

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 Matihow's 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 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 taking 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 mangle 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 Aberdeenshire 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 in 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 principles of sound farming it is: that mangels demand nitrogen in a freely accessible form. We are not growing sugar-beets for the factory; what we want is a large crop of bulky roots, the bigger the better, though, no doubt, the moderate-sized root is analytically preferable. Now, M. Ville, in his marvellous book on chemical manures, gives the following formula for beets:

	lbs. per acre.
Superphosphate of lime.....	352
Chloride of potash.....	176
Sulphate of ammonia.....	176
Nitrate of soda.....	308
Sulphate of lime (plaster).....	132
	1,144

This, of course, without farmyard dung. The cost would be, in this country, at least twenty-one dollars. According to my experience, superphosphate has hardly any effect on mangels; potash is only wanted on thoroughly exhausted light soils; and a moderate dose of sulphate of ammonia, with a good but not extravagant dressing of dung, will produce the largest possible crop of mangels. Somewhere about the year 1845, Mr. Pusey, then President of the R. A. S. of England, tried experiments in mangel-growing, on land which, two years before, was said to be incapable of producing even white turnips. I remember the district well; the soil was a peaty sand, on a sort of moor-band subsoil, below which the plant-roots could not penetrate. The manures were used in the following proportions:

- No. 1.... Fourteen tons of dung.
- No. 2.... Twenty-eight tons of dung.
- No. 3.... Three cwt. Peruvian guano—(17. of ammonia).
- No. 4.... Fourteen tons of dung and three cwt. of Peruvian guano.

The yield of mangels—long-red—produced respectively from these four different dressings, was, per acre:

No. 1.....	18 tons.
No. 2.....	21 "
No. 3.....	17 "
No. 4.....	33 "

We left the land ready for drilling up, and the question now arises, at what

distance apart shall we draw our drills. There is nothing gained in wide drills: all that is necessary is to make the intervals wide enough to allow the horse in the horseshoe to walk comfortably without treading on the plants. Twenty-six inches is my favorite distance, and it will be sufficient to let plenty of light and air into the growing crop. An immense number of acres may be seen wasted every year, taking the province as a whole—thirty-six inch drills for roots, and even for Early-rose potatoes, are not uncommon, by which extravagance one-third of the whole ground is left unplanted. It does not seem any great loss, until we look at it on a large scale. Such potatoes as the Champions do demand great space on account of their luxuriant tops—I have seen them four feet long—, but ordinary sorts, and all root crops, will produce as much as they can yield at twenty-six inches. Having made the drills, the dung should be carefully spread; and here I may mention that some even of our best farmers manage this part of the business uneconomically. A heap of dung to be divided among five rows will cost more to spread than if it were divided among three rows. The Scotch excel in this.

The foreman starts the horse up the middle of the first three drills, and pulls out the dung in sufficient quantity into the drill in which the horse walks, without stopping the horse at all. A woman goes up one of the *wheel-drills* (to avoid treading the dung into the ground and making it troublesome to spread) and gives a fork full of manure to all three drills, which fork-fulls are equally shaken about and spread by three women who follow, one in each drill. Unfortunately, in this country we have no field workers to speak of, so we must be content with one man spreading the three drills, which he will do much more accurately with, much greater ease, and in much less time per acre, than if he were to attempt to meddle with five or more drills at once.

The dung being all spread, as we probably have no manure drill, if we use sulphate of ammonia, or any other artificial compound, the best plan we can adopt is to sow it over the dung. Splitting the drills with the double-mould board plough makes all safe. (1.)

Sowing the seed.—This operation will vary, according to the state in which our seed is: wet or dry. If dry, it should be *very dry*, as the best machines as we find them here won't sow if the seed is slightly damp. I remember once starting to sow Belgian carrots, and, fortunately, finding out before I had gone over the first three rows that the seed-drill—a

(1) Number of yards along a drill, manured with one pound of any manure, equal to 112 lbs. per acre, at 27 inches apart = 57.