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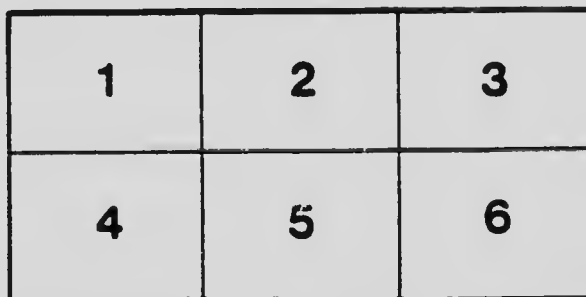
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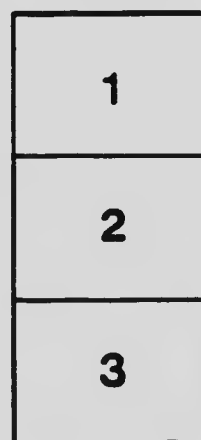
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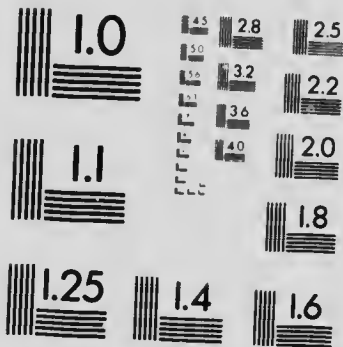
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# THE VEGETABLE GARDEN

## A PAPER

READ BY

W. SAXBY BLAIR

*Professor of Horticulture, Macdonald College*

BEFORE THE

STANDING COMMITTEE OF THE SENATE

ON

AGRICULTURE AND FORESTRY

1911

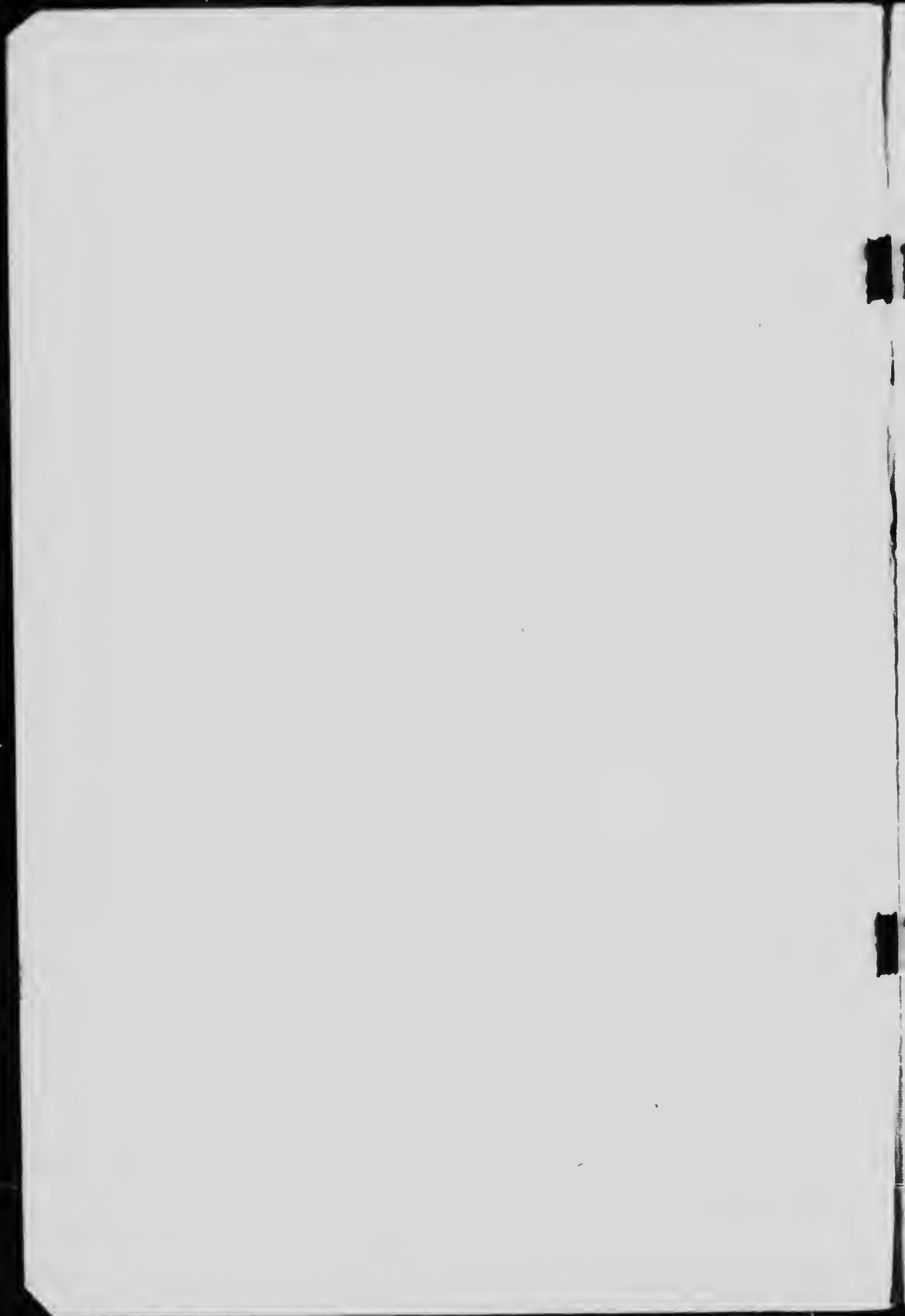
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# THE VEGETABLE GARDEN

BY

W. Saxby Blair

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Vegetable growing involves more detail than does the growing of any of the general farm crops. Many of these details may be of minor importance in general agriculture, whereas in vegetable growing, success or failure may be determined largely by attention to them. For this reason to deal with vegetable gardening briefly in a comprehensive manner is exceedingly difficult. Consider, for instance, details incident to the growing of tomatoes, or any representative vegetable crop, such as starting the seed, usually under glass, and the management of the hotbed for best development of seedlings; transplanting of seedlings to secure desirable plants; hardening off of the plants for setting to the open field; preparation of the ground; setting out the plants; cultivation; training; harvesting as the crop matures, and the packing of such perishable fruit in attractive and stable packages, in comparison with a grain or fodder crop, to start which the preparation of the soil is usually not nearly so important; the seed is sown where the crop is to develop; the product is harvested easily, usually all at one time, and in bulk; does not require so careful handling and permits of easy storage.

I shall attempt first to point out certain important details more or less common in their application to all vegetable crops, and follow this with more specific information relative to the growing of some of the principal vegetable crops.

## STARTING THE SEED.

In sowing seed whether in the open ground, hotbed or greenhouse, attention should be given to certain factors which contribute to successful germination. Heat, moisture and air are essential. The temperature requirements for best germination are usually a few degrees higher than required for the best development of the plant. Avoid extreme temperature conditions. A high temperature followed by cold may prove disastrous.

Uniform moisture conditions are imperative. Excessive watering one time followed by drying out is the cause of many seeds not starting. Keep the soil moist, not wet. Seeds if not in contact with moist soil cannot possibly germinate. The reason for pressing the soil over seeds that are small is to bring the soil moisture to the surface to supply the seed. The smaller the seed the shallower they should be planted as a rule. The air requirement is regulated largely by the depth of planting. The depth of planting will be governed somewhat by the condition of the soil, for on

light open soils the seed can be safely planted deeper than on heavy compact soil. Small seed, such as celery, may be sown one-eighth inch deep. Medium-sized seed, such as cabbage and onion, one-quarter inch deep. Peas and beans may be planted one to two inches deep.

### PREPARATION TILLAGE.

By preparation tillage is meant the tilling of land before planting. With all vegetable crops this should be thoroughly done. The heavier or more compact the soil the greater the necessity for care in this operation. Any manure applied should be well mixed through the soil. The ground should be well worked to at least six inches deep with the two-horse cultivator or similar implement. Crops should never be rushed into poorly prepared ground, for it is not possible to make up for preparation tillage after the crops are planted.

### MAINTENANCE TILLAGE.

Maintenance tillage is the tillage required after the crops are planted. Maintenance tillage should be shallow. The object should be to keep down all weed growth by frequent shallow cultivation, and leave a fine earth covering on the surface of the ground to prevent evaporation from the soil. Two inches is the usual depth for such cultivation. When the plants are young deeper cultivation may be given, but after the roots commence to spread through the soil much injury from cutting or exposing them may result from deep cultivation.

### MANURING.

Partially-rotted stable manure may be applied to vegetable land in the fall and ploughed in to a depth of five or six inches. Stable manure applied in the spring should be well rotted. This is especially so in the case of early vegetables. The advantage of well rotted manure is that the plant food it contains is in a more readily available form and can be used by the crop at once. Rough and partially decayed manure may be used to advantage for late vegetable crops if applied in the spring. As a general thing, however, manuring in the fall and ploughing it under is advisable for all vegetable crops.

### COMMERCIAL FERTILIZERS.

Commercial fertilizers can be used to advantage in vegetable growing. One containing 4 per cent. nitrogen, 8 per cent. phosphoric acid, and 10 per cent. potash will prove the most satisfactory. This may be home mixed by purchasing the unmixed material and mixing in the following proportions: 150 lbs. nitrate of soda, 125 lbs. sulphate or muriate of potash and 325 lbs. of 15 per cent. acid phosphate. From 500 to 1,000 lbs. per acre is the usual application of this fertilizer. The practice is to sow broadcast just before seeding or planting, scattering evenly and mixing with the soil by harrowing. Fertilizer scattered at the rate of one ounce to the square yard represents approximately 300 lbs. per acre.



Where quick vegetable growth is desired, nitrate of soda at the rate of 200 to 300 lbs. per acre may prove desirable. A heavier application than this is not advisable and may prove injurious.

### HOTBEDS.

For lengthening the season of fresh vegetables and to raise vegetables which require a long season to mature, hotbeds will be found to be quite necessary. They are constructed in the early spring before the weather becomes warm enough to start growth without some artificial heat. This heat is supplied by using fermenting manure. Horse manure that has not 'fire-fanged' or 'burnt-out' should be used. When collecting the manure care should be taken to keep the mass well tramped to exclude the air as much as possible, thereby preventing this rapid decomposition or 'fire-fanging.' When the necessary amount of manure has been secured it is turned and made into a heap, and after a week it may be again turned and made into a hot-bed.

An even, uniform heat is desired, and not the quick violent heating which soon spends itself. In order to secure this, spread the manure evenly in layers of one foot at a time, distributing the dry and cool parts of the manure with the warm and moist parts, and tramp the whole mass quite firm as the work proceeds. The amount of tramping will be determined by the amount of straw the mass contains, the greater the proportion of straw as compared with the solids the more tramping required. If the mass is very dry it may be advisable to wet it some to make it more compact.

The manure may be made into a hotbed on the surface of the ground or put into a pit made about 18 inches deep. If the pit is used care must be exercised not to allow water to enter it. In many cases the bed should be larger on each side than the frame to be used. It will not be necessary to use so much manure if the pit is used as in the case of the surface bed, for the heat will be held better from the bed being protected. If the hotbed is started on the surface the latter part of February, three feet of manure is necessary. If started the last of March, two feet will be sufficient.

The frame for supporting the sashes should be 10 inches to 12 inches high in front and 15 inches to 18 inches at the back, giving a drop of about 6 inches to the sash. They are usually made 12 feet long to support four 6 x 3 feet sashes. The sashes usually contain three rows of 10 x 12 inch glass.

The hotbed should be located on the south side of a building and be protected from cold and prevailing winds.

Two or three inches of cinders, sand or soil may be put on the manure in the frame if flats are to be used, or if the seed or plants are to be grown with flats, six inches of good loam is necessary. The seed may be sown or plants put into the frame about one week after the bed is made or as soon as the first violent heating commences to subside. For warm season vegetables the temperature at the bottom of the soil should have fallen to 90 degrees and for cool season vegetables to 70 degrees. Up to this time the frames should be left slightly open in the daytime to allow plants to escape.

### Management of Hotbeds.

Owing to the volume of air in the hotbed being small great care is necessary not to allow the temperature to run too high, nor to leave too much air on the bed and chill the plants. In order to develop stocky, thrifty plants, as much ventilation as possible should be given. A close confined atmosphere invites disease, and produces sickly, 'leggy' or drawn plants. More ventilation can be given the cool-season than is the case with the warm-season vegetables, and it is advisable to have two hotbeds, or a division in the frame if only one is used, so that these two classes can be handled under the necessary different temperature conditions.

Watering should be done about the middle of the day, so that the plants and the surface of the soil will have a chance to dry off before the frames are closed. The soil should be kept damp throughout but not wet.

### Cold Frame.

A cold frame is similar to a hotbed except that no manure is used to secure bottom heat and the sun is depended upon entirely for heat. The soil inside the frame may be dug up and the seed sown in it, or the seed may be sown in flats and set into these frames for hardening off. They require attention similar to hotbeds. During very cold nights, like hotbeds, they may be protected by a mat covering or shutters. Straw may be scattered over the glass to give this necessary protection.

### Flats.

Flats or small boxes are necessary for convenience in handling plants. Flats are usually made of 1-inch lumber for sides and bottoms and 1-inch ends. 13-inch x 23-inch and 3 inches deep is a convenient size. Old soap or similar boxes may be cut down for the purpose. They should all be of the same size if possible to make use of the hotbed space. The advantage of flats is that they can be moved from place to place, and shifted from one bed to another as desired. The seed starts generally better in flats and, when ready to transplant, the work can be done inside with greater comfort. Less soil will be required when flats are used.

When the plants are ready to harden off the flats can be moved to a cool bed, or cold frame, and the bed be given up to plants requiring more heat. When transplanting time arrives the flats can be taken to the field, and the plants cut out with a square of soil attached to them and transplanted without suffering much check.

### Hardening off Plants.

Plants taken from warm quarters where they have been protected will suffer much check when set directly in the open ground, whereas if gradually accustomed to outside conditions they will not mind the change. Ten days or so before planting in the open ground a start should be made to gradually harden the plants to field conditions by a gradual lessening of the protection they have been receiving, until finally all protection is withdrawn during both day and night. If there is danger from frost, protection should be given in any case.

## Cool and Warm Season Vegetables.

Vegetables may be divided into these two groups. The cool season vegetables do best at a low temperature and may be started in the open early in May, or earlier, or as soon as the ground is fit to work up properly. Peas, carrots, beets, parsnips, turnips, radish, spinach, lettuce, parsley, cabbage, cauliflower, celery and onions are the principal cool season crops. Plants for transplanting may start in a temperature of 50 to 55 degrees, and if grown in an atmosphere above this temperature they may be weak and unthrifty and not make satisfactory plants.

The warm season vegetables such as tomatoes, cucumbers, melons, corn, beans, peppers, and egg plant, require a temperature not lower than 60 degrees to develop properly. They cannot be set in the open ground until danger from frost is past or toward the latter part of May. Seed of these sown in the open ground should not be sown until the weather is settled, the ground warmed up, or after the middle of May. Warm season vegetables must have warm soil and a southern exposure, whereas the cool season vegetables may be put on cooler and later soils in more northern situations. For very early vegetables the southern exposure is always desirable.

## Importance of Good Seed

Considering that one ounce of celery seed should produce 3,000 plants and one ounce of cauliflower produce 1,500 plants, and that the crops from these if properly grown would each be worth \$75, the importance of securing the best seed of a good strain cannot be overestimated. If one has to pay \$3 to \$1 an ounce for cauliflower seed he knows to be good it is better to do so than run the risk of losing a part of the crop from the purchase of cheap seed. What is true of these crops is equally true of all vegetable crops, and expense in the purchase of seed is a small consideration as compared with the value of resultant crops.

## SUCCESSIONAL SOWING.

In order to continue a supply of certain vegetables, successional sowings of the same kind of seed may be made every ten days until the middle of June with cool season crops such as peas, radish and lettuce, and later with beans. In this way often a supply usually confined to a week or ten days may be spread over several weeks.

## HAND WHEEL HOE.

One of the tools advisable where hand work is necessary in maintenance tillage operations is the double wheel hoe. With this the surface soil can be worked close up to the plant and left in a fine condition, thus doing away with much of the costly hand hoeing and weeding. It cannot be used to advantage in soils which have become hard, nor where weeds have grown large. It is indispensable in small gardens and in onion growing, where a large amount of the work must be done by hand.

## THE PHYSICAL AND CHEMICAL CONDITION OF SOILS.

A soil may be rich in plant food and the plant not be able to make use of it owing to the physical conditions of the soil not being suitable for the plant's development. Plants require food, but they require as well suitable conditions for root development, and a uniform supply of moisture. A heavy compact soil may be made suitable in texture by proper working at the right time, or it may be rendered practically useless by improper working.

A soil that dries out quickly may be made retentive of moisture through the incorporation of humus or vegetable matter, and proper cultivation. The reason why stable manure often gives better results than commercial fertilizer is that it improves the physical condition of the soil as well as supplying plant food. Commercial fertilizers supply plant food only. Best results from the use of commercial fertilizers are always obtained from soils in good physical condition and containing a fair amount of humus.

Conditions modify practice, and a practice suitable to a heavy compact soil may not be desirable on a light soil. Deep cultivation may be necessary on a heavy type of soil, but not advisable on an open leachy soil. It is more difficult to change the physical condition of a soil than the chemical, hence the importance of directing more thought to this phase of soil improvement.

## TOMATOES.

The tomato requires a high temperature for best development and should be given a warm, sunny situation. A well drained sandy loam is best. Well-rotted manure at the rate of 10 to 15 tons per acre is advised. If applied in the spring, plough it under to a depth of four inches and work the ground by cultivating six inches deep. Commercial fertilizers at the rate of 500 pounds per acre may be used in place of manure. Nitrate of soda may be used to advantage by scattering it broadcast evenly around the plants at the rate of 150 pounds per acre after the plants have been set.

About the only time growth can be safely forced is during the first month or six weeks after being set in the open, for at other times the vegetative growth may be made at the expense of fruit production, hence the importance of not overfertilizing, especially with nitrogenous manures, except during the early growth of the plant.

Seed started in the hotbed on the last of March will make good plants for setting outside seven to eight weeks later, or from the 20th to the last of May. The seed is sown on flats, and in two weeks time the seedlings may be transplanted to 3 to 3½ inch pots, strawberry boxes or into flats, putting one plant to a pot or box or spacing the plants four inches apart in the flat. Here they remain until ready for planting out, when they are removed and set in the open soil without disturbing the root more than is possible. The plants are taken out of the pots by tapping the edge of the pot on something solid, and from the strawberry boxes by cutting the box. They are cut from the flats in squares.

The plants are usually spaced 4 x 4 feet apart. If the intention is to stake the plants and train to a single stem they may be set 3 x 1½ feet apart. The stakes may be 1½ inches square lumber or round small saplings. They should be 5½ feet long and

cost about one cent each. At the above distance about 10,000 plants can be put on an acre. As the plants grow they are tied to the stake, this being necessary four or five times during the season. All lateral growth which starts up from the axil of the leaves is pinched out as it appears and only the one branch allowed to develop. When the plant reaches a height of five feet it is pinched off and no more growth allowed to form, thus throwing all of the energy into the formation of fruit. The leaves should not be pinched off, however, as the maturity of the fruit will not be hastened by such a practice.

### ONIONS.

Onions do best on a light loam soil rich in plant food. Light loams can be worked to better advantage than heavier loams and do not dry out so badly during summer. An abundance of available plant food is necessary if profitable crops are to be obtained, and consequently a soil that has been manured for several seasons previous should be selected. The land should be free from stone and weed seeds.

Onions may be grown in the same land year after year, and it cannot be made too rich. Well-rotted barnyard manure applied in the fall and ploughed in shallow, about four inches deep, is one of the best fertilizers. Fifteen tons per acre annually is a good application. If the soil is well supplied with vegetable matter successful crops may be grown with commercial fertilizers applied at the rate of 500 to 1,000 pounds per acre. This is sown broadcast and harrowed in just before seeding.

The ground can be best prepared with the disc, springtooth, and smoothing harrows, and should be well pulverized to a depth of four inches.

The seed is sown in rows on the level ground 12 to 14 inches apart at the rate of  $3\frac{1}{2}$  pounds per acre and  $\frac{1}{4}$  inch deep. A hand seeder is usually used. A seeder and wheel hoe combined can be purchased from any seed merchant at a reasonable rate. Seeding should be done as soon in the spring as possible, so that the plants will get well established before the dry, hot weather of summer.

Maintenance tillage is done principally with the wheel hoe, and consists in keeping the surface ground loose around the plants and all weeds from starting.

The falling down and withering of the tops indicates maturity, at which time the onions should be pulled. They are left for a week to dry, after which they may be topped and put into slatted crates, or put into these crates without topping, taken to a shed and allowed to cure for two or three weeks, after which they are ready for market. The advantage of the crate is that a small bulk of onions are together with plenty of ventilation, which is very necessary for proper curing for storage or shipment. They should not be stored in bags or in large piles in bulk. They may be stored in slatted bins arranged one above another, 10 inches to 12 inches deep. If stored the temperature should be kept as low as possible and the air be dry.

Onions may be started in flats in the hotbed or greenhouse ten to twelve weeks before ready to plant, being set in the open ground early in May. They will transplant easily, and good large plants will prove most satisfactory. About ten good plants can be grown on a square inch. The seed should not be sown too thickly. One and one-half to two pounds of seed will give sufficient plants to set an acre, spacing the plants four inches apart in rows one foot apart. The disadvantage is the expense of transplanting. For securing early onions and onions of large size this practice is advisable.

## CABBAGE.

Any good garden soil will grow cabbage. A warm, well drained sandy loam, very rich in plant food, is best for early cabbage. A northern exposure is best for late cabbage and a heavy soil may be used. The cabbage is a gross feeder and there is no danger from making the ground too rich. Twenty tons or more per acre of manure can be used, and this may be supplemented with from 500 to 1,500 pounds of commercial fertilizer for an acre. Commercial fertilizer is especially advisable for early cabbage where the object is to develop marketable cabbage quickly.

If the ground has been manured in the fall and ploughed, it should be again ploughed in the spring and thoroughly worked to a depth of six inches.

For early cabbage start the seed about March 15. The seedlings are transplanted to two inches apart three weeks later, and will be ready for the open ground early in May. The plants are usually set on the level in rows 30 inches apart and 18 inches apart in the row. Late cabbage are usually grown from seed sown thinly in a cold frame early in May and plants from these are set in the field about the middle of June, spacing the plants in rows 32 inches apart and 20 to 22 inches apart in the row.

The usual maintenance tillage should be given during the summer, and the ground not allowed to become hard and compact or to dry out.

In the storing of late cabbage cut the heads during a dry day and store where good ventilation is possible. The air should be kept dry and the temperature as low as possible. The heads should be placed on slatted shelves far enough apart to store two or three tiers of cabbage, with a good chance for ventilation under the shelves. A confined atmosphere renders cabbage storage impossible.

## CAULIFLOWER.

The cauliflower requires a cool, rich loam. A northern exposure is best. Continuous growth is important, and anything that tends to check the plant in any way should be avoided. Dry weather often results in failure, and where watering is possible it may be advisable. For early and late cauliflower start the seed and handle the same as for early and late cabbage, except that more careful attention should be given to detail in the development of plants. Like the cabbage, it takes about seven weeks to develop a stocky, properly hardened-off plant. They may be spaced in the field the same as cabbage.

When the heads are three to four inches in diameter the leaves should be tied together over the head in order to develop a good white flower.

## CELERY.

Celery may be grown on almost any soil from light sandy to clay, and even muck or peaty soil may be used. The chief requirements are a soil retentive of moisture, but one well drained and rich in plant food. A rich sandy loam produces firm, crisp heads, that keep best in storage and are superior in quality to the average celery grown on peaty or muck soils.

The objection to peaty or muck soils is that unless carefully fertilized, a pitiful celery is obtained, and a heavy clay is objectionable because of difficulty in working.

Farmyard manure is the best fertilizer. Twenty to thirty tons per acre may be used. The ground cannot be made too rich. Well rotted manure is advised. Land fair in fertility with plenty of humus may be fertilized with commercial fertilizer at the rate of 1,000 to 1,500 pounds per acre. The ground should be thoroughly worked and the manure well incorporated with it by ploughing and cultivating.

For early celery the seed should be started about the middle of February and for late crop one month later. It takes about three weeks for the seed to germinate. The seed is usually sown in flats, and about six weeks after seedling may be transplanted, one to one and one-half inches apart, to other flats, where they remain until planted out. This transplanting develops a very desirable root, and a stocky plant necessary for successful transplanting.

The plants are usually set on the level ground in rows four inches apart and six inches apart in the row. If the soil has been freshly worked no watering will be necessary, but if the ground has become dry this may be necessary.

Frequent cultivation to keep down weeds and form a fine earth mulch on the surface is all that is required.

Early celery may be blanched by standing boards 10 to 12 inch wide on edge at each side of the row close up to the plant. Late celery is blanched usually with earth. The plants are banked first when 8 inches to 10 inches of growth has been made, and as the plants develop more earth is banked up to them. In banking one should hold the plants together while the earth is shovelled up to them, otherwise soil will get into the heart of the plant, which should be avoided.

Early celery is dug, trimmed, washed, bunched and marketed as soon as fit. Late celery is dug with roots attached, broken stalks are removed and the plants packed upright, close together, in about five inches of sand or soil. An earth floor is best because the soil does not dry out so quickly.

A fairly dry atmosphere and temperature as low as possible is necessary for successful storage. The foliage of the plant should always remain dry, and the root should be in contact with moist soil. If this soil dries out, water should be added, but in no case pour any water on the foliage. To blanch green celery, growth should continue after storage and light should be excluded.

## MELONS.

Melons are started by planting the seed in three and one-half inch pots, or strawberry boxes answer the purpose, toward the last of March. About four seeds are sown to a pot. These are placed in a temperature of 65 degrees to 70 degrees. The plants remain in these pots until ready to plant in the field. Should all of the seed start, pull out all but two plants.

It is advisable to prepare the ground in the fall by manuring and ploughing. Fifteen to twenty tons of manure per acre is advisable. In the spring as soon as the ground is fit, it is worked up thoroughly, at least six inches deep. Furrows are then run out ten feet apart, making a trench eight to ten inches deep and one foot wide, into which six to eight inches of fermenting manure is forked and tramped. With a plough or shovel six inches of earth is crowned up over this manured trench. The hotbed frames are then placed over this row, sashes put on and closed tightly.

After one week, or about the 8th of May, the plants are set, one pot to each sash, or eight plants to a twelve foot frame. These are set right over the trench of manure under the central point of a sash. The plants are disturbed as little as possible when trans-planting.

The frame must be carefully watched to give proper ventilation, and as time goes on some watering may be necessary. When the vines fill the frame it should be lifted and blocked up to allow the vines to run out under the frame. About the middle of July the frames may be removed entirely.

The ground should be hoed very shallow around the plants to keep down weed growth. Do not plant too many plants together, and give the plants a good chance to develop. Properly enrich the soil, and avoid extreme moisture and temperature conditions. A temperature of 65 degrees to 70 degrees is the most suitable for the melon.

The seed may be sown a month later and plants set in the open field the last of May or early in June, without giving any protection. This practice enables one to develop good fruit, although not nearly so early as when the frame is used.

### WATERMELONS AND CUCUMBERS.

These may be grown as outlined for melons. They may also be started from seed sown right in the open ground. The hills are usually made in rows six feet apart and four feet apart in the row, and about four plants allowed to develop to each hill. The watermelon is planted in rows ten feet apart and four feet apart in the rows, two plants to a hill.

### SQUASH AND PUMPKINS.

For early squash or pumpkins the seed may be started in pots the last of April and set in the open field a month later. For late crops the seed may be sown direct in the field after the middle of May, as soon as the ground warms up some.

The bush vegetable marrow may be planted in rows five feet apart, and four feet apart in the rows. The trailing squash and pumpkins should be planted in rows ten feet apart, and the hills made eight feet apart in the rows. Three plants are sufficient for a hill.

The hills may be prepared by placing six inches of well-rotted manure in a space four feet in diameter, and digging this in, working the ground six inches deep. Or the manure may be spread about four feet wide every ten feet, and ploughed under. The advantage of this extra preparation and fertilization is to give the young plant a vigorous start.

The preparation of the whole of the soil should be similar to that given for melons, *i. e.*, manured in the fall and ploughed.

Vegetable marrow squash may be used as soon as developed in size and before fully matured. When fully matured they may be kept all winter in a thoroughly dry, fairly warm room. The Hubbard and similar squash keep best in a dry room at a temperature of about 50 degrees. They should be harvested when the vines are thoroughly dry, and the fruit not be bruised in handling.

A warm situation should be selected for all of the crops.



### CARROTS AND PARSNIPS.

These should be grown in deep, thoroughly prepared soil of loose open texture, to admit of even root development. This is especially true in the case of parsnips, as a heavy compact soil develops a poorly shaped and rooty parsnip. The ground may be spring or fall manured, ploughed deeply and thoroughly worked.

The seed is sown in the open ground usually before the middle of May, in rows two and one-half feet apart, at the rate of two pounds per acre for carrots and four pounds per acre for parsnips. The carrots may be thinned to two inches apart, and the parsnips four inches. If carrots are spaced too far apart in the row they become too large for table use. The ground should be rich enough and sufficient moisture maintained by frequent cultivation to continue an even growth throughout the season. The root should be kept covered with soil to the top, preventing the top of the root from becoming green, which is objectionable for market carrots.

### BEETS.

Beets for early use should be started as early as possible on well prepared ground. For winter use seeding toward the last of May, or early in June, is advised, as the beet does not become so large. Any good soil will develop good beets providing a uniform growth is maintained. A checked growth has a tendency to produce fibre.

Six pounds of seed per acre is usually used. The seed is sown in rows two and one-half feet apart, and the plants thinned to three to four inches apart.

### TURNIPS.

The early turnips may be sown as soon as the ground is fit, in well prepared soil. The Swede turnip should be sown about the last of May. They do best on a good loam retentive of moisture. Continuous growth is necessary to develop good quality. Like most of the root crops, they develop best during the damp, cool fall weather, and the advantage of late seeding is that they make little growth during the hot summer, developing a succulent tissue in the fall. Swede turnips planted early are very liable to be checked in growth during the heat of the summer, developing a root containing much fibre, and lacking in quality.

### SALSIFY.

The salsify, like the parsnip, requires a deep, loose, rich soil. It may be sown at the same time as the parsnip, and thinned to three inches apart in the row.

### RADISH.

The radish may be sown as soon as the ground is fit to work, in rows one foot apart, and the plants thinned to one inch apart. Successional sowing may be made one week apart until the first of June.

### PEAS.

Garden peas may be sown as soon as the ground is fit to work. The land should be fall manured with ten to fifteen tons of well rotted manure per acre, and ploughed. This is well worked in the spring to a depth of five inches. The seed is usually sown in rows two and one-half feet apart, and the seed planted one inch apart in the row.

Dwarf and semi-dwarf varieties do not require staking. It is advisable to stake the tall-growing sorts.

If one variety only is used, successional sowings should be made every week or ten days until the first of June. The garden pea is a cool season vegetable, and will not do well during the heat of summer. The season may be extended also by planting late maturing varieties. The early seeding is usually made one to one and one-half inches deep; the later seeding, two to three inches deep.

### BEANS.

Beans do best on a fairly rich soil, and unlike the pea, require a warm situation and warm soil. While the pea will do well on a fairly heavy soil, the bean likes a loose, friable soil for best development. The seed should be sown not earlier than the middle of May. They are usually planted in rows two and one-half feet apart, and the seed dropped two to three inches apart and one to one and one-half inches deep.

Successional sowings may be made every two weeks until the middle of July, for the purpose of extending the season into the fall.

### CORN.

A warm, friable, rich soil should be selected for garden corn. The seed is sown in hills three and one-half feet apart each way, and five plants allowed to develop in a hill. The seed is sown soon after the middle of May. Early and late varieties should be planted to extend the supply of table corn into the fall. As is the case with peas and beans, constant surface cultivation to keep the weeds down and maintain a loose surface mulch is necessary.

### EGG PLANTS AND PEPPERS.

These may be handled the same as tomatoes for planting out. It is better not to set them in the open ground until the first of June. They require a rich soil. The egg plants may be set in rows three feet apart, and two feet apart in the rows. The peppers are set three feet by one foot apart in the rows.

### SPINACH.

Spinach is one of our best pot herbs. It should be sown very early, usually in rows one foot apart, and the plants thinned to two inches apart. The ground cannot be made too rich for this plant. The richer the soil the less liable are the plants to go to seed quickly. A later sowing may be made in the middle of May and June 1. This

last seeding should be watered some, if dry weather prevails. A fall crop may be obtained by seeding the last of August on well prepared soil. This is a cool season crop, and will not thrive during the heat of summer.

### LETTUCE.

Any good garden soil will grow lettuce. The ground should be rich and fairly friable. The seed may be sown inside six weeks before planting outside is possible. The plants are developed as is the case with cabbage. They may be set in rows one foot apart, and six inches apart in the row.

Seed may be sown in the open ground as soon as it is fit to work, and the plants thinned to four or six inches apart. Successional sowings may be made every two weeks until the first of June. Seed may be sown the last of August for a fall crop on well prepared soil.

### PARSLEY.

Parsley may be grown from seed sown ten weeks before planting-out time in the early spring, and the plants handled the same as lettuce. The seed may be sown in the open ground in the early spring. This is not a very particular plant as to soil requirements.

### SWEET HERBS.

Summer savory, sage, and sweet marjoram may be grown from seed sown to the open ground in the early spring. They are not particular as to soil requirements, although a fairly rich, friable soil is best. Summer savory and sweet marjoram should be cut when in full bloom, and the sage should be cut before fall rains and the foliage too much. To prevent this sanding of the foliage, the ground at each side of the plants may be mulched with straw.

### ASPARAGUS.

Asparagus may be started from seed sown in rich, well-prepared soil in the early spring, in rows about two and one-half feet apart, dropping the seed three inches apart in the row and covering one inch deep. These will make good plants for planting permanently the following spring. One-year-old plants are better than older ones, for the reason that they suffer less from transplanting, and will develop a good cutting bed as soon as if older plants were used. Select the best developed plants, discarding all inferior ones.

The best soil for asparagus is a rich, deep loam, well drained. Asparagus may be grown on any type of soil, from light to heavy loam. A stony, gravelly, or heavy clay soil should be avoided. The ground should be as rich as it is possible to make it. Thirty to forty tons of stable manure per acre may be applied at the start, and the ground ploughed deeply and well worked.

After this thorough preparation tillage, plough out V-shaped furrows by turning two furrows at one side and one at the other, spacing them five and one-half to six feet apart. The plants are set in these furrows eighteen inches apart by shovelling

out some of the loose soil to give a good level base to set the plant on, spreading the roots in all directions. The crown of the plant should be about six inches below the level of the soil. Cover the plant with three inches of soil, and tramp the soil firmly. After the plant makes growth the furrow may be cultivated in level around it.

Frequent cultivation during the summer to keep the surface soil loose and all weed growth down is all that is required.

An annual application of manure at the rate of 20 tons per acre is advisable. This may be applied in the fall or spring, spread broadcast and ploughed under. Commercial fertilizer at the rate of 800 to 1,500 pounds per acre may be used in place of manure, if the soil contains a good supply of humus.

It is advisable to plough lightly toward the plants in the fall, crowning the soil over the row. In the early spring this is worked level again with disc and smoothing harrows, making the surface in good tilth to a depth of three to four inches.

Cutting is commenced the third year after the plants have been set, and may be continued until the middle of July, but not later. In the late fall the stalks are cut off with a scythe, removed and burned.

### RHUBARB.

Rhubarb thrives best in a deep, rich, mellow soil. A clay soil or one with a hardpan subsoil should be avoided. The ground should be heavily manured, and worked deeply. It is impossible to overfeed this plant. The tendency to produce seed stalks will be greatly lessened by fertilizing heavily. The plantation may be started from seedling plants one or two years old, or from division of the crown. In dividing the crown each piece should have at least one good strong eye. The planting is done in the spring, and the plant set so that the top of the bud or eye is level with the soil.

Old plantations may be improved by ploughing off the side of the old plants, manuring heavily, and cultivating thoroughly, or the plants may be lifted, divided, and reset into fresh soil. A plantation properly handled and thoroughly manured should give good results for ten years.

The early spring growth depends largely upon the leaf growth made the previous season, hence the importance of not removing too much foliage at once, and encouraging good strong foliage during the summer and fall, for the purpose of storing in the root, nourishment for the next spring's growth. The importance of cultivation during the summer, keeping the soil well worked and all weed growth down is therefore obvious.

The usual practice is to manure in the fall and work this in the following spring. Some follow the practice of manuring heavily, which prevents the frost from penetrating the ground, and then remove the bulk of this in the early spring; others allow this heavy mulch to remain around the plant during summer, do not cultivate, and pull out any weeds that may start.

## DESIRABLE VARIETIES OF VEGETABLES AND SMALL FRUITS FOR THE PROVINCE OF QUEBEC.

### Vegetables.

- Asparagus.**—Argenteuil.
- Beans.**—Red Valentine, Stringless and Refugee or 1000 to 1 (green pod); Davis Wax, Keeney's Wax and Wardell's Wax (golden pod); Linna Beans, Henderson's Bush.
- Beets.**—Egyptian Turnip, Eclipse, Half Long Blood.
- Kale.**—Green Curled Scotch.
- Brocoli.**—White Cape.
- Brussels Sprouts.**—Improved Dwarf.
- Carrots.**—Chantenay, French Market and Danvers.
- Cauliflower.**—Extra Early Erfurt.
- Cabbage.**—Paris Market (very early), Jersey Wakefield, Early Spring (early), Succession (medium), Autumn King, Savoy Drumhead, Danish Roundhead (late).
- Celery.**—Paris Golden and Perfection Heartswell.
- Corn.**—Peep O'Day (very early), Early Cory (early), Golden Bantam, Crosby's, Early (medium), Country Gentleman (late).
- Cucumbers.**—White Spine.
- Citron.**—Colorado Preserving.
- Egg Plants.**—New York Improved and Black Beauty.
- Kohl Rabi.**—Early Purple Vienna.
- Lettuce.**—Grand Rapids and Unrivalled.
- Melon, Musk.**—Paul Rose, Montreal, Rocky Ford and Hackensack.
- Melon, Water.**—Cole's Early.
- Onions.**—Yellow Globe Danvers, Large Red Wetherfield, Mammoth Silver King.
- Parsnips.**—Selected Hollow Crown.
- Parsley.**—Champion Moss Curled.
- Peppers.**—Cayenne and Ruby King.
- Peas.**—Alaska (very early), Thomas Laxton (early), Admiral Dewey, Heroine (medium), Stratagem, Juno, Telephone.
- Pumpkin.**—Calhoun.
- Radish.**—French Breakfast, Icicle.
- Winter Radish.**—Long Black Spanish.
- Spinach.**—Victoria.
- Salsify.**—Sandwich Island.
- Squash.**—English Vegetable Marrow (summer, fall and winter), Hubbard (winter).
- Tomatoes.**—Earliana and June Pink (early), Early Jewel (medium), Truckers Favourite (late).
- Turnips.**—Golden Ball, Extra Early Milan.
- Swede Turnips.**—Hall's Westbury.
- Rhubarb.**—Victoria, Linnaeus.

