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# The Growth of Cheaper Winter Food for Livestock

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## The New Zealand Solution of the Problem

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## THE NEW ZEALAND SOLUTION OF THE PROBLEM

BY DR H. E. ANNETT

*New Zealand*

IN New Zealand there are approximately 16,700,000 acres of good grassland, and 14,200,000 acres of land in rough grass. It will be of interest to note that Great Britain is similarly situated as regards grassland, in that she has 16,700,000 acres in good grassland and 14,800,000 acres in rough grassland.

Arable land is relatively of little importance in New Zealand. Rapid developments in production from grassland have taken place within recent years. The output of butter is six times greater than in 1900, and cheese fourteen times greater. The amount of dairy produce exported has doubled since the War, while the number of cows and heifers two years old and over in 1918 was 793,000, and 1,305,000 in 1927. The output of wool has increased by 80 per cent. and meat by 70 per cent. since 1900, but the meat increase has been mainly from lamb.

This great increase in production is due largely to the more extended use of fertilizers, chiefly phosphates, and better pasture management. In regard to the increase in production of dairy products, the part played by the herd-testing movement must not be overlooked.

The climate of the Auckland Province of North Island is, as a general rule, almost ideal for dairy farming. Cattle are never housed during the winter, and it would seem quite possible to get grass to grow the whole year round. The rainfall is ample and, on the whole, well distributed.

The New Zealand farmer is, moreover, an intelligent type of man. He has had his mind broadened by the co-operative movement, both as regards his dairy factories and the herd-testing movement, and that he is prepared to watch his own interests is indicated by the interest he is now taking in the marketing of his own products. I do not, however, claim any superiority for the farmer of New Zealand over the British farmer. The difference is one of circumstance.

Of recent years he has become accustomed to use large quantities of fertilizer, particularly in the Waikato. Since the war the percentage of grassland fertilized has increased from a negligible figure to about 20 per cent. This is a remarkable demonstration of how quickly the New Zealand farmer has taken to new methods. The fertilizer used is mainly superphosphate, and 215,000 tons of rock-phosphate, equivalent to 400,000 tons of superphosphate, were imported into New Zealand in 1928. This was mainly converted

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into superphosphate, though a small quantity of rock was used as such.

As an indication of the rate at which the practice of top-dressing with superphosphate is increasing, it may be mentioned that 174,587 tons of rock-phosphate were imported into New Zealand in 1927-1928, against 113,472 tons in 1926-1927, an increase of 54 per cent. It is estimated that approximately 3,000,000 acres of grassland were top-dressed in New Zealand last year, and certainly the bulk of this superphosphate was used on grassland.

The Waikato area of the Auckland Province is the most advanced in regard to the use of superphosphate, and the dairy farmer there commonly uses 3 cwt. of superphosphate per acre per annum, and cases are known where 4 cwt. or even 6 cwt. per acre per annum is being used over the whole farm. Quite a number of farmers are applying their superphosphate in two dressings at different times of the year, and the experiments being carried out by the Department of Agriculture at Marton appear to indicate that this is a very sound practice.

In these experiments it has been found that a flush of grass-growth occurs six to ten weeks after the application of superphosphate according to the time of year the manure was applied. It is possible that the phosphate content of grass recently manured with phosphate is higher than that not so recently manured, and this may react on the feeding value of the pasture. Therefore I think future work will show that the New Zealand practice of annual applications of phosphate is sounder than the usual English custom of applications of phosphates every few years.

It will be seen that although the New Zealand farmer is becoming a great user of fertilizer his manurial practice is one-sided, being almost entirely phosphatic. Liming is being practised to a small extent in certain areas, but the use of potassic and nitrogenous manures is rare.

Superphosphate has undoubtedly enabled the New Zealand farmer to carry more stock per acre. Many dairy farmers are now producing more than 200 lb. of butter-fat per acre, or say 550-600 gallons of milk. This increased production means an increase in the amount of plant food constituents removed from the soil in the increased grass consumption of the animal. The superphosphate supplies phosphate and some lime, but there is a danger that the animals may suffer on account of an insufficiency of potash, and, perhaps, of other rarer minerals which are not being replaced in the manurial scheme. We know nothing, moreover, regarding the rate at which lime is being lost from our New Zealand soil, and it is quite likely that even our heaviest dressings of superphosphate do not supply sufficient lime to make up for the loss from the soil in the drainage water and in the food consumed by the animal.

The recent developments in grassland farming in Europe, embracing as they do a complete manurial scheme, seem therefore to have special interest for New Zealand.

Recently I have had the opportunity of visiting a large number of farms in Great Britain and Ireland, Holland and Germany, which are run on the intensive system. As a result of these visits I have been able to obtain much valuable information. Undoubtedly great results are being obtained from the system in many places, but it is quite obvious to me that we have still a great deal to learn regarding the way in which intensively grazed farms should be managed.

In New Zealand my own farm is run very intensively, and I am associated with numerous farmers who are working on similar lines. There is one very marked difference between the way we are putting the system into practice and the way it is being practised in England. In the latter country six or seven grazing paddocks are considered to be sufficient, and cows are left on each paddock a week, or even more. In a few cases, however, I was interested to see that the best milkers are allowed to go ahead of the rest of the herd into the paddock next to be grazed, for an hour or two per day. But perhaps the best system is that adopted by Mr Shaw at the Seale Hayne College, where, when a field is ready for grazing, the cows are allowed into it only for one and a half hours a day morning and evening for the first few days—the rest of the time being put back into the previous grazing field to clean it up. In this way the good grass is not fouled by the droppings, and very even grazing is obtained.

We in New Zealand are using many more paddocks in the grazing rotation, and we consider twelve to fifteen are necessary. It is unusual on the farms with which I am associated to allow milking cows to graze a paddock for more than two days. During the actual grazing time we usually run fourteen to sixteen cows to the acre, so that on a farm with, say, forty-five cows our paddocks would be about three acres in area. The grazing stock are followed by young and dry stock and, in my own case, with sheep after the young and dry stock.

Harrowing we consider to be an essential part of the system, and in general, I should say, we attach far greater importance to this than is done in England. A good deal of work is being carried out in New Zealand regarding the designing and testing of suitable harrows.

Quite a number of farms are now being run under the system in New Zealand, but before giving details of these I would like to make a few general remarks.

The use of milking machines is universal throughout New Zealand.

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Certainly as regards the North Island the use of the plough is becoming rare on dairy farms.

The growing of root-crops is being given up in favour of ensilage made from grass. The ensilage is made mostly in trenches and stacks, the tower silo requiring much more labour. One point which cannot, however, be sufficiently emphasized is that grass must be cut for ensilage much younger than is usually the case. We have all heard recently of the very great feeding value of young grass, and if we want silage capable of the best milk production it is only reasonable to suppose that grass for ensilage should be cut at the stage at which it is most nutritious. I have heard it said that it is not possible to handle such short grass, but I have recently visited a farmer in Germany who has made silage from short grass for some years, and finds no difficulty whatsoever in handling it. Moreover, when feeding the silage out from his tower silo he finds the further advantage in short grass that it can be easily forked out of the silo without previous cutting into sections with the hay knife. This farmer feeds this ensilage in the winter and gets 2d. per lb. more than his neighbours at this time of the year for his butter, because it is recognized as having the same quality as butter made from May grass. We in New Zealand have followed with interest the excellent work on silage which has been carried out at Cambridge. We are hoping to get more information regarding ensilage made from young grass, and Professor Drew's work in Ireland should prove of great value. I am also pleased to find that an important feature of the work at the Imperial Chemical Industries Research Station at Jealots Hill is a study of ensilage, and an investigation of what may eventually be an alternative process—namely, the preservation of young grass in the form of grass-cake, by means of artificial drying and pressing.

The fact that the farms are entirely, or almost entirely, grass farms in the North Island of New Zealand means a great economy of labour: on a hundred-acre farm it is common to milk 55–60 cows. The whole labour of the farm, including milking, would be done by two men.

It is probably realized by all of you that our seasons are opposite to yours, our winter coming at the time when your summer comes, and *vice versa*. Milking hitherto in New Zealand has not been practised all the year round. The New Zealand farmer has aimed at getting his cows to calve down at the middle to the end of August, and has usually had them dry in June and July. During this period of the year, and into August, hay is carted out for the stock into the fields, and the farmer usually likes to have from a half to one ton of hay per cow for winter feed.

Our first year's experience in the use of sulphate of ammonia showed us that we should have no difficulty in getting excellent

feed in July. In consequence of this it seems certain that cows will be brought in several weeks earlier, and, moreover, better feed would be obtained in August and September, in which months early calvers have in the past been frequently pinched for feed. In October and November we usually have a great flush of grass.

We are also finding that applications of nitrogen in autumn—say, in early May—keep grass growing well into the winter, and it seems quite likely that nitrogenous manures will in parts of the North Island enable us to keep grass growing throughout the winter and thereby solve the problem of winter-feeding in a simple manner.

I will conclude by giving a few details regarding the stocking and the management of certain farms of which I have personal knowledge.

On my own farm I have 40 acres laid off for intensive grazing, but, deducting the areas taken up by buildings, trees, etc., there remain available for the stock approximately 34 acres. New milking sheds were erected in the centre of the farm, and the farm has been subdivided into fourteen paddocks of 2–2½ acres each, one of 3 acres and a bull paddock of 1 acre. Water has been laid on to each paddock, no crops are grown, and the whole area is under grass.

In the first season 5 acres were cut for hay and another 5 acres for ensilage. The farm had been carrying 20 cows and 2 horses under the old system, but no young stock and no sheep. Under the new system 33 cows were milked on the area until the last three months of the season, when only 31 were milked; 12 calves were reared and, in addition, there were also 1 bull, 2 horses and 1 pony.

After the first three months 43 ewes, with 13 lambs at foot, were purchased; the ewes were shorn on the farm and were all sold off, together with 31 fat lambs, after five months on the farm. The farm produced 165 lb. of butter-fat per acre, reckoned on the gross area, and the sheep gave a fair profit. In addition, there were returns from calves sold, including some pedigree short-horn calves, and one has also to take into consideration the value of the twelve calves reared.

The manurial scheme was experimental and will not be detailed here, but consisted of an all-round manuring with phosphates, potash and nitrogen.

The many visitors to the farm remarked that the stock all looked in excellent condition.

The effect of the heavy stocking has resulted in great improvement of the pasture; the rye-grass has been especially stimulated.

The system of grazing was as follows: the milking cows were usually two days on a paddock, and were followed by the young and dry stock, and these in turn by the sheep, and after each grazing the paddocks were harrowed.

*Farm A.* This farm is on rolling downs country near Hamilton,

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Waikato. The present owner has had it for nine years and has never used a plough on it in that time. The farm is 150 acres in area and was carrying in this present season 917 breeding ewes, 450 hoggets, 22 yearling heifers, 20 steers, 8 dairy cows and 5 horses, and even with this stocking the feed was difficult to keep down.

Last year 1300 sheep were grazed during the winter, and in that season the ewes and lambs netted their owner £1287.

The system of management involved rotational grazing of small paddocks, together with heavy top-dressing—namely, with super-phosphate and limestone. I ought to add that the owner is a business man and developed his own system independently of the newer idea of grass-land farming.

*Farm B.* is 50 acres in area and carried 40 cows. Two seasons ago it produced approximately 14,000 lb. of butter-fat, or about 280 lb. per acre: this was under a system of rotational grazing in small paddocks, together with a fairly good system of manuring.

*Farm C.* is 78 acres and carried 50 milking cows. The gross returns in each of the past two seasons has been approximately £1200.

The owner is a skilled English farmer, and grows a certain quantity of root-crops.

*Farm D.* is approximately 150 acres and is carrying 85 milking cows. The farm is laid out in 5-acre paddocks for rotational grazing. A good all-round manurial scheme is practised, including a fairly liberal use of nitrogenous manures.

No crops are grown, and the cattle are dependent entirely on grass, hay, and grass ensilage. A large number of yearling heifers—approximately 50—are carried, and recently 200 breeding ewes were purchased. Last year the herd of 85 cows averaged 364 lb. of butter-fat per cow, which is equivalent to approximately 200 lb. of butter-fat per acre.

The full benefit of the subdivision of fields has not yet been reached on this farm, and it is anticipated that far greater returns will eventually be realized.

The owner is so satisfied with the system that he is applying it to another farm of 180 acres which he has in the vicinity.

These instances are given, not as typical of dairy-farming conditions in New Zealand, but in order to show the results which certain farmers are at present obtaining. However, there are quite a number of dairy farmers in New Zealand who are producing over 200 lb. of butter-fat per acre.