

weather, to not overwater, as it makes the plants grow spindly, and also favors the development of the "damping-off" fungus. Plants should be pricked out as they develop their second leaves, into rows 2 inches apart and 1 to 2 inches in row. As these crowd, they may be again shifted about 3 by 3 inches; and when crowded again they may be shifted further, or put in pots. Four inches are most generally used; some growers again shift to 6 inches apart. When these get well rooted, they may be shifted outside into cold-frames, if the weather permits, remembering at all times not to overwater. The plants may be hardened off this way, and transferred to outside soil when danger of frost is over.

The soil should be largely a sandy loam, or gravelly soil, well drained, is the earliest and warmest, manured with good barnyard manure the year previous, and plowed in spring before planting, and worked thoroughly.

Superphosphates, 800 pounds per acre, and muriate of potash, 200 pounds per acre, may be worked into the soil. For early tomatoes, fresh barnyard manure and an excessive use of nitrates may create a too-vigorous leaf growth, at the expense of early maturity. The culture of late tomatoes differs in that often the seed is not planted until April, and the plants are often only once transplanted into cold frames, with a little gentle heat from manure under them (not enough to be classed as a hotbed). They are planted 4 by 4 inches apart, and then a steady growth is kept up. They are planted into suitable soil, manured same as for early tomatoes, or even heavier soils. The use of nitrates will increase the size of plants, and also the subsequent crop; and as earliness is not the object, it is often better to use nitrates, especially on the slow-growing heavier soils. Fungous diseases are numerous. The tomato rot, or blossom-end rot, is about the most destructive. This is often worse on heavy soils and soils manured with fresh barnyard manure. It is sometimes worst in fields where a very rank growth is followed by a dry spell of weather, and an absence of fruit-producing elements in the soil. Remedies are mostly preventive, such as changing of earth in hotbed and cold-frames every year, growing tomatoes on new soil every year, avoidance of use of fresh barnyard manure as much as possible, and other things which predispose the crops to attacks. Varieties differ in locality. It is sometimes advisable, in certain localities, to grow one of the earlier-ripening of the late varieties, such as Success, then we are able to get the crop off before frost.

GROWING TOMATOES UNDER GLASS.

C. Gibbard, of Todmorden, said, in his address, for forcing under glass, the early varieties have proved most profitable to grow. He uses Earliana and Earliest of All. There is a marked difference in fruit produced from the different strains of these varieties. It is safer to use your own strain.

He has not had success with bench culture, so has adopted the solid bed, or earth floor, with a passage down center, about a foot deep and a foot wide, dividing the beds. The soil is a sandy loam, well manured with well-rotted manure. He used the house in winter for growing lettuce and radishes.

He starts sowing seeds in plots in greenhouse about the second week in January; second sowing two weeks later; and third sowing still two weeks later. When second leaves show, they are transplanted into flats 3 inches apart each way. When they crowd or draw up, he moves them into pots or berry boxes, then transplanting into the permanent beds the second week in March. The beds are six feet wide, taking 5 plants across, and two feet apart the other way. Between these he plants a double row of lettuce, which matures while plants are developing. When lettuce is off, the plants need attention. They are trained to one stalk, all laterals being removed, and tied to an upright lath. Holding plants back will check their growth at any time and injure the crop. He likes to get the fruit all set well and evenly sized, by a continuous, steady growth, before fruit starts to mature.

The temperature at night should not be below 60 degrees, and varies from 70 to 90 degrees during the day. He commences to ventilate when 75 degrees is reached.

Keep plants dry when fruit is forming. This aids in fertilization of blossom during spring months. He does not artificially fertilize blossoms.

Manure-water is the only fertilizer he then uses; the crop is ready by June 1st, and is all off by July 1st. He often keeps artificial heat in house until the middle of June.

FORCING LETTUCE UNDER GLASS.

A paper on this subject, contributed by Eugene Davis, Grand Rapids, Mich., was read by Mr. McMeans, of Guelph. The soil used in his section is fine, light sand, finely manured. It gives good drainage, and never gets hard. They use the best seed obtainable.

Mr. Jones is the originator of the well-known Grand Rapids Forcing, which is a selected and improved strain, produced by 14 years of selection, starting with black-seeded Simpson as the parent strain.

The seed should be water-cleaned, giving a plump, heavy seed and a more uniform crop. Watering should be done with judgment, especially during dull weather; water thoroughly when needed.

For aphid and green fly, fumigate twice a week with tobacco stems, or use tobacco dust, sprinkled on plants and ground after plants are watered, until half-grown. Tobacco dust should be withheld when plants

are about half-grown, and smoking should be withheld when crop is nearly ready to sell. They carry a night temperature of 45 to 50 degrees, and day temperature of 60 to 75 degrees. They use a self-registering thermometer and thermostat, with electric bell attachment, in the dwelling-house. Some firemen are careless about keeping an even temperature at night. They get better results in starting the seed-bed under glass, even in August, when seed is sown for the first crop.

Plants are not so apt to get brown-rooted or rusty—injuries from which there has been very much trouble in the past three years. The rust is known locally as "shot-hole" rust, as the leaves are eaten full of holes. The crop is often completely ruined.

For fertilizers, livery-stable manure, partly rotted, or in a short condition, is used. If run through a manure spreader, it is put in a fine condition to mix with the soil.

His houses are 29 by 280 feet, with double-doors in each end, so that the soil and manure may be drawn in with a team and wagon. In preparing for a crop, two inches of the top soil is shovelled to one side, then four inches of manure evenly spread; then, with a horse and plow, is thoroughly mixed, levelled off, well watered, and the top soil replaced. Eight-inch boards are used for walks, giving practically all the space for lettuce. The manure is all the fertilizer used for the three crops usually grown through the season. It is planted in rows six inches each way, with double-rooted plants six weeks old. The crop is usually ready for market from seven to eight weeks from planting. It is sold by the pound, and packed in sugar barrels and bushel baskets, paper-lined. Competition is keen, and prices vary, usually averaging 8 to 12 cents a pound for the season.

For the last three years, sterilizing the soil has taken the place of the removal of the earth. This is done by injecting live steam into the soil. It is less work, renews the soil, makes the crop grow faster, prevents damping-off, kills weed seeds and insects, and he thinks it will pay any one who has trouble in growing lettuce to try it.

FERTILIZERS IN RELATION TO VEGETABLE-GROWING.

An address on the above subject was delivered by Prof. R. Harcourt, O. A. C., Guelph. He prefaced his discussion of fertilizers with a few remarks about plant-physiology. Plants resemble animals in many ways. They feed, they breathe, they take up certain materials; they give off waste materials; they are unlike animals in that they can't go in search of food.

The food of a plant consists of many elements or chemical constituents. Some of these are in the soil in sufficient quantities, but the amounts of lime, phosphoric acid, potash and nitrogen vary in different soils, and are sometimes wholly lacking; if any one is lacking, the plant cannot grow, hence the necessity for using fertilizers.

Then, again, plant food may be in an insoluble form in the soil; while again, plants differ in their ability to dissolve the insoluble forms of plant food in the soil. Of course, cultivation and tillage let in the air into the soil, which helps to disintegrate the insoluble material, hence the necessity of drainage and cultivation.

Plants also differ as to their requirements. A leafy plant, or a plant such as a lettuce plant, needs a food which will tend to vegetable growth, and this is found in the nitrogen of the manure, which gives a quick-growing growth and forms a large, crisp lettuce plant.

Excessive nitrogen on a plant like the tomato, which is grown for its fruit, will give a rather vigorous growth, at the expense of fruit. Tomatoes, therefore, do best with more potash and phosphoric acid in the soil. Hence the necessity for the use of artificial fertilizers in conjunction with barnyard manures for best results. Fertilizers, for profit, must be used intelligently. Fifty years ago artificial fertilizers were very little known. Wood ashes was the principal source of potash; this is also to-day one of the cheapest ways of procuring potash for plant growth, when necessary. But to-day we have the mines in Stassfurt, Germany, the source of kainit, muriate of potash and sulphate of potash, so much used now where ashes are not obtainable.

Phosphoric acid is got from bones in the various forms, also phosphatic rock. These substances are treated with sulphuric acid to form what are termed superphosphates, the action of the acid rendering the phosphates more soluble.

Nitrate of soda—a salt from Chili—blood meal, etc., are forms of artificial fertilizers of the nitrogenous character.

Discussion followed which hinged principally on the treatment of land such as is used by vegetable-growers near the large centers where there is a superabundance of barnyard manure, and the failure of such soils under present conditions to grow paying crops of tomatoes and other kindred crops on account of the superabundance of nitrogen in the soil; how best to remedy this defect by the use of phosphate and potash manures, and also the correcting of the acidity of such soils by the application of lime where necessary.

FORCING EARLY VEGETABLES.

E. E. Adams, of Leamington, speaking on the above subject, said the forcing of early vegetables is done in his section by starting the plants in steam-heated houses and bringing plants along well, then transplanting them to the outside when weather will permit. Success depends on season, market, methods, and principally on the man. They use the houses for forcing early to-

matos, peppers, early cabbage, cucumbers, beans and musk melons. The soil in greenhouses is made of fresh horse manure and sod, layer for layer, then rotted. The soil outside is sandy loam, manured heavily with barnyard manure. For the cabbage and leafy plants, they are aided by nitrate of soda applications, and for fruiting plants they also use phosphoric acid and potash. Sea fowl, guano, with extra potash, gives good results.

ONION-GROWING.

E. G. Malcolm, of Scotland, Ont., said the climate and much of the soil in Ontario are such that onions may be brought to a high state of perfection. We should be able to export onions from Ontario, instead of importing them. The favorite soil is a good loam or sandy loam, very rich; this can be made so by successive applications of well-rotted manure. Each grower must experiment for himself what he is to use. He fertilizes with wood ashes and salt; about one-third of the mixture is sometimes salt, and, if possible, 600 to 800 pounds of salt are used to the acre. Salt deters the growth of maggots.

Prepare seed-bed by rolling, harrowing, cultivating and levelling. Spring-plowing has produced best results with him. Variety is determined by the wants of the market. Upon seed depends the crop; good seed is absolutely necessary, poor is dear at any price. Don't sow until the ground is ready for the seed. He plants rows 12 to 16 inches apart. When onions come up, he has a light harrow arrangement made, about 3 by 4 feet, with 4-inch nails driven through for teeth. This is pulled by hand over the patch, just as onions come through; it destroys small weeds. They cultivate mostly with wheel hoes, starting to use them after the second cultivation.

As soon as onions are ripe they commence to harvest, putting six rows in a pile, then sort and weigh up, 76 pounds in a sack. They are shipped in bags of this weight. Yield is from 400 to 600 bushels per acre.

Salt checks maggot worms; cutworms are troublesome; Paris green put in soaked bran and buried in the earth, will attract and kill many. Blight has been troublesome, and they have not yet found an effective remedy. Scallions have been more troublesome among onions grown on muck lands; some attribute it to seed produced from immature onions.

CELERY-GROWING.

T. Benstead, Strathroy, was down for an address on this subject. Celery grows on any soil, but is most successful on black muck. The soil he uses was formerly a tamarack swamp. The soil is 10 feet deep. He uses 20 to 25 loads of good rotten barnyard manure per acre, spread evenly over the ground in the winter. In spring it is plowed under five inches deep. Let it lie about two days, then harrow it; then sow 75 to 100 bushels of wood ashes and harrow in thoroughly. Then broadcast 1,000 to 1,200 pounds of fine-ground bone, harrow it again, then add 1,000 to 1,500 pounds of common salt, and work that in. All this is done as early in the spring as possible. He sows his first seed 15th to 20th of March, in a cool hotbed, and transplants when two inches high into beds covered with cotton. If checked in growth, the plants will go seedy; if started too early, they also go seedy. He prepares these beds in the fall, manuring more heavily for them than for the other land. These beds are 4½ to 5 feet wide, for convenience in handling the plants. For later plants, he sows in rows six inches apart, and thins out plants, but does not transplant.

About June 20th the main crop is transplanted. Rows are run north and south, so that the sun shines on both sides of each row.

He grades the plants when planting, putting all the larger plants in together, next size together, and so on. He puts a double row 7 inches apart and 3 feet 9 inches to 4 feet apart between the double rows. Uses a wheel 3 feet in diameter, with cleats of wood 7 inches apart on wheel; these are run along the double-marked rows, the strips of wood marking each 7 inches. A boy drops the plants where they should be planted, and the person following can plant 1,000 plants an hour. Care is taken not to expose plants to sun before planting. A week after planting cultivate with a five-tooth cultivator, then twice a week afterwards with an eight-tooth cultivator.

Blight has not affected his crop. Bleach by boards fastened together with a wire hoop at ends, and also by the earth piled up at sides in some cases, which takes two weeks to bleach.

The earth washes off best by a forced stream of water before earth dries on.

He does not store much of the celery. He keeps it by putting six rows in a trench, covering two-thirds depth; as it freezes, increase the earth up sides; then, after it freezes, cover earth over the tops. When the top earth is frozen hard enough to hold a man up, manure is put over for extra protection; but he does not keep much past Christmas time.

He uses Vaughan's White Plume, which is the best strain of White Plume he can get. The Golden Heart celery, selected by Mr. McInnes, of London, Ont., is a very superior celery.

MELON-GROWING.

W. G. Horne, Clarkson, spoke on melon-growing. The two kinds of melons grown are water and musk melons. The watermelon is not so profitable, for the Southern stock competes with ours. The musk melons from South are picked before maturity and lack flavor, while ours are allowed to ripen, and we can market in