

The root-weeds having thus been all got rid of, the next operation is the winter furrow. When land has been fairly treated, and is not an absolute stranger to the dung-cart, the depth of this ploughing may be given as just as deep as your horses can draw the plough. I should not like, as a rule, to bring up more than one or, at most, two inches of raw-soil from the bottom of the old furrow; but we must not forget the enormous pulverising effect of our Canadian frost on a well-laid furrow slice, and the descent of some portion of the former manurings into the subsoil will have tempered its acerbity so as to render it less hostile to the interpenetration of the filamentous roots of the future root-crop, particularly in connection with the heavy dressing which *must* be given if you expect a remunerative crop of mangels. In truth, if I was to lay down so dangerous a thing as a law for ploughing, it would be: always plough deep for roots before winter, but never go below the old furrow for grain or pulse.

On *very* heavy land, not subject to spring-flooding, I am inclined to think that the easiest plan for growing mangels is to plough down the dung in the autumn, and to sow the seed in the spring on the flat surface of the stale furrow. I have tried this, and found it answer well. It simplifies matters extremely, and does away with half the work at the busiest season of the year. The only objection I see to its practice is the difficulty of finding enough manure at the time of preparation. This might be avoided in the neighbourhood of towns or large villages, but in a "far-removed place" I do not see any way of getting over it except by keeping the manure of the previous winter in a flattened heap, covered over with fifteen or twenty inches of earth.

I saw many years ago at Butleigh, in Somersetshire, England, a very wonderful crop of mangels grown on the sternest, stiffest yellow clay on the lias formation. As far as I recollect, the process carried out by Mr. Gray, the steward of the Hon. and Rev. Neville Grenville, was as follows: the land was cleaned in September, and ploughed ten inches deep immediately afterwards; grubbing and harrowing then reduced the land to a state which admitted of its being set up in drills by the plough at twenty-seven inches apart; twenty tons of dung were spread to the acre, and covered by splitting the drills as usual, and the land lay in this state till the following spring. As there was an open furrow between each drill and its neighbour, no water could well lodge on the piece, and so when the next season opened, the soil was found thoroughly dry and well pulverized. In April, a good many seed-weeds, such as *cadluck* (wild mustard), chickweed, and other annuals, had sprouted, these were destroyed by the harrows with one *time* along the drills, which were set up again in good shape with the double-mould-board plough, care being taken in performing this operation not to touch the land till it was thoroughly dry, and not to put any of the rawer soil on the top of the drills. All was now ready for planting, which was done in a peculiar fashion invented by Mr. Gray himself: a light roller was passed along the drills to flatten them a little; a man with a largish dibble made holes every foot down to the dung, into which a boy poured about half-a-pint of mixed manure, and a girl, following last of all, covered the manure with a handful of earth, dropped three or four seeds on the spot, and covered them with about half-an-inch of mould. The roller completed the job. The mixed manure was composed of superphosphate, guano, and fine garden-earth; but with our better knowledge now-a-days we should leave out the superphosphate. The crop over the twenty acres thus treated was thirty-seven tons to the acre of sound roots, with about six tons of tops, which were ploughed in then, but now would be put into a silo.

Mr. Drummond, of Petite Côte, Montreal, dibbles in all his mangel seed, but without the extra manure in the holes. I

need not say he grows good crops, but in my opinion he sows too many seeds in a hole, as the last time I saw his crop the plants, which were about fit to hoe, looked crowded and twisted together, and the boys in singling them must have been very careful if they did not leave gaps. Each grain of fresh mangel seed contains at least two and sometimes four germs; hence, three or four grains in a hole would be quite sufficient. For my part, I prefer, I must confess, a continuous row to a crop of fixed intervals.

When sowing in spring on flat-work, where the dung was ploughed down in autumn, all that is necessary is to harrow well until all the annual weeds are destroyed, and then sow in the seed at two feet apart with Matthews' or the Planet, jr., seed-drill. In following out the system, I beg to recommend the cultivators of heavy land not to make their ridges too wide: two feet would be quite enough, and this width would give four rows of mangels to the ridge, as the two outside rows should be one foot from the open furrows, leaving the crop two feet apart from one end of the field to the other. The greatest care should be taken in drawing plenty of cross water-furrows—grips in Scotland—to prevent any work in spring, particularly when the field lies on a slope.

*Spring preparation.*—This is, of course, the usual way of getting in mangel seed, the land rarely being got thoroughly clean in the autumn, and dung enough being hard to be come by at that season. Cross-ploughing the winter-furrow or grubbing it is optional; I prefer harrowing along and across first, then cross-ploughing, and the grubber last of all; then, if your land is in decent condition, it should require no further implement than the harrow, and perhaps the roller, to put it in a proper state for drilling up. The cross-ploughing should be of the same depth as the winter-furrow, and the plough will go all the more steadily if it takes up half an inch of the subsoil; more would be dangerous. This will bring any root-weeds, that may have escaped in the autumn cleaning, up to the top, when they can be collected and disposed of in the easiest fashion. If turned up with raw manure, the heating will destroy all power of vegetation, except perhaps in the case of *docks*, which are dangerous enemies; in fact, as an old A. Berdeenshire ploughman told me once: "If you lay a *dockan* on a *slate stene* for three months, he's na' muckle to lippen to even then," which, being interpreted, means: If you lay a dock on a slate for three months, he'd just as soon grow again as not; which is not very far from the truth.

The land is now ready to be set up in drills, but we must not forget the preparation of the seed. I always steep mangel and carrot seed, as thus: tie the seed up in a bag, soak it in water for twenty-four hours, hang the bag up to drain, keep it in a warmish place till the white germ is chipped, and then dry it up with plaster, sand, or charcoal in powder. The quantity of seed required is about four pounds per acre. Nothing is gained by sowing the absurd quantities recommended by some American writers: there is no fly or beetle to eat the young plant, as is the case with swedes and turnips. Messrs. Crozier and Henderson, in "How the Farm pays," a book only recently (1884) published, say: "About six to eight pounds of seed are used to the acre, sown with seed-drill. If sown by hand, fully double that quantity will be required." How men like Messrs. Crozier and Henderson, who have been occupied in farming and market-gardening for years, can talk such absurd nonsense passes my comprehension altogether. Fancy, sixteen pounds of mangel seed to the acre!

The steeped seed cannot be sown by the seed-drill; the manner of treating it will be seen further on.

*Manures for mangels.*—And we must by no means ignore the fact that mangels are of all root-crops the most dainty in the choice of food. If there is anything certain in the pri-