Gardening
For Health and Happiness
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GARDENING FOR HEALTH AND HAPPINESS
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copy one
DEDICATED to

ARMAND MICHAUD who first used the tools

and to the

WAR VETERANS who have found peace

and happiness in their little
gardens.
Foreword

This book is prepared primarily for the blind who love nature and gardens, and those who wish to add more vegetables to the world's great storehouse.

There have been several books written on the scientific treatment of the vegetable garden on large commercial tracts, but this book is planned for the one who wishes to get health and happiness from the small home garden. This is also for the teacher who wishes to help the blind to use the tools, to know how to manage the soil, how to apply plant food and in general how to plan and cultivate their own vegetable garden.

The general advise is applicable to any section but the dates on which to put these principles into operation vary according to the latitude and altitude of the section of the country. The gardener must also be governed by the variation in seasons.

The culture of each individual crop has not been discussed in this little book but may follow. One of the best teachers along this line is practical experience.

I am especially indebted to E.L.D. Seymour, garden editor of The American Home for extracts from the November 1945 number of the magazine, and to Nelson Coon for his excellent suggestions on teaching gardeners at the Perkins Institution and Massachusetts School for the Blind, Watertown, Mass.

Several quotations have been taken from "Open Letter to My Newly Blinded Friend," by Joseph F. Clunk, U.S. Office of Education, Washington, D.C. Extracts have been taken from Practical Gardening and from The Handbook for Practical Farmers by Hugh Findlay, D. Appleton Century Company, New York, N.Y.

I am indebted to many blind gardeners who have demonstrated the practical use of the garden tools in Detroit, Michigan, Watertown, Massachusetts and the Naval Hospital, Philadelphia, Pennsylvania.

Hugh Findlay
Armed with new strength, no longer blind,
Within the cradle of his mind
He sows the seed of living light
Which lifts a lamp against the night:
For in his hand, like April's wing,
He holds the new breath of the Spring:
He feels the seed cry out for birth
Deep in the darkness of the earth;
He knows the soil's familiar things,
And feels their quiet beckonings
Of bud and root, of rain and sun,
And knows that life and God are one.
Introduction

Those of us who can see how straight are the furrows we made for our rows of beans or how great is the depth to which we spade, would find it impossible to do our gardening in total darkness.

While we, who have found healing of body, mind and spirit and happiness in our heart as we have worked in our gardens have rejoiced at the "garden therapy" our government, both federal and state provides for the blind. Most of us have assumed that the blind could never do gardening efficiently and happily.

A few years ago a friend of mine asked me to build a garden for the blind at the Institute for the Blind at the Grand Concourse and Kingsbridge Road, Bronx, New York. I felt the whole project was truly for the trustees and directors, that they might rest their minds on something beautiful to aid them in their depressing task of looking after these people living in the dark. That's where I was absolutely mistaken.

On the exercise path which was in the rear yard, surrounded by a high fence, walked a girl, Georgia. She had a bright smile, radiating cheerfulness and her voice showed that she was full of seeing, although she was totally blind. After a few paces she would stop and smell something which she held in her hand, then walk on a few paces and repeat the performance, searching, as though it were a habit. I asked her what she had in her hand and she showed me a dead, withered rose. I remembered that "a rose is heaven's utterance of a kiss," and this girl was dreaming memories about this little bit of withered beauty.

We made a garden! It was eighteen inches wide and bordered the path. The gardeners were guided by galvanized pipe. Then we placed roses on the walls, fence and in individual beds. We used plants with different fragrances, such as geraniums in variety. Of course we used the braille system of identification at first, but it was not long before those who walked there knew every rose and plant by its fragrance. They did their own planting,
Introduction - (Cont.)

thinning, and weeding in the garden. Every fall the girls planted the bulbs, and got them right side up. This took very little teaching. They could see more through their fingers than many people do through their eyes. It was only a short time until any one of them could stand in any part of the garden and direct others to various plants. The space was too small and inadequate for raising vegetables.

While on the battlefields of France during the first world war, I dreamed of these blind boys being able to come close to the soil and to know its healing and happiness. As Frank Eyre, a blind English gardener once said, "I should like to insist on the value of gardening as an occupation for the blind. I consider it one of the best and happiest ways of finding abundant life."

When our boys started to come back from the battlefields of the second world war with the light of day shut out of their eyes, I found a way to have the garden tools made. At first I got in touch with Dr. Gabriel Farrell, Director of the Perkins Institution and Massachusetts School for the Blind, Watertown, Massachusetts and with his good cooperation was able to take the tools to the Institute where a young man by the name of Armand Michaud tried them out. I was fortunate in meeting Michaud, who is a teacher of the blind and himself a gardener who not only had an excellent outlook on life but a true vision of happiness in his soul, though he had been blind for many years. He took hold of the tools and carried them through to success. I am deeply grateful for the cooperation of Mr. Nelson Coon, a teacher of gardening for the blind, part blind, and deaf blind of all ages, who says: "The blind can do anything they want and have the will to do. It all depends on themselves and their mentality. Gardening is an especially desirable activity because it takes them out into the sunlight and overcomes a natural tendency to stay indoors and miss out on proper exercise. But do not think of it as a "last resort," the only thing a blind person can do. Nor is it the thing for every blind child or adult any more than it is the thing for every seeing person. However, it is peculiarly adapted to their specialized senses and needs. It provides the feel of the soil and of plant textures, the smell of the earth and various flower
Tightening the wire with the tee-rod placed at each end of the row. No. 1

Attaching the rake to the wire No. 3

Attaching the hoe to the wire No. 2
Raking, following the wire No. 4

Armund Michaud memorizing the Norcross Weeder . . . . . No. 5

Attaching the Norcross Weeder to the wire . . . . . . . No. 6
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fragrances, the sound of windblown foliage. And, because gardening is never easy, it offers a challenge; successful accomplishment becomes a triumph over odds and helps build confidence, assurance, independence." That last is a point stressed by Joseph F. Clunk in his remarkable "Open Letter to My Newly Blinded Friend" (U.S. Office of Education) he says: "Remember that the loss of sight is but the loss of a convenience. Since you still have vision and a normal mind, this extra burden is but a challenge and an opportunity to prove you are a superior contender."

I am also deeply indebted to Professor Percy M. Lowe who was for twenty years an instructor in the College of Agriculture at the University of Minnesota and for some time instructor in agriculture and gardening and rehabilitation aide to the blind at Old Farms Convalescent Hospital, Avon, Connecticut, the training center for war-blinded veterans. He is one of America's good gardeners, though he is totally blind.

The vegetable and flower garden at the U.S. Naval Hospital, Philadelphia, Pennsylvania, where the garden tools are used is a credit to the interest and cooperation of Lieutenant (jg) Faith Kock and Cleveland N. Hastings Ph M 3/c, who have spent considerable time in directing the blind veterans in gardening.

Secure landmarks in the garden and soon you will learn to interpret the location of certain crops, north and south, east and west subconsciously and automatically. You will find your ability to detect objects and that the classification of growing things will vary under certain conditions.

Some blind find that brilliant sunshine and strong winds dull the perceptive ability and at first have difficulty in locating certain parts of the garden, but take courage because there is a vast difference between the exercise of caution and the domination of fear. As Emerson once said: "He has not learned the lesson of life who does not every day surmount a fear."

These men whose souls have been, as it were, shut
Introduction - (Cont.)

out from the light, have cheerful natures full of the spirit of light. No other poem more nobly expresses the situation than Edwin Markham's:

They drew a circle to shut me out
A thing to despise and loathe and flout
But love and I had the wit to win
For we drew a circle that took them in.

A blind gardener being shown how to force the tee-rod into the soil before turning it to tighten the wire. Use the ankle against the wire to guide the worker.
Checking on how close to the plants he may use the Norcross Weeder without injuring the foliage. No. 7

Cultivating with the Norcross Weeder. No. 8
Letter from Armand Michaud, Perkins Institution and Massachusetts School for the Blind, Watertown, Massachusetts, the first blind man to use the garden tools in America. His fine and noble spirit have done much to encourage the use of these tools in many places:

Dear Professor Findlay:

In answer to your cordial letter may I say that I was born in April 1909 at Fall River, Massachusetts. My parents are French-Canadian. Dad was born in Aroostook, Maine; mother in Quebec. I am the oldest of four boys and a girl.

In the spring of 1919 we moved to a suburban acreage in North Dartmouth on the Fall River - New Bedford state highway. There, after the most delightful and precious summer of my boyhood, just at the moment father was contemplating buying this little paradise of birds, woodland, cornfield, and berry patches, I unwittingly caused the explosion of two percussion caps, carelessly left behind by the previous occupants. The result was total blindness, the loss of the ends of six of my fingers, a long hospitalization and the return to the now drab existence of the city dweller, this time, in New Bedford. Nature's beautiful window was boarded up! The loving care of my family did not dispel the dark that engulfed me, nor the inactivity that shackled my limbs and dispirited my heart.

However, the training I received at Perkins Insti-
tution during the twenties liberated me in soul and body. Then, through the love and generous aid of Mrs. William F. Potter of New Bedford, I started my college career at Boston University where I majored in English and obtained an AB in 1935. The following year Dr. Farrell appointed me to the teaching staff of Perkins. Here I have been teaching such subjects as braille, English, French and Latin. In the meantime I married and pursued an MA in French which I obtained from the same University in 1941.

My hobbies have been several: the appreciation of fine music, intermittent trumpet practice, carpentry and in recent years, victory gardening both at my home and at Perkins.

Thus in the past twenty-five years since my most unforgettable summer of 1919, I have sought intellectual and physical independence, both in my interest in the fine arts and letters and through the manual activities for, didn't Voltaire admonish: "Il faut cultiver son jardin." In this way I may proclaim my paradise regained some day.

Yours cordially,

Armand Michaud
Soil is placed in the palm of the hand and with the fingers of the other hand the type of soil is easily seen. A slight movement of the hand will aid in detecting the type of soil. The gardener is here seeing sand through his fingers.

Sometimes the gardener can tell by the weight or smell, but it is always safe to test the soil by the tips of the fingers. The above gardener is seeing clay for the first time. Note how tense the fingers are. When the gardener sees the soil clearly usually a smile comes to his face and his voice is full of confidence.
CHAPTER I

SOIL

God breathed the breath of life into the soil and it smiled back at its Creator in the form of a flower.

The Soil

The soil with its enchanted song
Awakens spring when life is young,
And all the garden with delight
Forgets the shadows of the night.

The green things feel God's boundless hand
Guiding their lives for future dreams
Of beauty...truth; from dust and clod,
The soil awakens knowing God.

The soil remembers long past springs
When south winds, and warm friendly rain
Coax seedlings reaching for life's power
Within the year's delicious hour.

God's hand feels the heartthrob in the deep places of the earth and out of the dust He brings health and beauty. His heart is glad when the first green things push up in Spring and the first primrose comes to bloom, when the fruit takes form in Summer, when the trees turn golden in Autumn and when the snow whitens the green boughs in Winter.

There are many problems to be considered in this dynamic mass of everchanging material called the Soil, before we plant our seed in the garden. Out of this soil comes all beauty and all beauty must return to the soil. To get the most out of our garden we must assist nature by first preparing the soil to support growth with moisture and food. If it were possible for us to look at the root system of plants as we look at the stem, leaf and flower, we would see millions of roots searching in the soil for both food and moisture.
Soil may be classified as good and poor. A good soil is one that is capable of producing a satisfactory crop under favorable climatic conditions. Most of our soils are quite fertile and produce profitable crops when they are first brought under cultivation, but it is a matter of common experience that continued cropping with the same crop results in a loss of fertility as indicated by a steady decline in yields. Under proper systems of management, however, virgin soils may be made to retain their productive capacity indefinitely and old worn-out lands may be restored to permanent fertility by changing the crops to different places in the garden and by adding some fertilizer and organic matter.

The intelligent use and the proper management of the soil is based on an understanding of its composition and its structure. A good soil is composed largely of two parts: 1) the organic matter derived mainly from plants that have previously grown upon the land and that have become more or less decomposed, 2) inorganic matter derived originally from the rocks that have broken down to form the soil. Both the organic matter and the inorganic material play an important part in determining the fertility of the soil. Dark colored rich loam soils are usually well supplied with organic matter and one hundred pounds of muck or black soil holds approximately 142 pounds of water. It is usually a cool soil. A poor, light colored soil is usually deficient in organic material and the restoration of organic content constitutes one of the first steps in the restoration of fertility. One hundred pounds of sand holds approximately twenty-two pounds of water at a temperature of 70° F. This sandy soil may be greatly improved by adding decayed leaves which not only add a waterholding material, but also fertilizer. It is well in preparing this soil for gardening after you have applied the decayed leaves, to use lime (see Lime in chapter on Fertilizers).

In order to get the best results from your garden, the type of soil and its treatment as well as the varieties of vegetables best suited to the various kinds of soil should be considered, also the methods of treating the soil at different seasons of the year in order to get the highest production should be given careful attention.

Don’t try to work the soil too early in the Spring
or directly after a heavy rain. Whenever the soil is worked it should drop freely from the spade or "scour" of the plowshare. All soils should be made fine, not only on the surface but from eight to ten inches in depth before planting. Many gardens fail because the soil is poorly prepared. The soil is the bed in which the seed gives birth to new life and is finally the home of the plant. In order to have quality as well as quantity it is necessary to make this home comfortable for the plant by supplying moisture, air and sufficient food for growth. The foundation of success in gardening is therefore the proper preparation of the soil before planting.

The sod should not be stripped from the surface of your new garden. It is the most valuable kind of fertilizer, in that it not only adds plant food but changes the texture of the soil. Turn the sod under early in the spring so that it has a chance to decay before planting the seed. If the sod is turned over and the rough, large clods are left exposed to the elements, both the air and moisture will hasten decay and after a week the soil may be made fine in order to proceed with the garden operations. The more decaying plants you can incorporate into the soil in the form of straw in manure and sod the better chance the plants have during a drought, for this humus acts like a sponge in holding the moisture and if the surface soil is kept fine the moisture does not escape.

The ideal location and the ideal soil are exceptional, but we may approach the ideal by working for it. The southern slope is the best for early vegetables, since it gets the early morning sun and if the soil is of a sandy formation it warms up quickly. The northern exposure with a clay loam is best for late crops in that it keeps cool, and this is important for such crops as cabbage. A flat strip of land is not at all objectionable and if treated properly it may be made to produce regardless of the original type of soil.

CLAY. There are three different types of clay: blue, yellow and red, and no one of them is desirable if very stiff. If a heavy coating of straw manure is applied late in the fall and the soil is left in the rough clods after plowing or spading, the frosts and snows work wonders. The elements break up this stiff soil and early in the spring the soil is again worked over and made
Holds 56 lbs. of water and when properly drained has a temperature of 48°F, but when not drained the temperature drops to 33°F.

SAND. 100 lbs. of sand holds 22 lbs. of water at 70°F.

MUCK SOIL. 100 lbs. of muck holds about 142 lbs. of water.
fine. Adding well decayed manure in the fall is not generally advised because the available plant food will be dissipated and lost by spring, but the continual freezing and thawing of rough straw manure and the clods of clay will change the texture of the soil and make it very productive. Straw manure also prevents clay soil from running together and puddling in low places. Work the decayed manure into the first three or four inches of surface soil in the spring.

Coal ashes are not generally advisable even though they are sifted very fine. There is little or no plant food in them and if they are used in excess the soil dries out quickly and the plants suffer during the months of July and August. On the other hand, some clay soils have been benefitted by the use of a little ashes and air-slaked lime, worked into the soil in the fall.

Clay soil is cool and usually rich in plant food but it is only made available by continual cultivation, by the exposure of the soil particles to the elements and by adding horse, sheep and cow manures.

A loose clay loam is by far the best soil for cabbage, cauliflower, Brussels sprouts, kale and endive. If the clay is loamy and supplied with sufficient plant food, it may raise almost any garden crop except sweet potatoes, muskmelons and watermelons.

GARDEN LOAM. Garden loam is by far the most desirable type of soil in that it usually contains considerable humus. The particles are fine and therefore the air gets into it, so it may be worked early in the spring and a short time after a rain. It is always benefitted if left in the rough during the winter and heavily coated with manure in the spring. Have the soil free from stones and made as fine as possible. Do not neglect to cultivate often, simply because the soil is loose. All varieties of vegetables and fruits do well on a well prepared and well kept garden loam.

SAND. Sand is the poorest type of soil on which to make a garden for two principal reasons. First, it lacks plant food and secondly, it cannot retain sufficient moisture. Nevertheless if the sand is not too rough, it may be made to produce by applying three to four inches of horse manure where straw has been used for bedding. Work this into the sand in the fall and make another ap-
LEAF MOULD. When well decayed, leaf mould will hold from 100 to 300 lbs. of water per 100 lbs. of soil. The cellulose bacteria are a great benefit to plant growth.

GARDEN LOOM. 100 lbs. of soil holds approximately 43 lbs. of water at a temperature of 57°F.
plication in the spring and after a few years there will be added sufficient humus to make a really good garden soil. Nothing is better than to sow a crop of clover where there is sufficient plant food and moisture to support it and this is usually possible the third year after applying manure to the sand. After the clover reaches a height of six inches, spade or plow it into the soil. The clover supplies some of the much needed nitrogen as well as humus.

A sandy loam is the best soil for early crops of peas, beets, radishes, or string beans and is especially adapted to sweet potatoes, muskmelons and watermelons. These crops may be aided by the use of commercial fertilizers and a continual application of water during the dry months.

MUCK. Muck soil is seldom found in home gardens but it is sometimes introduced. It is a common mistake to think, because the soil is black, that it is rich in nitrogen because it is almost wholly made up of decayed and decaying vegetable matter which supplies available nitrogen if the soil is properly drained, and cultivated; but it lacks the other two necessary chemicals, phosphoric acid and potash. These however may be supplied as advised in the following chapter.

Muck soil is especially adapted to the culture of lettuce, onions, and celery. The three principal practices to be considered in handling muck are to drain, to supplied needed food and to cultivate frequently.

THE COMPOST HEAP. Where plants are started early in the spring in the greenhouse, hotbed, or in pots or boxes in a sunny window, good soil is needed and this is usually hard to get because of the weather. For seed, the compost soil is not necessary but for transplanting from the seed bed into pots, strawberry baskets or flats, soil properly mixed with manure is invaluable. The soil for seed flats may be kept in the cellar, shed or tool house, thawed out and made fine when needed.

Wherever the compost heap is to be started, the location must be well drained. Secure sod on which clover has been grown, whenever possible, but any sod may do. Invert the sod, grass side down, and build up about six inches of sod, then six inches of well decayed manure and again six inches of sod and garden loam. With each
application of manure add a liberal amount of bone meal. After the pile has reached a height of four feet cover it over with inverted sod and allow it to stand for two or three months, then chop up the sod and mix the soil, sod and manure. Turn the pile over at least three times before using and then you will be sure to have mixed the fertilizers and soils equally.

Early in the spring is the best time to make the compost, after the grass and clover have reached a height of two or three inches. By August or September the soil may be mixed and put in a place where it may be had before the frost and snows have passed. Do not allow the compost heap to dry out but never use dishwater to wet it down. The lye from the soap and the grease in the water are both objectionable. Never mix garbage with soil. It has a tendency to make it sour and is also slow to decay.

If the soil is a clay formation or a little sour, as shown by the growth of moss on it, add a little lime to the layers of soil but do not add lime to the manure.

Many gardeners who have only a small space, construct a compost heap in the fall and use it as a top dressing on the soil in the early spring. Sometimes, when a load or two of manure may be had in the fall and you have no place to keep it, a compost heap is most advisable. The fertilizers are retained in the soil and a large per cent of the gases set free by decomposition is retained by the moisture. Wherever wood ashes are available, these may be scattered on the layers of soil.
DOS AND DON'TS IN MAKING THE SOIL

Don'ts

Don't try to raise plants where the soil is poorly drained.
Don't strip the sod from the surface of a new garden.
Don't add a great quantity of ashes to the soil.
Don't smooth the surface of clay soil in the fall after digging or plowing.
Don't try to work the soil when it is wet.
Don't rob the soil; apply manure each year.
Don't expect crops suited to a sandy loam to grow well in clay.
Don't fail to add humus and plant food to sand.
Don't let the soil get so dry that the plants wilt.
Don't think because the soil is black that it is rich.
Don't fail to get acquainted with the needs of your soil.
Don't throw dishwater or garbage on the compost heap.

Dos

Drain the soil if necessary.
Add humus in the form of manure to all soil.
Plow or spade from six to ten inches in depth.
Apply water only when necessary and do not puddle the soil.
Work the cultivator. A dust mulch on the surface of the soil will help to retain the moisture.
Work with the soil, in the soil and for the soil, and you will get results.

* * *
CHAPTER II

TOOLS AND HOW TO USE THEM

To use a hoe or rake properly is an art as well as a science.

The Blind Gardeners’ Dream

These watchful hands can see
The green expectancy
Of stem and bud and leaf
Up from the breathing earth.

They dream again, with zest
Their inner light to test,
No fear can grip their hearts
While trusting in the earth.

For in quiescent moods
They know life’s solitudes.
God with His rain and sun
Reechoes their new song.

A few hints in caring for garden tools:

Do not leave the garden tools out overnight as the heavy dew causes rust.

Do not leave the garden tools out during a rain.

Clean all soil from the tools before putting them in the toolhouse.

Do not leave the rake, hoe, Norcross weeder or any other tool wrong side up. Prevent accidents.

Oil the tools carefully before storing them away for the winter.

A few drops of oil in the clips will make them easy to handle as well as prevent rust.
TEE-ROD. The tee-rod may be one-half inch galvanized pipe or smaller solid iron rods welded, so as to form a tee. If the soil is clay and a little hard the wire may have to be adjusted in order to get the proper height to use the garden tools. The rod is forced into the ground by holding the rod as shown in the illustration and forcing the weight of the body against it. Then the cross piece which is at right angles to the pipe in the ground is turned so as to make the wire very taut.

Various grades of wire may be used, but preferably a copper wire, so there will be no rust. If a telephone wire can be secured it will last a long time and is easy on the ankles.
The spade has a gaging rod that may be adjusted by loosening the winged screws and moving the rod with the shoes to different holes. The first set of holes from the point is gaged to dig a hole two or three inches deep. The second set of holes from the point of the spade is about four inches and the last or third set of holes, from six to eight inches. In order to use the spade successfully make sure the wire is taut. Bring the toe of the shoe up to the wire at the starting end of the row. Touch the back side of the spade with the toe of the shoe. The wire will be between the flat side and the back of the spade. Now place the right foot on the shoulder of the spade to force it into the ground. Keep the knee of the right leg back of the handle and then it is easy to throw the force of your body into the operation of the spade without straining or tiring the leg. The bar with a shoe on each side prevents the spade from going too deeply into the soil. This bar is graded to three depths as indicated above. The first is shallow for corn if corn is to be planted in hills. The second holes are gaged for planting string beans in midsummer if they are to be planted in hills and the third set of holes from the cutting edge of the spade is for planting potatoes.

The distance between the hills in the row may be measured by the graded rod or by tapping the spade in the hole with the toe and spreading the legs apart the desired (18 to 20 inches) distance. Then lift the spade out of the hole and again tap the toe of the shoe farthest away from the hole; then bring the feet together. Repeat this practice to the end of the row. Keep the wire in place until the seed is planted and covered. Be sure to mark the end of the row before removing the wire rods.
Note the clip attached to the wire. Allow the ankle to rub against the wire as one rakes. This, with the aid of the taut wire, make the raked area a straighter row. The finer the soil the better the germination of the seed so draw the furrow on the side of the line where the wide space is raked. Hold the rake lightly and keep the movement of the rake under control. Keep both hands over the handle and never under it, but never press the rake deeply into the soil.

Note the position of the clip which is easily snapped on the wire. Have the wire, while operation the tools, the proper distance from the soil so as to make the raking easy; one of the most delightful practices in the garden.
DRAW HOE or NURSERY HOE

Note the clip by which the hoe is attached to the wire. The wire is stretched between the planted rows and in the center. The wire should be so arranged as to allow the hoe to just cut the surface soil and destroy the weeds. Keep the ankle touching the wire while hoeing so as to prevent the hoe from going off center and destroying the vegetable or flower seedlings.

THE FURROW HOE

This hoe is made by attaching a discarded blade of a mowing machine to an iron rod which in turn is attached to the handle. The wire clip is attached to this rod. Across the mowing machine blade, is welded a rod with two shoes attached to each end. These shoes prevent the hoe from making too deep a furrow. This hoe is designed to draw a furrow deep enough for carrots, beets and turnips. In fact it is arranged for most all small seed.

When drawing the furrow do not press heavily on the handle but draw the furrow lightly along the wire. Keep the ankle close to the wire and this will help to guide the operator in a straight row. The seed is covered by hand.
THE HOE

Note the clip which is easily clipped to the wire. The bent rod, with the shoes at each side, prevents the hoe from sinking into the soil too deeply. The winged screws are attached with two washers next to the metal of the hoe. The hoe has two sets of holes and the first set is placed so that the furrow will be shallow. For late or mid-season, corn or beans, the second set of holes is used and the furrow may be drawn deeper. The deeper furrow is often drawn close to the furrow already made for the seed, and fertilizer applied in the deeper furrow and covered. The commercial fertilizer will thus be carried both up and down to the roots.
THE HOE

Note the depth of the furrow in which fertilizer or seed may be sown. The soil is light and fine (covering the shoes) but these shoes still control the depth of the furrow. Allow the ankle to rub the wire, thus guiding the gardener so that the row remains straight. Even though the wire is taught, in the center of twenty feet the wire seems a bit loose, but the position of the gardener while working will make it easy to draw a straight line. Hold the hoe firmly and draw the furrow in short strokes. Move the hoe back along the wire; repeat the operation until the end of the row is reached.
Two types of scuffle-hoe valuable for destroying weeds and forming a dust-mulch.

**SCUFFLE HOE**

The guide wire is placed between the rows of growing plants with the clip attached. The gardener should keep the wire close to his ankle and often straddle the wire which aids him in keeping between the rows. This prevents the destruction of growing vegetables or flowers. The scuffle hoe is an easy implement to work. It is a quick way to keep control of the weeds.
THE NORCROSS WEEDER

This five-pronged implement is valuable in destroying weeds and in cultivating the plants so that air may reach the roots, and good in forming a dust mulch. The clip is attached to the wire close to the plants (see cultivator in operation). Hold the implement firmly and move slowly. With a little practice there will be no trouble in keeping the cultivation between the rows. After cultivating close to the plants, move the cultivator to the center of the row; loosen the winged screws and move the implement to the center of the row. Tighten the winged screws firmly and cultivate as directed.
Measure with the hand the distance from the plants to the blade. It is important that the blade should not scrape the roots of the plants to be cultivated. Note the clip attached to the wire.

Make sure the clip is properly attached to the wire. The wire must always be taut.

The Norcross weeder, adjusted to cultivate the center of the row. Note the hand adjusting the winged screws. The adjustment rod moves very easily. Remember, the tool is made of steel and should be kept oiled to prevent rust.

The Norcross weeder
FERTILIZERS AND HOW TO USE THEM

A comfortable home, food, water, fresh air and sunshine are as necessary to plant growth as they are to the health and happiness of any human being.

Grass, The Forgiveness of Nature

Rich wisdom of the growing grass
    Reflects the first green blade that felt
The sun, when deep black heavens stroked
    Primeval death with running winds.

Green grass has never lost its ease
    Amid the measured beat of time,
Recording strife and agony
    Relived in every growing thing.

The shapeless echo of a bell
    Lost in the wilderness of night
Destroys old Pharaoh's curse that dies
    Among forgiving blades of grass.

Frail thunder of the aspen leaves
    Cannot dissuade the singing tongues
Of grass that build all love and truth
    Out of the poignant dust of years.

Scientifically, we recognize at least ten elements necessary for plant growth and the maturing of a crop. The three most important of these may be secured from the soil, air and water. These three elements, which must be present in any soil in sufficient quantities and in an available form to insure success, are nitrogen, phosphorus, and potassium. No one of these may be left out or the crop will suffer, if indeed, it matures at all.

The important points to consider are the various
soils and what they lack and the different crops that need these three elements in certain proportions in order to produce a maximum yield. This plant food may be secured from different sources. Tillage alone will not render sufficient available plant food to mature a perfect crop in the average soil, therefore the direct application of plant food in the form of animal manures, green manures or commercial fertilizers, is necessary in every well managed garden.

**STABLE MANURE** is without doubt the most valuable source of plant food for all soils and all classes of vegetables. Stable manure if added each year, will not only be a continual source of plant food but will change the physical condition of the soil, while commercial fertilizers may show marked effects quickly but are often disastrous if wrongly applied. Few gardens are large enough to grow a crop of clover or other plants, which may be turned under in one or two years, though this management is one of the most valuable sources of plant food as well as a benefit to the texture of the soil.

Fresh manure, especially where the animals have been bedded with straw, to apply in the fall, plowed into the soil, with the ridged furrows left for the elements to work on. Well decayed manure may be applied to the same soil, from a thin scattering to two inches over the surface, and worked into the first four inches with the digging fork or disk harrow. The young seedlings come in direct contact with this source of plant food at the beginning of their growth, which is very important especially with early crops.

**HORSE MANURE** is loose in texture and one of the best manures for the vegetable and fruit garden, providing straw has been used for bedding. Manure mixed with shavings is objectionable. It is slow to decompose and in some cases the turpentine and resin in the chips of wood have a decidedly bad effect on the soil. Horse manure mixed with bone meal, dried blood or tankage is made more valuable as a lasting supply of plant food.

If the manure from young horses, fed oats and bedded in straw, is kept moist and applied to the soil when it is partly decayed, the temperature of the soil is sometimes raised three degrees, which means a rapid growth of early spring crops like beets, lettuce, radishes, peas, etc.
Horse manure which separates in thin sheetlike layers and has a gray appearance, should never be used. Manure in this condition is "burned" and the food value is lacking.

Manure should never be left in a pile out of doors over winter. If a shed is not available make a compost heap and if both are impossible, cover the manure pile with soil so as to prevent the loss of ammonia.

**Cow Manure** is very valuable, even though it is not as heating as horse manure. It is a slow-acting manure and especially valuable for cabbage. In fact, well decayed cow manure applied near the time of planting will be of great value to any crop.

**Hog Manure** is sometimes applied, especially in the rural home gardens. It is slow in action and generates very little heat. It is foul and is not generally used. It also encourages general root diseases, such as the club root of cabbage.

**Sheep Manure** decomposes and heats rapidly. It contains a great amount of nitrogen and may be obtained at any seed house, pulverized and dry. A little of this fertilizer, scattered along a row of onions after they appear above the ground and worked into the soil just before a rain, is most valuable. A teaspoonful, applied to each hole and mixed a little with the soil before head lettuce is transplanted, will quickly give results. Also, a little applied to hills of corn will show a marked effect. In fact almost every vegetable will respond quickly to sheep manure, and it is strongly advised if used sparingly; because it is available, easy to handle and inexpensive, compared to commercial fertilizers.

**Hen Manure** is one of the most valuable of all animal manures, since it contains a large per cent of potash, phosphoric acid, and nitrogen. No manure can equal it for onions. Of course, it must be handled with great care and applied very sparingly. It is not an easy matter to apply hen manure on account of the moisture in it, but if kept in a dry place, mixed with a limited amount of sifted coal ashes or dry soil and pulverized as much as possible, it may be scattered along the rows of growing vegetables, or applied to the hills of beans or corn.
COMMERCIAL FERTILIZERS

All stable manures must undergo a change in decomposition or fermentation before the food is available for the plant, while many of the commercial fertilizers go into solution quickly in combination with water and are immediately available as food for the plant. The slow growth of beets, lettuce and other crops often develops fiber and the vegetable is tough or woody, while a little application of nitrogen, in the form of nitrate of soda, would hasten the crop and prevent the growth of the woody fiber. Also late crops may often be successfully matured by the use of commercial fertilizers before the frost checks all growth.

NITROGEN may be secured in the form of nitrate of soda and is valuable according to its availability. It is a leaf builder and should be applied sparingly just before a rain as it is readily soluble. In dry weather a furrow may be drawn close to the growing plants, one or two inches in depth, and a little of the nitrate of soda scattered in it; then cover the furrow as you would seed. The moisture from the soil will dissolve the soda and the plant soon makes use of it.

Nitrate of soda may be dissolved in water, one ounce to one gallon of water, and applied sparingly before watering the garden. The salt in crystal or liquid should never come in contact with the foliage. If it does, and the sun is bright, the leaves will burn and turn brown in blotches. There is one exception to this and that is cabbage. If the liquid nitrate of soda is used place the wire close to the plants and run the spout of the watering can along the wire. Do not apply the liquid so that it wets the foliage and especially the hearts of lettuce and cabbage. In fact, any vegetable or flower must be protected as it usually burns the foliage, especially on bright days.

Nitrogen may be secured in dried blood, ground fish, tankage, bone meal, cottonseed meal and Peruvian guano, but for the quickest and best results nitrate of soda is the best source of this most valuable fertilizer.

There are no rules as to the frequency of application, as it all depends on the health of the plant and the desired results looked for, but one thing that must
be remembered is that fertilizer must be applied in very small quantities. If the leaves of peas or beans or other plants are turning yellow before the crop has matured the crop is calling for nitrogen. Any fertilizer containing available nitrogen is especially valuable for lettuce, endive, celery, onions and other stem or leaf crops.

**PHOSPHORIC ACID** if lacking in the soil will cause the crop to mature slowly and may in some instances cause a complete failure. This is the ripening element and may be secured in raw or steamed bonemeal, rock phosphate or Thomas slag, all of which vary in the available phosphoric acid. The rate of application depends on the character of the soil, sandy and muck soil usually requiring more phosphoric acid than clay or garden loam. It is always better to apply it with care, watch results, and keep a record for reference. A good gardener must know the needs of his soil as well as the varieties of plants best suited for his location.

**POTASH** is often lacking in sandy and muck soils. In fact there are few soils that do not need it, especially where such crops as turnips, carrots, parsnips, and radish are grown. This element is the skeleton or fiber builder of the plant. There are four principal sources from which it may be secured, muriate and sulphate of potash, kainit, containing about twelve per cent potash and wood ashes, containing from four to six per cent potash. The muriate of potash is considered the best for fruit crops and for general purposes in the vegetable garden but the sulphate of potash has long been considered the most desirable for potatoes. Unleached wood ashes are doubtless the cheapest and easiest source of potash to secure and may be applied freely to the soil without doing any harm. Wood ashes, with a little Paris green mixed into them, may be dusted on cucumbers, squash and pumpkins to prevent the striped beetle and at the same time to enrich the soil.

Kainit is sometimes used freely on root crops and asparagus.

One of the best balanced fertilizers used for vegetables and applied in a furrow close to the seed row or growing plants is 5-10-5. This means five per cent available nitrogen, ten per cent available phosphate and five per cent available potash. Apply sparingly and cover the furrow.
LIME is not a fertilizer but it is important in the growth of vegetables since it is better for all vegetables to have the soil slightly alkaline rather than acid. Lime favors the growth of micro-organisms which are beneficial. It changes the physical conditions of the soil, makes certain types of plant food available and promotes the decomposition of vegetable matter. A little lime each year, applied in the early spring, will benefit especially soils of a clay formation. Sand is also benefitted by the use of lime, which has a tendency to hold the loose particles together and in this way the sand retains more moisture. From fifteen to thirty-five pounds per square rod will sweeten a sour or acid soil and aid it to be productive.

POINTS ABOUT MANURES WORTH KNOWING

Never apply fresh stable manure to growing crops.

Never allow animal manures to be exposed to the open air. An appreciable amount of plant food is lost in the form of gas.

Manure from young animals is better than manure from old animals.

By applying coarse, fresh manure to the soil and plowing or spading it under, leaving the soil in the rough, you can change the texture of the soil. This is especially true with clay soil where the manure is applied in the fall. Do not seed immediately after applying stable manure. Two weeks should allow the manure to decompose slightly and prevent rotting the seed.

The rate of applying any manure depends on the texture of the soil, the need for plant food, the kind of food available in the soil, the age of the manure, and the requirements of the crop.

If stable manure is supplemented with commercial fertilizers, less stable manure is necessary.

Add bone meal to horse manure to make it more valuable as a plant food.

Never scatter nitrate of soda on the foliage.
There is less danger in applying too little commercial fertilizers than in applying too much.

Never try to substitute lime for any fertilizer. It is not a fertilizer.

Frequent cultivation will make the plant food in the soil available.

Plants, like children, cannot stand over- or under-feeding.

Know the food values of manures and only apply them when needed.

**PRACTICAL GARDENING**

**THE PLANT FOODS**

Select one fertilizer from each group and work it well into the soil.

<table>
<thead>
<tr>
<th>Plant food Necessary</th>
<th>Fertilizer or Source</th>
<th>Amount Per Square Rod</th>
<th>Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen - Leaf builder</td>
<td>Nitrate of Soda</td>
<td>2 lbs.</td>
<td>Apply before or after rain</td>
</tr>
<tr>
<td>Phosphoric acid - Fruit builder</td>
<td>Ground rock acid phosphate</td>
<td>5 lbs.</td>
<td>The dissolved bone meal is considered the best. Make your own selection.</td>
</tr>
<tr>
<td></td>
<td>Dissolved bone Basic Slag</td>
<td>2 lbs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 lbs.</td>
<td></td>
</tr>
<tr>
<td>Potash - Stem builder</td>
<td>Kainit Sulphate of Potash</td>
<td>3½ lbs.</td>
<td>Very difficult to secure. Buy early.</td>
</tr>
<tr>
<td>Fruit builder</td>
<td>Wood) Hardwood Ashes) best</td>
<td>Apply freely</td>
<td></td>
</tr>
</tbody>
</table>

* * *
To sow small garden seed place a small quantity of seed in the hand and with the aid of the thumb work the seed between the second and third knuckle. Keep the wire over the furrow and the tips of the fingers slowly follow the wire as the seed is dropped in the furrow. Be sure that the fingers are held close so that the seed will not be lost.
PLANNING THE HOME GARDEN

Plan your dream of the garden so you may make your dream come true.

The Blind Gardener

There was a waiting strangeness in the soil
That filled his empty hands with deep repose
And laughter, for he felt the budding rose
Shaped by compelling beauty out of toil.

His knowing hand saw in the leafless clod
The vanished mornings when eyes strained to see
The greening branches of the apple tree,
Repeating silent promises to God.

His tender hand sowed seeds of singing words
To tell about forgotten moons, when skies
Touched the remembering hour, the hour that tries
To time the birth-cry of the seed, with birds.

His lonely hands could feel life in the breath
Of seeds reclining softly on the breast
Of scented soil; unkissed by moons at rest,
Time weaves a web of destiny from death.

The plan of the consumer's garden will differ as the individual tastes differ, but a loss of time and money will be avoided if the garden is well thought out before the planting season arrives.

The assortment and continuous supply of vegetables will depend largely upon the amount of land available as well as upon the method of planning and planting. Of the two types of garden practices, intensive and extensive, the intensive is by far the more important and, in most cases is necessary if the desired results are to be obtained. The intensive method of gardening, if properly
planned and executed, is considered the best in suburban and city gardens especially, because the entire effort and interest is concentrated on a small plot which may be heavily fertilized and cultivated more often than the extensive garden.

The man who plants whatever he likes whenever he happens to think of planting, and who buys his seeds as he needs them, is sure to come to grief before the season advances far. He often orders more seed than is necessary, plants some of his crops too early or too late, in order to get the best results, and he never follows the intensive method of gardening by starting in a succeeding crop before the first crop has full matured.

A good time to begin planning the home garden is in January or February. Obtain seed catalogs from several reliable firms and make up your list, send your order in early and state the time you wish the seed to be delivered. Let the seed firm keep the seed as long as possible for they have conditions in which to store seed, while a few days of dampness or warmth in a steamy kitchen may spoil such seed as lettuce and radish. In ordering early you are never disappointed in having your seeds when you want them and there is seldom a mistake in filling the order, because the clerks have time to do their work carefully, while in the rush season mistakes often occur. There are firms which make a specialty of certain varieties of seed, such as corn, peas, etc. Better results are obtained if such seed, full of vitality and true to name is secured from these special firms. In going over the catalog, select varieties that will mature at a stated time, such as early peas, corn, beets, etc., for early planting, then follow with the mid-season and late varieties. With most of our vegetables the edible stage is just before full maturity is reached. Therefore, plan to replace these crops by starting other crops to be transplanted between the rows, or even by planting the seed before the maturing crop has been removed. It is just as important to plan for quality as it is to arrange the crops in order to have quantity.

For the best planned garden it is necessary to understand the influence of temperature on the quality and maturity of certain vegetables. For instance, it is impossible to raise radish, cabbage, turnips and other such crops in a high temperature, while it is equally impos-
sible to raise a good quality of corn, beans, cucumbers and such tender crops in a low temperature.

Vegetables are therefore classified as "hardy" and "tender" according to their degree of growth and quality in certain temperatures. Cabbage is considered a hardy vegetable because it endures a certain amount of frost and the quality is best if grown in a cool climate and soil, while the tomato may be called "tender" because it is destroyed with the first frost and the quality is poor if the season is cool. The crops may be arranged according to the temperature desired for the best results.

THREE GROUPS OF COOL-SEASON CROPS

The first group consists of leaf lettuce, mustard, early peas, kohl-rabi, cress, radish, turnips, early spinach and early beets. These are planted as soon as soil is fit to work. These crops mature best with an abundant supply of moisture throughout their growth which is provided by the frequent spring rains. They also mature in a short period of time before the heat of summer sets in. If the seed of this group is sown late in the summer and a sufficient supply of moisture is applied during the germinating period several of these crops will mature in the fall.

The second group consists of head lettuce, cauliflower, cabbage and midseason peas. These vegetables do best if started early, when the nights are cool. Late cabbage may be planted in July but this group makes its best growth in the autumn and after the first light frost. Early celery if started in April will mature before fall, providing sufficient moisture is available during the first part of its growth and throughout the entire season. All of these crops, though started early, endure the summer heat.

The third group consists of what is known as "long season crops," or those making a strong root growth during the cool, moist spring, enduring the summer heat and maturing in the summer and autumn. This group includes carrots, parsnips, salsify, beets, leeks, onions, early potatoes, Swiss chard, kale, New Zealand spinach, parsley, Brussels sprouts and upland cress.

The two common garden perennials, asparagus and rhu-
barb, are also included in this group.

**TWO GROUPS OF WARM SEASON CROPS**

The first group consists of those vegetables with a sufficiently short period of growth to enable them to mature during the warm weather; sweet corn, cucumbers, string beans, muskmelons, watermelons, squash, Lima beans, pumpkins, okra all of which should be planted after the soil is warm. While these crops need the spring rains yet they will not grow successfully if planted when the soil is cold and the atmospheric temperature is low.

The second crop includes tomatoes, eggplants, peppers and sweet potatoes. All of these vegetables do best in a high temperature. On account of the long period of growth necessary to mature these crops, they must be started under glass (greenhouse, hotbed or a well lighted window).

The moisture supply should be considered in planning the garden. If part of the garden is moist all season, such crops as potatoes, beans or peas should not be planted in such soil, while cabbage, celery or onions do their best in a moist cool soil.

Moist soil does not mean a wet soil, for no vegetable will thrive where the water becomes stagnant. If radish and lettuce are planted during a drought they not only lost their flavor and crispness but they seldom mature sufficiently to make them worthwhile for table use.

In planning your garden consider the moisture content of the soil in reference to its use in aiding germination, rapid growth and the maturity of the plant.

Rows running north and south get the sun on the east side of the plant in the morning and on the west side in the afternoon. But as a matter of fact, practical gardeners are not so particular how the rows run on level ground so long as the sun is not shut off from the plants by tall objects such as a well, trees or shrubs.

The following list of vegetables and the names of satisfactory varieties may be an aid to making your selection of seeds from the catalogs. Other varieties may be just as satisfactory and each gardener is advised to
work out for himself those varieties best suited to his soil, climatic conditions and individual taste.

PERENNIALS

Asparagus. Strong, well developed, two year old roots of Argenteuil, Palmetto, or Conover's Collossal.
Horseradish. Sets of Bohemian.
Rhubarb. Linnaeus or Victoria.
Artichokes. Green Globe, which is cultivated for its flowerheads being cooked as asparagus, is the variety most commonly desired. If the edible part wanted is the root, Jerusalem is the variety to use. Plant the latter variety one foot apart in the row, and the former three feet apart.

ANNUALS

Beans, all dwarf, Green Snap. Six weeks and Giant Stringless Greenpod Valentine are very early.
Beans, all dwarfs, yellow or wax. Wardwell's Kidney Wax, Golden Wax, Stringless Refugee Wax and others are good.
Beets, early. Crosby Egyptian, Early Eclipse. The former is very desirable.
Beets, late. Edmond's Blood for a standard, Detroit Dark Red of a deep, bloodred color.
Brussels sprouts. Long Island and Danish are very good.
Cabbage, early. Early Jersey Wakefield, Early Erfurt.
Cabbage, late. All Seasons, Danish Ball Head, Volga, Drumhead. Extra Choice Drumhead Savoy is a very fancy cabbage.
Carrots, one-half long. Danvers One Half Long, Chantenay
One Half Long, Oxheart.

Carrots, long. Danvers, Long Orange.

Cauliflower. Snowball, Erfurt.

Celeriac. Apple Shape.


Celery, late. Self-blanching, Winter Queen, Kalamazoo, Boston Market, Giant Pascal.

Chard, Swiss. Order by name only, or variety Giant Luctullus.

Corn, early. Metropolitan, Adam’s, Cory, Aristocrat.

Corn, midseason. Quincy, Market, Golden Bantam, Black Mexican, Country Gentleman.

Corn, late. Stowell’s Evergreen, some of the midseason varieties planted later.


Endive. White Curled, Batavian.

Kohl-rabi. Early White or Purple Vienna.

Leek. Giant Carentan, American Flag.

Lettuce, forcing. For forcing in hotbed, Hittinger’s Forcing.

Lettuce (head). Belmont Mammoth, Salamander, Big Boston, All Heart.

Lettuce (looseleaf). Grand Rapids, Early Curled, Simpson and Silesian.

Lettuce (Summer). Hanson Improved and Iceberg.

Lettuce (Cos). Kingsholm Cos, Paris White Cos.


Onions, Yellow. Danvers, Southport, Prizetaker, Australian Brown.
Onions, red. Wethersfield, Danvers, Southport.

Onions, white. Southport.

Onions, top. Plant in the fall, harvest in the spring. Multiplier and Egyptian.


Peas, midseason, dwarf. Thomas Laxton, American Wonder, Early Morn, Admiral Dewey, Abundance.

Peas, late Dwarf, Telephone. Champion of England is a taller grower on mellow soil. Substitute the Dwarf Champion for better results in the very small gardens; yet there is no better yielder on the market than the Champion of England. Dwarf White Sugar.

Peppers. Chinese Giant, Ruby King, Red Cayenne.

Potatoes, early. Bliss Triumph, Early Rose, Early Northern, Early Ohio.


Pumpkins. Sugar, Quaker Pie, Cashaw.


Radish, summer. Peckert's Chartier, Icicle.


Salsify. Sandwich Island, Long White.

Spinach. Giant Thick Leaf, Long Season, New Zealand.

Squash, early. White Bush, Crook Neck.

Squash, late. Hubbard, English Marrow, Boston Marrow, Delicious.

Tomatoes. Earliana, Bonnie Best, Chalk's Jewel, Model, Ponderosisi, Stone, Champion.


Varieties vary greatly in different catalogs. New varieties appear each year.

ARRANGEMENT OF GARDEN

The question now arises, how to arrange the vegetables in the above list so as to have all or most of them in the garden. It is a considerable task to plan for so many varieties of vegetables. However, by the interplanting of crops and by successive cropping - two of the principles followed in intensive methods of vegetable production - it is possible to include most of the annuals in a plot twenty-five by thirty-five feet and the perennials and annuals in a plot fifty by sixty feet. In many of the small gardens the hotbed and perennials are omitted the main object being to produce the maximum amount of vegetables in the minimum space.

DATES FOR SOWING OR SETTING KITCHENGARDEN VEGETABLES IN DIFFERENT LATITUDES

_Lansing, Michigan: Average of 4 and 5 years_

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Sowing/Setting Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bean, bush</td>
<td>May 16</td>
</tr>
<tr>
<td>Bean, pole</td>
<td>May 30</td>
</tr>
<tr>
<td>Beet</td>
<td>April 20</td>
</tr>
<tr>
<td>Broccoli</td>
<td>May 10</td>
</tr>
<tr>
<td>Brussels sprouts</td>
<td>May 10</td>
</tr>
<tr>
<td>Cabbage, early, under glass</td>
<td>March 15</td>
</tr>
<tr>
<td>Cabbage, late</td>
<td>May 20</td>
</tr>
<tr>
<td>Carrot</td>
<td>May 7</td>
</tr>
<tr>
<td>Cauliflower, under glass</td>
<td>March 15</td>
</tr>
<tr>
<td>Celery, under glass</td>
<td>March 18</td>
</tr>
<tr>
<td>Celery, in open ground</td>
<td>May 20</td>
</tr>
<tr>
<td>Vegetable</td>
<td>Planting Date</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Corn</td>
<td>May 19</td>
</tr>
<tr>
<td>Cucumber</td>
<td>May 23</td>
</tr>
<tr>
<td>Eggplant, under glass</td>
<td>March 15</td>
</tr>
<tr>
<td>Kale</td>
<td>May 9</td>
</tr>
<tr>
<td>Kohl-rabi</td>
<td>May 9</td>
</tr>
<tr>
<td>Lettuce</td>
<td>May 5</td>
</tr>
<tr>
<td>Melon</td>
<td>May 30</td>
</tr>
<tr>
<td>Okra</td>
<td>May 15</td>
</tr>
<tr>
<td>Onion</td>
<td>April 17</td>
</tr>
<tr>
<td>Parsnips</td>
<td>May 7</td>
</tr>
<tr>
<td>Peas</td>
<td>April 15</td>
</tr>
<tr>
<td>Pepper, under glass</td>
<td>March 16</td>
</tr>
<tr>
<td>Potato</td>
<td>May 3</td>
</tr>
<tr>
<td>Pumpkin</td>
<td>May 31</td>
</tr>
<tr>
<td>Radish</td>
<td>April 26</td>
</tr>
<tr>
<td>Salsify</td>
<td>May 7</td>
</tr>
<tr>
<td>Spinach</td>
<td>April 10</td>
</tr>
<tr>
<td>Squash</td>
<td>May 28</td>
</tr>
<tr>
<td>Tomato, under glass</td>
<td>March 13</td>
</tr>
<tr>
<td>Turnip</td>
<td>April 15</td>
</tr>
</tbody>
</table>

**Boston (Rawson)**

- Asparagus: About the end of April
- Bean, bush: About the first week in May
- Bean, pole: From about the middle of May to the first of June
- Bean, Lima: About the first of June
- Beet: About the middle of April
- Borecole, or kale: About the middle of April; plant out in June
- Brussels sprouts: In March or April in hotbed
- Cabbage: Transplant the last week in April or first in May
Carrots ...... Last of May or first of June
Cauliflower .. From the first of May until the first of July
Celery ...... The first week in April to the second in July
Corn, sweet .. About the first of May
Cucumber ..... For first crop, about the middle of March
Eggplant ..... About March 15 in hotbed
Endive ....... June or July
Kohlrabi .... May or June
Okra ........... About the tenth of May
Peas .......... During the last of April up to first of May
Pepper ....... Put out of doors about first of April
Radish ....... From first of April to middle of June
Spinach ...... About the first of September
Tomato ....... About the 25th of May set plants outdoors
Turnips, for fall use ... Any time from July 1 to August 20
Watermelon ... About the middle of May

*New York (Henderson)*

Plants to sow from the middle of March to the end of April. Thermometer in shade averaging 45 degrees.

<table>
<thead>
<tr>
<th>Beet</th>
<th>Cauliflower</th>
<th>Parsley</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrot</td>
<td>Endive</td>
<td>Peas</td>
</tr>
<tr>
<td>Cress</td>
<td>Kale</td>
<td>Radish</td>
</tr>
<tr>
<td>Celery</td>
<td>Lettuce</td>
<td>Spinach</td>
</tr>
<tr>
<td>Cabbage</td>
<td>Onions</td>
<td>Turnip</td>
</tr>
<tr>
<td></td>
<td>Parsnip</td>
<td></td>
</tr>
</tbody>
</table>

From middle of May to middle of June. Thermometer in the shade averaging 60 degrees.

<table>
<thead>
<tr>
<th>Bean, bush</th>
<th>Bean, runner</th>
<th>Nasturtium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bean, cranberry</td>
<td>Corn, Sweet</td>
<td>Okra</td>
</tr>
</tbody>
</table>
Bean, Lima  Cucumber  Pumpkin
Bean, pole  Melon, musk  Squash
Bean, scarlet  Melon, water-  Tomato

Norfolk, Virginia

Months in which different crops are planted or sown, or set out in the open air.

Kale and spinach ... Sown during August, September, October
Cabbage ...... The seeds are sown in August and September and the plants are transplanted in the open air in November and December.
Onions ........ Sown in August, September, January, February
Leeks ......... The same as onions
Lettuce ...... Sown in September and January
Radish ....... Sown in every month in the year
Peas .......... December, January, February, March, April, August, September
Beans .......... March and April
Eggplant ..... April and May
Tomatoes ..... April and May
Squash ...... April
Cauliflower .. March and April
Potatoes ...... February, March and July
Sweet potatoes ... May
Peas ......... February and March
Corn .......... April, May, June, and July
Oats ........ September, October, November, December, February, March
Millet ........ June and July; after potatoes
Grass seed ... September, October, November, February, March
Carrots ...... February and March
Celery ........ April and May
Cucumbers .... April
Watermelons .. April
Cantaloupes .. April
Peanuts ...... May

Georgia (Oemler)

Asparagus .... From December 1 to middle of March
Bean, bush ... From first to middle of March
Peet .......... Through November and December
Cabbage ...... From the first of October to the 15th. Transplant about November 1 and later.
Cauliflower .. May to September
Cucumber ..... About March 1 to the 15th
Eggplant ..... To prick out, about the middle of January; otherwise ten or fifteen days later
Lettuce ...... About the middle of September
Onion ......... About January 1
Pea ............ About December 1
Potato ........ The first of February
Radish ....... From Christmas to the last of February
Spinach ...... From September 10 until October 15
Squash ...... About the last of February up to the middle of March
Sweet potato . In cold frames, about the first of January
Tomato ........ About January 1
Watermelon ... About the 15th of March

TENDER AND HARDY VEGETABLES

Vegetables injured by a slight frost, which should therefore be planted only after the weather has settled.

<table>
<thead>
<tr>
<th>All kidney, Lima and common Beans</th>
<th>Eggplant</th>
<th>Pumpkin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>All melons</td>
<td>Squash</td>
</tr>
<tr>
<td>Cucumber</td>
<td>Okra</td>
<td>Sweet potato</td>
</tr>
<tr>
<td></td>
<td>Pepper</td>
<td>Tomato</td>
</tr>
</tbody>
</table>

Vegetables which, when properly handled, will endure a frost.

<table>
<thead>
<tr>
<th>Asparagus</th>
<th>Cauliflower</th>
<th>All onions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bean, Windsor, Broad or Horse</td>
<td>Celery</td>
<td>Parsley</td>
</tr>
<tr>
<td>Beet</td>
<td>Corn Salad</td>
<td>Parsnip</td>
</tr>
<tr>
<td></td>
<td>Cress</td>
<td>Pea</td>
</tr>
</tbody>
</table>
Forecole  Endive  Radish
Broccoli  Horseradish  Rhubarb
Prussells sprouts  Kohl-rabi  Salsify
Cabbage  Kale  Sea kale
Carrot  Leek  Spinach
Lettuce  Turnip

Garden plan 40x60 feet. Vegetables for both summer and winter for a family of 5. All the vegetables suggested may not be desired and in the place of those discarded, plant late potatoes. Dates arranged for New York City and vicinity. The rows apart are in inches.

36" - 7 roots of rhubarb. Harvested after 3d year, yield 35 bunches per year. Rhubarb 4 feet apart in the row. 12 feet of horseradish. Harvested 2d year, yield 5 lbs.

36" - 35 one year old asparagus roots. Harvested after 2d year in garden, yield 150 lbs.

36" - 48 plants early lettuce, Apr. 15. Harvested June 20. Followed by late cabbage. 20 plants.


24" - Onion (seed) Apr. 15. Harvested Sept. Yield 1 bu.

18" - Early beet plants, May 1. Harvested June 15. Yield
1 bu. Followed by parsnips, yield 1 bu.


18" - Salsify, Apr. 15. Harvested Sept., yield 16 bunches.

16" - Early cabbage 27 plants, Apr. 15. Harvested July 15. Followed by late peas, yield 20 qts.


24" - 10 pepper plants, June 1, yield 150 pods. 10 eggplants, June 1, yield 30 fruit.


24" - 40 midseason lettuce plants, June 1. Harvested Aug. Followed by 40 endive plants.

18" - Spinach, Apr. 15. Harvested June 20. Yield ½ bu. Followed by 120 celery plants.


36" - Late corn, July 1. Harvested Sept. Yield 6 doz. June 1 plant Hubbard squash between the hills where the corn is to be planted. Yield 100 squash.


- 14 tomato plants, June 1. Yield 5 bu. Between tomato plants late lettuce, Aug. 20. 24 plants.


24" - Late potatoes, 40 hills, June 1. Harvested Sept. Yield ½ bu.

* * *


<table>
<thead>
<tr>
<th>Kind of Vegetable</th>
<th>Seed or Plants Required per 100 Feet of Row</th>
<th>Distance for Plants to Stand</th>
<th>Time Required to Secure Crop after Planting</th>
<th>Approximate Yield per 100 ft. of Row</th>
<th>No. of Feet of Row for Average Family of 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beans, Bush - Kidney &amp; Lima</td>
<td>1 pt. to 1 qt.</td>
<td>2 ft.</td>
<td>2 to 4 inches</td>
<td>1 to 2 inches</td>
<td>40 to 65 days</td>
</tr>
<tr>
<td>Beans, Pole - Kidney &amp; Lima</td>
<td>4 oz.</td>
<td>3 to 4 ft.</td>
<td>1½ to 2 ft.</td>
<td>1 to 2 inches</td>
<td>50 to 80 days</td>
</tr>
<tr>
<td>Beets</td>
<td>1 oz.</td>
<td>12 to 18 inches</td>
<td>4 to 6 inches</td>
<td>½ in.</td>
<td>60 to 75 days</td>
</tr>
<tr>
<td>Broccoli</td>
<td>small pkt. or ¼ oz.</td>
<td>2 to 2½ ft.</td>
<td>½ to 1 ft.</td>
<td>¼ in.</td>
<td>100 to 130 days</td>
</tr>
<tr>
<td>Brussels sprouts</td>
<td>small pkt. or ¼ oz.</td>
<td>2 to 3 ft.</td>
<td>¼ to ½ ft.</td>
<td>½ in.</td>
<td>100 to 125 days</td>
</tr>
<tr>
<td>Cabbage - early</td>
<td>1/8 oz.</td>
<td>2 to 2½ ft.</td>
<td>1½ to 2 ft.</td>
<td>¼ in.</td>
<td>110 days fr. plants</td>
</tr>
<tr>
<td>Cabbage - late</td>
<td>1/8 oz.</td>
<td>2 to 3 ft.</td>
<td>½ to 1 ft.</td>
<td>¼ in.</td>
<td>150 days fr. plants</td>
</tr>
<tr>
<td>Carrot</td>
<td>1 oz.</td>
<td>12 to 18 inches</td>
<td>3 to 6 inches</td>
<td>¼ to ½ in.</td>
<td>80 to 110 days</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>small pkt. or ½ oz.</td>
<td>2 to 2½ ft.</td>
<td>½ ft.</td>
<td>¼ in.</td>
<td>170-170 days Seed 90-100 days Plant</td>
</tr>
<tr>
<td>Celery</td>
<td>small pkt. or ¼ oz.</td>
<td>1½ to 2 ft.</td>
<td>4 to 8 inches</td>
<td>½ in.</td>
<td>100 to 130 days</td>
</tr>
<tr>
<td>Chard - Swiss</td>
<td>2 oz.</td>
<td>1½ to 2 ft.</td>
<td>4 to 6 inches</td>
<td>¼ in.</td>
<td>To midsummer</td>
</tr>
<tr>
<td>Corn - sweet</td>
<td>2 to 3 oz.</td>
<td>2 to 3 ft.</td>
<td>1 to ¼ ft.</td>
<td>½ to 1 inch</td>
<td>60 to 100 days</td>
</tr>
<tr>
<td>Cucumber</td>
<td>¾ oz.</td>
<td>4 to 5 ft.</td>
<td>4 to 5 ft.</td>
<td>½ to 2 inches</td>
<td>60 to 80 days</td>
</tr>
<tr>
<td>Eggplant</td>
<td>small pkt. or ¼ oz.</td>
<td>3 to 4 ft.</td>
<td>2 to 3 ft.</td>
<td>¼ to 1 inch</td>
<td>120 to 150 days</td>
</tr>
<tr>
<td>Kale or bok choy</td>
<td>¾ to 1 oz.</td>
<td>1½ to 2 ft.</td>
<td>6 in. to 1 ft.</td>
<td>½ in.</td>
<td>Ready for use after frost</td>
</tr>
<tr>
<td>Leek</td>
<td>1 oz.</td>
<td>12 to 18 inches</td>
<td>1 ft.</td>
<td>1½ to 2½ in.</td>
<td>120 to 180 days</td>
</tr>
<tr>
<td>Lettuce</td>
<td>¼ to 1 oz.</td>
<td>12 to 18 inches</td>
<td>5 inches</td>
<td>1 in.</td>
<td>60 to 90 days</td>
</tr>
<tr>
<td>New Zealand Spinach</td>
<td>1 oz.</td>
<td>2 to 3 ft.</td>
<td>1 to ½ ft.</td>
<td>1 in.</td>
<td>60 to 100 days</td>
</tr>
<tr>
<td>Onion, seed</td>
<td>½ oz.</td>
<td>1 to ¼ ft.</td>
<td>2 to 4 in.</td>
<td>¼ in.</td>
<td>125 days</td>
</tr>
<tr>
<td>Onion, sets</td>
<td>1 to ¼ qt.</td>
<td>1 to 1½ ft.</td>
<td>2 to 4 in.</td>
<td>¼ in.</td>
<td>60 days</td>
</tr>
<tr>
<td>Parsnips</td>
<td>¼ oz.</td>
<td>12 to 15 inches</td>
<td>3 to 4 in.</td>
<td>¼ in.</td>
<td>125 to 160 days</td>
</tr>
<tr>
<td>Peas</td>
<td>1 qt.</td>
<td>2 to 3 ft.</td>
<td>10 to 15 inches</td>
<td>1 to 2 inches</td>
<td>60 to 80 days</td>
</tr>
<tr>
<td>Pepper</td>
<td>small pkt. or ¼ oz.</td>
<td>20 to 24 in.</td>
<td>1 to ½ ft.</td>
<td>¼ to 1 in.</td>
<td>100 to 140 days</td>
</tr>
<tr>
<td>Potato, white</td>
<td>5 to 8 lb. tubers</td>
<td>2 to 3 ft.</td>
<td>1 to ½ ft.</td>
<td>4 in.</td>
<td>80 to 140 days</td>
</tr>
<tr>
<td>Radish</td>
<td>1 oz.</td>
<td>6 to 12 in.</td>
<td>1 to 2 inches</td>
<td>¾ in.</td>
<td>30 to 40 days</td>
</tr>
<tr>
<td>Rutabaga</td>
<td>¼ to 1 oz.</td>
<td>1½ to 2 ft.</td>
<td>8 inches</td>
<td>¾ to 1 in.</td>
<td>70 to 100 days</td>
</tr>
<tr>
<td>Spinach</td>
<td>1 oz.</td>
<td>1 to ¼ ft.</td>
<td>6 to 8 inches</td>
<td>¼ in.</td>
<td>50 to 60 days</td>
</tr>
<tr>
<td>Squash - bush or early</td>
<td>1 oz.</td>
<td>3½ to 4 ft.</td>
<td>3½ to 4 ft.</td>
<td>1 in.</td>
<td>60 to 75 days</td>
</tr>
<tr>
<td>Squash - late</td>
<td>1 oz.</td>
<td>6 to 10 ft.</td>
<td>6 to 10 ft.</td>
<td>1 in.</td>
<td>125 to 150 days</td>
</tr>
<tr>
<td>Tomato</td>
<td>small pkt. or ¼ oz.</td>
<td>2½ to 4 ft.</td>
<td>2½ to 4 ft.</td>
<td>½ in.</td>
<td>130 to 150 days</td>
</tr>
<tr>
<td>Turnips</td>
<td>¼ to 1 oz.</td>
<td>1 to 1½ ft.</td>
<td>2 to 6 in.</td>
<td>4 to 6 in.</td>
<td>40 to 60 days</td>
</tr>
</tbody>
</table>