

1916.
NEW ZEALAND.

STATE EXPERIMENTAL FARMS

(REPORT OF THE BOARD OF AGRICULTURE ON THE).

Return to an Order of the House of Representatives dated the 1st June, 1916.

Ordered, "That there be laid before this House the report of the Board of Agriculture on the State experimental farms,"—(Mr. SCOTT.)

THE GOVERNMENT EXPERIMENTAL FARMS.

SIR,—

Board of Agriculture, Wellington, 21st January, 1916.

As I stated at the time you were good enough to attend one of our meetings, Mr. Massey has asked us to give him our opinion as a Board as to what should be done with the various experimental farms. In pursuance of that wish the members of the Board have severally visited the farms, and the following is the report which they wish to present to you as the present Minister in connection therewith. I might add that we are very fortunate in having on the Board men of such varied interests and experience. They represent agriculturists, pastoralists, dairymen, fruitgrowers, stud breeders of various breeds of animals, as well as the small-farming class, and one of the members is a man of large experience and high standing in commercial matters, as well as being a farmer himself. Several of the members have written special reports upon the various subjects upon which they have experience.

State farms are established for three purposes—(1) Demonstration; (2) experimental and scientific work in connection with agriculture; (3) education. (All the work done on State farms, however, is of an educational nature.)

DEMONSTRATION.

The objects that a demonstration farm may have are various. Once having shown to the farming public what was intended to be demonstrated, and when the farming community has benefited by the demonstration, the uses of this section of the farm are gone. A demonstration to be of most use must be easily seen by farmers, hence in Ireland they have instituted what are known as "cross-road demonstrations," so that every one who passes by may see them and know what is going on. The demonstrations carried out at the various farms that we have in the North Island have been undoubtedly useful, but unfortunately the number of farmers visiting them is few, owing to the fact that they are somewhat difficult to visit and return home from in a day; and you know from your experience of farmers that unless they can see for themselves the results following any system they remain sceptical and averse to making any alteration in their own method. It does not always follow, however, that a demonstration given at any one point is actually seen by many farmers, but some of the more enterprising and eager farmers do see it, and reduce the methods of practice on their own farms, and thus spread the knowledge among the neighbours by what they see. At the same time the original Government demonstration should receive the credit for any change of system.

One point which may be noted here is that the work of the farms would be very much popularized by having excursion trains run to them at certain times of the year. Hitherto any body of men wishing to go there have been responsible to the Railway Department, and the guarantors having been called upon in one or two cases, the excursions to the farms have to a large extent been discontinued. It would be of great service from an educational point of view if the Agricultural Department could arrange for special trains for the purpose of visiting the various farms. Without doubt the opportunity would be largely availed of.

EXPERIMENTAL AND SCIENTIFIC WORK.

The object of the whole work of demonstration and experiment is to educate the farming community. In carrying out experiments the object in view must always be the advancement

of New Zealand agriculture or some particular section of it. It is of no use conducting experiments on lines that can never prove of any possible advantage to New Zealand agriculture. Neither is it any use doing anything on lines that are already widely known and universally adopted. Improvements on existing New Zealand methods of farming and the introduction of improved methods must always be the object in view. There is, too, a matter of extreme importance—viz., plant-breeding—which includes the improvement of our various grains and fodder plants by means of selection or cross-fertilization, and this work must be extended.

The carrying-out of ordinary commercial farming on any of its well-known and widely adopted lines should not be the work of an experimental farm. Farming is divided into many branches, and the best practice in any branch is attained only by specialists. The work of a specialist in any of the known branches of farming can seldom, if ever, be equalled by an experimental farm. Nor can it be looked upon as a directly profit-earning venture or be expected to show direct profits. The practical farmer works on known lines, and he knows at the outset that certain conditions will give him certain results. He may—and if at all enterprising probably does—experiment in a small way, but these experiments will not be on a large enough scale to seriously affect the financial results of his farming operations if the hoped-for result is not obtained. It must always be remembered that failure to produce the expected result may teach as much as success. The very word “experiment” indicates that the result is doubtful. In the case of the Government experimental farms the information obtained is given free to the public. It would be as reasonable to expect a primary school giving free education to show by a profit and loss account a profit balance as to expect a profit balance from an experimental farm. We should only expect from them what we expect from our schools—namely, that they should be economically and efficiently run. The profit lies in the increased production which is the result of the investigations, thereby benefiting the Dominion through the farmer. Many experiments require scientific knowledge, and this must be available and must be drawn on freely if the experiments are to be a success. With experiments it is essential that there should be accurate and complete records. Inaccurate or incomplete records are worse than none at all, because they are frequently misleading and cause wrong deductions to be made. Again, the results of an experiment may be largely influenced by the previous treatment of the soil, and unless the history of such soil from its original state has been kept, inferences may be extremely misleading. The results of all experiments should be carefully recorded and clearly tabulated and made freely available to the public. Unless the public has this information put before it and the deductions therefrom clearly stated the educational value is lost.

The objective and policy of these farms has never been clearly laid down, and there have been so many Ministers with various views as to what should be attempted that constant changes have left much ground for criticism. But criticism of past mistakes is not the object of this report, and it cannot be denied that all the farms have served some good purpose. Ruakura has shown by top-dressing experiments how greatly the production of the land can be increased by manuring, and the farming community has greatly benefited by these experiments. The system of testing dairy cows and keeping and publishing exact records of every cow milked has shown the value of herd-testing. This lesson has not yet been widely learnt, but the practice is spreading each year. Plant-breeding and selection has been carried out at Ruakura, and the demonstration of lucerne-growing at Moutmahaki may yet prove of value, though it is too early yet to speak definitely on the point.

ACCOUNTS AND RECORDS.

We have had the advantage of one of our members with a complete knowledge of accountancy to go through the accounts of the various farms. When the members of the Board first glanced over these accounts they were astonished to find that the cost of training lads was so high. The net cost shown in the balance-sheet for the year 1914–15 is as follows:—

	£	s.	d.
Twelve lads at Ruakura	1,939	17	8
Six lads at Moutmahaki	614	17	2
Six lads at Weraroa	368	13	3

When this matter was looked into by the above-mentioned gentleman he found that the account was charged with many items which do not seem justifiable, and that the cost per head at the different farms varies according to the difference in the method of keeping the accounts. It was found, too, that the wages of the lads (which run up to 17s. 6d. per head per week) were charged to this account, while no credit was given for the work which the learners did. This is an instance of how records may be made misleading unless carefully and accurately kept.

The Board considers that the learners should not receive wages.

There has been an inclination to unjustifiably write up in some cases the value of the stock, which should remain in the stock-sheets at a fixed value.

Whereas the records of the production of the cows milked seems to be carefully and accurately kept, this is not so with the records of the various experiments, which are incomplete, and there are no continuous records of the work done in the various fields. Although a few entries have been made at Ruakura and Moutmahaki they are not continuous, and are therefore of little value. It will be well, while Managers and employees who have had to deal with these fields are yet available, to have the history of each field written up as far as possible from the time it was first brought in. Unless this is done all knowledge of previous experiments will be lost. Failing such a history as we have suggested, a careful analysis of the soil and a record of the original growth should be made, and a start made from that point. This history would be continued every year. At Rothamsted such a complete history has been kept for sixty years,

and an instructive book in connection with it published by Mr. A. D. Hall, the late Director, under the title "Rothamsted Experiments." An annual report, with a guide to the experimental plots as a supplement, is published each year, which brings the history up to date.

Neither do there seem to be any records (except very brief notes) of either the stock carried by the various paddocks or the crops grown.

The Managers of the various properties complain that with the clerical staff at their disposal this work cannot be done properly. The Board thinks that it is essential that sufficient clerical assistance should be supplied not only to keep the exact records, but also properly to tabulate them and have them made available to the public. Without this, experimental work can be of little value. The cost of this additional assistance, in comparison with the present expenditure on the experimental farms, would not be great, and without these records the work done is likely to be misleading and of little educational value. In the case of Ruakura the office accommodation is sadly inadequate.

ABSENCE OF FARMS IN THE SOUTH ISLAND.

If these farms are to be used for experimental and research work more than they have been in the past it is important to note that they are all situated in the North Island. It is quite true that southern agricultural farming until quite lately was much in advance of that of the North Island, and that they had Lincoln College doing some experimental work for them. But as time goes on, and as land rises in value, and the virgin qualities of the soil are lost, it is evident that one or more experimental farms in the South are just as essential as in the North. Yet it is likely that the money required for this purpose would be very difficult for the Government to find for some time to come. This point has been carefully considered by the Board, and, as will be seen later, their recommendation includes a suggestion that a portion of the North Island farms could be sold without impairing their efficiency, in order to provide others in the South Island. These might form the nucleus from which demonstration plots in various parts of the districts surrounding them might be carried on by officials from the farms, or probably by the cadets or learners who might be receiving their training there.

STUD SHEEP.

The Board was unanimous in thinking that the day had gone past when it was necessary to maintain stud sheep on the experimental farms. All the members who had seen them were of the opinion that they had gone back. None of them show any exceptional quality, and some are inferior. There are large numbers of stud breeders throughout New Zealand of all the breeds of sheep used in this country, and it is not reasonable to expect the Managers of these State farms, working under departmental rules and restrictions and attending at the same time to the vast number of details in connection with the many experiments being carried on, to compete in the production of stud sheep with the specialists who are devoting their whole time to the work. The only breed of sheep that the members have any doubt about is the Ryeland. There are very few of this breed in New Zealand, and until it is proved whether they are suitable or not for our requirements it might be well to retain them. The flocks of this breed at Weraroa and Moumahaki, however, should be joined. If they prove of value there will soon be plenty of breeders ready to take up the work of supplying any demand that may arise for rams of the breed. The Board thinks, therefore, that with the exception of this one breed all the stud sheep should be disposed of and replaced with commercial sheep as they may be required for carrying out grazing, feeding, fattening, and crossing experiments, or for the growing of fat lambs which may be disposed of in the usual manner.

The delay of the Department in replying to Managers' requests for authority to buy store stock is much against the best results being obtained from feeding experiments and the grazing of the farms. If authority has to be obtained it should be granted promptly by wire. A Manager should, however, have the power to buy ordinary commercial stock as required. He could before the end of each month furnish the Department with a return of his probable requirements and sales for the ensuing month, at the same time explaining, if necessary, why his previous estimate has not worked out.

DAIRY HERDS.

Members of the Board are of opinion that the Holstein cattle at Weraroa are a valuable lot. It was questioned whether the Department was right in having imported two bulls from America of an entirely different class, and it was the opinion of one that the progeny of these American cattle were not so good as the old herd. Having this valuable strain, however, it would be better to retain the cattle in the meantime, because all these farms would require a milking-herd. The selection of sires should be left entirely to the man in charge of the herd.

There is nothing special about the Jerseys at Ruakura—in fact, there are many people in the district who are breeding much better animals for stud purposes. This herd might be sold off.

It would be advisable to send the Illawarra cattle to Ruakura for the purpose of having this breed carefully tested as to milking-qualities and general profit with the Shorthorns at present there.

The Moumahaki cattle are a nondescript lot, except one or two good Ayrshires.

The most important demonstration that any of these farms can possibly give, and which should never be lost sight of, is the selection of the dairy animal by test. This could be shown as easily with an ordinary herd—in fact, perhaps better—than with a purebred one. So far as breeding for sale goes, it is the same with the dairy herds as with the stud sheep; the Government farms are not likely to be able to compete against the private owner. There is therefore

no reason why the purebred herds at the various farms should not be sold off, with the exception of the Weraroa Holsteins, the Illawarra breed, and the milking Shorthorns, which are worthy of further trial.

FRUIT.

One extraordinary fact was noted by our member who reported upon this subject—viz., that none of the fruit-farms was in a fruitgrowing district, except Arataki and perhaps Tauranga. Weraroa, for instance, could scarcely be called a fruitgrowing district in the same sense as Nelson is, but a large sum of money has been spent upon the fruit-farm there. The Overseer, however, states that in his opinion neither the soil nor the climate is suitable for apple-growing, giving as his reason that the high winds, sometimes laden with salt, are deleterious to fruit generally, and that there is not sufficient sun to give the bright attractive colour which is so necessary for export apples. Pears, however, are said to do well.

At Moumahaki much has been done, although latterly this section has been somewhat neglected.

At Ruakura the Overseer has this portion of his work well in hand, but our information is that, with the exception of pears and peaches, the land is quite unsuitable for fruit-culture.

At Arataki the orchard is in very fair order, being well cultivated and the trees well pruned and sprayed, and it is thought that this orchard, worked as a practical experimental orchard, would be of immense benefit to surrounding districts, as it is in the midst of a very fine orchard district. With the exception, therefore, of Arataki, as the land is not particularly suitable for fruitgrowing, and is not in districts where fruitgrowing is the staple industry, it is thought that it is a waste of money and energy for the Government to encourage the cultivation of fruit in dairying and grazing districts, as what constitutes a good climate and soil for one branch of agriculture does not necessarily for another. The aim of the Government should rather be to the encouragement of fruitgrowing in districts which are unsuitable for grazing but which make ideal land for the production of the very best of export fruits.

Again, at Waerenga there seems to be no move among the farmers of the district to develop fruitgrowing, as dairying seems to be the object they have in view. As with the other farms, mistakes have been made here in the past, but with regard to the trees now being planted the Department seems to have benefited by the lessons learnt. It is quite certain, however, that elsewhere in the Dominion there are districts where fruitgrowing is becoming the staple industry, and it is in these districts that experimental fruit-farms should be. At such farms experiments of all kinds could be carried out under exactly the same conditions as those under which the commercial growers are working. Then and then only will experimental fruit-farms be of any real value to growers, but they must be managed and organized better than at present, and the fruitgrowers' associations should be consulted as to their scope.

It was noted that records in fruitgrowing have not been kept, and it was thought that such reports are of just as great value in this branch of agriculture as in any other, and for that reason we would like to emphasize the fact that immediate steps should be taken to collect what records are available, and for the future a thorough system should be maintained.

RECOMMENDATIONS REGARDING FUTURE OPERATIONS.

Ruakura. (914 acres.)

The Board is of opinion that the whole of this property should be retained and the farm placed under the management of a trained professional man; that the stud sheep should be sold; that the Illawarra and milking Shorthorn breeds be specialized there; and the stud sheep replaced by commercial sheep for the carrying-out of the ordinary experiments in connection therewith. The present work in connection with grain-selection should be continued, as it is of great value.

The cadet system might be extended and worked in conjunction with the high-school pupils, who might camp at the farm for the purpose of practical instruction, and opportunity should also be given to the Education Department to hold teachers' summer schools there.

It must always be remembered that there is a great difference between the cadet who goes on a farm merely to gain knowledge of the practical work and the student whose aim is the scientific side of agriculture, combined with practice, and for whom the motto of the Royal Agricultural Society of England would be appropriate—viz., "Science with practice."

Tauranga. (97 acres.)

This horticultural station might well be retained, as it has not yet been proven whether that district is suitable or not for fruitgrowing.

Moumahaki. (585 acres.)

The area of this farm is greater than is required for experimental purposes. The homestead and 200 acres should be retained for that purpose, and the balance sold.

Here again the stud stock should be sold. The purebred Ayrshire cattle of good class, however, might be transferred to any farm which might be established in a neighbourhood where this breed is more suitable. An ordinary dairy herd should be retained. The Leicester sheep should be sold. The sheep of the Ryeland breed should be concentrated either at this farm or at Ruakura, and retained for some time to ascertain whether they are suitable for producing fat lambs or as wool-growers. The pigs are of good quality and should be retained. As the land seems to be suitable for potatoes, experiments with these tubers should be continued. The grass-selection work should be extended. There is an immense field in this direction for

investigation. As our production is practically dependent on the growth of grass, any improvement upon the existing varieties or any new grasses being made available or known must be of great consequence to New Zealand. The lucerne experiments should certainly be continued. It would be of great advantage if some demonstration plots could be grown in various localities on the west coast.

Arataki, Hawke's Bay. (70 acres.)

This farm is of small area, and was originally stated to demonstrate that vines could be successfully grown in that district, and for the growth of phylloxera-resistant stock. Now that vine-growing has been taken up by the public there is no further use for the demonstration, and the vines could with advantage be disposed of and the land used for other purposes. The orchard should be retained, as there are large quantities of fruit grown in the district. The Manager of the farm should consult with the fruitgrowers' association in the neighbourhood to ascertain what experiments could be carried out to solve the problems of the fruitgrowers of the district.

One very important work which might with advantage be undertaken, and which we have already alluded to, is the growing of drought- and frost-resisting grasses and plants for grazing purposes. One of the disadvantages of the Hawke's Bay climate is that it is subject to late frosts, which in some seasons cause a great deal of damage. Pumpkins, for instance, can be grown easily, but a frost may completely destroy the grown crop. Here again much benefit would be gained by the experiments were a committee of the practical men of the district being consulted as to their direction.

Te Kawwhata. (2,842 acres.)

In connection with the wine-growing and wattle-bark industries at this farm it is well to remember that these farms are run quite differently from any other business. A farmer puts his receipts into the bank and draws upon them as necessity arises, and at the end of the year (if he is a wise man) he makes a statement of his position. In the case of the Government farms the receipts go direct into the Consolidated Fund, and before any money can be drawn out of that fund a vote must be passed by the House. As this vote must not be exceeded, the returns which would be made by an ordinary farmer are liable to be curtailed. In this case the wattles require to be cut down and the bark stripped and crushed, which entails considerable expenditure. It is quite possible that funds may not be available for that purpose, and this may be the explanation of why one year the wattle plantation shows a large profit and in another a loss. This is a further proof that a Government experimental farm should not be put to commercial uses. It would be much better, therefore, for the Government to get rid of the portions of the farm devoted to these purposes. Should it be decided to sell the plantation a shelter-belt of wattle on the western side of the road should be left.

There is a balance of about 400 acres which is suitable for fruitgrowing, and this might be planted at once with proper fruit-trees which have been proved to be successful in the district. A small area of grass should be retained with the fruit-trees, and the farms disposed of as hitherto. In connection with this, however, it is important to note that the Board is not satisfied that the Government has been selling the land at a payable price, and very careful consideration should be given to this before the land is disposed of. Naturally the land should be cut up into such areas as would be most likely to sell as fruit-farms, and only those varieties of apples planted which are suitable for export and such pear-trees as are known to suit the district and the market. The whole farm might then be disposed of, and the funds devoted to fruit-farms in suitable districts, as is suggested elsewhere in this report.

Weraroa. (800 acres.)

This farm was originally bush land, and has been nearly all reclaimed, stumped, and the greater part ploughed. The land is of excellent quality, too good for experimental purposes, and in the midst of a very populous and thriving dairy district. It was stated to visiting members of the Board that this farm could be sold at from £60 to £65 per acre. What few experiments were tried before the present Manager took charge have been lost sight of, and no records retained. The dairy cattle there of the Grigg strain are undoubtedly valuable, but the Board was not impressed with the appearance of the American cattle, despite the fact that they might have been bred from strains having high milking records in America. It is thought that it would be much better to continue the Longbeach strain in itself, discarding the American sires as not being suitable mates for the New Zealand cows. The original Longbeach Dutch-Friesian cattle were bought in one small neighbourhood between Groningen and Leuwarden in Friesland, North of Holland, and were peculiar to that district only. It is quite likely, therefore, that the American strain may be almost considered a different breed, for we are assured that the farmers from whom the Longbeach cattle were bought were much averse to having their cattle called "Holsteins."

It is considered that the Manager should be allowed greater discretion in the mating of the cows, as he is responsible for the success of the herd.

As already stated, we think the Illawarra dairy cattle should be sent to Ruakura.

The stud Romneys should be sold and the Ryeland flock combined with that at Moumahaki, and kept either there or at Ruakura, whichever is the more convenient. The stud sheep should be replaced by ordinary commercial sheep and lamb-fattening resorted to.

The horses on the farms are a good lot, but rather many are kept for the amount of cultivation done.

The orchard is much too extensive. It might be cut down with considerable advantage and only sufficient retained for domestic purposes, and the land put to other and more profitable occupation.

The Board considers that this farm should be retained, as it is quite possible that in the future it may be required for educational purposes. But the land is so valuable and the area so large that it would not be necessary to retain the whole of it, especially as money is required for farms in the South Island. We recommend, therefore, that 400 acres of the outlying portions of the farm should be sold.

The making of soft and fancy cheese has been successfully initiated, and a demand has been created for this class of dairy-produce. This work should be continued, as the farm is not in any way competing with the public.

FARMS FOR THE SOUTH ISLAND.

If the above recommendations were carried out there would probably be something like £50,000 realized from the sale of the land. This money should be devoted to the purchase of two farms of, say, 200 acres each, one in the agricultural district of Canterbury, and another in South Otago or Southland, as the soil and climate of these two districts are quite different.

There has been a tendency in the case of the other experimental farms to overbuild, and many expensive buildings have been put up which are now quite useless. We would strongly urge that proper consideration should be given to the whole question of building when these farms are bought, so that no unnecessary expenditure in connection with buildings will be gone into.

FRUIT-FARMS IN FRUITGROWING DISTRICTS.

Three small fruit-farms should be established, one north of Auckland, which is going to be a great fruitgrowing district; one in Nelson, and another in Central Otago. These would all be in the midst of fruitgrowing districts, and the associated fruitgrowers should advise as to the direction in which experiments are necessary. Fifty acres each would be ample for these farms. Fruitgrowing for export is in its infancy in New Zealand, and bids fair to become of first-class importance to the Dominion. We therefore emphasize the necessity of at once proceeding with these farms.

DAIRY INSTITUTE.

In the opinion of the Board a dairy institution is distinctly wanted, where a dairy scientist might make many experiments in connection with the difficulties which are being experienced in the dairying industry. It could be worked in conjunction with one of the farms—perhaps more easily at Weraroa than at any of the others, owing to the necessity of having a constant supply of milk, any surplus of which might be made into butter or cheese. Practical instruction in connection with dairy-factory management and the making of butter and cheese is at present (according to Mr. Cuddie, Director of Dairy-produce) well carried out in the various factories of the Dominion, but at such an institution classes of instruction could be held for dairy-factory managers and their assistants mainly on the theoretical side of dairying, and instruction could be given in the elements of dairy chemistry and dairy bacteriology, as recommended by Mr. Cuddie in the report on the subject which he prepared at the request of the Board. The chemical and bacteriological work which is at present being done by the Dairy Division could be undertaken and much extended at such an institution.

LINCOLN COLLEGE.

This college is devoting a considerable amount of its funds and of the time of its scientific staff to the improvement of cereals. As its efforts in this direction are of vital importance to the whole Dominion, it should certainly be subsidized by the Government.

CO-OPERATION WITH LOCAL AGRICULTURAL COMMITTEES.

We should like to place before you the necessity of having the assistance of the local agricultural committees which are now being established by the County Councils to work in conjunction with the Department of Agriculture. These committees would most undoubtedly spread the interest of the work going on at the experimental farms, and their knowledge of what experiments would be likely to be of service to the community which they represent would be of great advantage to the management.

LITERATURE FOR SCIENTIFIC STAFF.

It is considered that our experimenters ought to be better provided with reports of what is being done elsewhere, and not have to find themselves, otherwise they run a great risk of wasting time through not knowing what other scientists have discovered.

The Hon. the Minister of Agriculture.

Yours faithfully,
JAMES G. WILSON, President.

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