

Growing Vegetables in Town and City 1962

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# Growing Vegetables in Town and City

By VICTOR R. BOSWELL and ROBERT E. WESTER, *Crops Research Division, Agricultural Research Service*

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## Contents

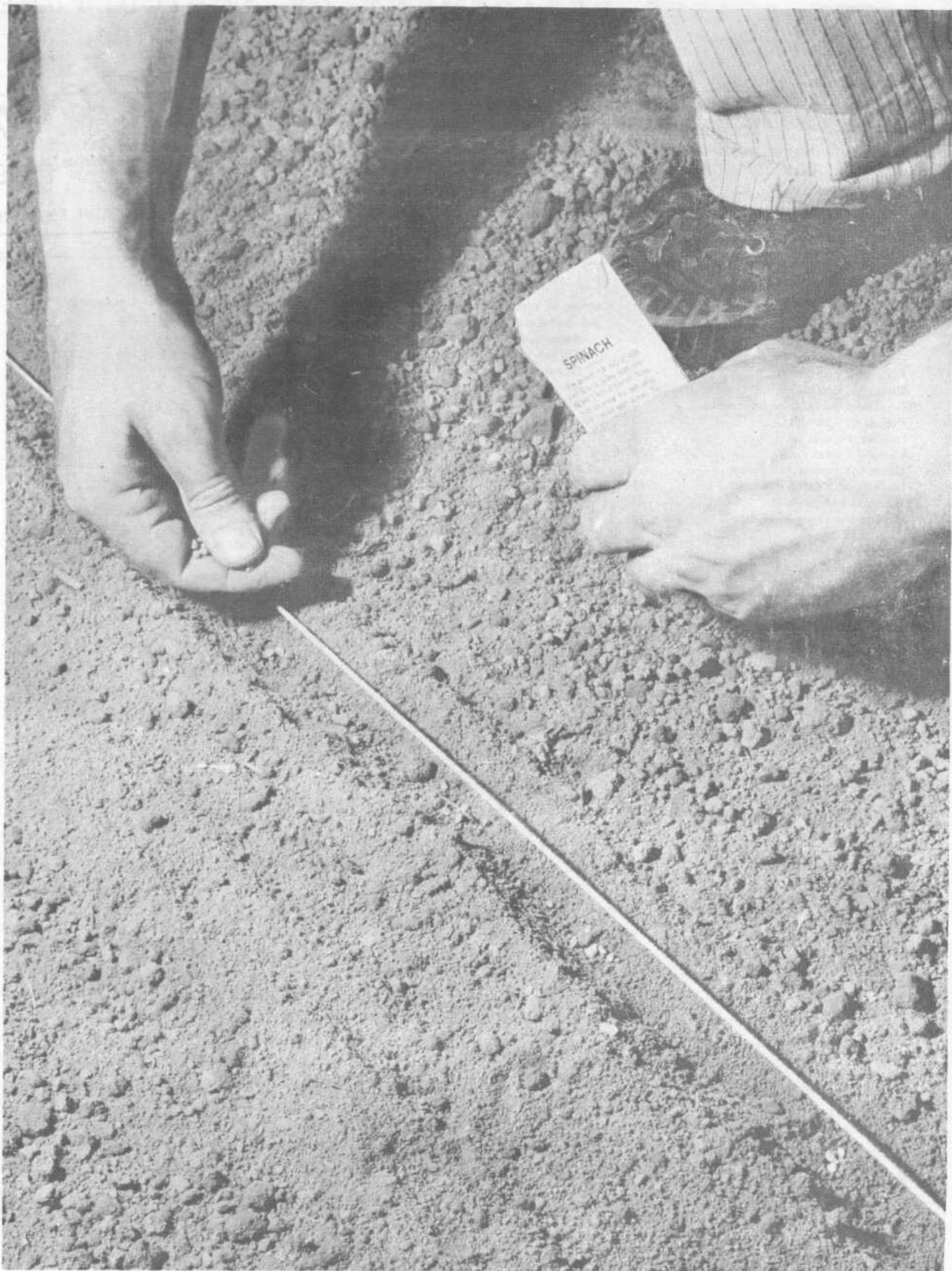
	Page		Page		Page
Gardening is an art . . . . .	1	Culture of specific crops—Continued.		Culture of specific crops—Continued.	
Planning the garden . . . . .	3	Perennial crops—Continued.		Annual crops—Continued.	
Choosing a location . . . . .	3	Asparagus . . . . .	24	Garlic . . . . .	30
What makes a good plot . . . . .	3	Chives . . . . .	24	Kale . . . . .	30
Arranging the crops . . . . .	4	Horseradish . . . . .	24	Kohlrabi . . . . .	31
Choosing and caring for tools . . . . .	5	Rhubarb . . . . .	25	Leeks . . . . .	31
Soil preparation and improvement . . . . .	7	Sorrel . . . . .	25	Lettuce . . . . .	31
Preparing the soil . . . . .	7	Annual crops . . . . .	25	Mustard . . . . .	32
Liming the soil . . . . .	8	Beans . . . . .	25	Okra . . . . .	32
Using manures . . . . .	9	Beets . . . . .	26	Onions . . . . .	32
Using commercial fertilizers . . . . .	9	Sprouting broccoli . . . . .	26	Parsley . . . . .	32
Making and using compost . . . . .	10	Brussels sprouts . . . . .	26	Parsnips . . . . .	32
Planting the vegetables . . . . .	11	Cabbage . . . . .	27	Peas (garden, or English) . . . . .	33
Conserving seeds . . . . .	11	Chinese cabbage . . . . .	27	Peas (black-eye and Crowder) . . . . .	33
Classes of crops . . . . .	11	Carrots . . . . .	27	Peppers . . . . .	33
Time of planting . . . . .	11	Cauliflower and heading broccoli . . . . .	28	Potatoes . . . . .	34
How to plant seeds . . . . .	18	Celery and celeriac . . . . .	28	Radishes . . . . .	34
Plants for transplanting . . . . .	19	Chard, or Swiss chard . . . . .	28	Rutabagas . . . . .	34
Transplanting . . . . .	20	Witloof chicory . . . . .	28	Salsify . . . . .	35
Flat culture vs. raised beds . . . . .	22	Collards . . . . .	29	Shallots . . . . .	35
Care of the garden . . . . .	23	Corn salad . . . . .	29	Soybeans . . . . .	35
Cultivating . . . . .	23	Sweet corn . . . . .	29	Spinach . . . . .	35
Mulching . . . . .	23	Upland cress . . . . .	29	New Zealand spinach . . . . .	36
Watering . . . . .	23	Cucumbers . . . . .	30	Squash . . . . .	36
Controlling diseases and insects . . . . .	23	Dandelion . . . . .	30	Sweetpotatoes . . . . .	36
Culture of specific crops . . . . .	24	Eggplant . . . . .	30	Tomatoes . . . . .	37
Choosing varieties . . . . .	24	Endive . . . . .	30	Turnips . . . . .	38
Perennial crops . . . . .	24	Florence fennel . . . . .	30	Harvesting and using products . . . . .	39

## Gardening Is An Art

SO MUCH has been said and written in the past few years about "scientific farming" and "scientific gardening" that there is danger of the uninformed person being led to believe that farming and gardening are sciences. While important advances have been made in plant and animal production through the work of scientists, farming and gardening are essentially arts, not sciences.

Success in gardening can be aided greatly by an understanding of many facts brought to light by the researches of scientists all over the world, and our farms and gardens contain many new and improved varieties produced by scientists. However, even after one has read many books and bulletins, such as this one, gardening must be learned as other arts are learned—by practice and experience, preferably under the guidance of someone who has already acquired the necessary skills and judgment. It is desirable that gardeners obtain all possible scientific background for their garden work; such a background is highly valuable, but it cannot take the place of experience: it only supplements it and enables them to profit more from experience.

A city back-yard or vacant-lot garden often can supply an important proportion of the fresh vegetables a family needs. Sometimes it can furnish a surplus for storing, canning, or drying, depending on how much good land is available and how well the garden is managed. A well-handled home vegetable garden in a suitable place should consistently yield produce having a money value considerably greater than the cost of seeds, fertilizer, lime, manure, chemicals for insect and disease control, and tools needed for the garden. The health values of the produce and of the outdoor exercise are of particular interest. Furthermore, vegetables from one's own garden can be harvested at the right time and used promptly when they have the highest quality and food value. Millions of town dwellers grow vegetables as a hobby, whether or not they need to produce part of their home food supply. They appreciate the superior quality of truly fresh vegetables and take particular pride in having grown the crops; but in most cases the profit motive is not overlooked.



## Planning the Garden

### Choosing a Location

ONE'S OWN BACK YARD is obviously the most convenient location for a garden, but unless the area is really suitable the garden should be located elsewhere, as near as satisfactory conditions can be found. Vacant lots and community garden plots are extensively used.

A farm gardener usually has the opportunity to select the best land on his place for his garden, but the city gardener rarely has such a chance; he must do what he can with the soil of his own small lot or some nearby plot. In many neighborhoods city or town lots are definitely unsuited to gardening. Steep slopes, bad drainage, too many trees, too much rock, too little topsoil, or too much shade from buildings are all serious draw-backs, any one of which might make a plot of land useless for vegetable growing.

If such conditions as these prevail, the gardener will usually do better to locate a satisfactory plot at some reasonable distance from home. However, the town gardener has some advantages that many farm gardeners do not enjoy. He usually has a water supply close enough to the garden that a hose or a few lengths of temporary piping will give protection against drought. He also is usually near convenient sources of materials and supplies and rarely is troubled by the depredations of roaming livestock and wild animals. Generally the town gardener has less desirable soil and exposure for his garden than the farmer; nevertheless, millions of town gardeners have obtained excellent results even under considerable difficulties.

### What Makes a Good Plot

First of all, a plot of land suitable for a town garden must be in the open where it can get direct sunlight at least 6 hours a day, with no obstructing trees or buildings. Vegetables cannot be grown successfully on wooded lots or between buildings where the sun cannot reach. If the sun reaches the plot no more than 6 hours a day, crops like tomatoes, eggplants, peppers, and lima beans probably will not do very well. The leafy crops like lettuce, mustard, collards, spinach, chard, and kale will tolerate some shade better than the fruit- and seed-bearing crops.

The plot must be well-drained. If possible, an area should be chosen which the gardener has had a chance to see at frequent intervals through a season so that he can know whether it is inclined to be very wet for a long time

after a rain and whether water stands on it or washes over it from above or from a nearby stream. An area subject to such excess water should not be used for gardening. The presence of a green scum on the soil surface indicates excessive wetness and danger from poor drainage. One should be especially wary of wet soils located in a pocket from which there is no adequate outlet and which might become a veritable pond during rainy periods. Street and other construction work about cities often results in water problems that are difficult, although they may involve only small areas.

A rich, deep, friable sandy loam free from debris is the best all-purpose garden soil, but such an ideal is rarely found. The surface soils of town and city back yards and vacant lots are too often thin and stony or heavy and clay-like or have had excavated materials and trash dumped on them. Unless a soil is of such character that it can be spaded up in the spring into a loose, crumbly condition, it will be difficult to work if not definitely unsuited to vegetable growing.

It is possible to use a wide range of soils, from sandy soils through silt loams to clays; but the silt loams and clays are heavy, sticky, and difficult to handle. In general the town gardener takes what he can get, removes the stones or trash, and does the best he can with it. Some lots, however, consist of rubble and "fill" that are so unproductive that it is wasteful to try to use them. If the soil is well-drained and produces a rank, quick growth of weeds or grass, it probably can be developed into a good garden.

Land that is nearly level is the best, because it is easiest to work and is less likely to be damaged through washing by heavy rains. If the only available area slopes enough for it to wash, special precautions must be taken to avoid loss of soil and destruction of the crops. This will be discussed further on page 22.

A gardener always has much to learn about any plot of soil on which he goes to work. He can rarely do as well the first year as in later years, because the peculiarities of the locality can be learned only by experience. Also, by proper soil management, it is usually possible to improve the soil gradually year after year and to get gradually better results.

The convenience of the garden location is more important than might be supposed. The garden should be as close to one's home as a suitable place can be found—preferably on one's own lot or an adjacent lot. A garden needs some attention almost daily; even when it is too wet to plant or cultivate, the gardener should see it every day or two so as to follow all developments and know in ad-

vance what work needs to be done. Gardening at a distance is not only inconvenient but generally less satisfactory than nearby, since it is more difficult to do things at the right time. Timeliness is a surprisingly large element in success.

## Arranging the Crops

There is no one "right" plan for a home garden, but numerous good plans can be developed for any one locality. A plan that is best suited to one family's needs might be undesirable for another's; plans that are good in one part of the country or even one part of a State may be very poorly adapted to some other. The reader of this publication is therefore urged to consider his own needs, the climate of his locality, and his own particular garden spot in planning and arranging his garden. Conditions and details of methods of growing plants differ so widely over the United States that it is not possible to tell here all that gardeners need to know in every locality.

This publication is designed to present the important principles that apply generally, together with approximate directions for different parts of the country. For greatest usefulness it should be supplemented by information obtainable from local sources on spring and fall frosts, on any specially adapted varieties, and on special cultural practices necessitated by any unusual local conditions. Gardeners should obtain the recommendations of their respective State agricultural experiment stations, agricultural extension services, agricultural colleges, and county agents. The State stations are located as follows:

ALABAMA	MAINE	OHIO
Auburn	Orono	Columbus
ARIZONA	MARYLAND	Wooster
Tucson	College Park	OKLAHOMA
ARKANSAS	MASSACHUSETTS	Stillwater
Fayetteville	Amherst	OREGON
CALIFORNIA	MICHIGAN	Corvallis
Berkeley	East Lansing	PENNSYLVANIA
Davis	MINNESOTA	State College
COLORADO	St. Paul	RHODE ISLAND
Fort Collins	MISSISSIPPI	Kingston
CONNECTICUT	State College	SOUTH CAROLINA
Storrs	MISSOURI	Clemson
New Haven	Columbia	SOUTH DAKOTA
DELAWARE	MONTANA	Brookings
Newark	NEBRASKA	TENNESSEE
FLORIDA	Bozeman	Knoxville
Gainesville	NEVADA	TEXAS
GEORGIA	Reno	College Station
Experiment	NEW HAMPSHIRE	UTAH
Tifton	Durham	Logan
IDAHO	NEW JERSEY	VERMONT
Moscow	New Brunswick	Burlington
ILLINOIS	NEW MEXICO	VIRGINIA
Urbana	State College	Blacksburg
INDIANA	NEW YORK	WASHINGTON
La Fayette	Geneva	Pullman
IOWA	Ithaca	Puyallup
Ames	NORTH CAROLINA	WEST VIRGINIA
KANSAS	Raleigh	Morgantown
Manhattan	NORTH DAKOTA	WISCONSIN
KENTUCKY	Fargo	Madison
Lexington		WYOMING
LOUISIANA		Laramie
Baton Rouge		

In a garden that is much longer than wide it is generally more convenient to work with wheeled tools, if the rows run the long way. It matters little whether the rows run north and south or east and west, but on a sloping area it is important that the rows run across the slope, not up and down. Running the rows across the slope, or on the



*Corn and other crops are stunted and ruined when they compete with tree roots for water and soil nutrients.*

contour, helps hold the rainfall on or in the soil instead of letting it rush down the sloping rows and carry away the soil.

Perennial plants, such as asparagus, rhubarb, and various savory herbs, should be kept together at one side of the garden, where they can be conveniently handled without interfering with the part to be plowed or spaded each year.

During the winter before a season's work is started, a detailed plan and schedule of operations should be developed for the garden (see scheme, p. 39). First, a good-sized sketch or map of the garden plot should be drawn, preferably to scale, so that the time and space that each crop will occupy can be set down on the sketch.

Very few town or city gardens can be large enough to supply all the vegetables a family will need in a year, or even all needed during the growing season. Thus, it is especially important that plans be made to insure that one does not plant more of any vegetable at one time than can be used or preserved before that crop becomes too old. Many vegetables remain in good edible condition but a short time; so the seeds for the entire supply desired for the season must not be planted all at once but at intervals. There are, however, difficulties with some vegetables in this matter of successive plantings in regions having short spring seasons and hot summers. Where late plantings of some vegetable suffer from hot weather it is usually better to plant it all early, using a number of varieties that mature successively; for example, early, medium, and late varieties of cabbage. This subject requires considerable knowledge of varieties and of local conditions, but it is so important that it is worth careful study. Additional information will be found under the headings for the individual crops (pp. 24 to 39).

Most beginners tend to plant too much of lettuce, radish, cabbage, spinach, and other quick-growing crops to mature at one time. The result is that some is wasted and then no more is available. A succession of varieties or of plantings will give a much longer period of harvest from the same total amount planted.

Another common failure of many gardeners is that they do not have a definite plan for following each early maturing crop promptly with some other, so as to keep the ground

constantly producing what they want during the growing season. Details of such succession planting should be planned during the winter, when the garden sketch and schedule are being developed. If one waits until one crop is out of the way before deciding what should follow, almost certainly there will be wasted land, seeds, and effort. The idea is not merely to be growing something—just anything—that can be planted somewhere, but to develop a plan that will produce the largest possible amounts of the particular things the gardener wants, at the times he wants them.

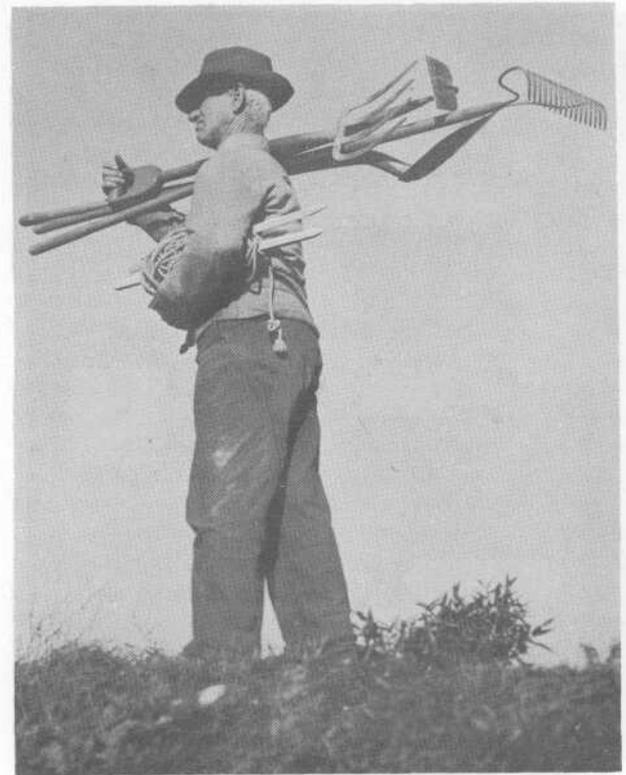
On page 39 is a garden plan that embodies succession cropping, but it is only an example. It is not suitable for all sections or even for all gardeners or localities within one section. This example may, however, serve as a basis from which the gardener can work out improvements that will better suit his requirements and conditions. More detailed information can be obtained for specific localities by writing to the State experiment station (see p. 4 for address).

Insofar as practicable, it is desirable to make the earliest plantings at one side of the garden and work gradually across with later planted crops until all planting or transplanting is completed. Care should be taken, however, to keep the tall-growing crops together and the low-growing crops together to avoid too much shading of the latter. If the rows run approximately east and west, the tall crops should be north of the low-growing crops. The example on page 39 illustrates this point.

## Choosing and Caring for Tools

Very few tools are necessary for a small back-yard or vacant-lot garden. It is better to buy a few simple, high-grade, substantial tools that will serve well for many years than equipment that is poorly designed or made of

*A sunny, well-arranged, small, back-yard garden, late in June. The rows run the long way, and the early, low-growing plants are at one side with successively larger and later bearing plants to the right. Spinach has been harvested and beans planted in the space toward the left.*



*A gardener's equipment may be very simple.*

cheap or low-grade materials that will not last. In most instances, one needs only a good spade or spading fork, a steel bow rake, a 7-inch common hoe with socket handle fitting, a strong cord for laying off rows, and enough garden hose to reach all parts of the garden with water. A trowel is useful in transplanting but is not essential;

*The garden shown on the left in early September. The Chinese cabbage next to the walk followed onions. Carrots, which grew to the left of the chard, have been harvested. The late turnips, which followed beans between the chard and staked tomatoes, are well started.*





*Tools kept clean do a better job and last longer.*



*Frequent hoe sharpening speeds weeding.*



if the soil is properly prepared, plants can be set more easily with the hands alone than with a trowel.

If the garden is larger than about 2,000 square feet a sturdy wheel hoe is very worth while, since it can be used for most work usually done with a common hoe, and with much less effort. The single-wheel type is probably the easiest to handle as an all-purpose wheel hoe, although other styles are very useful and are preferred by some gardeners. It is important that the cultivating tools or attachments for the wheel hoe include one or more of the so-called hoe blades, since they are the best for weeding and will be used more than the cultivator teeth or small plow usually supplied with such equipment.

Tools will last longer and do better work if they are always kept clean and bright. After each use they should be thoroughly cleaned and wiped with heavy oil to prevent rusting. Hand hoes as well as those on wheeled implements should be kept sharp for doing the best work with the least effort.

Rubber garden hose should be handled with special care. It should never be pinched or kinked and should be kept neatly coiled and under cover when not actually in use. A coil of garden hose should never be hung on a single peg or other slender support; two or three pegs should be provided, spaced far enough apart that the weight of the coil will be well distributed, preventing any pinching or breaking.

## Choosing and Caring for Tools



*A well-built, small compost pile in a corner of a city garden. Note the flat top and nearly vertical sides.*



## Soil Preparation and Improvement

### Preparing the Soil

**D**URING LATE WINTER or in early spring before the garden plot is spaded or plowed, all coarse plant remains that would interfere with plowing or spading should be removed. If there are no remains of badly diseased vegetables in this trash it may be placed on the compost pile (see p. 10), but any badly diseased plants from a previous crop should be burned. Crop residues or weeds that can be worked into the soil should be spaded under. Any stones or other debris large enough to interfere with working the soil should be thoroughly removed and hauled away or so placed that no inconvenience or unsightliness will result.

Most town and city gardeners will not be able to hire the plowing of their gardens, so the job will have to be done by hand with a spade or spading fork. In fact, most urban gardens are either so small or so inaccessible to teams or power equipment that hand spading is the only feasible method of breaking the soil. Before proceeding with plowing or spading, one should remember not to work soils when they are wet. There is a great temptation to plow or spade the garden while it is still too wet, in order to make an early start. This error, however, may so "puddle" the soil, packing the particles closely together, that it will be hard and cloddy for weeks or months afterward.

To determine if the soil is dry enough to work, squeeze a handful tightly into a ball and then break it apart with the fingers. If the mass crumbles it is safe to work the soil, but if the soil clings together and cannot be readily broken up it is too wet. Sandy soils dry out more quickly than silty and clay soils. Furthermore, sandy soils are damaged less by working when somewhat wet than are heavy silty or claylike soils.

Areas in sod or that have not been in cultivation for many years should be spaded or plowed in the fall, and such manure or other organic matter as is feasible should be turned under. A cover crop adapted to the locality should be sown if there is time for it to make enough growth to protect the soil before cold weather. If the soil is spaded too late for a cover crop, the surface should be left rough, and generous amounts of straw, strawy manure, leaves, or other coarse organic matter should be chopped into the surface. This may appear a little unsightly, but it will increase absorption of rain and help prevent blowing and washing of the soil. The coarse material

that might interfere with working the ground can be raked off in the spring and put on the compost pile.

Town and city gardeners have more trouble than country gardeners in obtaining manure or other organic matter at a reasonable price—or at any price—to work into their soil. If the soils are very sandy or very heavy and claylike, well-rotted manure, compost, peat, leaves, or some such material is especially valuable for improving their workability and productiveness. Large quantities, up to 15 or 20 tons per acre per year, can be applied with beneficial results to the soil and to most plants, but such applications in the city would be expensive. Manure or other organic matter should be spread evenly over the soil before it is spaded and then worked in thoroughly incidental to spading and fitting the soil for planting. Large amounts of coarse materials or sod preferably should not be turned under immediately before planting because they interfere with cultivation. They should be spaded under in fall (see illustrations, pp. 8 and 9). Sawdust or shavings when finally decayed in the soil have a very beneficial effect on soil structure but have the serious disadvantage of requiring great quantities of nitrogenous fertilizer for their decay. In the absence of really large amounts of nitrate of soda or sulfate of ammonia, sawdust will seriously retard plant growth by tying up all the available soil nitrogen until it is decayed. During periods of fertilizer shortage, as during wartime, sawdust should not be used.

When enough organic matter is not available for properly improving the structure of heavy clays, some advantage will be found in ashes from nonlignite coal. The cinders and clinkers should be screened out and the ashes spread evenly over the soil and spaded in thoroughly. Quantities up to 2 tons can be worked into an area 30 by 50 feet. Coal ashes have no fertilizing value but only improve the workability of heavy soils. Ashes from lignite coals must never be used. Wood ashes have some fertilizing value (5 to 7 percent potash) and are somewhat caustic if they have not been exposed to weathering. On a plot 30 by 50 feet not over 50 pounds of dry, unleached hardwood ashes should be applied annually. This difference between coal and wood ashes is very important.

In spading the garden one should avoid turning up to the surface more than an inch or so of the hard or unweathered subsoil. It is usually recommended that the soil be spaded to a depth of 8 to 10 inches. If spading to 8 inches brings too much undesirable subsoil to the surface, it may be necessary to double spade the plot. This is very laborious and not a common practice in America. If



*A deep sandy loam, which is excellent for gardening, can be improved by mixing in dead leaves or manure. First, the soil should be spaded to about a foot and finely crumbled.*

possible one should obtain a plot having at least 6 to 7 inches of good surface soil, since an area requiring double spading is likely to require much improvement before it can be considered very satisfactory.

If double spading is necessary to loosen up the subsoil beneath a shallow surface soil, it should be done as follows. Starting at the end, spade out a strip a foot or so wide across the plot, removing only the surface soil. On removing this soil, throw it out at the end of the plot, out of the way, but where it can be picked up and later returned to the plot. This will leave an open trench just as deep as the surface layer. The second step is to dig up the subsoil at the bottom of this trench, leaving the subsoil in place after breaking it up. If well-rotted manure or other suitable organic matter is available it should be worked into this subsoil layer at this point. The third step is to spade out the next strip of surface soil, of course continuing on from the strip first spaded out. This strip of surface soil is thrown on top of the recently worked subsoil described in the second step. Naturally, moving the succeeding strip of surface soil exposes a fresh strip of subsoil, which is to be spaded up like the first. This sequence is continued until the plot is all spaded, thus working the surface soil and some of the subsoil but without mixing the two.

Some apparently good surface soils are underlain with a very heavy, tight claypan or hardpan, a layer that is very poor in nutrients and that the roots and moisture can hardly penetrate. When such a layer is very near the surface of the soil, few vegetables can be grown successfully. It is usually necessary to break it up to a depth of

several inches and to work into it some surface soil and manure, or compost, ground limestone, and possibly sand or ashes to "lighten it up." This is a very laborious task and must be done by the double-digging method described above. Claypans or hardpans are often so very hard that a pick or mattock must be used instead of a spade in digging into them.

In using the spade or spading fork the beginner is inclined to dig up too big a "bite" of soil at one stroke, with the result that it cannot be turned over and broken to pieces as nicely as it should be. Effective spading is an art that requires some practice and judgment for properly working over different kinds of soils. Upon lifting up a spadeful of soil one should overturn and shatter or slice it to pieces, leaving a loose crumbled mass.

## *Liming the Soil*

Lime improves the structure of certain heavy soils, but too much of it may prove injurious to most garden crops. As a general rule asparagus, celery, beets, spinach, and sometimes carrots are benefited by the moderate use of lime, especially on soils that are naturally deficient in lime. Most of the garden vegetables do best on soils that are slightly acid, and all vegetables are injured by the application of lime in excess of their requirements. For this reason it should be applied only where it is definitely shown by actual test to be necessary, and in no case should it be applied in larger quantities than the test indicates. (Inquire of your local garden leader, county agent, or experiment station about soil-testing sources

*Next, nonrotted leaves are spread to a depth of 4 to 6 inches at the bottom of the freshly spaded furrow.*



available in your locality. Do not send samples of soil to the U. S. Department of Agriculture.) As a matter of fact most garden soils that are in a high state of fertility do not require the addition of lime. With good drainage, plenty of manure in the soil, and the moderate use of commercial fertilizers, the growth requirements of nearly all vegetables may be fully met.

Where lime is applied it should be spread after plowing and should be well mixed with the topsoil by harrowing, cultivation, forking, or spading. It should not be applied at the same time as commercial fertilizers or manure or mixed with them, on account of the chemical changes that result in the loss of nitrogen, thus destroying the effectiveness of the fertilizers. As a rule lime should not be applied in the fall, on account of its being washed from the soil during the winter. Any of the various forms of lime, such as hydrated and air-slaked lime, may be used. In most cases the unburned but finely ground dolomitic limestone is best. The action of limestone is slower than that of the burned lime. Fifty-six pounds of burned lime and 74 pounds of hydrated lime are equivalent to 100 pounds of ground limestone. Finely ground oystershells and marl are frequently used as substitutes for lime. Lime should not be used on land that is being planted to potatoes, because it increases the development of potato scab.

## Using Manures

The use of barnyard or stable manure on garden land has already been mentioned, but too much stress can hardly be placed upon this important point. The most successful commercial gardeners not only follow the prac-

*Then, the decay of the leaves can be hastened by sprinkling them with a nitrogen-containing fertilizer at the rate of a pound to 5 square yards.*



*Finally, the leaves are buried by covering them with soil from the next furrow.*

tice of plowing or spading under large quantities of manure, but they stack up manure to rot and apply the thoroughly rotted manure as a top dressing when fitting the land for planting. Beans, tomatoes, and potatoes may be injured by the use of too much manure, but it is practically impossible to have the land too rich for most other garden crops.

Poultry and pigeon manures are excellent fertilizers for the garden, but they must be used sparingly as they are very strong and may burn the crops. These manures should be kept under shelter until used and then should be well mixed with the soil, care being taken that no lumps of the manure come in direct contact with the seeds. Not more than 200 pounds of poultry or pigeon manure should be applied to a garden plot 30 by 50 feet in size.

Sheep manure is sold by florists and seedsmen and is an excellent fertilizer for garden crops. Like poultry manure, it is very strong and should be used sparingly. A little pulverized sheep manure worked into the soil near the rows will give the plants a vigorous growth.

As animal manures are relatively low in phosphorus they should be supplemented by superphosphate at the rate of 100 pounds per ton of horse or cow manure and 100 pounds per one-half ton of sheep or poultry manure.

## Using Commercial Fertilizers

The use of commercial fertilizers is advisable, especially where plenty of stable or barnyard manure cannot be obtained. On small intensively planted gardens, fertilizers may be sown broadcast and thoroughly harrowed or raked into the upper 3 to 4 inches of soil. Where applied under-

neath the rows the fertilizer should be well mixed with the soil before the seeds are planted. It is better, however, to apply the fertilizer 2 inches to each side of the seed and a little deeper than the seed (see illustration, p. 13). Apply about 1 pound per 25 to 30 feet of row if rows are 2 feet apart.

Great care must be taken in the use of commercial fertilizers in a small garden, as there is often a tendency to use too much and thereby do more injury than good. From 50 to 60 pounds of a standard fertilizer, such as is used by truck gardeners, may be applied to a plot of ground 30 by 50 feet in size. A fertilizer containing about 5 percent nitrogen, 10 percent phosphoric acid, and 5 percent potash is good.

Commercial fertilizers may be used in moderate quantities as a side dressing for most growing crops. Nitrate of soda and sulfate of ammonia are frequently used in this manner at the rate of about 1 pound per 100 feet of row—with rows 2 feet apart—especially with crops that are grown for their leaves and stems rather than for fruit. Where fertilizer is used as a side dressing, it is best to apply it a short distance from the plants, but where the small feeder roots will reach it. Care should be taken to keep it off the leaves of plants, especially when they are wet. The fertilizer should be worked into the soil immediately after it is spread.

It should be remembered that the best results are obtained with commercial fertilizer where there is plenty of manure or organic matter in the soil. All sods and weeds and the remains of garden plants that are not diseased should be turned under or composted in one corner of the garden, in order to form material with which to enrich the soil.

## Making and Using Compost

Compost is a decayed mixture of soil and organic matter, such as manure and any available plant remains—leaves, lawn clippings, weeds, and crop residues. The soil absorbs the products of decomposition of the organic matter, prevents their loss, helps to give a more desirable texture or consistency to the decayed mass, and makes it easier to use.

Compost may be made by first piling soil and manure or other organic matter in alternate layers in a neat flat-topped pile with vertical sides, so that the organic matter will rot down without leaching or other loss of decomposition products. Layers of soil 1 to 2 inches thick alternate with layers of organic matter about 4 to 5 inches thick, the bottom and the top layers being soil. The pile should be kept moist. If no manure is available as a source of nitrogen to hasten decay of coarse plant material, a few handfuls of fertilizer high in nitrogen can be thrown over each layer of organic matter.



*How the "cutting" of a new compost pile is started. The "cut" and mixed material is immediately below the shovel. At the extreme right note the corner of an older compost pile that has been turned twice.*

When the plant material has so decayed that it can be easily cut through with a spade or shovel, the whole pile should be "cut" by vertical slices about an inch thick down through all the layers (see illustration above). The slicing is started at one end of the pile. As the slices fall to the ground they are mixed somewhat and put in a new pile for further decomposition, after which that pile is sliced down, mixed, and repiled. Two or three turnings, as this process is commonly called, over a period of a year, will usually give a compost of satisfactory fineness and composition.

Compost varies greatly in its composition and physical condition, depending on the nature of the soil and other materials of which it is made and upon the degree of decomposition and mixing. It is usually mixed with additional soil or with sand and soil instead of being used alone. Although good compost may be too rich for use straight in growing plants to harvest, it should not be considered as a fertilizer. It is most valuable for improving the physical condition of the soil, for growing seedlings for transplanting, for covering rows of small seeds, for working into small areas of soil that are especially unfavorable, and for preparing small plots for special purposes. Even after organic matter has been worked into the soil, it is very desirable to apply more as a top dressing immediately after seeding to prevent crust formation and to help keep the soil moist.

## Planting the Vegetables

### Conserving Seeds

A COMPARATIVELY SMALL QUANTITY of seeds is required for planting the average city garden, but these should be obtained in ample time and should be of the highest quality available. The best are the cheapest in the long run. Garden seeds should not be wasted; only enough should be planted to insure a perfect stand. Most gardeners buy too much seed and plant too thickly, not only wasting seeds but actually also reducing yields. Any seeds that are left over should be stored in a tin or glass container in a cool, dry place until needed for later planting.

The particular variety of any seed to buy will depend upon local conditions. In each community there are usually experienced persons who can be relied upon for advice as to the best varieties to obtain for a locality. The recommendations of the State experiment stations should be followed. A number of seed firms offer special garden-seed collections adapted to various conditions and sizes of gardens.

### Classes of Crops

Vegetable crops may be roughly grouped and sown according to their hardiness and their temperature requirements. A rough timetable of planting some of the commoner crops is shown in table 1, based on the frost-free dates in spring and fall. The frost-free date in spring is usually 2 to 3 weeks later than the average date of the last freeze in a locality and is approximately the date that oak trees leaf out.

*Applying organic matter on top of the row immediately after seeding prevents crust formation and helps keep the soil moist.*

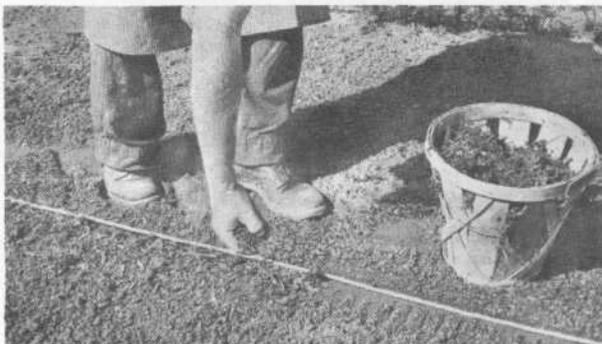


TABLE 1.—Some common vegetables grouped according to the approximate times they can be planted and their relative requirements for cool and warm weather

Cold-hardy plants for early-spring planting		Cold-tender or heat-hardy plants for late-spring or early-summer planting			Hardy plants for late-summer or fall planting except in the North (plant 6 to 8 weeks before first fall freeze)
Very hardy (plant 4 to 6 weeks before frost-free date)	Hardy (plant 2 to 4 weeks before frost-free date)	Not cold-hardy (plant on frost-free date)	Requiring hot weather (plant 1 week or more after frost-free date)	Medium heat tolerant (good for summer planting)	
Broccoli Cabbage Lettuce Onions Peas Potatoes Spinach Turnips	Beets Carrots Chard Mustard Parsnips Radishes	Beans, snap Cucumbers Okra New Zealand spinach Soybeans Squash Sweet corn Tomatoes	Beans, lima Eggplant Peppers Sweetpotatoes	Beans, all Chard Soybeans New Zealand spinach Squash Sweet corn	Beets Collards Kale Lettuce Mustard Spinach Turnips

The gardener naturally wants to make the first planting of each vegetable as early as he safely can, without too much danger of its being damaged by cold. Many vegetables are so hardy to cold that they can be planted a month or more before the average date of the last freeze, or about 6 weeks before the frost-free date. Furthermore, it should be remembered that most, if not all, of these cold-tolerant crops actually thrive better in cool weather than in hot weather and should not be planted late in the spring in the southern two-thirds of the country where hot summers occur. Thus, the gardener must time his planting not only to escape cold but with certain crops also to escape heat. Some vegetables that will not thrive when planted in late spring in areas having rather hot summers may be sown in late summer, however, so that they will make most of their growth in cooler weather.

### Time of Planting

One of the most important elements of success in growing vegetables is the planting or transplanting of each crop at the time or times that are best in each locality. Unfortunately it is not possible in a brief publication like this one to give detailed information on each crop for every different set of conditions in each of the 48 States. Temperatures often differ so much between localities not many



Before the seeds are planted, clods must be broken up and all interfering trash removed by proper use of the rake

miles apart that the best planting dates for some one vegetable may differ by several days or as much as 2 weeks.

A gardener anywhere in the United States can determine his own safe planting dates for different crops by using the maps on pages 14 to 17 of this publication, together with tables 2 and 3.<sup>1</sup> These maps, drawn from United States Weather Bureau originals, show the average dates of the last killing frosts in spring and the average dates of the first killing frosts in fall. These are the dates from which planting times can be determined, and such determinations have been so worked out in tables 2 and 3 that any gardener can use them, with only a little trouble, to find out the planting dates for his locality.

### Use of the Maps and Tables

Table 2, for use with the maps on pages 14 and 15, shows planting dates between January 1 and June 30, covering chiefly spring and early-summer crops. This table shows *how early* it is safe to plant, but it also shows the spring and early-summer dates *beyond which* planting usually gives *poor* results.

Opposite each vegetable in table 2 there are two dates shown in each column. The first date in each particular column is the *earliest generally safe* date that the crop should be sown or transplanted by the gardener using that column. (No gardener needs to use more than one of

<sup>1</sup> The authors gratefully acknowledge the assistance of workers in a number of experiment stations and elsewhere in developing tables 2 and 3. The authors, however, are responsible for the approximate dates shown in the tables.

these columns.) The second date is the latest date that is likely to prove satisfactory for the planting. All times in between these two dates may not, however, give equally good results. Most of the crops listed do best when planted near the earlier date shown.

### How to Determine Spring Planting Dates

To determine the best time to plant any particular vegetable in the spring in your own locality, proceed thus:

1. Find your location on the map on page 14 or 15.
2. Find the solid line on this map that comes nearest to your locality.
3. Find the date shown on this line. *This is the average date of the last killing frost.* On the map the first figure of this date is the month. The second figure is the day. Thus, 3-10 is March 10.
4. Note this date. Once you know this date you will be through with this map.
5. Turn to table 2 and find the column that has your date shown at the head of the column.
6. Draw a heavy line around this entire column. It is the only date column in this table that you will have to use.
7. Find the dates in this column that are on a line with the crop that you want to plant. These dates show the period during which this crop can be planted. The best time is on, or soon after, the first of the two dates. A time halfway between these two dates is also very good, but the second date is not as good.

For locations in the Plains region that warm up quickly in the spring and are subject to dry weather, very early planting is essential to escape heat and drought. In fact, most of the cool-season crops do not thrive when spring-planted in the southern part of the Great Plains and southern Texas.

### How to Determine Late Planting Dates

Table 3 is used with the maps on pages 16 and 17, in the same way, to find the dates for late plantings in summer and fall.

These recommendations for late plantings and for those in the South for overwintered crops are less exact, however, and less dependable than those for the early crops. Factors other than direct temperature effects—summer rainfall, for example, and the severity of diseases and insects—especially in the Southeast, often make success difficult, although some other areas having the same frost dates are more favorable. A date about halfway between the two shown in table 3 will generally be best, although in most locations fair success can be expected within the entire range of the two dates.

Along the northern half of the Pacific coast, warm-weather crops should not be planted quite as late as the frost date and table would indicate. Although frost occurs late, very cool weather prevails for some time before frost, retarding late growth of crops like sweet corn, lima beans, or tomatoes.



*A shallow seed furrow can be made with the end of the hoe handle.*



*A furrow for large seeds like beans should be made with the edge of a hoe.*

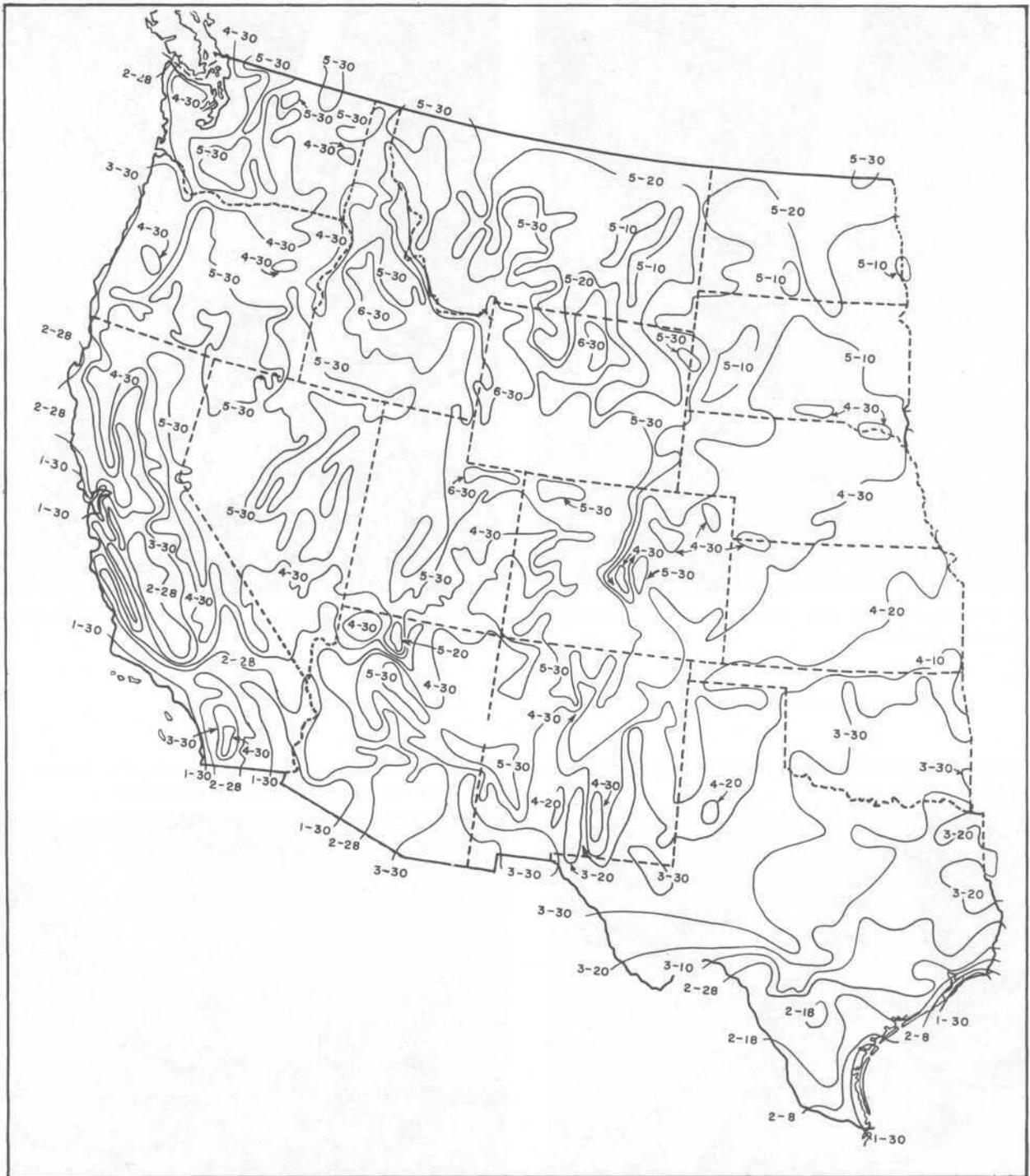


*Setting a tomato plant. Note the soil still clinging to the plant roots.*

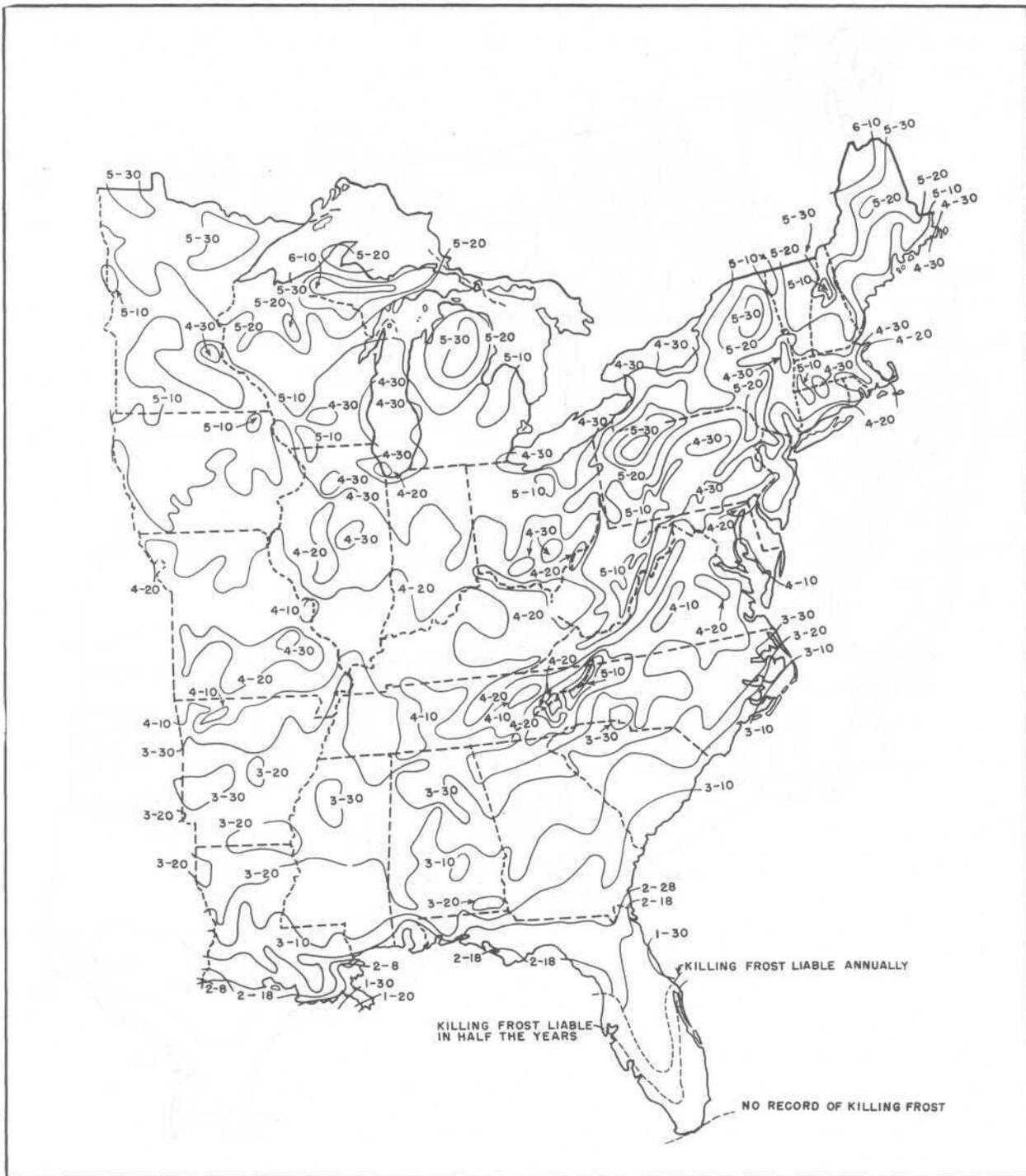


*The seed furrow goes between the bands of fertilizer and is an inch or two shallower.*

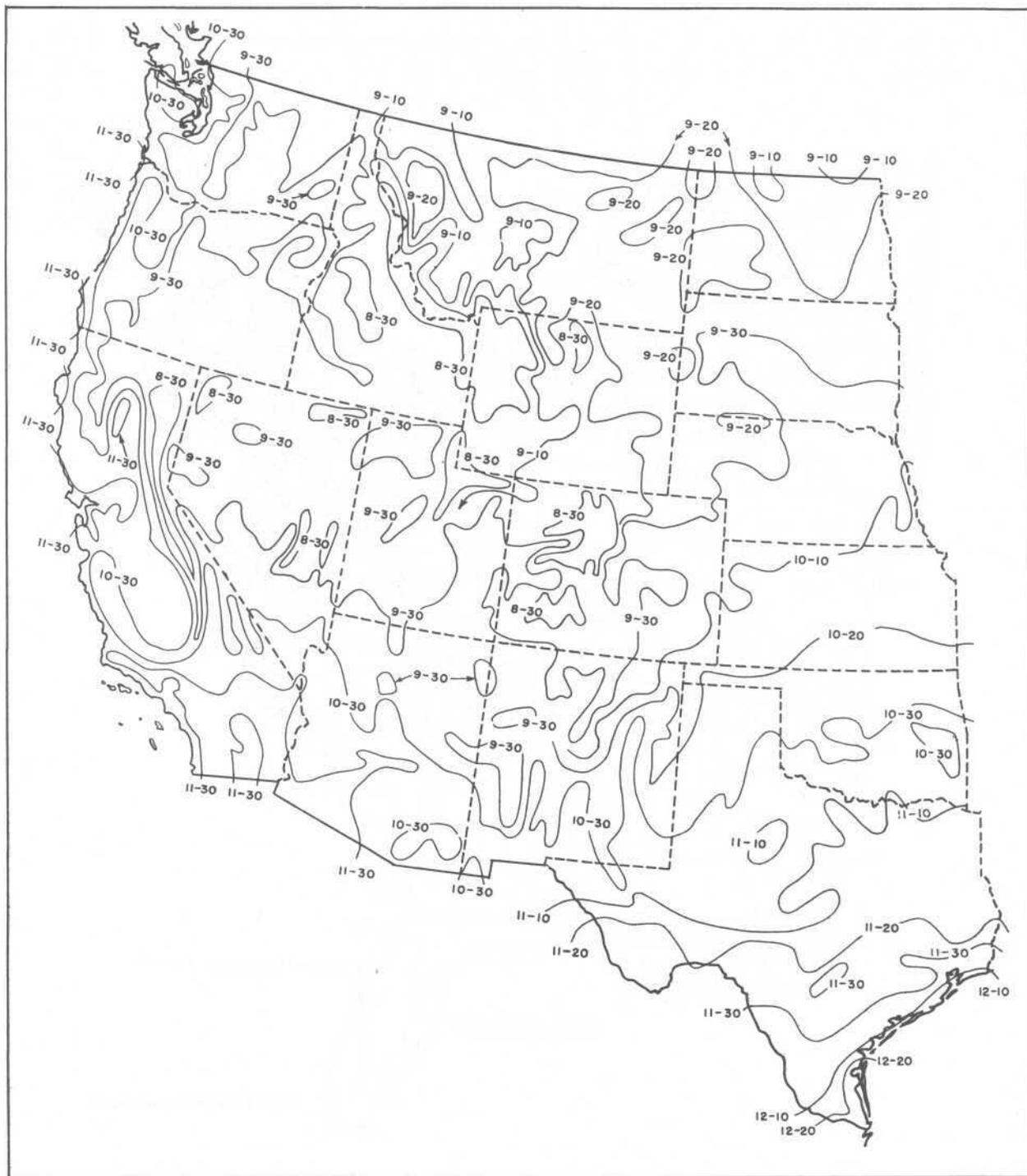




Average dates of the last killing spring frosts in the western United States, 1899 to 1938. Gardeners should locate the line nearest to the locality in which they live, note the date on that line (the first figure indicates the month, the second the day; thus, 3-20 is March 20), and then refer to table 2. Detailed instructions are on page 12. This map and the table on pages 18 and 19 are most useful in the absence of local information. The places to which gardeners should write for State publications are shown on page 4. (Redrawn from U. S. Weather Bureau original.)



Average dates of the last killing spring frosts in the eastern United States, 1899 to 1938. Gardeners should locate the line nearest to the locality in which they live, note the date on that line (the first figure indicates the month, the second the day; thus 3-10 is March 10), and then refer to table 2. Detailed instructions are on page 12. This map and the table on pages 18 and 19 are most useful in the absence of local information. The places to which gardeners should write for State publications are shown on page 4. (Redrawn from U. S. Weather Bureau original.)



*Average dates of the first killing fall frosts in the western United States, 1899 to 1938. Gardeners should locate the line nearest to the locality in which they live, note the date on that line (the first figure indicates the month, the second the day; thus, 11-30 is November 30), and then refer to table 3. Detailed instructions are on page 12. This map and the table on pages 20 and 21 are most useful in the absence of local information. The places to which gardeners should write for State publications are shown on page 4. (Redrawn from U. S. Weather Bureau original.)*



Average dates of the first killing fall frosts in the eastern United States, 1899 to 1938. Gardeners should locate the line nearest to the locality in which they live, note the date on that line (the first figure indicates the month, the second the day; thus, 11-10 is November 10), and then refer to table 3. Detailed instructions are on page 12. This map and the table on pages 20 and 21 are most useful in the absence of local information. The places to which gardeners should write for State publications are shown on page 4. (Redrawn from U. S. Weather Bureau original.)

TABLE 2.—Earliest safe planting dates and range of spring-planting dates for vegetables in the open

[Average frost dates shown in figures on pages 14 and 15]

Crop	Planting dates for localities with average last freeze on—						
	Jan. 30	Feb. 8	Feb. 18	Feb. 28	Mar. 10	Mar. 20	Mar. 30
Asparagus <sup>1</sup>					Jan. 1–Mar. 1	Feb. 1–Mar. 10	Feb. 15–Mar. 20.
Beans, lima	Feb. 1–Apr. 15	Feb. 10–May 1	Mar. 1–May 1	Mar. 15–June 1	Mar. 20–June 1	Apr. 1–June 15	Apr. 15–June 20.
Beans, snap	Feb. 1–Apr. 1	Feb. 1–May 1	do	Mar. 10–May 15	Mar. 15–May 15	Mar. 15–May 25	Apr. 1–June 1.
Beets	Jan. 1–Mar. 15	Jan. 10–Mar. 15	Jan. 20–Apr. 1	Feb. 1–Apr. 15	Feb. 15–June 1	Feb. 15–May 15	Mar. 1–June 1.
Broccoli, sprouting <sup>1</sup>	Jan. 1–30	Jan. 1–30	Jan. 15–Feb. 15	Feb. 1–Mar. 1	Feb. 15–Mar. 15	Feb. 15–Mar. 15	Mar. 1–20.
Brussels sprouts <sup>1</sup>	do	do	do	do	do	do	Do.
Cabbage <sup>1</sup>	Jan. 1–15	Jan. 1–Feb. 10	Jan. 1–Feb. 25	Jan. 15–Feb. 25	Jan. 25–Mar. 1	Feb. 1–Mar. 1	Feb. 15–Mar. 10.
Cabbage, Chinese	(?)	(?)	(?)	(?)	(?)	(?)	(?)
Carrots	Jan. 1–Mar. 1	Jan. 1–Mar. 1	Jan. 15–Mar. 1	Feb. 1–Mar. 1	Feb. 10–Mar. 15	Feb. 15–Mar. 20	Mar. 1–Apr. 10.
Cauliflower <sup>1</sup>	Jan. 1–Feb. 1	Jan. 1–Feb. 1	Jan. 10–Feb. 10	Jan. 20–Feb. 20	Feb. 1–Mar. 1	Feb. 10–Mar. 10	Feb. 20–Mar. 20.
Celery and celeriac	do	Jan. 10–Feb. 10	Jan. 20–Feb. 20	Feb. 1–Mar. 1	Feb. 20–Mar. 20	Mar. 1–Apr. 1	Mar. 15–Apr. 15.
Chard	Jan. 1–Apr. 1	Jan. 10–Apr. 1	Jan. 20–Apr. 15	Feb. 1–May 1	Feb. 15–May 15	Feb. 20–May 15	Mar. 1–May 25.
Chervil and chives	Jan. 1–Feb. 1	Jan. 1–Feb. 1	Jan. 1–Feb. 1	Jan. 15–Feb. 15	Feb. 1–Mar. 1	Feb. 10–Mar. 10	Feb. 15–Mar. 15.
Chicory, witloof					June 1–July 1	June 1–July 1	June 1–July 1.
Collards <sup>1</sup>	Jan. 1–Feb. 15	Jan. 1–Feb. 15	Jan. 1–Mar. 15	Jan. 15–Mar. 15	Jan. 1–Apr. 1	Feb. 15–May 1	Mar. 1–June 1.
Corn salad	do	do	do	Jan. 1–Mar. 1	Jan. 1–Mar. 15	Jan. 1–Mar. 15	Jan. 15–Mar. 15.
Corn, sweet	Feb. 1–Mar. 15	Feb. 10–Apr. 1	Feb. 20–Apr. 15	Mar. 1–Apr. 15	Mar. 10–Apr. 15	Mar. 15–May 1	Mar. 25–May 15.
Cress, upland	Jan. 1–Feb. 1	Jan. 1–Feb. 15	Jan. 15–Feb. 15	Feb. 1–Mar. 1	Feb. 10–Mar. 15	Feb. 20–Mar. 15	Mar. 1–Apr. 1.
Cucumbers	Feb. 15–Mar. 15	Feb. 15–Apr. 1	Feb. 15–Apr. 15	Mar. 1–Apr. 15	Mar. 15–Apr. 15	Apr. 1–May 1	Apr. 10–May 15.
Dandelion	Jan. 1–Feb. 1	Jan. 1–Feb. 1	Jan. 15–Feb. 15	Jan. 15–Mar. 1	Feb. 1–Mar. 1	Feb. 10–Mar. 10	Feb. 20–Mar. 20.
Eggplant <sup>1</sup>	Feb. 1–Mar. 1	Feb. 10–Mar. 15	Feb. 20–Apr. 1	Mar. 10–Apr. 15	Mar. 15–Apr. 15	Apr. 1–May 1	Apr. 15–May 15.
Endive	Jan. 1–Mar. 1	Jan. 1–Mar. 1	Jan. 15–Mar. 1	Feb. 1–Mar. 1	Feb. 15–Mar. 15	Mar. 1–Apr. 1	Mar. 10–Apr. 10.
Florence fennel	do	do	do	do	do	do	Do.
Garlic	(?)	(?)	(?)	(?)	(?)	(?)	(?)
Horseradish <sup>1</sup>						Feb. 1–Mar. 1	Feb. 10–Mar. 10.
Kale	Jan. 1–Feb. 1	Jan. 10–Feb. 1	Jan. 20–Feb. 10	Feb. 1–20	Feb. 10–Mar. 1	Feb. 20–Mar. 10	Mar. 1–Apr. 1.
Kohlrabi	do	do	do	do	do	do	Mar. 1–Apr. 1.
Leeks	do	Jan. 1–Feb. 1	Jan. 1–Feb. 15	Jan. 15–Feb. 15	Jan. 25–Mar. 1	Feb. 1–Mar. 1	Feb. 15–Mar. 15.
Lettuce, head <sup>1</sup>	do	do	Jan. 1–Feb. 1	do	Feb. 1–20	Feb. 15–Mar. 10	Mar. 1–20.
Lettuce, leaf	do	do	Jan. 1–Mar. 15	Jan. 1–Mar. 15	Jan. 15–Apr. 1	Feb. 1–Apr. 1	Feb. 15–Apr. 15.
Mustard	Jan. 1–Mar. 1	Jan. 1–Mar. 1	do	Feb. 1–Mar. 1	Feb. 10–Mar. 15	Feb. 20–Apr. 1	Mar. 1–Apr. 15.
Okra	Feb. 15–Apr. 1	Feb. 15–Apr. 15	Mar. 1–June 1	Mar. 10–June 1	Mar. 20–June 1	Apr. 1–June 15	Apr. 10–June 15.
Onions <sup>1</sup>	Jan. 1–15	Jan. 1–15	Jan. 1–15	Jan. 1–Feb. 1	Jan. 15–Feb. 15	Feb. 10–Mar. 10	Feb. 15–Mar. 15.
Onions, seed	do	do	do	Jan. 1–Feb. 15	Feb. 1–Mar. 1	do	Feb. 20–Mar. 15.
Onions, sets	do	do	do	Jan. 1–Mar. 1	Jan. 15–Mar. 10	Feb. 1–Mar. 20	Feb. 15–Mar. 20.
Parsley	Jan. 1–30	Jan. 1–30	Jan. 1–30	Jan. 15–Mar. 1	Feb. 1–Mar. 10	Feb. 15–Mar. 15	Mar. 1–Apr. 1.
Parsnips			Jan. 1–Feb. 1	Jan. 15–Feb. 15	Jan. 15–Mar. 1	do	Do.
Peas, garden	Jan. 1–Feb. 15	Jan. 1–Feb. 15	Jan. 1–Mar. 1	Jan. 15–Mar. 1	Jan. 15–Mar. 15	Feb. 1–Mar. 15	Feb. 10–Mar. 20.
Peas, black-eye	Feb. 15–May 1	Feb. 15–May 15	Mar. 1–June 15	Mar. 10–June 20	Mar. 15–July 1	Apr. 1–July 1	Apr. 15–July 1.
Peppers <sup>1</sup>	Feb. 1–Apr. 1	Feb. 15–Apr. 15	Mar. 1–May 1	Mar. 15–May 1	Apr. 1–June 1	Apr. 10–June 1	Apr. 15–June 1.
Potatoes	Jan. 1–Feb. 15	Jan. 1–Feb. 15	Jan. 15–Mar. 1	Jan. 15–Mar. 1	Feb. 1–Mar. 1	Feb. 10–Mar. 15	Feb. 20–Mar. 20.
Radishes	Jan. 1–Apr. 1	Jan. 1–Apr. 1	Jan. 1–Apr. 1	Jan. 1–Apr. 1	Jan. 1–Apr. 15	Jan. 20–May 1	Feb. 15–May 1.
Rhubarb <sup>1</sup>							
Rutabagas				Jan. 1–Feb. 1	Jan. 15–Feb. 15	Jan. 15–Mar. 1	Feb. 1–Mar. 1.
Salsify	Jan. 1–Feb. 1	Jan. 10–Feb. 10	Jan. 15–Feb. 20	Jan. 15–Mar. 1	Feb. 1–Mar. 1	Feb. 1–Mar. 1	Mar. 1–15.
Shallots	do	Jan. 1–Feb. 10	Jan. 1–Feb. 20	Jan. 1–Mar. 1	Jan. 15–Mar. 1	Feb. 1–Mar. 10	Feb. 15–Mar. 15.
Sorrel	Jan. 1–Mar. 1	Jan. 1–Mar. 1	Jan. 15–Mar. 1	Feb. 1–Mar. 10	Feb. 10–Mar. 15	Feb. 10–Mar. 20	Feb. 20–Apr. 1.
Soybeans	Mar. 1–June 30	Mar. 1–June 30	Mar. 10–June 30	Mar. 20–June 30	Apr. 10–June 30	Apr. 10–June 30	Apr. 20–June 30.
Spinach	Jan. 1–Feb. 15	do	Jan. 1–Mar. 1	Jan. 1–Mar. 1	Jan. 15–Mar. 10	Jan. 15–Mar. 15	Feb. 1–Mar. 20.
Spinach, New Zealand	Feb. 1–Apr. 15	Feb. 15–Apr. 15	Mar. 1–Apr. 15	Mar. 15–May 15	Mar. 20–May 15	Apr. 1–May 15	Apr. 10–June 1.
Squash, summer	do	do	do	do	Mar. 15–May 1	do	Do.
Sweetpotatoes <sup>1</sup>	Feb. 15–May 15	Mar. 1–May 15	Mar. 20–June 1	Mar. 20–June 1	Apr. 1–June 1	Apr. 10–June 1	Apr. 20–June 1.
Tomatoes <sup>1</sup>	Feb. 1–Apr. 1	Feb. 20–Apr. 10	Mar. 1–Apr. 20	Mar. 10–May 1	Mar. 20–May 10	Apr. 1–May 20	Apr. 10–June 1.
Turnips	Jan. 1–Mar. 1	Jan. 1–Mar. 1	Jan. 10–Mar. 1	Jan. 20–Mar. 1	Feb. 1–Mar. 1	Feb. 10–Mar. 10	Feb. 20–Mar. 20.

<sup>1</sup> Plants.

<sup>2</sup> Planted in fall only. See table 3.

## How to Plant Seeds

Perhaps the most common errors made by inexperienced gardeners are the sowing of too much seed and the failure to thin out excess plants in the rows. The crowding that follows not only causes poor quality in the plants produced but also generally results in very low yields or even failures. Another very common error is planting the seeds too deep; for example, the old custom of planting peas 4 inches deep is definitely wrong under most conditions.

For easy reference, table 4 has been prepared to show (1) how far apart rows of different vegetables should be, (2) how far apart the plants should be left in the row after thinning, (3) how deeply the seeds should be covered, (4) how many seeds should be sown per foot of row, and (5) how much seed or how many plants are needed per 100 feet of row.

The planting depths recommended are for good sandy loam garden soils. On heavier soils, as silty or clay soils,

the seeds should be sown somewhat shallower than indicated; on very light sandy soils they should be sown deeper. In general, seeds should be sown only deep enough to insure that they lie in soil that is moist and are covered deep enough that they will not be splashed out by an ordinary rain.

For small seeds the soil must be worked until fine, smooth, and free of clods, trash, or stones. In making rows about one-fourth to one-half inch deep for planting small seeds, the end of the handle of a rake or hoe may be drawn through the soil along the string that marks the row (see illustration, p. 13). For larger seeds that are to be planted an inch deep or deeper, the row is best opened up with the corner of a common hoe. With a little practice it is possible to make the trench of uniform and proper depth for the kind of seeds to be planted. Irregular depth or covering often causes irregular "come-up" and stand of plants. After the seeds are carefully covered, the soil should be firmed but not packed over them with a rake or hoe (see illustration, p. 25). If

TABLE 2.—Earliest safe planting dates and range of spring-planting dates for vegetables in the open—Continued  
[Average frost dates shown in figures on pages 14 and 15]

Crop	Planting dates for localities with average last freeze on—						
	Apr. 10	Apr. 20	Apr. 30	May 10	May 20	May 30	June 10
Asparagus <sup>1</sup>	Mar. 10-Apr. 10	Mar. 15-Apr. 15	Mar. 20-Apr. 15	Apr. 10-Apr. 30	Apr. 20-May 15	May 1-June 1	May 15-June 1
Beans, lima	Apr. 15-June 30	May 1-June 20	May 15-June 15	May 25-June 15	May 25-June 15	May 25-June 15	May 25-June 15
Beans, snap	Apr. 10-June 30	Apr. 25-June 30	May 10-June 30	May 10-June 30	May 15-June 30	May 25-June 15	May 15-June 15
Beets	Mar. 10-June 1	Mar. 20-June 1	Apr. 1-June 15	Apr. 15-June 15	Apr. 25-June 15	May 1-June 15	May 15-June 15
Beets, sprouting <sup>1</sup>	Mar. 15-Apr. 15	Mar. 25-Apr. 20	Apr. 1-May 1	Apr. 15-June 1	May 1-June 15	May 10-June 10	May 20-June 10
Brussels sprouts <sup>1</sup>	do	do	do	do	do	do	Do.
Cabbage	Mar. 1-Apr. 1	Mar. 10-Apr. 1	Mar. 15-Apr. 10	Apr. 1-May 15	do	May 10-June 15	May 20-June 1
Cabbage, Chinese	(?)	(?)	(?)	do	do	do	Do.
Carrots	Mar. 10-Apr. 20	Apr. 1-May 15	Apr. 10-June 1	Apr. 20-June 15	May 1-June 1	May 10-June 1	Do.
Cauliflower	Mar. 1-Mar. 20	Mar. 15-Apr. 20	Apr. 10-May 10	Apr. 15-June 15	Apr. 25-June 15	May 20-June 1	June 1-June 15
Celery and celeriac	Apr. 1-Apr. 20	Apr. 10-May 1	Apr. 15-May 1	Apr. 20-June 15	do	do	Do.
Chard	Mar. 15-June 15	Apr. 1-June 15	Apr. 15-June 15	do	do	do	Do.
Chervil and chives	Mar. 1-Apr. 1	Mar. 10-Apr. 10	Mar. 20-Apr. 20	Apr. 1-May 1	Apr. 15-May 15	May 1-June 1	May 15-June 1
Chicory, witloof	June 10-July 1	June 15-July 1	June 15-July 1	June 1-20	June 1-15	June 1-15	June 1-15
Collards	Mar. 1-June 1	Mar. 10-June 1	Apr. 1-June 1	Apr. 15-June 1	May 1-June 1	May 10-June 1	May 20-June 1
Corn salad	Feb. 1-Apr. 1	Feb. 15-Apr. 15	Mar. 1-May 1	Apr. 1-June 1	Apr. 15-June 1	Apr. 15-June 15	May 15-June 15
Corn, sweet	Apr. 10-June 1	Apr. 25-June 15	May 10-June 15	May 10-June 1	May 15-June 1	May 20-June 1	May 15-June 15
Cress, upland	Mar. 10-Apr. 15	Mar. 20-May 1	Apr. 10-May 10	Apr. 20-May 20	Apr. 20-May 20	May 1-June 1	May 15-June 15
Cucumbers	Apr. 20-June 1	May 1-June 15	May 15-June 15	May 20-June 15	June 1-15	June 1-15	Do.
Dandelion	Mar. 1-Apr. 1	Mar. 10-Apr. 10	Mar. 20-Apr. 20	Apr. 1-May 1	Apr. 15-May 15	May 1-30	May 1-30
Eggplant <sup>1</sup>	May 1-June 1	May 10-June 1	May 15-June 10	May 20-June 15	June 1-15	June 1-15	Do.
Endive	Mar. 15-Apr. 15	Mar. 25-Apr. 15	Apr. 1-May 1	Apr. 15-May 15	May 1-30	May 1-30	May 15-June 1
Florence fennel	do	do	do	do	do	do	Do.
Garlic	Feb. 20-Mar. 20	Mar. 10-Apr. 1	Mar. 15-Apr. 15	Apr. 1-May 1	Apr. 15-May 15	do	Do.
Horseradish <sup>1</sup>	Mar. 10-Apr. 10	Mar. 20-Apr. 20	Apr. 1-30	Apr. 15-May 15	Apr. 20-May 20	do	Do.
Kale	Mar. 10-Apr. 1	Mar. 20-Apr. 10	Apr. 1-20	Apr. 10-May 1	Apr. 20-May 10	do	Do.
Kohlrabi	Mar. 10-Apr. 10	Mar. 20-May 1	Apr. 1-May 10	Apr. 10-May 15	Apr. 20-May 20	do	Do.
Leeks	Mar. 1-Apr. 1	Mar. 15-Apr. 15	Apr. 1-May 1	Apr. 15-May 15	May 1-May 20	May 1-15	May 1-15
Lettuce, head <sup>1</sup>	Mar. 10-Apr. 1	Mar. 20-Apr. 15	do	do	May 1-June 30	May 10-June 30	May 20-June 30
Lettuce, leaf	Mar. 15-May 15	Mar. 20-May 15	Apr. 1-June 1	Apr. 15-June 15	do	do	Do.
Mustard	Mar. 10-Apr. 20	Mar. 20-May 1	Apr. 1-May 10	Apr. 15-June 1	do	do	Do.
Okra	Apr. 20-June 15	May 1-June 1	May 10-June 1	May 20-June 10	June 1-20	June 1-20	Do.
Onions <sup>1</sup>	Mar. 1-Apr. 1	Mar. 15-Apr. 10	Apr. 1-May 1	Apr. 10-May 1	Apr. 20-May 15	May 1-30	May 10-June 10
Onions, seed	do	Mar. 15-Apr. 1	Mar. 15-Apr. 15	Apr. 1-May 1	do	do	Do.
Onions, sets	do	Mar. 10-Apr. 1	Mar. 10-Apr. 10	Apr. 10-May 1	do	do	Do.
Parsley	Mar. 10-Apr. 10	Mar. 20-Apr. 20	Apr. 1-May 1	Apr. 15-May 15	May 1-20	May 10-June 1	May 20-June 10
Parsnips	do	do	do	do	do	do	Do.
Peas, garden	Feb. 20-Mar. 20	Mar. 10-Apr. 10	Mar. 20-May 1	Apr. 1-May 15	Apr. 15-June 1	May 1-June 15	May 10-June 15
Peas, black-eye	May 1-July 1	May 10-June 15	May 15-June 1	do	do	do	Do.
Peppers <sup>1</sup>	May 1-June 1	May 10-June 1	May 15-June 10	May 20-June 10	May 25-June 15	June 1-15	Do.
Potatoes	Mar. 10-Apr. 1	Mar. 15-Apr. 10	Mar. 20-May 10	Apr. 1-June 1	Apr. 15-June 15	May 1-June 15	May 15-June 1
Radishes	Mar. 1-May 1	Mar. 10-May 10	do	do	do	do	Do.
Rhubarb <sup>1</sup>	Mar. 1-Apr. 1	Mar. 10-Apr. 10	Mar. 20-Apr. 15	Apr. 1-May 1	Apr. 15-May 10	May 1-20	Do.
Rutabagas	do	do	May 1-June 1	May 1-June 1	May 1-20	May 10-20	May 20-June 1
Salsify	Mar. 10-Apr. 15	Mar. 20-May 1	Apr. 1-May 15	Apr. 15-June 1	May 1-June 1	May 10-June 1	Do.
Shallots	Mar. 1-Apr. 1	Mar. 15-Apr. 15	Apr. 1-May 1	Apr. 10-May 1	Apr. 20-May 10	May 1-June 1	May 10-June 1
Sorrel	Mar. 1-Apr. 15	Mar. 15-May 1	Apr. 1-May 15	Apr. 15-June 1	May 1-June 1	May 10-June 10	May 20-June 10
Soybeans	May 1-June 30	May 10-June 20	May 15-June 15	May 25-June 10	do	do	Do.
Spinach	Feb. 15-Apr. 1	Mar. 1-Apr. 15	Mar. 20-Apr. 20	Apr. 1-June 15	Apr. 10-June 15	Apr. 20-June 15	May 1-June 15
Spinach, New Zealand	Apr. 20-June 1	May 1-June 15	May 1-June 15	May 10-June 15	May 20-June 15	June 1-15	June 1-15
Squash, summer	do	do	May 1-30	May 10-June 10	do	June 1-20	June 10-20
Sweetpotatoes <sup>1</sup>	May 1-June 1	May 10-June 10	May 20-June 10	do	do	do	Do.
Tomatoes <sup>1</sup>	Apr. 20-June 1	May 5-June 10	May 10-June 15	May 15-June 10	May 25-June 15	June 5-20	June 15-30
Turnips	Mar. 1-Apr. 1	Mar. 10-Apr. 1	Mar. 20-May 1	Apr. 1-June 1	Apr. 15-June 1	May 1-June 15	May 15-June 15

<sup>1</sup> Plants.

<sup>2</sup> Planted in fall only. See table 3.

the soil tends to pack or form a crust that interferes with the seedling coming through, the covered row should be mulched lightly with muck, peat, leafmold, or similar fine, moisture-holding material; a band 3 to 4 inches wide and 1/2 to 1 inch deep should be enough. Also lawn clippings, leaves, or other organic matter of similar character should be chopped partly into the surface soil to increase absorption of rain and to prevent washing and baking of the surface.

The recommended distances between rows and plants (table 4) are for varieties of about average size, as grown on a garden soil having moderately good fertility and moisture supply. In the "dry-land" parts of the country where no irrigation is available spacings should be wider, since the available moisture is generally too little to support as many plants per unit area as implied. This is a special problem that calls for local information and directions. In general, however, only about a third to a half as many plants can be supported per unit area on "dry land" as under irrigation or on land in the so-called

humid parts of the country. Furthermore, in growing certain very large and vigorous varieties of some crops, the recommended planting distances may be too close. Certain very large varieties that require more room will be mentioned under specific crops (pp. 24 to 39).

## Plants for Transplanting

In general, it is probably better for small gardeners in towns and cities to buy the few plants needed for early transplanting than to grow them. Tomato, cabbage, pepper, and eggplant, in the order named, are the plants most in demand, with pepper and eggplant holding a minor place. Gardeners who have or can build a hotbed or coldframe may be able to produce early plants to better advantage than to buy them, but if only 2 or 3 dozen plants are needed it is more efficient to obtain them elsewhere. This may not be true for plants for late transplanting, seeds for which can be sown in the open without any special facilities.

TABLE 3.—Latest safe planting dates and late range of planting dates for vegetables in the open

[Average first fall freezing dates shown in figures on pages 16 and 17]

Crop	Planting dates for localities with average first freeze on—					
	Aug. 30	Sept. 10	Sept. 20	Sept. 30	Oct. 10	Oct. 20
Asparagus <sup>1</sup>					Oct. 20–Nov. 15	Nov. 1–Dec. 15
Beans, lima				June 1–15	June 1–15	June 15–30
Beans, snap		May 15–June 15	June 1–July 1	June 1–July 10	June 15–July 20	July 1–Aug. 1
Beets	May 15–June 15	do	do	do	June 15–July 25	July 1–Aug. 5
Broccoli, sprouting	May 1–June 1	May 1–June 1	May 1–June 15	June 1–30	June 15–July 15	July 1–Aug. 1
Brussels sprouts	do	do	do	do	do	Do.
Cabbage <sup>1</sup>	do	do	do	June 1–July 10	June 1–July 15	July 1–20
Cabbage, Chinese	May 15–June 15	May 15–June 15	June 1–July 1	June 1–July 15	June 15–Aug. 1	July 15–Aug. 15
Carrots	do	do	do	June 1–July 10	June 1–July 20	July 15–Aug. 1
Cauliflower <sup>1</sup>	May 1–June 1	May 1–July 1	May 1–July 1	May 10–July 15	June 1–July 25	July 1–Aug. 5
Celery <sup>1</sup> and celeriac	do	May 15–June 15	May 15–July 1	June 1–July 5	June 1–July 15	June 1–Aug. 1
Chard	May 15–June 15	May 15–July 1	June 1–July 1	do	June 1–July 20	Do.
Chervil and chives	May 10–June 10	May 1–June 15	May 15–June 15	(?)	(?)	(?)
Chicory, witloof	May 15–June 15	May 15–June 15	do	June 1–July 1	June 1–July 1	June 15–July 15
Collards <sup>1</sup>	do	do	do	June 15–July 15	July 1–Aug. 1	July 15–Aug. 15
Corn salad	do	May 15–July 1	June 15–Aug. 1	July 15–Sept. 1	Aug. 15–Sept. 15	Sept. 1–Oct. 15
Corn, sweet			June 1–July 1	June 1–July 1	June 1–July 1	June 1–July 20
Cress, upland	May 15–June 15	May 15–July 1	June 15–Aug. 1	July 15–Sept. 1	Aug. 15–Sept. 15	Sept. 1–Oct. 15
Cucumbers			June 1–15	June 1–July 1	June 1–July 1	June 1–July 15
Dandelion	June 1–15	June 1–July 1	June 1–July 1	June 1–Aug. 1	July 15–Sept. 1	Aug. 1–Sept. 15
Eggplant <sup>1</sup>				May 20–June 10	May 15–June 15	June 1–July 1
Endive	June 1–July 1	June 1–July 1	June 15–July 15	June 15–Aug. 1	July 1–Aug. 15	July 15–Sept. 1
Florence fennel	May 15–June 15	May 15–July 15	June 1–July 1	June 1–July 1	June 15–July 15	June 15–Aug. 1
Garlic	(?)	(?)	(?)	(?)	(?)	(?)
Horseradish <sup>1</sup>	(?)	(?)	(?)	(?)	(?)	(?)
Kele	May 15–June 15	May 15–June 15	June 1–July 1	June 15–July 15	July 1–Aug. 1	July 15–Aug. 15
Kohlrabi	do	June 1–July 1	June 1–July 15	do	do	Do.
Leeks	May 1–June 1	May 1–June 1	(?)	(?)	(?)	(?)
Lettuce, head <sup>1</sup>	May 15–July 1	May 15–July 1	June 1–July 15	June 15–Aug. 1	July 15–Aug. 15	Aug. 1–30
Lettuce, leaf	May 15–July 15	May 15–July 15	June 1–Aug. 1	June 1–Aug. 1	July 15–Sept. 1	July 15–Sept. 1
Mustard	do	do	do	June 15–Aug. 1	July 15–Aug. 15	Aug. 1–Sept. 1
Okra			June 1–20	June 1–July 1	June 1–July 15	June 1–Aug. 1
Onions <sup>1</sup>	May 10–June 10	May 1–June 1	(?)	(?)	(?)	(?)
Onions, seed	May 1–June 1	do	(?)	(?)	(?)	(?)
Onions, sets	do	do	(?)	(?)	(?)	(?)
Parsley	May 15–June 15	May 1–June 15	June 1–July 1	June 1–July 15	June 15–Aug. 1	July 15–Aug. 15
Parsnips	May 15–June 1	do	May 15–June 15	June 1–July 1	June 1–July 10	(?)
Peas, garden	May 10–June 15	May 1–July 1	June 1–July 15	June 1–Aug. 1	(?)	(?)
Peas, black-eye					June 1–July 1	June 1–July 1
Peppers <sup>1</sup>			June 1–June 20	June 1–July 1	do	June 1–July 1
Potatoes	May 15–June 1	May 1–June 15	May 1–June 15	May 1–June 15	May 15–June 15	June 1–July 15
Radishes	May 1–July 15	May 1–Aug. 1	June 1–Aug. 15	July 1–Sept. 1	July 15–Sept. 15	Aug. 1–Oct. 1
Rhubarb <sup>1</sup>	Sept. 1–Oct. 1	Sept. 15–Oct. 15	Sept. 15–Nov. 1	Oct. 1–Nov. 1	Oct. 15–Nov. 15	Oct. 15–Dec. 1
Rutabagas	May 15–June 15	May 1–June 15	June 1–July 1	June 1–July 1	June 15–July 15	July 10–20
Salsify	May 15–June 1	May 10–June 10	May 20–June 20	June 1–20	June 1–July 1	June 1–July 1
Shallots	(?)	(?)	(?)	(?)	(?)	(?)
Sorrel	May 15–June 15	May 1–June 15	June 1–July 1	June 1–July 15	July 1–Aug. 1	July 15–Aug. 15
Soybeans				May 25–June 10	June 1–25	June 1–July 5
Spinach	May 15–July 1	June 1–July 15	June 1–Aug. 1	July 1–Aug. 15	Aug. 1–Sept. 1	Aug. 20–Sept. 10
Spinach, New Zealand				May 15–July 1	June 1–July 15	June 1–Aug. 1
Squash, summer	June 10–20	June 1–20	May 15–July 1	June 1–July 1	do	June 1–July 20
Squash, winter			May 20–June 10	June 1–15	June 1–July 1	June 1–July 1
Sweetpotatoes <sup>1</sup>					May 20–June 10	June 1–15
Tomatoes <sup>1</sup>	June 20–30	June 10–20	June 1–20	June 1–20	June 1–20	June 1–July 1
Turnips	May 15–June 15	June 1–July 1	June 1–20	June 1–Aug. 1	July 1–Aug. 1	July 15–Aug. 15

<sup>1</sup> Plants.

<sup>2</sup> Generally spring-planted only. See table 2

Too many beginners fail to appreciate the necessity of full sunlight at least 6 hours a day for growing normal plants, even small ones, for transplanting. Seeds can be germinated and seedlings started in a box of soil in a window very easily, but such conditions often are not very satisfactory for growing good seedlings to the stage for setting in the garden as soon as the weather is safe. Plants grown by commercial growers with proper equipment are usually better than those grown with insufficient light and temperature control.

If plants for transplanting cannot be obtained through local merchants, greenhouse operators, or market gardeners, they can often be obtained from plant growers who sell by mail order. Garden magazines, farm papers, and local publications usually carry the advertisements of a number of these plant growers.

When none of the above-mentioned sources appear available or convenient, the gardener may be justified in growing plants for early transplanting. In addition to plants

of tomatoes, cabbage, peppers, and eggplant, it is usually profitable to start lettuce, especially the head type, for transplanting. Those planning to grow their own plants should obtain Farmers' Bulletin 1743, Hotbeds and Coldframes, from the United States Department of Agriculture, Washington 25, D. C., or similar information from their own State sources.

## Transplanting

Contrary to popular belief, transplanting a plant does not in itself stimulate the plant or make it grow any better—actually it checks its growth for a while. Transplanting is done only because it is often necessary to start certain plants in protected places to prevent damage by unfavorable conditions while they are small, or to save space in the garden for use by other plants while those of the crop to follow are being started. Every effort should be made to interrupt the growth of plants as little as

TABLE 3.—Latest safe planting dates and late range of planting dates for vegetables in the open—Continued

[Average first fall freezing dates shown in figures on pages 16 and 17]

Crop	Planting dates for localities with average first freeze on—					
	Oct. 30	Nov. 10	Nov. 20	Nov. 30	Dec. 10	Dec. 20
Asparagus <sup>1</sup>	Nov. 15–Jan. 1	Dec. 1–Jan. 1				
Beans, lima	July 1–Aug. 1	July 1–Aug. 15	July 15–Sept. 1	Aug. 1–Sept. 15	Sept. 1–30	Sept. 1–Oct. 1
Beans, snap	July 1–Aug. 15	July 1–Sept. 1	July 1–Sept. 10	Aug. 15–Sept. 20	do	Sept. 1–Nov. 1
Beets	Aug. 1–Sept. 1	Aug. 1–Oct. 1	Sept. 1–Dec. 1	Sept. 1–Dec. 15	Sept. 1–Dec. 31	Sept. 1–Dec. 31
Broccoli, sprouting	July 1–Aug. 15	Aug. 1–Sept. 1	Aug. 1–Sept. 15	Aug. 1–Oct. 1	Aug. 1–Nov. 1	Do
Brussels sprouts	do	do	do	do	do	Do
Cabbage <sup>1</sup>	Aug. 1–Sept. 1	Sept. 1–15	Sept. 1–Dec. 1	Sept. 1–Dec. 31	Sept. 1–Dec. 31	Do
Cabbage, Chinese	Aug. 1–Sept. 15	Aug. 15–Oct. 1	Sept. 1–Oct. 15	Sept. 1–Nov. 1	Sept. 1–Nov. 15	Sept. 1–Dec. 1
Carrots	July 1–Aug. 15	Aug. 1–Sept. 1	Sept. 1–Nov. 1	Sept. 15–Dec. 1	Sept. 15–Dec. 1	Sept. 15–Dec. 1
Cauliflower <sup>1</sup>	July 15–Aug. 15	do	Aug. 1–Sept. 15	Aug. 15–Oct. 10	Sept. 1–Oct. 20	Sept. 15–Nov. 1
Celery and celeriac	June 15–Aug. 15	July 1–Aug. 15	July 15–Sept. 1	Aug. 1–Dec. 1	Sept. 1–Dec. 31	Oct. 1–Dec. 31
Chard	June 1–Sept. 10	June 1–Sept. 15	June 1–Oct. 1	June 1–Nov. 1	June 1–Dec. 1	June 1–Dec. 31
Chervil and chives	( <sup>2</sup> )	( <sup>2</sup> )	Nov. 1–Dec. 31	Nov. 1–Dec. 31	Nov. 1–Dec. 31	Nov. 1–Dec. 31
Chicory, witloof	July 1–Aug. 10	July 10–Aug. 20	July 20–Sept. 1	Aug. 15–Sept. 30	Aug. 15–Oct. 15	Aug. 15–Oct. 15
Collards <sup>1</sup>	Aug. 1–Sept. 15	Aug. 15–Oct. 1	Aug. 25–Nov. 1	Sept. 1–Dec. 1	Sept. 1–Dec. 31	Sept. 1–Dec. 31
Corn salad	Sept. 15–Nov. 1	Oct. 1–Dec. 1	Oct. 1–Dec. 1	Oct. 1–Dec. 31	Oct. 1–Dec. 31	Oct. 1–Dec. 31
Corn, sweet	June 1–Aug. 1	June 1–Aug. 15	June 1–Sept. 1			
Cress, upland	Sept. 15–Nov. 1	Oct. 1–Dec. 1	Oct. 1–Dec. 1	Oct. 1–Dec. 31	Oct. 1–Dec. 31	Oct. 1–Dec. 31
Cucumbers	June 1–Aug. 1	June 1–Aug. 15	June 1–Aug. 15	July 15–Sept. 15	Aug. 15–Oct. 1	Aug. 15–Oct. 1
Dandelion	Aug. 15–Oct. 1	Sept. 1–Oct. 15	Sept. 1–Nov. 1	Sept. 15–Dec. 15	Oct. 1–Dec. 31	Oct. 1–Dec. 31
Eggplant <sup>1</sup>	June 1–July 1	June 1–July 15	June 1–Aug. 1	July 1–Sept. 1	Aug. 1–Sept. 30	Aug. 1–Sept. 30
Endive	July 15–Aug. 15	Aug. 1–Sept. 1	Sept. 1–Oct. 1	Sept. 1–Nov. 15	Sept. 1–Dec. 31	Sept. 1–Dec. 31
Florence fennel	July 1–Aug. 1	July 15–Aug. 15	Aug. 15–Sept. 15	do	Sept. 1–Dec. 1	Sept. 1–Dec. 1
Garlic	( <sup>2</sup> )	Aug. 1–Oct. 1	Aug. 15–Oct. 1	Sept. 1–Nov. 15	Sept. 15–Nov. 15	Sept. 15–Nov. 15
Horseradish <sup>1</sup>	( <sup>2</sup> )					
Kale	July 15–Sept. 1	Aug. 1–Sept. 15	Aug. 15–Oct. 15	Sept. 1–Dec. 1	Sept. 1–Dec. 31	Sept. 1–Dec. 31
Kohlrabi	Aug. 1–Sept. 1	Aug. 15–Sept. 15	Sept. 1–Oct. 15	do	Sept. 15–Dec. 31	Do
Leeks	( <sup>2</sup> )	( <sup>2</sup> )	Sept. 1–Nov. 1	Sept. 1–Nov. 1	Sept. 1–Nov. 1	Sept. 15–Nov. 1
Lettuce, head <sup>1</sup>	Aug. 1–Sept. 15	Aug. 15–Oct. 15	do	Sept. 1–Dec. 1	Sept. 15–Dec. 31	Sept. 15–Dec. 31
Lettuce, leaf	Aug. 15–Oct. 1	Aug. 25–Oct. 1	do	do	do	Do
Mustard	Aug. 15–Oct. 15	Aug. 15–Nov. 1	Sept. 1–Dec. 1	do	Sept. 1–Dec. 1	Sept. 15–Dec. 1
Okra	June 1–Aug. 10	June 1–Aug. 20	June 1–Sept. 10	June 1–Sept. 20	Aug. 1–Oct. 1	Aug. 1–Oct. 1
Onions <sup>1</sup>	( <sup>2</sup> )	Sept. 1–Oct. 15	Oct. 1–Dec. 31	Oct. 1–Dec. 31	Oct. 1–Dec. 31	Oct. 1–Dec. 31
Onions, seed	( <sup>2</sup> )	( <sup>2</sup> )	Sept. 1–Nov. 1	Sept. 1–Nov. 1	Sept. 1–Nov. 1	Sept. 15–Nov. 1
Onions, sets	( <sup>2</sup> )	Oct. 1–Dec. 1	Nov. 1–Dec. 31	Nov. 1–Dec. 31	Nov. 1–Dec. 31	Nov. 1–Dec. 31
Parsley	Aug. 1–Sept. 15	Sept. 1–Nov. 15	Sept. 1–Dec. 31	Sept. 1–Dec. 31	Sept. 1–Dec. 31	Sept. 1–Dec. 31
Parsnips	( <sup>2</sup> )	( <sup>2</sup> )	Aug. 1–Sept. 1	Sept. 1–Nov. 15	Sept. 1–Dec. 1	Sept. 1–Dec. 1
Peas, garden	Aug. 1–Sept. 15	Sept. 1–Nov. 1	Oct. 1–Dec. 1	Oct. 1–Dec. 31	Oct. 1–Dec. 31	Oct. 1–Dec. 31
Peas, black-eye	June 1–Aug. 1	June 15–Aug. 15	July 1–Sept. 1	July 1–Sept. 10	July 1–Sept. 20	July 1–Sept. 20
Peppers <sup>1</sup>	June 1–July 20	June 1–Aug. 1	June 1–Aug. 15	June 15–Sept. 1	Aug. 15–Oct. 1	Aug. 15–Oct. 1
Potatoes	July 20–Aug. 10	July 25–Aug. 20	Aug. 10–Sept. 15	Aug. 1–Sept. 15	Aug. 1–Sept. 15	Aug. 1–Sept. 15
Radishes	Aug. 15–Oct. 15	Sept. 1–Nov. 15	Sept. 1–Dec. 1	Sept. 1–Dec. 31	do	Oct. 1–Dec. 31
Rhubarb <sup>1</sup>	Nov. 1–Dec. 1					
Rutabagas	July 15–Aug. 1	July 15–Aug. 15	Aug. 1–Sept. 1	Sept. 1–Nov. 15	Oct. 1–Nov. 15	Oct. 15–Nov. 15
Salsify	June 1–July 10	June 15–July 20	July 15–Aug. 15	Aug. 15–Sept. 30	Aug. 15–Oct. 15	Sept. 1–Oct. 1
Shallots	( <sup>2</sup> )	Aug. 1–Oct. 1	Aug. 15–Oct. 1	Sept. 15–Oct. 15	Sept. 15–Nov. 1	Sept. 15–Nov. 1
Sorrel	Aug. 1–Sept. 15	Aug. 15–Oct. 1	Aug. 15–Oct. 15	Sept. 1–Nov. 15	Sept. 1–Dec. 15	Sept. 1–Dec. 31
Soybeans	June 1–July 15	June 1–July 25	June 1–July 30	June 1–July 30	June 1–July 30	June 1–July 30
Spinach	Sept. 1–Oct. 1	Sept. 15–Nov. 1	Oct. 1–Dec. 1	Oct. 1–Dec. 31	Oct. 1–Dec. 31	Oct. 1–Dec. 31
Spinach, New Zealand	June 1–Aug. 1	June 1–Aug. 15	June 1–Aug. 15	June 1–Aug. 15		
Squash, summer	do	June 1–Aug. 10	June 1–Aug. 20	June 1–Sept. 1	June 1–Sept. 15	June 1–Oct. 1
Squash, winter	June 10–July 10	June 20–July 20	July 1–Aug. 1	July 15–Aug. 15	Aug. 1–Sept. 1	Aug. 1–Sept. 1
Sweetpotatoes <sup>1</sup>	June 1–15	June 1–July 1				
Tomatoes <sup>1</sup>	June 1–July 1	June 1–July 15	June 1–Aug. 1	Aug. 1–Sept. 1	Aug. 15–Oct. 1	Sept. 1–Nov. 1
Turnips	Aug. 1–Sept. 15	Sept. 1–Oct. 15	Sept. 1–Nov. 15	Sept. 1–Nov. 15	Oct. 1–Dec. 1	Oct. 1–Dec. 31

<sup>1</sup> Plants.

<sup>2</sup> Generally spring-planted only. See table 2.

possible in moving them from the plant bed to the garden.

On very heavy soils, where seedlings can emerge and become established only with great difficulty, careful transplanting with sturdy seedlings from a special plant bed is a great advantage with lettuce, endive, beets, collards, and related vegetables.

Plants differ greatly in the way they recover from the loss of most of their roots and from being placed under new conditions. Small plants of tomatoes, lettuce, beets, cabbage, and related vegetables are easy to transplant. They withstand this rough treatment better than plants of peppers, eggplant, and the vine crops, which are commonly transplanted. Some other vegetable plants usually recover from transplanting so poorly that the practice is not recommended, even if it should be desirable to get earlier crops by starting them under protection. Beans, carrots, spinach, and sweet corn, for example, are not often transplanted profitably.

For best results, most plants for transplanting should have a mass of soil and undisturbed roots attached. How-

ever, those that recover most easily can be successfully set with no adhering soil and very few roots. The soil of the garden should, of course, be thoroughly worked into a fine loose condition before the plants are set. In transplanting, the hole in the soil can be made with the hand, a peg, or a trowel—whichever is easiest; but the hole should be large enough to receive the roots and any adhering soil of the plant without crowding. Soil is then filled in around the roots and pressed down firmly to insure contact with all the roots. Small plants are easily set in holes made with a peg, the operation being completed simply by pushing the soil firmly back into place around the roots. No air pockets should be left at the bottom of the hole. If the soil is only slightly moist, or at all dry, some water or starter solution is poured on the roots before the filling of the hole with soil is completed. If it is necessary to add water or if starter solution is used the soil about the plant may be actually muddied. Such soil should be pressed about the plant only slightly, since heavy pressure may be followed by caking of the soil.

TABLE 4.—Seeds and space required for vegetables when grown intensively for hand culture

Crop	Approximate distance between—		Depth to cover seeds or roots	Seeds or plants required for—		
	Rows	Plants or hills in rows		1 foot of row or per hill	100 feet of row	1 acre
Asparagus <sup>1</sup>	In. 30	In. 18	In. 8	No. 70 plants		Lbs. 3
Beans, lima (bush)	28	4	1 1/2	4	3/4 pound	100
Beans, lima (pole) <sup>2</sup>	36	24	1 1/2	24	1/2 pound	60
Beans, snap (bush)	28	3	1 1/2	5	3/4 pound	100
Beans, snap (pole) <sup>2</sup>	36	24	1 1/2	24	1/4 pound	40
Beets	16	3	3/4	6	1 ounce	12
Broccoli, sprouting <sup>3</sup>	30	18	1/2	3	1 packet	1/4
Brussels sprouts <sup>3</sup>	30	18	1/2	3	1 packet	1/4
Cabbage <sup>1</sup>	30	18	1/2	3	70 plants	1/4
Cabbage, Chinese <sup>3</sup>	24	10	1/2	4	1 packet	1/4
Carrots	16	1 1/2	1/2	20	1/4 ounce	4
Cauliflower <sup>1</sup>	30	18	1/2	3	70 plants	1/4
Celery and celeriac <sup>1</sup>	24	6	1/2	2	200 plants	1/4
Chard	24	6	3/4	4	1 ounce	12
Chervil	16	2	1/2	15	1/4 ounce	4
Chives	16	2	1/2	15		
Chicory, witloof	20	4	1/2	10	1 packet	2
Collards <sup>3</sup>	30	18	1/2	3	1 packet	1/4
Corn salad	16	10	1/2	5	1 packet	2
Corn, sweet	36	12	1 1/2	2	1/4 pound	15
Cress, upland	16	3	1/4	20	1 packet	2
Cucumbers <sup>2</sup>	72	72	1	12	1/2 ounce	2
Dandelion	16	8	1/4	10	1 packet	2
Eggplant <sup>1</sup>	36	30	1/2	10	40 plants	1/4
Endive	20	10	1/2	10	1 packet	2
Florence fennel	20	4	1/2	20	1/4 ounce	3
Garlic <sup>1</sup>	16	3	1 1/2	4	1 pound	325
Horseradish <sup>1</sup>	30	18	2	2	70 roots	
Kale <sup>3</sup>	24	10	1/2	4	1 packet	4
Kohlrabi	16	4	1/2	10	1/4 ounce	4
Leeks	16	3	1/2	20	1/4 ounce	4
Lettuce, head <sup>1</sup>	16	12	1/2	10	100 plants	1/4
Lettuce, leaf	16	6	1/2	10	1 packet	2
Mustard	16	6	1/2	10	1 packet	2
Okra	36	18	1	3	1 ounce	8
Onions, seed	16	3	1/2	20	1/4 ounce	4
Onions <sup>1</sup>	16	3	1/2	4	1 qt. sets	600
Parsley	16	4	1/4	20	400 plants	3
Parsnips	16	3	1/2	15	1/4 ounce	2
Peas, garden (dwarf)	18	1	1 1/2	12	1 pound	120
Peas, garden (tall)	24	1	1 1/2	12	1 pound	120
Peas, black-eye	28	3	1 1/2	5	1/2 pound	60
Peppers <sup>1</sup>	30	18	1/2	10	70 plants	1/4
Potatoes	30	12	4	1	7 pounds	1,200
Radishes, spring	12	1	1/2	15	1 ounce	12
Radishes, summer or winter	20	3	1/2	20	1/2 ounce	6
Rhubarb <sup>1</sup>	42	42	4	30	30 roots	
Rutabagas	20	4	1/2	20	1/4 ounce	2
Salsify	20	2	1/2	15	1 ounce	12
Shallots <sup>1</sup>	16	2	1/2	10	600 plants	
Sorrel	20	6	1/2	10	1/4 ounce	2
Soybeans	24-36	3	1 1/2	5	1/2-1 pound	45-90
Spinach	12	4	1/2	12	1/2 ounce	10
Spinach, New Zealand	30	12	1	3	1 ounce	4
Squash, bush <sup>2</sup>	48	48	1	10	1/2 ounce	3
Squash, trailing <sup>2</sup>	96	48	1	10	1/2 ounce	2
Sweetpotatoes <sup>1</sup>	36	12	1/2	10	100 plants	
Tomatoes, not staked	48	48	1/2	26	26 plants	1/6
Tomatoes, staked	36	24	1/2	51	51 plants	1/4
Turnips	16	3	1/2	20	1/4 ounce	2

<sup>1</sup> Plants or sets.

<sup>2</sup> Hills of about 4 plants each.

<sup>3</sup> Four or five seeds planted in 1 spot where plants are to stand; later thinned to 1 plant.

Starter solutions are fertilizer solutions added to the plants at transplanting to give them a quick start. They have been used but little and have not always proved definitely beneficial; however, on the lighter soils they appear worth while. A typical solution is prepared as follows: Add one-half pound of 4-12-4 or 5-10-5 fertilizer to 4 gallons of water and stir occasionally for 10 minutes. Drain off the solution and use a cupful (one-half pint) on each plant, as described in the preceding paragraph.

Cabbage, tomato, pepper, eggplant, and other plants set at similar distances should receive 1/2 to 1 pint of water

or solution. Small growing plants that are set closer—such as lettuce, beets, and onions—need the equivalent of only about a pint of starter solution per foot of row. Water alone may be used more generously.

## Flat Culture vs. Raised Beds

As a rule it is not necessary to construct raised beds, ridges, or hills on which to plant vegetables except to facilitate irrigation or to avoid excess surface water in regions of very heavy rainfall. In most of the country flat cultivation of the garden surface is preferred because it involves less work and less danger of damaging shallow-rooted crops through scooping out deep trenches between the rows. Also, a flat-cultivated soil dries out less seriously during mild drought.

In the Gulf coast, southern Atlantic coast, and some other sections of heavy rainfall it is desirable to plant each row on top of a ridge 4 to 8 inches high to keep the plants above excess surface water during and after storms. In the Great Plains and most regions on westward to the Pacific coast, irrigation is necessary during part or all of the growing season. In home gardens it is not necessary to use the rather elaborate and precise bed construction that is common in commercial vegetable growing. Low ridges or moderate furrows are provided as a means of running water between the rows, since the flooding or border method of irrigation is not satisfactory in the home garden.

In gardens where the soil tends to wash, the rows may be on low ridges or slight terraces that run across the slope (on the contours). Soil washed from small gullies or from furrows on light slopes in the garden often can be held from further loss by setting up one or more old boards edgewise at a right angle to the direction of water flow. The boards can be held in place by stakes driven on both sides, and packing a little soil on the uphill side of the dam thus formed will help it hold water.

*After each rain, plants should be cultivated as soon as the soil is fit. The first cultivation or hoeing should be soon after the plants are up.*



## Care of the Garden

A GARDEN REQUIRES some care, or at least should be looked over, almost every day, as stated on page 3. Insects or disease attacks, rapid weed growth, or overmaturity of crops can go too far with surprising speed. In making the original plans one should keep these facts in mind and plan for no more than can be done thoroughly at the proper time. A small area that is well tended can yield much more than one that is too large to be cared for in the right way.

### Cultivating

Weeds rob the cultivated plants of water, nutrients, and even space and light that they require. As soon as the soil can be properly worked after each rain or irrigation, it should be thoroughly hoed or cultivated, to kill weeds that have sprouted and to leave the surface in a loose, friable condition to absorb later rainfall. The primary value of hoeing or cultivating is weed control. This cultivation should be shallow so as to avoid injuring the vegetable plant roots that lie near the surface. Although it is desirable to keep the surface soil loose, there is little to be gained by hoeing or cultivating oftener than necessary to keep weeds out of the garden.

### Mulching

In nonirrigated localities that have frequent periods of insufficient soil moisture, a mulch of straw, dried lawn clippings, leaves, or similar material will help conserve moisture and hold down weeds. To be effective the mulch must be applied between the rows and around the plants early, before the soil dries out. Such a mulch is valuable, too, around nonstaked tomato, cucumber, and bush squash plants to keep the fruits from contact with the soil, thus keeping the fruits clean and reducing losses from certain rot organisms that are carried in the soil. The mulch should be of only medium depth after it has settled down, about 2 inches. A very deep, or thick, mulch may defeat its purpose by absorbing the water from any light rain before it reaches the soil, thus making a water shortage more serious. In rainy areas mulching may be harmful because it helps keep the soil too wet.

Generally, any large quantity of coarse mulching material should be raked off the garden and composted, instead

of being worked into the soil just before crops are planted, because it may interfere with planting or temporarily deplete the available nitrogen supply in the soil. If such mulch material is turned under, much additional nitrogenous fertilizer must be applied to the crops immediately following.

### Watering

In most localities the garden will require a moisture supply equivalent to about an inch of rain a week during the growing season for the best plant growth. It will require roughly that amount of watering per week to maintain good production if the moisture stored in the soil becomes depleted and periods of weeks occur with little or no rain. An inch of rain is equivalent to about 28,000 gallons on an acre, or 900 gallons on a 30- by 50-foot garden.

It is much better to give the garden a good soaking about once a week than to water it sparingly more often. Light sprinklings at frequent intervals do little, if any, good. The best way to apply water, when the soil and slope are suitable, is to run it the length of furrows between the rows until the soil is well soaked. If the soil is very sandy or the surface too irregular for the furrow method, sprinklers or porous irrigating hose must be used.

### Controlling Diseases and Insects

Garden crops are subject to attack by a number of diseases and insects. Preventive measures are best, but if an attack occurs and the city gardener is not familiar with the insect or disease and the proper treatment to protect his crops he is advised to consult the local garden leader or write immediately to his experiment station (see p. 4). The United States Department of Agriculture and many of the States have publications containing the necessary information on garden diseases and insects, and these can be procured free upon request. Detailed information can be found in Home and Garden Bulletin No. 46, *Insects and Diseases in the Home Garden*.

Every gardener should have available either a duster or a sprayer for applying insecticides and fungicides to control insects and diseases, respectively. For small gardens, most gardeners prefer dusters because the use of dust is somewhat easier than the preparation and handling of sprays.

## Culture of Specific Crops

IN THIS SECTION dealing with individual crops and groups of crops, frequent reference to large gardens and to small gardens will be found. These designations are very loose, since a garden that would appear large under one set of circumstances might be considered small in a different situation. In this publication, however, a garden having 3,000 square feet or less is considered small, and greater areas, large.

(See tables 2 to 4 for planting dates, rates, distances, and depths for the several crops.)

Fertilizer requirements for individual crops will be discussed in only a few instances where the general treatments are not satisfactory. It is assumed that if the garden needs it a good application of manure, of complete fertilizer, or of both will be made. (See pages 9 to 10.)

### Choosing Varieties

Commercial seedsmen and public research agencies both are breeding an ever-increasing number of high-quality, productive, new varieties of vegetables, many of which are resistant to one or more diseases and some of which are especially adapted to certain parts of the country. In this publication the new and improved sorts will be mentioned, but they are not always available from small retail stores or mail-order seedsmen. Gardeners should ask for the new kinds that have proved superior, but if they are not available the old established varieties mentioned here are often satisfactory.

The choice of varieties is far more important than most beginners realize. Varieties differ not only in their appearance, but, what is more important, in their ability to yield in certain localities and seasons. The comments on varieties of each crop should be carefully noted.

### Perennial Crops

#### Asparagus

Asparagus should be grown only in large gardens, because it requires so long to come into production and yields comparatively little food per unit of land. It does not produce satisfactorily in the warm climate of the Gulf coast, but does best in the northern half of the country. It is well adapted only to rich, friable soils. Mary Washington is the dominant variety.

Only vigorous 1-year-old roots that have not been allowed to dry out should be planted. Two-year-old roots are often recommended and sold in the belief that their larger size is an advantage, but over a period of years a planting from 1-year-old roots is better. The roots should be set in deeply worked soil, thoroughly enriched with manure and fertilizer, in a trench wide enough to avoid crowding the roots, and about 8 inches deep. In covering the roots, place only about 4 inches of soil over them and then wait for the tops to grow before completing the 8-inch covering. (See tables 2 to 4 for planting dates and directions.)

No asparagus should be harvested the year it is planted. The following year, harvest for only 2 weeks; the second year, for 4 weeks; and the third year for a normal harvest season up to the end of June. The planting may be fertilized either in the spring or at the end of the cutting season with the fertilizer recommended for the garden as a whole. Very thorough weed control at all times is especially important. After frost the dead tops should be removed and burned if they are diseased or infested with insects. If they are clean, they may be allowed to stand until late winter as a soil cover and then removed.

Asparagus shoots should be harvested before the branches toward the tip begin to show, generally when they are 8 to 10 inches long.

#### Chives

Chives, or cives, are small, perennial, onionlike plants that grow in dense clumps and will thrive anywhere that onions do. They are used for flavoring soups and stews. A few clumps are all that are needed for the average home garden. They should be put to one side of the garden with any other perennials or in a border where they will not be in the way of annual plants.

Chives can be started from seeds or by transplanting bulbs from the clump. Every 4 or 5 years the clumps should be taken up, divided, and reset in a new place to prevent their becoming too thick and poor in development. (See tables 2 to 4 for planting dates and directions.)

There are no recognized varieties.

#### Horseradish

Horseradish is a cool-season perennial that is not adapted to the South. A few plants will supply enough roots for preparing grated or ground horseradish as a condiment, or flavoring, for the average family. It probably should not be grown in a very small garden, because the plants are

large and usually occupy a given space for several years. It requires a deep, loose, rich soil.

Horseradish is propagated by planting cuttings or pieces of root 6 to 8 inches long and the size of a pencil. They are usually planted on a slant so that the upper part is about 2 inches deep. (See tables 2 to 4.) As soon as these cuttings sprout in several places along their length, the soil is carefully removed by hand from around the piece, all sprouts are removed except one good cluster near the top, and the soil is then replaced. This helps the development of a plant with a strong, simple root and top instead of a thick cluster of small leaves and roots.

## Rhubarb

Rhubarb, or pieplant, is a hardy, cool-season perennial that is well adapted only to the cooler parts of the country. While it is grown to some extent south of a line through the middle of the United States, growth is not very good in such areas, diseases are more troublesome, and the plantings are shorter lived than in the North.

Rhubarb is usually propagated by transplanting divisions of the crown (large storage roots together with a few leaf buds) of the old plants. It is rarely grown from seed because such plants are not true to the variety that produced the seed. A half-dozen pieces of crown are enough to transplant in the small garden. (See tables 2 to 4 for planting dates and directions.) The plant will grow in any good garden soil, but for good growth it needs more organic matter than most other vegetables.

Rhubarb should not be harvested within a year of transplanting, and only a few stalks should be harvested per plant the second year. After 7 to 8 years the large crowns should be divided and a new planting established. Very old crowns produce crowded, spindling stalks. Seedstalks should be removed as soon as they appear because seed production interferes with the best root and leafstalk development.

Rhubarb stalks are one of the first crops that can be harvested in the spring. The largest stalks are removed from the crown by a sidewise pull. Only the leafstalks are edible. *The leaves must never be eaten because they contain harmful substances that have been known to cause death when eaten.*

Linnaeus and Victoria are old, well-known varieties of rhubarb that are generally available from seedsmen and nurserymen. Valentine, Cherry, Ruby, and MacDonald are newer varieties having more attractively colored stalks.

## Sorrel

Sorrel is not commonly grown in American gardens but is used extensively as a potherb in other lands. It is kin to dock, a wild plant well known to American farmers and often collected when young for spring greens. Sorrel, like dock, puts out a vigorous early-spring growth of leaves from the crown of its large perennial root. If only the outer leaves are harvested for a part of each growing season, a planting will continue productive for several years. Sorrel is usually started from seeds. Production of

leaves is small the first year. (See tables 2 to 4 for planting dates and directions.) Two varieties of sorrel frequently listed in this country are French Broad Leaved and Narrow Leaved (Silver Leaf).

## Annual Crops

### Beans

Snap beans are among the most profitable crops that can be grown in the small garden, since they are generally quite productive at one or more seasons of the year. Lima beans produce somewhat less edible matter than snap beans, but one variety or another is generally worth while except in the northernmost parts of the country or at high altitudes. Dry beans of the field type, such as navy and kidney beans, are rarely desirable in small gardens, because their yield of food is so much lower than that of many other plants. Furthermore, dry beans are easily stored and are available the year round.

Beans will thrive on any good garden soil and are adapted to a wide range of conditions. However, in the eastern half of the country where many garden soils need lime, gardeners must take care to avoid too much of it because that is definitely harmful to snap beans. If stakes are available pole varieties may be an advantage in very small gardens, since they are more economical of space and bear over a longer period.

Pole beans may be planted either in hills of three to four plants with a pole to climb upon or in drills with a wire or wire-and-twine trellis to support the plants.

The pods of snap varieties should be harvested as soon as they attain their maximum length but before the seeds are fully grown or the pods become tough or shriveled.

In most parts of the country a succession of plantings of bush snap beans at about 3-week intervals can be made to keep a fresh supply coming on all through the summer until frost. (See tables 2 to 4 for planting dates and directions.)

Kentucky Wonder and White Kentucky Wonder are widely adapted pole varieties of snap beans. There are a

*Beans and other large seeds are covered with about 1 to 1½ inches of soil with a rake or hoe. The soil is then pressed down over the seeds.*



number of rust-resistant strains of this type, such as Rust-Resistant Kentucky Wonder and Rust-Resistant White Kentucky Wonder. Alabama No. 1 is a pole bean adapted to the South that has shown some resistance to root knot. Columbia, a pole variety, is resistant to curly top. It should be grown only where curly top is a problem in the Mountain and Pacific Coast States, since it is not a superior variety elsewhere.

The most popular green-podded dwarf, or bush, snap beans are Tendergreen, Burpee Stringless Green Pod, Landreth Stringless Green Pod, Bountiful, and Stringless Black Valentine. Topcrop and Tendercrop are widely adapted mosaic-resistant varieties. Contender, also mosaic resistant, is suited to the South. Common wax-podded varieties are Improved Golden Wax, Pencil Pod Black Wax, and Brittle Wax (Round Pod Kidney Wax). A new wax-podded variety developed for the South is Florida White Wax.

Of the pole types of white lima beans, the small-seeded Carolina, or Sieva, is probably the most dependable, although its quality is only fair. King of the Garden is a large-seeded variety of high quality, but under many conditions it is less productive than Sieva. Florida Butter is a purple-and-buff speckle-seeded kind popular in the South.

Henderson Bush and several green-seeded varieties of that type are the most widely adapted lima beans. These include such varieties as Early Thorogreen, Clark Bush, and the mildew-resistant Thaxter. They are dependable bearers but only fair in quality. Fordhook is a favorite large-seeded dwarf kind of high quality but it is often unproductive under adverse conditions. Fordhook 242, a variety of Fordhook type having medium-sized seeds is high in quality and generally more productive than Fordhook in the middle part of the country.

## Beets

Beets are very sensitive to soil acidity, are somewhat sensitive to heat, and do not thrive in the hotter parts of the country in summer. (See tables 2 to 4 for planting dates and directions.) One planting should be made to reach harvest in late fall for storage. Before the tops become old they make excellent greens, especially early in the season. At the first thinning the plants may be left about 1½ inches apart; then alternate plants may be removed for greens before they crowd each other in the row. Beets will tolerate frost and can stand in the garden until the approach of hard freezing. They should be harvested when about 2 inches in diameter.

Globular, or top-shaped, varieties of beets are most popular; among them are Crosby Egyptian, Early Wonder, and various strains of Detroit Dark Red. Strains of the first two when maturing in hot weather (spring-sown) are likely to be streaked inside with light-colored zones alternating with the purple, but this does not impair their food value. Detroit Dark Red is usually grown for fall harvest.

Garden beets are generally damaged little by insects and



*Beets must be thinned to about 3 inches apart before they become crowded in the row, so that they will develop properly.*

diseases except in the intermountain sections where they are attacked by curly top, a virus disease carried by the beet leafhopper. Unfortunately, there is no practical control for curly top on garden beets.

## Sprouting Broccoli

Although sprouting broccoli is a comparatively new crop in America, it is now very popular and widely grown commercially. It is well adapted to home gardens and is grown in essentially the same way as cabbage. Plants can be grown for transplanting, like cabbage, or the seeds for the late crop can be planted in place in the garden. By this latter method 4 or 5 seeds are planted in spots at 18-inch intervals in the rows. The seedlings are later thinned to a single plant per place, some of the thinnings being transplanted into the blank spaces or misses that occur. (See tables 2 to 4 for planting dates and directions.)

Like other members of the cabbage group, this plant responds well to top dressings of nitrogenous fertilizers (p. 10).

Sprouting broccoli is hardy to frost and is an excellent late-fall and winter crop in mild regions. It is subject to the insects and diseases affecting cabbage, which should be controlled in the same way as for cabbage.

Calabrese (Italian Green Sprouting) is a common variety.

Sprouting broccoli should be harvested by cutting the flower clusters together with 3 to 4 inches of fleshy stem when the cluster is well formed but before the flowers show any yellow of the petals. The side branches produce usable clusters after the main central cluster is harvested.

## Brussels Sprouts

Brussels sprouts is definitely a cool-season crop that is well adapted only to the coolest third of the country (see maps, pp. 14 to 17). The plants are hardier than cabbage and may be grown as described for a late crop of cabbage or sprouting broccoli. (See tables 2 to 4 for planting dates and directions.) The plants may be left in

the garden until hard freezing approaches and then dug up and set upright close together in a coldframe or cellar with soil packed over the roots for later use.

When the small heads, or sprouts, begin to crowd where the large leaves are attached to the stem, these large lower leaves may be removed to give the sprouts more room. The top leaves should always remain, since they manufacture nourishment for the developing sprouts.

Fertilizer practices and insect- and disease-control methods for brussels sprouts in the home garden are essentially the same as for cabbage.

## Cabbage

All gardens except the smallest should have at least a few cabbage plants in them. One of the big problems in growing early cabbage for the small family is that of avoiding waste through having too much cabbage all at once, or of obtaining a few heads over a fairly long harvest period. A highly uniform commercial strain tends to reach harvest stage all within a few days. This is what most commercial growers desire, but it does not suit the home gardener. A few plants each of two or three varieties maturing a week or so apart would be desirable if obtainable. If only a single variety is available, it is an advantage for the home gardener if the particular lot of seeds planted lacks uniformity in time of heading.

Spring cabbage must be transplanted very early. (See tables 2 to 4 for transplanting dates and directions.) If the gardener grows his own spring plants in a hotbed and coldframe, seeds should be sown 6 to 8 weeks before transplanting time. For fall cabbage, seeds may be sown in an outdoor bed or a row in the garden 4 to 5 weeks before time to transplant.

Cabbage requires a very fertile soil or heavy applications of fertilizer high in nitrogen for good yields and quality. Two top dressings of nitrate of soda or ammonium sulfate should be made at about monthly intervals after transplanting, in addition to complete fertilizer applied at transplanting time (see p. 10).

Choice of variety for the home garden is very important, and varieties differ markedly in their suitability to different

*Properly spaced Chinese cabbage approaching the harvest stage.*



seasons and regions. In regions of mild winters where the average last spring frost occurs about April 1 to 10 (see map, p. 14 or 15), Early Jersey Wakefield and Charleston Wakefield can be sown in the fall, transplanted about Thanksgiving to Christmas, depending on location, and wintered over as small plants. Other varieties should not be so handled if there are frequent freezes or frosts, lest they go to seed instead of forming heads with the return of growing weather.

Early Jersey Wakefield and Charleston Wakefield are early pointed-head varieties, very hardy but not as high in quality as Golden Acre. Golden Acre is an excellent, early round cabbage for spring transplanting. Copenhagen Market and Glory of Enkhuizen are successively later varieties that are best when spring-planted. Still later kinds are All Seasons, Early Flat Dutch (really a midseason variety), and Succession. The commonest late varieties are Late Flat Dutch and various strains of Danish Ballhead. Strains of the latter are suitable for winter storage, and the other midseason and late varieties named are suitable for making kraut. The late varieties should be grown only in the cooler regions of the country.

In areas where cabbage yellows causes trouble, yellow-resistant varieties should be grown: Marion Market or Globe for midseason, Wisconsin All Seasons for late midseason, and Wisconsin Ballhead for late storage.

## Chinese Cabbage

Chinese cabbage generally does best as a fall crop in the northern half of the country and as a winter crop in the South. It is sensitive to hot weather; so it should be sown in the spring only in the coolest parts of the country.

Chinese cabbage is a succulent and delicately flavored salad plant that should be more generally grown. When sown at the proper time (tables 2 and 3), it is not difficult to grow. The seeds are generally sown thinly in drills or spotted in place and thinned to about 10 inches apart (table 4).

In the Orient there are a great many varieties of Chinese cabbage, but only a few are found in America. Those most commonly grown are Chihili, Wong Bok, Cheefoo, and Chokurei.

## Carrots

Two common difficulties frequently interfere with successful growing of carrots in home gardens. (1) Carrots are not adapted to wet, heavy, claylike, stony, or trashy soils; such soils result in misshaped roots and unsatisfactory yields. (2) It is often difficult to obtain a good stand because the seedlings are delicate and slow growing. Much of this trouble will be avoided if carrots are planted only on deep, loose soil that is free from clods, stones, and trash. If the soil tends to form a crust at the surface, the seedlings may be safely started by covering the seeds in the row only about one-fourth inch deep with soil and then covering the row with leafmold, peat, or similar fine material.

Carrots must be thinned to about 1½ inches apart in the row, if the best roots are to be obtained under most conditions. (See tables 2 to 4 for planting dates and directions.)

Late plantings for a fall storage crop are generally more difficult to handle successfully than early-spring plantings, because of the hotter, drier weather during germination and early life of the plants. However, it is desirable to grow a fall crop wherever possible, since the roots are very hardy to cold and can be left in the garden until the soil freezes. In regions with mild winters carrots can be harvested all winter.

Red Core Chantenay and Nantes are high-quality varieties adapted to home gardens. Nantes, however, is not a good storage variety. Chantenay and Danvers Half Long are also popular sorts.

### *Cauliflower and Heading Broccoli*

Cauliflower and heading broccoli are practically identical in appearance, but they differ markedly in rate of development. Heading broccoli develops much more slowly and is even more exacting in its climatic requirements than cauliflower. Neither crop is well adapted to growing by inexperienced gardeners. Except in the cooler parts of the country, as parts of New York, New England, the high areas of the Rocky Mountain States, and in the Pacific Coast States, cauliflower and heading broccoli are little grown commercially and are not recommended for the average small home garden.

Planting and cultural practices are similar to those for cabbage (tables 2 to 4). Home gardeners who are interested in further information on growing these difficult and often disappointing crops may obtain *Farmers' Bulletin 1957, Cauliflower and Broccoli Varieties and Culture*, from the Office of Information, United States Department of Agriculture, Washington 25, D. C.

### *Celery and Celeriac*

Celery and celeriac belong to the same botanical species and differ chiefly in plant habit. Compared with celery celeriac has a less developed top, or stalks, and a much enlarged root. It is sometimes called turnip-rooted celery. Both the tops and the roots are used in soups and stews.

Celery is one of the more difficult vegetables to grow successfully because it is very exacting in its soil and climatic requirements. It requires a very rich, moist, deep, friable soil and a cool, even climate. It requires about 10 weeks to grow seedlings ready for transplanting. The seeds are extremely small, and the seedlings are delicate, requiring much attention. (See *Farmers' Bulletin 1743, Hotbeds and Coldframes*.) Generally it is more desirable to buy the few plants needed than to try to grow them with inadequate facilities. (See tables 2 to 4 for planting dates and directions.)

The soil for celery requires especially thorough preparation, including working in heavy applications of well-

rotted manure or compost. An ample water supply is also essential. The plants are normally set in a row rather than in beds, to facilitate working soil up to them. Care must be taken to avoid getting soil into the hearts of the plants during transplanting or later when working the soil to them during cultivation.

Formerly celery was nearly always blanched by excluding the light from the stalks. Early celery can be blanched by wrapping black paper around the stalks without covering the leaves. After cool weather arrives, late celery can be blanched by hilling up to the leaves with soil. Banking with soil during warm weather will cause rotting of the stalks. Celery is now more commonly used without blanching, since the higher vitamin content and eating quality of the green celery are better appreciated.

Easy-Blanching and Golden Self-Blanching are common nongreen, easy-blanching varieties of celery for early culture. For fall crops Utah and Giant Pascal are high-quality, late, green sorts.

Celeriac is much less exacting in its requirements than celery. No special cultural preparations or procedures are necessary. If the gardener is interested in celery primarily for its flavor and conditions appear of doubtful suitability for growing celery, celeriac may prove to be a very satisfactory substitute in cookery. Giant Prague is the principal variety. In regions with mild winters the roots may be left in the ground and protected with a mulch of straw or leaves over winter.

### *Chard, or Swiss Chard*

Swiss chard, more commonly called chard in America, is a leafy form of garden beet without an enlarged root that is grown as greens, or a potherb. It is heat-resistant and will furnish greens in summer long after spinach, mustard, and other early-spring greens become unavailable. It is very easy to grow. The young plants may be thinned gradually or successively and the thinnings used for greens, but they must not be allowed to crowd in the row. In harvesting, only the larger outer leaves are cut from the plant, permitting the inner leaves to continue development. Thus a single planting, grown under favorable conditions, will continue to yield heavily through most of the summer. (See tables 2 to 4 for planting dates and directions.)

There are numerous highly decorative varieties of chard, but the very showy ones apparently have no merit over the green varieties except appearance in the garden. Fordhook Giant is very popular because of its dark-green leaves. Lucullus and common green chard are medium green in color.

### *Witloof Chicory*

Witloof chicory, or French endive, is grown mainly for the blanched, succulent leaves obtained by forcing the large storage roots that are produced during a season's growth in the garden. In Europe the tops or leaves of the young plants are sometimes used as greens, but they are bitter and not so desirable as many other potherbs.

A deep, loose, rich soil free from clods, stones, or trash is required for growing chicory roots of good size and shape. Planting dates and directions for witloof chicory are shown in tables 2 to 4. The roots are dug after the tops are killed by cold and stored in a very cool, moist cellar or pit until they are wanted for forcing.

Witloof chicory is forced by placing the roots close together nearly upright with the crowns on the same level in a bed or box of moist soil with the soil just up to the crowns. The soil is thoroughly watered and then 6 to 8 inches of moist, clean sand or fine soil is placed over the crowns. The soil and roots should be kept at about 55° to 60°F. in a warm cellar, in a hotbed, or by any other convenient means until new leaves push up through the covering. This covering should be moist but not soaked with water lest it cause decay of the tender new leaves. These headlike clusters of leaves are then cut from the roots and washed and are ready for use.

### Collards

The collard plant is essentially a cabbage that forms only a large rosette of leaves instead of a head. It is somewhat more resistant to heat than cabbage and is hardy to cold. In regions having the first fall frost about October 30 or later, collards will remain in good edible condition in the garden throughout the winter. Although collards can be grown as a spring crop, they are most commonly grown as a fall crop in the South for a supply of winter greens. The commonest variety, or type, is Georgia. Collards may be harvested any time after the plants are large enough to use or have a spread of 10 to 12 inches. (See tables 2 to 4 for planting dates and directions.)

### Corn Salad

Corn salad is also known as lamb's-lettuce and fetticus. Seeds are sown during the early spring in drills and the plants are cultivated the same as lettuce or mustard (tables 2 to 4). For an extra-early crop the seeds may be planted during the autumn and the plants covered lightly during the winter. In the Southern States covering the plants is not necessary, and the plants are ready for use during February and March. The leaves are frequently used green, but they may be blanched by covering the rows with anything that will exclude the light. Corn salad is used as a salad in place of lettuce, or mixed with lettuce or water cress. Its flavor is very mild, and it is improved by being mixed with some other salad plant. It is also boiled with mustard for greens.

### Sweet Corn

Sweet corn, like potatoes and sweetpotatoes, requires considerable space and is adapted only to large gardens. Although a warm-weather plant, it may be grown in almost all parts of the United States and does well on any good garden soil.

In the South the corn earworm, drought, and heat make it difficult to obtain worth-while results with sweet corn in midsummer. The ears pass the edible stage very quickly, and succession plantings should be made to insure a constant supply. In the North, too, succession plantings need to be made to insure a steady supply. (See tables 2 to 4 for planting dates and directions.) Sweet corn is frequently planted to good advantage after early potatoes, peas, beets, lettuce, or some other early, short-season crop. In some cases, to gain time, it may be planted between the rows of the early crop before the latter is removed.

Experiments have shown that in the eastern part of the country there is no advantage in removing suckers from sweet corn.

Hybrid sweet corn has largely replaced open-pollinated varieties in home gardens, although not so extensively as in commercial plantings for canning or market. There are now available a large number of excellent hybrid sweet corns that are superior in yield and quality, but this does not mean that just any hybrid is superior because it happens to be a hybrid. There are poor hybrids as well as good ones. Home gardeners should obtain seeds of only those known to be good in their locality. The recommendations of State and Federal agricultural agencies should be followed.

*Do not save the seed of hybrid sweet corn for planting.* Because of its particular hybrid character it will not come true to seed. Hybrid seed must be produced anew each year from special parent strains under carefully controlled conditions.

Among the more valuable yellow hybrids, named in order of earliness, are Spancross, Marcross, Carmelcross, Whipcross, Golden Cross Bantam, Calumet, and Ioana. The white hybrids are all rather late; as, Stowell Evergreen Hybrid 14 × 13 and Country Gentleman Hybrid 8 × 6.

Some good open-pollinated yellow varieties, in order of earliness, are Golden Early Market, Golden Sunshine, Golden Bantam, Whipple Early Yellow, and Bantam Evergreen. Well-known white varieties are White Early Market, Early Cory, Whipple Early White, Country Gentleman, and Stowell Evergreen.

In southern gardens where earworm damage is serious, Honey June may be grown. It is white, large, late, and not adapted to the northern two-thirds of the country.

Sweet corn should be harvested in the milk stage, when the kernels exude a thick milk upon being crushed with the thumbnail. The best stage has passed when the contents of the kernel appear doughlike or starchy. As the sugar content of green corn decreases very rapidly after harvest, the corn should be used as quickly as possible.

### Upland Cress

Upland cress, sometimes erroneously called "peppercress," is a hardy, short-season plant that remains in usable condition a very short time. If a supply is desired over an appreciable period, small amounts should be

sown weekly over the spring-planting range shown in table 2. The leaves and young shoots are used as a green salad or cooked as greens. (See table 4 for planting directions.)

## **Cucumbers**

Cucumbers require so much space and produce such a small amount of food per unit area of land that they should not be grown in the smaller gardens (table 4). They are not only frost-sensitive but require warm weather for good development (tables 2 and 3). They also require a very fertile soil, preferably one well supplied with manure or other organic matter. Cucumbers are especially susceptible to various insects and diseases, so that frequent spraying or dusting is necessary.

When grown primarily for slicing, the large varieties should be planted; as, A and C, Marketer, Palmetto, Early Fortune, Straight Eight, and Stays Green (Black Diamond). Small, prolific sorts should be planted for pickles. Some common pickling varieties are National Pickling, Snow Pickling, Boston Pickling, and Chicago Pickling. Shamrock is a mosaic-resistant variety of the white spine type.

Frequent harvesting, removing each fruit before the seeds begin to harden or the color begins to change, will lengthen the time the plants continue to bear. Picking the fruits while small will result in a much larger number of fruits, but the total weight of the crop will be less than if the fruits are allowed to grow larger before they are harvested.

## **Dandelion**

The dandelion is a hardy, cool-climate crop adapted to much the same conditions as kale and spinach. It is grown very little in America, but seeds of improved, cultivated forms are available from seedsmen. It will grow on any good garden soil. If wintered over in the colder parts of the country, it should be mulched lightly with straw or leaves; such wintered-over plants will produce greens very early in the spring. (See tables 2 to 4 for planting dates and directions.) Dandelion is used like spinach. Named varieties include Arlington Thick Leaved, Improved Thick Leaved (French Broad Leaved), and Common French.

## **Eggplant**

In general, eggplant is not a good plant for the beginner or very small gardener to grow. It requires a long, warm season, abundant moisture, a very rich soil, and arduous attention to insect and disease control. Its food value is very low. Three or four good plants will produce enough for a family, but most gardeners are disappointed with results. Two months is required for growing plants ready to transplant, and they must be grown without any check in growth from low temperature, dry soil, or any other causes. (See tables 2 to 4 for transplanting dates and planting directions.)

Florida High Bush, Fort Myers Market, New Hampshire Hybrid, and Black Beauty are common varieties.

Gardeners who wish to grow this rather difficult plant should obtain Leaflet 351, Growing Eggplant, from the Office of Information, United States Department of Agriculture, Washington 25, D. C.

## **Endive**

Endive is similar to lettuce in its soil, cultural, and temperature requirements and in its use, but it is less sensitive to heat. In many areas endive remains good after temperatures have become too warm for good growth of lettuce. It is grown in the South mainly as a winter crop and in the North through the spring, summer, and fall. (See tables 2 to 4 for planting dates and directions.) In cool weather the leaves of large well-formed plants may be drawn together and tied to blanch the inner leaves and to remove some of the bitterness. Tying in this manner in warm, rainy weather, however, may result in decay of the inner leaves. For winter use the plants may be lifted, together with a ball of soil, and placed in a cool, moist cellar or coldframe where they will not freeze.

There are several varieties of endive, the most popular of which are Broad Leaved Batavian and Full Heart Batavian, broadleaved kinds; and Green Curled, a narrow, cut-leaved kind. The broadleaved varieties are often called escarole.

## **Florence Fennel**

Florence fennel, also called finocchio, is a highly flavored salad plant or potherb. Although usually cooked, the tender stalks lend flavor to raw salads. (See tables 2 to 4 for planting dates and directions.) When the base of the leaf cluster reaches about 2 inches in diameter, soil may be mounded around the plants to blanch the lower part. The plant should be harvested before the leafstalks become tough and stringy.

## **Garlic**

A little garlic goes such a long way in most home kitchens that few gardeners will care to bother with raising the small amount desired by the family. The dry bulbs or cloves are generally available in grocery stores. Each garlic bulb contains several small bulbs, or divisions, called cloves. These are separated and then planted and handled like set onions. (See tables 2 to 4.) Garlic, however, is more exacting than onions in its cultural and climatic requirements. It is grown chiefly as a winter crop in the Pacific Coast and Gulf States. Garlic requires rich soil and mild temperature and is sensitive to frequent rainfall.

When the tops fall over, the bulbs are pulled, dried, braided into strings by their tops or tied into bunches, and hung in a cool, dry place where they will not freeze, for later use.

## **Kale**

Kale is a hardy greens plant that can winter over in the garden with no protection, in regions having the average

first fall freeze about the end of October or later. While it also will grow at fairly high temperatures, its eating quality is poor when it is harvested in hot weather. It is one of the very best of fall vegetables, especially in the southern half of the country. In the northern States it can be grown in spring, summer, or fall. (See tables 2 to 4.) Kale is an especially good source of minerals and vitamins in the diet and should be grown in every garden.

Kale will grow in any good garden soil. It may be harvested by cutting the entire plant or by removing only the larger leaves while they are young. Large, old leaves are usually tough and of poor quality. Dwarf Green Scotch Curled is the most popular variety. Dwarf Curled Siberian is lower growing and hardier than Dwarf Green Scotch Curled but less attractive.

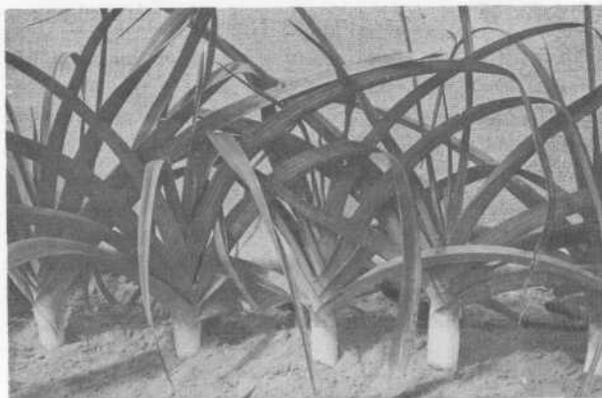
### Kohlrabi

The edible part of the kohlrabi plant, a member of the cabbage family, is the turniplike, swollen stem. It is hardy to cold but intolerant of summer heat in most parts of the country. It is easily grown and is harvested and used like turnips. Early crops may be grown from transplanted plants, but it is usually sown in place. (See tables 2 to 4.) Early White Vienna is the principal variety, but Purple Vienna is also grown.

### Leeks

Leeks are very similar to nonbulbing onions except that the leaves are flat instead of round and hollow. They are used in soups, stews, and any other ways that green onions are used. Leeks are generally grown from seeds (tables 2 to 4) in the same way as onions. Where there is little danger from too much surface water they may be started in a

*Properly spaced kohlrabi plants almost large enough to harvest.*



*Leeks, large onionlike plants, do best in a region of cool to moderate temperatures.*

trench 2 to 3 inches deep to facilitate later hilling up a little to blanch them. They can be used any time after they are as large as usable green onions, but they will attain a diameter of  $1\frac{1}{2}$  inches under good conditions. They may be lifted in autumn with soil on the roots and stored in a cool, moist cellar or coldframe to prevent hard freezing. They will stand mild freezing in the garden without protection.

American Flag (London Flag) and Monster Carentan are common varieties.

### Lettuce

In much of the United States it is difficult for home gardeners to grow good head lettuce from seeds sown in place. Our present head-lettuce varieties are very sensitive to heat and must be grown from early transplants in many regions if good heads are to be obtained before hot weather interferes. Head lettuce requires a very rich soil and will not tolerate drought. Unless good head lettuce is commonly grown in a locality the beginner should be content with leaf varieties which are less sensitive to heat. It requires about a month to grow good-sized lettuce plants for transplanting in early spring. Both types may be transplanted, but leaf lettuce usually does fairly well from seeding in place. (See tables 2 to 4 for planting dates and directions.) Most gardeners fail to thin lettuce to proper distances in the row. It will grow well on a wide range of soil types provided the soil is rich and not strongly acid or alkaline.

In regions where head lettuce is grown commercially, home gardeners may reasonably expect good results from such varieties as the several strains of Imperial and Great Lakes and also Big Boston and White Boston. Elsewhere, it is probably safer to try less exacting varieties such as Mignonette, May King, and Hansonette. Of the leaf lettuces, Slobolt and Salad Bowl are the most tolerant to warm weather.

Cos, or romaine, lettuce is an upright loose-heading kind of excellent quality. It should be handled like head lettuce.

## Mustard

Mustard is a quickly maturing spring or fall crop that will not stand hot weather. (See tables 2 to 4.) A few successive sowings at 10-day intervals in early spring will yield greens for a few weeks. Very large-leaved oriental types such as Elephant Ear, Southern Curled, and Ford-hook Fancy (Ostrich Plume) are grown for greens. The so-called Mustard-Spinach (Tendergreen) is another popular form of oriental mustard. Common black and white mustards go to seed very quickly, produce few leaves, and are grown for their seeds rather than their leaves.

## Okra

Okra, or gumbo, has about the same climatic requirements as cucumbers and squash and may be grown wherever vine crops thrive. It is grown little, however, except in the South, where it is commonly used in soups and mixed vegetable dishes and to some extent cooked alone. Okra will grow on any good garden soil. (See tables 2 to 4). The pods must be harvested only a few days after the bloom falls, before they become tough and fibrous. Allowing pods to remain too long on the plant makes them inedible and also reduces yields of edible pods. Lady Finger and Perkins Mammoth are tall-growing varieties; Dwarf Green, Clemson Spineless, and Emerald are medium height.

The tender pods are sometimes strung on strings and dried for later use in soups and stews.

## Onions

Nearly every gardener wants to grow a few onions, and attempts to grow them are made nearly everywhere. Some variety or kind of green onions can be grown at some season of the year in every place where vegetables can be grown; but mature, dry onions fail too commonly in home gardens because suitable varieties and procedures are not used. Onions are sensitive to weather, insects, and diseases. They require a very rich soil, and only varieties suited to the region should be planted. The planting dates shown for different methods of propagating onions (tables 2 and 3) must be followed carefully if failure is to be avoided. Also gardeners must be sure they are choosing varieties and methods of culture that have chances to succeed.

The commonest method of starting onions in small home gardens is by sets, and under average conditions probably it has the best chance for success. The varieties commonly available as sets, however, will not form good bulbs during the short days of winter in the South, so only green onions can be expected under those conditions. In regions where onions are sown in the fall, for making most of their growth in winter and maturing bulbs in early spring, one should grow only varieties of the Bermuda type, Early Grano or Granex. Farther north, in the middle States, winter sowing of seed under protection and early-spring transplanting of plants of Sweet Spanish and related varieties (and

hybrids) such as Golden Beauty are feasible. Creole should be planted only in the lower South.

Varieties suitable in the North are various strains of Yellow Globe, Southport Red Globe, Southport White Globe, and White Portugal; and the hybrid Abundance.

A number of varieties of multiplier onions are available for use as green onions. The Egyptian (Tree; Top Set) onions are hardy and perennial and should be grown wherever early, green, spring onions are desired. They are generally planted in the fall from the top sets or from divisions of the clump of onions that develops. Only a few yards of row of these are needed in the average garden, and they should be planted out of the way of annual crops.

Plants from spring-sown seeds in the southern and middle parts of the country encounter hot weather, insects, and diseases and frequently fail. In the middle part of the country early-spring planting of sets or transplants is much better. Only in the more northerly States or at high altitudes is spring sowing of seeds likely to give really good results. Onion seeds are short-lived; so fresh seeds should be obtained each year.

Onion seedlings are delicate and cannot make a good start in soil that bakes or forms a crust. Thorough, careful, and timely weeding is especially important, because the seedlings cannot compete with weeds.

When most of the tops of onions in a planting have weakened and fallen over, or become dry, the bulbs should be pulled and dried a few days in trays, in shallow slatted crates, or spread on a floor in a well-ventilated place; then the tops may be removed and the bulbs put in crates for later use. Cool, dry conditions, without freezing, are required for storage.

## Parsley

A row of parsley a few feet long will furnish enough for garnishing purposes, but more is sometimes desired for use in soups and stews. Parsley is hardy to cold but sensitive to heat, thriving under conditions suitable for kale.

When sown at the proper time (tables 2 and 3) parsley will thrive on any good rich garden soil, but the seeds germinate slowly and the seedlings are delicate. Soaking the seeds in water overnight before planting is often an advantage. If the soil tends to bake or form a crust, the planting procedure described for carrots in such cases (p. 27) should be followed.

Paramount and Moss Curled are the most popular varieties for garnishing, while Plain parsley is grown to some extent for cooking. Hamburg or Turnip-Rooted parsley is grown for its much enlarged root, which looks somewhat like a parsnip but tastes more like celery. It is grown like common parsley, and the roots are handled, stored, and used like parsnips, celeriac (p. 28), and similar root crops.

## Parsnips

Parsnips can be grown in most parts of the United States, but they do best in the northern half of the country

where they can be spring-sown, can grow during a mild summer, and can be harvested after cold weather arrives. (See tables 2 and 3.) The eating quality is rather low unless the roots have been exposed to temperatures near freezing for a few weeks before use. They do not grow well during the summer in the South, and when planted there for early-summer maturity the quality is low. Also it is difficult to start seedlings in hot weather in time to grow a fall crop in the South, and they are highly susceptible to the root knot nematode. Parsnip seeds are short-lived, so fresh seeds should be obtained each year.

Parsnip seeds germinate slowly, and they require a fertile, loose, deep soil. The seedlings are delicate, so special steps may be necessary in order to get good stands, as described for carrots (p. 27). (See table 4 for planting directions.) Hollow Crown (Guernsey) and Ideal are good varieties.

Parsnips may be dug and stored in a cellar or pit or left in the ground until used. Roots placed in cold storage above freezing gain in quality faster than those left in the ground, and freezing in the ground in winter improves the quality. There is no basis for the belief that parsnips that remain in the ground over winter and start growth in the spring are poisonous. The reported cases of poisoning from eating so-called wild parsnips have all been traced to the poisonous waterhemlock (*Cicuta*), a plant that belongs to the same family. The plant resembles the parsnip somewhat, and uninformed persons should not use wild plants of this type.

### Peas (Garden, or English)

Although the garden pea, called English pea in the South, is a most important food crop in America, it is not well suited to small gardens in most parts of the country. Fresh peas are highly nutritious and delightful to eat, but they take too much seed, space, time, and work to grow, harvest, and prepare, in comparison with many other vegetables that might better be grown. They are very sensitive to hot weather and are rather a gamble in many parts of the country.

Very early planting is essential for success with spring-sown peas (table 2). Fall-sown peas (table 3) are rarely as successful as the spring crop and are not generally recommended for the small garden except in the Southwest and the Gulf States. Successive plantings of spring peas at 10-day intervals will lengthen the period over which they are available for harvest, but the later plantings produce low yields and frequent failures wherever the spring weather warms up rapidly. Gardeners who consider growing peas should keep all these limitations in mind.

Aside from the special attention that must be given to time of planting and to choice of varieties, the cultural methods required for peas are among the simplest for any vegetable (table 4). They will thrive on any good garden soil.

Tall varieties should be provided with brush, small branches 3 to 4 feet high from trees or shrubs, stuck upright along the rows as supports for the plants. A light

trellis about 3 feet high, made of heavy string or light stakes, is often used.

Alaska is the most widely grown of all pea varieties in America because it is one of the earliest, hardiest, and surest to make a fair yield. Its quality, however, is not high. Laxton Progress, Hundredfold, and Little Marvel are good, medium-early, dwarf varieties of higher quality than Alaska, but they are more susceptible to heat and other adverse conditions. Stratagem is a late dwarf variety adapted only to areas having a long, cool growing season. Of the tall varieties, World Record and Thomas Laxton are early; Alderman (Telephone) is late.

Peas yield the maximum food value when the seeds have become fully grown, but the most pleasing eating quality is obtained a few days before this stage. Very immature and undeveloped seeds may be considered a great delicacy, but harvesting at such a stage gives very low yields. The pods generally should be harvested only after they appear well filled, but before the pods begin to fade in color with approaching maturity.

### Peas (Black-Eye and Crowder)

In the South, the unqualified word pea usually refers to the black-eye or some edible cowpea, a species entirely different from garden, or English, pea. The black-eye is a heat-loving plant, well adapted to summer culture in the South (tables 2 and 3) but not adapted to the northernmost States or to high altitudes. It is widely grown in gardens and is generally used as green shell beans are used; the pods are harvested after the seeds are well developed and can be easily removed from the pods, but before the pods begin to dry out. The pods may be used as snap beans, usually mixed with the shelled seeds. The seeds also are used extensively as dry beans. Planting directions are given in table 4.

There are numerous strains of the Black-Eye type, among them California Black-Eye, Extra Early Black-Eye, and Large Black-Eye. Other popular varieties are Brown Crowder (Sugar Crowder), Cream Crowder, Conch, and Cream Lady.

The so-called yard-long bean, or asparagus-bean, is a closely related species that produces pods up to 3 feet long. It is, however, less productive than the other varieties named and less desirable as a food plant.

### Peppers

Although peppers are not a major article of food, they are being used more and more generally on the American table. It is probably unwise to include them in very small gardens, since the food they produce per unit area is small. In small gardens, however, 1 or 2 dozen pepper plants add worth-while variety to the vegetable supply.

Peppers are warm-weather plants, having requirements somewhat like tomatoes but more exacting. They are more sensitive to cool weather than tomatoes, require more heat, and should be planted a little later in the spring. (See tables 2 and 3.) They require a good, rich soil and must be kept growing rapidly. A check in growth of seedlings or in growth of transplanted plants by cool

weather, dryness, or poor soil seriously reduces yields. Any neglect or adverse condition is generally more harmful to peppers than to tomatoes. (See table 4 for planting directions.) Two months is required to grow plants for transplanting.

Some popular sweet varieties for home gardens in regions of cooler, shorter summers are Early Giant and Windsor-A. For most of the country Worldbeater, California Wonder, and Ruby King are good varieties. Perfection is the principal variety of the pimiento type, grown chiefly for canning; it is not so widely adapted as the other varieties named, so is not recommended for the average home gardener. Red Cayenne and Red Chili are hot kinds commonly grown for flavoring.

Sweet peppers should be allowed to become fully grown before harvest. The immature fruits are soft and yielding to pressure between the fingers; they become firm and crisp when fully grown but before they turn color. Ripe peppers are richer in vitamins A and C than green ones.

## Potatoes

Potatoes are one of the most productive vegetables in terms of food per unit area of land under proper growing conditions. Because liberal supplies are always on the market, potatoes are not recommended for small gardens. They should be grown in all large gardens.

Potatoes, a cool-season crop, do not thrive in midsummer in the southern half of the country. (See tables 2 and 3 for planting dates.) They are adapted to a wide range of soils, but usually the tubers are misshapen on stiff, heavy clay. Potatoes respond well to generous fertilization, but on too heavily limed soil the tubers may be scabby. Scab, a soil-borne disease, does not damage the tubers if the soil is kept acid. Farmyard manure should be well decomposed and applied well before planting. Commercial fertilizers can be applied at planting but should be mixed with the soil so that the seed pieces will not come in direct contact with the fertilizer. The amount of fertilizer to use depends on the soil and available moisture. In the North 5-8-5 or 5-8-7 fertilizer is often applied at the rate of about 1 pound per 8 to 10 feet of row and double-strength fertilizer at the rate of about  $\frac{1}{2}$  pound per 8 to 10 feet of row. (See table 4 for planting directions.)

Many varieties of potatoes are grown commercially in this country. Some yield well under certain conditions but poorly under others. In choosing varieties for your home garden, therefore, make sure in advance, by consulting your county agent or State agricultural experiment station, that the varieties you select are adapted to the conditions under which you will grow them.

In the northern, or main potato-growing, region two types of potatoes should be planted: One that produces tubers early for summer use and the other, requiring a longer growing period, for winter use. Both should be planted as early as conditions permit. Varieties of the first type are Irish Cobbler, Warba, and Red Warba. Chippewa, a midseason variety, usually gives high yields of high-quality tubers. The best late varieties are Katahdin, Kennebec, Sebago, Sequoia, Pontiac, and Rural New

Yorker No. 2. Irish Cobbler is the most widely adapted early variety and Katahdin the most widely adapted late, but other varieties are often preferred. In the Great Plains, Triumph is preferred for summer use and Katahdin and "Rural" for winter. In the Pacific Northwest, Russet Burbank (Netted Gem), White Rose, Katahdin, and Sebago might be recommended for the late crop.

In the South, where one crop is planted in early spring and another about midsummer, varieties are very important. Irish Cobbler and Triumph have been standard for the spring crop for many years, but they are being replaced in some sections by new varieties. In home gardens Red Warba, Warba, Katahdin, Chippewa, and Sebago often outyield standard varieties. For best results three varieties might be grown: Red Warba, very early; Chippewa, intermediate; and Katahdin, late. They should be planted as early as possible. For midsummer planting Irish Cobbler and Dakota Red give fair results, but often Katahdin, Sebago, Sequoia, and Pontiac (a late red-tuber variety) give higher yield and better quality. Spring-crop tubers for storage should not be harvested until the plants mature. They should be handled carefully and not stored permanently until a firm skin develops.

## Radishes

Radishes are primarily cool-season plants that will tolerate neither summer heat nor hard freezing, but they will thrive on any good garden soil. The small varieties of radishes are ready for use sooner after they are sown than any other vegetables, requiring but 3 to 4 weeks under good conditions. They remain edible such a short time that successive sowings of a few yards of row each should be made at about 10-day intervals if they are to be available over a period of weeks. (See tables 2 to 4.) The large, so-called winter radishes require 8 to 10 weeks for development, are more tolerant to heat than the small varieties, and have a very firm, very pungent flesh.

The most popular, small, round radishes are various strains of Scarlet Globe, Sparkler, and Scarlet Turnip; early, small, long kinds are Long Scarlet Short Top (Cincinnati Market) and White Icicle. The long varieties require a few days more than the round ones to reach harvest stage and unless soil and climate are right are not quite so dependable. Some common winter varieties are Long Black Spanish, Round Black Spanish, Chinese Rose Winter, and Chinese White Winter (Celestial).

## Rutabagas

Rutabagas, or Swede turnips, differ from common turnips in a number of respects. Most varieties of rutabagas require about a month longer to reach harvest stage than do most varieties of turnips. Rutabaga leaves are smooth, waxy, and bluish green like cabbage leaves, while turnip leaves are hairy and have no waxy covering. Rutabaga roots average 1 to 2 percent higher in dry matter than turnips, and generally a more distinct neck is formed atop the root than in turnips. There are both yellow- and white-fleshed varieties of rutabagas as well as of turnips. Because of their longer growing period and equal or greater

sensitivity to heat as compared with turnips, rutabagas are not so well adapted to growing in the southern and middle States. They really thrive only in those districts north of a line through New York City and Chicago and westward.

Rutabagas will grow on any good garden soil. (See tables 2 to 4 for planting dates and directions.) They are hardy to frost, but will not tolerate hard freezing. Fall-harvested rutabagas can be stored several months in a cool, moist place, preferably just above freezing temperature.

American Purple Top is the principal variety grown in this country. Early Neckless and Bangholm are somewhat similar varieties.

### *Salsify*

Salsify, also called oysterplant and vegetable-oyster, is a hardy root crop that requires a fairly long growing season. Its requirements and the methods of growing, handling, and using it are essentially the same as described for parsnips (p. 32). Its appearance, however, is quite different. (See tables 2 to 4 for planting dates and directions.) Salsify seeds are short-lived, so fresh seeds should be obtained each year.

Mammoth Sandwich Island is the principal variety of common salsify. A different species, *Scorzonera*, or black salsify, is grown to a very limited extent in the same way as common salsify. It is a perennial having long slender roots that are black outside and white inside and is more susceptible to adverse conditions than common salsify.

### *Shallots*

Shallots are a kind of multiplier onion that produces a very desirable form of scallions, or green onions, for early-spring use. Although this form of onion produces seeds under favorable conditions and can be grown from seeds, it is almost always propagated by planting small divisions or shoots that develop in the clump of plants. Shallots are grown chiefly in the lower South as a winter crop from plant divisions set in the fall. Winter- and spring-planted shallots in the lower South sometimes produce seedstalks and virtually stop their first season's growth before a worth-while harvest is attained. (See tables 2 to 4 for planting dates and directions.)

Specific varieties of shallots are not recognized, but the type most commonly grown is often called Louisiana shallot.

### *Soybeans*

Vegetable varieties of soybeans showed some popularity in America during World War II but have gained little since then. The soil and cultural requirements and methods of growing them are essentially the same as for bush forms of common beans. Soybeans, however, are slower growing than most garden beans, requiring 3 to 5 months for maturity, and warmer weather. They also are taller

growing, the larger, later varieties requiring a greater distance between rows than dwarf snap beans. Small, early varieties may be planted in rows as close as 2 feet, but the larger, later ones require 3 feet between rows. (See table 4.) The planting dates given in tables 2 and 3 are for midseason varieties (about 120 days), neither the earliest nor the latest kinds. Differences in time of development among varieties are so great that the gardener must choose the proper variety and know its time of maturity in making plans for planting in any particular locality.

Since this crop is still rather new to gardeners, large seed supplies of many varieties are not generally available. Some of the more widely grown varieties and the number of days until their green edible stage when grown in the Corn Belt follow: Giant Green, 90 to 95 days; Bansei, 95 to 100 days; Jogun, 100 to 110 days; Hokkaido, 100 to 115 days; and Imperial, 110 to 120 days. In cooler sections the rate of development will be slower. Only the early varieties should be grown in the more northerly States, and the medium or late varieties in the South. Until more is known about the climatic and regional adaptabilities of the numerous varieties, it is suggested that plantings be made principally when tomatoes and other long-season, warm-weather crops are put in the garden.

For use as a green vegetable, soybean pods should be harvested when the seeds are fully grown but before the pods turn yellow. Most varieties produce beans in usable condition over a period of a week to 10 days. The green beans are difficult to remove from the pods unless the pods are boiled or steamed 4 to 5 minutes, after which they are easily shelled. The beans are prepared for the table in much the same way as lima beans or garden peas.

The yields per unit area of land are about the same as are usually obtained with peas and are thus less than can be obtained with many other vegetables. On this account, they appear of major interest only to gardeners having medium to large gardens.

### *Spinach*

Spinach requires no description here because it is so commonly grown and eaten. Its rather exacting climatic requirements, however, are not generally understood, with the result that many plantings produce only fair or poor yields. Spinach is very sensitive to heat, and some varieties shoot to seed very quickly when the days become long in late spring unless the weather stays very cool. It is very sensitive to soil acidity, so the soil should be limed to the point of only slight acidity if tests show it to be strongly acid. For good results it requires a very rich soil with an abundance of moisture and nitrogenous fertilizer or manure. Spinach is cold-hardy and will overwinter with little or no protection in the garden in the southern half of the country. Special attention must be given to dates of planting if good yields are to be obtained.

For spring harvest, spinach must be sown very early in the spring, or in the milder parts of the country in late

winter or even the preceding fall. Local information will be necessary in many areas to enable the gardener to time his plantings to give a crop in the fall or early spring (table 2) at the time desired. For example, the early part of the fall-planting range (table 3) for the upper South is early enough to give fall harvests; the latter part of the range encounters cold weather before the crop is ready for harvest, so late plantings are overwintered and harvested in the spring. Spinach is a quick-growing crop that must be carefully adjusted to seasonal conditions if it is to do its best.

No special cultural methods or devices are required in growing spinach. (See table 4 for planting directions.)

Long Standing Bloomsdale is perhaps the most popular crumpled-leaved variety. For fall planting, Virginia Savoy and Old Dominion are especially adapted in the East and Southeast. Neither of these two should be sown in the spring, however, because they shoot to seed quickly. Large, flat-leaved varieties like Nobel and Prickly-Seeded are grown commercially in the Pacific Coast States but are more exacting in their requirements than Long Standing Bloomsdale.

### New Zealand Spinach

New Zealand spinach is entirely different from common spinach in growth habit and climatic requirements, although they are cooked and eaten the same way. New Zealand spinach is a heat-resistant, warm-weather plant that is tender to frost. The seeds are large, germinate slowly, and produce much-branched, succulent plants that will grow 2 feet or more in height and in spread. When the plant attains a spread of a foot or so, the end 2 or 3 inches of many of the numerous branches are harvested with a sharp knife or with shears. New growth will arise along the remaining branches and the ends of these new branches may in turn be harvested. Harvesting too heavily will retard development of new growth and reduce the total crop obtainable. The severity of cutting that a plant will stand depends on local conditions, soil fertility, water supply, weather, and size of the plant. The gardener must learn from experience how much can be harvested under his own conditions.

Soaking the seeds for about 2 hours in lukewarm water, not over 120° F., may hasten germination and give better stands. (See tables 2 to 4 for planting dates and directions.)

### Squash<sup>2</sup>

Bush or summer squash may be grown to advantage in small gardens, but the vining or trailing sorts should be grown only in large gardens because they require so much space and time for proper development. The soil and climatic requirements are the same as for cucumbers

<sup>2</sup> Bush, or summer, varieties of squash all belong to the species *Cucurbita pepo*, as do certain varieties of pumpkin, such as Small Sugar and Connecticut Field, and will intercross with them. Thus, the summer squash is sometimes classified as a summer pumpkin in botanical distinction from *C. maxima*. In this publication the more common system of naming is followed.

(see page 30). (See tables 2 to 4 for recommended planting dates and directions.)

Yellow Bush Scallop, Yellow Crookneck, and Yellow Straightneck are popular yellow bush sorts. Cocozelle and Zucchini are bush types that produce dark-green, more or less cylindrical fruits. Fruits of all varieties of bush squash should be harvested while quite immature, before the seeds begin to harden and while the rind can be punctured easily with the thumbnail. They must be used promptly.

The vining winter squash produces fruit with hard rinds, which can be stored in a moderately warm, dry place for many weeks. Hubbard, Delicious, and Boston Marrow are popular kinds. Umatilla Marblehead is adapted to the Northwest and is resistant to curly top. Buttercup is a relatively early turban squash developed for the Great Plains.

### Sweetpotatoes

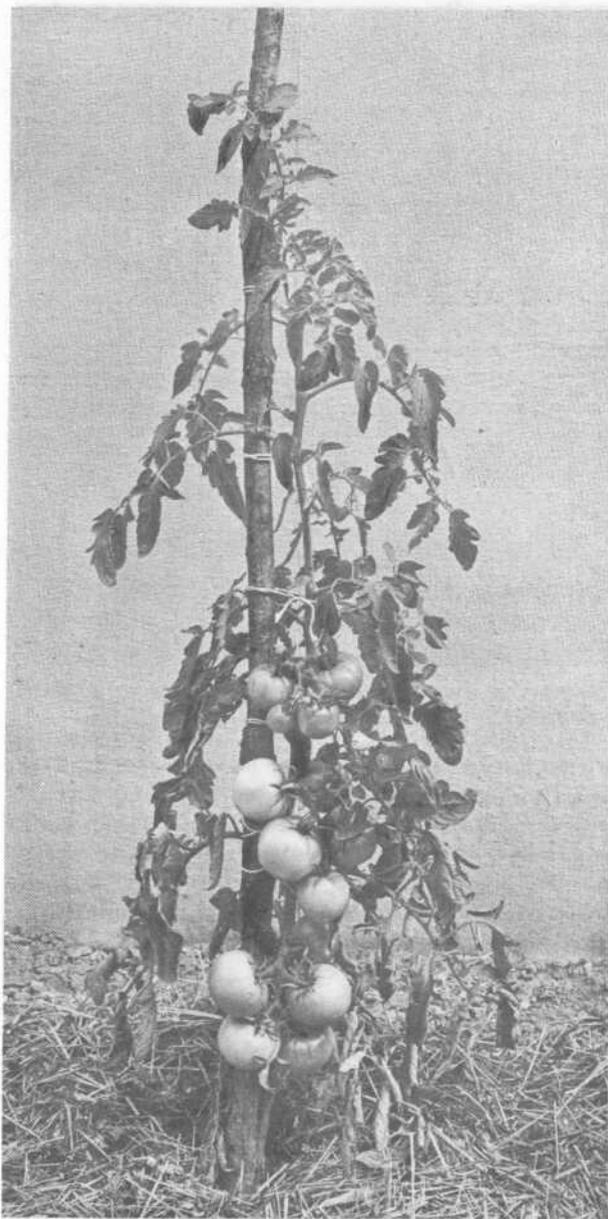
Sweetpotatoes are a distinctly warm-weather crop that requires a rather long season and is not generally adapted to the northernmost States. They should not be grown in small gardens because the vines of most varieties trail so far that they interfere with the growing of other vegetables near by. In large gardens in the warmer parts of the country, they should be grown if the soil is suitable.

Sweetpotatoes require light to medium soils, doing best on the sandy loams or on the lighter loams. They develop poor yields and roots of undesirable shape on clays or other heavy soils and in soil that receives heavy applications of nitrogenous fertilizer. Applications of manure should not be made immediately before sweetpotatoes are planted. They respond well to moderately heavy use of fertilizer high in phosphorus and medium in potash, such as a 3-12-6 or 4-12-8 mixture.

It is generally better for the home gardener to get sweetpotato plants—also called draws and slips—from seedsmen or plant growers than to grow his own. A good plant for transplanting should be about 6 to 9 inches long, sturdy, and free from disease, damage, or wilting. The plants are usually set on ridges about 8 to 10 inches high and 3 feet apart. If the fertilizer is placed in the ridge before planting, it must be well below the level of the plants and thoroughly mixed with the soil. Considerable damage has been done to newly set plants by contact with fertilizer. About half the fertilizer may be worked into the row before the ridge is made and the other half cultivated into the sides of the ridges 3 weeks after transplanting. (See tables 2 to 4 for planting dates and directions.)

Little-Stem Jersey and Jersey Orange are popular "dry-fleshed" varieties, and Porto Rico and Nancy Hall are the most widely grown "moist-fleshed" varieties. These soft-fleshed sweetpotatoes are not yams. The yam is an entirely different plant rarely grown in the United States.

Sweetpotatoes should be dug promptly after frost first damages the leaves. The roots are very easily skinned and bruised, so must be handled carefully in digging them.



*Tomato plant pruned to a single stem and tied to a stake. Note the straw mulch on the soil for conserving moisture.*

If they are to be kept more than a few weeks, they must be cured before storing. Curing is in reality a process of healing cuts and bruises so that rot-producing organisms cannot attack the roots. Sweetpotatoes are cured by holding them for 10 or 12 days in crates or baskets at a temperature of about 85° F. and in moist air of about 85 percent relative humidity. After curing, the temperature is slowly changed to 50° to 55° where the roots can be kept in moderately moist air for several months. Since rather special conditions are required for curing and storing sweetpotatoes successfully, the beginner should undertake

the growing of them in only a very small way until he finds that he has the proper conditions for keeping them safely. (See Farmers' Bulletin 1442, Storage of Sweet Potatoes.)

## *Tomatoes*

Tomatoes are the universal favorite of home gardeners because they are productive and a pleasure to grow and to eat. Although they are a warm-season crop that is tender to frost, they become unfruitful under the high summer temperatures and hot winds of the South and Southwest. Despite the fact that they are so generally grown, tomatoes are susceptible to many diseases and their fruitfulness is easily upset. They will not grow and yield normally in partial shade. Plants that are in the shade half the day or more often yield very little or no fruit; the plants grow very rank, but the blossoms drop off instead of forming fruits. Applying much manure or nitrogenous fertilizer has a similar effect. However, in full sun on any reasonably good soil with a medium to good supply of moisture, tomatoes can be grown at some season or another in every State.

If good tomato plants for transplanting are available from dealers, the small gardener should purchase them rather than grow the few needed, although they are not especially difficult to produce. Good plants about 8 inches tall that are well grown are very desirable for transplanting (see illustration, p. 38). In most localities plants should be transplanted to the garden about the frost-free date, not on the average date of the last frost. (See tables 2 and 3.) Only half as many plants are needed for growing without supports as for training up on stakes because untrained plants will spread over considerable space. (See table 4 for planting directions.) Small varieties adapted to the North can be set somewhat closer than shown in table 4, but large varieties on very rich soil in the warmer Pacific coast districts should be given twice as much space per plant as shown.

If barnyard manure is applied to the garden where tomatoes are to be grown, it should be supplemented with 4 to 5 pounds of superphosphate for each 100 pounds of manure; and twice that amount should be added to sheep or poultry manure. It is generally unwise to work manure into the holes into which tomato plants are to be set, but a handful of complete fertilizer should be well mixed with the equivalent of a bucketful of soil at the spot where each plant will be set. Some 5-10-5 or 4-12-4 fertilizer may be thus applied although the garden has received a general application.

In most small gardens it is desirable to prune the plants to a single stem or two stems and to tie them to stakes. The stake should be about 8 feet long, driven into the soil about 2 feet, and at least 1½ inches in diameter. As the plant develops, side shoots or branches appear at the points where the large leaves are joined to the main stem. These shoots are easily broken out (see illustration), thus restricting the plant to a single main stem. When growth is rapid it is necessary to go over the plants every

2 or 3 days to remove the new side shoots as they arise. Care must be taken that the growing tip of the main stem is not inadvertently pinched out.

For tying the plants to the stakes, strips of rag or large soft twine may be used; small, hard twine is undesirable because it cuts the stems. The string may be firmly tied around the stake so that it will not slip, then passed loosely around the stem of the plant not far below a large leaf, and tied again. The stem must not be drawn tightly against the stake, nor the tie drawn tightly around the stem. Usually, a tie about every 1 to 1½ feet up the stake is enough to support the plant properly. If a few branches are allowed to develop many more ties will be needed to keep them up off the ground. Unpruned plants cannot be well supported on single stakes because they become too large. Care should be taken to avoid crowding or crushing branches and leaves about a stake or other support.

Wide variations in soil moisture are generally accompanied by more or less damage to fruits by blossom-end rot, especially after a period of very rank plant growth. Careful irrigation to maintain a uniform and moderate moisture content of the soil will help avoid loss from blossom-end rot. Staked and pruned plants usually show more blossom-end rot than those allowed to grow naturally. On the other hand, plants growing naturally on the ground usually show more fruit rots of other kinds, caused by the fruits lying on or too near the soil. A light mulch of dried lawn clippings, leaves, or similar material beneath plants grown without supports will keep the fruit off the soil and help avoid some of the loss due to fruit rots. Mulching is also of great value in conserving soil moisture and often helps prevent high losses from blossom-end rot.

In the northernmost States where the season is short, early, quick-growing varieties like Bounty, Victor, Firesteel, and Bison are proving very satisfactory. Most varieties are not adapted to the Great Plains section, but these

*Tomato plant of suitable size for transplanting, about 8 inches tall.*



*Removing a young branch (side shoot or sucker) in pruning a staked tomato plant to a single stem.*

varieties just named are among the best. Over most of the eastern United States, Marglobe, Rutgers, and Pritchard are well-established, wilt-resistant varieties. They are not quite as early as Earliana and Bonny Best but are generally more productive. Pan America, a variety that resembles Marglobe, is practically immune to fusarium wilt and promises to be especially valuable on seriously wilt-infested soils. Some late varieties grown in the warm valleys of California are Stone, Norton, Pearson, and Santa Clara Canner. The last-named variety is adapted only to the warmer districts of California and requires more space than most other varieties because its plants normally grow very large.

In the fall just before the first killing frost, the most mature green tomatoes that still remain on the plant may be gathered and taken to a protected place to ripen over a period up to 2 to 3 weeks. The best way to ripen a green tomato is to place it at a temperature of about 65° F. and preferably in the dark. The immature green tomatoes can be used in making pickles or relishes.

## *Turnips*

Turnips are a quick-growing, cool-weather crop that is grown at some season of the year everywhere that any vegetables can be grown. They require a shorter season than rutabagas and are less exacting in their requirements. (See page 34 for a comparison of turnips and rutabagas.) (See tables 2 to 4 for recommended planting dates and directions.)

There are two distinct groups of turnip varieties, each grown for a different purpose: Varieties grown mainly for their roots and those grown mainly for their leaves. The

tops as well as the roots of the root varieties are commonly eaten, but if only the greens are to be eaten the foliage type is probably best to grow.

There are both white- and yellow-fleshed varieties of turnip. Purple Top White Globe is by far the most important variety; it is white-fleshed. Golden Ball is a yellow-fleshed kind. Shogoin is grown mainly for its leaves although it produces a small to medium white-fleshed edible root of good quality. It is somewhat resistant to plant aphids, or lice, but shoots to seed in its first season of growth when planted in the spring.

Seven Top is the most familiar greens turnip that forms no enlarged edible root. Another, but little known, form is

called Broccoli Rab, or Italian, turnip. It produces thickened flower shoots somewhat similar to sprouting broccoli, but it is much smaller and develops more quickly; the leaves are hairy like those of turnips, instead of smooth like those of sprouting broccoli. These leafy forms of turnips are winter-hardy in the South and as far north as the Chesapeake Bay region, where they are commonly sown in the fall for winter and early-spring use.

Turnip seeds are so small that it is difficult to avoid sowing them too thickly and too deeply. Special care is required if good results are to be obtained without wasting seeds and labor.

## Harvesting and Using Products

**T**OO MANY GROWERS, in attempts to get larger growth and yield, delay harvest beyond the stage of best quality. No vegetable should be allowed to become tough, coarse, overgrown, and unpalatable before being harvested. Quantity is important, but so is quality. Large size in a product is of little value in itself; indeed, excessive size is generally associated with mediocre, if not low, quality.

The sooner vegetables can be used after harvest the

better. If they must be kept a while, they should generally be kept in a cool, moist place.

It is not the purpose of this publication to go into the details of food preservation, use, and storage. However, no gardener who can produce a surplus of fresh vegetables should overlook the possibilities of preserving or storing that surplus for later use. Publications on these subjects can be obtained from the Office of Information, United States Department of Agriculture, Washington 25, D. C.

### SCHEME FOR A 30- BY 50-FOOT GARDEN<sup>1</sup>

[Figures at left margin indicate distance between rows. Rows run long way of plot.]

1 foot	↑			
2½ feet	↑	POLE SNAP BEANS.	} Kentucky Wonder; ¼ pound seed.	
3 feet	↑	POLE LIMA BEANS.		
2½ feet	↑	POLE LIMA BEANS.	} Carolina, or Sieva; ½ pound seed.	
3 feet	↑	TOMATOES.		
3½ feet	↑	TOMATOES.	} Marglobe; 4 dozen plants (staked).	
2½ feet	↑	CHARD. ½ row Fordhook Giant; 1 packet seed.		LETTUCE. ½ row Slobolt or Salad Bowl; 1 packet seed.
1½ feet	↑	BEETS. Crosby Egyptian; ½ ounce seed.		
1½ feet	↑	CARROTS. Chantenay or Nantes; 1 packet seed.	} After harvesting beets, carrots, and turnips, follow about August 1 with 2 rows COLLARDS; 1 packet seed.	
1½ feet	↑	TURNIPS. Purple Top White Globe; 1 packet seed.		
2 feet	↑	CABBAGE. Golden Acre and Copenhagen Market; 15 plants each.	} After harvesting cabbage and onions, follow in late July with 2 rows Detroit Dark Red BEETS; 1½ ounces seed. 1 row Purple Top White Globe Turnips; ½ ounce seed.	
2 feet	↑	ONIONS (yellow). 1 pound sets, or 200 plants.		
1½ feet	↑	RADISHES. Two ¼-row plantings Scarlet Globe; 1 packet seed.	SPINACH. ½ row.	} Follow about July 1 with 1 row All Seasons CABBAGE; 2 dozen plants.
1 foot	↑	SPINACH. Long Standing Bloomsdale; ½ ounce seed.		
1 foot	↑			

<sup>1</sup> No one plan suits all parts of the country or all gardeners. This scheme is an example, not a general recommendation.

## Where To Get Seeds and Garden Supplies

**T**HE UNITED STATES DEPARTMENT OF AGRICULTURE has had no seeds or plant materials for general distribution to gardeners since the discontinuance of the Congressional seed distribution in 1923. Hundreds of seed firms all over the country sell seeds, plants, and garden supplies by mail; these items as well as fertilizers, lime, fungicides, insecticides, and tools are also sold by thousands of retail seed, hardware, and general stores. The classified sections of telephone directories of the larger towns and cities list large numbers of such dealers. *Do not write to the Government for seeds, fertilizer, or other materials.*

## Some Important Don'ts

**I**T REQUIRES YEARS OF STUDY and experience to become an expert gardener, but a reasonable amount of study and careful attention to simple instructions will enable a beginner to avoid disastrous or humorous errors and to obtain some gratifying results. To help the inexperienced gardener keep out of some of the commonest troubles, several important don't's are here listed.

*DON'T try to grow vegetables on a lot that is—*

*Too poor to make a good growth of weeds or grass.*

*Made up mostly of rubble or unweathered subsoil "fill."*

*Contaminated with coal-, chemical-, or oil-product wastes.*

*So wet that it grows weeds common to marshy or poorly drained spots.*

*Likely to be flooded often by stream overflow.*

*Located so that it receives much storm drainage or surface water from above.*

*Shaded by large trees more than a few hours a day.*

*DON'T spade, plow, or cultivate soil that is too wet.*

*DON'T apply too much lime.*

*DON'T run the rows up and down a slope.*

*DON'T plant seeds, roots, or tubers too deeply.*

*DON'T sow seeds too thickly, and DON'T FAIL to thin out plants to the proper distance.*

*DON'T guess at the amounts of fertilizer or strong manure to apply per unit area of land.*

*DON'T let fertilizer or manure come in contact with the seeds or plants.*

*DON'T cultivate deeply enough to injure the shallow roots of the vegetables.*

*DON'T let the weeds get big before you try to destroy them.*

*DON'T apply water in numerous light sprinklings, but water thoroughly about once a week if rainfall is deficient.*

*DON'T FORGET to obtain the necessary dusting or spraying equipment and materials early in the spring—before you need them.*

*DON'T let the vegetables become too old before harvesting them, thereby losing high quality.*

*DON'T let any vegetables go to waste.*

*DON'T leave any land idle during the growing season.*

*DON'T leave the soil in such condition that it will wash or blow away during the winter.*

## Where to Get Information on Gardening

**A** GARDENER'S BEST SOURCE of information is the reliable authority nearest home. There is no better way of learning about gardens than watching and talking to good gardeners. "Ask the man who grows one." All gardeners should also get the recommendations of their State garden authorities. See page 4 of this publication for a list of addresses. From the same sources or from the U. S. Department of Agriculture, Washington 25, D. C., a motion picture on gardening, entitled "Grow Your Own," may be borrowed for use at garden meetings. Also available are U. S. Department of Agriculture slidefilms No. 641, "Home Grown Plants for Transplanting;" and No. 657, "A Backyard Vegetable Garden."