(32)

COLONIAL SECRETARY'S OFFICE
25 MAY. 1925
FALKLAND ISLANDS

PORT HOWARD.

WEST FALKLAND ISLANDS.

April 20. 1925.

To

The Colonial Secretary

Port Stanley.

Sir,

I have the Honour to acknowledge your letter No.638/24. dated March 25. 1925, enclosing copies of Mr. H.Munro's report on his investigations into the Sheep farming industry in this country, for which I am greatly obliged

I have the Honour to be,

Sir,

Your Obedient Servant,

W.B. Rob Evans.

COPY.

NEW ZEALAND.

No. 82.

Wellington,

23rd April, 1925.

Sir,

I have the honour to acknowledge the receipt of your despatch No. 20 of the 6th February, forwarding three copies of the Report by Mr. H. Munro on the sheep farming industry of the Falkland Islands.

2. It is very gratifying to my Government to learn that Mr. H. Munro's services were so highly appreciated, and it is hoped that as an outcome of his visit the sheep farming industry of the Falkland Islands will be established on a sound and enduring basis.

I have the honour to be,

Sir,

Your most obedient,

humble servant,

Charles Fergusson,

Governor General.

The RIGHT HONOURABLE

L. C. M. S. AMERY, M.P.,

SECRETARY OF STATE FOR THE COLONIES.

(33)

A
1

Reference to previous correspondence:-
Secretary of State's Despatch No. 19 of the
~~Governor's~~
6th February, 19 25.

FALKLAND ISLANDS.
No. 75

COLONIAL SECRETARY'S OFFICE
3 SEP 1925
FALKLAND ISLANDS

DOWNING STREET,
9th June, 19 25.

Sir,

I have the honour to transmit to you the papers noted below on the subject of the Report by Mr. H. Munro on the Sheep Farming Industry of the Falkland Islands.

I have the honour to be,
Sir,
Your most obedient, humble servant,

THE OFFICER ADMINISTERING
THE GOVERNMENT OF THE FALKLANDS ISLANDS.

L. S. Amery.

Date.	Description.
1925 23rd April No. 82	From the Governor General of New Zealand.

(42)

GOVERNMENT HOUSE,
FALKLAND ISLANDS.
2nd February, 1926.

Dear Mr. Munro,

No doubt before you left England last year you knew that it had been decided to proceed with your scheme for an Experimental Farm. The Secretary of State had no hesitation in accepting the proposals which you put forward. Progress has perhaps not been so rapid as I could have wished and there have naturally been difficulties, but I will give you a brief account of what has been done and what it is proposed to do.

2. Arrangements had to be made for the exchange of lands with the Falkland Islands Company/

H. MUNRO, ESQ.,
PRINCIPAL DISTRICT INSPECTOR
OF THE DEPARTMENT OF AGRICULTURE,
WELLINGTON,
NEW ZEALAND.

Company and it was some time before the area selected by you could be taken over. A survey has now been made of it and it contains about 7,200 acres. The boundary fence has been erected and all sheep were removed last spring so that the land will have a long period of rest and there is already a noticeable improvement in the pasture. Sixty head of cattle from Stanley Common are at present grazing on the land and doing their part in "crushing" but they will be removed at the end of September.

3. You attached great importance to the careful consideration of a fencing plan and the survey which has been made has enabled this matter to be gone into very carefully. No fence other than the boundary fence has yet been erected but given decent weather during the next few weeks the fencing of a considerable area of

wet/

wet camp will be proceeded with.

4. Two houses are being constructed at present for the Manager and the Farm Hand and this work will be pushed on as quickly as possible. I propose to ask the Secretary of State to request the Government of New Zealand to be so good as to select a Manager and a Farm Hand and no doubt this matter will eventually come to you as you were good enough to say that you would help in the selection of suitable candidates.

5. The salary proposed for the Manager (a Stockman) will be as recommended by you, namely, £400 a year. In addition he will have a free house furnished on a moderate scale but without linen, blankets, plate and cutlery. He will also be given a free supply of peat and when the farm produces them mutton, vegetables and milk. He will have to pay for a servant.

6./

6. The salary proposed for the Farm Hand (Agriculturist) is £300 with free house and this will be smaller than that of the Manager. The other conditions will be similar to those for the Manager.

7. It is very desirable that the Manager should be married but this is not so essential in the case of the Farm Hand. It is possible that the Manager might wish to have with him an unmarried man and it will be well to leave this point open.

8. I have selected for provisional appointment a Station Hand, Mr. Duncan Coutts, who bears an excellent character, is enterprising, is keenly interested in the work which is to be undertaken and knows the country well. He is married and if the Farm Hand is married it will be necessary to build a third house but only two are being built at present and the cost of the first buildings is heavy.

9./

9. Perhaps it may be possible for you to consider likely candidates before the official communication through the Secretary of State reaches you; little work can be done until September so that it is hardly necessary for the Manager and Farm Hand to arrive before then.

10. With regard to stock, Mr. Carter got four draught horses from Punta Arenas and the stallion which you recommended should be obtained from England has been ordered. An Aberdeen Angus bull, eight Aberdeen Angus heifers, and two Aryshire heifers, have been ordered from Scotland and the Board of Agriculture for Scotland has been asked to arrange for their selection. They should arrive towards the end of October.

11. I am most grateful for your great kindness in arranging for the selection of

the/

the sheep which are to come from New Zealand for the other farms in the Colony. There have been difficulties with Messrs Shaw Savill and Company, regarding freight but I trust that everything has now been arranged with Messrs Dalgety & Company of Wellington. They have telegraphed to the effect that shipment cannot be made until the middle of March which is much later than you had originally intended but it is satisfactory that a start has at last been made in importing sheep from New Zealand. I trust that the farmers when they have seen these sheep will import more and I have every hope of making up another cargo of well over 300 for shipment at the most convenient season of the year although information is not available at present as to what time of the year Messrs Shaw Savill and Company can most easily arrange for a ship to call at Stanley.

12./

12. The Government itself will import

150 Romney ewes, price in New Zealand £3 - £5.

4 " rams, price in New Zealand £20 - £30.

10 " " , price in New Zealand £10 - £12.

These are the numbers of sheep which you advised me should be imported and the 10 rams at £10 - £12 are intended for crossing with good local ewes. I should be very grateful for your assistance in the selection of suitable sheep for the Government Experimental Farm. An official letter will go on in due course but letters take so long to get to New Zealand that I have thought it well to write at some length as to what is proposed; this may enable you to arrange for the selection of good sheep which might not otherwise be available later in the year and I should be glad if you could take the

matter/

matter up at the proper season. The prices mentioned above are only nominal and you have full discretion in regard to price or any other matter that may arise.

13. Before you left the Falkland Islands you very kindly told me that you would send me from New Zealand a selection of literature on experimental farm work and on matters relating to stock. I am going home on leave shortly and should be grateful if you would be so good as to send the literature to the Colonial Secretary, Stanley. If, however, you wish to communicate with me on any matter letters addressed to Windham Club, St. James' Square, London, S.W. 1., will always be forwarded to me.

14. Owing to the difficulty of communicating with you by letter I am asking Captain

Daniel/

(34)

Daniel, R.M.S. "Oropesa" to take this letter with him to Colon and to send it from there direct to New Zealand.

I remain,
Yours sincerely,

J. Middleton.

ENCLOSURE TO DESPATCH
No. 41 OF 29 April 1926

C.8741/26

Downing Street.

29 April, 1926.

Gentlemen,

With reference to the letter from this Department No. 9367/25 of the 24th February, 1925, I am directed by Mr. Secretary Amery to transmit to you the accompanying account in respect of the printing of an index to Mr. Hugh Munro's Report on Sheep Farming in the Falkland Islands, and to authorise you to pay to the Stationery Office, from Falkland Islands Funds, the sum of £2.3.1.

(in orig.)

I am,

Gentlemen,

Your most obedient servant,

(Signed) G. GRINDLE.

THE CROWN AGENTS

FOR THE COLONIES.

A
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Reference to previous correspondence:-
Secretary of State's ~~Governor's~~ Despatch No. 75 of the
9th June 19 25.

FALKLAND ISLANDS.
No. 41.

DOWNING STREET,
29th April, 19 26.

Sir,

I have the honour to transmit to you ~~the~~ for your information, a copy of the papers noted below on the subject of expenditure incurred in respect of the printing of an index to Mr. Hugh Munro's Report on Sheep Farming in the Falkland Islands.

I have the honour to be,
Sir,
Your most obedient, humble servant.

THE OFFICER ADMINISTERING
THE GOVERNMENT OF THE FALKLANDS ISLANDS.

L. S. AMERY.

Date.	Description.
1926. 27th April	To the Crown Agents for the Colonies.

45

Form C.

FALKLAND ISLANDS.

19 26. No. 16

SPECIAL WARRANT.

Acting *Governor.*

Date August, 19 26.

To the Honourable
The Treasurer.

Whereas it has become necessary, in the interests of the Public service, to incur certain Expenditure, not sufficiently[a] provided for in the Estimates, as set forth in the subjoined Schedule,[b] in anticipation[c] of a vote of the Legislature[d] ~~and of the approval of the Secretary of State.~~

You are hereby, on my personal responsibility, authorized and required to pay from the Treasury the sum of NINETY-FIVE..................... Pounds .... Shillings and .... Pence and to charge it to the Heads and Sub-heads of the Expenditure specified in the Schedule.

And for so doing, this, together with the proper Accounts, Certificates and Acquittances, shall be your sufficient warrant and discharge.

a. to remain only in case of an excess on a vote.
b to be struck out if complete authority has been obtained *c* or *d* if either partial authority has been obtained.

Schedule.

Particulars of Service.	To be charged to: Head.	Sub-Head.	£	s.	d.
Cost of printing index to Mr. Munro's Report ... £2. 3. 1. (S of S. Despatch No.41 of 9th June, 1926.) M.P. 638/24 Salary paid to Mr. Munro from date of departure from Colony to arrival in New Zealand. 90.10. 9. (S of S. Despatch No.15 of 14th March, 1924.) M.P. 296/24 Additional amount provided to cover unforeseen expenditure ... 2. 6. 2. TOTAL... £95. 0. 0.	APPENDIX II.	(New item) 2. Stock Investigation and Research.	95	0	0

Signature of the Officer submitting the Schedule for Warrant. — G. L. Brown, for Colonial Secretary.

Date 14th August, 19 26.

(Special warrants are to be prepared in triplicate. One copy to be filed in the Office of the Colonial Secretary, one in the Treasury, and one to be furnished to the Audit).

New Zealand Department of Agriculture.

PROSPECTUS

OF THE

RUAKURA FARM OF INSTRUCTION,

HAMILTON, N.Z.

WELLINGTON.
By Authority: W. A. G. Skinner, Government Printer.

1923.

New Zealand Department of Agriculture.

PROSPECTUS

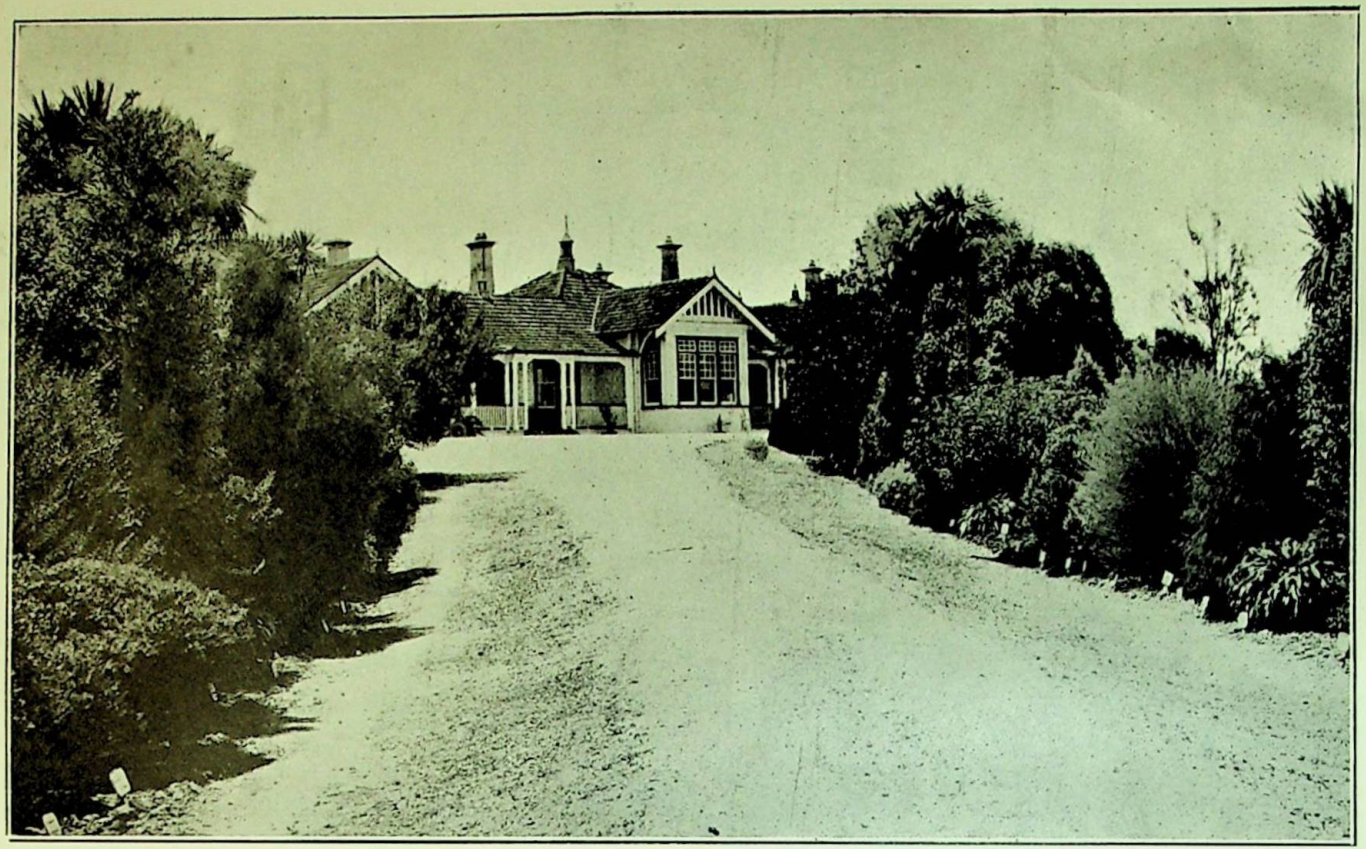
OF THE

RUAKURA FARM OF INSTRUCTION,

HAMILTON, N.Z.

WELLINGTON
BY AUTHORITY: W. A. G. SKINNER, GOVERNMENT PRINTER.

1925.



RUAKURA HOMESTEAD FROM THE DRIVE.

New Zealand Department of Agriculture.

MINISTER OF AGRICULTURE:
HON. W. NOSWORTHY.

DIRECTOR-GENERAL:
C. J. REAKES, D.V.Sc., M.R.C.V.S.

DIRECTOR, FIELDS DIVISION:
A. H. COCKAYNE.

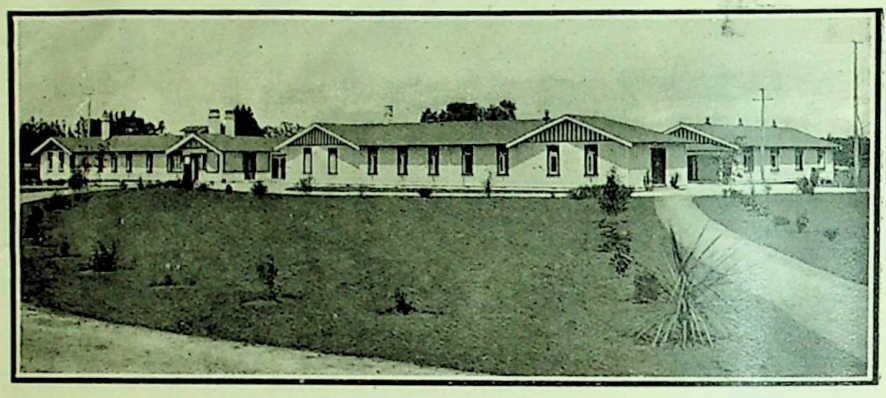
RUAKURA FARM OF INSTRUCTION,
HAMILTON.

ADMINISTRATIVE STAFF.

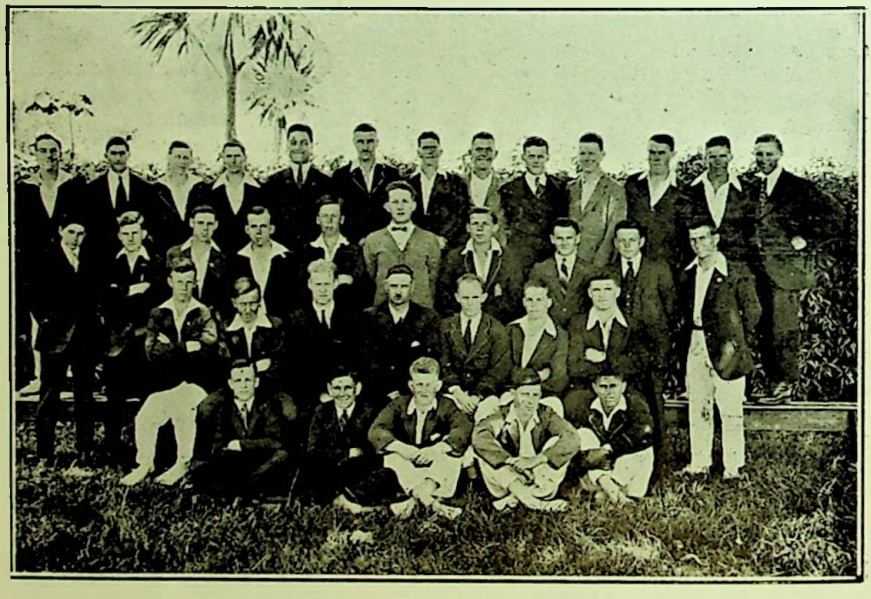
Superintendent	~~A. W. GREEN~~ H. M. LUMPO.
Instructor in Agriculture	P. W. SMALLFIELD, B.Ag.
Housemaster	G. A. HOLMES, M.Sc., B.Ag.
Matron	Mrs. A. W. GREEN.
Farm Clerk and Accountant	F. A. LYFORD.
Farm Overseer	W. HONEYBUN.
Horticultural Overseer	T. ROACH.
Apiarist	A. B. TRYTHALL.
Poultry Overseer	H. KITTO.

TEACHING STAFF.

~~A. W. GREEN~~ H. M. LUMPO	Live-stock.
P. W. SMALLFIELD, B.Ag.	Crops, Farm-management.
G. A. HOLMES, M.Sc., B.Ag.	Soils, Farm Mathematics.
A. MACKENZIE, D.V.S.M., M.R.C.V.S.	Health of Live-stock.
F. A. LYFORD	Book-keeping.
T. ROACH	Horticulture.
H. KITTO	Poultry-keeping.
A. B. TRYTHALL	Bee-keeping.
J. G. COOK	Wool-classing.
W. HONEYBUN	Manual Operations (Farm).
W. SMITH	Manual Operations (Carpentering).
C. WEATHERLY	Manual Operations (Dairy).
J. HALTON	Manual Operations (Pigs).
M. SHANAGHAN	Manual Operations (Sheep).
C. O'NEILL	Manual Operations (Cattle).



STUDENTS' QUARTERS, CLASS-ROOMS, ETC.



GROUP OF STUDENTS AND STAFF, 1924.

RUAKURA FARM OF INSTRUCTION.

THE Ruakura Farm of Instruction is situated in Waikato County and adjoins the Borough of Hamilton. The farm was established as an experimental station in August, 1901. The training of farm students was commenced in April, 1912, from which time twelve students were continuously in residence. In 1920 buildings were erected to accommodate sixty returned soldiers. On the completion of the repatriation work the teaching of farm students was reorganized, and the present system of resident instruction was established in August, 1923.

THE FARM.

The farm consists of 900 acres of land, level to gently undulating land, varying considerably in quality, and is worked as far as practicable on commercial lines. Milk, mutton, lamb, wool, pork, beef, poultry, eggs, honey, and pedigree live-stock are the main products.

Farm Buildings.—An extensive and up-to-date stable, implement-shed, and grain-loft; milking-shed complete with milking plant and dairy; wool-shed with four stands, up-to-date sheep-yards and dips; an extensive piggery built on approved lines; a carpenter's shop furnished with all necessary tools.

Implements.—All modern implements for the working of an up-to-date farm, including chaff-cutting and threshing plant.

Horses.—Good-quality draught horses of the Clydesdale type.

Cattle.—A very fine herd of pedigree Milking Shorthorns, also a high-class herd of pedigree Jerseys, Guernseys, & Ayrshires.

Sheep.—A registered flock of 200 Southdown sheep, together with about 1,000 crossbred ewes from which fat lambs are raised. Over 1,000 sheep are shorn annually, thus enabling students to obtain good practice in shearing and wool-classing.

Pigs.—A large number of fine pedigree Berkshire pigs are kept on the farm. & Large white Yorkshire

HORTICULTURAL SECTION.

The Horticultural Section of the farm is well equipped, and offers excellent facilities for students to study horticulture, fruitgrowing, and tree-planting.

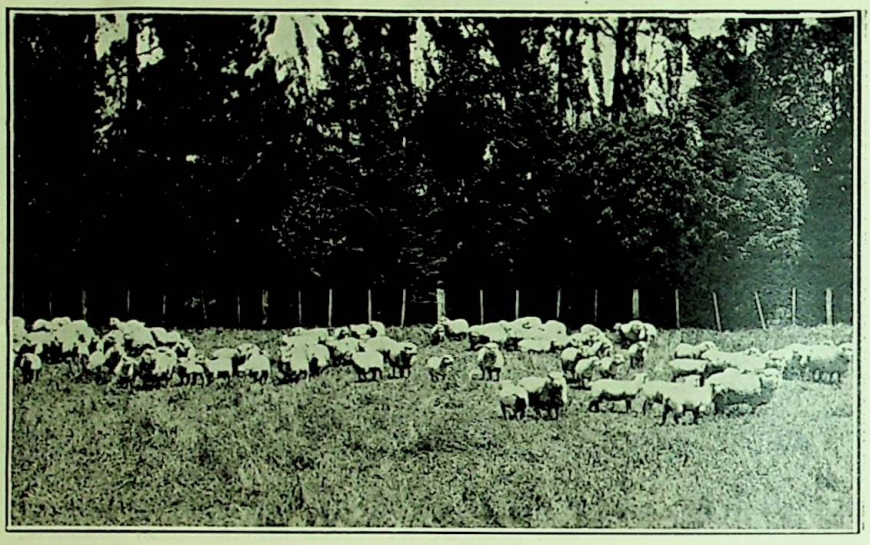
APIARY.

A model apiary is maintained, and students are given every facility to study the technique of bee-keeping.

POULTRY SECTION.

The Poultry Section is well equipped, and offers good facilities to students who wish to study the various phases of poultry-keeping.

Students working in the various sections come under the direct supervision of the section Overseers.



SOME OF THE SOUTHDOWN FLOCK.

STUDENTS ENGAGED IN SHEARING.

EXPERIMENTAL WORK.

Field experiments are carried out to investigate various points connected with the production and utility of forage crops and cereals. A small area is laid out in plots in the Horticultural Section whereon all available grasses, forage crops, and cereals are grown. These plots afford students an excellent opportunity of becoming thoroughly acquainted with the characteristics of all crops and grasses of economic importance in New Zealand.

ACCOMMODATION.

The students' quarters will accommodate sixty students. Each student has a bedroom to himself. Baths and showers are supplied with hot and cold water. The dining, sitting, and lecture rooms are large and airy, and provide comfortable accommodation for the students in residence. The buildings are lit by electric light. The playing-fields adjoin the quarters, and offer excellent facilities for football, cricket, and tennis. Students are given every encouragement to engage in these games, and the formation of the usual student societies is encouraged.

ADMISSION OF STUDENTS.

The course of instruction is open to lads of not less than sixteen years of age and of reasonable educational attainments. Application for enrolment should be made through the Director-General of Agriculture, Wellington. Candidates are required to satisfy the Director-General as to their general fitness for admission, and to furnish a certificate of conduct from the headmaster of the school or college last attended.

The following is the prescribed form of application :—

The Director-General of Agriculture,
P.O. Box 888,
Wellington.

I DESIRE that [*Name in full*] be considered as a candidate for enrolment as a student at Ruakura Farm of Instruction.

His date of birth is :

His educational qualifications are as follows :

His farming experience is as under :

Enclosed is a certificate of character from the headmaster of the school or college last attended.

I undertake that, if he is accepted as a student, he shall during his period of residence at Ruakura conform to and obey the rules and regulations authorized for the management of the school.

[*Signature.*]

FEES.

The fee for each term for tuition and board (including soft washing) is £18. All fees are payable in advance. Students leaving before the end of their course are required to give three months' notice.

Stationery is supplied at wholesale prices.

COURSE OF INSTRUCTION.

The course of instruction is fully set out in the attached syllabus, and is designed entirely for the requirements of the farmer and not of the agricultural teacher or research worker. The curriculum occupies two years. Instruction is imparted by lectures and by field classes and demonstrations. The course is so arranged that students devote alternate weeks to theoretical and practical work. Attendance at all lectures and demonstrations is compulsory. The year is divided into

two terms of twenty-three weeks, ten of which are devoted to theoretical work and thirteen to practical work. The first term begins in February and the second in August. New students are required to be in residence on or about 10th January.

EXAMINATIONS.

Examinations are held at the end of each term, and students must pass these before being admitted to the next term's work. A full report on the student's progress is supplied to parents or guardians at the end of each term.

FINAL CERTIFICATE.

A certificate in agriculture will be awarded to such students as have been two years in residence, have passed the term examinations, and have satisfied such examiners as the Hon. Minister of Agriculture may appoint to conduct a special examination in the following subjects :—

	Maximum Marks.
Ruakura agriculture	100
Soils	200
Crops	200
Live-stock	200
Farm-management	200
Farm book-keeping	100
Farm mathematics	50
Horticulture	100
Poultry-keeping	50
Bee-keeping	50
Practical farm-work	750
Total	2,000

NOTE.—To *pass*, students must gain 75 per cent. of the marks allocated to practical farm-work, 50 per cent. of the total marks allocated to written subjects, and not less than 33 per cent. in any one subject.

STUDENTS' OUTFIT.

In addition to ordinary clothes, students must provide themselves with at least two suits for farm-work; two pairs of heavy boots; leggings; stock raincoat; two bath-towels; two pillow-slips; four bed-sheets. All clothes and bed-linen must be plainly marked with student's name in full.

RULES AND REGULATIONS.

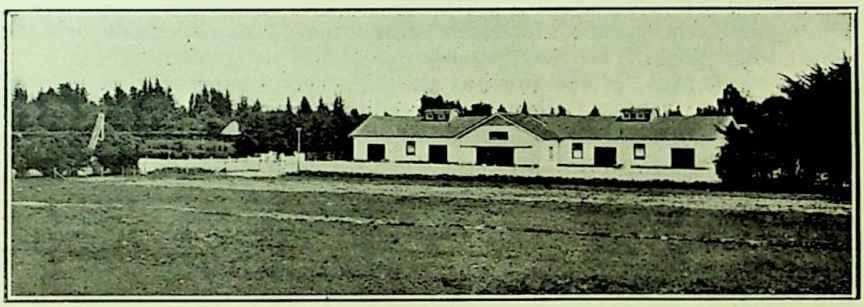
A copy of rules for farm students is handed to each student on admission. All students coming to the school must clearly understand that the rules will be strictly enforced. Government property must be respected, and cost of breakages where such occurs through negligent use of same will be charged against the student concerned.

MEDICAL EXPENSES OF STUDENTS.

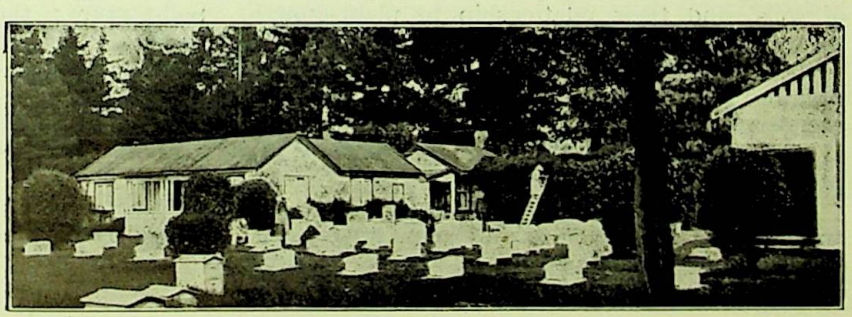
In the event of an accident to a student while actually on duty, or of sickness of an epidemic nature—*i.e.*, where several students are suffering from the same infectious disease at the same time—the Department will pay for medical attendance, nursing, medicine, &c., authorized by the Farm Superintendent or his representative. In all other cases the student must bear the expense, whether it is authorized by himself, his parents or guardian, or the Superintendent.

CEREAL HARVESTING OPERATIONS.

PART OF THE DAIRY HERDS.



THE STABLES AND BARN.



THE APIARY.

SYLLABUS OF INSTRUCTION.

I. AGRICULTURE.

(1.) RUAKURA AGRICULTURE.

A series of lectures taken during the first term. They are of an elementary nature, and aim at giving students a proper farm outlook. Demonstrations of common farm operations occur early in the course. The study of agriculture as carried out on Ruakura is continued in the remaining terms of the course by means of students' diaries. These will include all farm-work done throughout the year, and periods are allotted for a critical analysis of the daily and seasonal work necessary on a mixed farm.

(*a.*) ORGANIZATION. — Plan of layout of the farm; subdivision; fences; shelter-belts; plantations; water-supply; buildings; roads; labour organization.

(*b.*) CROPPING.—The physiographic features of the farm; soil types; the breaking of virgin land and laying down in long rotation and permanent grass; history of the different fields; team-work and team-management; the crops grown; their place in the rotation; cultivation; seeding; manuring; harvesting and utilization. The main types of pastures; their establishment; composition and management.

(*c.*) LIVE-STOCK MANAGEMENT.—*Dairying:* Outline of work throughout the year; feeding and management of the dairy herd; handling of dairy-products on the farm.

Sheep: Crossbred flock; purchases and sales; general management throughout the year; fat-lamb production; management of the Southdown flock.

Pigs: Outline of the work at the piggery. Importance of pigs on a dairy farm; types of piggeries; breeding; rearing and management; feeding for pork and bacon production.

(2.) SOILS.

(*a.*) SOIL GEOLOGY.—Derivatives of soils; weathering; soil-movements; vertical and horizontal variation; proximate constituents, stones, sand, clay, silt, lime, organic matter; soil classification and soil types.

(*b.*) SOIL PHYSICS.—The physical principles involved in the movements of soil-water, the presence of air, and variation in temperature of soils, and their relationship to plant-growth. Soil-texture; the value and interpretation of mechanical soil-analysis.

(*c.*) SOIL CHEMISTRY.—Fundamental chemical considerations; composition of soils; chemical analysis, its value and interpretation; chemistry of manures, and soil amendments.

(*d.*) SOIL BIOLOGY.—The relationship of soil-organisms to crop-production.

(*e.*) SOIL MANAGEMENT.—Drainage and irrigation; tillage operations, and detailed description of all tillage implements and their significance in crop-production; crop-rotation; liming; fertilizers; green-manuring; efficient management of live-stock manure.

(3.) CROPS.

(*a.*) CROP BOTANY.—The elements of the structure and functions of the root, stem, leaves, flowers, and fruits of plants, with special reference to the common plants of the farm. Methods for the recognition of ordinary farm crops and other plants; the principles of plant-classification, and the special classification and botanical characters of farm crops, grasses, clovers, and other economic plants of the farm. Plant-variation, and the principles of plant-selection and plant-breeding.

(*b.*) CROP-PRODUCTION.—The preparation of various types of seed-beds for different crops, and the relationship of soil type, climatic conditions, and prior crop to the methods adopted. Place in rotation, times of sowing, suitable varieties and the methods for securing reliable seed, rates of seeding, manuring, subsequent cultivation, harvesting, and storage of all the common farm-crops. Machinery connected with harvesting and utilization. Preparation of farm-crops for market, and methods of marketing.

(*c.*) PASTURE-PRODUCTION.—Types of grassland in New Zealand, their composition, origin, and development under different methods of management. Establishment, stocking, top-dressing, cultivation, mowing, grazing, and renewal of the different types of grassland under varying systems of management. Hay and ensilage making, and their relation to pasture-maintenance. The utilization and management of pastures for seed-production.

(*d.*) CROP-ENEMIES.—*Weeds:* The relationship of weeds to crop-production; the main weeds of grassland and of arable soils; methods of distribution; the main factors governing their prevention and suppression.

Pests: General characters and classification of insects; the main insects causing damage to crop-production; other animals injurious to crop-production; general and specific methods for the control of crop pests along chemical, mechanical, and biological lines; legal obligations of the farmer for the suppression of crop and grassland pests.

Diseases: The recognition of diseased conditions in crops; the causes of disease; the main fungi and other organisms detrimental to crop-production, and methods for their control.

(4.) LIVE-STOCK.

(*a.*) STRUCTURE AND FUNCTIONS OF LIVE-STOCK.—The elements of the structure and functions of the various systems of the animal-body, and the main variations that occur in the various groups of farm-animals.

(*b.*) TYPES AND BREEDS OF LIVE-STOCK.—The main characteristics, points, and history of various breeds.

Horses: Clydesdale; Shire; medium, heavy, and light farm-horses.

Dairy Cattle: Milking Shorthorn, Jersey, Friesian, Ayrshire, Guernsey, Red Poll.

Beef Cattle: Shorthorn, Hereford, Aberdeen Angus.

Sheep: Romney, Lincoln, English Leicester, Border Leicester, Southdown, Shropshire, Ryeland, Suffolk, Merino, Corriedale, and halfbred; various types of crossbred sheep.

Pigs: Berkshire, Tamworth, Large Black, Yorkshire.

(*c.*) JUDGING OF LIVE-STOCK.—Terms used; methods of judging horses, cattle, sheep, and pigs; points of stock; stock-sales, and practice in valuing market classes of live-stock.

(*d.*) BREEDING OF LIVE-STOCK.—General principles of breeding, heredity, variation, selection, influence of sire and dam, influence of environment, Mendelism, line-breeding, inbreeding, cross-breeding, pedigrees. Breed associations; flock-books and herd-books.

(*e.*) FEEDING OF LIVE-STOCK.—The general principles of animal-nutrition; the main classes of feeding-stuffs; systems of feeding adopted under various types of management. The feeds required for maintenance, growth, fattening, and milk-production; comparative feed value of various crops, and methods of utilization; value of concentrate-feeding.

(*f.*) HEALTH OF LIVE-STOCK.—The causes, symptoms, and farm treatment of the common diseases and ailments of live-stock.

(*g.*) MARKETING OF LIVE-STOCK.—Private sales; saleyards; systems of purchase and sale; droving; delivery of stock; farmers' responsibilities; Stock Act.

(5.) FARM MANAGEMENT.

(*a.*) AGRICULTURAL GEOGRAPHY.—Land under occupation in New Zealand; physiography of New Zealand; climate; agricultural statistics; the relation of physiographical, soil, climatic, and marketing features on the development and distribution of the various systems of farming.

(*b.*) SYSTEMS OF FARMING.—*Pastoral Farming:* General description of the conditions regulating the adoption of pastoral farming; land tenures; fencing and subdivision; buildings and equipment necessary for grazing farms and runs of various types; capital and labour required; sheep-farming, cattle-farming, and their combination; general features of soil and live-stock management under pastoral conditions; the relationship between extensive grazing and mixed farming; movements of stock; the products of pastoral farming—surplus live-stock, wool; types and characteristics of wool, qualities and values, wool-classing and preparation for market; calendar of operations.

Mixed Farming: Conditions governing the development of mixed farming; buildings and equipment necessary; horse-management, and the feeding, care, and economical utilization of farm teams; the planning of seasonal cropping, and management operations in the production of grain, pulse, chaff, and seed crops; the relationship of crops to grass in the production of fat stock and wool; consideration of the finance and labour provision involved in the management of mixed farms of various size; calendar of operations.

Dairy-farming: History and development of dairying in New Zealand; landmarks in its progress; soil, climate, and transport conditions favourable for dairying; organization of dairy farms of various sizes; capital and labour required; subdivision; shelter; buildings; machinery and its proper care; the general management and breeding of dairy herds—crossbred, grade, and pedigree; early and late calving; calf-rearing; feeds for dairy cows; pasture-management on dairy farms of various types; special winter and summer feed provision—farm-grown and purchased; seasonal production of milk; chemical and bacteriological considerations regarding milk and milk products; milk records, butterfat-testing, herd-testing; the handling of milk and cream on the farm; the New Zealand factory system—co-operative and proprietary; manufacture of butter and cheese; co-operation and control; methods of marketing milk products.

II. FARM BOOK-KEEPING.

Why a farmer should keep books of account, and why a farm should be treated as a business. Double-entry system of keeping books of account, and how it can be applied to farm operations. Essential books—diary, journal, ledger, cash-book, and stock registers.

Illustrations in treatment of cash transactions and credit transactions—what accounts to debit and what accounts to credit, and why.

Definitions of terms used in book-keeping. Need for stock-taking and keeping records of stock.

Accounts—real, personal, nominal; assets and liabilities. Difference between capital of a farm and the proprietor's capital in a farm. How to proceed to open up a set of books of account; trial balance, and how to prepare and reason for same.

Exercises in farm book-keeping. Transactions appearing in diary taken into accounts. At end of six months' and twelve months' transactions, trial balances taken out.

Taking stock, preparing profit and loss account, closing entries, and balance-sheet. Cheques, promisory notes, bills of exchange, capital and revenue expenditure. Interest and depreciation.

Mortgages and responsibilities of mortgagor. Land and income tax. Rates. Rents. Treatment in books of freehold property and leasehold property. Partnership accounts and necessity for partnership agreement in legal form. Crop accounts. Distribution of wages. Cost accounts.

III. FARM MATHEMATICS.

Practical measurement of length, area, and volume. Use of formulæ. Measurement of timber. Calculation of materials required for fencing, concreting, earthworks, and farm buildings. The design of simple culverts, bridges, and farm buildings.

IV. HORTICULTURE.

(*a.*) VEGETABLE-GROWING.—Farm vegetable-garden; soil and situation; how to lay out a garden; shelter; buildings; frames; implements and tools. Value and treatment of farmyard manure; lime and fertilizers; green-manuring; compost heaps. Garden cultivation; preparation of seed-bed; rotation of crops; time to sow; varieties; harvesting of all vegetables. Marketing vegetables; home saving of seed.

(*b.*) FARM FORESTRY.—Propagation of plants—seeds, cuttings, layers, transplanting, wrenching, balling, root-pruning; varieties of trees suitable for hedges, shelter-belts, timber. Layout of shelter-belts and timber areas; planting and maintenance. Propagation, planting, selection, and identification of useful trees of the New Zealand flora.

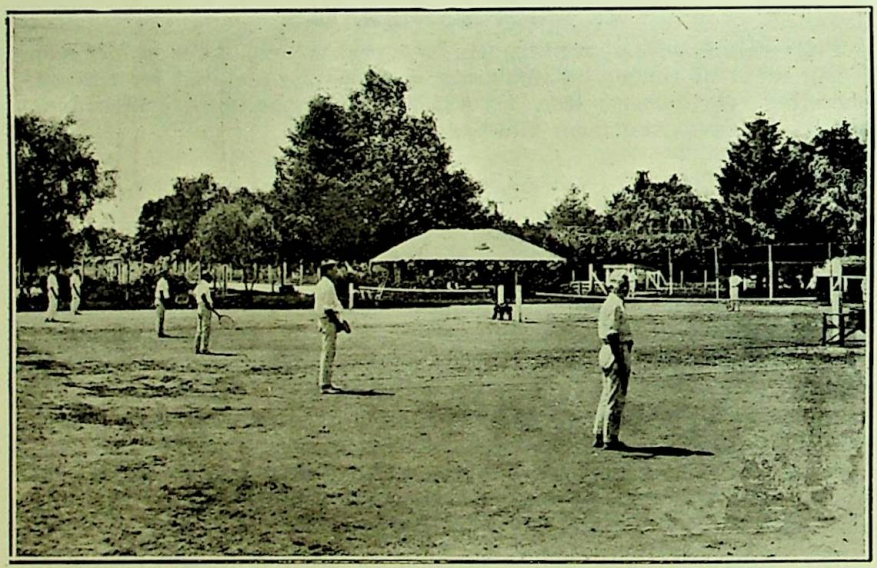
(*c.*) FRUIT-CULTURE.—Soil; selection of site for orchard; how to lay out an orchard; shelter; buildings; implements and tools; cultivation; use of manures; green-manuring; cover-crops; propagation of fruit-trees; stocks; grafting, including root-grafting; budding; pruning; spraying and preparation of spray mixtures; thinning fruit; harvesting; grading; packing; marketing; varieties recommended.

V. POULTRY.

General account of poultry-farming in New Zealand, and its commercial aspect as a side-line to various types of farming. Layout of plant; poultry-house construction; characteristics and points of various breeds; breeding, selection, and culling; natural and artificial incubation; natural and artificial brooding, and the care of chicks; nutrition, digestion, and poultry-foods; principles of feeding; rations and feeding-practices; utilization of farm-grown foods, and the purchase of foods. Management of stock birds; diseases—prevention and treatment. Economics of poultry-keeping and returns under varying conditions; marketing of poultry products.

VI. BEEKEEPING.

Value of beekeeping; the relation of bees to agriculture; the production of honey as a farming side-line; the anatomy and physiology of the honey-bee; establishment of an apiary; hives and appliances; handling and management of bees. Queen-rearing; extracting honey; disposal of honey; diseases and their control.



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22.

Postal Address:
"The Manager,
Ruakura Farm of Instruction,
Hamilton."
Telegraphic Address:
"Agfarm,
Hamilton."

DOMINION OF
NEW ZEALAND.

Railway Address:
"The Manager,
Ruakura Farm of Instruction,
Claudelands."
PARCELS TO HAMILTON.

Please quote No.

DEPARTMENT OF AGRICULTURE.

RUAKURA FARM OF INSTRUCTION,
PRIVATE BAG,
HAMILTON,

To

10th June 1926.

Sir John Middleton,
Government House,
Port Stanley,
FALKLAND ISLANDS.

Dear Sir John,

Your letter of the 2nd. February reached me only seven days ago from which it would appear that it was subjected to considerable delay en route.

I am pleased to learn that substantial progress has been made in giving effect to the proposals in connection with a state experimental farm and it will certainly be a pleasure to me to render any assistance possible at this end. I note that you will request our Government, through the Secretary for State to select a Manager and a Teamster in New Zealand and I am already making confidential enquiries with a view to locating suitable men.

Had we been able to secure the shipping space for the last consignment of sheep even a month earlier than was the case much better sheep on the average would have been secured. I saw the whole of the Romneys and rejected two rams and a few ewes. I was unable to examine the Corriedales which were purchased in the South Island but my brother who resides there and is a competent judge examined and passed them on my behalf. Even if not many of the sheep selected by the Company have to be rejected the fact that they will be examined prior to shipment tends to much more careful selection.

I shall certainly endeavour to secure the best available for the money when filling the Government's order for the experimental farm.

I have not overlooked my promise to forward a supply of literature dealing with experimental farm work and matters relating to stock in New Zealand. What I had in mind principally at the time was a set of bound volums of the New Zealand Journal of Agriculture.

These Journals contain a mass of information on practically all matters relating to Agriculture and Stock in this country a great deal of which will provide valuable information to Falkland Island farmers also. I shall forward

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RUAKURA FARM OF INSTRUCTION,
PRIVATE BAG,
HAMILTON,

To

these together with recent publications that are likely to be of interest by the first direct boat. I would have forwarded them earlier but for the fact that they have been stored together with other property since prior to our departure to the Falkland Islands.

Since returning to the Dominion I have been managing "Ruakura Farm of Instruction" which is the principal state experimental and training farm. This suits me better than my previous position which entailed constant travelling. I enclose a copy of the farm prospectus which may interest you.

During last winter we carried 550 pedigree cattle of four different breeds and 1750 sheep on 900 acres.

I remain, Sir,

Yours sincerely,

(A) 1

The Quarters
Stanley

Sir.

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

:- I arrived in Port William in company with Mrs. Munro & Mr. R. W. Carter, Chief Inspector of Stock by the S. S. Kia-Ora, at 3 p.m. on the 5th April last & landed at Stanley by 4:30 p.m..

Mr. Carter & myself left Stanley for Fitzroy South, on our first tour of the Camps, on the morning of the 9th April returned to Stanley by H.M.C.S. Afterglow from Fox Bay via Speedwell Island on the 7th. May. During this tour we visited the following stations:- Fitzroy South, Seal Inlet, & Douglas on the Eastern Island & Port Howard, Hill Cove, Roy Cove, Chartres, Port Stephens, Fox Bay West, & Fox Bay East on the Western Island - Also the Islands of Weddell & Speedwell.

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

On the 23rd. June we proceeded to Port Louis by H.M.C.S. Afterglow & returned by the S. S. Falkland on the 29th. June. During this tour we visited the

unless he possesses a sound knowledge of its indigenous grasses.

Notwithstanding the importance of the subject & the accumulated experience of nearly 70 years which should be available regarding it, great diversity of opinion still exists on essential points in connection with pasture management among the capable men who are in charge of the various stations.

Some hold that the County has always been overstocked while others maintain that their properties are understocked, & that Stock would do better, & the lambing percentage would be higher, if more were carried. Some hold that burning is essential & does no harm provided it is carried out at the proper time, while others contend that it is harmful at all times, & a few go to the length of suggesting that it should be prohibited by law.

The majority do not hold any pronounced views regarding the necessity for periodically resting of pasture but two managers with whom I discussed the question were opposed to the principle holding that they obtained better results by having their Camp well stocked at all times.

The indigenous grasses which comprise the pastures of these Islands are, prudentially all of a decided tussock forming nature & it is well recognised that overstocking is highly injurious to such pastures, whilst periodical resting is highly beneficial to any pasture, it is

essential in the case of Tussock pastures in order to maintain the carrying capacity of the County.

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

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

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

If the foregoing fairly represents the position - & I believe it does - it means that the Colony's only asset has been reduced in value to the extent of more than one fifth during the past 25 years, which should be sufficient

stions to make those who have most at stake consider, seriously, whether there is not something wrong with the system of farming that has brought this about.

The Causes which have been responsible to the extent to which the large tussocks has been destroyed, particularly on the Western Island, & the total absence of any serious effort to replant the old hays appears to me to be very regrettable. In view of the fact that this can probably be classed as one of the most nutritious grasses in the world it is remarkable to see it so much neglected in a County where nutritious vegetation of any kind is all too scarce. I can assure Falkland Island Farmers that, had we similar tussock points & Islands in our County, we would value them sufficiently to take very good care of them! Various different manners to mean, any estimate to be reliable must be based on an intimate knowledge of the County over a period of both good & bad years, in order that the law of average may be applied.

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

sions to make those who have most at stake consider seriously, whether there is not something wrong with the system of farming that has brought this about.

The Causes which have been responsible for reducing the Carrying Capacity of this County have also, no doubt, detrimentally influenced the nutrition of the remaining pasture, & it will probably be found that this has a strong bearing on the extraordinary heavy mortality among young stock - but this aspect will be dealt with later in this report.

Overstocking

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

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

If a County is stocked according to its Carrying Capacity during favourable seasons, as is often the case, it follows that overstocking with all its attendant evils must be practised during less favourable seasons, & to a more extent, even during average seasons.

Immediately on taking over control of a property the wise manager sets to work to ascertain its maximum carrying capacity, & by the time this is accomplished he is also in a position to decide what margin of safety the local conditions require & stocks accordingly.
While an extended knowledge of country is necessary to enable a person to form a reliable opinion of its carrying capacity, an experienced man does not require such knowledge to enable him to recognise when country is overstocked, particularly when it has been overstocked for an extended period.
In all parts of the Falkland Islands the pastures provide abundant evidence of overstocking over a long period, & judging by the present condition of large areas of country, as well as by the gradual decline in its carrying capacity - as instanced by the official records - it is safe to say that the country has been subjected to overstocking for a period of at least 30 years.
X There are still areas of dry camp where the pastures have been well maintained as a result of good management, & from these, as well as from the home paddocks at many settlements, one has little difficulty in forming a reliable opinion as to what the greater areas of what is now more

or less exhausted pasture, where once like, & what they would still be like had they not been subjected to overstocking & other forms of injudicious management in the past.

Unfortunately, the best of the country has suffered the greatest damage from both burning & overstocking - from burning because being dry days the fire has been able to burn into & destroy the roots of the grass as well as to damage the surface soil; - from overstocking because being dry small country, sheep have been able to crowd on to & eat it out in the absence of sufficient subdividing fences to keep them properly spread. Nature insists that soil shall be protected by a covering of vegetation of some kind & the experience of all countries has been, that when man destroys the indigenous vegetation, & fails to immediately replace it with some other, nature will provide one of her own choosing which is usually very inferior to that which man destroyed.

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

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

There is strong evidence that when stock was first introduced to these Islands, practically the whole of these areas were carrying grass & that they were the eyes of the country from the pastoralists point of view.

There are many instances, particularly on the Western Island, where the different conditions of the pasture on either side of a boundary fence provide striking illustrations of the result - to pasture - of different forms of management when followed consistently over a period of years -

In one such case a boundary fence for several miles devides an area on which diddle-dee &c. has completely replaced the native grasses from another area which is quite free from diddle-dee & still carrying very good native pasture. - the diddle-dee growing right up to the fence on one side & the tussock pasture doing likewise on the other side. In this instance the

difference in the Camp on either side of the fence is so pronounced & so sharply defined as to enable a person strange to the locality to trace the line of the boundary from as distance of several miles. On some properties where severe overstocking has been practised the Condition of the Camp on either side of a subdivision fence provides similar lessons; Areas which have been reserved for horse paddocks & for holding stud Stock & Consequently not overstocked, are still carrying good mixed native grasses, whereas on the other side of the fence the Pasture has been Completely exhausted by overstocking & burning & replaced by diddle-dee, Christmas bush moss & other inferior vegetation. The Island of Weddell probably provides as good an illustration of the evils of burning & overstocking as it is possible to find either in this Colony or elsewhere. This Island is typical of the best Camps in the Colony & in the virgin Condition its Carrying Capacity was no doubt quite equal to any other area of similar size.

During the year 1897 Weddell was carrying 23,400 sheep whereas at the present time it is fully stocked with 8,500. The original Carrying Capacity of this Island was probably in the vicinity of 16,000 sheep & had

this number not been exceeded, it would have maintained that Capacity indefinately under reasonable management.
This Island has recently Changed hands & there is every indication that it will be given every opportunity to recover some of its lost glory.
The system of management, or should I say mismanagement, which has brought Waddell to its present deplorable Condition, has also left its mark on about 90 per Cent of the remaining pasture of the County, & although in most localities the process of decay has been Considerably slower than at Waddell, it will nevertheless achieve the same result eventually unless overstocking & injudicious burning is discontinued.
Not only is overstocking still practised extensively, but, on a large number of stations, the excess Consists of dead old sheep that cannot possibly pay their way while at the same time they are consuming the grass which is required to maintain the younger sheep in that Condition which is necessary to enable them to produce their maximum weight & quality of wool & to enable the ewes to rear their lambs.
This Class of sheep are not taken at any time but when they cease

an excess over the true Carrying Capacity of the Country, they become a menace.

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

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

The managers quite realise the error of hanging on to these old sheep, but on account of the poor lambing percentage & heavy mortality among hoggets, a number of them are forced to keep the Culls in order to comply with ~~the instructions which practically~~ communications which practically amount to instructions from H.O. absentee Owners or Company Directors as to the number of sheep that should be carried. It apparently does not occur to these Owners & Directors that the exhausted condition of the Pastures, which is to a great extent the direct result of overstocking with these old Culls, is in turn the principal Cause of mortality

" " "

among their combs & hoggets.
A great number of people who
are financially interested in sheep
without having had any experience
of their management appear to think
that the income from their wool
clip depends on the number of sheep
they carry - apparently overlooking
the fact that both the flesh & wool
are products of the soil & that the
weight & quality of the latter
will depend to a great extent on
the condition in which the sheep are
maintained during the year.
Any competent manager knows that
a flock of 15,000 good young sheep that
are carried in healthy condition right
through the year will give better
results than an inferior flock of 20,000,
more particularly when the feed is
insufficient to carry the latter number
through the winter without a check.
I took advantage of opportunities at
different settlements, to examine wool
from last seasons clip & the only large
percentage of tender fleeces (not really
bare ample testimony to overstocking
on an extensive scale.
It would appear that Absentee
Owners & Company Directors are a great
deal more to blame than managers
for the overstocking of pastures. When
discussing carrying capacity with
managers during my tour of the camps
the majority agreed that the country
has been seriously damaged by overstocking

" "

stated that their owners - or Directors as the case might be - insisted upon a given number of stock being carried. No reasonable person would question the right of an owner or managing Director to issue any instruction they may think fit, to their resident Managers, but the wisdom of doing so can well be questioned, unless the person issuing the instruction knows at least as much about the subject as the manager.

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

After looking carefully into the matter I am of opinion that Company Directors & Absentee owners who are either not fully conversant with station management or have not kept in close touch with the progress of events by regular visits to the Colony would best serve their own interests & those of the County by relying a great deal more on the judgment & advice

of their resident managers than they have done in the past.

Burning.

Probably burning has been almost equally responsible with overstocking for the exhausted condition of the pastures, which has resulted in the reduced carrying capacity & other evils which are so seriously affecting the sheep farming industry. The land in this County can be roughly be divided into three classes, as follows:- The first is the County which is dry & hard as a result of good subsoil drainage. The soil on this County is light & usually black but occassionally chocolate in colour, & varies in depth from 10 to 18 inches, according to locality, with a subsoil of yellow clay of very open texture varying in depth according to locality - the maximum being about 10 feet with probably pervious rock underlying. In some localities a few inches of rubble separate the soil from the subsoil, & in other localities rubble is mixed with the subsoil.

This Class constitutes the eyes of the County from the Pastoralists point of view for it grows the most nutritious grasses, & stock can feed in comfort & find a dry Camp on it at all seasons. In its virgin condition this was very good County & quite equal to average good tussock Pasture in other Counties.

The second class is the medium dry country retains the moisture to a greater extent than is desirable during about 4 months of the year as a result of indifferent subsoil drainage. Here the soil is of a more pleaty nature with a stiffer subsoil, & probably less pervious rock underlying.

The third is the wet Camp & the land of which is represented by the high Country. This is a wet & pleaty soil varying in depth from 6 inches to about 2 feet 6 inches with no subsoil & apparently impervious rock underlying.

I am informed that this camp dries to such an extent at times during summer that fissures appear in the soil - due of course to the same cause that makes the swamps a bog during winter, viz the impervious rock which lies so close to the surface. As has been previously indicated in this report, the first class is unfortunately that which has suffered the greatest damage from both overstocking during the fact of its having a well drained & consequently dry surface has enabled pines to burrow below the surface into the roots of the grass or when they do not actually burrow below the surface, sufficient dirt is conveyed below, to either destroy or, at least, considerably weaken the roots of the grass. Each time an area of pasture is fired a certain percentage of the fine grasses & herbs, which grow between the white grass tussocks & which provide the feed sheep feed,

is destroyed & others are weakened & killed that has either recently germinated or is in the process of doing so is completely destroyed & the surface soil itself, which is the main cog in the wheel of the pastoral industry, is damaged to a greater or lesser extent.

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

The evil of burning this class of country does not end even with the damage that is done directly to the fires, for the reason that stock round onto burned areas & gnaw the succulent young grass so hard, that further extensive damage is due to this factor.

Some managers contend that any class of country can be burned without injuring the roots of the grass provided it is done when the surface soil is damp, also that sheep eat the young growth of whitegrass which follows a fire & thrive on it. This is carried up to a certain point only - Hoary Camps can be burned at any time without doing some damage & although sheep eat the young growth of whitegrass that follows a fire & thrive on it, this is only a temporary advantage; proving to be an ultimate round of loss in place of gain when compared with the damage that

is done to the fine grasses which grow between the whitegrass tussocks, & which provides the real sheep feed & the foundation of the pastures. It is the gradual elimination of these fine grasses, among other reasons, that is directly responsible for the Pastoralists troubles in this County, including the drop in the Carrying Capacity, the mortality among young stock, & the slow maturing of young stock.

Whitegrass is not a sheep feed in the ordinary sense of the term & its principal value on good County from the sheepmans point of view is to provide shelter for the fine grasses & weeds which grow on the spaces between. If a manager is determined to burn any Camp certainly the best time to do so is when the surface soil is wet & a strong wind blowing but even under these favourable conditions some damage will certainly result.

The second class County has not been damaged to the same extent as the first Class owing to its well compact nature making it more difficult to destroy the roots of the grass or damage the compact soil, & also because stock have not crowded onto it to the same extent.

However the second Class is now subjected to a great deal more burning than the first because there is more left

to burn, & if the practice is continued its tussock pasture will eventually be destroyed over extensive areas, as surely as this has already been accomplished on the first class County.

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

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

So the process of exhaustion has proceeded slowly but surely for many years, until now in many localities all that remains to be

done in order to completely destroy the productivity of the surface soil is to fire the deep rooting & very inflammable diddle-dee, which has already replaced so much of the valuable tussock pasture as a result of overstocking & burning.

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

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

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

The regressing of the more or less waste areas of first class County

with introduced grasses should not present any insurmountable difficulties & it will eventually more than justify any expenditure that may be wisely incurred in carrying it out. With the great areas of wet or even moderately wet Camps however, the position is different, for here the soil conditions are such as to render regrassing on an extensive scale - excepting by the seeding of the grasses already growing there - so difficult as to be almost impracticable. Those who agree with the foregoing will readily realise the necessity for departing in any way that may be deemed necessary from the system of management which brought the pastures to their present condition, & the departures which immediately strike me as likely to be most effective are further subdivision, reduction of stock to a stage which will permit of the resting & seeding of all pasture at regular intervals, & the confining of burning to wet Camps, having resort to this very sparingly even there. Pastures cannot last indefinitely unless they are permitted to seed at regular intervals & unfortunately the best varieties of grasses are those to disappear first, particularly so on sheep country for the reason that being palatable & nutritious they are kept fed close to the ground until finally exhausted,

whereas the less palatable herbivorous varities are permitted to seed & replace them.

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

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

Importantly the result of exhausted pasture does not end with the drop in the carrying Capacity, for there is also, reduced lambing percentages, reduced weight & quality of wool,

delayed maturity of young stock increased mortality, all of which this County is already experiencing. Nor does the advantage of close subdivision end with the protection of the pastures for it also gives a much better control of the stock, enables inferior County to be put to full use during suitable seasons of the year (which applies particularly in the case of cultivated crops in this County), helps to guard against inbreeding, enables most of different classes to be kept separate at shearing. Sheep running on small blocks are much quieter than those on large blocks, & anything that will quieten Falkland Island sheep - more particularly the breeding ewes - must be a great advantage. A change from paddock to paddock is also very beneficial to sheep when they become accustomed to it, as they quickly do under the rotation system of grazing. What will constitute personally sized subdivisions depends to a great extent on the carrying capacity of the County but on the average good camp in this County between 4 000 & 5 000 acres for breeding ewes & hoggets & 7000 acres for main flock would not be aiming too high.

When the value of close subdivision is fully realised managers often carry it further than was originally intended or thought possible & in

such cases it is a great advantage to have the original fences so situated as to be most favourable for further subdivision. Consequently, before any new subdivision fences are erected it will be found a wise plan to prepare a rough plan of the property showing all existing fences as well as lines where there is any possibility of others being erected in the future.

Cattle.

It would be very beneficial to pasture to carry many more Cattle than is done at present, more particularly on properties that are subdivided into areas which will enable them to be used to the best advantage as regards to clean up the coarse vegetation as well as for the purpose of consolidating the surface soil. The coarse vegetation must be kept in check in order to give the fine grasses & herbs, which provide the principal sheep feed, a chance, & for this purpose either Cattle or fire must be used.

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

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

It is of course not suggested that any portion of the main camps can be brought to anything approaching the condition of the settlement paddocks by using cattle but they will assist very materially if kept in sufficient numbers & handled judiciously. Unfortunately there is no means of marketing surplus cattle at the moment but if the number were carried that is necessary for the benefit of the pasture they would

materially hasten the time when the County will be in a position to support a small fattening works.
Then should it not be found profitable to grow turnips to top them off they could be marketed in the form of
X The standard of quality of the cattle in the Colony is extremely low, which is due no doubt to the fact that under existing conditions there exists practically no incentive to improve them. They are very much inbred & extremely small, weighing only from 3½ to 5 cwt. when put in place of the usual average of 7 to 9 cwt. which one expects elsewhere.
The Colony is indebted to those owners who have imported fresh blood during the past few years.

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one of the most serious difficulties with which the pastoralists of this County have to contend.
A few stations are still able to rear sufficient young sheep to enable them to cull, to a limited extent, for both quality & age, but on the majority of properties the trouble has reached a stage at which the Annual increase is barely sufficient to maintain the flocks without any culling except for dead old age while on a few even that stage has been passed & sheep must be imported from outside to maintain the flocks.

materially broaden the time when the County will be in a position to support a small pulping works. Even should it not be found profitable to grow turnips to top them off they could be marketed in the form of "boned leg" for which there is always a ready sale.

Importantly the existing fences were erected with a view to holding sheep only & they are not sufficient for even quiet Cattle. I recommend that all fences erected in future should be constructed to hold Cattle also. X

Mortality Among Young Sheep.

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

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

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

During the course of my investigations I gave particular attention to securing information regarding lambing & mortality among young sheep during stated periods throughout the year, but owing to the very indifferent manner in which the records are kept on most stations it was difficult to get reliable figures. However, as a result of careful enquiries I believe that the following figures, which are based on the number of ewes to the ram, fairly represent the position during the past 3 years.

Lambs born 90%.
Born dead or died before marking 28%.
Died between marking & dipping 10%.
Remaining at dipping 52%.

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

"The steady increase in the mortality which has been experienced during recent years has been credited to various causes but that which is most generally accepted, on the Eastern Island at least, is that ewes in which Romney blood predominates are slay breeders & bad mothers; & unfortunately in some cases action based on this theory has already been taken with a view to overcoming the trouble by introducing other breeds of sheep not nearly so well suited to the County as the Romney. I am satisfied that there is absolutely no justification for this theory & any changes of breeding that may be based upon it will result only in injury to flocks by the further wiping of the valuable breeds, of which there has already been altogether too much in this country, without in any way mitigating the trouble.

It has also been suggested that the trouble is due to the fact that Falkland Island sheep are now too well bred. If inbred had been used in place of pure bred the suggestion would deserve serious consideration for it would be possible,

X "The idea that the remedy for the trouble lays in a change to a hardier breed of sheep is a fallacy. What is required is a change to a different system of farming the breed already in the country

that nothing should be permitted to pass unchallenged which is likely to turn

The steady increase in the mortality which has been experienced during recent years has been credited to various causes but that which is most generally accepted, on the Eastern Island at least, is that ewes in which Romney blood predominates are shy breeders & bad mothers; & unfortunately in some cases action based on this theory has already been taken with a view to overcoming the trouble by introducing other breeds of sheep not nearly so well suited to the County as the Romney. I am satisfied that there is absolutely no justification for this theory & any changes of breeding that may be based upon it will result only in injury to flocks by the further striping of the ewes breeds, of which there has already been altogether too much in this county, without in any way mitigating the trouble.

It has also been suggested that the increase is due to the fact that Falkland Island sheep are now too well bred. If inbreeding had been used in place of pure breeding the suggestion would deserve serious consideration for it would be difficult to find any other County where inbreeding has been practised to such an extent. X X

I am of opinion that the Romney is the most suitable of all breeds of sheep for this County, & it is desirable therefore that nothing should be permitted to pass unchallenged which is likely to turn

breeders against them, & for this reason I beg to submit the following extracts regarding their breeding & milking qualities from most authoritative sources:-

In "Sheep Farming in New Zealand," which is the recognised hand-book in that country, William Perry one of that leading breeders & exporters - who owns studs of Lincoln, English Leicester, & Romney Marsh sheep & is a recognised authority - writes as follows (page 45) -

"Romneys are excellent mothers, & are noted for their milking qualities, which enables them to rear two lambs as successfully as a single lamb reared by most other breeds; thus increasing the percentage of good lambs. For breeding fat lambs by Down rams they cannot be beaten". Again on page 60 of the same publication he writes as follows:-

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

In "N.Z. Stock & Station Journal" which is the result of the combined efforts of several of the country's leading stock breeders, the following appears on page 24:-

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

Unfortunately the stock literature at my disposal is extremely limited, otherwise I could no doubt quote

other Authorities or similar lines to the foregoing. This is the first occasion in my experience on which I have heard the Romney ewe — pure bred or otherwise — charged with being either a shy breeder or a bad mother. The extracts quoted represent the opinions of the great bulk of the pastoralists of Australasia the combined flocks of which number 108,000,000 sheep.
One of New Zealand principal exports is frozen lamb of which that Country is the largest exporter in the world. There are 13,000000 breeding ewes in the Country of which approximately 8,000,000 are either pure Romney or with Romney blood predominating.
The New Zealand pastoralist has to pay too much for his land, & knows his business too well, to keep ewes that are shy breeders or bad mothers, from which to produce fat lambs.
There is one large flock of practically pure bred Cheviot sheep & at least two other flocks showing as much Cheviot as Romney in this County & the lambing per centage in these are certainly not greater than in flocks in which Romney blood predominates.
Contagious Abortion also has been blamed for the unsatisfactory annual increase, but there appears to be no good ground for believing that this trouble has existed here at any time & I am of opinion that this theory also may be safely discarded.

It is my opinion that the original main cause of the increased mortality is the gradual process of exhaustion to which the pastures have been subjected as a result of overstocking injudicious burning over a long period, & that the more rapid increase in the mortality which has been experienced during the last few years has been to some extent, due to the fact that older & still older ewes have been retained for breeding

X A defective nutrition is most harmful to the very young & it may materially affect the embryo during the period of gestation with the result that a large percentage would be born lacking in vitality. X

promoting the second main common causes, while dangerous Creeks, ditches & holes have also taken some toll & I shall make further reference to each of these in due course In order to realise the extent to which Pastures at various stages of exhaustion will influence the mortality among young stock - & for that matter all other branches of the sheep farming industry - it is first necessary to recognise the extent to which the all depend on a healthy well conditioned flock, & also in its turn, the extent to which such health & condition depend upon a sufficient & well sustained nutrition.

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No doubt the in & in breeding which has been carried on promiscuously for years, & the wildness of the ewes due to indifferent shepherding, have provided the Second & third Contributing Causes, while dangerous Creeks, ditches & holes have also taken some toll & I shall make further reference to each of these in due course.

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

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

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

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

In some affected areas the deficiency is not sufficiently pronounced to seriously affect the health of stock, while the pastures are still more or less in their virgin condition or even later, provided they are not subjected to treatment which will result in exhaustion to an undue extent.

Should the pastures & soil of such areas be subjected to undue strain for an extended period however, the ingredient that was originally in short supply

will in time become exhausted to the stage at which the deficiency will exert quite an apparent influence on the general wellbeing of the stock.

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

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

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

Strong evidence that the deficiency has become more pronounced

during recent years is provided by the increased mortality among young stock as well as by the increased extent to which the other disabilities mentioned have been noticeable during recent years. In this County young sheep require from 6 to 9 months longer to reach maturity than they do elsewhere, & it is held that if even the best developed ones are used for breeding purposes when 18 months old, it permanently interferes with their development to an appreciable extent. Besides which, the percentage of lambs obtained from them is extremely small. The fact is well recognised that after breeding from local mountain stallions for a few successive generations the progeny become reduced to the size of ponies & for this reason horses must be imported regularly from South America for breeding purposes. Cattle also which are the progeny of several generations of locally bred animals are very small, averaging only about 500 lbs. when fat. They have the dry coat & hide bound appearance which is so typical of cattle suffering from mal-nutrition. Cattle grazing on County where there is a deficiency quickly develop a depraved appetite the which is evidenced by the chewing of bones, wood & other articles for which they would evince no desire on healthy County. Here both sheep & cattle have developed depraved

appetites to an unusual degree.
Cattle eat up all the old skeletons of sheep & sheep have a great appetite for the excrement of penguins & wild geese.
Early during the course of my investigation I was surprised at seeing practically no skeletons of dead sheep notwithstanding the heavy annual mortality, & on making enquiries I was informed that they were all cleaned up by the cattle. Later I learned that this applies to all camps where cattle are running. On camps where cattle have not been grazing - Weddell Island for instance - skeletons at all stages could be found. On one occasion reference was made, in my hearing, to the fact that sheep eat the excrement of wild geese, &, as a result of further enquiries, I am satisfied that they eat the excrement of both wild geese & penguins extensively. The great flocks of the latter which exist here should certainly be able to supply the demand.
Further, what appears most convincing evidence that defective nutrition is exerting very considerable influence on the mortality among young sheep, is provided by comparing the mortality & extent of maturity among Westernbred lambs during the first six months of their lives with that of eastern bred lambs during the same period. An estimate which is based on very reliable information (see file 178/24)

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

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

The investigations which are now being carried out by the Rowett Institute on behalf of the Colony, must eventually prove of great value, among other services, will no doubt throw

considerable light on the question of nutrition from the point of view of soil contents.
Should the investigations disclose any serious deficiency of one or more of the essential ingredients, it may be possible to supply them to stock in the form of a chemical lick but nothing should be done in this way except as may be advised by the Institute as a result of the investigations.
Salt, however, will provide very valuable & at the same time a perfectly safe lick meanwhile I am confident that its extensive use would prove very beneficial, even quite apart from the question of serious soil deficiency.
I have been informed that a lot of sheep hang about the Coast to eat the Kelp, but what they really are after is the salt & other valuable chemicals that are always associated with salt in small quantities.
Why not prevent these sheep congregating to an undue extent on the Coast pasture & at the same time supply the requirements of the main flocks by placing suitable troughs containing rock salt at suitable intervals all over the Camp.
Salt is beneficial to sheep in almost any country but here - where such a large proportion of the country is mountain & scrub - it should prove particularly beneficial -

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

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

Flushing breeding ewes for two or three weeks before turning out the rams is one of the very old Customs the advantage of which has never been challenged. A rising condition is highly favourable to pregnancy because a change onto fresh & abundant pasture stimulates the whole system including the breeding impulse. The necessity also for breeding ewes being in good condition at lambing time cannot be too strongly stressed. If she is in good condition she has in her body a reserve of milk producing material to supplement the food supply for a period in event of it being insufficient at the most critical period of the lambs life, whereas if she is in poor condition the milk supply must depend wholly on the food she can get from day to day,

of fat that is below requirements so also will be the milk for the lamb.

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

These things are only possible on properties that are well subdivided.

Sufficient of the best camps should be set aside for the fattening lambs & hoggets & subdivided into areas which would permit of the stock being changed, & the paddocks rested at frequent intervals. All fences should be constructed to hold cattle & these should be used to a greater extent in place of sheep to clean up the coarse vegetation & consolidate the surface soil.

Experiments should be undertaken to determine which grasses are most suitable for surface sowing to adopt particularly with a view to regressing the present camping inferior vegetation.

Experiments should also be carried out with a view to growing roots, particularly turnips & swedes, on the extensive scale which in some other countries has proved a mine of wealth & a way

speeding method of improving land.
I shall deal more comprehensively with these matters later in my remarks regarding state experiments.

Rough Handling of Stock

Wildness among lambing ewes is a great disadvantage at all times & usually a source of mortality too, even when lambs are born strong & other conditions favourable for them; but here, where a large percentage are weak for several days after birth & so many dangerous creeks & ditches have to be negotiated, the wild condition of the ewes must be taken seriously into account when considering the various causes which contribute to the heavy mortality among young lambs.
Unusual wildness of sheep is invariably due to one or more of the following causes:- the breed, running on large subdivisions, & rough handling with inferior dogs.
Romney blood predominates in the Falkland Islands flocks & the Romney is certainly not a wild sheep by nature. They are certainly running on large subdivisions, but after making due allowance for this, the main cause of the trouble is reached - Viz rough handling with inferior dogs.
The rough handling to which all classes of stock are subjected here, which is probably a relic of the historic Gaucho, would not

be tolerated in any other County where I have seen Stock handled.
Among other abuses Shepherds go about their ordinary duties with any number up to 5 dogs following themwhen one would be ample & often none would be still better. The great majority of these dogs are very badly trained & not under proper Control a great deal too much use is made of them.
It was not at all an uncommon occurrence to see a dog Collecting & working a point of sheep on his own initiative without being viciously checked by his master.
When a well trained dog is sent round a mob of sheep he Collects the lot quietly & holds them together when Collected. Sheep that are used to this style of handling are quiet & easy to gather into a mob, because they are used to proper Control & Know they Cannot escape from the dog in any Case.
The Average Falkland Island dog is not at all particular about Collecting the whole of a mob, or yet about holding them when Collected. It is quite usual to see sections of a mob break away after being gathered without the dog in Charge showing any Concern.
When dogs were sent some distance to Collect a mob it was quite usual to see them cut through & Collect a portion only, the remainder making

best time for safety. I have seen dogs commence working any number ups to 200 sheep & finish with about a dozen being apparently quite satisfied so long as they had some. During one day I saw 3 sheep drop exhausted & die from apoplexy as a result of rough handling. I do not desire to convey the impression that this last is a usual occurrence, but I mention the fact to illustrate the wild condition of the sheep & the extent to which they are hunted at times.

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

Managers would be justified in taking a very firm stand against this abuse & it would pay owners well to import Border Collies liberally for breeding purposes in order to provide their shepherds with decent material to work on. It would also pay to organise dog trials

as an incentive to men to train & control their dogs properly.

Creeks, Ditches & Holes.

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

This is a source of mortality which requires neither investigation nor advise & which could have been tackled years ago with great advantage. The narrow creeks, into which sheep blunder because they are hidden by vegetation, could be cleaned & opened so that stock may all them; crossings could be made in many places, & where these are not possible owing to the creeks

being narrow & deep, light bridges could be placed over them, at intervals, at small cost.
The majority of these dangerous creeks are from two to five feet wide, & the only material required for most of the bridges would be three 6 ft stringers, 6 piles, & some two inch planking nails, while a number would require only two stringers, (Strong fencing posts would do) four piles, & some two inch planking & nails.
In view of the importance that is attached to these as a source of loss, it is remarkable how little has been done to make them more safe. Even creeks & crossings, which have been in regular use by horsemen for years, have, apart from being dangerous for steer, been tolerated for years when they could have been made convenient & safe at the expense of a small bridge or a little labour with a spade. This work would not necessitate the employment of additional labour. All that is necessary is to make the best use of the permanent hands during the slack season.

Breeding

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

include (1) Breeding from parents (particularly males) that have been bred for a long period without any infusion of alien blood; (2) breeding from parents that are true to the type of their breed; (3) breeding only from animals of good Constitution & high standard of excellence; (4) breeding persistently to a standard on which the breeder must already have all his mind; (5) breeding from selection, by mating animals so as to conceal defects & render desirable qualities more permanent in their progeny. "These principles are all based on the first law of heredity, viz that like begets like.

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

While the most thorough knowledge of these principles & the results that are likely to be obtained by adhering to them will not make a man a successful breeder unless he has practical experience & sound judgment, it will nevertheless enable him to avoid many serious errors & work along those lines most likely to lead to

success, without indulging in costly experiments which so often result in extensive damage being done to flocks. The men who occupy responsible positions in connection with the sheep farming industry of this country have experience & sound judgment but it can hardly be claimed that the system of breeding which the great majority are following is either in accordance with recognised principles or that which will certainly one handicap under which they are labouring is that they have not at their disposal the facilities which will enable them to apply better methods. X

[illegible] breeding is practised indiscriminately by the use of sires selected from within the flocks by running breeding ewes rams of all ages up to 11 years together. The lineage breeder, the term pedigree, as applied to stock, indicates animals whose lineage can be traced back by a line of pure breeding for an extended period. The benefit which stud animals derive from such a long line of pure breeding lies in the added prepotency, or, in other words, the great power which it gives them of transmitting their type & individual excellence to their progeny. The Crossbred sire rarely possess this power in any marked degree, & when he does he is only a happy chance & seldom transmits the power to his progeny.

Nothing provides such good proof