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Preparation and Care of a Garden for Vegetables

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THOMAS GRAHAM GRIER
FRID L. MINCE

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Preparation and Care

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Garden for
Vegetables

Second Edition

COMPILED BY
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INTRODUCTION

In 1916 a corn field was turned into a garden. In 1917 Mr. Fred L. Minge, an experienced gardener, and myself, compiled information based on results, and published it in pamphlet form. There was a demand for it.

Mr. D. J. Brumley, one of the most successful owners of a garden and one of the officers of the Illinois Central R. R., has taken the original publication, reviewed, enlarged and amplified it. Mr. Brumley is recognized by his neighbors as being an authority on gardens—and the gardens of Flossmoor are among the finest in Cook County.

The following introduction was written by Mr. Brumley.

THOMAS GRAHAM GRIER,

Flossmoor, Ill.

The newspapers of 1916 advised every one who either owned or could lease a small plot of ground to have a garden and raise vegetables.

The slogan, "Food will win the war, don't waste it," suggested by the Federal Government, was enthusiastically accepted by all loyal citizens. Gardens were prepared and planted on the back lots of city homes, on vacant property, in the suburbs and on vacant strips of railroad right-of-way. The impetus given by this movement has not yet spent itself. Many of those who had their first gardening experience three years ago, are now confirmed and will continue for the exercise and pleasure it affords and the supply of delicious vegetables it insures.

The war has been won and those who rolled up their sleeves, dug in the ground and raised good things to eat did their part. The reconstruction period is not over. There exists the same necessity for raising food and not wasting it, as at the time our nation was preparing to do her part in the titanic struggle raging in Europe. The High Cost of Living must be beaten into submission. The starving people in the war-stricken countries must be fed. Greater demands will be made on our country for food. This will place our people in competition with those of our allies and enemies as well. A certain

way of keeping prices within reason is to produce more in this country than ever before. The gardener now will contribute his share in reconstruction if he will surpass his records of former years and produce at least seventy-five per cent of the vegetables needed in his own home.

Some war gardens were successful, others were failures. The failures were in the minority. It was clearly demonstrated that "back to nature" is the instinctive trait of most of us. Had the war gardeners been given help at the right time, failures would have been rare indeed.

The following pages have been compiled for the purpose of suggesting first aid to those who may need some help. The methods have been tried out in a practical way and are suitable for this region, 25 miles south of Chicago, Illinois. The suggestions would not apply to places having seasonal ranges differing much from those in this locality. The effect of latitude, altitude, proximity of large bodies of water and other peculiar local conditions must be given due weight.

It is thought the practical experience of those who compiled these pages would be helpful to those who are in earnest and desire to gather the reward of their labors.

D. J. BRUMLEY.

DESIGNING AND PREPARING A GARDEN

Everyone who has a garden, be it ever so small, helps to increase the supply of food.

This pamphlet is based upon the experience of operating a garden within 24 miles of the city of Chicago, the information in this pamphlet would not be correct for locations farther south or north.

However, it may be of value when supplemented with local conditions—seasons are longer or shorter according to the latitude—and certain vegetables mentioned are not adapted for other climates—while there are vegetables not mentioned that are.

A plan of the garden should be carefully worked out. This can be done in the winter when there is plenty of spare time available. The dimensions of the garden should be obtained, a plat made to a convenient scale and the garden rows laid off on the plat and numbered. The succession of crops can be carefully thought out in advance and thus provided for. The permanent beds containing asparagus, rhubarb, mint, horseradish, and other perennials should be placed together in one corner or one end of the garden where they will be out of the way of the spring or fall spading and plowing. After the ground is prepared in the spring and before any planting is done, the rows having been numbered on the plat should be staked out on the ground and both ends of the row marked with a numbered stake. If this is done, any rows in the garden can be located when the appropriate time for planting arrives and thereby avoid embarrassing mistakes and duplications. When the garden is of considerable extent, it would be well to lay out the rows so as to make horse cultivation practicable.

The home garden often is usually placed in the rear of the home buildings within the enclosure. It is desirable that the garden site be laid out in regular lines so that it will present a neat appearance. The taller growing plants should be put in that part of the garden farthest away from buildings and serve as a background, and the smaller growing plants in front. If the garden adjoins the lawn a hedge of rather tall hardy flowering annuals such as zinnias or marigolds placed along the border will give a distinctive setting and serve to improve the appearance of the garden.

The rows should preferably be laid out in a north and south direction particularly for the taller growing plants. Rows thus planted afford a better distribution of sunlight, so essential to the growth and maturity of such plants as tomatoes. Care should be taken to space the rows far enough apart to prevent the taller plants shading the smaller ones.

Assuming the ground had never been used as a garden.

Garden truck, or vegetables, need rich soil.

If the plot of ground is large enough, and a farmer with a team and plow is available, have the ground plowed in the fall.

If the garden plot is small, instead of having it plowed, in the fall, have it spaded.

Before plowing or spading, spread over the ground a covering of rotted manure. If rotted manure is not to be had, fresh manure will answer.

This manure is to be plowed under, so it will decompose, and in the spring the soil will be light and workable; the soil will also have the nourishment in it that the vegetables require.

If the garden is full of cutworms and insects, scatter a thin coat of air slacked lime over it in the spring—unslacked lime can be scattered in the fall.

When the spring opens, the garden soil must be pulverized before planting. This is done when the plot is large enough to plow with a disk machine or harrow. If it is a small garden, it can be done with a rake or a hand cultivator.

When the ground is heavy or soggy, the soil can be benefited by the use of a thin coat of bone meal in the rows where the plants or seed are placed. The bone meal has the necessary plant food in it, and also seems to keep the soil loose around the roots.

In case it is decided to start a garden in the spring when no preparations had been made in the fall, it can be done.

First, it will be found that the ground is very tough and hard to work. However, by a little greater effort, the ground can be broken up and when so done—either by spading or plowing—manure should be worked into the ground. Rotted manure would be best, but fresh manure can be used.

New ground always seems to have cutworms in it, but a slight amount of lime scattered over the ground after spading or plowing apparently kills the cutworms.

The purpose of the lime on the soil is to neutralize the acidity of the soil, but from practical experience, it has been demonstrated that the cutworms do not thrive in soil that has lime in it.

Lime is not a fertilizer, however, it is an active agent which releases the "plant food" from the soil so that the plants obtain nourishment readily. Too much lime will make vegetation grow very rapidly and exhaust the soil.

Soil which has much organic matter in it, that is, decayed vegetation, is sour or acid, and that is often the condition of new soil. Soil should be tested to determine if it is too acid to grow garden plants successfully. The test is made by placing a strip of blue litmus paper which can be obtained at any drug store, pressed into a ball of moist soil. If the paper turns red acids are present and therefore the use of lime is advisable.

Drainage is a prime essential. A tile under-drain placed two feet or more below the surface of the ground will give best results and does not mar the general appearance of the garden as open ditches do. If an outlet for the tile drain can not be obtained open ditches should be used. This can be accomplished by planting in beds fifteen feet or

so apart, and surface drainage obtained by opening furrows or paths a spading in depth and a foot or eighteen inches in width.

When new land is plowed in the spring, it must be harrowed or cut with a disk machine, when ground is dry enough, so that there will be no lumps in it, and the ground will be loose and mealy. If done when it is wet, it gets sticky and lumpy.

When ground is spaded, it must afterwards be raked and made loose and mealy before planting and seeding.

Wood ashes, that is, the ashes from a wood fire, contain plant food, and is good for the soil. The soil should be firm enough to prevent too rapid evaporation of moisture. Failure to get a stand of plants is frequently due to cloddy, lumpy earth which permits it to dry out quickly and prevents the soil particles from coming completely in contact with the seed. Soil is in proper condition for planting when each tiny particle is surrounded with a film of moisture.

Ashes from a coal fire can be used when the soil is clayey and sticky, but it is not for fertilizer. Just the fine ashes are to be used and mixed in the soil for the purpose of breaking up the soil and removing the stickiness.

In placing plants and seeds in the garden, some may be sowed in the garden, and others have to be raised in hot-houses or hot-beds.

Thinning is a needful thing. Often the tendency is to plant too close together in the row. There must be room enough between the plants to admit of development. If crowded too much the crop will not be representative specimens. Thinning should be done before the plants have attained very much growth, as pulling out large plants will disturb the root system of those nearest.

If sowing is done in the garden by hand, care should be taken to distribute the seed at about the same spacing as the plants should grow. A little more time and care used in sowing will save many hours, thinning if too thick or replanting or transplanting if too thin. When the seed trench is filled in, the soil should be made firm either with the back of a hoe or treading foot over foot along the row. This will embed the seed firmly in the soil and will serve to retain the moisture so necessary for germination.

Sometimes the rainfall is not sufficient to keep plants in a healthy growing condition and, at times, it is necessary to supply moisture. Some care must be taken. Watering should be done late in the day. It is advisable to use water about the same temperature as the air, say 60 to 65 degrees. If done then the soil will soak up the water through the night and will reach the roots of the plant. To sprinkle, water sufficient to moisten the soil, a half inch will do very little good and sometimes will work an injury. Surface sprinkling will cause the rootlets to grow toward the surface where the moisture is. When a plat is watered it should be soaked. Then when the surface is dry enough it should be cultivated, leaving the surface well pulverized and fine. This condition of the surface will tend to conserve the moisture.

Some work of transplanting, such as late cabbage and late celery, will come during the last of June and early in July. If the ground is

not moist it should be watered the day before the plants are set out. The plants should be set out late the following day and well watered. After the water has soaked in the soil, dry surface dirt pulled around the plants will retard evaporation. If the weather is hot the plants should be shaded for a day or two. Newspapers can be placed over the individual plants, or a plank over deep trenches such as celery. The covering should be removed at night to give the plants the benefit of moisture or dew from the air.

Many plants that are raised in hot houses and hot-beds, may be started in a house in small boxes. The boxes placed on supports near windows with southern exposures.

The mention of the possibility of accomplishing the same result with plants in houses is made, because in starting a small garden one may not have a hot-bed, or hot-house available.

The temperature of the room should be at least 60 degrees, where the small boxes of plants are kept, a little higher temperature would be beneficial.

To start plants in the house, use flower pots, when the plants are very few; and small boxes about 4 in. deep and 18 in. square when a number of plants are to be raised.

These pots and boxes should be filled with rich soil. The preparation of this soil will be given in the description of a hot-bed. This soil could be secured from your florist. The florist always prepares a lot of soil for hot-house and hot-bed seed and plants.

When the flower pots or small boxes are in a house, no manure needs to be put under the prepared soil, as is necessary in a hot-bed. The temperature of the house furnishes the heat, which in a hot-bed comes from the chemical decomposition of the manure.

HOT-BED

A hot-bed is an enclosure with a glass top, for the purpose of raising plants for transplanting in gardens.

The top is a sash, like a window-pane. The standard sash for a hot-bed is 3 feet by 6 feet.

The hot-bed is a box, usually made of planks. The north side of the box is 6 inches higher than the south side, as this permits the sun to shine into the hot-bed.

The depth of the inside of the hot-bed on the south side, should be 2 feet, and on the north side, 2 feet 6 inches. The box should be sunk into the ground about one foot, and the ground taken out of the hot-bed should be banked up around the outside.

The ends should slant from the north to the south, so that when the sash is laid on, it will fit snugly.

To prepare the ground for the hot-bed, take garden soil, if not sandy, but clay loam; take one shovel full of sand to ten of soil, and **three** of old rotted manure, and mix in the fall, and let it lie over the winter.

In the spring or middle part of March, put in a layer of fresh

horse manure about 16 inches—this gives the heat—tamp it down well. Over this spread six inches of the mixed soil. This soil should go through a sieve, so that there are no lumps, sticks, or stones in it.

This will bring the soil within two inches from the sash. Put on the sash and let it stand from two to three weeks, as this will allow your manure and ground to settle, and the surface of the ground will be about 8 inches from the sash.

The weeds will sprout, and should be raked, so that the sun will kill them before putting in the seed.

If there is danger of cold nights in the early spring, the glass sash should be covered with a heavy blanket before sunset, and it should be removed as soon as the sun is up.

The plants need the sunshine and daylight, and also, need as much protection as possible against cold. North winds are always hard on plants in hot-beds, in the spring—guard against the cold.

To start a hot-bed in March or April, you must have manure for heat, otherwise, artificial heat must be supplied, and in such cases a hot-house becomes necessary.

COLD-FRAME

When the hot-bed becomes crowded, potted plants and those which are placed in boxes, may be moved to cold frame.

A cold-frame is similar to a hot-bed, but is usually only one foot deep, if built on the level of the ground.

The north side is built 18 inches high, the south side 12 inches high, the ends slanted, and is built so that the glass sash, same as the hot-bed, can be placed on the cold-frame.

There is no soil put in the cold-frame. It is simply a shelter to protect the plants from the winds and the frosty nights.

If the days are warm and the sun shines, the sash is lifted 3 to 4 inches so that the air can circulate.

When one is raising a lot of plants, the hot-bed becomes crowded, and the cold-frame is needed.

ARTICHOKE

Helianthus Tuberosus

This vegetable can be grown successfully on thin soil, but better crops result if fertilized. The tubers are planted and cultivated the same way as Irish potatoes. They are planted as early in the spring as weather conditions will permit, in rows 3 feet apart with the tubers from 12 to 15 inches apart in the row. When the tops die, the tubers are ready for use. They can be taken up and stored in the root cellar or left in the ground all winter.

ASPARAGUS

Asparagus Officinalis

This plant is not suitable for harvest until three years old.

Asparagus is a perennial, which comes up every year from the roots.

When starting a garden, it is customary to purchase two-year-old roots but if one wishes to start the plant from seed, it can be done so.

To plant Asparagus seed, make a trench (May 1st) four inches deep—sow seed thinly, cover trench to the level of the ground. If more than one row is desired, the rows should be placed 2 feet apart. Water freely until plants appear above ground.

In about 4 weeks the plants will peep above the ground, and at this time one should begin cultivating the soil, and keep it clear of all other growth, as this is very important after the seed has sprouted. It is not necessary to water though, except in real dry weather.

There is nothing more to do. The tops will die in the fall and sprout again the next spring, when the ground must be cultivated just as in the previous summer—this is the second year.

Early in the spring following, the roots are two years old, and must be transplanted or replanted.

To Plant Asparagus Roots Two Years Old

When the root grown from the seed is two years old, it is taken up and replanted to a greater depth as follows:

Make a trench 15 inches deep and 10 inches wide at the top. If more than one row is to be planted, the trenches should be 3 feet apart. Fill in with 4 inches of good rich soil, place the roots on top of this soil—roots placed about 8 inches apart.

Cover the roots with about 6 inches of soil, as there is to be no showing of the roots.

When the stalk of the Asparagus grows to a height of 6 inches, fill in with about 3 inches more of the earth in the trench, and keep adding gradually a little more earth as the plants grow, until the trench is filled to the level of the ground.

The ground must be kept raked and loose and free from all other growth. It must, also, be sprinkled from the latter part of May, through the month of June.

Asparagus is ready for cutting from the latter part of May through June. After June, Asparagus gets too hard for table use—then the plant may be allowed to grow up for seed, but if cut off, it benefits the root and the next year the asparagus tops will be larger.

Every fall the Asparagus bed should be loosened up, by digging and manure spread over the top of the ground after it is dug up.

Asparagus has two rather serious enemies: the beetles and their offspring operate on the plants through the entire growing season.

During the period of cutting they can be controlled by sprinkling the plant with air-slacked lime or pyrethrum. Another method of control during the cutting season is to allow several lure plants to grow and spray them with arsenate of lead. After the cutting season control by spraying with arsenate of lead. Rust appears as a reddish brown dust on the leaflets and stems. Spraying with bordeaux is the most effective remedy to apply. When the stems are removed in the fall they should be burned at once.

BEANS

Vicia, Phaseolus

All kinds of beans can be planted from May 15th to July 1st.

Beans are affected by the slightest frost, and if planted after July 1st, they may not mature before there is a liability of frost.

Beans are seeded directly into the garden. To plant beans, make a small trench about three inches deep and put from three to four beans together—have the space between the little groups of beans twelve inches apart—and cover the trench to the level of the garden.

If more than one row is planted, place the rows 18 inches apart.

The plants will appear above the ground in 5 to 8 days.

The early planting of the beans, do not need watering, but as the season advances, the ground begins to lose its moisture, so beans planted after June 1st should be soaked in water over night before planting.

When the plants are from three to four inches high, the ground must be cultivated and kept clear of other growths. Do not cultivate or pick while there is dew on the plants.

If the season is dry, the vines must be sprinkled at sunset or late in the afternoon.

The Navy Bean is planted the latter part of June for the best results. Navy beans that mature in the hot weather are frequently attacked by a small black bug which eats into the heart of the bean.

The pole or climbing bean must be supported on sticks or brush. It can be planted where corn is growing after the corn is two feet high, and it will use the corn-stalk for its support.

All beans, except Navy Beans, or beans that are allowed to grow for seed, should be picked when they are young and tender.

Anthrachnose is a common fungus disease which attacks the tender young plants and later the pods, showing as brown spots. Spraying with bordeaux will control to a certain extent. Careful selection of seed and rotation of crops should always be practised.

BEETS

Beta Vulgaris

These may be sown from May 15th to July 1st, in trenches three inches deep. They should be sowed thinly, and then covered with two inches of earth.

The rows should be 12 to 18 inches apart.

Keep the ground moist by sprinkling, as beets need a great deal of moisture.

Cultivate the soil, and keep plants free from all other growth.

The early seeded beets are usually the sweetest and the best.

It takes about three weeks for the plants to grow three inches high.

Beets may be taken from the ground, five weeks after they are seeded.

If the ground is allowed to get too dry, the beet becomes hard and stringy, and is only good for chicken and cow food.

Beets should not be allowed in the ground more than six weeks, and should be canned for winter use, if you want them tender.

Beets, if watered, can be left in the garden until the latter part of September for winter use, but they will grow large and will not be so tender and therefore will require more cooking than the beets which are only six weeks old.

Occasionally beets are attacked by small black beetles. They may be controlled to some extent by spraying with arsenate of lead. Leaf spot or blight can be reduced by spraying with bordeaux. Rotation is probably the best means of escaping leaf blight.

BRUSSEL SPROUTS

Brassica Oleracea, Gemmifera

The plants are started by seeding in the hot bed about April 1st. When the plants are three or four inches high transplant in the open garden, 15 to 20 inches apart, and if several rows are planted, the rows should be 2 feet apart. If the weather is warm and ground rather dry, water well after transplanting.

Instead of a large terminal head as in cabbage, the small heads develop in the angle between the leaf stem and the main stalk. This vegetable is considered a delicacy in the late fall and early winter and cooked about the same way as cauliflower. If the leaves are cut off, the little heads will grow more rapidly and larger.

EARLY CABBAGE AND EARLY CAULIFLOWER

Brassica Oleracea-Capitata—Brassica Oleracea-Botrytis

Each of these are treated alike and one description will answer for both.

These plants are started by seeding in the hot-bed about April 1st, and seeded in rows. One row 6 ft. long will raise 200 plants. The plants will be large enough in a month to transplant.

They can be planted in the garden about May 1st. There need be no special preparation of the soil. The plants should be placed 2 ft. apart, and if several rows are planted, the rows should be 2 ft. apart.

The ground should be cultivated and all weeds kept out.

Late Cabbage and Cauliflower may be seeded direct in the garden about June 1st. When the plants are from three to four inches high, they should be planted in rows—the plants being two feet apart.

Late Cabbage and Cauliflower must be watered in dry weather. This is done by using a dipper of water and pouring the water close to the root.

Cabbage and Cauliflower have many enemies—maggots which feed on the tender roots and are difficult to control. In the adult stage it looks like the ordinary house-fly. In the hot bed control can be had by covering with cheese cloth. The aphid is a greenish louse which attacks the underside of the leaves, causing them to curl and wilt. Control by using kerosene emulsion. Black rot appears as brownish streaks in the head and around the stem. The disease manifests itself in irregular shaped and undersized heads. Seed treatment by soaking a half hour in solution of formalin in the proportions of one pound to 30 gallons of water will serve to reduce the prevalence of the disease. Club root is probably the most difficult to control of all diseases to these plants. Lime applications to the soil several months before planting is a most effective remedy. The cabbage worm is probably the most destructive insect enemy. Dusting or spraying with arsenate of lead is the best method to use until the time when the heads are forming and nearly ready for use.

Cabbage worms must be watched. Pick off the large worms. We have had success in sprinkling the cabbage plants with air-slacked lime early in the morning when the plants were covered with dew. If there is no dew, sprinkle with a watering can so the lime will stick.

Salt water has also been used. About a cup of salt to two gallons of water and sprinkled on very lightly or put on with a spray.

Salt water seems to kill the eggs, but it doesn't kill the large worms.

Salt water should only be used on full grown plants.

CANTALOUPE

All Varieties

Musk-Melons, Water-Melons and All Varieties

Cucumis Melo—Citrullus Vulgaris

These are planted from June 1st to the 20th, and are planted and cared for just as the cucumbers are. They are, also, subject to the same insects.

If it is a late cold spring, melons and cantaloupe will not mature. They need 90 days of nice warm weather to raise perfect melons.

In 1917, there were only 62 days between June frost and August frost.

Melons ripen from about the 1st of September to the last. If any of the melons do not ripen, they can be picked while green, before the frost comes, and then spiced or preserved.

The enemies of this plant are the same as cucumber and the same treatment will apply.

CARROTS

Daucus Carota

Carrots are seeded right into the garden, from the 1st of May to the 1st of July.

When planting, make a small trench with a hand trowel, 2 inches deep, seed very thinly, and cover with 1 inch of ground.

If more than one row is planted, the rows should be 18 inches apart.

The one-inch depression holds the moisture, and the ground must be kept moist by sprinkling, until the plants are from 2 to 3 inches high.

It takes about three weeks for the plants to grow two inches high—the later they are planted, the quicker they grow.

Carrots can be seeded every week, between May 1st and July 1st, as this will give a continuous crop of young and tender carrots.

The ground must be cultivated and kept clear of all other growths.

If the carrots are to be held over for winter use, it is best to leave them in the ground until late October, when they can be taken up, packed in sand placed in the root cellar. They are not affected by frost, but they are by freezing weather.

Carrots are sometimes attacked by a reddish brown beetle which feed on the roots. They are not easily controlled and rotation of crops should be practised.

CELERIAC—CELERY ROOT

Apium Graveolens—Rapaceum

Celery root is raised in a hot-bed from seed.

It can be seeded the 1st of April or later. The seed may sprout in two weeks, but it may take four weeks, as it depends upon the heat in the hot-bed.

When the plants are two inches high, they are ready for thinning, or transplanting.

As the frost affects them, it is best to transplant into boxes 4 inches deep and 18 inches square, and leave plants in hot-bed until safe to plant. The plants can be put into the garden about June 1st.

Transplanting in Garden

Place the plants in rows 10 to 12 inches apart. If more than one row, see that the rows are from 18 to 20 inches apart, so that the plants can be well cultivated.

To cultivate these plants means, to keep the ground surrounding the plants free from all other growth, by using either a hoe or small cultivator. Keep the top soil loose.

The Celery root does not need much water, but does require loose ground. When the ground is kept loose and hoed up, it retains the moisture which in many cases is better than sprinkling. The ground

should always be moist, not muddy; in extreme dry weather, sprinkling is necessary, but should be in the very late afternoon. If done in the morning, the sun evaporates the moisture, which if done after the sun is low in the afternoon, the water has a chance to be absorbed by the earth.

When the tops become 6 to 8 inches high, the outer stalks should be pulled off, so that the strength of the plant does not all go to the tops. When the tops are pulled off, the root or bulb then receives the nourishment and grows large.

If you find that the bulb is large, and this will be the case if the soil is rich, take a case knife and cut around the ground about an inch from the bulb; this will cut off all of the small lateral roots and leave the straight down-shooting roots to feed the bulb. This is known to be the best way to raise perfect bulbs. Otherwise, they have a number of small roots extending in all directions and the bulb is not fully developed. If the soil is poor the number of small roots will be less, and it is not advisable to cut them off.

Celery root is used mainly for flavoring, and it matures sufficiently for use, about the middle of July. But the longer it remains in the soil, the larger it grows and can be left in the garden until late in October.

Light frost will not affect it, as long as the bulb is covered with earth. But if the bulb itself is exposed to a heavy frost, it will soon rot. So, when taking up bulbs of celery root, they must be put in a place protected against freezing temperature.

HOW MUCH TO PLANT

A 5c package of seed will produce 500 plants—if seed is good. The amount depends upon the space in the garden.

CELERY

Apium Graveolens

To grow celery just as a gardener grows it in the home garden.

Two transplantings of celery can be made in a season. The first planting should be ready for use about August 15th and the second about October 1st. For the early crop the plants must be propagated in a hot-bed. For the later crop the plants can readily be propagated in the open garden in this manner: Select a sheltered place in the garden which can be reached conveniently for watering. Have the surface of the ground well pulverized and raked level. Broadcast the seed thinly and cover by sifting on top of the seed a thin layer of fine soil or preferably fine sand. The sand will prevent the surface from drying out to a certain extent. Cover the seed plat with a medium weight muslin cloth and keep covered until the young plants make a good showing through the ground. The seed plat must be kept well watered. This can be done by sprinkling the water over the cloth. After the cloth is removed the plants should be kept well watered. Celery plants started in the open garden in this manner about May 10th are ready for transplanting in trenches about sixty days later.

The later crop if forced by watering, cultivating and fertilizing, will be more tender, crisp and less stringy than the earlier crop grown during the heat of the summer.

First: In the fall of the year, take garden soil and mix it with well rotted manure and sand. Take about ten shovels of soil, one shovel full of sand and three of manure. Mix it well, and leave it in a pile to freeze over the winter, and in the spring it will be loose and friable, ready for the hot-bed.

The amount of ground prepared will depend upon the amount of celery that it is intended to raise.

The celery is raised from seed—for the early planting the plants are started in a hot-bed.

The bottom of the hot-bed is covered with the soil prepared as above, to a depth of about six inches, in which the seed is planted in rows about eight inches apart. The number of rows would depend upon the size of the hot-bed, and the amount of celery one wished to raise.

The standard size of a sash for hot-beds is six feet by three feet. A description of the hot-bed and how it is prepared will be given.

A row of celery six feet long should be enough plants for any home garden.

The ground in the hot-bed should always be kept moist, and especially on celery. On hot dry days the moisture evaporates, and on dark cloudy days the ground will remain moist, so that the watering is a matter of observation. The water should not be cold, or else the plants will be chilled. The water can be put in a bucket and left in the sun on bright days; on cool days if possible have the water heated to a temperature of about 65 degrees F.

Celery is a very slow growing plant in the hot-bed. In the lower lake regions of Illinois, April 1st is about as early as it is advisable to sow the seeds. If the hot-bed maintains a temperature around 65 degrees, the seeds will peep above the ground in about three weeks. It may be three weeks more before the plants will be three inches high.

When the plants are three inches high, they can be thinned and transplanted.

By thinning, it is meant, that each plant should have an inch space. In sowing the seed, some plants will grow up in close bunches, and it cannot be told just how the seed will sprout until the plants are above the ground.

When they get three inches high, the plants must have more room, so they will get a heavy root and get strong, so that they can grow out of doors.

The transplanting at this thinning time, means that they are transplanted in the hot-bed, and plants should remain in the hot-bed until all danger of frost is over.

A good method when the thinning out process time arrives, is to have a number of small boxes, 4 inches deep and 18 inches square, and transplant into the boxes—but leave the boxes in the hot-bed.

The idea of the boxes is, that it is easier to carry them out into the garden when it is time to transplant the celery out doors.

Transplanting Celery in Garden

To prepare for planting the celery, make trenches in the garden 10 inches deep and 8 inches wide. Fill in 5 inches of the well mixed soil, that is the soil that was mixed in the fall of the year, then place the plants in the trench 8 inches apart. Water them when transplanting. To prevent excessive wilting of the plants, they should be shaded for a day or so. This can be done by placing papers or planks over the trench.

When the plants show that they have become rooted and well started, in the trench, which is generally about a week, add 2 inches of soil **around** the roots. For this, just take soil that was taken out of the trenches. This will leave a little trench about 3 inches deep and should be allowed to remain.

The celery should be watered frequently, and all weeds pulled out. The trench must be kept clear of all other growth.

Celery is made white by bleaching. The Golden Self-Blanching celery is the variety better adapted for early use. The White Plume, is better adapted as a winter celery. Both are planted at the same time, and cultivated in the same manner.

The time for bleaching is about September, but for early use, one may bleach a small amount at an earlier date.

To Bleach Celery

Before bleaching celery, fill trench with water. After the water is well soaked into the ground, fill up on both sides (commonly termed as "heeling up"), with the common garden earth, within 4 inches of the top of the celery.

The tops must be left in the open air, because the celery keeps growing.

It takes about 10 to 15 days before any of the celery is ready for table use.

A touch of frost on the celery tops, improves the flavor of the celery, and the celery can remain banked up in the earth until late fall. But if the weather gets much below freezing, and remains cold the celery will freeze and be ruined, so it is a matter of judgment how long it is safe to keep it in the garden.

Celery usually is immune from the attack of insects. Some seasons it is attacked by a black white-striped worm. If early in the period of growth, the worms can be gotten rid of by dusting on dry arsenate of lead when there is dew on the plants, or spraying with a weak arsenate solution. If the plants have nearly reached maturity the worms should be picked off by hand. If any of the forms of blight appear it is necessary to spray with Bordeaux mixture. As a preventive the plants should be sprayed in the seed bed, and applications should be made periodically until the plants are ready for blanching.

CHARD

Beta Vulgaris

This is seeded thinly in trenches 3 inches deep from May 1st to June 1st. Cover the trenches with 2 inches of soil, and keep moist until the plant is two inches above the ground, which will be about two weeks.

Thin out, so as to allow each plant from 6 to 8 inches of space.

Cultivate and keep all other growths out.

It will mature from 6 to 7 weeks.

Chard should be cut three inches above the ground, which allows additional growth from the same root, and in this manner a continuous crop is obtained.

If it is desired to maintain the appearance of the garden and the symmetry of the row, pick out the tender leaves for use and allow the older ones to remain.

CHICORY

Cichorium Intybus

This is grown the same as other root crops such as parsnips.

Plant the seeds in the open garden after May 1st, when the soil is in good condition. The rows should be not less than 18 inches apart and the plants 6 inches apart in the row.

The roots are sometimes prepared for table use in the same way as parsnips. If the roots are parched they make a war-time substitute for coffee.

The roots, if forced in sand, also afford an excellent salad for use in the winter time. The roots when taken up in the fall can be dried and packed in sand until forcing time arrives. Place the roots tops up in a box of sand, and cover the tops with two or three inches of sand. Keep well watered. In two weeks or so the crowns will send out white tender shoots which make most delicious salad. The roots while being forced should be kept in a temperature of about 60 degrees. A corner of the basement away from the furnace will answer very well.

CHIVE

Allium Schoenoprasum

This is seeded thinly, in trenches 2 inches deep, from April 1st to July 1st. After the seeds have been put in, cover the trench with one inch of soil, and keep the ground moist until the plants are 2 inches high.

Cultivate and keep all other growth out.

Chives can remain in the garden all winter and they will sprout from the old roots early in the spring, or they can be cut at any time during the summer—it is a perennial.

Roots taken from the garden, planted in a box and then taken into the house, will grow all winter, if kept warm and moist.

CORN SALAD

Valerianella Olitoria

This vegetable thrives best in cool weather and is grown early in the spring or late in the fall. Six to eight weeks are required from seeding time until the leaves can be taken off and used as greens. Plant in rich soil with rows 15 inches apart with plants about 6 inches apart in the row. Cultivate frequently by shallow hoeing or raking and keep all weeds pulled out. This plant grows rapidly and does best when kept moist and well watered.

CUCUMBERS

Cucumis Sativis

These are grown from seed and sown in the garden from May 20th to August 1st.

Dig a hole in the ground 8 inches deep and 8 inches square. Fill the hole with earth, as prepared for a hot-bed. Scatter from 12 to 18 seeds on the top of the soil in the 8-inch square spot, and cover with 3 inches of the prepared earth.

The seeds will sprout in about two weeks. Care should be taken so that the cucumber bug does not kill the vine. Just as soon as the sprout appears, scatter wood ashes over the plant if any bug appears. After this scatter air-slacked lime or slug-shot, a prepared insecticide.

After the vine is from 6 to 8 inches long the danger of the bugs is about over, as the vine is hardened and strong by this time—then the vines may be thinned out so that there will be four vines to a hill.

Hoe around the hill, to keep the ground loose, and if cuttings from grass lawns can be obtained, scatter it around the hill about three inches thick. As the vine grows larger a small amount of grass can be scattered between the vines, but not on top of the vines. After scattering the grass, lift up the vines and shake them, so that any grass which may have fallen on the vines can be shaken off.

The grass makes a covering for the earth and keeps in the moisture.

Cucumbers that are planted after July 1st, must be watered on the root—the vine must not be watered.

Cucumbers may be pulled at any time, after they are large enough—they keep growing all summer.

In watering the cucumbers, do not use water that has a temperature below 65 degrees, as cold water on the roots will kill them in a short time. Cold water on the vines will kill them very quickly, therefore, avoid watering the vines.

The striped beetle can be controlled by sprinkling the plants with slacked lime, ashes, road dust or arsenate of lead. Mildew and blight can be controlled by spraying with bordeaux at intervals of two weeks.

DILL

Anethum Graveolens

Sow early in the spring in rows 12 to 15 inches apart and thin to spaces of 6 or 8 inches apart in the row.

Keep well cultivated and free from weeds.

When the seed is nearly ripe, it should be removed, thoroughly dried and stored for use.

EGG PLANTS AND PEPPERS

Solanum Melongena—Capsicum Annuum

As these plants require the same method in planting and care, one description will answer for both.

Sow the seeds about April 1st in boxes which are about 4 inches deep and about a foot square.

Place the boxes in the center of the hot-bed where it is the warmest.

In four weeks the plants will be from three to four inches high and will be ready for thinning out and transplanting.

The plants should be 2 inches apart. The plants taken out in the thinning process should be placed in additional boxes or small flower pots.

The plants must remain in the hot-bed until the 1st of June, or until all danger of frost is over.

When placing the plants in the garden, no special work is needed. They are placed right in the regular garden soil, about 18 inches apart. If placed in rows, the rows must be two feet apart.

When they are first placed in the garden, the roots should be watered every night until they are well caught—which usually takes about a week. After this, it is not necessary to water them unless it is exceptionally dry weather, and then they can be sprinkled at sunset.

The ground around the roots must be raked and cultivated, and kept clear of all other growth.

When the plants are from ten to twelve inches high, the roots should be banked up with about four inches of earth. At this time it is necessary to drive a stake along-side of the plant and tie the plant to it, so that the weight of the growing peppers or egg plants do not break down the stalk.

These plants are not trimmed as the tomato vines.

The egg plant is affected by a very small insect that is found on the underside of the leaf. The leaves of the plant should be carefully held up so that the underside of the leaf is uppermost, and then sprinkle or dust the leaves with air slacked lime or wood ashes. This should be done early in the morning when the leaves are moist, and repeated two or three times a week. If this treatment is kept up for about two weeks, it will destroy the insect.

Potato bugs will also eat egg plant leaves, but the only way

to treat the potato bugs is to pick them off by hand, as the egg plant cannot stand poison that would be strong enough to kill this bug.

The insects and potato bugs seldom bother the peppers.

Egg plants and peppers ripen about August. Some ripen before others. The fruit of these plants can be allowed to remain on the vine until danger of frost, as the slightest frost injures both the egg plant and peppers, and either one, after being frosted, is worthless.

Peppers and egg plants can be picked early in July, but although they are suitable for eating or cooking, they have not reached their full growth, therefore, it is advisable to only pick what is necessary for use, and allow the others to remain on the vine and grow.

FLAT LEAF AND CURLED ENDIVE

Cichorium Endiva

Sow the seed in the open garden in well prepared soil, about June 1st. Sow it very thinly—a five-cent package will sow two or three rows 6 ft. long and will give 500 plants.

It should be cultivated and the soil kept moist.

The plants should be 2 inches high before they are transplanted, and it will be from three to four weeks before the plants are strong enough to be transplanted.

It is planted in rows, placing the plants 12 to 14 inches apart, and the rows 20 inches apart. It should be planted just on a level of the ground, that is, no trenches.

When the leaves of the plants are from 6 to 8 inches long, then reach under them and raise them so that they stand up straight. Tie a string around them and slip a paper sack over them, or tie a piece of dark paper around them, in order to keep out the light. The plant will keep on growing, but the stalks will bleach to a cream white, and get tender.

This process can be started early in August, as it takes 15 days to bleach it. But only a small number of plants should be tied up at a time, as it is not necessary to bleach more than can be used.

The plants can be bleached any time that they are needed up until the latter part of October.

Endive that is to be used in the latter part of October and November, should be covered with garden soil (heeled up), the tops of Endive remaining exposed. Over the top of the Endive, lay a board to keep rain from running down into the stalks, and also to prevent the frost from freezing down into the heart of the plant. The board will permit the heat from the plant and the ground to escape—that is, a circulation of fresh air will continue to go around the plant, which will keep the plant from rotting.

When there is danger of temperatures low enough to freeze the

ground, the plants can be taken up with plenty of moist dirt around the roots and placed in the vegetable storage room for use until Christmas time or later.

This is one of the garden plants which as yet has no insect enemies and is not attacked by blight.

GARLIC

Allium Sativum

Garlic is a member of the onion family and has an odor peculiarly its own. It is grown largely for flavoring.

The bulb is divided into a number of bulblets familiarly known as cloves. The cloves are planted in the same way as onion sets and can be put in the garden in the spring as soon as the ground can be worked. Keep well cultivated and free from weeds.

As soon as the tops fall over the bulbs are matured. Plait the bulbs in strings and hang up in a dry place for future use.

HORSE RADISH

Cochlearia Armoracia

Horse radish is grown from cuttings from the roots of plants that are taken up for use. The rootlets are planted in rows 2 feet apart and 8 to 10 inches apart in the row. Cultivate frequently and keep all weeds removed. This plant requires an abundance of moisture and a good supply of plant food. Roots planted in the spring should be large enough for use the following winter.

KOHL RABI

Brassica Oleracea, Caulorapa

The seed can be planted in the open garden between May 1st and May 15th for the spring for the first crop and the last of July for the fall crop.

Drill in rows 18 inches apart, and thin to space the plants 8 or 10 inches apart. Keep the soil well cultivated, free from weeds, and supply moisture by sprinkling if the season is dry.

The edible part of the plant is enlarged bulb from which the leaf stems radiate, and is ready for use as soon as the bulbs are large enough.

Kohl Rabi is attacked by the same enemies as the cabbage and their control is secured by use of the same remedies.

LEEK

Allium Porrum

Like onions leek requires a rich soil, and should be thoroughly cultivated.

The plants can be grown from seed planted in the open garden early in May. Light surface cultivation while in this stage will insure strong sturdy plants in six weeks.

When the plants are about 5 inches high they can be transplanted. Set the plants in rows 12 inches apart and 4 or 5 inches apart in the row. It will be found advantageous to clip the blades before transplanting. The plant should be planted in a trench 5 or 6 inches deep. As the plants develop, fill in the trench. Better specimen plants can be secured by banking up around the plants. This will serve to bleach the plants and make them more tender.

Leek can be kept for winter use if taken up and stored in the same manner as celery.

HEAD LETTUCE

Lactuca Sativa

Head lettuce is seeded in prepared soil in hot-bed, about April first.

If the hot-bed is warm, it will sprout in about three days and in 15 more days will be 2 inches high.

When the plants are 2 inches high, they should be thinned out and transplanted in hot-bed.

Lettuce should not be planted in the garden until after May 1st. Lettuce, however, will stand a greater amount of cold than most plants, so the danger of frost is not so great, as it can stand a light frost after it is transplanted in the garden.

To raise head lettuce, extra good rich soil is needed. Place the plants in rows 12 inches apart, and the rows 18 to 20 inches apart. Keep the ground free from all other growth by using a hoe or small cultivator. Keep the top soil scratched to a depth of 2 inches or deeper to keep the ground moist.

Head lettuce grows in the spring; when the hot weather comes, it goes to seed; that is, it stops growing a head and gets a stalk on which grows the seed. You can save this seed for the next planting.

A nickel package will produce 500 plants. The amount you sow will depend upon what you wish to raise.

LEAF LETTUCE.

About the first of April, take the spot in the garden in which you wish to raise the leaf lettuce.

If the ground was spaded in the fall of the year, as all good gardens should be, then rake the spot with a small cultivator or garden rake. Then set up stakes. Put a string along it to mark a row. Then take a little garden trowel and make a furrow along the string 2 inches deep and sow the seed thinly along the furrow and then cover it over with one inch of ground. This leaves a little furrow to catch and hold the moisture.

When the lettuce grows to a height of four inches, then fill it up with about three inches of soil, that is, fill up the furrow, and raise the ground around plants about two inches.

To grow good stalks of leaf lettuce, it is necessary to thin out

the plants so that there is a free space between plants, of at least two inches.

The plants that are pulled up can be thrown away, or fed to the chickens.

Lettuce must be well cultivated. The soil must be kept loose and no sprinkling or watering is required until after July 1st, and then sprinkle plants at sundown.

If the garden had not been spaded in the fall, it would be difficult to raise leaf lettuce, because the ground would be hard.

Neither insect enemies nor blight prove very serious. They appear at times, but as a rule do not do much damage. The best plan is to plant the lettuce in a new place in the garden each year.

The energetic and resourceful gardener should have lettuce for his table from early May until killing frosts in November. After the first crop, new beds can be started in some garden spot which is shaded a part of the day. Successful crops of leaf lettuce have been grown from sowings made the first week of July and located on the north side of rows of sweet corn. The corn stalks furnish enough shade and with plenty of water late in the day **most excellent lettuce was raised.**

MINT

Mentha

Mint is an aromatic herb and should have its small place in every garden.

Mint is grown from roots of matured plants. Plant early in the spring. If a small quantity is required it need not be set in rows. Once started the plants will care for themselves and will spread rapidly to the adjoining ground.

OKRA

Hibiscus Esculentus

This may be seeded in the hot-bed about April 1st, or planted in rows in the garden about May 10th.

A row two feet long will furnish enough plants for a small garden—a ten-cent package of seed will be sufficient.

In about four weeks, plants will be four inches high, and they should be thinned out and transplanted, that is, those plants that are pulled up may be planted in boxes.

The plants, both in the boxes and those left in the row, must be two inches apart.

The plants must be kept in the hot-bed until after June 1st.

No preparation need be made in the garden—the plants simply planted eighteen inches apart and if in rows, the rows two feet apart.

Plants must be kept free from other growths and the ground kept raked or cultivated.

The roots of the plants should be watered in dry weather.

The plant grows a little shell, like a very large pea, and it is fully matured in September, but can be used early in August.

These plants usually dry up before the frosts come in the fall.

The pods are the edible portion of the plant and are used very extensively in the south where it is used either as a vegetable or salad or in making "gumbo" soups. When the pods are more than one-third or one-half of full size they are at their best. No use can be made of the fully developed or ripened pods. The plants will produce longer in the season if all the pods are removed when they have reached usable size.

ONIONS

Allium Cepa

These are grown from seed and from onion sets.

An onion set is a small onion grown from the seed, and is used the second year, just like a bulb, to grow large onions.

Onions are seeded thinly in trenches 3 inches deep, from May 1st to July 1st, and the seeds covered with 2 inches of soil.

Sprinkle frequently until the seed has sprouted, as the ground must be kept moist.

Cultivate and keep all other growth out.

Onions will sprout from the seed in about three weeks.

Green onions can be pulled from the ground five weeks after they are seeded, but if they are allowed to remain in the ground they will grow larger.

It takes from 8 to 9 weeks for an onion to mature, after which time the tops begin to dry up and fall off. The onions should be taken up and dried in the sun, so that they can be kept all winter.

When the onions are sorted, there will be quite a number of this crop which are very small. Enough of these can be saved and used for onion sets to grow large onions.

When planting onion sets, make a trench 3 inches deep, place the onion sets in the trench 4 inches apart and cover them with earth to the level of the ground.

Sprinkle frequently, until the onion tops are from 2 to 3 inches above the ground, which takes from 2 to 3 weeks' time.

Cultivate and keep out all other growth.

The tops from an onion set, if let alone, will go to seed. If this is not desired, and one would like the large onions, bend the top over and step on it so as to put a decided kink above the onion, as this permits the strength to stay in the onion, and the stalk will gradually dry up. The tops are not bent over, however, until there are good indications of them going to seed. If the top is broken off, it is like a wound, and the onion bleeds.

When the tops are thoroughly dried, the onions should be taken up, dried in the sun, and put away for the winter.

For earliest spring onions, plant Multiplier or Top onions late in the fall in the same way as planting sets early in the spring.

The large bulbs of the Multiplier onions contain a number of hearts or buds and if planted will produce a number of small onions. The small onions have but one heart and will produce large onions. A few large bulbs should be planted each year to produce sets for fall planting.

The Top onion produces a number of bulblets on top of the stem. These small bulbs can be planted in the autumn and will produce onions the following spring.

Maggots, thrips and smut are the worst enemies to the onion plant. Maggots can be controlled by treating with a carbolic acid emulsion made as follows: Dissolve a half pound of soap in a half gallon of hot water; add a half pint of crude carbolic acid. Stir until it is thoroughly mixed. Apply by diluting in water one part of the mixture to fifteen of water and apply to the plant by spraying. Thrips can be controlled by spraying with kerosene emulsion. Smut does not yield to either seed or plant treatment. Rotation of crops is the only remedy.

PEAS

Pisum Sativum

There are many varieties of peas.

The Dwarf Peas are sowed in rows and do not need to be supported on sticks or brush.

The Telephone Peas grow high, and the vines must be supported on sticks or brush.

Peas are sowed right into the garden about April 15th. Peas can be sowed from that date on for a month, and they should be sowed every week so that you will have a harvest which will last over a month.

Old seed peas, for late sowing, should be soaked in water over night, before planting, especially if the ground is dry. The ground about April 1st is moist, and the soaking of peas for the early seeding is not necessary. The condition of the weather, and the ground, will have to be the guide.

In planting peas, make a furrow with a hoe or garden trowel about four inches deep. Sow the peas thinly, about from two to three inches apart, and cover with three inches of soil. This permits a one-inch depression which catches the moisture.

Peas are not watered, but the ground must be raked or cultivated very often, as it must be kept clear of all other growth.

If the peas are planted in rows, the rows should be from 2 to 3 feet apart.

When peas are "blooming" the plants should have the roots banked up with earth about four inches high.

A pea is sweet, but when the pea-pod is taken off the vine, the pod seems to gradually absorb the sweetness from the pea, so that to obtain the best from the pea, the quicker they are shelled, the better they taste.

When planting Telephone Peas, when the vines are about 12

inches high, take brush, that is, branches of any kind of bushes, and stick them along the row of peas, and the vines will climb up on them.

The pea aphid in some seasons is a serious enemy. They attack the tender growing branches and stop growth. Kerosene emulsion spray will control the pest and save the crop if applied as soon as they first appear.

WHITE OR IRISH POTATOES

Solanum Tuberosum

Potatoes are planted about May 1st to June 1st, for early potatoes. Late potatoes are a gamble—they are planted from June 1st to July 1st. Late potatoes suffer in growth, because of the dry weather, and when the weather is dry the insects attack the vines.

The potato vine grows fast in hot, dry weather, and about July 15th the vine of the late potato is young and tender. The potato itself does not grow in dry weather, as the potato needs moisture to grow—but it ripens in dry weather.

One wants potatoes, not vines, so the ground must be kept watered to give the late potato a chance to develop.

Potatoes are used for seed. On all potatoes will be noticed spots, which are known as eyes. From these eyes the potato sprouts. If the seed potatoes are small, plant one potato, and if they are of medium size, cut them through the center—that is, cut them through their narrowest diameter. One end will have more eyes in it than the other, and is called the top of the potato.

Cut the top in two—that is, halve it, as if you were quartering the potato, but do not cut the bottom in half, unless the potato is extra large, and then the bottom may be cut in two.

These instructions can be best followed by noting the number of eyes in the potato, and then cutting the potato so that each portion of it has at least one or more eyes. A potato or portion of a potato will produce no sprout unless there is an eye.

Potatoes are usually planted one foot apart, and the rows three feet apart. Mark the places where the seed is to be planted and dig holes 6 inches deep. Drop into the holes, one seed potato, or a portion of one, and cover the holes to the level of the ground.

It is not necessary to water early potatoes. The potatoes that are planted in the early part of May will take from 2 to 3 weeks before they show above the ground. The later the potato is planted, the shorter the time before it shows above the ground.

When the vines are about three inches high, the ground should be cultivated and kept loose.

The striped, hard shell, potato bug appears as soon as the potato sprouts above the ground, and should be picked off by hand, as the young potato vine is too tender to stand any poison, sufficiently strong to kill the bug. One way of freeing the potato vine from this bug is to take a pan which has about one-half an inch of kerosene in it, taking a shingle, and then hold the pan alongside of the plant; bend the vine over the pan with the shingle, carefully, and

gently keep tapping and shaking the plant with the shingle until all the bugs and insects fall into the pan. The necessity of getting rid of these bugs quickly is, because they lay eggs on the under side of the leaves and the second generation is worse than the first.

If the area planted in potatoes is large, hand picking of the striped beetle may be rather burdensome. A spray made of arsenate of lead applied every ten days or two weeks will keep the plants free from the beetle in all stages of development. The spray will reach the smallest of the beetles which feed on the tenderest parts of the plants on the tops.

When the plant is from 10 to 12 inches high, they will show signs of a bud. When they are of this size, they are strong enough so that Paris Green, Pyrox, and other poisons may be used for killing the insects.

In using these preparations, be careful to read the instructions on the cans or packages, and follow them.

When the plants show signs of a bud, they should be banked with from 4 to 6 inches of earth.

Potatoes planted about May 1st, are about ready for use July 5th, if it has been a nice warm spring, but at that time one should not dig up any more than they can use, as the potato has not reached its full growth, and will continue to grow until the vines are dried up and dead.

If potatoes are to be kept for winter use, they should be left in the ground until late September. If dug up, they should be left out of doors, covered with hay or straw and over this a layer of earth to keep the hay or straw in place. In this way they can be left out until late in October.

The object in handling potatoes this way is to give them a chance to dry out. A potato must not be dried in the sun, but when dried either by allowing them to remain in the garden, or by being covered with straw and earth, they keep better over the winter.

Care should be taken when the potatoes are boxed or barreled for the basement, that each potato must be dry.

Early blight, late blight and tip burn are more destructive enemies to the potato than the Colorado beetle or any other insect which feed on the plant. The blight appears as black spots on the leaves. These grow larger rapidly and in a very short time the entire leaf is covered—and the leaves and the whole plant turn yellow and die. The first preventive is crop rotation. The seed potatoes should be soaked two hours in a solution of formaldehyde in the proportion of one pound to 30 gallons of water. When the plants are six inches high they should be sprayed with bordeaux every two weeks, until the period of tuber development is passed. The spray for the Colorado beetle and the blight can be mixed and applied at the same time.

PUMPKIN

Cucurbita Pepo

The sweet pumpkin is grown to some extent for use in making pies for the winter season. One or two hills or 6 or 8 plants is enough to supply the needs of one family.

It is propagated and cultivated in the same way as the squash.

The striped beetle is the only serious enemy but can be controlled in the same way as that for the squash.

RADISHES

Raphanus Sativus

These are sown from the 1st of May to the 1st of July, directly into the garden.

The early radishes are the best.

In planting radishes, make a small trench 2 inches deep with a garden trowel, and sow the seed thinly and cover with one inch of earth.

Radishes need a lot of moisture—sprinkle every day if there is no rain.

It takes them from 15 to 18 days to grow and they need moisture until they are taken from the ground.

If sown in rows, the rows should be 10 inches apart.

If seeded after July 1st, the plant grows to tops, but after Sept. 1st, radishes can be sowed and one or two crops obtained before the frost comes.

RHUBARB

Rheum Rhaponticum

Rhubarb is the first essential of the garden. It is one of the first things the garden produces in the spring and contains the elements the human system needs after a winter's inactivity.

For successful growth rhubarb requires a deep soil, well fertilized. While it can in time be grown from seed, it is more satisfactory to buy clumps of roots and thus gain two years' time.

Dig the soil to a depth of 18 inches and fill the bottom with a mixture of soil and well rotted manure. Place the crown of the plant about level with the general level of the ground and fill around the roots with a mixture of earth and manure.

It is advisable not to pull the stems too closely the first season.

Pull out all the seed shoots which may appear.

Fertilizer should be dug in around the plants every fall.

In three or four years the plants should be taken up, divided and reset in the same manner as for the first planting.

RUTABAGA

Brassica Campestris

If an early crop is desired the plants can be started in a hot-bed.

The usual plan is to sow the seed in the open garden, as early in the spring as soil conditions and weather will permit in the rows when they are to mature. They require a deep rich soil and are well supplied with moisture. The rows may be 18 inches apart and the plants spaced by thinning to 8 or 10 inches. The roots can be stored in the root cellar late in the fall for winter use.

SAGE AND PARSLEY

Salvia Officinalis—Carum Petroselinum

This is seeded thinly in trenches 3 inches deep, from May 1st to July 1st.

After the seed has been sown, cover them with 2 inches of soil.

The soil must be kept moist until the plants appear above the ground. The soil must be also cultivated and all other growth kept out.

Sage and Parsley will grow until the late fall—until freezing weather, which kills it.

SALSIFY AND PARSNIPS

Tragopogon Porrifolius—Pastinaca Sativa

Both of these are treated alike.

These may be sown into the garden from June 1st until July 1st, in trenches three inches deep, and the seed sown very thinly. Cover with two inches of soil.

If more than one row is planted, the rows should be 18 inches apart.

The plants come up in three weeks, and they should be sprinkled frequently until the plants are two inches high.

The ground must be well cultivated and kept free from all growth.

Salsify and Parsnips are best after a slight frost. If they are to be held over for winter use, they should be kept in the ground until late October. They may be stored in pits, or packed in sand in the root cellar, but can not be kept a long time in the open without drying and shriveling.

These root vegetables are used during the summer, before they are mature, for flavoring soup, stews, etc. They can be taken from the ground as they are needed, but they do not mature until the light frost.

They can be kept in the ground all winter if well protected with a covering of straw or leaves, and dug up as required or when the weather will permit. They should not be used the following spring after vigorous growth is started.

SAVORY

Satureia Montana

Sow the seed in the open garden in rows 12 inches apart and thin to spaces of 6 to 8 inches in the row. Cultivate frequently and remove the weeds.

When the leaves are fully developed remove them, dry them and store them for seasoning.

This variety is an annual and new plantings must be made each year.

SPINACH

Spinacea Oleracea

This may be seeded about April 15th to June 15th, in trenches 3 inches deep. Seed thinly, and cover with 2 inches of soil.

If more than one row is desired, place the rows 12 inches apart. The ground should be kept moist—sprinkle freely.

Cultivate the soil, so plants are kept free from all other growth.

It takes about two weeks for these plants to come up, but spinach is cut from 5 to 6 weeks after seeding.

Spinach will only grow in the early summer—after the season becomes hot, it goes to seed.

A fall crop may be grown if the season is not too short. The seed for this crop should be planted about the middle of August. The ground must be kept moist and cultivated frequently.

SQUASH

Cucurbita Maxima

Squash can be planted in the garden from May 10th to June 10th.

It is seeded in hills, six feet apart, and 8 to 10 seeds in a hill.

If the seed sprouts well, and the danger of bugs is past, thin out to three vines in a hill. That is, one will notice bugs on the plants but when they get to be six inches high the bugs do not affect them, then thinning out process is started.

Hoe the plants, to keep all other growth out.

The Squash develops about August 1st and continues to until late fall. It is a continuous maturing crop.

If the weather is real dry, the roots may be watered, but not the vines.

The striped beetle which attacks the plants as soon as they come through can be controlled by sprinkling slacked lime, ashes, road dust or arsenate of lead on the foliage when there is dew on it. A more dangerous enemy is the vine borer. This insect tunnels into the vines just above the ground and consumes the greater part of stem of the vine. The plant can be saved by covering the second and third joint with dirt. **Enough rootlets will develop to support the plant.**

SWEET-CORN

Zea Mays

Corn is planted in hills. Make small holes in the garden, 4 inches deep and $2\frac{1}{2}$ feet apart. The rows should be placed 3 feet apart.

Three or four kernels are put into each hole, and then covered with earth to the level of the ground.

Excellent results can be obtained also by planting the corn about 10 inches apart, one grain in a place, in rows spaced 3 feet. This gives plenty of room for the development of the plant and growth of ears, and affords more space for the distribution of the root system.

Corn may be planted from May 1st to July 1st. In order to have a gradual maturing crop, corn is planted about every eight or ten days.

Corn takes from 80 to 90 days to ripen. Hot weather makes it grow and ripen fast, but cool weather retards its growth.

Sometimes corn planted May 1st does not ripen any sooner than that which is planted May 15th. Whenever this is the case, it will be found that the weather, early in May, has been unusually cool.

Corn is not watered except when planted in the latter part of June, as the ground by that time may have become very dry. In such a case, it is only necessary to water the ground.

Corn requires moisture in the ground, and the natural moisture is best retained by cultivating the ground around the corn. That is, hoeing and raking the ground, which keeps the top soil broken up and loose, which prevents evaporation and which absorbs moisture. This, also, keeps down the weeds and other growth.

The cultivating must be kept up until after the corn is over 18 inches high.

When the corn is 18 inches high, it should be banked up with garden soil about 6 inches.

The suckers or shoots which spring from the plant near the ground should be broken out to permit all the substance to go to the development of the main plant.

If the corn is not picked when young and tender, it can be left on the stalk for seed or chicken feed. The stalks can be fed to horses and cows, and are also used for covering such plants that are to be protected from frosts.

There are many varieties of sweet corn: Early Champion and Golden Bantam are known as good varieties for early corn, and the Bantam Evergreen, Stowell's Evergreen and Country Gentleman for late corn—for further information consult seed catalog.

Different corns when planted at or near the same time, and planted close together, will produce a hybrid corn—that is, the pollen from one kind of corn mixes with that of another kind.

If corn is frost-bitten early in the spring, it is best to replant, as frost-bitten corn will never produce a perfect crop. A light frost in the fall will not affect the ear of corn when in its husk as the husk protects it, but a heavy frost will. If some corn is not ripe by fall,

and it is attacked by a heavy frost, the best thing to do is to leave it on the stalk and eventually use it for chicken feed.

If the fall season is favorable, sweet corn will mature and can be planted between the rows of earliest potatoes. If the potato rows are 3 feet apart the cultivation of the corn will not interfere with the potatoes.

SWEET POTATO

Ipomoea Batatas

The sweet potato thrives best in the south where temperature and seasonal conditions are more favorable. Certain varieties having a period of 4 or 4½ months for maturity will do well in this section.

Plants are started from the tubers. Propagation of plants requires temperature and moisture conditions not obtainable in the ordinary hot-bed. It is best to buy plants from seed men who usually can furnish them when the planting time arrives.

The plants are very sensitive to low temperature and should not be set out until there is no danger of frost.

Plant in rows 3½ or 4 feet apart with the plants 15 inches apart in the row. It is preferable in this section to plant them on a ridge about 6 inches high. The surface of the ridge should be kept well stirred by shallow cultivation.

STRAWBERRIES

Fragaria

Strawberry plants can be obtained from any nursery, and planted in the garden any time during the month of April.

If planted in May, June or July, the ground is dry and they would require constant sprinkling.

In August, the nights are cooler, and with a little sprinkling, planting at this time will be a success.

Plants that are put in early in the spring will not bear much fruit the first year. The plant that is planted in August, will show as good a crop the following summer, as that which is planted in the spring—the strawberry plant is a perennial.

The strawberry grows best in sandy soil. If the garden soil is not sandy, scatter sand right over the plants and ground, after they have been set or planted in the garden.

To plant strawberries, have them placed one foot apart, and the rows two feet apart. Dig a little hole with a garden trowel, stick the root in, and squeeze the earth around it.

Water the root, until the plant is well started. Cultivate the soil and keep free from all other growth.

It was directed, if soil was not sandy, to scatter sand over the garden; in raking and cultivating the ground, the sand is worked into the soil.

In the fall of the year, cover the plants, not over 4 inches deep,

with dry manure to keep them from freezing over the winter. At the same time they obtain nourishment from the manure.

In the spring of the year, take off the manure, cultivate and rake the ground so that it becomes loose. Then scatter lawn grass all over the strawberry bed about two inches deep over the plants—the plants will grow up through the grass.

The lawn grass, will hold the moisture, and the berries will eventually rest on the grass and keep clean of the sand and earth.

After the berries are picked, it is still necessary to cultivate the bed until fall, to keep out all other growths, and runners, which takes the strength of the producing plant.

When the plants are three years old, it is necessary to start a new bed, as the old plant will die out about the fourth year, and those that do not die, will bear only small and imperfect fruit.

There is a strawberry called "The Ever-Bearing." This plant is treated as above and the only difference is that it has a continuous crop from June until the late fall.

Strawberries require moisture, and should be sprinkled in the dry weather.

THYME

Thymus Vulgaris

The plants may be started from seed or from the runners of other plants.

If grown from the seed, sow thinly in rows 8 to 10 inches apart and thin to 6 inches in the row. Cultivate early in the growth of the plant. Late in the season they will spread and almost if not entirely cover the ground.

The leaves are picked off, dried and stored for use in seasoning.

TOMATOES

Lycopersicum Esculentum

These plants are started by seeding in the hot-bed April 1st, either in rows or small boxes.

In three weeks the plants will be about four inches high.

When they are four inches high, they should be thinned out. They can be put in pots. Plants left in the rows or boxes must have at least three inches of space, and those that are potted should each have a separate pot.

Tomato plants are tender and should be kept in the hot-bed until after June 1st, as the slightest frost will nip them. Plants touched by the frost will never produce a perfect crop.

When the plants are placed in the garden, no preparation need be made. The plants must be placed three feet apart, and if placed in rows, the rows should be four feet apart.

When the plants become one foot high, they should be trimmed—all the bottom leaves which touch the ground should be cut off.

This gives the plant strength, the air can circulate and the insects do not gather on the plant.

Larger and better fruit will be obtained if about one-third of the new shoots are trimmed out as they appear in the angles of the leaves. It will be observed that a fruit cluster will appear at about every third leaf angle, and in pruning care should be taken and not remove them.

In case of dry weather, water the root by dipping water from a pail—you do not wet the leaves.

If the tomato worm appears, the plant must be cleared by picking the worms off by hand.

After the tomatoes show up on the plants, earth should be banked up around the roots about 6 to 8 inches, and it is no longer necessary to water the plants.

If the plants are tied up on stakes or on a trellis, the tomatoes keep cleaner and will ripen more uniformly, faster and are less liable to rot on the vine. When the vines lie on the ground and the weather is rainy, the tomatoes are more easily affected.

A method used for building a tomato trellis is to drive a row of stakes made of 2x2-inch pieces about nine inches on each side of the row and should be nearly 6 feet high when driven. Nail a 1x2-inch strip on the sides at the top of the rows of stakes and across each pair to make the trellis stiff and rigid. The intermediate ties for the plants can be made of 16 gauge galvanized wire preferably spaced eight or ten inches on the outside of the stakes. As the plants grow and are pruned they should be secured to the wires by ties of soft cord or strings. It is important that the branches of the plants be well distributed on the sides of the trellis to get a good distribution of light and air.

Tomatoes do not all ripen at the same time. There are red, yellow and pink tomatoes, and their color indicates when they are ripe and should be picked as soon as they ripen.

If the season is advanced and green tomatoes still appear on the vine, they can be picked and put in a dry place where there is no danger of freezing and many of them will slowly ripen, but a frost-bitten tomato will rot.

The tomato is subject to several forms of blight which can be controlled by spraying with bordeaux mixture. Rotation of crops should always be followed.

TURNIP

Brassica Rapa

Two crops of turnips can be grown in one summer season. For the first crop, the seed should be sown as early as the ground can be prepared and the second or fall crop between the middle of July and first of August.

The sweetness of the turnip depends largely on a rapid growth. Sow the seed thinly in rows 12 to 15 inches apart. Thin to 5 or 6

inches between plants. Cultivate frequently and keep the soil well supplied with moisture.

Turnips do not freeze very easily. The fall crop can be left in the ground until temperatures are low enough to freeze a crust on the ground.

Turnips are stored for winter use by placing in the root cellar and packed in sand.

UTILIZING ALL GARDEN SPACE

Special Note for Intensive Gardening

Spinach and radishes mature early, and other crops can be grown on the same ground—giving two crops in one season.

It is not advisable to sow the second crop of spinach or radishes on the same ground as the first crop was sown.

However, beans, peas, carrots, beets, parsnips, or salsify, can be planted on the ground made vacant by the harvesting of the first crop of radishes or spinach.

Radishes and spinach for late crops may be sown on any other portion of the garden.

When head lettuce matures it should be taken up or it will go to seed—this ground can be used for late cabbage, cauliflower, or beans.

If space occupied by these early crops is large enough, late corn can be planted instead of the other crops mentioned. **However**, corn that is **planted after June 25th** may not mature if there are **early frosts**.

Before sowing the second crop, scatter a little bone meal thinly over the top of the ground, and work the ground over with a rake, thus bringing the bone meal under the surface and then sow your seeds.

In two weeks' time the bone meal is thoroughly absorbed in the soil, and gives nourishment to the plants.

Bone meal can be purchased from seed stores or the stock yards.

GARDENER'S PLANTING TABLE

Distances apart for rows, depths of planting, quantity of seeds for 50 feet of row, planting seasons and approximate date of maturity

Kind of Vegetable	Distance Apart		Depth for Planting Seed	Seeds and Plants for 50 Feet of Row		Planting Dates		Time Until Ready for Use
	Rows	Plants in the row		Seed	Plants	Earliest	Latest	
Artichoke	3 ft.	12 in. to 15 in.	4 in. to 5 in.	.....	.....	May 1	May 30	4 mo. to 5 mo.
Asparagus	3 ft.	8 in. to 12 in.	10 in. to 12 in.	.....	50 to 60	May 1 to 15	.....	After 2nd yr.
Bean—Bush	18 in.	12 in.	2 in. to 3 in.	$\frac{1}{2}$ pt.	.....	May 15	Aug. 1	40 da. to 65 da.
Bush Lima.	2 $\frac{1}{2}$ ft.	6 in. to 10 in.	2 in. to 3 in.	$\frac{1}{2}$ pt.	.....	May 15	June 15	70 da. to 90 da.
Pole Lima.	3 ft.	2 ft. to 3 ft.	2 in. to 3 in.	$\frac{1}{4}$ to $\frac{1}{2}$ pt.	.....	May 15	June 1	80 da. to 120 da.
Beet	12 in. to 18 in.	4 in. to 5 in.	2 in. to 3 in.	1 oz.	.....	May 1 to 15	Jul. 1. to Aug. 1	60 da. to 80 da.
Brussel Sprouts...	2 ft.	15 in. to 20 in.	.....	.....	30 to 45	May 1	June 15	80 da. to 100 da.
Cabbage	2 ft.	2 ft.	.....	.....	25	May 1	July 1	90 da. to 120 da.
Carrot	18 in.	2 in to 3 in.	1 in.	$\frac{1}{4}$ to $\frac{1}{2}$ oz.	.....	May 1	July 1	70 da. to 100 da.
Cauliflower	2 ft.	2 ft.	.....	.....	25	May 1	July 1	90 da. to 120 da.
Celeriac	18 in. to 20 in.	10 in. to 12 in.	.....	.....	50 to 60	May 15	June 15	4 mo. to 5 mo.
Celery	1 $\frac{1}{2}$ ft. to 2 ft.	8 in. to 10 in.	.....	.....	60 to 75	June 1	July 15	100 da. to 120 da.
Chard	18 in.	6 in. to 8 in.	3 in.	$\frac{1}{4}$ oz.	.....	May 1	June 1	60 da. to 75 da.
Chicory	18 in.	4 in. to 6 in.	.....	$\frac{1}{4}$ oz.	.....	May 15	June 15	90 da. to 120 da.
Chive	12 in.	2 in. to 3 in.	.....	$\frac{1}{2}$ oz.	.....	Apr. 1	July 1	90 da. to 120 da.
Corn Salad.....	12 in. to 15 in.	6 in. to 8 in.	.....	$\frac{1}{4}$ oz.	.....	Apr. 15	May 1	40 da. to 50 da.
Cucumber	5 ft. to 6 ft.	4 ft. to 5 ft.	3 in.	$\frac{1}{4}$ to $\frac{1}{2}$ oz.	.....	May 20	Aug. 1	60 da. to 80 da.
Dill	12 in. to 15 in.	6 in. to 8 in.	1 in.	$\frac{1}{2}$ oz.	.....	May 1	June 1	90 da. to 100 da.
Egg Plant	2 ft.	1 $\frac{1}{2}$ to 2 ft.	.....	.....	25 to 35	June 1	.....	90 da. to 120 da.
Endive	12 in. to 15 in.	18 in. to 20 in.	.....	.....	30 to 35	July 15	Sept. 1	60 da. to 75 da.

GARDENER'S PLANTING TABLE—Continued

Distances apart for rows, depths of planting, quantity of seeds for 50 feet of row, planting seasons and approximate date of maturity

Kind of Vegetable	Distance Apart		Depth for Planting Seed	Seeds and Plants for 50 Feet of Row		Planting Dates		Time Until Ready for Use
	Rows	Plants in the row		Seed	Plants	Earliest	Latest	
Garlic	12 in. to 15 in.	4 in. to 5 in.	.....	1 pt.	.....	Apr. 15	May 10	90 da. to 120 da.
Horse Radish.....	2 ft.	8 in. to 10 in.	.....	.....	60 to 75	Apr. 15	May 15	Following Winter
Kohl Rabi	18 in.	8 in. to 10 in.	.....	.....	60 to 75	May 1	Aug. 1	60 da. to 75 da.
Leek	12 in.	4 in. to 5 in.	.....	$\frac{1}{4}$ oz.	.....	Apr. 15	June 1	100 da. to 120 da.
Lettuce	18 in. to 20 in.	10 in. to 12 in.	1 in. to 2 in.	$\frac{1}{2}$ oz.	.....	Apr. 15 to May 1	Sept. 1	40 da. to 60 da.
Mint	12 in.	8 in.	$\frac{1}{2}$ in.	.....	35	May 1	June 1	90 da. to 120 da.
Muskmelon	6 ft.	Hills 4 ft. to 5 ft.	.....	$\frac{1}{4}$ to $\frac{1}{2}$ oz.	.....	May 15	June 15	120 da. to 150 da.
Okra	2 ft. to 3 ft.	18 in.	.....	.....	30	May 15	June 1	60 da. to 75 day.
Onion Seed	15 in.	3 in. to 4 in.	.....	$\frac{1}{2}$ oz.	.....	May 1	July 1	40 da. to 120 da.
Onion Sets	15 in.	3 in. to 4 in.	.....	1 qt.	.....	Apr. 15	June 1	40 da. to 90 da.
Parsley	10 in. to 12 in.	4 in. to 5 in.	.....	.....	.....	May 1	July 1	50 da. to 60 da.
Parsnip	18 in.	4 in. to 5 in.	2 in.	$\frac{1}{8}$ oz.	.....	May 1 to 15	July 1	6 mo.
Pea	2 ft. to 3 ft.	2 in. to 3 in.	3 in. to 4 in.	.....	.....	Apr. 15	July 15	60 da. to 90 da.
Pepper	2 ft.	1 $\frac{1}{2}$ ft. to 2 ft.	.....	.....	25 to 35	June 1	June 15	75 da. to 90 da.
Potato	3 ft.	10 in. to 12 in.	6 in.	5 to 6 lb.	.....	May 1	June 1	100 da. to 120 da.
Pumpkin	10 ft. to 12 ft.	2 ft. to 3 ft.	2 in. to 3 in.	$\frac{1}{4}$ oz.	.....	May 10	June 10	120 da. to 150 da.
Radish	10 in.	1 $\frac{1}{2}$ in. to 2 in.	1 in. to 2 in.	$\frac{1}{4}$ oz.	.....	May 1	Sept. 1	30 da. to 60 da.
Rhubarb	3 ft. to 4 ft.	3 ft. to 4 ft.	.....	.....	13	Apr. 1	June 1	Following Season
Rutabaga	18 in.	8 in. to 10 in.	.....	$\frac{1}{8}$ oz.	.....	Apr. 15	May 1	6 mo.
Sage	10 in. to 12 in.	8 in. to 10 in.	.....	$\frac{1}{8}$ oz.	.....	May 1	June 1	90 da. to 120 da.

GARDENER'S PLANTING TABLE

Distances apart for rows, depths of planting, quantity of seeds for 50 feet of row, planting seasons and approximate date of maturity

Kind of Vegetable	Distance Apart		Depth for Planting Seed	Seeds and Plants for 50 Feet of Row		Planting Dates		Time Until Ready for Use
	Rows	Plants in the row		Seed	Plants	Earliest	Latest	
Salsify	18 in.	4 in. to 5 in.	2 in.	$\frac{1}{4}$ oz.	.....	May 1	July 1	120 da. to 150 da.
Squash—Bush	3 ft. to 4 ft. 7 ft. to 10 ft.	Hills 4 ft. Hills 8 ft.	2 in. to 3 in. 2 in. to 3 in.	$\frac{1}{4}$ oz. $\frac{1}{4}$ oz.	..... .....	May 10 May 10	June 10 June 10	60 da. to 80 da. 120 da. to 150 da.
Vine								
Spinach	12 in.	4 in. to 6 in.	2 in.	$\frac{1}{2}$ oz.	.....	Apr. 15	Aug. 15	30 da. to 60 da.
Sweet Corn	3 ft.	10 in. to 12 in. $2\frac{1}{2}$ ft. hills	3 in. to 4 in.	$\frac{1}{8}$ pt.	.....	May 1	July 1	60 da. to 100 da.
Sweet Potato	$3\frac{1}{2}$ ft. to 4 ft.	15 in.	.....	.....	40	May 15	June 1	120 da. to 150 da.
Strawberry	2 ft.	12 in.	.....	.....	50	May 1	Aug. 1	Following Season
Thyme	8 in. to 10 in.	6 in.	$\frac{1}{2}$ in.	$\frac{1}{8}$ oz.	.....	May 1	June 1	90 da. to 100 da.
Tomato	4 ft.	3 ft.	.....	.....	17	May 20	June 1	80 da. to 125 da.
Turnip	12 in. to 15 in.	5 in. to 6 in.	$\frac{1}{2}$ in. to 1 in.	$\frac{1}{8}$ oz.	.....	Apr. 15	Aug. 1	60 da. to 80 da.
Watermelon	8 ft. to 10 ft.	Hills 8 ft.	2 in. to 3 in.	$\frac{1}{4}$ oz.	.....	May 15	June 1	100 da. to 120 da.

CALENDAR FOR THE TREATMENT OF PLANT DISEASES AND INSECT PESTS

The propagation of plants, their proper arrangement in the garden, their training and cultivation are requisite to a successful garden but the identification of plant diseases and insect enemies and application of repellents against their attacks must be given careful study and prompt action if maximum results are desired. It would seem advisable to give the formulæ for the preparation of the most commonly used fungicides and insecticides, and also append a table in concise form giving the time to spray, and the remedies to use. The following information is quoted from the information compiled by the Ohio Agricultural Experiment Station:

REMEDIES

Fungicides

1 BORDEAUX MIXTURE I*

Copper sulphate (blue vitriol), 4 pounds
Quicklime (not air-slaked), 4 pounds
(Of dry air-slaked lime or hydrated lime one-fourth more)
Water to make 50 gallons

Dissolve the copper sulphate in about 2 gallons of hot water contained in a wooden vessel, by stirring, or even better suspending the sulphate contained in a cheese cloth sack in a large bucketful of cold water. With the cold water and cheese cloth bag a longer time is required. Pour the sulphate solution into the barrel or tank used for spraying, and fill one-third to one-half full of water. Slake the lime by addition of a small quantity of water, and when slaked cover freely with water and stir. Pour the milk of lime thus made into the copper sulphate, straining it through a brass wire strainer of about 30 meshes to the inch. Pour more water over the remaining lime, stir and pour into the other; repeat this operation until all the lime but stone lumps or sand is taken up in the milk of lime. Now add water to make 50 gallons in the tank. After thorough agitation the mixture is ready to apply. The mixture should be made fresh before using, and any left over for a time should be thrown out or fresh lime added. In most operations on a large scale, and for uniform results from arsenicals added to Bordeaux mixture, it is usually better to combine the diluted copper sulphate solution and the milk of lime diluted to volume in a mixing tank before putting into the spray tank.

When in a small way separate barrels are used, and both the lime and blue vitriol are made up to equal measured volume, insecticides may be added in the lime barrel and the equal volumes run together directly into the sprayer.

*The strength of Bordeaux mixture best adapted to use upon apple trees varies with the spray appliances employed; with hand pumps and low pressure of the spray a 4-4-50 formula may be used with safety; while with high pressure and heavy applications of spray a 3-3-50 strength is safer even in earlier sprayings in foliage—for summer ones a greater strength than 2-2-50 is seldom desirable.

2 BORDEAUX MIXTURE II

Copper sulphate, 2 pounds

Quicklime, 2 pounds

(Of dry air-slaked lime or hydrated lime one-fourth more)

Water to make 50 gallons

For use on such trees as have foliage injured by Bordeaux I

Stock Solution and Lime Putty

A solution of copper sulphate containing 1 pound of sulphate to the gallon of water may be made and permitted to stand indefinitely in a covered barrel if no lime is added. Such a solution is known as a stock solution and 2 or 3 or 4 gallons of this stock solution, according to the strength desired, is taken for each 50 gallons of the mixture to be made. For extensive spraying, a long trough or box of uniform width may be used, in which to slake and keep the lime. The quicklime is weighed out according to the amount needed, immediately placed in the trough and slaked with a small quantity of water. The whole is evenly spread and covered as a putty with water to exclude the air. This putty may be removed in calculated portions, placed in a tub and treated like the freshly slaked lime. By means of stock solution of copper sulphate and the lime in putty state, much valuable time is saved in filling the barrels or tanks used in spraying. (See mixing-tank suggestions above.)

3 AMMONIACAL SOLUTION OF COPPER CARBONATE

Copper carbonate, 6 ounces

Ammonia, about 3 pints (avoid excess)

Water, 50 gallons

Dissolve the copper carbonate in the ammonia and add the water.

Caution—Use no more ammonia than is required to dissolve the copper carbonate. Ammonia is variable in strength, and the amount required must be tested in practice.

To Make Copper Carbonate—Dissolve 10 pounds of copper sulphate (blue vitriol) in 10 gallons of water, also 12 pounds of carbonate of soda in same quantity of water. When cool, mix the two solutions slowly, stirring well. Allow the mixture to stand 12 hours and settle, after which pour off the liquid. Add the same quantity of water as before, stir and allow to stand the same length of time. Repeat the operation, after which drain and dry the blue powder, which is copper carbonate.

4 SODA BORDEAUX MIXTURE

Copper sulphate, 4 pounds

Commercial caustic soda, soda lye (sodium hydroxide) slightly in excess so that mixture is alkaline—according to strength, 1 lb. 5 oz. to 1 lb. 8 oz. by testing

Water to make 50 gallons

For use instead of ammoniacal copper carbonate

Warning—In each case of change of grade or brand of commercial caustic soda, it will be necessary to test the strength. Keep the mixture well agitated. In order to test the strength of caustic soda provide materials and appliances and test carefully the reaction with both red and blue litmus.

To Keep Caustic Soda—After opening a container and testing, weigh out the entire contents into portions such as are needed to make a single spray tank of mixture; put in Mason jars under shelter; cover with a pint or so of water. This portion is ready to be used as needed. Open packages of caustic soda will absorb water and increase in weight on standing; unopened packages will usually keep for a year or more.

5 COPPER SULPHATE SOLUTION

Copper sulphate, 4 pounds

Water to make 50 gallons

Dissolve the sulphate as directed in Bordeaux I.

Caution—This solution will injure foliage. It can be used only before the buds open.

6 BORDEAUX MIXTURE AND IRON STICKER

Copper sulphate (blue vitriol), 2 pounds

Iron sulphate (copperas), 2 to 3 pounds

Quicklime, 4 to 5 pounds

(Of dry air-slaked lime or hydrated lime one-fourth more)

Water to make 50 gallons

Recommended as a substitute for Bordeaux I upon most fruit trees in foliage and upon certain vegetables. It is used especially for apples and potatoes. The iron sulphate is precipitated by the lime as hydroxide and serves as a dilution sticker. The spray is rust colored because of this iron compound.

Note—A stronger 4-4-8-50 formula may be used on apple, pear and plum trees before blossoms open.

Caution—Do not leave a solution of iron sulphate standing beyond a second or third day. It is best to make it fresh for each day.

7 POTASSIUM SULPHIDE SOLUTION

Potassium sulphide (liver of sulphur), 1 ounce

Water, 3 to 4 gallons.

This solution will not remain unchanged. The potassium sulphide must be kept in a well-stoppered bottle. This may be made by a similar process to that of No. 8.

8 SODIUM SULPHIDE SOLUTION

Commercial caustic soda, $2\frac{1}{2}$ pounds
Flowers of sulphur, 5 pounds
Water to make 50 gallons

To Make Sodium Sulphide at Lowest Cost—Place the caustic soda in a metal vessel and add a little hot water. Then stir in sulphur gradually, adding meanwhile hot water or applying heat. The chemical reaction will generate heat. With its progress the color will change from yellow to nearly brick red. No heat is required after complete solution unless lime is added. Do not add excess of water until the solution is effected. It may be made in quantity with external heat and kept a day as stock solution. Excess of lime may be added with double and triple portions of sulphur to make the possible equivalent of lime-sulphur solution.

Caution—This solution is prepared for application on dormant trees. Care must be observed. Upon foliage, as of peach, a strength greater than 1 pound of caustic soda to 2 pounds of sulphur is not to be recommended.

To make sodium sulphide for treating seed potatoes, use at the rate of 1 pound of caustic soda to 10 ounces of sulphur for 36 gallons of solution.

9 SELF-BOILED LIME-SULPHUR MIXTURE

Stone lime (only), 10 pounds
Flowers of sulphur, 10 pounds
Water to make 50 gallons

An 8-8-50 strength is also used.

It is best to prepare the mixture in large lots for at least 200 gallons of spray, using 40 pounds of lime and 40 pounds of sulphur, so as to get enough heat to produce a violent boiling for a few minutes. Place the lime in a barrel and pour on sufficient water (about 3 gallons to every 20 pounds) to start the slaking of the lime and to hold up the sulphur. Then add the sulphur after working through a sieve to break up the lumps, meanwhile stirring thoroughly; and finally add sufficient water to slake the lime into a paste. Considerable stirring is necessary to prevent caking on the bottom. If mixture tends to become sticky, a little more water may be added. After the violent boiling produced by the slaking of the lime is over, the mixture should be diluted ready for spraying, or at least sufficient cold water added to stop the cooking—5 to 15 minutes being required for this, according to whether the lime is quick acting or sluggish. The intense heat in boiling seems to produce the desired mechanical mixture of the lime and sulphur. If allowed to stand too long before dilution, the sulphur tends to unite with the lime, and at the end of 30 to 40 minutes sufficient reddish liquid is produced to burn peach foliage and even apple foliage in some cases. Strain through a sieve of about 20 meshes to the inch to remove coarse particles of lime, but all of the sulphur should be worked through the strainer. For the 10-10-50 strength, dilute to 200 gallons. For other strengths, use a different dilution.

The large disk nozzles are successfully used in the application of this spray.

Proposed by W. M. Scott, U. S. Department of Agriculture, as a fungicide for use on peach trees in foliage. Also available on American and Japanese plums and upon all varieties of cherries.

Caution—While this may be used upon the peach in foliage and upon other fruits, care should be exercised in the preparation of the mixture to avoid the formation of soluble sulphides as by use of hot water or allowing to stand before dilution, since these result in foliage injury from the spray.

10 LIME-SULPHUR SOLUTIONS

Lime-sulphur solutions, either derived from commercial preparations or from home-boiled concentrates, are often useful fungicides. For dormant sprays these are the same as for San Jose scale treatment. For foliage applications, greater dilutions are required. Upon apple a dilution of 1 part of the concentrate of 32° Beaume is made with 40 parts of water.

These solutions are quite weak as fungicides, and as foliage sprays have not proved satisfactory where strong germicides are required. They have been thus far better adapted to use in apple orchards. See formulae 14 to 16.

10½ DUST PREPARATIONS (See also No. 16)

Dust preparations for treatment of apple orchards have been tested more or less in certain states, but are only in the experimental stage as yet. The tests made at the Cornell Experiment Station indicate fair promise for combination treatments especially. It has been found that finely ground sulphur is most promising as a fungicide. This is designated so fine that 95 percent passes a sieve having 200 meshes to the inch. Coarser sulphur is much less satisfactory. The most successful combination employed has been a mixture of 90 percent finely ground sulphur and 10 percent powdered arsenate of lead.

11 FORMALDEHYDE (FORMALIN) SOLUTIONS

For oat and wheat smuts, 1 pound or pint of 40 percent formaldehyde to 40 gallons of water

For potato scab, ½ pint of formaldehyde to 15 gallons of water

For cabbage black-leg, ¼ pound or pint of formaldehyde to 6 gallons of water

For onion smut, 1 pound of formaldehyde to 25 or 33½ gallons of water

For soil drench, 3 pounds or more of formaldehyde to 50 gallons of water

See table of Seed and Soil Treatment

11½ FORMALDEHYDE GAS

Commercial 40 percent formaldehyde, 3 pounds
Potassium permanganate crystals, 23 ounces
Sufficient for 1,000 cubic feet of space occupied
by crates or trays. (Maine formula.)

Inclose open tiers or piles of slat crates filled with dry onions, potatoes, and so forth, in tight room or oiled tent of canvas buried in earth about the base. Generate the formaldehyde gas in a flat-bottomed dish or pan of adequate capacity by placing one of the materials, as the liquid formaldehyde, in the pan, and adding the other the last thing before retiring. Then close tight and allow to remain closed 24 to 48 hours.

Proportionate amounts may be taken for smaller or larger inclosed spaces. Applicable to fumigation of seed potatoes for rot troubles and to newly gathered, dry onions before storing for winter.

12 CORROSIVE SUBLIMATE (MERCURIC CHLORIDE)

Corrosive sublimate, 2 ounces
Water, 15½ gallons—equal to 1 to 1000 strength
Label POISON; use for potato scab and for disinfection.
To hasten solution, have druggist pulverize the mercuric chloride.

INSECTICIDES

13 KEROSENE EMULSION

Laundry soap (chipped), ½ pound
Kerosene (coal oil), 2 gallons
Water (preferably soft and free
from dirt particles), 1 gallon

Dissolve the soap in the full amount of water, and when this solution is boiling hot remove from the fire and add the kerosene. Stir the mixture violently by driving it through a force pump back into the vessel until it becomes a creamy mass that will not separate. This requires usually from 5 to 15 minutes. For use, dilute one part of the emulsion with 8 or 10 parts of water for use on hard-bodied insects like the chinch bug. For soft-bodied insects, such as plant lice, lice on animals, and so forth, use one part emulsion to 15 or 20 parts of water. The stock emulsion will keep good for months if kept in air-tight vessels.

Kerosene emulsion kills by contact, and therefore, the application should be thorough. It may be used against a great many different pests but is especially valuable for destroying those with sucking mouth parts, for they cannot be killed with arsenical poisons.

Caution—Only the dilute emulsion, 1 part emulsion to 15 or 20 parts of water, should be used when the trees are in leaf, and in all

cases it should be kept thoroughly stirred; otherwise the foliage or even the twigs will be injured. Applications of this insecticide are much safer if made only on dry, sunshiny days, not scorching hot, preferably with a light breeze blowing, so as to hasten evaporation, and thus minimize danger to the plants.

14 LIME-SULPHUR WASH

Stone lime, 12 to 15 pounds
(Hydrated lime $\frac{1}{4}$ more)
Flowers of sulphur, 15 pounds
Water, 50 gallons

Slake the lime in a small quantity of hot water, gradually adding and stirring in the sulphur. Dilute mixture with 12 gallons of water and boil in an iron kettle or cook by steam in a covered tank or barrel for 1 hour or longer. Fill with water to the required 50 gallons. Strain the wash through a fine-mesh strainer and apply hot. In using an iron kettle, keep the mixture vigorously boiling and thoroughly stirred to prevent caking and burning of the materials. When the wash is cooked by steam, it is more easily prepared and better made.

Apply wash in spring before buds open or in fall after leaves drop. Cover all parts of the tree with a heavy coat of the wash. If a single application is made each year for scale insects, especially for San Jose scale, it is advised that the treatment be given in the early spring. Where infestation is excessive, one spraying should be given in the fall after the leaves drop, and a second the following spring before the leaves appear. Also in case of large orchards it may be necessary to commence work in the fall so as to insure its completion before vernal in spring. Cover every bit of bark on every tree to insure success.

This remedy is perfectly safe in anybody's hands, if used during the dormant period. It is also a fungicide and controls peach leaf curl as well as San Jose scale.

This is one of the early formulae for making lime-sulphur solution. The only objection to it is the great quantity of sediment which must be removed by straining. Even when carefully strained, it frequently clogs pumps and nozzles with accumulations of dirt. Notwithstanding this drawback, some of our best orchardists have returned to its use after a few years' trial of the commercial mixtures, being convinced that it is more effective for controlling scale insects.

15 COMMERCIAL LIME-SULPHUR SOLUTIONS

These are convenient to use, being free from sediment and requiring no preparation other than stirring into water. When properly made and properly diluted, these mixtures are thoroughly reliable. The most convenient method for diluting the mixtures is by the hydrometer test. The standard liquid should test 33° on the Beaume hydrometer and should contain 2.7 pounds of sulphur to a gallon of undiluted liquid. For use, such a liquid should be diluted at the rate of 1 gallon of lime-sulphur to 7 gallons of water.

TABLE OF DILUTIONS FOR DORMANT AND SUMMER SPRAYING WITH
LIME-SULPHUR MIXTURES

Reading on hydrometer	Number of gallons of water to one gallon of lime-sulphur solution	
	For San Jose scale Winter use	For summer spraying of apples
<i>Degrees Beaume</i>		
35	8.00	45.00
34	7.50	43.00
33	7.00	40.00
32	6.50	37.50
31	6.00	36.00
30	5.50	34.00
29	5.25	33.00
28	5.00	31.00
27	5.00	29.50
26	5.00	28.00
25	4.50	26.00
24	4.25	24.00
23	4.00	23.00
22	3.50	21.00
21	3.25	20.00
20	3.00	18.00
19	2.75	17.00
18	2.50	16.00
17	2.50	15.00
16	2.00	14.00
15	2.00	13.00
14	1.75	12.00

The foregoing table records the minimum strengths to be used for San Jose scale. The mixture can be used at twice the strength recommended in the table, or even stronger, and no ill effects will follow, but by so doing the expense is considerably increased and no practical advantage is gained. The summer strengths should in no case be increased beyond the figures given in the table.

16 POWDERED SULPHUR PREPARATIONS

These materials are comparatively recent developments in an attempt to secure a highly concentrated sulphur spray. Several brands are on the market at the present time. Briefly stated, the results, while somewhat variable, were promising for scale control. Until more is known concerning them, they should not be used as summer foliage sprays. Use according to directions on the container.

17 SOAP SOLUTIONS

One pound of fish-oil soap or laundry soap in 4 to 7 gallons of water is a good spray against plant lice.

18 SOLUBLE OR MISCIBLE OIL

Some commercial houses make brands of oil that readily mix in cold water. They are used as dormant applications against San Jose scale, maple terrapin scale, magnolia scale, maple cottony scale and others which the lime-sulphur wash will not control. They are especially valuable for destroying scale on old, rough-barked apple and pear trees. The ordinary rate of dilution is 1 gallon to 15 gallons of water.

19 PARIS GREEN

In combination with Bordeaux mixture, Paris green may be used at the rate of 1 pound in from 50 to 150 gallons.

When Bordeaux mixture is unnecessary, the Paris green may be used at the same rate, but 2 or 3 pounds of freshly slaked lime must be added to prevent burning of the foliage. Keep the mixture well stirred so that the poison will be distributed evenly.

In cases where successive sprayings are necessary, it is important to consider the accumulation of the poison and consequent danger of injury to foliage from soluble arsenic. Arsenate of lead is safer for continuous use.

When diluted with 20 parts by volume of ground lime or cheap flour Paris green may be applied with a dusting machine or shaken from a cheese cloth bag on potato vines to kill the Colorado potato beetle.

20 COMMERCIAL ARSENATE OF LEAD

This poison is in many respects the most satisfactory for spraying purposes of any of the arsenicals. It is more adhesive than Paris green and if properly made of good materials will burn foliage but little, no matter what strength is used. The paste form is used at the rate of 2 to 5 pounds in 50 gallons of spray and the powdered product at from 1 to 3 pounds. For average use 3 pounds of the paste or $1\frac{1}{2}$ pounds of the powder is the most frequent recommendation. The paste form should not be allowed to freeze or dry out. If either happens, the addition of soap at the rate of 2 pounds to 50 gallons of diluted spray assists materially in keeping the lead in suspension. Water, Bordeaux mixture, No. 6 or lime-sulphur solution may be used as the carrier. The powdered material may be applied in the dry form as a dust.

21 ARSENITE OF SODA

Dissolve 2 pounds of commercial white arsenic and 4 pounds of carbonate of soda (washing soda) in 2 gallons of boiling water and use from 1 quart to 3 pints to a barrel of Bordeaux mixture (50 gallons).

Orchardists often use 1 pint of this poison with the addition of $1\frac{1}{2}$ pounds of commercial arsenate of lead in 50 gallons of Bordeaux for spraying apples. Results seem nearly as good against codling worm as when full-strength arsenate of lead is used, but more burning of the leaves occurs.

The easiest way to make the solution is to put both the white arsenic and carbonate of soda in a gallon of boiling water and keep boiling about 15 minutes, or until a clear liquid is formed, and then dilute to 2 gallons for stock solution,

Caution—This cannot be used alone safely, but must be applied in Bordeaux mixture. It is not safe in lime-sulphur.

22 ARSENITE OF LIME

White arsenic, 1 pound
Lime, 2 pounds
Water, 3 gallons

Boil together for fully 40 minutes after the boiling point is reached. As a precaution against danger of burning, slake 2 or 3 additional pounds of lime, put the milk in 3 or 4 gallons of water, and add to the boiled mixture. Strain and dilute to from 200 to 250 gallons for hardy vegetation such as potatoes. Do not use at all on stone fruits or on cucurbits. Dilute to 300 or 400 gallons for tender vegetation. It is safer when used in Bordeaux mixture.

23 WHITE HELLEBORE

Because it loses its poisonous properties quickly, hellebore may be employed to spray fruits a few days before harvest when arsenical sprays would be dangerous. Use 1 ounce to 3 gallons of water.

24 PYRETHRUM

Pyrethrum is usually applied as a powder with a bellows, but may be used as a spray at the rate of 1 ounce to 2 gallons of water. Poisonous to insects but not to higher animals. Can be used on ripening fruits. By closing up rooms containing flies and mosquitoes, then filling the air full of the dust by means of a blow-gun, and keeping closed for several hours, preferably over night, most of the insects will be either killed or stupefied and will drop to the floor. They should then be swept up and destroyed.

25 NICOTINE SULPHATE. TOBACCO DECOCTION

Nicotine sulphate is a commercial preparation much used for the destruction of aphids and sucking insects. It is readily used in combination with Bordeaux mixture and arsenate of lead and somewhat less safely in combination with lime-sulphur solution and arsenate of lead. When used alone in water some soapsuds should be added to enhance its spreading qualities.

To make a decoction of tobacco, boil 1 pound of tobacco stems or tobacco dust in 1 gallon of water for about 1 hour. Strain to remove dirt that would clog nozzle, and add water to make 2 gallons of spray for each pound of tobacco used. Excellent for plant lice and does no injury to the most tender plants. Some of the commercial decoctions or preparations of nicotine are better than the homemade ones.

26 BISULPHIDE OF CARBON

This is a convenient fumigant for treating granaries, bins and closed compartments which contain stored grain, groceries and food-stuffs being injured by insects, provided the temperature is above 70° F. Make the compartment tight if possible by pasting paper

strips over cracks and openings. When everything is made tight, pour the liquid on burlap sacks laid on top of the grain, using about 5 to 8 pounds or pints for every 1,000 cubic feet of space inclosed in the bin. A good way to distribute the liquid for rapid and effective action is to spray it over the grain through a small opening near the top of the bin, using a small spray pump. If the first method is used as soon as the dosage has been completed, close the door and make it tight. Keep closed for 40 hours, then open and air thoroughly. Do not bring a lighted lantern or fire of any kind near the bin while fumigation is in progress as this gas is inflammable. Sometimes treatments at intervals of a few weeks apart are advisable in case the bins are not tight. Fumigation according to these directions will not injure grain for either feed or seed. This material can be used for fumigating woollens and furs infested with clothes moths. Place the article to be fumigated in a tight chest or trunk and saturate a sponge or mass of cotton with the carbon bisulphide at the proportions given above. Leave the chest closed for 48 hours or more, and if the goods are to be stored, place in tight chests or sew in paper bags. Carbon tetrachloride can be substituted for carbon bisulphide in clothes chests, but it should be used in approximately double the amounts. It has the advantage of being less offensive in odor, and not being inflammable is much safer for household use.

27 POISONED BAIT FOR CUTWORMS, GRASSHOPPERS, SLUGS, ETC.

Cutworms are quite readily destroyed by a poisoned bran bait made as follows: With 25 to 35 pounds of coarse wheat bran, thoroughly mix, while dry, one pound of Paris green or an equal weight of powdered white arsenic. Chop fine six lemons or six oranges and add juice, rinds and all to the ingredients. Dilute 1 quart of any cheap syrup with 2 or 3 gallons of water and mix with the bran and arsenic. Add sufficient water to wet all the bran, but do not have it sloppy when ladeled. This bait is scattered over infested lands in little heaps, which keep moist longer if covered with pieces of board; the cutworms are more likely to find the poison when thus hidden, since they retreat to such locations for hiding during the day. A teaspoonful of the mixture put at the base of each garden plant liable to attack will afford good protection. If the plants are in drilled rows, a line of the bait may be placed along each side of the row. It is always best when possible, to put the bait in gardens when freshly plowed, before the crops are planted; the worms finding nothing above ground to eat but the bait, feed on it greedily and are destroyed before the crop is planted.

If the bait is to be scattered for grasshoppers best results may be expected in Ohio when it is distributed early in the morning. It should be sown broadcast either on foot or from a light wagon or buggy. A broadcast grain seeder mounted on a wagon has been used successfully for this purpose in the western parts of the United States. From 1 to 5 days is required for the grasshoppers to die off in conspicuous numbers.

Another good bait for cutworms and grasshoppers is obtained by spraying a patch of clover or other succulent vegetation with Paris green, one-half pound to 50 gallons of water, or with arsenate of lead, 3 pounds to 50 gallons of water. A few hours after spraying, the poisoned grass is cut with a scythe or mowing machine and scattered in little heaps over the infested land. These piles should be made large enough to prevent rapid drying out of the under portions, or the grass may be placed under boards like the bran bait.

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Apple continued	Twig blight...	Cut out and burn.	Cut out and burn on appearance...	.....	.....	.....	Bacterium lives over in blight cankers. Remove all pruning.
	Aphis	Nicotine sulphate or soluble oil.	As buds are swelling	Pre-blossom spray.	Just after bloom if necessary .....	.....	Nicotine sulphate may be combined with lime-sulphur or Bordeaux mixture. Soluble oil should not be used after leaves appear.
	Bud moth...	Arsenicals in Bordeaux or lime-sulphur solution	With opening of buds .....	.....	.....	.....	.....
	Canker worm.	Arsenate of lead alone, 6 lb. to 50 gal.	With first young worms	2 or 3 days later if worms remain..	Same as second..	.....	20, 21 or 22 in Bordeaux are not quite as efficient as arsenate of lead alone.
	Codling moth and curculio	Band with tree tanglefoot .....	.....	.....	.....	.....	Bands should be in place by Feb. 15.
	San Jose scale	Arsenites or arsenates in Bordeaux or 6 or lime-sulphur solution with arsenate of lead, 3 lb. to 50 gal.	As soon as blossoms fall.....	7 to 10 days later	For southern Ohio 2d week in July; central Ohio 3d week in July; northern Ohio, 4th week in July or 1st week in August .....	.....	Third spraying, arsenate of lead alone on light-colored apples. Summer sprays may be combined with those for bitter rot and blotch.
Ash	Oyster shell scale and scurfy scale	Lime-sulphur or No. 18.....	Late in winter, or early spring or late in fall.	.....	.....	.....	In case of bad infestation spray in fall and repeat in spring.
	Woolly aphids.	Lime-sulphur, kerosene emulsion or No. 18.	Early spring with 14	June 1 to 15 with lime-sulphur or 13 or 18.....	For oyster shell scale Aug. 1 to 15 with 13 or 18..	.....	See Mo. Bul. O. A. E. S., I (April, 1916), No. 4, p. 103.
	Canker of branches ..	Nicotine sulphate.	When trees are in full leaf.....	.....	.....	.....	.....
Ash	Canker of branches ..	Cut out and burn parts .....	.....	.....	.....	.....	Wound parasite to be avoided. This canker is caused by the Horstia Chestnut Bark, Elm, Maple, Oak, etc., See O. A. E. S. Mo. Bul., 1 (Oct., '16), No. 10
	Leaf spot...	Gather and burn diseased leaves.	.....	.....	.....	.....	.....

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Aster	Fusarium wilt..... Blister beetle	See seed and soil treatment. Whale oil soap, 1 lb. to 6 gal. water, or dilute chloro-naphthol-eum	When beetles appear				
Asparagus ...	Asparagus beetle..... Asparagus rust.....	Alf-slaked lime or pyrethrum as a powder	When larvae appear	Same as first.....	Same as first.....	Same as first.....	Do not use arsenicals except in late summer; add soap. Repeat 3 or 4 times. Burn rusted brush in fall
Bean	Anthracnose. Rust	Bordeaux I..... Burn old plants...	After cutting crop.	10 days later.....	10 days later.....	10 days later.....	Repeat if needed. Reject diseased seed. Select resistant varieties.
Beet	Leaf spot..... Damping off.	Bordeaux I..... See soil treatment.	Soak seed 1 to 2 hours in am. cop. carb. 5 times strength of 3.... Destroy diseased pods	Bordeaux on 2 or 3 in. plants....	Bordeaux 10 days later	After blossoms....	
			When plants are 5 to 6 inches high.	2 weeks after first	2 weeks later		
Cabbage, Cauliflower, etc.	Black leg... Cabbage worm..... Club root... Yellows Maggot Downy mildew.....	See soil treatment. Pyrethrum	With first appearance of worms..	Whenever worms are observed....	Same as second...	Same as second...	1 oz. to 2 gal. water or dust 1 to 10 of flour by bulk.

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Thrd Spraying	Fourth Spraying	
Carnation ...	Leaf or calyx mold.....	Bord. I or ½ of 5	Upon appearance of fungus.....	2 weeks later.....	2 weeks later.....	Repeat if needed...	Begin early before the calyces are ruined. Cover foliage well.
	Leaf spot....	Bord. I or ½ of 5	Upon appearance of fungus.....	2 weeks later.....	2 weeks later.....	.....	
Catalpa	Leaf spot....	Bordeaux I.....	Upon appearance of fungus.....	2 or 3 weeks later.	Repeat if necessary	.....	Cover foliage well. Gather and burn leaves in fall to destroy leaf parasites.
	Mildew and wilt .....	.....	.....	.....	.....	.....	
Celery	Leaf spot or leaf blight.	Bordeaux I.....	On young seedlings	Repeat on seedlings	Before or after transplanting ...	2 weeks later.....	Keep leaves well covered in plant bed with mixture.
	Root rot.....	Drain soil .....	.....	.....	.....	.....	
Chard	Leaf spot....	See beet leaf spot	.....	.....	.....	.....	.....
Cherry	Leaf spot and mildew ...	Bord. II or No. 9.	When leaves are unfolding	2 weeks later.....	2 or 3 weeks after second .....	.....	First after blossoming. Often necessary to treat repeatedly after crop is gathered.
	Rot	Bordeaux I & II.	Before blossoming I	After blossoms drop II on fruit.....	2 weeks later II on fruit	2 weeks later II, 3 or 4.....	
Aphis .....	.....	Nicotine sulphate and soap suds..	On first appearance of aphids...	.....	.....	.....	Difficult to reach aphids. Use 1 lb. of soap to 50 gal. of solution.
	Cherry slug..	Arsenate of lead in Bordeaux I or self-bolled lime-sulphur	After fruit harvest when slugs appear	Repeat if slugs remain .....	.....	.....	

SPRAY CALENDAR—Continued

What to spray	For what to spray	With what to spray	When to spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Cherry	Curculio	Arsenate of lead in Bordeaux I & II or in self-boiled lime - sulphur with soap added 14 or 18.....	Before blossoming in I.....	As blossoms dry up in II.....	1 week later in II.	.....	Avoid strong solutions. Do not use other arsenicals than arsenate of lead.
	San Jose scale		Before buds open..				
Chrysanthemum	Leaf spot....	Bord. II or $\frac{1}{2}$ of 5	July 1.....	2 weeks later.....	Repeat if necessary		
Cucumber ...	Anthraxnose	Bordeaux I.....	When plants begin to vine.....	2 weeks later.....	2 weeks later.....	2 weeks later.....	Repeat as necessary.
	Downy mildew	Bordeaux I.....	July 25 to Aug. 1.	8 to 10 days later.	8 to 9 days later.	8 days later.....	Repeat at weekly intervals.
	Root rot.....	See soil treatment	After first blossoms	10 days later.....	2 weeks after 2nd	2 weeks after 3rd.	Apply to fruit carefully.
	Spot of fruit.....	Bordeaux I.....	Pull out and burn infected plants.	.....	.....	.....	Rotate crops. See Rand*
	Nematodes ..	See soil treatment	Soon as plants appear	Week later.....	Week after second.	Week after third..	as to Bordeaux spray. Week after fourth.
	Willt	See soil treatment					
	Cucumber beetle.....	Arsenate of lead in Bordeaux I. Or sprinkle and wash freely with tobacco dust					
Currant	Leaf spot....	Bordeaux I.....	As leaves are unfolding	2 weeks later.....	2 weeks later.....	2 or 3 weeks later.	Fourth necessitates washing fruit.
	Plant bug....	Kerosene emulsion or nicotine sulphate	May	Early in June if necessary.			

*Rand, F. W. and Enlow, Ella M. A., *Transmission and control of the bacterial wilt of cucurbits*, Jour. Agr. Research, U. S. Dept. Agr. 6, No. 11.

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Currant	Rust	Destroy plants...	.....	.....	.....	.....	Rust on Ribes alternate stage of white pine blister rust
	San Jose scale	Lime-sulphur or 18	As with the apple	In spring as with apple	.....	.....	Look for worms on under side of lower leaves first
	Worm	White hellebore or arsenate of lead	When worms first appear. Arsenate of lead when in bloom	In 3 or 4 days repeat	Repeat as second.	.....	
	Bacterial blight	Remove and burn	.....	.....	.....	.....	
Egg plant	Canker	Cut and burn.	.....	.....	.....	.....	See ash canker. These fungi mature spores on fallen leaves. Hence gather and burn diseased leaves in fall
	Leaf spot and black spot.	Bordeaux I	When leaves are half grown.	3 weeks later.	.....	.....	
	Powdery mildew	Lime-sulphur or Bordeaux	With first appearance of mildew in mid-summer.	3 weeks later.	.....	.....	
	Leaf beetle.	See potato	.....	.....	.....	.....	Repeat every 3 weeks until disappearance
Gooseberry	Lecanium scale	As maple for ter-rapin scale	.....	.....	.....	.....	
	Leaf beetle.	Arsonate of lead, 1 lb. to 10-15 gal., also bands of burlap and tan-glefoot; band below	When larvae appear	.....	.....	.....	
	Leaf spot	Bordeaux I	As currants with leaf spot	As currants with leaf spot	As currants with leaf spot	As currants with leaf spots	Bordeaux coats fruits if used for third. Sodium sulphide may be substituted for 7
	Mildew	Bordeaux I or 7.	Before leaves open	After blossoming	Potassium sulphide 2 weeks later.	.....	
	Rust	See currant	Destroy diseased plants	.....	.....	.....	
	Worm	White hellebore or arsenate of lead	As on currants	.....	.....	.....	

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Grape	Anthracnose.	Bordeaux I	Just before buds open.	Just before blossoming.	Just after fruit has set.	10 days later, Bordeaux	
	Berry moth.	Arsenate of lead with Bordeaux	4 to 7 days after bloom.	10 days after fruit has set.	Aug. 3 to 12.		Use 2 lb. soft soap to 50 gal.
	Downy and powdery mildew.	If plus soap, Bordeaux I or 6.	Just before blossoming.	After fruit has set.	10 to 15 days later.		
	Necrosis.	Bordeaux I.	In early spring coat vines and trunks well.	Repeat with next rot spray.			
	Rot.	Bordeaux I or 6 and 3 or 4.	Just before blossoming. Bordeaux I or 6.	Just after fruit has set, 1 or 6.	7 or 8 days later.	Bordeaux I or 6	Follow by two or three sprays with am. cop. carbonate.
Horse Chestnut	Leaf hopper.	Nicotine sulphate or 18.	Before young can fly.				Repeat treatments at short intervals until insects are exterminated.
	Rose bug.	Arsenate of lead, 6 lb. and glucose, 1½ gal in water, 50 gal.	Soon as bugs appear.	2 or 3 days later.	1 week later.		Continue at intervals of 1 week or oftener as long as necessary.
	Leaf blotch.	Bordeaux I or dust spray.	When leaves are half grown.	2 weeks later.			Mixture of 90 parts fine sulphur and 10 parts powdered arsenate of lead successful dust.
	Leaf hopper.	Tobacco decoction or dilute kerosene emulsion.	As soon as noticed, before insect acquires wings.	Repeat first 10 days later.			
	San Jose scale.	Lime-sulphur or 18.	As for apple.				
Japan Quince.	Rust.	Cut out cedar apples.	As soon as seen, better in fall.				Better destroy cedars near commercial apple orchards.
Lettuce.	Downy mildew.	Keep houses cool and avoid water on leaves.					Warmth and moisture about plants are dangerous. Subirrigation gives good conditions.
	Rosette.	See soil treatment.	Gather diseased leaves.				
	Rot or drop.						

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Maple	Anthraxnose .	Bordeaux I	When leaves are half-grown . . . .	.....	.....	.....	May usually control by gathering and burning leaves in fall
	Borers	Whitewash trunks	.....	.....	.....	.....	Keep trunks white-washed from early summer till fall, 2 or 3 applications
	Caterpillars .	Arsenicals	When seen . . . . .	.....	.....	.....	Mulching of great help to conserve water supply
	Leaf scorch..	Protect from drying . . . . .	.....	.....	.....	.....	
	Tar spot ...	Burn diseased leaves	.....	.....	.....	.....	
Muskmelon ..	Terrapin scale	Kerosene emulsion, 1 part to 6 or 8 parts water or miscible oils, 1 part to 12 parts water	When buds are swelling	.....	.....	.....	
	Anthraxnose .	Bordeaux I and II	In seed bed or when plants begin to vine, Bordeaux I	2 weeks later Bordeaux I	2 weeks later . .	2 weeks later	Repeat as necessary; use II very early
	Cucumber beetle	Same as for cucumbers	July 25 to Aug. 1	8 to 10 days later	8 or 9 days later.	8 days later	
	Downy mildew ...	Bordeaux I	When plants begin to vine	3 weeks later	3 weeks after second	2 weeks after third	Repeat same
	Leaf blight..	Bordeaux I	Pull out and burn wilted plants	.....	.....	.....	
Oak	Wilts	See soil treatment	.....	.....	.....	.....	
	Anthraxnose .	Bordeaux I or 14	Just as buds are opening I or 14	2 weeks later if necessary . . . . .	.....	.....	Bordeaux spraying is aid to canker control; not complete remedy
	Branch canker ...	Cut out and burn.	.....	.....	.....	.....	Destroy fallen leaves that have disease
	Powdery mildew	Bordeaux when leaves are half-grown . . . . .	.....	.....	.....	.....	
	Caterpillars .	See maple	.....	.....	.....	.....	

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Onion	Smut and storage rots	See seed treatment					
Pea	Blight and mildew ...	Bordeaux I	Just before bloom	2 weeks later	Repeat if needed		
Peach	Leaf curl ...	Bord. I, 5 or 14..	In fall, or March, Bord. I, 5 or 14	As buds are opening, I, 5 or 14	Just after calyx drops, Bord. II.	Not required (nor 3d) if others are well done	
	Little peach.	Prune severely or dig out					
	Pustular spot	Bordeaux II or 9.	Just after calyx drops	2 weeks after first drops	2 weeks later		Cover fruit well
	Rot	Bordeaux I, 14 and 9 or Bordeaux II	As buds are swelling, I or 14....	Just after calyx drops, 9 or Bordeaux II	3 or 4 weeks later, 9	As fruit begins to color, 9	Every 7 to 10 days repeat. Destroy all mummies. Three may be used for fourth 9 is safest remedy on foliage
Pear	Scab	Bordeaux I, 5, 9 or 14	As buds are swelling, Bordeaux I, 5 or 14....	Just after calyx drops, 9 or Bordeaux II	2 weeks later, 9 or Bordeaux II	Repeat third	
	Yellows	Cut out and burn					
	Bud moth...	Arsenicals in Bordeaux I	With opening of buds				Use only half usual amount of poison
	Curculio	Arsenate of lead..	Arsenate of lead 10 days after bloom falls				
Pear	Terrapin scale San Jose scale	As on maple Lime-sulphur	In late fall or early spring				
	Leaf blight and leaf spot	Bordeaux I or 6 and 3 or 4....	Before blossoms open	2 weeks later, I or II	2 weeks after second, 3		Bordeaux may make russet fruit. Use 3 for 3d, not Bordeaux after 2d. Fear in foliage very badly injured by lime-sulphur solutions

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Pear	Scab	Bordeaux I	When leaves are half-grown	After blossoms drop			See apple See apple
	Blisters	Kerosene emulsion, miscible oil or lime-sulphur ..	When buds begin to swell in spring	When leaves have fallen in autumn ..			
	Bud moth....	Arsenicals in Bordeaux I	With opening of buds				
	Canter worm ..	Arsenate of lead ..	As with the apple ..	Same as first.....			
	Codling moth ..	Arsenicals in Bordeaux I					
	San Jose scale ..	Lime-sulphur or 18 ..	In winter or early spring ..	Repeat if slugs remain ..			
	Slug	Arsenicals in Bordeaux I or dust with air-slaked lime ..	When slugs appear ..				
	Black knot....	Cut out and burn, Dec. to Feb....					
	Pockets or bladders ..	Bord. I or lime-sulphur	In March, I or 14 ..				
	Rot	Bordeaux I, also 3; No. 9 on Am. and Jap. varieties ..	As buds are swelling, I or 14....	Just after calyx drops, I or 6....	3 or 4 weeks later, I or 6.....	As fruit begins to color use 3.....	
Poplar or Cottonwood	Shot-hole fungus	Bordeaux I or 6, also 9	When leaves are half-grown	3 weeks later.....	3 weeks later if needed	No. 9 on Am. and Japanese varieties	Formation of knots prevented when Bordeaux is used for sprays of peach Every 7 to 10 days repeat 4th; useless to spray for rot unless mummies are destroyed
	Curculio	Arsenate of lead in Bordeaux I or self-boiled lime-sulphur	With starting of buds	Just after calyx drops	5 days later.....		Protect to end of season
	Aphis	Nicotine and soap or soap, 1 lb. to 6 gal.	On appearance of aphids				Destroy stung plums in addition
	San Jose scale ..	Lime-sulphur or 18 ..	In late fall or early spring ..				
	Cottonwood leaf beetle..	Arsenate of lead, 1 lb. to 10 gal. water	Spray at intervals of 10 days until danger is checked ..				
	Leaf spot and rust	Gather and burn leaves					Control measures seldom needed
	Black leg....	See seed treatment					
Potatoes							

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Potatoes	Early blight..	Bordeaux I	When plants are 6 in. high	2 weeks later....	2 weeks later....	2 weeks later if needed	Seed selection desirable
	Fusarium blight	See seed treatment					
	Late blight..	Bordeaux I or 6..	July 15 to 20....	2 weeks later....	2 weeks later....	2 weeks later	Repeat at 2-week intervals until crop is mature
	Rosette	See seed treatment					
	Blister beetle	Whine-oil soap or dilute chloro-naphtholeum	When beetles appear	Repeat if necessary			Use 1 lb. soap to 6 gal. of water
	Colorado beetle	Arsenicals alone or in Bordeaux I.	When beetles or young appear..	As for first....	As for first....		Arsenate of lead, 5 lb. to 50 gal. of water
Quince	Flea beetle..	Bordeaux I or 6 comb. with 20..	When beetles appear	Repeat if necessary	As for first and second		
	Leaf spot ...	Bordeaux I and 6	When leaves are half-grown		2 weeks later, 1 or 6	2 weeks later	First should come before blossoms open
	Fruit and leaf spot	Bordeaux I	Just before blossoms open	After blossoms drop	2 weeks after second	2 weeks later	
Radish	San Jose scale	Lime-sulphur or 18	In late fall or early spring ...				
	Club root ...	See soil treatment					
Raspberry and Black-berry	Maggot	See soil treatment					
	Anthraxnose .	Bordeaux I and II	Before leaves open use I	II on canes 6 in. high	Repeat 2d 1 week later		Keep spray from leaves of bearing canes
	Cane blight..	Bordeaux II	On young canes just before blooming of old.	Immediately after fruit is gathered	3 weeks after 2d.		Remove old canes at once after picking and spray new canes very thoroughly
	Leaf spot...	Bordeaux I	When leaves are half-grown	2 weeks later....	2 weeks later		
	Rust	Remove diseased stools and burn.					Be prompt in destroying diseased stools
Rasp. byturnus		Arsenate of lead..	Before beetles appear about May 1	May 10 to 15....			Cultivate thoroughly in fall to destroy and expose pupae
	Saw fly.....	Pyrethrum, bell-bore or arsenate of lead	As for currant worm. Arsenate of lead as soon as leaves are out	In 3 or 4 days repeat			

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Rose	Leaf spot...	Bordeaux 1 or ½ of 5.....	With first appearance of fungus.	2 or 3 weeks later	Repeat if necessary	.....	Bordeaux shows on plants When Bordeaux is used for leaf spot, other spray may not be needed
	Mildew	Lime-sulphur as for apple or No. 9..	With first appearance of mildew.	2 or 3 weeks later	3 weeks later if needed .....	.....	
Salsify	Nematodes ..	See soil treatment	On appearance of slugs	Repeat if needed			
	Slug	Arsenicals in Bordeaux II or hellbore					
Squash	Cystopus ...	Remove and burn diseased parts..					Pick bugs and egg-masses from leaves. Trap bugs by laying shingles beneath vines and collecting insects the following morning
	Cucumber beetle	Same as for cucumber .....	.....	.....	.....	.....	
Strawberry ..	Squash bug..	Hand picking .....	.....	.....	.....	.....	
	Leaf spot...	Bordeaux I, 6 or 9	On new growth after crop	2 or 3 weeks later			

SPRAY CALENDAR—Continued

What to Spray	For What to Spray	With What to Spray	When to Spray				Remarks and Cautions
			First Spraying	Second Spraying	Third Spraying	Fourth Spraying	
Tomato	Anthracnose ..	Bordeaux I	Soon after fruit begins to set...	3 weeks later....	3 weeks later....	3 weeks later....	Selection of resistant strains advised. See cabbage yellows
	Fusarium wilt	See soil treatment Rotate crop	3 weeks after fruit transplanting ..	3 weeks after first	3 weeks later....	3 weeks later....	
	Leaf blight..	Bordeaux I	Watch carefully and ventilate well	3 weeks after first	3 weeks later....	3 weeks later....	Deficient ventilation makes this serious
	Mosaic disease (in greenhouse) Point rot....	Avoid too high temperatures at night	Watch carefully..	3 weeks after first	3 weeks later....	3 weeks later....	
Tree seedlings (conifers) ..	Sclerotium wilt	Remove and burn diseased plants. Hand picking or clip in two with grass or sheep shears	Watch carefully..	3 weeks after first	3 weeks later....	3 weeks later....	Danger in refuse from diseased houses
	Tomato worm ..	Remove and burn diseased plants. Hand picking or clip in two with grass or sheep shears	Watch carefully..	3 weeks after first	3 weeks later....	3 weeks later....	
	Damping off.	Slaked lime dust 10 parts, powdered copper sulphate 1 part, thoroughly mixed and screened	Dust freely on young seedlings in afternoon ..	Repeat first.....	Repeat first.....	Repeat first.....	Very strong Bordeaux mixture as 6-6-50 may be useful in bad, advanced cases.
	Downy mildew	Spray with Bordeaux mixture	Upon appearance of disease	2 or 3 weeks later	2 or 3 weeks later	2 or 3 weeks later	
Turnip	Anthracnose ..	Bordeaux II	When plants begin to vine	3 weeks after first 3 weeks later	3 weeks after first 3 weeks later	3 weeks after first 3 weeks later	Bordeaux I, some danger.
	Cucumber beetle	Same as for cucumber	When plants begin to vine	3 weeks after first 3 weeks later	3 weeks after first 3 weeks later	3 weeks after first 3 weeks later	
	Downy mildew	Bordeaux II	July 25 to Aug. 1	8 to 10 days later.	8 or 9 days later..	8 or 9 days later..	As on muskmelons
	Leaf blight..	Bordeaux II	As disease appears on muskmelons.	Repeat as on muskmelons ..	Repeat as on muskmelons ..	Repeat as on muskmelons ..	
Watermelon ..	Anthracnose ..	Bordeaux II	When plants begin to vine	3 weeks after first 3 weeks later	3 weeks after first 3 weeks later	3 weeks after first 3 weeks later	Bordeaux I, some danger.
	Cucumber beetle	Same as for cucumber	When plants begin to vine	3 weeks after first 3 weeks later	3 weeks after first 3 weeks later	3 weeks after first 3 weeks later	
	Downy mildew	Bordeaux II	July 25 to Aug. 1	8 to 10 days later.	8 or 9 days later..	8 or 9 days later..	As on muskmelons
	Leaf blight..	Bordeaux II	As disease appears on muskmelons.	Repeat as on muskmelons ..	Repeat as on muskmelons ..	Repeat as on muskmelons ..	

SEED AND SOIL TREATMENTS

Seed or Plant	For What Treated	Treatment	Method of Treatment
Aster	Fusarium wilt.....	Sterilize soil with steam	Apply steam as under cucumber.
Bean	Anthraxnose	See spray calendar.....	
	Rhizoctonia	Sterilize soil.....	Sterilize soil with steam as under cucumber, lettuce, etc., or drench with formaldehyde.
	Sclerotinia	Sterilize soil.....	As for rhizoctonia with steam; formaldehyde of doubtful value.
	Weevil	Bisulphide of carbon...	Submit to fumes for 24 hours in air-tight vessel or chamber, or treat the same as for peas.
Beets, sugarbeets.	Black rot.....	Formaldehyde	Use $\frac{1}{4}$ pint formaldehyde in 6 gallons of water; soak seed 20 minutes; wash in pure water; dry or plant at once.
	Damping off.....	As for lettuce rosette	
Begonia	Nematodes	Sterilize soil with steam	Disinfect soil to be used by heating with steam as described under cucumbers.
Cabbage, cauliflower and kohlrabi	Black leg.....	Seed treatment.....	Treat seed with formaldehyde $\frac{1}{4}$ pint in 6 gallons water; soak 20 minutes; wash in pure water and dry or plant at once. Change beds each year. Reject diseased plants. (See Bulletin 228.)
	Black rot.....	Seed treatment.....	Treat as for black leg. Rotate beds and crops.
	Club root.....	Quicklime on soil.....	Apply stone lime (quicklime) preferably ground lime, before planting, at rate of 80 bushels per acre and work into the soil with suitable tools.
	Fusarium wilt or "yellows"	Place seed beds on new soil each year. Rotate seed crop.....	"Yellows" is chiefly transmitted in the soil. Rotation of the crop is necessary. Resistant selections now available. See Ohio Agr. Exp. Sta. Bul. 228 and Mo. Bul. II (Feb. 1917), No. 2.
	Maggot	Bisulphide of carbon, tobacco dust or carbolic emulsion or solution of heliebore.....	Make hole in soil near roots; pour in about a teaspoonful of bisulphide of carbon and fill holes with soil. Cover soil around stalks freely with tobacco dust once per week. Dilute one of the carbolic or coal tar sheep dips with 100 parts or more of water and pour $\frac{1}{4}$ pint around the root after removing the earth from one side. Apply decoction of heliebore in same manner. Use non-infected soil for seed beds and cover with screens.
	Nematodes in hot-house	Sterilize soil with steam	See cucumber.
Corn	Dry rot and mold. Ear rots.....	Reject diseased seed ears Reject diseased seed ears	This fungus spreads badly in continuous corn growing. See Bulletin 214. Same as dry rot of corn.

SEED AND SOIL TREATMENTS—Continued

Seed or Plant	For What Treated	Treatment	Method of Treatment
Cucumber	Nematodes in hot-house	Sterilize soil with steam	Sterilize soil with steam by perforated pipes, high pressure 35 pounds 1 hour, 75 pounds $\frac{1}{2}$ hour, or low pressure in subdrains 4 to 5 hours or inverted pan until soil is heated to 200° F. at depth of 12 inches. See Ohio Agr. Exp. Sta. Cir. 151.
	Stink bug.....	Hand-pickling eggs.....	Pick off patches of brownish eggs on leaves and burn. Go over the vines 2 or 3 times per week.
	Root rot.....	Drench soil with formaldehyde	Drench soil with formaldehyde, 3 to 4 lb. to 50 gal. of water for preceding lettuce crop.
	Wilts	Sterilize bed soil with steam	Method as for nematodes. See Ohio Agr. Exp. Sta. Cir. 151.
	Wilts	Sterilize bed soil with steam	Method as for nematodes. See Ohio Agr. Exp. Sta. Cir. 151.
Egg-plant	Wilts	Tobacco smoke.....	Smudge for several hours by burning tobacco stems or leaves in closed greenhouse or use nicotine fumigant.
Lettuce	Rosette, root rot..	Sterilize soil with steam or drench with formaldehyde	Steam as above or drench with formaldehyde 2 to 4 lb. where trouble follows with cucumbers 3 to 4 lb. to 50 gal. of water. 1 gal. solution to each sq. ft. of surface. Two weeks must elapse before setting plants. See Ohio Agr. Exp. Sta. Cir. 57 and Cir. 151.
	Drop or rot.....	Steam soil	Turn number of toads in greenhouse to devour slugs. Use poisoned bran bait recommended for cut-worms. Much ground quite freely with ground lime or with soot.
	Slugs and snails..	Toads, poisoned bait, lime, soot.....	
Muskmelon	Wilts	As for cucumber wilts	
Onion	Smudge	Use formaldehyde as for onion smut.....	Sow seed with formaldehyde drip as for onion smut; rotate onions with other crops.
	Smut	Use formaldehyde or ground quicklime. Plant other crop. Use sets or transplanted seedlings	Use formaldehyde solution 1 lb. to 30 gal. of water sprinkled on seed in contact with soil and cover at once, or better sow with drill and drip attachment, the solution falling with the seed. Or apply ground quicklime at the rate of 75 to 125 bushels per acre just previous to seeding on freshly plowed land, and stir into soil. (See Ohio Agr. Exp. Sta. Bul. 131.)
	Storage rots.....	Disinfect with formaldehyde gas.....	Fumigate to disinfect the dry onions, with formaldehyde gas in inclosed piles of slat crates for 24 to 48 hours.

SEED AND SOIL TREATMENTS—Continued

Seed or Plant	For What Treated	Treatment	Method of Treatment
Pea	Anthracnose (blight) Weevil	Spray the growing crop with Bordeaux Heat carefully in oven.	Keep down infection of seed through spraying of plants. See Spray Calendar. Submit seed to heat of 125° F. for 1 hour, stirring to prevent uneven heating, at end of which time all weevil will be dead and germination will not be injured.
Potato	Black leg. Fusarium wilt, dry rot	Reject tubers of diseased hills at harvest Cut away slight infection of seed tubers—then soak in corrosive sublimate. Rotation of crops	Treat seed tubers with corrosive sublimate as for scab to kill adhering germs. After rejecting badly diseased tubers, cut off slight infection and treat with corrosive sublimate as for scab. Rotate the potato crop. (See Ohio Agr. Exp. Sta. Bul. 229.)
	Scab, powdery scab Rosette (rhizoctonia)	Soak uncut seed in corrosive sublimate.... Soak seed in corrosive sublimate as for scab	Soak seed for 1 hour in corrosive sublimate; then dry and plant on scab-free soil; formaldehyde less effective. See Handbook of Plant Diseases. Also Ohio Agr. Exp. Sta. Mo. Bul. I (Jan., 1916), No. 1, p. 10.
Radish	Club root..... Damping off.....	Quicklime on soil..... Drench beds with formaldehyde or sterilize with steam	As for cabbage. See tobacco bed treatment.
Rape—Rutabaga	Black rot.....	Formaldehyde	Treat seed with formaldehyde as for cabbage.
Roses	Nematodes in hot-house	Sterilize soil with steam	Heat soil with steam as described above; thoroughly disintegrated soil from sod 1 year old or more is less dangerous. Limewater stimulates affected plants but is not a remedy.
Sweet Potato ...	Black rot and stem rot	Formaldehyde	Soak or fumigate seed roots as for potato scab; discard old diseased hotbeds; drench slightly diseased beds with formaldehyde as for lettuce and tobacco. Then set plants on new soil.
Tomato	Nematodes in hot-house	Sterilize soil with steam	As for roses and cucumbers above.
	Point rot in hot-house	Mulch or subwater....	An insufficient water supply seems favorable to development of point rot of green tomatoes.
	Rhizoctonia	Same as for tobacco beds	
	Fusarium wilt....	Sterilize bed soil with steam	Sterilize beds with steam as for cucumbers and tobacco. Transplant plants into new soil. Avoid succession of crops of tomatoes.
Turnip	Black rot..... Club root.....	Treat seed..... Quicklime in soil.....	Formaldehyde seed treatment as for cabbage. As for cabbage and cauliflower. Avoid succession of these crops.

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