

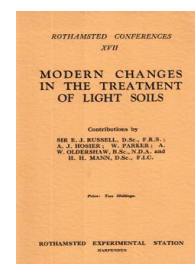
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Modern Changes in the Treatment of Light Soils

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Foreword

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FOREWORD

By SIR E. J. RUSSELL, D.Sc., F.R.S.

THE light soils of England have always presented difficulties to cultivators. In the old days very little could be done with them; they were left as wastes and heaths, and were in general disrepute. The coming of the four course rotation, however, and the development of sheep farming, opened up considerable possibility of improvement and they were enclosed and brought into cultivation. Sheep help wonderfully in farming these light soils; the "Golden hoof," to quote the old farmers, cannot yet be fully replaced by any artificial contrivance and so long as arable sheep-farming paid, and so long as satisfactory prices could be obtained for the barley that followed the sheep, so long could these soils be cultivated. There were of course always difficulties due to failure of the root crop through drought, fly, and other troubles. These difficulties were reduced in some places by growing a series of fodder crops for sheep, so that if one failed another would still be available. Some most ingenious sequences of cropping were devised, especially for the light chalky soils of the Southern Counties, and the technical management was admirable.

With the general rise in costs of farm production, the fall in prices of sheep, and the preference for lamb over mutton, the old arable sheep farming has ceased to be profitable and is fast going out. Summer feeding on grass is now the usual method and the light soils do not lend themselves to this. They do not easily carry grass, and if they are kept as arable they must be well farmed, for, if anything in agriculture is certain, it is that light soils badly farmed soon become hopeless. Light land is a paradise for weeds and also it easily becomes sour.

There are, in fact no short cuts to light land farming; it must either be done decently well or it will drive the farmer out of business. The trouble is to find some system that combines hope of profit with efficient cultivation.

This was the purpose of the present and the two preceding Conferences at Rothamsted. Several possibilities were discussed.

Market Gardening is specially adapted to light soil, because it necessitates intensive culture. For many years it has in certain regions been successfully adopted. Bedford has long been famous for its vegetables: so have Kent and Worcester. Parts of Suffolk round Woodbridge and elsewhere were equally well known in the old days when London had to be supplied by coasting vessels. In recent years market gardening has considerably extended; two of

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its crops, Brussels sprouts and potatoes, have been taken up by farmers so enthusiastically that the market gardener can no longer regard them as peculiarly his own affair.

If the demand for vegetables become much greater the light lands would be well able to supply them, and farmers would have a promising source of revenue. This revenue was fully discussed at an earlier Conference.† In many ways it is attractive but it is limited: the markets will not absorb more than a certain amount of vegetables and anything in excess is liable to be wasted. The canning factories are giving a new element of stability to the growers by the extension of the contract system, but they will take only the highest quality produce and the lower grade material is very apt to remain unwanted.

Two farm crops are very suitable for the light soils, and around them several systems of cropping could be built up. Sugar beet and potatoes both grow well on these soils. Like the market garden crops they respond to high cultivation and indeed are much more likely to prove profitable if well done than if treated shabbily. Both repay deep ploughing, which is specially useful wherever there is a pan. Potato growing formed the subject of the last Rothamsted Conference. It is also dealt with here in Mr. Oldershaw's paper in which he shows how, on the Suffolk Heath, potatoes were successfully grown on derelict land regarded only as waste. The trouble had been the sourness or acidity to which light soils are especially liable; when this was remedied by a dressing of 5 tons of lump chalk per acre, crops of 12 tons or more potatoes per acre were obtained simply by the use of artificial manures: the benefit of the chalk was specially marked in dry seasons. The result is interesting because the potato is more tolerant of acidity than most agricultural crops, indeed overliming is apt to favour scab. It is evident however, that a light soil may be too acid even for the potato crop.

Sugar beet also does very well on light soils. It is much less tolerant of acidity than potatoes, but on the other hand it stands drought better. In Mr. Oldershaw's experiment the chalked land gave an average of $12\frac{1}{2}$ tons washed beet per acre over the seven years 1927 to 1933, while on the unchalked land the crop almost always failed. Such striking responses to lime or chalk are unusual, but many sugar beet growers lose yield by neglecting to apply lime; this is, perhaps, one of the commonest mistakes in growing this crop.

Using sugar beet and potatoes as pivots in the system, Mr. Oldershaw has devised rotations to suit the light soils of Suffolk. Grass is not included, but lucerne is, and this furnishes green food for horned stock, pigs and poultry.

†Rothamsted Conf. Reports, No. 15. Recent Developments in Market Gardening, Rothamsted Experimental Station.

*Rothamsted Conf. Reports, No. 16. Problem in Potato Growing. Rothamsted Experimental Station.

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The use of lucerne on light soil is discussed by Mr. Parker who successfully farms several hundred acres of poor land in Norfolk. He also grows sugar beet and carrots, another root crop specially well suited to light soils, but he has neither turnips nor mangolds. His grain crop is barley, also well adapted to light land, and in order to avoid damage due to wet weather at harvest—one thing over which the farmer has no kind of control whatsoever—he uses a drying plant to dry the grain. This works well in Mr. Parker's hands but it is a risky proceeding for general adoption when the grain is intended for malting, and farmers are not advised to use it except after consultation with the maltster. If drying were likely to become general we would organise a conference at Rothamsted in the hope of finding some way of agreement on the matter.

One of the most striking improvements in light land farming, however, is that made by Mr. Hosier on his farm at Marlborough. He is on a light chalky soil, though favoured with a higher rainfall than either the Suffolk or the Norfolk farmers mentioned above. But unlike them he keeps mainly to grass. As is well known, he does not accept the old doctrine that sheep are the best animals for farming the light soils; he prefers cattle as being heavier, and therefore better treaders, and also as being less selective in their grazing. So he goes in for dairying and he keeps his cows out of doors on the poor, light chalky land, milking them in the open in the New Zealand fashion and using movable bales; in consequence the manure is deposited straight on to the land, so avoiding waste and cost of cartage and distribution. Poultry also are folded on the land. The treading of the cattle and manuring of the poultry and cattle improve the hill grass out of all recognition, breaking through the mat, which otherwise is a great obstacle to improvement. In wet seasons the effect is specially good, and while the lower lying grass would be badly poached the hill grass specially benefits. He can now keep 1 cow per acre on his own land. On the better parts of the farm he grows fodder mixtures of peas and oats or rye and tares cut green for silage or for hay: this supplies winter feeding. After a few years the grass has reached its maximum improvement: he then ploughs it up and grows three or four excellent cereal or other crops for sale, then he seeds down again. Even the new seeds, however, are grazed by cattle; the treading and grazing keep down "twitch"—one of the worst weeds on light lands—and they ensure a good development of clover.

Besides turnip beetles, wireworms often cause trouble on light land. They are perhaps the worst of the soil pests because there is no sure and easy way of dealing with them. Mr. Hosier tells us he has no trouble with wireworms which he attributes to the close grazing of his grass land and the careful picking by the poultry. We have long wanted at Rothamsted to investigate the control of wire-

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worms and this year we shall have the opportunity as we have an attack over a good deal of the arable land.

Mr. Hosier's method has the advantage of bringing the land periodically into grass and leaving the grass down for some-time. This is not usual on the market garden or sugar beet and potato systems. Dr. Mann deals with important difficulties that arise where light land is kept under arable cultivation with one crop only : a deterioration in yield in which soil exhaustion, accumulation of diseases and pests, and perhaps other factors come into play. It is specially well shown on the permanent wheat and barley crops on Stackyard Field, Woburn, and there are indications of some such deterioration on certain old market garden soils elsewhere. Putting the land down to a long ley is probably the surest way of dealing with the trouble, but experiments will shortly, we hope, be begun at Woburn to discover the causes and if possible to find other remedies.