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Mr. William Davies, M.Sc.

SUBJECT.

1938.

7th March.

GRASSLANDS OF THE FALKLAND ISLANDS AND
PROBLEMS ASSOCIATED THEREWITH.

Previous Paper.

Interim Report.

MINUTES.

1-13. Interim Report by Mr. W. Davies, M.Sc., of 7. 3. 38.

W. Submitted. No copy of the report was sent to this office.

*WCH
es.
25.3.38*

Official members of Ex Co. notified on this

5/4/38

*Clerk Ex. Co,
Accordingly please.*

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5.4.38*

Subsequent Paper.

Hon. Treasurer. *B. To. 5/4/38.*
" S. W. D. *Nov. K. 9. 4. 38*
" *G. H. H. 11-4-38.*
" *W. H. H. 13. 4. 38*

To see Reas 1-12.

C. J. J.
For. L.
5/4/38.

From H. E.

(13)

The A/A or Mr. Davis
was to send a copy of
this interim report to you.
If you have not received
it will you please furnish
this original. Mr. Davis
wishes it kept confidential

~~W.H.H.~~ 22/3/30

7 MAR 1938

12



CONFIDENTIAL.

Interim Report.

The Grasslands of the Falkland Islands and problems associated therewith.

by William Davies, M.Sc.,
Senior Grassland Investigator - Welsh Plant Breeding
Station Aberystwyth.

The following interim report must be regarded as purely tentative in its conclusions. It is of a preliminary character only and is based upon generalized observations made during the course of a comprehensive survey of the Colony including most of the larger outlying Islands. This survey was made during the period November 1937 - March 1938. Every Station on the East & West Falklands respectively has been visited, and the general grassland problem has been discussed as fully as possible with the Owners and/or Managers concerned.

The general reaction to the grasslands of the Falklands and their associate problems has been discussed with a large number of other persons representing all shades of opinion, and many grades of grassland knowledge within the Colony.

I have been favourably impressed by the general enthusiasm shown relative to potential grassland improvement. One has everywhere been well received and nowhere has any hindrance been placed in my way during the whole conduct of the work. Private individuals have gone to considerable length to make my stay pleasant among them, whilst Official circles have provided me with every facility and have given me every encouragement in my work.

For obvious reasons I have been most closely associated with the Department of Agriculture and I would wish to add that the Director and the whole of his staff have at all times been most helpful and without their close and whole /

hearted co-operation the volume, at least, of the work which has been achieved could never have been attempted within the short period of time allotted. The whole effort from start to finish has been based upon co-operation and team work. For this I cannot but feel highly gratified.

(1) The improvement of pasture lands as they exist at present in the Falklands is possible and there is every indication that such improvements will be payable and would have a highly favourable reaction upon the general economy of the Colony as a whole.

(2) The improvement of existing grasslands may be viewed from the viewpoints of,

(a) the natural grasslands as they stand.

(b) the use of new species designed to improve the general character of the grazings.

(c) the existing fertility standard of the soil together with potential means of soil improvement.

(d) the management of stock on pastures and the effect of this upon both existing and potential grassland types.

(a) The natural grasslands. As they exist today the natural grasslands of the Falkland Islands contain relatively few species of high nutritive value. The majority of plants appear also to be of low relative palatability when compared with many pasture plants already introduced into the Colony. Some of these latter are widespread and under the influence of man, have invaded the natural grasslands. On the whole the introduced plants are more valuable grazing plants than those natural to the Colony. Among the latter group however, there are a few elements of outstanding merit as pasture plants and in particular are the small rush (Juncus scheuzerioides) commonly the chief component of the "green valleys" in Camp,

Aira or wavy grass (Deschampsia flexuosa) and sheep's fescue (? Festuca ovina var. magellanica) Each of these is highly palatable, produces very nutritious feed, and can withstand to a considerable degree the almost incessant grazing to which ^{it is normally} ~~they are~~ being subjected. There is a good deal of evidence which suggests that the number of species in Falkland Island pastures which are "pulling their weight" is few and that the animals in the main concentrate their attention upon these few. There is evidence too, which indicates that selective grazing in the past has reacted detrimentally upon most of the native grasses of high palatability and in some cases they have been reduced to very low proportions; in this connection may be quoted the tussac (Poa flabellata) and native fog or soft blue grass (Trisetum subspicatum). There are others that might be added but they all as a group are tussock forming (=Caespitose) plants which while being palatable are unable to make rapid recovery after grazing with the result that they quickly become diminutive and are completely exterminated under continued close defoliation.

With regard to the improvement of pastures envisaging only the use of plants native to the Falkland Islands it would appear that all the evidence gained from lands completely or partially rested from stock over a period of years shows this method of potential improvement to be slow and on the whole unlikely to prove an economic proposition. Granted that the proper grazing plants are available and will flourish, there is no better soil and land improver generally than the grazing animal.

(b) Exotic or introduced species.

From the viewpoint of pasture improvement in the Falkland



Islands it is ~~entirely~~ fortunate that many European grazing plants of accepted value will grow well in this country. Of extreme importance is the fact wild white clover (Trifolium repens) once properly established will grow to profusion on a variety of grassland types in the Falklands although at the present time its distribution is largely limited to "hard camp" chiefly in the vicinity of the settlements including outlying shepherd homes. The growth and spread of white clover throughout the pasture lands of the Colony should be regarded as a project of the first importance for there is no other single species which is calculated to promote the progressive improvement of pasture lands more than wild white clover. White clover is likely to provide the foundations for better pastures and the keystone of land improvement* in general.

Yorkshire Fog (Molcus lanatus) appears for a number of reasons to be the grazing plant most appropriate to work with in the immediate future. Fog establishes extraordinarily well on most types of camp; in its young leafy stage it is extremely palatable* and recovers rapidly after being grazed off. When compared with most other grasses and clovers the seed of fog is cheap and this provides still another incentive for its wider use. There are abundant indications in the Falklands that fog when established in the native pastures tends materially to improve the carrying capacity of such pastures. Any such increase in stock carried must to an extent build up soil fertility which in turn will make for a gradual but progressive improvement in the herbage growing upon that soil.

*Even in advanced stage of growth Yorkshire fog compares quite favourably in respect of palatability with the greater number of native plants growing in association with it.



Experiments conducted by the Department of Agriculture (and including those lots received from Aberystwyth) have shown that fog will establish successfully from surface sowing. On most types of soft camp the establishment is reasonably good without any preliminary treatment such as harrowing the surface, but on many grades of hard camp, especially where the existing vegetation is short and very matted, it would appear that a good "scratching up" of the surface is an essential pre-requisite to the sowing of fog or any other seeds. It is wholly likely too that better "takes" will accrue after drastic harrowing on all types of camp - soft as well as hard - but this remains a problem for the investigation by the Agricultural Department within the Colony. There can be no doubt however that fog when sown on unprepared soft camp will establish fairly well & will provide an appreciable addition to the diet of stock grazing upon such camp. As a general rule however the rough and dead herbage usually associated with such camp should first be burnt off prior to the sowing of any grass seeds.

It has been indicated that the sowing of fog can go ahead with every confidence of a successful outcome. With regard to wild white clover the position is less easy. There is at least one problem associated with the establishment and spread of clover which must first be solved before the general sowing of white clover can be recommended. This problem is one associated with the apparent lack of appropriate bacteria (Bacterium radicolola) in Falkland Island soils. Suggestions for experimental work in this connection are being made in a memorandum to the Director of Agriculture. There is a second problem of some importance connected with white clover. Chiefly all perennial clovers (including white clover) are cross fertile and normally /



bee - pollinated. In the absence of bees or other appropriate pollinating agents in the Falklands white clover does not set seed*. It is obvious that ~~is~~ if the production of seed could be induced the clovers would spread by that much the more rapidly.

Apart from wild white clover and Yorkshire fog a number of other grasses and clovers which have been introduced to the Falklands have a potentially high value. These include (among the grasses), brown top, cocksfoot, red fescue, timothy, dogstail, sweet vernal and (among the "clovers") strawberry clover, alsike, suckling clover, subterranean clover & Lotus major. Among miscellaneous herbs to which some attention might be paid are ~~ryegrass~~^{ribwort} (Plantago laneolata) dandelion (Taraxacum officinale) yarrow (Achillea millefolium) It is becoming apparent on the basis of current researches in Britain that the above among a number of other herbs have a high nutritional value and are themselves rich in minerals.

(c) Soil fertility. The view that the character of soils can be changed under the combined influence of the grazing animal and of the ^{quality of the pasture} feed which that animal consumes, finds fairly general acceptance. A rich herbage therefore will provide a ~~for~~ correspondingly rich excrement and if this is returned directly to the land as under normal grazing conditions then a progressive up-building of soil fertility must take place. Usually stock concentrated on a small area on a basis of rotational grazing will fairly rapidly promote a soil change. This may be, and in most instances, will be, followed by a corresponding change in the herbage. The turfs shown at Stanley indicate the type of change which may be expected to take place on camp of various types in the /

* Counts made in the Colony show that approximately one flower in every 2,000 or so, produces a seed.

Falklands and as a consequence of different intensities of Stock concentration.

(d) Pasture Management. It has been indicated that differential management of pastures has a very material influence upon both herbage and soil. Grassland is usually composed of an admixture of different species and different forms of plants. These different groups usually differ widely in their nutritional value and in their reaction to stock. Some are more palatable than others, although as a broad generalization it would seem that the more palatable are also the more nutritious. Some species which are highly palatable are not however able to withstand hard grazing, usually these types lack the ability to rapid recovery after defoliation and they are the forms which normally become depleted from mixed pasturage. Other species of high palatability associated with high nutritive value are able to withstand repeated grazing, it is in this group that the best pasture types are to be found.

It is obvious therefore that the proper way to manage any particular piece of pasture depends to a large extent upon the floristic composition of that pasture. The native pastures of the Falkland Islands as they stand today will require to be managed in a way very different from a pasture composed entirely of introduced species, e.g., Fog and white clover. Furthermore the latter type of pasture will carry more stock and by so carrying, the fertility of the underlying soil will be enhanced.

Recommendations.

(1) The grassland problems of the Falkland Islands require closer investigation. There is every reason to suppose that such an investigation would bring about results of great value in showing the way to improve greatly the stock carrying capacity of the Colony.

(2) With the exception possibly of a number of investigations which demand well equipped laboratory facilities the greater part of the grassland investigational work must of necessity be conducted within the Falkland Islands themselves. For this purpose it is recommended that the existing Department of Agriculture should be strengthened both in personnel and in equipment. Relative to personnel it is suggested that the following new appointments should be made:-

(1) A first class grassland man, trained if possible at some recognized grassland research station. This man needs to be very carefully chosen, he should have the proper personality and far sightedness necessary for his work as well as having a sound general training in economic grassland work.

(II) A man of sound training in livestock matters and in general pastoral farming who would be placed in constant contact with the Camp and its problems. He would act as a direct stock assistant to the present head of department, who is himself a highly qualified livestock man. Also this livestock man could act in an advisory capacity relative to grassland problems generally. He would be in constant touch with his "grassland" colleague who would in this way very largely be left free to conduct his investigational work. It would be a mistake to hamper the "grassland" man with



too much advisory work although it would be very essential that he should be thoroughly acquainted with the Camp throughout the whole Colony.

Relative to equipment and facilities in general, the Department of Agriculture should have land at its disposal and that land for many reasons should lie in close proximity to Stanley. It is understood that the Government hold such a site (block 57) and I have examined this area in some detail. In some ways it provides an admirable site. In situation it is almost as good as could ever be expected, - its acquisition by the Department of Agriculture would however entail the constant use of a boat for the purpose of transporting men and material to and from Stanley. The block referred to, contains chiefly soft camp and the site would have added attraction if parts of the adjacent block 4 could be procured. (It is possible that this might be done on an exchange basis quid pro quo with the present owners of block four-. The easterly peninsulays in block 4 carry a good deal of hard camp and one feels sure that within blocks 4 and 57 an area could be chosen which would very appropriately be representative of almost every grassland type within the Colony.

The acquisition of land such as is suggested would ~~actually~~ mean considerable initial expense in terms of tractor, harrows, and other implements, also in connection with fencing and the purchase of farm livestock.

Such expenses can and should however be kept within bounds and in any case the erection and establishment of costly buildings should be avoided. Any building required would be in the nature of a field laboratory or field shelter and could be of the simplest design

adequate for its purpose.

(3) In connection with the proposed expansion of the Department of Agriculture it is to be hoped that the services of the present head of the department will be retained for at least a second period of secondment from New Zealand. Men with the requisite foresight, personality, sound technical knowledge and administrative ability are not always to be found. It is essential that this first phase in the development of a new department shall be in capable hands and that there should be continuity of policy in the Administration of the Colony. Unless such continuity can be guaranteed with reasonable certainty it would seem far better not to expend any further monies upon development, but rather to allow the pastoral industry of the Colony to develop purely along its own lines.

(4) Throughout the Falklands I have found that turf does not rot and that biological activity in the surface soil generally is at a low ebb. I feel that this problem is one that needs to be thoroughly investigated in England and it is recommended that the Director of The Welsh Plant Breeding Station be asked if he would consider the conduct of such an investigation at his Station. The work would probably require the appointment of a junior assistant and this with the necessary equipment would probably cost some £500 or £600 per annum. If a grant were made for this purpose it should probably be for a minimum period of two to three years when the continuation of such work might be reconsidered and if thought worth while could be renewed or modified. Ideally of course, work of this nature would be best done in the Falklands themselves, but the necessary laboratory

Facilities are not available here and would be altogether too costly to be so made. On the other hand most research stations in Britain will already be equipped for such work.

(5) Chemical work on pasture and soil samples collected in the Falklands.

Some fifty pasture samples and a number of soil profiles have been collected together and are now in the main ready for despatch to Aberystwyth. It is recommended that complete chemical and other analysis be made on these samples. The lots collected differ materially from the herbage samples reported upon in 1925 by The Rowett Institute, Aberdeen, on behalf of the Government of the Falkland Islands. The present samples of grasses, clovers, and miscellaneous plants are in almost all cases "pure species" and it is hoped to deal with these at the Welsh Plant Breeding Station during the course of the present (English) summer. The cost of analysing these samples should not exceed £80 and might be even cheaper. It is recommended that the expenditure be incurred because the investigation is of fundamental importance in connection with the grassland report based upon the tour I have made in the Falklands.

(6) Peat Investigations in Other Countries.

Before the report upon the grasslands of the Falklands is published it is recommended that some appropriate officer should be asked to investigate peat lands in other countries and in particular Scandinavia, Finland, and Scotland. In all of these countries a good deal of peat reclamation work is being conducted. It might be of added value if that same officer paid short visits to Iceland, The Faroes and Ireland. The purpose of these

visits would be to report upon the work being conducted on peat lands in those several countries and to consider that work in the light of the reclamation of soft (peat) camp in the Falkland Islands. The whole investigation should not occupy more than about a month and the cost should not exceed £120 - it might even prove cheaper.

(7) Most of my time in the Falklands has been taken up in the field work and I have taken detailed notes everywhere regarding herbage and other conditions. These notes when properly edited and typed might prove to be useful records when placed on the files of the Department of Agriculture. I have been wholly unable to find time to edit such notes in Stanley and in the absence of a qualified stenographer I have not been able to pay any attention to my field notes. It is recommended that this work be done at Aberystwyth and that a "typist - stenographer" be allotted for my use after I return to Britain. I would use such a person to collate all my material including some dozens of plant specimens (dried) which are being sent to England for correct identification. All these specimens will be returned to Stanley correctly identified and properly mounted and annotated. The cost under this general heading need be no more than £60 or £70. The services of this assistant would not be required once the final report had been completed.

7 MAR 1933