

Agriculture.

Culture and Quality of Root Crops.

Jonathan Periam, of Chicago, in the London (Eng.) *Agr. Gazette*, says:

In your issue of Nov. 27th, I notice an enquiry relating to difference in quality of mangels: 1st, Whether the evils of over-manuring would not be met by thinning out less widely the roots, and thereby gaining a greater number per acre. 2nd, Are the small mangels as nutritious as the medium-sized? The answer to both questions may be in the affirmative, so far as feeding to stock is concerned, and with the addendum to the second enquiry, that, as a rule, and a pretty constant one, large roots are not nearly so nutritious, weight for weight, as smaller ones, for the reason that the cells are larger, and contain proportionately, weight for weight, more water than smaller ones.

During my connection—as superintendent—with the Chatsworth (Illinois) Company, for the manufacture of beet-sugar, I found no special difference in feeding stock, between that portion of the sugar-beet grown above ground and that portion below; but for sugar the difference was very marked, that portion above ground containing the nitrates notably in excess, thus reducing the sugar product if mashed with the lower. Hence the absolute necessity of hilling the crop as it progresses, and in some seasons more than in others.

So we found that high manuring was fatal to the crop as to its saccharine qualities. In testing by the polariscope, I always found the large roots deficient in saccharine as compared with the smaller roots, say those of from 1 to 2 pounds weight; but in a crop of large roots the yield of saccharine would of course predominate, since the yield would be largely in excess over the smaller. We did not seek to exceed 12 tons of 2,000 pounds each per acre.

In relation to external marks for determining nutritious quality, these, of course, are determinable and in a measure constant, both in the leaf and shape of the bulb; but my experience would indicate more from family characteristics than anything else. As a rule—and this is known to all practical cultivators—recently manured land tends to cause all root crops to grow forked, knobby, uneven, and with many side roots. Such specimens are usually deficient in nutriment, and generally from their own size and sponginess.

Growing Oats.

In a recent number of the *Ohio Farmer*, E. says among the objections which some farmers make to this crop are the following:

1. It is an uncertain crop.
2. It is not a good crop with which to seed down the land.
3. It is not profitable.
4. It exhausts the land.

To these objections allow me briefly to reply.

1. I do not consider this objection well founded. In my experience I have had as good success with oats as with almost any crop which I ever tried to cultivate. If the land is at all suitable, is well fitted to receive the seed, and the sowing is done early, a good crop is almost sure to be obtained. Most of the failures which I ever have known with this crop resulted from putting it on wet, undrained land, or else from late sowing. Too much water will ruin oats, and late sowing will be fatal to success in their cultivation.

2. While this is not the best crop with which to lay down land to grass, yet if the soil is finely pulverized and a liberal quantity of grass seed is used, there will seldom be any difficulty in getting a good catch. I very often seed with oats and almost always obtain good results.

3. This objection, it seems to me, must be made by men who do not have a good market, or else do not understand the culture of the crop. Where there is a fair market the crop can be made to pay well.

4. This is the chief objection that many farmers have to growing oats. But the impression that so widely prevails that this crop is very exhausting to the soil is without any reasonable basis. It is true that after a crop of oats is taken off, the land is not usually in as good condition as it is after the removal of a crop of corn. But in most cases this is due to the fact that the oats were grown without any fertilizer whatever, while the corn was well

manured. As a natural consequence of such a course, the oats must leave the land poorer than the corn, but it is the fault of the method of culture, and not of the oats. According to analyses of the various kinds of grain, and which can be relied upon as substantially correct, a good crop of oats is much less exhausting to the land than equally good crops of either wheat, corn or rye. Of the three great elements of plant food which are furnished by the soil, ammonia, potash and phosphoric acid, oats require less ammonia than wheat and but little more than corn or rye, while of potash and phosphoric acid, oats require much less than either of the other crops named.

I believe the oat crop is worthy of a great deal more attention than it has received in the past, and I am confident that with good culture it can be made very profitable.

Poisons in Agriculture.

Dr. R. C. Kedzie, Professor of Chemistry in the Michigan Agricultural College, has furnished a valuable paper to the transactions of the Board of Health of that State, on the Use of Poisons in Agriculture, and more particularly on the effect of Paris green. He states that there are three forms in which arsenic is used, namely, white arsenic, arsenate of soda and Paris green. The first has been used to destroy weeds in garden walks, but Dr. K. regards this practice as dangerous, as there is nothing in its appearance to distinguish it from some other substances used as articles of food, and its use is liable to fatal mistakes. Arsenate of soda is still worse, as its appearance and flavor is not unlike common salt, and an unsuspecting housewife might use it for flavoring dishes, and destroy a whole family if it were brought into the house. Paris green is very widely used for destroying the Colorado potato beetle and the cotton worm. Its brilliant color is likely to prevent accidents from mistaking it for something else. Dr. Kedzie estimates that more than a hundred tons were used in one year in the State of Michigan. This extensive use brings up the questions, Will it poison the plants, and render crops unsafe as food? Will it poison the soil, and injure succeeding crops? Will it become washed into drains and poison springs and wells? What becomes of it in the soil?

To answer the first question,—cabbage plants were watered with a saturated solution of arsenic, and were killed in a week, but the leaves did not contain a trace of the poison, except by a discoloration of the stem near the roots. When the solution was weaker, so as not to injure the plant, the slightest trace could not be discovered anywhere. The experiments were repeated on barley and on turnips. Again, they were tried on peas, all with the same results. Dr. Kedzie says, "Four years ago I made a careful investigation to determine whether the potato tuber absorbed arsenic when Paris green was applied to the plants to destroy the potato beetle. I took potatoes raised in the ordinary course, and repeatedly dusted, and others to which all the Paris green had been applied that could be used without killing the plant; but in no instance could I find a trace of arsenic in the tubers. Other chemists have made similar investigations with the same results."

To determine the very important question, whether the poison applied one year to potatoes, would affect the quality of wheat the year after, four square rods of wheat were measured off in March, and two ounces of Paris green were applied in water, or at the rate of five pounds per acre—much more than is used for potatoes. The surface of the ground was rendered sensibly green by the application. The wheat was not injured in growth. The grain, when ripe, was submitted to three of the most rigid tests, but the slightest trace of arsenic could not be discovered. Dr. K. was satisfied that it contained none at all. The poison exerts more influence the first year, and therefore it is very safe to conclude that wheat is not injured in any degree as human food when growing the year after the potatoes.

In another case, cabbages were grown in the college garden after potatoes which had been dressed with Paris green. Six ounces of the cabbage head, submitted to the closest examination, failed to indicate any trace.

In answer to the question, What becomes of the Paris green? Dr. K. remarks, that it is insoluble in pure water; and it may be taken up to an extent of one part in 100,000 of rain water which contains traces of ammonia. Water charged with carbonic acid will take up one part in 10,000. The water in the soil containing some carbonic acid will therefore dissolve a portion of it.

Where then is the remedy? A perfect antidote or safeguard is at hand. Hydrated oxide of iron is the well-known and standard antidote for Paris green, as it forms an insoluble salt with arsenious acid, or only soluble in strong mineral acids. Fertile soils contain always a far greater amount of this antidote than is required to neutralize all the arsenic ever applied to it, for one per cent. of the hydrated oxide would be no less than a hundred tons per acre, with a depth of one foot of soil. Dr. Kedzie proved the correctness of his reasoning on this point by actual and repeated experiments. Hence the fear of this poison injuring water is entirely groundless.

Several cases are mentioned where the careless use of Paris green, in applying it to potatoes, resulted in poisoning. More than one thousand reports were received from clerks in all parts of the State, only five of which report poisoning to the workmen. In one case, by careless handling, the Paris green was allowed to come in contact with a sore in the hand. "It swelled enormously, but was subdued by vinegar and salt." In another case the dust was inhaled, resulting in much pain in the head and a copious discharge from the nose for two weeks. The operator states that he had been subject to catarrh since childhood, but when the effects of the Paris green had left him he had not suffered from it since. It proved a powerful medicine. In another case the poison was permitted to enter a hole in the boot leg, causing some inflammation. Another man narrowly escaped with his life, from inhaling the dust, which he had absurdly endeavored to exclude with a veil over his face. He was sick two weeks. Another had his eyes badly inflamed for a long time by the dust entering them, and some children were injured by playing among the dusted potatoes. It seems remarkable that so few cases should occur in more than a thousand reports, when it is remembered how careless many are in the application of the poison. It is much safer, however, to apply the Paris green in water—a moderate spoonful to two or three gallons—care being especially required only at mixing.—*Country Gentleman*.

How to Kill the Canada Thistle.

By a Correspondent of the Michigan Farmer.

For twenty years I worked among the English thistle, but you say they have not the Canada thistle in England; that is true, the Canada thistle grows a little more bushy and also more prickly, but I believe one is just as easy to kill as the other.

About fifteen years ago I bought my clover seed from York State, and I suppose I bought a few Canada thistle seeds also. Two or three years afterwards I had a few spots, about two rods across, of as nice Canada thistles as ever you saw. My Yankee friends told me I would never kill them but I was not much alarmed. I plowed my field a good depth and worked my fallow good; twice during the summer I took my grub hoe and grubbed deep every thistle I could find. I looked them over again late in the spring, and that was the last of the Canada thistles on my place.

If I had a farm covered with Canada thistles, I should plant as much as I could with corn, two years in succession, or fallow after corn; I should thoroughly work my corn; occasionally a thistle would dodge the cultivator, which would be grubbed out, a foot deep, with a good, long-shanked grub hoe. Do this for two years and the Canada thistle will be dead.

To work the fallows I should plow deep and harrow, then would have a shovel plow-share made three feet wide, with a loop through the middle just right to slip over the point of any common plow share.

With such a plow one can plow five acres per day; don't need to be plowed more than four inches deep, and just as often as a thistle can be found appearing in sight I should run my plow through the fallow.

Of course this cannot be done where there are stumps or rocks, but thoroughly cultivate land in this way two years in succession and the Canada thistle cannot stand it.

JOHN SKINNER.

American seedling potatoes continue popular in England, on account of their immense productiveness, but are pronounced very inferior in quality to the standard English kinds.