within the layer previously formed. In consequence of the bark being continually generated within that of the previous year, it is necessary that the layers, which are pushed outwards, should be extensible; and in many plants this extensibility is very remarkable. In the apple several successive zones of bark are formed without any appearance of dislocation or disruption of the tissue of the outside; and in a species of laurel, *Daphne Lagetto*, the fibres of the bark are so tenacious that, instead of being ruptured by the force of the inward growth they are merely separated into lozenge-shaped meshes, arranged in such beautiful order as to have acquired for the plant itself the name of the Lace Bark Tree. There exists, however in all cases a limit to the extensibility of the old layers of bark; and when this is reached, the outer bark either splits into deep fissures, as in the oak, the elm, the cork, and most of the trees of temperate climates, or it falls away in broad plates, as in the plane, or peels off in long thin ribands, as in the birch.

In those plants that have but one seed-leaf (hence called monocotyledons) the structure is very different from that which has just been described. There is here no central pith, and no distinct separable bark. A cross section of a piece of cane affords a good illustration of this mode of growth. There are here no annual rings, but the surface of the section appears covered with a number of dots irregularly arranged. The dots are the terminations of bundles of woody fibre, which in this class of plants are pushed down from the leaves among those of previous growth without any particular order. Plants growing in this manner are termed endogenous, the word meaning growing inwards. Peculiarities of leaf and flower distinguish this order of plants, as well as that of which we have already spoken. The veins of the leaves in this case are parallel; and the parts of the flower are arranged in circles of three, or some multiple of three. Palms, grasses, lilies, etc., are examples of this class.

Though the style of structure is the same in all, an endless variety may be observed in different tribes and species of plants. While the majority stand erect and independent in their sturdy strength, not a few twine around or cling by tendrils to other objects for support, and so raise themselves into the air and light, others trail along the surface of the ground; and some even burrow under the surface. The vine, the runners of strawberries, and the underground stems of the couch grass (*triticum repens*) are familiar examples of these somewhat exceptional forms. The last named are excessively tenacious of life, and division seems only to stimulate fresh development. A vegetable hydra, it sends forth new scions from every mutilation, so that it is almost impossible to eradicate it by mere ploughing. The potato and other tubers are but a modification of underground stems, which in their case is very much enlarged, and stored with starchy matter. The surface is dotted over like ordinary stems, with leaf-buds, here called eyes, which under favorable circumstances shoot out into new branches. These are but a few of the endless modifications which may be seen in the structure of stems; and we must refer the reader to systematic works on botany, and to his own powers of observation and study for further light on this interesting subject.

Harvesting Carrots.

Mr. Ware, of Marblehead, stated to the Board of Agriculture the method of harvesting carrots as practised there, as follows:

Our method is to top them, either with a hoe or shovel, (we generally use a shovel,) and then use a sub-soil plough, and so far as my experience goes, it is the only use to which a sub-soil plough can be put to any advantage in our county. Previously to ploughing the tops are raked off the field, so as to be entirely out of the way. We then run the sub-soil plough directly by the side of the row of roots, which lifts them out of the ground about two inches; then with potato diggers, forks or hoes, we go along and rake them out, so as to lift them from the ground and throw them inward, leaving room for the team to go through again. We first turn a back furrow in the centre of the piece, and go round that back furrow, drawing the carrots into the centre, and leaving a space for the horse or ox to travel, without treading upon the carrots. That leaves them spread all over the surface of the ground. We do that in the forenoon; in the afternoon we pick them up, throw them into the carts, and put them into the cellar. That gives about half a day's time for the carrots to dry, and in picking them from the ground and throwing them into baskets, the dirt is mostly shaken off, so that, if the weather is suitable—and dry weather ought to be chosen for the harvesting of roots—they will go into the cellar dry, which, in my opinion, is very important.—*Mass. State Agricultural Report.*

The Sewage of Towns.

A mass of valuable information on this subject has just been issued from the press. The papers by various authors read at the congress on the sewage of towns, held at Leamington, Warwickshire, last year, have been gathered into a volume. It is stated in the introduction to the papers that one chief object of the congress has been attained in making plain the nature and causes of the failures in our sanitary arrangements, and the many evils which have arisen out of them, owing to the unnatural admixture of excreta with large quantities of water, and to the prevailing custom of employing water as the vehicle for their removal out of our houses. It is argued that vast benefits will accrue to the community at large from ceasing to use water, and, in place of water, resorting to the natural agency of earth, which is as old as the creation itself. Experience has taught that, after the admixture of water with excreta, a putrid fermentation and decomposition result. The noxious gases generate while this decomposition is in progress, fill our habitations with impure air, and become the frequent cause of epidemics, while the decomposing sewage water, escaping from the imperfectly constructed sewers, percolates into the wells of drinking water. Mr. Hitchman goes on to state that the result of irrigation with sewage water is unsatisfactory in a commercial point of view, and of doubtful value agriculturally; while, in a sanitary point of view, the effects of saturating a large surface of land with decomposed sewage water become a still further source of evil. Both the liquid and solid excreta may be made portable and inoffensive, and removed from houses with regularity by a staff of officers duly appointed. By the exclusion of water, and the mixture of earth with excreta, which is in accordance with the laws of nature, all the evils of a putrefactive decomposition are avoided. The working of the earth-closet system at Baron Rothschild's estate is described by Mr. James to be perfectly successful. The cottagers express themselves grateful for this addition to their health and comfort. The village has now no foul smell, nor are the ditches any longer filled with liquid filth. This is the result of a simple mixture of dry earth with the soil; and is in accordance with the Divine command, received through the great law-giver, Moses, in his well-known rule for the sanitary arrangement of the Jewish camp. Mr. Craig, treating the subject as one of national as well as sanitary importance, shows that Austria is almost bankrupt in her exchequer, mainly through the exhaustion of the soil. Until recently, she exported her bone manure, and threw away her sewage into the Danube; while China and Japan have turned both to profitable use on the land. Belgium, with the poorest of soils, maintains the greatest amount of population in proportion to the extent of its surface of any nation in Europe, and sustains at the same time the productive powers of the soil by a liberal and judicious application of manure to the land. If England had adopted, long ago, the dry earth system which has been found to work so successfully on Baron Rothschild's estate, at Lancaster, and at other places, and had been more practical and prudent in returning the guano to the soil, instead of throwing this vast source of national wealth into her rivers, to poison fish, pollute the water, and disseminate disease and death, thousands of lives destroyed through drinking impure water in times when cholera was epidemic might possibly have been saved.—*London Times.*

Note by Editor C. F.—Considerable inconvenience appears to have resulted in the neighbourhood of several English towns by the application of the sewage to the surface of fields, though in other localities a marked improvement in the crops is claimed as the result of this practice. In one instance, at Malvern, great complaints were made of the unpleasant and evil effects of this method of employing the sewage, in contaminating the air; and the authorities, after trying various expedients and getting into fresh difficulties and perplexities, having called in the assistance of an able man of science, accustomed to the practical working of various systems of the kind, were recommended by him to adopt a plan of subsoil irrigation, as the only effectual remedy for the evils complained of. His method was to conduct the sewage beneath the surface into a series of perforated pipes, and thus at once avoid the ill effects of the surface application on the air, and deposit the fertilizing material where, he contended, it would be most beneficial in increasing the productiveness of the soil. Without discussing the merits of the suggestion, it is only necessary to advert to its expense to show the great superiority of the dry earth method, which commends itself to the judgment of most unprejudiced persons as being more natural, cheap and efficacious. This we believe to be the right principle of rendering innoxious and utilizing the solid and liquid animal excrements in our towns and private dwellings. The method is gaining great favour, and its general adoption would be attended with incalculable benefit.

Exterminating Charlock, or Field Mustard.

The operations of exterminating weeds generally extend over more than one season, especially in the case of the most troublesome and obstinate. The following article, from the *American Agriculturist*, though rather late for the present year, contains valuable suggestions, applicable to other pests besides that immediately under consideration, and will furnish as good an answer as we can give to certain enquiries which we have lately received on kindred subjects.

We know of no weed that is so difficult to exterminate as charlock. Canada thistles, daisies and dock can be eradicated with facility, compared with this. Field mustard is an annual plant, having leaves like the turnip, and bright yellow flowers. It starts from the seed at any time between early spring and late autumn. The plants grow rapidly, and produce a large number of seeds in a short time. In ordinary seasons, two crops will mature on the same field, but winter kills every plant. The seeds will remain in the ground a lifetime, without losing their vitality. We have cultivated a field for sixteen successive seasons, allowing no mustard to go to seed; but deep ploughing brought seed to the surface the seventeenth year, so that the ground was nearly covered with the young plants.

When wheat, rye, barley, oats, flax, and such crops are raised, if there is mustard seed in the soil, it will appear, and will ripen its seeds before the crops. Much of the seed will shell out while the grain is being harvested. If it should not be covered with earth sufficiently deep to promote vegetation, it will remain until the next season, or until the moisture and heat happen to be just right to cause germination.

There are two things indispensably necessary to exterminate mustard. One is to allow no seed to mature; and the other is to cultivate such crops as will induce all the seed to vegetate, that the plants may be destroyed before they go to seed. Grain having mustard seed among it, should never be fed to stock until after it is ground into meal.

When mustard comes up very thick, harrow the ground thoroughly, as soon as the crop of grain has been removed. After a few weeks have elapsed, harrow it again. This will destroy most of the young plants in the seed leaf. After this, use a cultivator instead of a harrow. These repeated scarifyings will cover the seed and bring others near the surface, so that a large proportion will vegetate and die before winter. The next season harrow the ground early in the spring, so as to start a new crop of the seed. Plough it soon after the time for planting Indian corn. Harrow again in about two weeks. After another fortnight, plough and sow buckwheat. As soon as the buckwheat is harvested, harrow the ground again. The next season manure well, and raise a hoed crop; and allow no mustard to go to seed. Next, sow a crop of winter grain. The mustard may now appear quite thick; but none of it will have time to ripen before winter, when every plant will die. A limited number of plants will appear the next season among the standing grain. When they are in full bloom, let every one be pulled. A careful, faithful man will be able to pull all the mustard in a day that will appear on several acres, after the soil has been treated in the manner recommended. After this, any kind of grain may be raised. But for more than twenty years mustard will come up every season, and must be pulled up before it ripens. This is the only way that our cultivable fields can be rid of this pestiferous plant. Incessant vigilance from year to year will exterminate it effectually.—*American Agriculturist.*