

GRASSLAND - WORK OVERSEAS.

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I think you realise that I will be able to give only the merest sketch of a subject of such dimensions as "Grassland Work Overseas". A good deal of it has already been touched upon by Dr Hilgendorf, who has dealt with some of the Overseas Work on Ryegrass selection, so I will just try and bring forward some of the points I think may bear on other phases of grassland work being carried on in New Zealand. After all, we have to recognise that grass is one of the most important factors in human existence, Somebody once said - "After air, light and water, the next most important thing is grass". We know it exists in all lands to some extent, but there is no country in the World so dependent on grass as New Zealand.

94% of our exports are from grass; in Australia 60%, Canada 17% - taking three countries of the Empire - and the importance of grass can be realised when it is remembered that five hundred million animals are carried on the grasslands of the Empire.

Now, the fact that practically all or most of the countries in the temperate zone are now becoming more interested in grass as a crop has a special significance for this Dominion. We find that most countries are trying to improve their pastures. Many of them have Plant Breeding Stations and are developing grass and clover seeds, etc.. Much experimental work on pasture management is being carried out, and all the work going on overseas has a very vital relationship to us in New Zealand.

Improved Strains. Taking the raw materials for pastures - grasses and clovers - Dr Hilgendorf told us of the ryegrass strains that had been selected over 100 years ago in England. Coming to a later period, Prof. Gilchrist was the one who did so much to bring forward the claims of wild white clover, and also was the first to show the virtues of New Zealand Cocksfoot. However, coming to more recent times, I think it can be said that modern grassland work dates from the foundation of the Welsh Plant Breeding Station at Aberystwyth in 1919. I have often thought what would have been the *result* of the Plant Breeding work at the Moutohaka State Farm started by Mr Hill, *now* Dr Hill, in 1912, had it not been abandoned. As you probably know, he then investigated particular strains of prairie grass - why he took prairie grass, God only knows - he also showed the difference in strains of cocksfoot. His Assistant, Mr Beverly, was, I believe, the first to isolate a strain akin to New Zealand No. 1, white clover. In 1912, Dr Hill told me that he intended to take up ryegrass the following year, but he left Moutohaka and shortly after the work ceased. Rothamsted, in England, has of course done a lot of work on grassland, but I think that Aberystwyth, established in 1919, can be taken as the foundation of modern grassland work. In 1927 the Imperial Bureau of Herbage Plants was set up under the Directorship of Prof. Stapledon and this Bureau gathers data from all parts of the World and publishes it in bulletin form. In this way the Imperial Bureau plays a big part in guiding the grassland work of the Empire. Mr William Davies works in conjunction with this Bureau. He is Liaison Officer on grassland work for the Empire. He spent two years in New Zealand, one in Australia, and I understand he is to go to Canada this year,

The valuable work that is being done at Aberystwyth on strain improvement of grasses and clovers, in improving the technique in regard to experiments on grassland and *in* studying the underlying factors *in* relation to grass and clover mixtures, their *sowing* and after-management, is well known,

We know of the work going on at Aberdeen, in other parts of Britain and *in* Europe also on pasture problems and it is interesting to note that even in Russia they have a Bureau with 130 Stations in various regions working on Plant Breeding alone.

Canada is now doing more work on pastures, particularly in connection with seed growing, but, as far as I can learn, grassland work in U. S. A. is overshadowed by the amount on crops, although there too, there is an intensification of pasture research activities. Much of this activity will mean increased competition to New Zealand because the agricultural depression beginning in 1920 meant that a lot of the wheat growing areas of Europe could not compete with the modern wheat growing methods of Canada, United States, Argentine and Australia. Quite a number of the European countries were forced to concentrate more and more on pastoral production and this has meant increased development of animal produce, with competition for New Zealand, particularly in the British market. It is therefore very important that we in this Dominion should keep up and even increase the work that is going on in regard to grassland research and on the improving of the quality of our exports in relation to grassland production,

As Sir Daniel Hall said some little time ago "Pastoralists must learn to farm grass, and not treat it as an Act of God".

I regard Australia as the greatest competitor we have in our Overseas markets. Australia has only 4 million acres of sown grassland (compared with our sixteen million). This is mostly in the Coastal regions and she is making tremendous advances in her dairying industry. Her fat lamb industry is also developing strongly in some States, e.g. Victoria. I believe that in many parts the Commonwealth is able to produce as cheaply as New Zealand and even more cheaply in some areas; I think we should watch what she is doing on her grassland areas. In this connection the following particulars regarding Grassland Research in the Commonwealth may prove of interest.

The Federal Government allocated £250,000 for research.-by the Council of Scientific & Industrial Research, and £100,000 as a trust fund for the training of research workers. The Annual expenditure of the Dept. of Scientific & Industrial Research is £100,000, and of this something like £50,000 is provided from funds other than the Government which means that a considerable amount of money is being given for research work in Australia, (of course only a proportion of this is devoted to grassland) quite apart from the Government;

Working under the direction of the D.S.I.R., there is the Plant Industry Division at Canberra, under the control of Dr Dickson, associated with whom is Dr McTaggart who is known to many of you; his job is plant introduction. Over 1,000 plants from all countries are under trial there. They are carrying out trials on New Zealand certified ryegrass, and I have here a photograph showing a trial of New Zealand certified ryegrass against Irish, and, as in this country, New Zealand ryegrass stands out pre-eminent,

Apart from the Division of Plant Industry established at Canberra there is a Bureau of Animal Health at Sydney which has also been assisted by grants.

Then there is the Institute of Animal Nutrition at Adelaide which is now presided over by Sir Charles Martin, at one time Head of the Lister Institute, London, and with him is associated Mr Headley Marston.

Apart from this, the D. S. I.R. give grants for pasture work of different kinds, subsidising funds given by the Empire Marketing Board. In South Australia we have the Waite Research Institute, which has a trust fund of just on £60,000. In addition, Sir John Melrose donated £10,000 for a Laboratory,

The Empire Marketing Board	£3,000	and £2,000 for five years.
D.S.I.R.	3,000	} Capital Grant
Adelaide University	3,000	
The Commonwealth Bank	2,500	
Private people have given	2,000	
Superphosphate Interests	250,	and gifts of fertiliser.

Much fundamental work on pasture plants is being carried out at the Waite Research Institute, which is really a Commonwealth Institution in many ways. There they are doing quite a lot on the transpiration of Plants. They are carrying out work on irrigation of pastures about 60 miles from Adelaide, and, on a recent visit, I was very interested to see the way our New Zealand certified ryegrass and N.Z.No.1 White Clover strains are showing up in comparison with other types. The work there, as you know, is in the charge of Dr Richardson. Mr Trumble, son of the famous cricketer, is associated with Dr Davies, a brother of Mr Wm.Davies, on the grassland work,

In Victoria, the Dept. of Agriculture have started at Burnley, near Melbourne, a Station for trials something along the lines of Mr Levy's plots at Palmerston North.. In Nes South Wales they have the Glen Innes Station and the Berry Farm, where various branches of research work on pasture problems are in progress.

Apart from these Government Departments or Institutions working on grass problems, they have in Victoria an organisation called the Pasture Improvement League. Funds for this are provided by the Australian Dairy Council, by Banks and Firms, and they are spending £2,000 a year on pasture trials in Victoria. In New South Wales, a Plant Food Advisory Committee has been set up, representing commercial firms working with the Agricultural Department, We have nothing quite like this in New Zealand - more's the pity.

In Western Australia, the Commercial interests collected a fund of £10,000, with the idea of developing pasture work in that State.

Time will not allow of any description of the type of work being carried on at the many Overseas Institutions working on grassland problems, but brief reference may be made to the investigation proceeding at the Agricultural Research Station of I.C.I. on the Jealott's Hill, near London, on grassland management and its influence on the sward.

In these experiments, Mr Martyn Jones, who is in charge of the particular phase of the grassland investigation at the Station, has shown the possibilities that lie before graziers, whereby by grazing alone it is possible to control and. determine the botanical composition of the sward.

In a summary of the experiments as conducted so far, appearing in the firs-", issue of the New Zealand Empire Journal of Experimental Agriculture, we read :

"In a study of the effect on the plant of cutting and grazing to various intensities, it was found that over-grazing and over-cutting markedly restricted the development of the root system and of the succulent leaf-base, both in young and in old established swards, During subsequent growth the production of green leaf during winter and spring was greatest when the grazing or cutting has been very lenient in the previous season.

The behaviour of wild white clover and of three widely varying species of grasses was studied in relation to rate of growth and to weed control when pure species were sown; also in relation t'o their interaction

when sown in admixture and subjected to various grazing conditions.

When sown alone, each of the grass species reacted favourably to non-grazing in the winter and early Spring; but where there was competition as when sown in admixture, the success of a species depended largely on the aggressiveness of the other grasses, and these in turn were strongly influenced by the times of stocking.

The earliest grass-perennial, ryegrass, was by far the most successful in checking the incursions of thistle, especially when the pasture was rested in winter and early Spring; but the late-starting species, rough-stalked meadow grass, crested dogstail and wild white clover, allowed this weed to establish itself and spread very rapidly."

The question of Rotational grazing of pastures has come very much to the fore in recent years. It is not new really, as a description of the so-called new system is given by Mr Marshall in a paper published in England in 1788.

It was given renewed significance by the work of Mr Karl Schneider Kleeberg of Germany in 1895, by Prof. Falke of Leipzig in 1899, and by the better known trials of Dr Warmbold's at Hohenheim, Bavaria, which were carried out during the War. In their trials, the use of small fields, fertilised with minerals and with nitrogenous fertilisers at suitable periods, were the principal features.

A prominent feature of modern grassland research work has been the use of a nitrogenous fertiliser such as Sulphate of Ammonia, along with other mineral fertilisers, in extending the normal season of production from grassland and in increasing the growth at certain periods. It is the latest ally in the effort to get maximum production from pasturage, and, as you know, a number of progressive farmers in this Dominion have taken advantage of it during recent years.

The value of grass grazed in the leaf stage is now being generally recognised in grassland work overseas and other countries.

Considerable research is also being conducted at Home in regard to the best way to preserve surplus grass as ensilage and hay and as grass cakes, but time forbids any detailed discussion of such matters.

I am afraid, as I said at the outset, that I have been able to give a most inadequate sketch of grassland work overseas. The main thought I would like to leave with you is the great amount of research work now being devoted to grassland problems of all kinds, in overseas countries. Particularly would I stress the amount and quality of the work being conducted in Britain and in Australia, which has special significance to New Zealand, since we dispose of most of our animal products secured from pasture to the former whose recent activities indicate an effort to produce more grain, meat and so on from Home farms, whilst the latter looms large as our biggest competitor in markets overseas,

(Mr Holford's lecture was illustrated by a cinematograph film showing phases of grassland research work at Waite Research Institute, Adelaide; Burnley, Victoria; Canberra, Federal Capital; as well as the pasture experiments under the auspices of the Victorian Pasture Improvement League and the N. S. W. Plant Food Advisory Committee. Strain selection trials at Canterbury Agricultural College, Lincoln, and at the N. Z. Plant Research Station, Palmerston North, were also screened,)