

FALKLAND ISLANDS.



Abstract of Report

on the

Work and Findings

of the

DEPARTMENT OF AGRICULTURE

1937 to 1946

by

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## FOREWORD.

Before he left the Colony in July, 1946, at the conclusion of 6 years' work Dr. Gibbs, the late Director of Agriculture, prepared a comprehensive report on the work and findings of the Department since its establishment in 1937. His report contains much of value and interest but owing to the continuing paper shortage and to the high costs of printing and production it will be published in somewhat abridged form: even so, it will necessarily be many months before the work can be completed and made available to the public.

In the meantime I have thought it desirable to release the following abstract of his report, also prepared by Dr. Gibbs, and this will be followed by two papers included as appendices in the main report; the first a Report on Visits to Centres of Peat & Hill Reclamation and its application to Falkland Islands Conditions by Mr. T. Beaty, at that time a member of the Department, and the second by Mr. H. R. Evans on Experimental Tree Planting, 1940-46.

MILES CLIFFORD,  
*Governor.*

GOVERNMENT HOUSE.

PORT STANLEY.

14TH JULY, 1947.

PART I.  
THE DEPARTMENT.

The Department was established in 1937 to administer the Ordinances and Regulations relating to Agriculture, to accumulate by experiment and other means, useful knowledge on agricultural subjects, and to distribute this knowledge among the people of the Colony. The staff of the Department has normally consisted of the Director, Stock Inspector, Common Ranger, two clerks, dairyman, foreman, mechanic and about 12 to 14 labourers. The office of Agricultural Officer was created on 27.9.42 and held until 15.12.44 by Mr. T. Beaty, B.Sc.

The Department is financed by appropriations from the Colonial Treasury, subsidised by the provision of £1,000 from the Land Sales Fund as a contribution towards the Salary of the Director. It produces (*i.e.* at the time the Report was written) a revenue of approximately £3,000 annually through the sale of milk, fodder and vegetables. The financial position is summarised in the following table :-

TABLE I.  
SUMMARY OF THE FINANCIAL POSITION OF THE DEPARTMENT  
(under two administrations, 1937-39, 1940-45).

	Period 1937-39. 3 years.	Period 1940-45. 6 years.	Period 1937-45. 9 years.
	£	£	£
Gross expenditure ... ..	21,356	41,282	62,638
Average gross expenditure per annum ... ..	7,118	6,888	6,960
Gross receipts ... ..	495	11,358	11,853
Average gross receipts per annum ... ..	165	1,892	1,317
Total nett expenditure for period ... ..	20,861	29,924	50,785
Average nett expenditure per annum ... ..	6,954	4,987	5,643
Less, in each year, contributions from Land Sales Fund	1,000	1,000	1,000
Nett expenditure of tax-payers money per annum ...	5,953	3,987	4,642
Proceeds from tax on wool for period ... ..	24,182	50,409	74,591
Average annual proceeds from wool tax ... ..	8,061	8,402	8,288
Nett expenditure of tax-payers money as percentage of wool tax ... ..	74%	47%	57%

This table shows that the revenue produced by the Department has materially reduced the real expenditure of Public Funds. During the past six

years the Department has cost the farming community only 47% of the amount paid by the industry in direct taxation. And during this period it has acquired a mass of information concerning agricultural techniques and practices, so that it is now in a position to advise with reasonable assurance, on the economics and practicality of improved methods in agriculture.

#### Services provided by the Department.

*Stock Returns:* The annual stock returns are compiled by the Stock Inspector. According to the 1944-45 returns the total number of sheep in the Colony is 619,449 as compared with 627,779 during the previous season. The totals of the various types of sheep are :- breeding ewes, 221,496; other ewes, 63,360; lambs marked, 139,764; rams, 7,829; wethers, 199,558; surplus sheep killed during the year or consumed as mutton, 45,693; sheep unaccounted for during the year, (including lambs since marking) 79,782; wool exported during the 1944-45 season was estimated at 4,613,047 pounds.

Of the 79,782 sheep unaccounted for during the year, 28,022 or 35.1% were less than 14 months old. The average loss between lambing and marking is probably about 20%, and between marking and shearing has averaged 19.67% during the past five years.

*Agricultural Statistics:* The total improved pasturage in 1941 was approximately, ploughed ground 772 acres; land carrying English grasses, 1,093 acres (of which approximately 450 were predominantly Yorkshire Fog); area, included above, carrying white clover, approximately 300 acres. Since 1941 16,710 pounds of grass seeds have been imported and 400 tons of lime, phosphatic and nitrogenous fertilizers.

*Stanley Common:* The Department of Agriculture administers the Common under the Trespass Ordinance of 1904 and through the Common Ranger who makes regular inspection tours, notifies sickness or accidents to stock, and is responsible for checking the payment of licences and for impounding animals which stray into the township. In 1939 four fences were renewed or erected on the Common, and 32 miles of drains have been completed during the past ten years. Clover and fertilizers have been sown by the strip method over sixty acres of Common and neighbouring suburban land. The Common is about 4,500 acres in extent and carried 166 cows, heifers and calves and 92 horses during the past year (the horses during the summer only).

*Destruction of Birds of Prey:* Since 1937 the Department has purchased from land-owners 17,120 beaks (turkey buzzards and coranchos) at a total cost of £428. The destruction of geese is no longer subsidised by the Government.

*Bulk Purchase of Vegetable Seeds:* During the war the Department purchased and packeted for distribution all the vegetable seeds required by private growers. The germination of seeds was tested before distribution.

*Bulk Purchase of Pasture Seeds:* The Department purchased and distributed all the pasture seeds required by land-owners during the war.

*Purchase of Vegetable Produce:* The Department purchased surplus vegetables from householders for disposal to the armed forces stationed in the Colony.

*Sale of Fodder to Registered Dairies:* To avoid a rise in the price of milk to consumers the Department imported from South America and sold to the registered dairies at cost price cattle fodders required for milk production. This was done with the consent of the main supplier of such fodder, who volunteered to forego his trading profits on these items. The prices of such fodders have more than doubled since 1940.

*Sale of Fertilizers:* To increase production the Department advocated the use of fertilizers, and as local merchants were not prepared to stock them the Department imported what was necessary from Montevideo. Approximately 330 tons of ground rock limestone, 44 tons of superphosphates, and 20 tons of nitrates were imported. Of this the Department used approximately 200 tons of lime, 40 tons of phosphate and 15 tons of nitrate.

*Supply of Tussac:* Between 1937 and 1939, tussac plants were planted on coastal areas near Stanley and fenced in. During 1940-42 some of these areas were cut for stock fodder. As the supply was insufficient during the summer 1941-42 the Department was authorised to charter the schooner "Porvenir" and thus supplied an average of 450 bundles per week. The scheme ran at a loss of £6. 6s. 0d. over a period of seven months.

*Treatment of Sick Animals:* The Department receives from fifty to sixty calls to sick animals during the year. Infectious diseases are uncommon and occur chiefly in cats and poultry. All cattle are tested with tuberculin every six months (in the Stanley area) and reactors are destroyed. These services are free.

*Extension and Educational Activities:* Such activities have included giving advice orally to farmers as opportunities occurred, and in reply to requests for information, the distribution of a monthly news sheet (discontinued in 1942) and of circulars on matters of moment, monthly broadcasts through the F. I. Broadcasting Station on agricultural and horticultural matters (by the Director and Government House Gardener on alternate fortnights), the supervision of vegetable gardens allotted to senior boys in the School, and the teaching at weekly classes on Agriculture in the School (discontinued since the departure of the Stock Inspector).

*Meteorological Records:* Soil temperatures were kept for the first time in the Colony between July 1942 and June 1944 when the thermometers became broken. The average monthly soil temperatures appear to be 4°F. to 5°F. beneath the mean monthly maximum air temperature when temperatures are falling, and 6°F. to 7°F. below these when temperatures are rising. The growing season in Stanley is from October to March or somewhat later for certain crops. The damage to vegetation usually attributed to wind is probably due to the salt spray it carries rather than to its force.



## PART II.

### STOCK.

*The Sheep Industry:* The sheep industry is controlled under the Live-stock Ordinance, 1901. Sheep-farming commenced in 1870. The owners became concerned at times with the ravages of scab and lice, the low prices for wool during the slump of the early thirties and the present difficulty of obtaining labour. The industry received setbacks through the closing of the canning factories in 1920, the closing down of the Anson Experiment Farm before it was fully established, and inability to ship sheep to freezing works in Southern Chile since 1940 due to shortage of shipping. There is no outlet for surplus sheep, mainly aged, which are killed for their skins or rendered down for tallow. The average lambing is about 66% marked (of the ewes put to the rams). On the average 19% of these have died before they are shorn. The lambing is so low that culling of breeding ewes cannot be practiced except on a few favourably situated farms. Many flocks exhibit too much diversity of type.

*Diseases of Sheep:* Scab and lice have been eradicated from the Colony. Keds, pulpy kidney, pinning, lung worm, six worms of the alimentary tract, the cysts of two types of tape worms, ante-partum paralysis, ophthalmia and scrofula have been observed in sheep during the past ten years but the incidence of these has not been recorded.

*Cattle:* Cattle were introduced in 1764, and at one time numbered 60,000 but are now reduced to about 10,000. They are used on some stations for pasture control, but on most appear to be kept for milk and for the value of their hides. With a few exceptions they are beef type animals and poor milkers.

The Department imported two pedigree Friesian bulls which have improved the milking quality of cattle near Stanley considerably and there is a growing demand for their progeny on camp Stations.

*Diseases of Cattle:* Cattle have been observed to suffer from tuberculosis (incidence about 2%), but dairy cattle within the Stanley area are tested every six months and reactors are destroyed. Other diseases that have been observed are ringworm, lice, mastitis (non-infectious), post partum paralysis, navel ill, milk fever, and ricketts.

*Horses:* Horses are used primarily for riding (unshod). The favoured sires are half-bred Percheron or Welsh Cob, but others of South American origin are also used. Each shepherd is allotted ten to twelve horses which forage for themselves. The majority are put on a tussac island during the winter.

*Diseases of Horses:* Lampas and lice are comparatively common ailments, and colic is not uncommon, though usually due to unwise feeding. Osteoporosis and strangles have been observed in the camp, and founder in the Stanley area. Sand cracks are not uncommon, nor are wounds due to rolling on broken bottles. Strangles and the tick (*Boophilus micronata*) were introduced during 1944.

*Dogs:* The sheep dogs are in general not well trained, and for the most part, unspecialised. They are free from fleas, but occasionally harbour lice and

possibly ear canker (mites). Mange, lice and ascarid worms have been intercepted in the quarantine station.

### Animal Quarantine.

*Application & Equipment:* All animals are examined on arrival in the Colony and sheep, horses, cattle and dogs are held for varying periods for observation. Two areas, one at Navy Point, Stanley, and one at Fox Bay (on West Falkland) have been isolated by double fences as quarantine stations. The former is equipped with buildings, dip, loose boxes, kennels with netted runs, horse corral and four small holding paddocks. The area of this station (approximately 100 acres) is divided into 8 paddocks including two isolation paddocks. The Fox Bay area lacks equipment and offers other administrative difficulties.

*Diseases Intercepted:* Since 1940 the following diseases have been intercepted in the Navy Point Quarantine Station :-

On Sheep :	Mycotic dermatitis, Braxy, <i>Melophagus ovinus</i> , <i>Linognathus pedalis</i> , and unidentified intestinal worms.
On bulls :	Warble fly (2 occasions).
On horses :	Ringworm.
On huskies and pet dogs :	Sarcoptic mange, lice and ascarid worms.
On Pigs :	<i>Haematopinus suis</i> .
On Poultry :	Chickenpox, and various ectoparasites.

A consignment of horses was held for a month on suspicion of infectious stomatitis.

Five rams died in quarantine after dipping as the result of absorption of arsenic through the skin.

### Economics of Sheep Farming.

*Carrying capacity and Income:* The carrying capacity of the land is on the average one sheep to 4.767 acres, and 1 cattle beast to 227 acres. There is considerable variation from these figures on different stations. The best (an out-lying island) carries a sheep to 1.092 acres, the poorest a sheep to 7.43 acres. Only six stations carry a sheep on less than 4 acres.

The income derived from wool during recent years has approximated 6s. 9d. per sheep, or 1s. 6d. per acre. The range would be approximately from 4s. to 10s. and 1s. to 7s. respectively.

*Future Outlook:* The sheep industry is at present organised purely for wool production. There are very few surplus sheep of a suitable quality for a frozen meat trade but this could be overcome if the death-rate of young sheep could be reduced.

Experimental grazing on a small area of poor camp near Stanley has shown that during a twelve month period (May, 1945 to April, 1946) sufficient fodder was produced to graze 1 sheep per 1.88 acres per annum. At the same time the



land was consolidated and eventually will be improved by such heavy grazing, provided that it is controlled.

A two-wire electric fence was used for the above experiment and held run sheep satisfactorily. (This constitutes the first demonstration of an electric fence for controlling sheep in the Colony.)

Managements should endeavour to reserve the best grazing for sheep and use cattle to reduce the rank growth left by the sheep, instead of permitting them to compete for fodder throughout the year.

### Dairying.

*Breeds and Outlook:* There are dairy type cows only at Port Howard (Ayrshire) and Stanley (Friesian). Inquiries are being received from Camp Managers for the progeny of the Friesian bulls. The methods of obtaining milk in the camp are primitive and there is scope for improved methods of butter-making. There is no reason why the Colony should not become self-supporting in milk, butter and cheese, and thereby provide a living for some 15 to 20 families.

*Stanley Milk Supply:* In order to make Stanley as independent of imported milk as possible the Department undertook to provide tussac and hay, and to assure a supply of pollard and other fodders. The co-operation of some Camp managers provided 51 tons of hay (between 1942 and 1944) which was transported to Stanley.

The sale of milk is controlled under the Dairy Produce Ordinance, 1938. The production of milk rose from 5,155 gallons in 1939-40 to 26,186 gallons in 1945-46, at which level the demand for fresh milk is satisfied. Some evaporated and condensed milk continues to be used by people who have acquired the taste for and habit of using it.

Six cows have produced more than 10,000 lbs. of milk during the Calendar year, and the average production per cow in the Government herd has risen from 3,714 in 1939-40 to 7,200 pounds per annum in 1945-46. Hand feeding is essential during the winter, but the animals are never housed. All cows are tuberculin tested, and milk is retailed from the dairy at 3½d. per pint or 4d. per pint delivered.

## PART III.

### PASTURAGE.

*Native Pastures:* The native pastures have deteriorated considerably since the introduction of sheep, due to the elimination of the most palatable and nutritious species. White grass (*Cortaderia* sp.) is the most common grass; it is of low feeding value (48% soluble Carbohydrates, 3-8¼% crude protein, 3-4% oil, low in minerals, high in fibre and silica). The nitrogen ratio has been assessed tentatively at 1 : 15.7 but is probably wider. Very few of the native plants have a sufficiently close ratio to improve the position.

The pasturage is the only source of wealth in the Colony. Supplementary

crops are almost unused, and are limited to the native tussac (*Poa flabellata*) usually reserved for horses, though on some of the smaller stations reserved for sheep.

There can be no doubt concerning the accuracy of Davies' statement (1939 : Grasslands of the Falkland Is.) that *White Clover is fundamental to any improvement of grasslands in the Colony.* Its introduction would enable a greater diversity of farming and cropping than is possible at present, and *there is evidence that it can be introduced economically.*

*Pasture management and improvement:* Sheep (farming) ranching in the Falklands is characterised by large paddocks, uncontrolled grazing, low carrying capacity and the grazing of flocks on the same ground throughout most of the year. The accumulation of unpalatable grasses is burnt off every 3-4 years, but in homestead paddocks heavier stocking prevents the accumulation of burn, consolidates the peat and brings about a natural improvement of the sward. No attempt is made to replace the minerals exported annually in the wool (estimated at the equivalent of 162 tons of sulphate of potash). The pasturage is very low in lime.

Some attempt was made between 1903 and 1910 to introduce English grass by surface seeding but without the aid of fertilizers, and there is now evidence that *surface sown grass seeds will not become established on Native camp unless it is weathered or phosphates and lime are applied.* (On weathered unfertilized camp only Yorkshire fog and occasionally fescues will "take" as a result of surface seeding). Pasture seeds were sown on ploughed ground about 1920 and produced a good sward. Since 1925 Mr. R. C. Pole-Evans has developed pastures composed of English grasses. The best contains white clover, crested dogstail, cocksfoot, red fescue, perennial ryegrass and *Lotus major*. Similar pastures are being developed slowly at Hill Cove, Chartres, Darwin, San Carlos, North Arm and Pebble Island. Yorkshire fog sown at 4 oz. per acre with phosphates and other grass seeds dominates the sward unless the land is cultivated.

*Experimental Work by the Department:* Since 1940 more than 25 experiments have been laid down to determine (i) the suitability of different grasses or strains of grasses and clovers as pasture plants for the Colony, (ii) the most suitable types of pasture seed mixtures, (iii) to ascertain whether there were cheaper methods of introducing these to the camp than by ploughing and tilling the land.

The findings of these experiments may be summarised as follows :-

- (1) The strike and growth of English grasses is very poor in the absence of fertilizers.
- (2) Yorkshire fog is by far the most aggressive of all imported grasses tested and Astoria bent appeared next.
- (3) A seed mixture containing cocksfoot, meadow fescue, timothy and fog produced a more productive sward than one containing ryegrass, cocksfoot, dogstail and the bents.
- (4) Timothy, crested dogstail, browntop (at 3 pounds or more per acre) cocksfoot (if not over-grazed) and white clover compete well against the encroachment of small seedings (¼ lb. to 1 lb. per acre) of Yorkshire fog.



## SUPPLEMENTARY CROPS AND CULTIVATION.

- (5) At San Carlos a mixture containing bents and crested dogstail produced a better sward but yielded less hay than mixtures containing the ryegrasses, cocksfoot and timothy, (Manager's report).
- (6) *Unless grazing can be controlled cocksfoot seed is likely to be wasted as the plants may be eradicated by over grazing.*
- (7) White clover and red clover (Montgomery strain) establish freely on limed cultivated land when sown with phosphatic fertilizers and lime, *provided the seed is inoculated.*
- (8) Suckling clover (*Trifolium dubium*) and subterranean clover are less suitable than the above clovers.
- (9) Approximately double the time should be allowed in the Falklands for the establishment of grasses and swards than is usual in *e.g.* New Zealand, or advocated in text books.
- (10) *The following method has been used to inoculate clover with the nodule organism with complete success :-*

Approximately one teaspoon of nodules are stripped from the roots of vigorous plants of white clover (growing for preference in loose soil). These are crushed on a plate with a flexible knife. One quarter pint of skimmed milk is added, and the suspension so formed is stirred into 12 pounds of white clover seed in an enamel or china bowl. The seeds are put out to dry on paper in a shady place, and should be dry in 10 to 15 minutes.

- (11) The most economic methods of introducing English pasture plants to the native camp, which at present provides an income of approximately 1s. 6d. per acre per annum, is by sowing seeds of plants that spread by rhizomes, with comparatively heavy dressings of lime and phosphates in narrow strips on the native pasturage, with the object of leaving them to spread over the intervening land. This can be achieved at a cost of 10s. per acre (for materials) in Stanley, and has produced a strip of white clover 15 inches to 18 inches wide in twelve months. Experiments designed to obtain the same results at reduced cost are in progress.
- (12) Another economic method of distributing the white clover once it has been established is through the introduction of bees, so that seed may be set. This can be distributed economically by (a) natural distribution, (b) by feeding seed-bearing hay to stock, and (c) by grazing cattle on the seed crop for 24 hours and driving them to native pasturage for two or three days.

*Cheap method of improving pasturage:* The technique of introducing desirable plants to native pastures is believed to be new and is described fully in the Report. The cost of the method may be varied by alterations in the width of strip, the distances between strips, the rate at which fertilizers are applied, and the proportions of phosphates to lime used. It is not unreasonable to expect that the cost may be reduced to 5s. or less per acre during the next few years. The estimated return (following a treatment costing 10s. per acre) is in excess of 5% per annum after the third year rising to 70% at the end of 10 or 12 years.

*Soil types and Cultivation:* Soils may be divided into ten types, (heavy peat 3, friable peat 3, tussac peat 2, sandy types 2). Some are very difficult to cultivate either because of the strength of the roots that bind the turf, or because of the lack of support provided by the subsoil to implements. Few soil analyses have been made, but those available indicate a considerable deficiency of lime and relatively high phosphoric acid, potash and nitrogen contents (probably in non-available forms).

A description of the difficulties and techniques associated with soil cultivation in the Colony is given in the Report. The method adopted by the Department consists of ploughing ten to twelve inches deep with a mold-board plough, cross ploughing with a disc plough, double discing with heavy disc harrows, and boarding (clod crusher) with tyne harrows attached until the desired tilth is attained. The ideal breaking plough is one capable of inverting a furrow 12 to 14 inches deep and 24 to 30 inches wide. Consolidation has been obtained with the clod-crusher heavily laden with rock. The most suitable type of tractor is the diesel type with the widest possible tracks for weight (exerting 2.5 lbs. per square inch of bearing surface) with a large reserve of power in relation to the draught of cultural implements. Wheel tractors are in general, unsuitable. Up-keep tends to be heavy through the inevitable lack of mechanical experience of the population.

## Drainage.

*Origin of Water:* Moisture accumulates through (a) rainfall, (b) run-off from higher levels, and (c) seepage from springs. Sometimes the local accumulations are difficult to remove by drainage because of the impermeability of peat but waterlogging of the camp by either of the other causes may be reduced or eliminated by suitably placed drains.

*Methods:* Drains were originally cut by hand (cost ranging from 9d. to 1s. 3d. per yard), but are now constructed with a Killefer "25" Ditcher drawn behind the tractor. Ditches 15 to 18 inches deep, 12 inches wide at the base, and 27 to 36 inches wide at the top have been made at a cost of a fifth of a penny a yard since the ditcher has been mounted on a sledge to prevent it burying itself in the soil. Some of the ditches so constructed have been estimated to carry up to 700 gallons per hour.

## Supplementary Crops.

*Tussac:* No supplementary fodder is supplied for other than a small percentage of stud sheep, horses and a few cows. The natural and replanted areas of tussac, *Poa flabellata*, provide the main source of winter feed for horses, and on three of the smaller properties for sheep. Sword grass, *Carex trifida* is used for similar purposes at Carcass Island and could be similarly used elsewhere. The provision of other supplementary crops necessitates cultivation.



*Oats for Hay*: The variety Storm King is grown on a number of stations to provide hay for working and winter horses, and on one or two farms for stud sheep. Owing to soil heterogeneity it is difficult to obtain statistical significance concerning experiments with field crops. The English varieties Welsh Brown (Ceirch Llwyd), Ayr Bounty and Yielder are all worthy of further trials. The yields of hay recorded from these varieties have been as high as 4.8 tons per acre.

*Oats for Seed*: Oat grain was not matured in the Colony, except as a curiosity, before the Department commenced sowing winter oats. Such crops have matured seed (even in one of the wettest seasons experienced) and would do better if grown on the northwest of the West Falkland where the growing season is longer. The sowing date should be not later than 20th March. The variety Fulghum (C.I. 699-202) sown on 13th October produced seed under garden conditions at the end of March. Other varieties sown at the same time were later. The present importation of oats for stock feeds is estimated at 80 tons annually. *There seems no reason why most of this should not be produced locally.*

*Wheat*: Wheat has not been grown under field conditions. It should be possible to locate a winter variety, suitable for poultry food, which would thrive satisfactorily under local conditions.

*Barley*: Barley is not grown, but if sown in December or January might afford a valuable autumn supplement for dairy cows, and eventually for fattening lambs.

*Brassicas*: Swedes, turnips, kales, cabbage and cauliflower grow freely in vegetable gardens. Up to 40 tons of swedes have been obtained per acre using field varieties, on consolidated land near Stanley. The swede crop is almost essential for economic production of milk during the winter.

*Swede seed (Disease free)*: Small yields of swede seed have been secured under rather adverse cultural conditions. The Colony appears to be free from the insect carriers of *Phoma lingam*, (which is a seed-borne disease and causes great losses in swedes in New Zealand), so that a seed trade between the Falkland Islands and New Zealand in disease-free swede seed should be possible.

*Potatoes*: The Colony possesses the climate and the freedom from vectors of virus diseases necessary for the production of seed potatoes of high quality; and there is a potential market for these in Uruguay and (were there no political barriers) Argentina.

Wart, *Synchytrium endobioticum*, and powdery scab, *Spongospora subterranea* are present within the Colony, but with suitable supervision could be kept out of seed potato growing areas.

## PART V.

## VEGETABLE PRODUCTION.

*Wartime Vegetable Production*: There is no market garden industry in the Colony, and all vegetables are produced in kitchen gardens. The Department was instructed to provide vegetables for the Garrison and visiting R.N. ships during the war. It took over waste sections and private lawns in Stanley and cultivated these and areas on the golf course and on Stanley Common. The area used rose from 3 acres (1939-40) to 72 acres (1945-46) and provided approximately 273 tons of vegetables and 160 tons of cattle fodders. Surplus vegetables were fed to cattle, but lettuces caused dietetic troubles and reduced milk production.

The Department was authorised to purchase all sound vegetables offered. Approximately 52 tons were so purchased between 1942 and 1945 inclusive and were sold to the Garrison and members of the public.

*Pests and Diseases of Vegetables*: Hares are plentiful about Stanley and destroy swedes, young oats, and vegetables planted in plots on Stanley Common. (They do not damage white or yellow fleshed turnips). During 1945 an unidentified maggot destroyed large numbers of turnip and cabbage seedlings. It was controlled by drilling a 5% DDT dust (in lime) at 40 pounds per acre along the drills. In a wet autumn damage is done to swede roots by a species of *Botrytis*, which spreads from decaying petioles.

*Varieties suited to Colony*: The most productive varieties of vegetables used by the Department were:-

## Cabbages:

Pride of the Market	}	main crop.
Enfield Market		
Flower of Spring		
Sutton's Earliest	}	Spring sown for early use.
Carter's Velocity		

## Winter greens:

New Year Savoy Cabbage.  
Rearguard " "  
Rosette Colewort.  
Drumhead Kale.  
Tall Scotch " "

## Carrots:

French Forcing	}	early.
Little Gem		
Early Short Horn.		
Stump-rooted Intermediate		(yielded 19 tons per acre).

## Lettuce:

Arctic early.  
Hercules (yielded 31 tons per acre).



Turnips :

Purple top Yellow-fleshed Aberdeen turnips.  
Masterpiece swede turnips.  
Superlative .. ..

Legumes :

Early Long-pod Broad Bean.  
Early Dwarf Green Pea.  
Pioneer Green Pea.

## PART VI.

### SHELTER PLANTS.

*Native and introduced trees:* There are no trees endemic in the Colony, and but two shrubs, *Veronica elliptica*, and *Chilictrichum diffusum*, but they have been destroyed by sheep and the practice of burning the camp. *Pinus sylvestris* and another pine were planted at Hill Cove at the end of last century, and now after reaching a height of 15 to 20 feet they are dying a natural death. A species of *Nothofagus* planted about the same time seems well suited to local conditions, and has produced boles up to 4 feet in circumference. White poplar grows slowly but lacks the strength and vigour of the *Nothofagus*. *Pinus sylvestris* and *Picea sitchensis*, planted by the Forester about 1925, are now growing at the rate of about 1 foot per year, and are beginning to "self-prune" the lower branches. At Roy Cove in a sheltered situation the spruce has added more than 36 inches during the season. *Cupressus macrocarpa* appears to be equally as well suited to the conditions in the Colony as the beech, and in reclaimed land has grown 12 inches per annum since it was planted (the earliest in 1926). Several species that are native to Southern Chile should prove satisfactory for low shelter in the Colony. Chief among these are "Coigue" *N. betuloides* (?) Canelo, *Drimys Winteri*, and *Ilex dura Myoporium* species.

The development of a systematic series of shelter belts throughout the camp would undoubtedly modify the severity of the climate. Such belts should run in a North to South direction since the prevailing winds are from the west.

## PART VII.

### RURAL ECONOMY.

*Living Conditions in the Camp.* Housing is provided by the landowners for the farm workers. There have been insufficient quarters for married men in the Camp, but the owners have agreed to improve this and to improve the amenities in the cookhouses (for single men). Wages have been increased lately. The houses have few or no labour saving devices, and much waste occurs through lack of knowledge of methods of circumventing it.

*Education:* Educational facilities are not good, especially in the camp. Lack of education handicaps any scheme of improvement, and prevents the native born Falkland Islander from holding high positions in either the Colony or the

world outside. There is in consequence little desire to undertake responsibility or to break new ground; and little opportunity to do so since all the land is owned in large blocks beyond the means of the small man, and trade is in the hands of a few. I believe that it is for these reasons that the population remains stationary. Were it possible for the small man to make a living in other ways than by selling his labour there would be more incentive to youths to remain in the Colony, and the population would soon begin to rise.

*Communications:* There are no public roads in the Camp. The opening of the Camp by light roads which would enable ready access to the doctor or permit children to travel to school would relieve parents of the greater burdens and anxieties of raising a family in the camp. Even roads that are open only during the summer would be an improvement on the present position.

## PART VIII.

### RECOMMENDATIONS.

*Basis of Recommendations:* The recommendations are submitted on the hypothesis that the most desirable condition from the Colonial point of view is the fullest use of the land commensurate with the greatest economic production and the maintenance of a reasonably high standard of living for those engaged in the industry. The recommendations have been put concisely and should be read in full with the pertinent arguments. They are presented under three sub-heads :-

- (1) Administrative.
- (2) Means of improving the present Industry.
- (3) New industries which can or might be developed.

*Administrative proposals:* These deal with the organisation of the Department of Agriculture, the desirability of an experimental-cum-educational agricultural institute and a demonstration farm; a scheme of taxation designed to encourage the development of private holdings; and an outline of legislation to protect the industry, and to grade produce. Recommendations are also made concerning the future of the Department's milk and fodder schemes.

*Improvement of Industry:* The recommendations under this head deal with the relationship between the Farmers' organisation and the Department, and are concerned chiefly with methods of improving carrying capacity and the adoption of modern practices and management. They refer, therefore, mainly to technical matters.

*Concerning new Industries:* New industries which would bring greater wealth to the Colony are suggested. Chief among them is that concerning the production of seed potatoes for the South American market though five other developments of agricultural activities are recommended.



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Communications - There are no public roads in the Islands...

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