

were all shovelled on to this ladder, and allowed to run down it on to the floor, and into the small trap-door cut in the ceiling over each bin; thus completely screening all earth out of the roots, and leaving them clean and free from soil. Simple as this contrivance was, it was most effectual. The incline at one end for entering the root house with a team answered so well and saved so much labour, that we cut a second door at the farther, or south end, as well as at the north, and thus drove the team through the top of the root house. When cold weather came we calculated to use the upper part for a hay mow, or to cover the floor with a layer of straw and chaff, if we could not succeed in getting sawdust in quantities sufficient. The cost of the root house was not great; it was quickly put up, and experience shows coal tar to be a perfect preservative against decay. The preservative qualities of tar do not seem to rest alone with the gummy substance, as one of the latest improvements in England, in preventing destruction by decay, in timber exposed to the action of the weather, or influence of moisture, is carbolic acid, which is made from coal tar, and can be furnished at such an almost nominal price, as to be well adapted to preserve timber from decay; but coal tar is all that we have to use, and it has also another excellent quality; no rat will attempt to gnaw through a tarred board.

One precaution we found absolutely necessary—we, of course, could not yet plank thirty feet long, and had to use some of twelve feet and sixteen feet. So we butted the short pieces so that the joints came in the centre of the planks above and below, and the use of one and a half inch dowels, made of sound oak, so equalized the strain, that for all practical purposes short plank answered quite as well as long. We also placed diagonal braces on the inside, sloping from the ground to the sides, and firmly butted at the foot, against a piece of cedar, buried in the earth, lengthened to receive the ends of the braces, and these braces formed a portion of the division between the bins.

If we found the roots heating in any one division, we at once removed the damper across the bin below the hollow floor, and also that of the outlet under the door, and a rush of cold air passed under the hollow floor and up through the heating bin of roots and out at the little trap above, and completely cooled and checked growth.

C.

### Utilizing Sewage.

Some most interesting experiments in utilizing sewage have been conducted of late years in England. Of these the most successful, perhaps, has been the sewage farm in connection with the camp at Aldershot, naturally a most barren and unpromising locality for farm operations.

In other places where similar experiments have been tried, there has been soil, of a greater or less degree of fertility, to work

upon, and people have naturally considered that only an added degree of fertility was given to it by the application of manure, either liquid or solid; but in the case at Aldershot there was a mere gravel and sandy tract, totally devoid of vegetation (for the patches of heather here and there do not deserve the name of vegetation), and which had conformed in this desert shape from time immemorial. Not only was there absolutely no fertility, but there was in the soil a quantity of those peculiar salts of iron, which are well known to be inimical to the support of vegetable life. A more unpromising spot to make a farm of could not be found, and a more perfect spot for the proof that fertility is dependent on man's will never existed, or was attacked by skill and capital.

The soil (if soil it can be called) consisted of ninety-five per cent. of absolute silica, that is, sand and gravel, stones and flints, three per cent. of protoxide of iron, or in fact, rust from iron ore, (the substance injurious to vegetation), and two per cent. of the vegetable refuse of withered heather; and every one who knows heather at all, knows that the results, from the decay of heather roots, will scarcely support mow. Well, this arid desert plain is now, by the means of sewage water, (that is, liquid manure in a weak form), brought into such a state of exuberant fertility, that six cuts of grass of the most luxuriant nature, can be cut from it annually, and it produces also capital crops of potatoes, turnips, and other green crops, and the experiment will, no doubt, yet be made to produce equally excellent crops of grain.

The sewage water alone is used as a fertilizer, the solid matter, after being thoroughly washed time after time, in the receiving pits, is removed to make room, but it is found to be of very inferior fertilizing power, and is only spread on the ground to get rid of it. Now, what does all this go to prove, to the thinking agriculturist? Here we have gravel and sand, infected with a matter poisonous to vegetable life, actually converted into the most fertile medium, (for soil it is not), for raising crops, and this, not by solids and mineral matters—by humus, decomposed vegetable matter, and all the usual elements of fertility in a soil—but by liquid alone, and that liquid used in as recent a state as possible; for one of the most striking propositions of the whole experiment is, that instead of the liquid manure being allowed to ferment and decay, and thus, as we have always supposed, from its production of ammonia and azotized matters, becoming in the most formidable state for manurial purposes; but it must be used fresh, and got on the land before the chief elements of decay are fully eliminated. This is one of the most important facts of the whole, although one which the careful observer will not be unprepared for when he recollects the effect of liquid discharges of cattle on pasture land.

There are now three of these great sewage farms in Britain; there may be more, but

these are the most important. The first, because the oldest, is at Edinburgh, and this has been in operation the best part of a century. There, the chief sewage of the city is conducted over meadow land in the same method as water is laid on to a water meadow, and with the most astonishing results. The produce of these meadows (although of the natural grasses alone) is wonderful, and is cut at least six times a year, and used for green cattle and cow feed for the city. The second is at Barking, at the outfall of the great London system of drainage. This is a modern affair, under six years old, but attended with equal success. The third is at Aldershot. But comparatively little attention was paid to the two first, since it was only an added fertility which was given to the meadows. But at Aldershot, Mr. James Blackburn, the enterprising farmer who undertook the task of utilising the sewage of the camp on the adjacent land, literally took the bull by the horns, and has carried out his scientific principles to the utmost possible extent. Instead of increasing fertility he may be said to have created it; instead of acting on a soil, or land worthy to be called such, he has attacked and converted a desert into a fertile plain.

These experiments have clearly shown that you may take the most barren sand, and by flooding it with the liquid discharges of the city sewers, render it capable of bearing any crop; and by a continuance of the flooding, keep up that fertility to any pitch required. This goes to prove that the entire virtue, or at all events the chief virtue of all our stable and farm-yard manures, consists in the liquid, or rather the soluble portion; or if that has been saved and absorbed by, and dried as it were into the straw, and vegetable fibre, it can by the action of rain or any moisture, be again leached out, and if not protected, will pass off and be lost, or be applied where it is not wanted. What can be a stronger argument for so constructing the farm-yard, stables, and byres as to save every drop of this precious fluid, and then apply it either direct as liquid by the sprinkling cart, to the grass fields, or take it up by absorbents, such as peat, chopped straw, earth, or other matters, and spread it where it is wanted? What can more show the necessity of keeping manure under cover, and free from the action of the elements; particularly from the leaching of the rain, and melting snows; and what can more show the folly of so constructing our manure heaps, as while rotting and destroying the best portions by the escape of the ammoniacal gases, to submit the manure at the same time to the action of the rain to carry away as fluid all that evaporation does not remove in an aeriform shape.

VECTIS.

Wild oats should always be pulled up in the spring, as soon as they show their heads above the wheat. Pull them up, there is no other cure.