. Blake said they had put up a mile of fencing with it this year and the fencers had liked it as it was easier to work with. It was stronger than No. 8 and you got more wire per cwt.

C. Young asked if anyone had been using this wire for any length of time as the main criticism seemed to be that it would not last.

S. Miller said that Douglas Station had used a lot but unfortunately Mr. Reid was away on leave.

C. Young said that Douglas had put up a fence of 12½ guage wire without the battens and it had been sheep-proof for quite some time. The droppers had been added later and were metal ones which were firmly clamped on to the wire; they were more expensive than wood but the reduction in cost through using the high tensile wire meant that the final cost of the fence was about the same. The metal droppers came from New Zealand and needed a special tool to clamp them on to the wire.

D. M. Pole-Evans said he was awaiting information on metal droppers from U.K.

S. Miller said that the old metal battens and 'tin whistles' could last for about 100 years. They did not seem to be available nowadays.

C. Young mentioned the strainers at Fitzroy which were pinned on to the ground rather like a holdfast. (see appendix II)

L. G. Blake said that they had found stainless steel wire to be excellent for tie-downs. Though expensive it justified its cost in its vastly increased life. 12½ guage wire had been in use for some time in New Zealand and perhaps more information could be obtained from there.

C. Young asked for an average cost of fencing per mile.

S. Miller said £280.

A. Miller said £350 with standards at 12 yard intervals, plus posts.

R. G. Vinson suggested £280 to £300.

(For details of costs on some farms, see appendix II)

C. Young wondered if the use of a mixture of wires did not lead to problems of differential stretching.

L. G. Blake said they used a high tensile stranded wire for seizing on to as it was difficult to twist the seizing wires around the thin 12½ guage stuff.

C. Young surmised that with the present standard of battens from the Coast this place would soon have to go over to metal ones.

R. G. Vinson suggested Quebracho ones; those he had seen were not excessively heavy and should last a long time. They were not bored but could presumably be ordeped bored from the mill.

KALE AS A WINTER FEEDA. B. Monk

The reasons we decided to grow thousand headed kale were that the seed is cheaper than oats and the labour requirement is so much less. Also you are not presented with the problem of trying to dry the stuff to make hay out of it. We have been trying it now for four years with varying success. Two years ago we had a very good crop indeed and we fed all the settlement cows for 2½ months. We had more milk and cream from fewer cows than we get from all the cows in the summer. Last year, however, it was a failure. We tried it in a paddock which is quite a long way from houses and it was virtually wiped out by geese.

The ground was also waterlogged in the centre but the geese accounted for 90% of the damage anyway.

This year we sowed 3½ acres of Leightons Special Selection thousand headed kale in early December which was rather late but there was no labour available before then. It was broadcast at 12 lbs per acre. 1½ acres of the area was an old paddock which had previously grown 2 kale crops and one oat crop. The remainder was completely new ground which had been joined on to it. The whole area was ploughed and in order to save time as the ground was dry and hard we then rotavated it: this was not a success at all on the new area as it laid a layer of bits of tough topsod all over the ground and it fluffed it all up. It worked alright on the old part. The old part had all the shed manure put on it but the new part was only manured by the settlement cows standing about on it. The soil on both parts varied from deep peat to light shallow soil on clay.

No appreciable germination took place till the end of January and this was mainly on the peaty ground at the bottom. The rest did come up in February but this was too late for several reasons; firstly the weeds, mostly chickweed, dead nettle and some spurrey came up before the kale and tended to smother it; and secondly the young geese came flocking in on it as it was at the ideal height. I think you must get it sown and grown to 9 ins. before the geese get to it. By June, 20% of the area had kale plants between 15 ins. and 2 feet high with a good deal of leaf. I estimate a further 20% of the area had plants between 9 ins. and 15 ins. and 35% had plants up to 9 ins. so there is approximately a 75% cover. I will expect it to grow a good deal more this month and in the early part of August. I do not like using it before at least the middle of August and preferably at the end. We found that while the geese very definitely prefer the small stuff they will eat plants up to 10 or 12 ins. high as there are a number of plants completely defoliated up to that height. In the first two years they only ate the small plants and left anything over 6 ins. but their taste has now changed. I think if we had no problem with the geese, instead of 75% of the area having plants on it, 90% would although I think we will get a good deal of fodder. We will cut it as it takes a very short time to cut enough kale to feed 12 cows adequately, and I found there is less wastage with cutting it. To avoid the weed problem and to prevent it from being eaten by geese it should be sown earlier because if it is 10-12 ins. high there is not the same amount of damage from the geese. If you want to grow kale successfully you must declare unrelenting war on the geese as they are the biggest enemies of any green crop grown around the settlement.

Kale is a very successful feed as far as cattle are concerned and it is quite cheap. It is much cheaper than oats and you have the feed at a time in August and September when there is no grass growing.

Costs of 1965 Kale Crop Compared with Oat Hay.

<u>Kale</u>	£.	s.	d.
Seed for one acre; 16 lbs at 16/- per lb.	12.	16.	0.
Labour for cultivation and sowing; 1 man 2 days	2.	15.	0.
Labour for cutting and feeding out; 90 man hours	18.	10.	0.
Sundries; fuel etc.	5.	0.	0.
Total cost, 60 days feed 14 cows, 1 bull	<u>39.</u>	<u>1.</u>	<u>0.</u>

<u>Oat Hay</u>	£.	s.	d.
Seed for 4 acres	75.	14.	0.
Labour for cultivation and sowing; 1 man 8 days	11.	0.	0.
Labour for harvesting; 5 men 4 days	27.	10.	0.
Labour feeding out; 60 man hours	12.	6.	8.
Sundries; fuel etc.	15.	0.	0.
Total cost 60 days feed 14 cows, 1 bull	<u>141.</u>	<u>10.</u>	<u>8.</u>
Saving in favour of kale	<u>102.</u>	<u>9.</u>	<u>8.</u>

Discussion

S. Miller asked if kale was a perennial and if it would be any use in camp.

A. B. Monk said it was not a perennial and would not be any use outside of settlement fields.

A. G. Barton asked if they had ever thought of putting in a few posts and wires to stop the geese from landing and taking off.

A. B. Monk said this had only recently occurred to him. It would make mowing difficult.

A. G. Barton suggested that once the crop was high enough the posts could be removed as the geese would no longer bother it.

A. B. Monk said the geese had now changed their habits and ate the kale at all heights, though less as it grew taller.

R. Cockwell inquired if any other type of kale had been tried.

A. B. Monk said he had thought of marrow-stemmed kale as it provided greater bulk but it would not have stood the winter here and the site for the kale was very exposed.

D. M. Pole-Evans added that they had tried three types at Port Howard and thousand-headed was the only one not affected by frost.

D. Barton asked how much earlier it should have been planted.

A. B. Monk said he thought early November would be best. He used not to think so as he had been told it would go to seed.

D. M. Pole-Evans said at Port Howard they had found that unless the kale was fairly well grown at the beginning of winter the frosts would hit it. This was so even of thousand-headed kale.

S. Miller asked Mr. Pole-Evans if he used kale for silage.

D. M. Pole-Evans replied that it was strip grazed.

A. G. Barton asked Mr. Monk what the seed-bed treatment was after broadcasting.

A. B. Monk said it was chain harrowed and rolled in. The chain harrow had tended to collect the little bits of topsod in heaps and this may have caused some of the bare patches.

D. Barton suggested that Pebble had less frost than Teal Inlet and wondered what effect a frost hard enough to damage the potatoes in December or January, would have on the kale.

A. B. Monk was unsure. He thought that Pebble had more wind and when there was a freeze up, as distinct from a frost, there was no shelter whatever. The kale plants were remarkably persistent as even when the geese had the plants grazed down to stumps they continually tried to grow.

D. M. Pole-Evans said a short frost did not seem to harm the kale, it was the frosts which lasted all day which did the damage.

R. Cockwell asked if a smaller acreage of kale than oats was needed.

A. B. Monk said that was the case.

D. M. Pole-Evans said the Port Howard cattle ceased to eat after an hour as they were full. There was no wastage with strip grazing as they were only given a little piece at a time. 3 acres had fed 12 cows for 5 months at 1 hour a day.

C. Young asked Mr. Monk how they cut the kale.

A. B. Monk replied that an old mower was used.

D. Barton inquired if better results were obtained on a peaty soil.

A. B. Monk answered that the second year on a peaty soil gave better results though it did not do so well in the first year. An application of shell sand was a great help also.

S. Miller wondered if there was any difference in the taste of the milk.

A. B. Monk said he did not think there could be as the whole experiment had been viewed with great misgivings and any complaint would have been voiced immediately. All agreed that in the good kale year the milk and cream had been better than had ever been known before on Pebble.

TUSSAC FOR WINTER FEEDINGOpen Discussion

- C. D. Young asked if there was anyone present who had tried growing tussac (Poa flebellata) on a large scale as a winter feed.
- R. Cockwell said they had a shepherd who did (Mr. Binnie). He had been working on an old tussac point and for some time had seemed to be getting on quite well but now it seemed to be dying back. He was trying all sorts of treatments like using kelp as a fertiliser.
- C. D. Young said it had always struck him as odd that tussac being the only indigenous grass worth cultivating for winter feed, had never been cultivated on a field scale as a row crop with proper manurial treatment. He would have tried this himself if he had had the facilities.
- S. Miller pointed out that you had to have a tussac soil. The only other place it flourished was in chicken runs.
- C. D. Young did not agree with this.
- A. B. Monk did not agree either. On the north coast of Pebble there was quite a lot of erosion and there was a quarter mile strip of pure clay and sand in some places. One and a half miles had been fenced off and within 18 months isolated tussac bogs were growing all over this clay having been seeded from the tussac strip. It was establishing itself elsewhere and without any question would do so here. The area was originally tussac and had been burned off by sealers 150 years ago but no tussac soil remained.
- A. Miller said they had had a similar experience at Port San Carlos at the end of Cape Dolphin. There had been more soil but the tussac was re-generating spontaneously.
- S. Miller suggested that the plant liked sea water as in the early days there was a complete tussac fringe.
- R. Cockwell said that with reference to row cropping Mr. Binnie had found in a plantation some distance from the sea that as long as he kept the soil loose about the roots he had quite good results.
- C. D. Young pointed out that this was what happened in a chicken run; the soil was scratched about and there was also a manurial effect from the droppings. Exactly the same effect would be achieved if it was cultivated as a row crop. It had a potential as winter feed for cattle as once established it would not need much maintenance and unlike a field of oats would not need resowing every year.
- W. H. Goss said that a tussac plantation in the Port Stephens settlement was growing well on the site of the old ash tip and this was not what could be called a tussac soil. There was some grass growing at one end of the plantation and here the plants were not doing so well.
- R. Cockwell agreed that it always seemed to do better when there was no grass to compete with it.
- S. Miller added that Yorkshire fcg was unpopular in the big tussac plantations on West Point for this reason.
- A. B. Monk said that tussac received a tremendous manuring from Jackass penguins and seals.
- C. D. Young did not agree with this as there were plantations high up the hills at West Point and on the cliffs at Cape Meridith which were thriving well away from any shoreside population of seals or penguins.
- A. B. Monk pointed out that a Jackass penguin will penetrate more than a mile inland.
- C. D. Young did not think they were present in large enough numbers in some plantations to make a great difference. Tussac thrives on sites inaccessible to these creatures.
- D. M. Pole-Evans asked Mr. Young what he thought would be the best way of harvesting tussac if it was grown successfully.
- C. D. Young thought it would be best strip grazed with a back fence.
- A. G. Barton asked Mr. Monk if the tussac plantation on the top of Steeple Jason which was growing in very loose dusty peat and appeared to be spreading down the hill many years ago, was still there.
- A. B. Monk replied that it had been almost completely destroyed by the sheep.

EFFECT OF MOWING ON WHITE GRASSC. D. Young

There are some tough, wiry grasses in Britain (e.g. moor mat grass) which have been treated very simply in rough grazings by repeated passes of the forage harvester. The result is that tall rough plants are eliminated and a close knit sward of the bent/fescue type comes away with great vigour in places where it was not in evidence before. What you are actually doing is accelerating the grazing process. Instead of a forage harvester a machine of the "Jungle-buster" type would be equally effective. There would be some manurial value from the rotting herbage and if this was done in conjunction with surface sowing the debris would serve as a cover for the germinating seeds. I feel that this would be a better method of getting rid of long rank white grass than burning because there is no deleterious effect on the finer grasses and they are bound to come away the better for it. The only problem is the disposal of the surface litter. When we did this for experimental purposes at the Edinburgh School of Agriculture we raked up the trash and piled it to one side as there was not a large area involved, but here one would have to rely on the wind and natural decomposition to get rid of the debris. There would be an improvement to the white grass itself as it is much more palatable when short and green.

Discussion

- S. Miller suggested that December would be a good time for this treatment as the seedheads of the finer grasses would then have time to form.
- A. B. Monk thought the main objection was the large area to be covered.
- C. D. Young said he didn't think it was any more daunting a prospect than ploughing or rotary cultivating and it would be much faster than either of these.
- A. B. Monk said the effect would only be for one season and the same result could be achieved with a match.
- C. D. Young replied that with proper grazing control the effect would be permanent. A more spectacular effect was achieved with a match but the end result of a harvester or mower was better for the camp.
- D. M. Pole-Evans claimed that with burning their fine grasses came away more and more every year. The burning did not seem to harm them as it just skimmed over the top.
- C. D. Young pointed out that there was no basis for comparison. There was not a burned plot and a forage harvested plot side by side. He thought that cattle were causing the fine grasses to come away. The long term effect of grazing with cattle, or mowing, was better.
- D. M. Pole-Evans agreed that it would be better if the roughage could be grazed off.
- L. G. Blake wondered if the trash would rot away easily here as the rate of decomposition was very slow.
- C. D. Young agreed that this was one of the problems. A good gale of wind would help by piling up the trash and probably blowing some of it away altogether. The low biological activity here was one of the snags in any improvement work.
- D. M. Pole-Evans said they had thought of harvesting some white grass to cover their silage but they now had a plastic sheet.
- C. D. Young added that this sheet would have to be in complete contact with the silage to prevent wastage.

CONCLUDING DISCUSSION

L. G. Blake asked how many people ran their ewes in ages and how many ran them as mixed flocks, making them up with maiden ewes each year.

R. Cockwell said they used to run them by ages but now they mixed them. They seemed to do better as they knew the camps really well.

A. B. Monk said they kept their maiden ewes separate and put them out to the main flocks every year. They had changed to this system from the other one.

A. Miller said they did the same.

D. M. Pole-Evans said their reason for keeping the maiden ewes separate was to shear them first and to shepherd them in spring to save losses.

S. Miller suggested that maiden ewes were shy of the ram and there was a tendency for them to miss being mated in a big flock.

L. G. Blake said they ran most of their sheep in ages. One advantage was that the younger sheep could be given the better camps. If maiden ewes were put into an established flock they were pushed out to the poorer parts of the camp by the existing social strata. The H.F.R.O. had done some work on the social orders of sheep and had found a tendency for newcomers to be pushed into the lower classes which were on poorer grazing. Annual moving might mean that it would take a certain amount of time to establish the social strata.

G. D. Young pointed out that this H.F.R.O. work had been done with Blackface sheep and what had also been proved was that they stayed in their own small hefts and raked the hill in a regular manner. He did not know if the Falkland Island sheep formed hefts in the same way.

D. M. Pole-Evans said they had a flock of 500 4-tooth ewes which ran too much like a dry flock; they were mixed all together all the time and did not form a social strata at all.

W. H. Goss said that the Port Howard sheep he had bought had not mixed with those at Port Stephens; they had stayed in the one group and travelled a great deal.

J. Robertson suggested that the hefting instinct was connected with breed. The nearer one got to Merino blood the more the sheep tended to run as one big mob, whereas the further from the Merino one went the more they tended to run as small groups.

L. G. Blake agreed and said that the Cheviot sheep at Hill Cove were never found on a large mob.

APPENDIX I

TREE RAISING AND PLANTING IN THE FALKLAND ISLANDSJ. S. FitzherbertForestry Commission, South Wales Conservancy.

For conifers a slightly acid seed bed is best. Sow very sparsely - say 350-500 per sq. yard. Cover with fine grit to a depth of 2 or $2\frac{1}{2}$ times length of seed.

The seedlings should be transplanted after the first or second years growth. The best size is from 4"-6". A two year old plant is more sturdy and usually produces a better forest plant.

After transplanting the seedling should be left in the "line" for one or two years depending again on rate of growth, species etc.

Sitka Spruce will give good plants at 2+1 or 2+2 (i.e. two years in Seed bed then one or two years in transplant line).

Japanese Larch is usually best as 1+1 (in this country) but a 2+1 or 2+2 if the growth is slow. Pines either 1+1 or 2+1.

Forest plants should be well balanced - root to shoot - with a root collar thickness of about $\frac{3}{8}$ "- $\frac{1}{2}$ ". Do not plant out trees bigger than 18" maximum; from 9"-15" is a good plantable tree. They can adjust themselves to the new conditions better.

You cannot really shelter young trees but you will find that those in hollows, or behind mounds, etc., will show a marked difference. You must create the shelter and let the outer ones take the brunt of the storms.

Root competition with weeds is quite marked in the early stages. If you can screef away the vegetation for about 12" around at time of planting it will help. Application of phosphate is a great help. Tall weeds must not be allowed to grow through the summer and then smother the plants when they die in the autumn. So some summer weeding is essential to keep the plants clear and allow air and light.

C. Macrocarpa is good in exposed areas. Sitka Spruce may be a slow starter but it is rather like the Tortoise. With Sitkas you must plant close enough for them to suppress all ground vegetation - say about 5' 6" x 5' 6". Once canopy is closed they start moving. They thrive on peaty bogs - phosphate will help. I do not think you need worry about mycorrhiza.

I would suggest you try some Japanese Larch, Pinus Contorta, Corsican Pine (on dry areas and they will stand sea and salt spray). Abies Nobilis (though they are very slow starters). The pines and the Noble Fir like rather dry conditions, Japanese Larch is not fussy if you are not fussy on the quality of the timber.

Do all planting at about 5 ft. or 6 ft. spacing. Keep in lines to facilitate weeding. Thin later when you have got your shelter and the trees begin to require more room for the crowns to develop.

APPENDIX II

FENCINGCost per mile of fencing at Port Howard as at 1st January 1967.PLAIN.

	£.	s.	d.
123 T. Standards @ 14/9½	90.	19.	5.
35 Bundles Battens @ 25/8	44.	18.	4.
24 Coils x ¼ mile (90 lbs.) No. 8 wire @ 77/1½ per coil	92.	11.	0.
1 cwt. No. 10 wire (seizing) @ 85/3	4.	5.	3.
14 lbs. Stainless Steel Wire @ 7/7	5.	6.	2.
4 Acacia Posts @ £3. 13s. 6d. each	14.	14.	0.
Cost per mile:	<u>£252.</u>	<u>14s.</u>	<u>2d.</u>

With Top Strand Barbed.

	£.	s.	d.
123 T. Standards @ 14/9½	90.	19.	5.
35 Bundles Battens @ 25/8	44.	18.	4.
20 Coils x ¼ mile (90 lbs.) No. 8 wire @ 77/1½ per coil	77.	2.	6.
8 Coils Barbed Wire @ 44/3	17.	14.	0.
1 cwt. No. 10 wire (seizing) @ 85/3	4.	5.	3.
14 lbs. Stainless Steel Wire @ 7/7	5.	6.	2.
4 Acacia Posts @ £3. 13s. 6d.	14.	14.	0.
Cost per mile:	<u>£254.</u>	<u>19s.</u>	<u>8d.</u>

Cost per mile of fencing at Fitzroy

	£.	s.	d.
139 standards @ 18/-	125.	0.	0.
47 Bundles Battens at 29/2 per bundle	68.	10.	10.
16 coils No. 10 wire @ 59/3	39.	8.	0.
8 coils No. 8 wire @ 91/3	36.	10.	0.
8 Strainers @ 20/-	8.	0.	0.
1 coil No. 10 wire for ties	2.	19.	3.
	<u>£280.</u>	<u>8.</u>	<u>11.</u>
Insurance	1.	16.	0.
Freight to Fitzroy	7.	13.	0.
	<u>£289.</u>	<u>17.</u>	<u>1.</u>

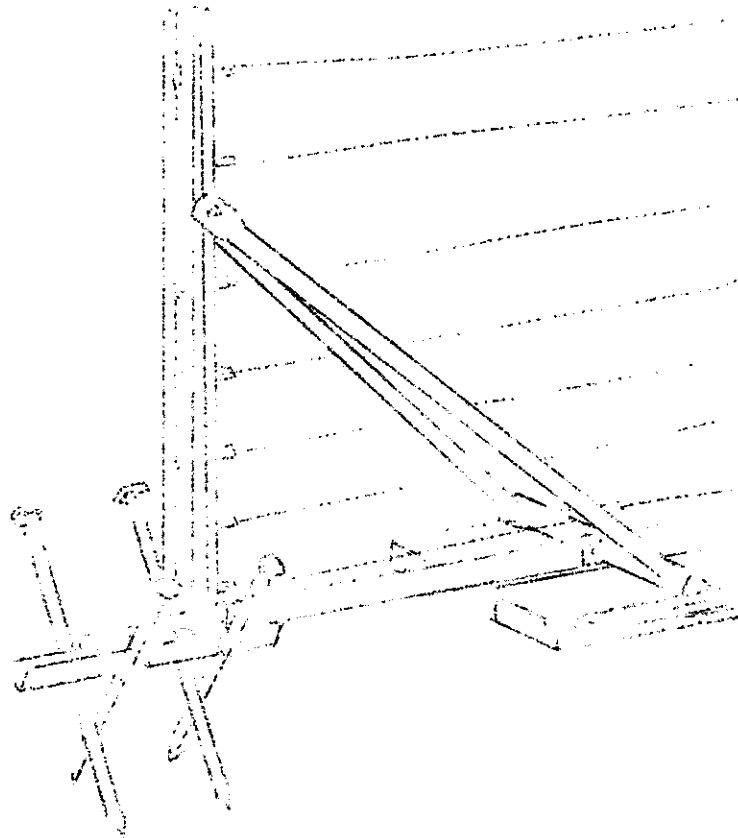
Cost per mile of fencing at Gibraltar Station

	£.	s.	d.
6 wooden posts @ 18/-	5.	8.	0.
143 Standards @ 15/-	107.	5.	0.
1126 Battens @ 104/- per 100	58.	5.	0.
7050 yds. No. 12½ high tensile steel wire @ 92/9 per coil (1302 yds.)	24.	14.	8.
3520 yds. No. 8 wire @ 94/6 per coil (440 yds.)	37.	16.	0.
47 Bundles tying wire			
Sundry nails and staples			
	<u>£244.</u>	<u>2.</u>	<u>4.</u>
Additional labour and fuel in transport of materials and clearing the site	10.	0.	0.
	<u>£254.</u>	<u>2.</u>	<u>4.</u>

The above fence has battens 4'6" apart and standards 12 yards apart. For a heavy duty fence to hold lambs with battens only 4' apart the No. of battens used becomes 1323 and the tying wire increased to 53 bundles. This gives a cost of £261. 1s. 1d.

Cost per mile of fencing at Port San Carlos.

Fence 1.	approximately	25	miles	from	settlement	£380	per	mile.
Fence 2.	"	15	"	"	"	£356	"	"
Fence 3.	"	6	"	"	"	£334	"	"

FENCING STRAINER UNDER TEST AT FITZROY

The length of the pins is 4' on peat but less in a harder soil. The strainers are spaced up to a suggested maximum of 880 yards apart. A corner post assembly is available in which the supports are set out at a right angle to each other.

This equipment, along with much more fencing material, is available from: Swyftite Ltd., Yoxall, Burton-on-Trent, Staffordshire, England from whom further details can be obtained.

LIST OF USEFUL PUBLICATIONSH. M. S. O. Booklets

Forestry Practice 6/6d. (obtainable West Store)

Tractor Ploughing M.A.F.F. 3/6d.

Silage, M.A.F.F. Bulletin No. 37 4/-.

Shelter Belts for Farmland, Fixed equipment on the Farm Leaflet No. 15.

Potatoes M.A.F.F. Bulletin No. 94 8/-.

Electric Fencing M.A.F.F. Bulletin No. 147 3/-.

M.A.F.F. Advisory leaflet 89, Couch or Twitch 4d.

" " " 182 Spurrey 4d.

" " " 200 Seaweed as Manure 4d.

H.M.S.O. sectional list No. 1 gives details of all the M.A.F.F. publications many of which are of interest to the farmer and gardener in the Falklands.

All the above are obtainable from : Her Majesty's Stationery Office,

P.O. Box 569,

London S.E.1.,

ENGLAND.

Third Report of the Hill Farming Research Organisation from:

H.F.R.O.,

29 Lauder Road,

EDINBURGH 9.

British Tractors and Farm Machinery (The Green Book) - published yearly from:

Norman Kark Publications Ltd.,

77 Brook Street,

London W.1.,

ENGLAND.

