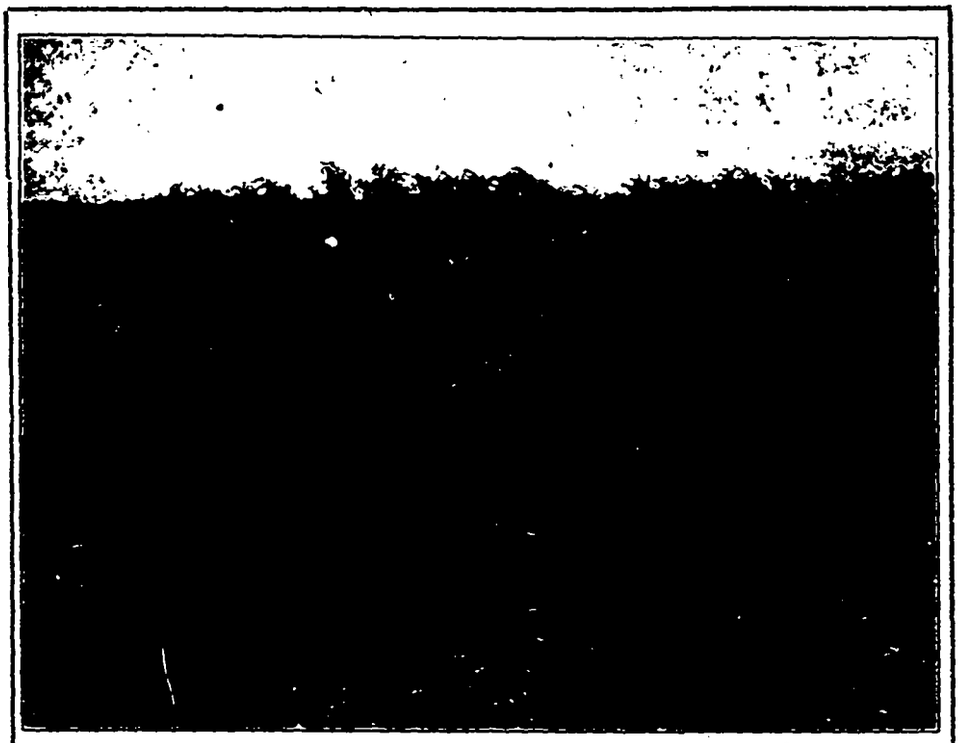

A Sample Yield of Onions in the Famous Leamington, (Ont.,) District.

Rotation of Vegetable Garden Crops

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THIS is a subject worthy of the attention of those who aim to attain the largest possible results and the highest possible quality with every kind of vegetable crop, for it concerns the natural relations of the plant and the soil as to their several chemical constituents. The principle may be illustrated by considering the demands upon the soil of two of the most common vegetable garden crops.

We submit a cabbage to the destructive agency of fire and analyse the ashes that remain. We shall find in them, in round numbers, eight per cent. of sulphuric acid, sixteen per cent. of phosphoric acid, four per cent. of soda, forty-eight per cent. of potash, and fifteen per cent. of lime. It is evident that we cannot expect to grow a cabbage on a soil that is destitute of these ingredients, to say nothing of others. If we submit a potato tuber to a similar process the ashes will be found to contain fifty-nine per cent. of potash, two per cent. soda, six per cent. lime.

Now the lesson for the cultivator is that to prepare a soil for cabbage, it is of the utmost importance to employ a manure containing sulphates, phosphates and potash salts in considerable quantity. As for lime, that can be supplied separately, but the cabbage must have it. On the other hand to prepare a soil for potatoes we must strongly charge it with salts of potash and phosphates. But it need not be highly charged with soda and lime for we find but a small proportion of these elements in the potato.

There are soils so naturally rich in fertilizing constituents that they may be tilled for years without the aid of manures, and still yield an abundant return. But these soils are exceptional. Those that constantly need manuring are the rule. In almost every soil, whether strong clay, loam, poor sand or chalk, there are to be found all the minerals required by plants. Indeed, if there were not, we should see no herbage on out of the way places; for instance at the top of limestone rocks. Usually, however, a considerable portion of those mineral constituents on which plants feed are in an insoluble form, and are slowly made available as the rain, the dew, and sunshine operate upon them.

As the rock slowly yields up its phosphates, alkalies and solutions of silica to the wild vegetation that clings to it, so the cultivated field (which is but rock in a state of decay) yields more readily its constituents for the service of plants. Because it is the practice of the cultivator to stir the soil and continually expose fresh surfaces to the transforming power of the atmosphere, it has been said that the air we breathe is a powerful manure. So it is, but not in the sense that is applicable to stable manure or guano. The air may, and does, afford to plants much of their food. Every fresh exposure of the soil to the air, and especially to frost and snow, is as the opening of a new mine of fertilizers for the service of those plants upon which man depends for his subsistence.

SCIENTIFIC PRINCIPLES APPLIED

The practical application of these considerations is an extremely simple matter in the first instance, but it may become complicated if followed far enough. Here we can only touch the surface of the subject. Suppose that we grow cabbage or cauliflower on the same plot of ground, one crop following the other for a long series of years, and never refresh the soil with a scrap of manure. It must be evident that we shall some day experience a crop failure because of the exhaustion of the soil.

But if this soil were allowed to lie fallow for some time it would again produce a crop of cabbage, owing to the liberation from the unavailable state of mineral matters which when the crops were failing were not liberated fast enough. But as this method necessitates keeping the ground idle for some time, it is obviously an unprofitable mode of procedure and tends to still further exhaust the soil. Whether a soil can be brought to a stage of utter exhaustion is at present unknown. Instead, however, of following an exhaustive practice, we enrich the soil with manure, and change the crops on the same plot so that when one crop has largely taxed it for one class of minerals a different crop will tax it for another class.

Let us consider the arrangement of a rotation. Beets contain very little sulphur, but both turnips and beets are strongly charged with potash and soda (common salt.) If we take a piece of ground on which is cabbage (which is low in soda content) and wish to avoid the failure that may follow the continual growing of this crop, we may expect to do well by giving the ground a dressing of common salt and alkalies and then crop it with beets.

DEEP VS. SHALLOW FEEDERS

Crops differ in their mode of seeking nourishment. For instance if we grow cabbage and other surface-rooting crops until the soil begins to fail, a good crop of parsnips or carrots might be obtained from it for the simple reason that these send their roots down to a stratum that the cabbage never reached. Parsnips can thus thrive on land that has been badly tilled for years because the root pushes down to a mine that has been but little worked.

It is quite proper to say that good land, well tilled and abundantly manured cannot be soon exhausted. But even in this case a rotation of crops is advisable. A good rotation will include both chemical and mechanical differences. We grow deep feeders after shallow feeders, and potash-loving plants, say, after those that draw more heavily on other fertilizing ingredients.