A COMPARATIVE ACCOUNT OF BRITISH GRASSLAND FARMING

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Most New Zealand farmers visiting Britain remark on the failure there to exploit the country's grassland. They see very few pastures which are well grazed by New Zealand standards and they seldom see the concentrations of stock that they think the land and the swards deserve. Carrying capacity seems to them to be unduly low, for it is normal to run $1\frac{1}{2}$-2 ewes to the acre or a cow equivalent on $2\frac{1}{2}$-3 acres on land which can maintain ryegrass, cocksfoot, and white clover swards. It must be admitted at the outset that there is a great deal of truth in these criticisms, for British agriculture, to its detriment, has not yet generally realised the potential of well-managed grass. Though there is a considerable volume of grassland research in progress and though the extension services preach the gospel of grassland farming-though not always based on sound doctrines-nevertheless the practice is not what it should be. This is brought out by the contrast between the best and worst in British grassland farming. In this respect it is certainly a country of contrasts. There are men high up on the clay with flints of the Downs or on the millstone grit of the Pennine Chain who can boast 25cwt per acre of utilised starch equivalent from their grassland, and there are others on lowland soils of good quality who are, well below the national average of about 16cwt of utilised starch equivalent per acre.

At the same time the overseas visitor who is generally a summer migrant arriving after the snow drops and leaving with the autumn tints, usually has a lopsided view of British farming, because he has not experienced a succession of winters there. In most years, and in all but the more favoured districts in the south and west, winter starts in October and does not let up till April. Even then, with a late spring, growth may be trifling and in the absence of positive measures,

there may not be a real bite of grass till May. When growth starts, generally, it comes with a rush and one may be conserving silage within a fortnight of finishing with winter feeding. It is the. rapidity and the wealth of this flush that misleads the summer visitors.

This does not mean, however, that farmers have to accept a grazing season which is no more than 5-6 months long. Very much to the contrary, for there is a great deal of evidence to show that it is economically possible to cut weeks off either end of the winter to provide good grazing in the south from mid-March and in the north from early April until the end of November. There are many tools at the disposal of farmers to achieve such an extension of the season-the use of early and late growing species, nitrogenous fertilisers, judicious resting, and the exploitation of youth in pastures. Some of the old permanent pastures in Britain are highly productive in the main growing season, but even their most vigorous protagonists will admit that they are very slow starters in the spring as compared with rotational grass or leys in their first year.

The best early grower is Italian ryegrass, which has the virtue that it may be very cheaply established by undersowing of a cereal crop and if the spring is a wet one it may be punished in a manner which would be ruinous to a long-term ley. Treated as a catch crop it can provide back end and spring grazing to save expensive concentrated foods and when it has finished its job in May, there is still plenty of time to plough and sow rape or kale as another grazing crop.

This flexibility introduced by rotational farming is, of course, one of the prime features of difference between British and New Zealand farming except for the arable districts in the South Island. The plough introduces a greater variety than is possible with permanent grass and in the greater part of Britain this flexibility is essential if a high rate of productivity from grassland is to be attained.

One of the greatest problems in Britain is the occasional failure of Italian ryegrass and short-rotation ryegrass to stand through a hard winter. This past winter was particularly serious in this respect and there are many farmers who have sown. their last stands of short-rotation ryegrass. Professor, Martin Jones, working at King's College, Newcastle, has demonstrated that there are two main reasons for winter loss. The first is over-grazing in the autumn. Time

and again one comes across farmers complaining after an open autumn, when growth has been particularly good, that their short-rotation ryegrass has disappeared in the spring. Invariably the story is that they have grazed and grazed it till Christmas to weaken the root reserves. It is the old question of having one's cake and eating it. The other extreme of the stand being too proud going into the winter is equally catastrophic because the lush material will rot and potential new tillers will be smothered. Autumn grazing should be controlled and repeated defoliation must be avoided.

To turn 'to another contrasting characteristic of British grassland farming, namely the use of nitrogenous fertilisers, it must be remembered that these cost about half as much, while the gross return for milk and meat is about double as compared with New Zealand. There is a completely different economic situation and on dairy farms where there is an efficient utilisation of pasture, it will pay to apply as much as half a ton of nitrogenous fertiliser over the season. Under such conditions,- clover is little better than a weed in the sward. This does not imply that there is no great function for the clover plant in British agriculture, for very much the converse is true, especially with sheep and beef cattle, which are considerably less efficient than dairy cows in turning grass into money. Even at present prices for meat, which are extravagantly high by New Zealand standards, it is doubtful whether the use of nitrogen on grass is economic except for enhancing a hay or silage crop or for obtaining an early bite when winter reserves are running out,

Several workers, notably Watkin and Williams, have shown that there is a conflict between bag nitrogen and clover nitrogen around the 3-5cwt level of application annually. Used for early and late bite dressings, there will, undoubtedly, be an extension of the grazmg season, but there will be a slumping of growth in the summer months, even to the point in some seasons where total production over the whole year will not differ between dressed and undressed swards. In dairy farming, where one mainly cashes grass as one grows it, this applied nitrogen may be financially worthwhile, but with fattening cattle and sheep! such is their resiliency, there may be no difference in production per acre by the end of July as between dressed and undressed pastures.

My own philosophy and practice in. the use of

artificial nitrogen, especially in dairying, is to use it at a heavy rate on a limited proportion of the farm where there are special-purpose pastures which will show a response. On the remainder of the farm the main reliance is on clover with some nitrogenous fertilisers for early bite, say 1½-2cwt of nitro-chalk per acre. In the long, hard winters the nitrogen reserves in the soil are lower and there is an inactivation of the micro-flora. Clover will not normally start to grow until May and the consequence is that pastures will be anaemic and growth will be poor unless this pump primer is given. If one keeps the light to the pasture in the early summer, no harm so far as clover is concerned will result from using nitrogen at this rate. Additional nitrogen may be applied to boost a hay or silage crop, for here the economics are different, for one must spread the overhead costs of conservation as widely as possible. Then there is the opportunist use of nitrogen to provide grazing if there is a prospect of an immediate shortage of grass.

So far as species are concerned, there are three which are used more widely -than they are in New Zealand, namely, timothy, meadow fescue, and cocksfoot. The last is prized because of its drought resisting qualities and because of the show of growth it makes. In my experience, it is essentially a maintenance grass, which has no great merits for either milk or meat production. Work at the Hannah Dairy Research Institute has shown a depression of dry matter intake by cows on cocksfoot as compared with ryegrass and Paterson, on his Hampshire farms, has recorded a very low output from cocksfoot leys. If concentrates were not so liberally used in British dairying, cocksfoot would be a less popular grass, for its shortcomings are being masked.

Paterson's best performing leys are based on timothy, meadow fescue, and white clover, and this is a fairly typical result with good grassland farmers. The two grass species dovetail well together in respect of establishment and manner of growth. The meadow fescue gives the earliest growth while the timothy gives leafy growth in late May and, June when other species are going to head. It is a very palatable combination and palatability is one of the essentials of a high-producing sward. Two useful additions to the above mixture are short-rotation ryegrass and Montgomery red clover. It is unwise to include more than 6-7lb of short-rotation ryegrass, for it will smother the slow establishing timothy and meadow fescue, but at the

following rates of seeding a good balance can be established.

5-7lb short-rotation ryegrass.
7-9lb S 215 meadow fescue.
5-6lb S 48 timothy.
3lb certified Montgomery red clover.
llb Kent white clover.
1lb S 100 or New Zealand white clover.

Total 22-27lb per acre.

This rate of seeding is low by New Zealand standards, but is ample for establishing a good swa.rd provided seed-bed conditions are good. The availability of leafy certified strains to replace the stemmy commercial 'types, which are still too widely sown for the good of British grassland, has made it possible to effect considerable economics in seeding rates.

The inclusion of two strains of white clover may seem strange in New Zealand eyes, but work at Wye College has shown that Kent white clover is more persistent under hard grazing conditions, due to its very prostrate growth habit, and it is a better summer producer than either S 100 or New Zealand white clover, which give better spring and autumn production. The two strains give greater flexibility to the mixture to meet the variety of conditions imposed by season and by grazing with sheep as well as cattle.

S48 timothy, to my mind, is the outstanding product of. the Plant Breeding Station at Aberystwyth, with S 100 a good second. The Aberystwyth rye grasses, however, have their weaknesses. S 24 runs to head very early in the season, while S 23, which is undoubtedly very leafy, is too late in starting growth and is not very palatable. It tillers well, but it must be managed carefully to maintain the balance of clover. Many farmers with considerable justification prefer a genuine old pasture strain of ryegrass such as Kent certified. New Zealand perennial in Britain tends to behave rather like S24 in making head too quickly and thereby losing quality. Short-rotation ryegrass, on the other hand, remains leafy for a longer period and would be a very valuable grass in Britain if it could be relied on to persist. We are living in hopes that-the new short-rotation will be better in this respect, for ryegrass, despite the popularity of other species, is still the staff of life in grassland farming.

One feature of the Aberystwyth plant breeding work has been the development of special strains for hay or for pasture. This is part and parcel of the British concept of mowing swards as opposed to grazing swards which is, of course, a reflection of the heavy conservation programme which must be undertaken each summer. This division of function is a bad one. On the one hand, it encourages the malpractice of taking hay too often from certain pastures to lower the soil fertility status and smother clovers, and, on the other, it means that there is too much weight given to stemmy rather than leafy strains. With the heavy stock concentrations made possible by fold grazing and the consequent reduction in the efficiency of utilisation by grazing as a result of fouling, it is important that the mowing machine should be taken over most of the grass so that there is a succession of clean aftermaths. The emphasis must be on leafiness and this is where good dual-purpose strains such as S 48 timothy and Kent ryegrass will score.

Most British pastures are established by undersowing of cereals and herein lies one of the great weaknesses of British grassland farming. Those who follow this practice believe they get something for nothing in that they harvest a crop of corn and have an established pasture for the cost of seed and broadcasting and harrowing in. Too often the result of this is the half-failure which is worse than the complete failure for it is retained. Eventually it will fill up with volunteer rubbish but it won't be the sort of pasture that merits intensive management. There is, however, an increasing tendency to seed directly in the spring using a cereal, either wheat or oats at a low seeding rate, as a grazing. nurse crop in order to control weeds as well as to improve initial production. Not only is this a fairly certain means. of securing good establishment but it provides most valuable grazing for the summer gap period of June to August when older pastures have gone stale. It is typical, when a herd comes on to such a spring reseed, for milk yields to rise by 10 per cent or more and there is no other grazing which will provide a comparable stimulus.

It is feasible, especially in the south, to establish leys in the late summer following an early harvested cereal crop such as winter oats, but the practice is not common on the grounds that clover establishment is impaired. Where there is proper consolidation, failure is due less to winter kill of seedling clover than to

smothering, especially in the spring. If: such autumn-sown pastures are properly grazed the take of clover will be satisfactory. The time will come when autumn seeding will become popular, for it is one of the best means at a farmer's disposal for extending the grazing season. Apart from providing useful back end grazing, maiden seeds will give appreciably earlier growth in the spring than long-established leys.

Generally it is considered in Britain that a pasture is never more productive than it is in its first harvest years. The expectation is that it will progressively decline in productivity until the point where it is ploughed. This contrasts with the New Zealand point of view that it takes several years from establishment before a pasture is in real heart. Undoubtedly most sown pastures do deteriorate in Britain and to a large extent this is due to the heavy concentration programme, especially for hay, without adequate fertilising to make good the plant nutrients which are locked up in a silo or a Dutch barn. Usually, when this fodder is used it is by stock which are housed and the farmyard manure, less the nutrients which are lost in the process, goes to tillage land, especially that intended for roots. Obviously, one cannot maintain fertility-demanding species if essential fertility is not provided and so it is little wonder that with the niggardly use of fertilisers the stage is set for invasion by *Agrostis* and *Poa* species.

Constant haying is another source of damage to pastures and the position is aggravated by leaving the crop to an over-mature stage. Surprisingly little silage is made in Britain and this is unfortunate, for the mowing machine used for silage is such an important tool in pasture management. British developments in machinery such as the buck-rake and the Silorator have taken much of the backache out of silage making and yet only a few hundred thousand acres are cut for silage as compared with millions of 'acres for hay.

On this point of green forage handling, a recent development is the adaptation of the gang mower so that the cut material is automatically loaded. The machine is still in the development stage, but the idea is very sound. It involves cutting at what is virtually the fold grazing stage when there is a yield of only 3-4 tons of green matter. There is an immediate recovery of leafy growth and so a succession of clean, fresh grazing can be maintained as a consequence of the conservation programme. One sees in this development a realisation of a promise once offered by grass

drying which never materialised. Unfortunately, grass became a crop for repeated mowing and there was not that alternation of grazing and cutting at a leafy stage which is such an ideal combination. Grass drying is now a thing of the past except on a few farms where dried grass is regarded as a fool-proof way of making super hay to maintain milk yields from pedigree herds and to provide a limited amount of material for incorporation in concentrate mixtures as a source of vitamin A. Costs of production, of which fuel is a major item, make dried grass a very uneconomic alternative to good silage or tripod hay for the ordinary farmer.

A number of farmers now use the gang mower not for conservation but as a means of controlling pasture to avoid flag. Instead of punishing stock to eat rough herbage for the sake of the sward a machine is used. There are trials in progress at present to establish the value of this technique, but from personal experience, one can anticipate the results by saying that gang mowing is a most effective method of removing rough, neglected patches to maintain the sequence of quality grazing. It is a particularly valuable tool in the reclamation of poor permanent pasture. In one instance, within the space of 5 years, gang-mowing, with necessary drainage and fertilising, has converted a waste of thistles, mare&ail, and rushes into a rye-grass-white clover sward which now produces 2501b of meat to the acre.

One deprecates mowing for mowing's sake if this can be avoided. Closer subdivision for grazing in Britain to effect the necessary stock concentrations would obviate a great deal of the under-utilisation of grazing pastures during the summer which is another factor responsible for much of the sward deterioration in Britain. If these clumps were concentrated more in the one field and were cut for silage, two birds would be killed with one stone. Stock could be wintered more cheaply on the one hand, and on the other there would be more mouths per acre in the summer to keep the flush of grass in proper check and so remove one cause for criticism from grassland conscious visitors.

Why are British farmers generally such indifferent managers of grassland when their tillage farming is so very good? The main reason is that their vision is distorted still by the cheap concentrates of the years between the wars. They still lack confidence in grass and only exceptionally do we find dairy farmers who will make grassland the dominant source of nutriment for their stock. In Britain only 55 per cent of the

nutriment for dairy cows is obtained from grass, whereas in the Netherlands, where conditions are no more favourable, the corresponding figure is 80 per cent. Nutriment from grass as grazing is less than one quarter of the cost today of corresponding nutriment purchased as dairy cake and the figure for silage and hay is about one third. Yet the great majority of farmers fail to appreciate this, for they have been so well indoctrinated in the past by recipes such as maintenance and the first 2 gallons from grass and concentrates at the rate of 41b per gallon thereafter. The provender trade never lets up in its efforts and there is no organised counter to its propaganda. In fact the majority of advisory workers are tarred with the same brush and still labour under the delusion that there is a straight line relationship between food input and milk output and that 41b of balanced concentrates always produce a gallon of milk. No wonder the great majority of dairy farmers need nearly 3s. a gallon for their milk in order to break even. There are some men who can produce milk for 2s. per gallon over the whole year and still make a profit and these are the men who farm their own acres and not someone else's in the form of purchased concentrates from which so many middlemen take a. cut. New Zealand dairy farmers can count themselves lucky that such men are still a minority and annually they should pass a vote of thanks to the British provender trade.

Turning now to fat lamb production from grass, British farmers have one tremendous advantage over New Zealand to counter the disability of their long and arduous winters- and that is the prolificacy of their breeding ewes. It is normal in lowland flocks, even relatively large ones, to dock 160 lambs for every 100 ewes mated while New Zealand farmers continue to persevere with breeds which will give 110 per cent of lambs. Moreover, most of the cross-bred ewes used for fat lamb production are good milkers and will rear their twins as well as Romneys will.rear their singles. Their prolificacy is an enormous help in synchronising stock appetite with food supplies, for with the onset of the spring flush there is a tremendous increase in the number of grazing units. By the time growth begins to decline most of the lambs will be marketed. It is likely that there will be an appreciable increase in fat lamb production in Britain because returns, relative to beef, are so much higher. With breeding ewes one avoids the Scylla of having to buy dear store cattle in the spring. and the Charybdis of heavy wintering

costs for stores that are bought in the autumn. These' are the twin menaces in beef production which can reduce profitability to zero.

Generally ewes and lambs, and store cattle too, are set stocked 'in Britain in the belief that if they are not disturbed there is a better finish on the fattened animals than there is with rotational grazing. Some experimental work with ewes and lambs and with Z-tooths supports this view, which is in accordance with the results obtained at Ruakura. We have been experimenting at Cockle Park with a system of rotational grazing which avoids most of the competition from the ewe for the best grass from the time that the lambs are at 7-8 weeks old. We had observed that about this stage there was a marked decline in the ewe's milk production and that she was becoming progressively a less efficient middleman in the chain of fat lamb production. We have borrowed an idea from the old folding system of sheep farming, namely, the provision of creeps, so that the lambs, but not the ewes, can pass through to the clean, fresh grass of the next field in the rotation. Twin lambs which had been creep grazed during the past season at the rate of 5 ewes and 10 lambs per acre-weighed 831b at 16 weeks as compared with 721b for corresponding lambs on ordinary rotational grazing. More than 70 per cent of these twins were fat off the mother as compared with 20 per cent for those on ordinary rotational grazing. Absolute results would have been better were it not for a severe infestation of ***Nematodirus*** spp. as a result of the area being heavily stocked with ewes and lambs in the previous season. Infection was much lower in the creep lambs, presumably because they were able to take the top growth and the ewes did the cleaning up. In the ordinary rotational grazing, the lambs, too, were asked to act as mowing machines and they suffered not only from the higher worm infection, but also from a saw tooth in their plane of nutrition.

We have tried the method out on a field scale and it has worked admirably up to the point where the ewes were shorn. Even then it prevented those which were putting on flesh, rather than producing milk, from gaining access to the best grazing. It promises to be most useful where early lambing is adopted and an endeavour is being made with small flocks of 80-100 ewes to catch the early market for lambs in mid-May through to early July..

This production of early fat lamb is likely to in-

crease, for it realises a premium at a time when fresh meat is relatively scarce. On the other hand, there is likely to be an even more marked reduction of the practice of finishing lambs off roots after Christmas, partly because of the expense of growing roots and partly because this heavy hogget mutton does not realise the money it did in the days of control. More and more fat lamb production will move to dovetail with supplies from New Zealand.

Mention has been made of *Nematodirus*, which has become a serious trouble with lambs, especially in the Border counties. Severe infection is characterised by scouring, a loss of thrift, and quite heavy mortalities in lambs in May and June when they are still on the mother. As yet there is no effective drench and the one method of control is by management. R. J. Thomas at King's College has established that lambs are mainly infected by eggs shed by lambs grazing the area in the previous season. These eggs take 12 months to develop to infective larvae, which are then ingested. The most effective method of control is to reserve for ewes and lambs pastures which have not carried lambs in the previous season, e.g., maiden seeds and fields grazed by cattle or cut for hay. Such control is effective, but it introduces another complication into pasture management.

Finally, a word must be said about the prospects of expanded production from grassland in Britain, as this will be of interest to you, for with the exception of fresh milk, the British grassland farmer is in direct competition with his New Zealand counterpart. That there is scope for expansion, no one will deny. We have the example of enough good farmers to show that this is possible. We cannot, however, expect spectacular progress, for the British farmer, especially in the grassland districts, is a conservative. What is more, intensive grassland management to him is a complicated way of farming. It is so much easier to accept what nature gives and to cut it or graze it in the traditional way, relying on the provender merchant or the arable land of the farm to supply the quality of the ration. Not enough people realise what a fascinating interest the management of grassland can provide in such a country as Britain. One has to be on one's toes to provide May quality grass for 8 or 9 months of the year and every device must be exploited. Things are just so much harder than they are in New Zealand, but economically, as well as from an interest viewpoint, it is very worth while being a good grassland

farmer in Britain. Apart from any question of immediate profit, the men who really farm their grass will be the ones with some measure of security when commodity subsidies disappear. This is inevitable for Britain is dominantly urban in character and is more concerned with the cheapness of food than its source.

DISCUSSION

Q. During the early stage of the war many pastures were ploughed up and wireworm problems were to the fore. I should be glad to know what is the position of the wireworm in British pasture today?

A. Any old permanent pasture will have a big population underneath it. That is why farmers were told not to plough up. There is now no need to worry about it. The dressing of seed with modern types of dust, gives very good control indeed. In very heavily infected pastures it is wise to broadcast dust. We now have non-tainting dusts which can be used on potato ground.

Q. You do 'not comment on any suggestions for improving grasslands in New Zealand. Please could we have a constructive criticism on New Zealand pastures ? Could we not improve Canterbury Plains farming?

A. Don't take it that I think the mixture of timothy-meadow fescue is necessarily good for New Zealand conditions; all I say is that it is good under British conditions. I suggest that because of a similar climate here for five or six months of the year, you might look at it here. Its great advantage is its palatability; when we replace concentrates with grass we must have palatable grass to get the maximum possible into the cows. That is where cocksfoot tends to fail. In South Auckland people have broken up old permanent pasture and reseeded after a fodder crop. The soil is badly prepared with the result that an open pasture results. This is a menace, If you are going to grow fodder crops do it on a smaller scale with inter-row cultivation. The technique of sod seeding is more preferable.

Finally I must say I am immensely impressed with the light-land improvement being done at Ashley Dene in particular and in Canterbury in general.