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The Making of New Grassland

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THE MAKING OF GRASSLAND

BY J. CRUICKSHANK

Cruden Bay

IN giving you my experiences of making grassland I am afraid I must go beyond the past five years, as by 1926 I had over two-thirds of my land in what I considered good pasture. Since then my attention has been devoted to maintaining and improving the value of these pastures by judicious manuring, grazing and treatment. The area is 650 acres, situated in East Aberdeenshire, within two miles of the coast and about 100 feet above sea-level.

The soil is locally known as clay. It is of glacial origin, the sub-soil being reddish clay, in some parts eighty feet deep, and overlying red granite.

There is a considerable area of this type of soil on the east coast of Aberdeenshire, which has been described as "good for wheat and beans."

The area originally consisted of four small farms, and was acquired on lease as the farms fell vacant (the first 415 acres between 1902 and 1910 and the last 235 acres in 1921). The rents varied from 9s. to 17s. per acre, the latter a post-war rent for the 235 acres. A large portion was pretty much waste, having been allowed to go down to poor grass or weeds and rushes. I have since bought the land at an average price of £8, 5s. per acre.

I have been familiar with this class of soil all my life, and have seen many farmers ruined financially through working it in regular rotation, particularly between 1872 and 1900.

I have always held the opinion that a rigid adherence to a regular rotation on a clay farm is a mistake. The largest possible proportion of such a farm should be in grass, and that as good grass as possible, and when a really good field of pasture-grass is secured the farmer simply cannot afford to plough it up again until it becomes one of the worst pastures on the farm.

I began to put this idea into practice in 1910 and have followed it since, when breaking up any pasture always ploughing the worst fields, irrespective of age.

The first really good field of pasture I got was in third-year's grass in 1913. It was sown out in 1910 after a poor crop of turnips in 1909.

The nurse crop was common bere, and the seeds sown per acre were :

14 lb. Perennial	2 lb. Broad Red
3 lb. Italian Ryegrass	2 lb. Cowgrass Red
10 lb. Cocksfoot	1 lb. Alsike
4 lb. Timothy	1 lb. Wild White
1 lb. Rough-stalked Meadow-Grass	

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Although the land was in poor condition only 2 cwt. per acre of superphosphates were sown with the nurse crop.

A dressing of 10 cwt. of high-grade slag was applied after the nurse crop was harvested. The field was cut for hay in 1911 and also in 1912. Both crops were good, and it was grazed for a few years and then cut for hay again.

It was the result in this field that convinced me of the real value of wild white clover in making a pasture.

I have practised the same type of seeding and manuring with little variation since, always applying 10 cwt. slag or 8 cwt. ground mineral phosphates to the young seeds, but rarely applying nitrogenous manures to a nurse crop, and never without bad results, which were generally apparent on the pasture for several years after, the adverse effect being due to the increased luxuriance of the nurse crop.

Prior to 1910—with the help of Mr W. M. Findlay, Aberdeen—I had experimented with different varieties and quantities of seeds, and had found those already mentioned the only varieties of much value on our soils, and the quantities those most likely to give the best results.

Many of the fields I found so weedy and rough that even after two oat crops—generally poor ones—there was little chance of getting them clean except by bare-fallowing.

When this was done autumn wheat was sown, and seeds on the wheat in spring. Some of my best pastures are those sown out with wheat. This is contrary to the experience of many, I know.

From 1913 to 1923 over 200 acres of the worst land was bare-fallowed and practically the whole of this area got two tons carbonate of lime per acre during the process of fallowing.

This had the effect of making the land more easily worked, and made it drain distinctly better. This was most marked when the limed fields came to be ploughed up a second time.

I did not always get a good take of seeds—much depended on the season, whether wet or dry. Dry seasons were always the best. For example, I have not ploughed up a single acre of seeds sown out in 1914, 1918 or 1921, as these pastures became too good to plough up. The seasons were fine dry ones of course, and admirably suited for getting a good take of seeds on our hard clay.

The seeds sown in 1916—a wet season—were all broken up again after the first year, and most of those sown out in 1924 also have been ploughed up. The failures were entirely due to the adverse effect of weather.

I found the best method of preparing the soil for getting a good pasture was by using an ordinary swing plough when breaking up any land, taking one or two grain crops, manuring these well with phosphates—generally superphosphate—and sulphate of ammonia when necessary, liming when I thought advisable and time permitted. I either took a cleaning crop, such as turnips or silage, or made a bare-

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fallow, being always careful not to have the tilth too fine. If too fine it is apt to run together after rain and form a hard crust, in which the seeds do badly.

I generally roll with a heavy roller just before sowing the seeds, harrow lightly after sowing and roll again at once if thoroughly dry.

On several occasions during the past twenty years I have tried taking two grain crops after pasture and sowing seeds for a permanent pasture with the second grain crop. I have never found this the success I would like.

The pastures were generally fair for a year or two, but not in my opinion good enough to leave permanently, and they have all been ploughed up and seeded down again after a cleaning crop.

It is most important to work our heavy land when in dry condition, and never work too much land at a time. There is one exception, and that is when making a bare-fallow, don't plough until late spring, and plough as wet as you can get it. This turns up the soil in a fine solid mass, which dries out readily in early summer, and if you keep ploughing backwards and forwards the weeds dry out nicely and the lumps come down readily with the August and September showers and make it easy to prepare for drilling wheat.

I have varied the seeding very little since 1910, always using about the same mixture as previously referred to, using English clovers, Scotch perennial and timothy, French-Italian and Kent Wild White, sometimes Danish and sometimes New Zealand Cocksfoot. This latter I have found much the best for pasture, but rather expensive when sowing 10 lb. per acre. Last year I sowed a quantity of what was called Evergreen Perennial Ryegrass, collected from Kent pastures. I am not yet in a position to give the result of this.

The nurse crop is most important. Many fields of what might be excellent pasture are completely spoiled by having too thick, too heavy, too leafy and too late-maturing a nurse crop. The best nurse crops I know are barley and common bere; the latter especially so. It can be seeded with $2\frac{1}{2}$ bushels per acre, can be sown a fortnight later and cut ten days earlier than barley.

There is a very great difference in the take of seeds sown with even different varieties of oats. The past season I had five different varieties of oats drilled in strips across a cleaned-land field and there is a marked difference in the take of seeds.

After Marvellous is by far the best, and Glasniven Sonas the worst; Potato R.30, Sandy and Victory in between.

The system of manuring has followed the lines of Cockle Park, and has remained the same, varying only in the form in which the phosphates have been applied.

In every case I have dressed the young seeds when the nurse crop was cut with 10 cwt. high-grade slag or 8 cwt. finely ground mineral phosphates, no nitrogeous manure being applied, and I have cut hay

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crops of 65 to 75 cwt. per acre weighed out of the stack in November to January after this treatment. I generally followed with 4 to 6 cwt. phosphates every third year after.

If inconvenient to apply at the three-year period it is generally left for five or six years, when 8 to 10 cwt. are applied. I rather like the heavier dressing as the result is more apparent.

I used either basic slag or ground mineral phosphates according to which I considered best value at the time. The latter was much the better value for a few years after the war, when slag was both dear and of low grade.

I have made a practice of missing a strip in every field when sowing manures and have found this most useful and interesting.

Particularly has it shown the cumulative effect of phosphates. I have in mind specific examples. I may mention that our rainfall is fairly heavy, round 34 to 35 inches. This, I think, favours the action of ground mineral phosphates particularly.

When ground mineral phosphates were to be applied I always found it advisable to sow them not later than the middle of November.

Slag I found gave good results sown as late as January. Where the rainfall is low I should think ground mineral phosphates would act rather slowly.

For timothy hay, grain, silage and root crops, superphosphates and sulphate of ammonia have invariably been the manures used.

During the past autumn I have treated 70 acres of pasture with bone-flour at the rate of 4 cwt. per acre. This is the first occasion on which I have used bone-flour. Large quantities have recently been used in Aberdeenshire on account of the low price.

The making of a good pasture does not end with the seeding and manuring.

I do not allow stock on the young seeds in the first year, and in my particular case I have found it advisable to take hay crops the first two years to avoid the risk of the land being poached by cattle in wet weather.

I always cut the hay crops early, and I am sure I get better and cleaner pastures than I could do by grazing at this stage. The aftermath is eaten off by sheep, and even these are not allowed on the aftermath the first year after October, unless the weather is exceptionally dry.

Once the pastures are properly established they will stand any amount of grazing and should go on increasing in value. My difficulty is to keep them sufficiently closely grazed, particularly in June and July. They are grazed with a mixed stock of cattle and sheep, and the mower is run over some of the roughest fields in late June or early July. Every year some of the fields are left rough to provide winter grazing for 450 breeding sheep in case of frost or snow. The fields are varied so that every field is eaten quite bare once, if possible,

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in two years. A few Galloway cows and calves are kept for this purpose.

One or more fields of old grass are put up for hay every year, generally after an application of phosphates and getting 1 or 2 cwt. sulphate of ammonia in April and being cut early.

If thistles appear in a field to any extent I take a hay crop two years in succession, cutting early; this effectively clears the thistles for a few years.

The worst weeds I have to contend with are buttercups, Yorkshire fog and crested dog's-tail, and I find nothing helps much but hard grazing early in the season.

Slag I have found a great help in controlling rushes.

Although potash has little or no apparent effect on our cultivated crops or ordinary pasture, 4 cwt. kainit per acre has a wonderful effect in making stock clear off a bit of rough neglected pasture.

One or more pasture fields are treated with farmyard manure every year. This is applied in June, the pasture being previously well grazed.

These fields are harrowed at intervals during the summer with parmiter harrows to get the manure thoroughly broken up. A great flush of grass comes up which stock do not relish during the summer, but it provides excellent and valuable feed for the Galloway cows and sheep during the winter, and they eat it readily.

Fields hard grazed up to the end of July and then left provide excellent winter food for sheep or cattle, and provided they are grazed hard the following season do not deteriorate.

Little or no mat has formed on the wild white pasture sown out by myself, and I have not found it necessary to use the harrows on much of the ordinary pastures, although the timothy meadows are harrowed every season if time permits.

To enable a large portion of the farm to remain in pasture it is necessary to have a short rotation in the remainder.

The present distribution is as follows:

About 380	acres	in good Wild White pasture
„ 50	„	in old pasture (twelve to thirty years) not sown out by me, but manured regularly
„ 70	„	for grain crop
„ 35	„	for silage crop
„ 35	„	for turnips, potatoes and bare-fallow combined
„ 30	„	for Timothy meadows, now ten to twelve years old
„ 35	„	for one year's seeds hay, Italian, Perennial, Timothy and Red Clover
„ 15	„	Wild White Clover pasture cut for hay
<hr/>		
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The fields for grain, silage, roots and Italian ryegrass hay are worked intensively and are all near the farm buildings.

This is to economize labour, and the bulk of the farmyard manure is distributed on these fields, most of them being treated with this twice in three years.

As all the produce, including hay, is consumed on the farms there is a large quantity of farmyard manure to distribute annually.

The real value of pasture lies in the stock it will carry and the live weight it will produce.

I have on occasion got 3 cwt. live weight per acre during the grazing season and my aim is to get this increase on all my pastures.

Particulars of Stock

The farm is worked from one centre by seven horses and a tractor, the latter being used for threshing and bare-fallowing only.

The stock carried in summer is larger than during the winter. At 28th May 1930 it consisted of 283 cattle, including calves, and on 10th February 1931 of 215—a reduction of 68; and 893 sheep, including lambs, and on 10th February 1931 of 524—a reduction of 369.

The sheep will be reduced by another 40 before 1st March by the sale of fat sheep, and the numbers will be brought up to about 900 again before May by lambs dropped. The cattle will be brought up to about 290 at the same time by calves dropped and purchased for suckling.

Nearly all the stock sold go off the grass fat during the summer, very little winter fattening of cattle being done. About 250 male lambs are fattened in autumn and early winter, the female lambs being kept and sold for breeding in September following year of birth, having meantime reared a number of lambs.

THE MAKING OF NEW GRASSLAND DURING THE LAST FIVE YEARS

BY W. M. FINDLAY, N.D.A.

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Experiments at Craibstone

IN the north of Scotland, where 80 to 90 per cent. of the soil is what may be called a light medium loam about a plough-furrow deep, a large proportion of the arable land is worked on the six-course rotation with three grasses, which may be either one year's hay and two years' pasture or three years' pasture. In a few cases there is a five-course rotation with two grasses, while in some other cases the pasture may be lengthened