SB

453

.R65

THE GARDENER'S POCKET MANUAL

F.F. ROCKWELL

Class SB453

Book R65

Copyright N^o

COPYRIGHT DEPOSIT.

THE GARDENER'S POCKET MANUAL

Frederick
BY
F. F. ROCKWELL

AUTHOR OF

"Home Vegetable Gardening," "Gardening Indoors
and Under Glass," "Making a Garden
of Small Fruits," etc.

NEW YORK
McBRIDE, NAST & COMPANY
1914

SB453

.R65

Copyright, 1914, by
McBRIDE, NAST & Co.

APR 21 1914

Published, April, 1914

J. V.
©Cl.A369772

no,

PREFACE

THE object in preparing this book has been to supply a manual giving in the briefest possible way all the necessary information and data covering the actual operations which one finds oneself called upon to perform in looking after the flower garden, the vegetable garden, and the place in general. It is intended to serve as a reminder, suggester, and general pocket memory in connection with the thousand and one points which one who is not devoting his whole time to the work, naturally fails to keep in mind, such as how deep to plant hardy lily bulbs, how far apart to put rows of salsify, when to prune the different sorts of shrubs, what spray to use for blister-mite, when to sow carrots and beets for the winter crop, and the innumerable other things which you will find yourself wanting to know during the course of the year, *while you are actually at work*.

You probably know from past experience, how annoying and time-wasting it is to drop your tools or your work to go back to the house, scrape the mud off your feet, and hunt up a book or the back number of a magazine and to search through it until you find or fail to find the bit of information you want to be certain about. It is to save these unnecessary steps, this loss of time and annoyance, to make the gardener's work easier and more pleasant and effective, that the present book is written. It is designed to be slipped into the pocket and to be carried out into the garden,—out of the way but “on the job” all the time.

CONTENTS

	PAGE
COLD FRAMES AND HOT BEDS: Dimensions; materials; sash and sash covers; starting plants inside; dates to sow; distances to transplant	I
MANURES AND FERTILIZERS: Home mixing; accelerators; keeping the soil in good condition	9
HANDLING THE SOIL: Sub-soiling; draining	14
SOWING AND PLANTING: Brief directions; early and late sowings; rule for depth	17
TOOLS AND CULTIVATION: Use of wheelhoe and various attachments; hand weeding; level culture	21
IRRIGATION: Hose and overhead systems; water pressure	26
WEEDS	29
GRAFTING AND BUDDING	31
TREE REPAIR	34
CONCRETE AND IRON PIPE: Uses and construction	36
VEGETABLES: Planting table; hardy and tender sorts; fruit, root, and leaf crops	39
CULTURAL DIRECTIONS	47
FLOWERS: Table of the most popular sorts; heights, colors, etc.; making beds; starting seedlings; making cuttings; transplanting	55
SHRUBS: Planting; mulching	68
FRUITS: Setting out; spraying; pruning	73
BULBS: Kinds for fall planting; for spring planting	75
INSECTS AND DISEASES: Sprays and sprayers	78
HOME-MADE SPRAYS AND POISONS: Formulas; complete spraying table	83

THE GARDENER'S POCKET MANUAL

I

COLDFRAMES AND HOTBEDS

ONE of the most important adjuncts to the flower and vegetable gardens is the "frames." The coldframe is merely a pit or frame sunk part way into the ground, the back usually six inches higher than the front to give a slope to the sash, which are used as a cover, so that rain will run off and the sun's rays will strike it more nearly at right angles. The coldframe is usually made eighteen to twenty four inches deep at the back and twelve to eighteen at the front.

A hotbed is practically the same as a coldframe, but made deeper, to allow for putting into it a thick layer of actively decomposing manure to furnish the heat.

Boards, plank, brick or concrete can be used to make the frame, but if the frame can be given a permanent place, the latter material is much the more satisfactory; and although it costs a little more than wood in the first instance, repairs are eliminated and the cold is most effectively kept out. In making the frame, be sure, first of all, to get all your measurements exact. Standard sash are approximately three by six feet, and the frame is usually made six feet wide inside measurement, and as long

2 THE GARDENER'S POCKET MANUAL

as necessary to accommodate the number of sash to be used. Where cross pieces are desired to slide the frames on, as in the accompanying diagram, an inch or so will have to be allowed for each of these. You can buy cast iron tops to finish off brick or concrete frames. The diagram shows the proper dimensions of material for

Fig. 1 — Frame, banked with soil.

an ordinary frame, and while cypress is the most lasting wood to use, pine or chestnut, thoroughly cured, will do well enough. In case narrow boards have to be used, a layer of roofing paper over the outside will be well worth while.

It is better, if possible, to make the frames in the fall before the ground is frozen. Sometimes it is necessary

Fig. 2 — Hot-bed, made on manure.

to make a hotbed in the spring, when the ground is frozen, hard, and in this case, the frame is placed *on top* of the manure, as shown in Fig. 2. The frame should, of course, be thoroughly banked up to protect from frost, using either soil, ashes or manure.

The manure should be actively fermenting when put

into the frame; that from grain fed horses is the best to procure. A small amount of short straw or leaves, not more than a third at most, may be mixed through it. Pack it in a square heap and turn two or three times at intervals of three or four days, wetting it down thoroughly if at all dry, but do not soak. From twelve to twenty-four inches of manure are put in to supply heat, the latter depth being necessary in a very cold climate, or where extra heat is desired. Before putting in the manure, remove three to eight inches of the soil, replacing it after trampling the manure down firmly, in layers of six to eight inches.

SASH. The standard sash have a single layer of glass; every set of frames should, however, include one or two of the double glass type, with an air space between the two layers of glass, as they are more efficient, especially on cold frames, where sunshine is the only source of heat. For use in late spring, a good substitute for the glass sash is had, in "cloth sash"—light wooden frames, made the same size as the sash, and covered with plant "protecting-cloth" which can be bought in the heavy grade for twelve to fifteen cents a yard. When not in use over the frames, these cloth sash can be used as shutters or mats over the glass sash. "Shutters" are merely light wooden sash used to put over the glass sash as an extra protection in cold weather. "Mats" are made of either straw or quilted burlap, and used to cover the sash in cold weather.

STARTING PLANTS UNDER GLASS

From four to eight weeks before any planting can be done outside, a number of vegetables may be started in the frames for transplanting later. The accompanying

table shows the kinds, and when to sow them. The temperatures recommended are those which are desirable, but not absolutely essential. In temperatures lower than these, however, germination is less certain and slower.

SEEDS SOWN UNDER GLASS

Vegetable	Date to Sow		Best Temperature (about)	Days to Germinate
Beets	Feb.	15-Apr.	1	7-10
Broccoli	Feb.	15-Apr.	1	
Brussels Sprouts ..	Feb.	15-Apr.	1	
Cabbage	Feb.	1-Apr.	1	3-7
Cauliflower	Feb.	1-Apr.	1	
Celery	Feb.	15-Apr.	1	
Corn	Apr.	1-May	1	10-25
Cucumber	Mar.	15-May	1	3-7
Egg-plant	Mar.	1-Apr.	1	5-10
Kohl-rabi	Mar.	1-Apr.	1	7-14
Lettuce	Feb.	15-Apr.	1	3-6
Melon, musk	Apr.	1-May	1	3-6
Melon, water	Apr.	1-May	1	5-10
Okra	Mar.	15-Apr.	1	5-10
Onion	Jan.	15-Mar.	15	5-10
Pepper	Mar.	1-Apr.	15	7-15
Squash	Mar.	15-Apr.	15	7-12
Tomato	Mar.	1-Apr.	15	5-10

The best method of handling the seedlings is to use flats, constructed of cracker or soap boxes sawed up into two and three inch sections, and bottomed in such a way that they are not water tight, as provision should be made for drainage. The shallow ones are used for sowing seeds and the others for transplanting.

The soil used should be rich, light and friable. A good, rich garden loam will do but a better soil will be made by using rotted sod, chip-dirt or dirt from the woods mixed with one part of thoroughly rotted manure, with enough sand added to "cut it" and make it friable

so that when it is compressed in the hands, even when moist, it will crumble apart readily. Dig up sods in the summer from the roadside or where the ground is rich; cut them evenly and several inches thick, and stack them, grassy sides together, to rot. If you have not prepared your soil, and want to start seeds in the spring when the ground is frozen, a bushel or so of soil can be readily obtained from some seedsman or market gardener.

Let the boxes soak up water from underneath or give them a thorough watering the day before planting. A layer of screenings, moss or other coarse material to assist in draining should be laid in the bottom of the flats before filling in with the seed soil.

All of the seeds mentioned in the table except the larger ones, such as beans, cucumbers, corn and squash, should be barely covered from sight. Celery especially should be covered thinly; the seed should be scattered thinly in rows, two inches or so apart, and the whole surface after covering lightly pressed down. Do not fill the boxes quite level full. A few odd pieces of glass placed on the boxes, leaving a crack at one side or end so as to admit air, will conserve the moisture and make germination more perfect.

TRANSPLANTING. Prepare the flats as before except that a layer of well rotted manure should be placed in the bottom of each one. If manure is not to be had, mix two or three quarts of bone flour through a bushel of the soil several days before you need to use it.

When the second true leaf is forming (Fig. 3), the seedlings will be ready to transplant. Take them out carefully without breaking any of the roots, and making a hole with the forefinger or a sharp pointed stick, "prick them off," fifty to one hundred in a flat. Place them at

6 THE GARDENER'S POCKET MANUAL

regular intervals, such as six rows of eight each or nine rows of twelve each. Give them a light watering and keep them well shaded from direct sunlight for three or four days.

Fig. 3 — Seedlings ready for transplanting. The two to the right have grown spindling through over-crowding.

WATERING. Both before and after transplanting, care should be taken in watering the seedlings, never to let the soil get dry and at the same time not to have it wet. Water thoroughly, once in several days, when the soil begins to get dry on the surface. Do it on a morning of a bright day so that the foliage and the surface will be dried off before night. If a tub or pan is available, the best way to water, is to place the flat in this and to pour water around it, letting the flat soak up from underneath until the soil is thoroughly saturated.

PAPER POTS AND SODS. Some things do not stand transplanting readily or are grown in hills. Formerly pieces of sod, inverted and packed close together, were used for starting these things, but now paper pots or "dirt bands" may be bought at a very low price and these are much more convenient and very satisfactory. Simply pack the pots together in a flat, fill them with a good rich com-

post, starting several seeds to a pot, and thin out to two or three of the best of these when they are well started. Melons, cucumbers, squash, lima-beans and corn may all be started readily in this way, two to four weeks before they could be planted in the open. After the pots are set into the soil, the paper rots away.

VENTILATION. Give as much air as possible while maintaining the required temperature. This may be done by opening the frames quite early on bright sunny mornings and closing them again before the sun begins to get off the glass in the afternoon, so that they will not get chilled at nightfall and will go into the night as warm as possible. On bright warm days, or during warm rains, keep the sash off entirely. Prop sticks, like those shown in Fig. 4, can be readily made from box ends, for adjusting the amount of ventilation to the weather. The temperature should be kept, if possible, within ten degrees higher during the day and ten degrees lower during the night, than those mentioned in the table. As the weather gets warmer give more and more air, and finally "harden off" the plants by leaving them uncovered day and night for several days before setting them out into the open.

Fig. 4 — Notched-stick for ventilating frames.

TREATMENT FOR FROST. If the temperature goes low enough to freeze the plants some night, they may be brought out of it usually by the following treatment: douse them at once with water as cold as you can procure, and give them a second or third watering if necessary at intervals of an half hour or so until they are thawed out; *keep them shaded from the sun.* The hardy things, such as cabbage or lettuce will stand several de-

grees of frost without injury, especially if they are gradually inured to it. All such tender things as tomatoes and egg-plants, if not actually killed by frost, will be so set back that they will not amount to much.

II

MANURES AND FERTILIZERS

ASIDE from the plant food in the soil itself, certain of the several natural and chemical fertilizers, such as manure, bone-dust and potash salts (see accompanying table for fertilizer materials and their analysis) are the commonest sources of plant food.

The several elements of plant food must not only be in the soil in abundance, but must be in soluble and available forms. The plant food in manure, for instance, is of little or no use until, through the process of decomposition, it becomes available to the plants' feeding roots.

Taking Care of Manure. Whether manure is made on the place or bought, it should be kept under cover, preferably in a pit with a cement bottom so that all the liquid shall be saved. If it shows a tendency to heat too much and becomes fire-fanged and burned, it should be turned and tramped down firmly into a square heap, sprinkling it with water if it is very dry. If it can be turned, in fact, several times before using, so much the better. Aim to get it just as fine, well rotted, and "mellow" as possible before using it.

In buying manure, try to get that which is in good condition and well rotted and remember that its value will depend very largely upon the richness of the food fed the animals; therefore manure from a livery stable or from a good dairy farm, other things being equal, is

likely to be worth much more than that from scrub farm stock.

FERTILIZERS. Fertilizer is a general term applying to almost any old thing which can be sold in a bag. The high-grade, high-priced goods, costing anywhere from forty to forty-five dollars a ton are, almost invariably, much cheaper than the low-priced goods, costing twenty-five to thirty-five dollars a ton. For garden use, a complete fertilizer, analyzing 4 per cent. nitrogen, 8 per cent. of available phosphoric acid, and 8 per cent. of potash, will give good results.

Mixing of Fertilizers. It is not, however, necessary to buy a ready-mixed brand. You can readily mix your own with a square-pointed shovel and a screen on any tight floor or in any large, tight box. Here is a good mixture: 250 pounds of nitrate of soda, 500 of tankage, 700 of acid phosphate, 400 of muriate or sulphate of potash; or, for small amounts, in about those proportions,—say 25 pounds nitrate of soda, 50 of tankage, 75 of acid phosphate, and 50 potash. This will give approximately a 4-8-10 mixture, fully equal to any you can buy and considerably cheaper.

Place the materials in layers on the floor or in a box, in a square heap, putting the bulkiest at the bottom, and mix *thoroughly* with a shovel or a hoe; then run through a coal sieve or a sand screen.

If another formula is preferred, it can be figured out easily from the accompanying table, as the figures in the third column show the number of pounds of any material required to give one per cent. in a ton. If the total number of pounds does not figure up to an even two thousand, it will make no difference, as it is the number of pounds of actual *plant food* only which is required.

Top-Dressings. A further advantage in buying the separate materials instead of the ready-mixed fertilizer is that they can be used separately as needed, or to mix with manure, or with any other material which may be lacking in one or more particular element. (Manure, for instance, is usually lacking in the percentage of phosphoric acid and of potash, in proportion to the nitrogen contained.) *Nitrate of soda*, the nitrate in which is immediately available, is especially valuable as a top-dressing for quick growing crops such as salads and most of the leaf crops, and a very light application put around the cabbages and similar crops and worked into the soil frequently produces incredible results. Potash is equally valuable for plants which are not maturing properly; especially for grapes, small fruits, and such vegetables as require a high percentage of potash.

Lime, which is called a soil "amendment," is not a direct fertilizer but is of direct benefit to the soil through its physical and chemical effects; it helps to sweeten sour soils and to make available the food already in the soil in unavailable forms. A good dressing of lime, one to two tons per acre, should be applied once every four or five years, to land which is at all inclined to become sour. The most convenient form to use is raw ground limestone, but any good agricultural lime from a reliable source may be used.

Compost. On every place, and especially on places where no stock of any sort is kept, a compost heap should be started, every spring, as soon as the garden has been planted, and all kind of refuse which will rot away should be added to it during the summer and fall. Vegetable by-products of all sorts such as sods, clumps of earth and roots, weeds (that have not gone to seed), roots and tops

of plants, leaves, grass clippings, and also street-sweepings, dishwater, etc., are available material. Make a frame or a pit for the pile somewhere, preferably out of sight, and under cover. Hasten decomposition by forking the heap over occasionally and by wetting it down when necessary with the hose so that it will never be dried out. If it seems desirable to give it more "body," mix common garden soil through the heap.

TESTING THE SOIL. You can send samples of your soil to your State Experiment Station and have it analyzed. A better way for practical results is to take five to ten pots full of soil, add a little each of nitrate of soda, acid phosphate, and muriate or sulphate of potash, and combinations of two and of all three of these, to the several pots, keeping one of plain soil as a "check," and labeling them all carefully. Plant them all with a few grains of corn or oats, and note which treatment indicates the largest increase of crop.

To determine if your soil needs *lime*, get a few pieces of litmus paper from the drug store. Select a part of the garden where the soil is fresh and moist, make a cut in it with a knife-blade, and insert the larger part of the strip of paper, pressing the soil up against it. If the paper turns red or reddish-pink, it will indicate that lime is needed — more in the former case than in the latter. A free growth of sorrel is another indication of sour soil.

FERTILIZING MATERIALS

MATERIAL	NITROGEN	PHOSPHORIC ACID	POTASH
Good Barnyard Manure...	.5	.33	.5
Nitrate of Soda	15.50	.....	.....
Tankage	5-12	13-3	.....
Dried Blood	12-14	.....	.....
Cotton Seed Meal	5-7	.....	.....
Sulfate of Ammonia	20	.....	.....
Raw Bone	4	20	.....
Steamed Bone	1-2	25-30	.....
Acid Phosphate .....	.....	14-16	.....
Muriate of Potash.....	.....	.....	50
Sulfate of Potash .....	.....	.....	53
Kinit .....	.....	.....	12.5

Rule to figure out number of pounds of any fertilizer material required to furnish 1 per cent. of plant food element (Nitrogen, Phosphoric Acid or Potash), for one ton of mixture—

Divide 2000 by the percentage of element contained in the material.

Example: How many pounds of Nitrate of Soda (15.5 per cent. nitrogen), will be required to supply 1 per cent. of nitrogen in a ton of mixed fertilizer? $2000 \div 15.5$ gives 129 + pounds. If 4 per cent. of nitrogen is required, four times that amount, or approximately 520 pounds of Nitrate of Soda could be used—(though in that case it would be much better to get half of the nitrogen (2 per cent., from Tankage or Dried Blood). (See page 10.)

CROPS FOR GREEN MANURING

SEED	WHEN TO SOW	AMOUNT TO SOW
Buckwheat	May to August.....	4-6 pks.
Crimson Clover	Spring or August.....	15-20 lbs.
Red Clover	Spring or August.....	15-20 lbs.
Canada Peas	Early Spring	1-2 bu.
Cow Peas	June to August	1-2 bu.
Millet	Spring to August.....	1-3 pks.
Rye	Spring or Fall.....	6-10 pks.
Soy Beans	June to September....	1-2 bu.
Vetch, Winter	Fall	60-100 lbs. with 1 bu.
Vetch, Spring	Early Spring.....	grain.
		2/3 pk.

Crops for plowing under may be sown much thicker than those to mature.

III

HANDLING THE SOIL

IN the flower garden and the home vegetable garden, no less than on the farm, the way the soil is handled has a great deal to do with what you get out of it.

Besides keeping it rich by adding manure and fertilizer, and sweet by the use of lime, it must be kept in a good mechanical condition by thorough plowing or spading and working over, and also by the addition of humus or decayed vegetable matter from time to time.

PLOWING AND SPADING. It is always much cheaper and better to get a piece plowed, where there is enough room for a team to turn, than to attempt to do it or to have it done by hand. Have it done by somebody who knows his job. The soil should be turned so that it lies smoothly, with no sod, trash, stubble, or manure or any material of that kind left on the surface to be in the way for all your other operations throughout the summer.

Have your plowing done deep; usually the soil should be turned clear down to the sub-soil, which should give a depth of furrow of from four to eight inches. Sometimes with a hard sub-soil, a sub-soil plow is used, but its place has been taken lately by the use of agricultural dynamite used to break up hard and impervious sub-soils. This is not very expensive, and as the soil is benefited for years to come, it frequently pays to do it; if you think your garden suffers from a "hard-pan" sub-soil, consult a local expert in this line.

In many small gardens it is necessary to use a fork or spade instead of a plow. The job should be done no less thoroughly. In loose, loamy soils the spading fork with flat tines will be more satisfactory; in stiff soils, the

Fig. 5 — Spading and trenching.

spade. The proper method of using the spade or fork is to make the cut diagonally, each one running in at one edge into the space left by the forkful just removed. This makes the work much easier.

TRENCHING is practically sub-soiling with the spade or fork. As each spadeful is turned over, the sub-soil exposed beneath it is spaded up and thrown back into the same place in such a manner as to loosen and to break it up; then the next spadeful of surface soil is thrown over it and the operation repeated.

FALL PREPARATION. Soil for crops to be planted early in the spring, and especially for heavy soils, are frequently plowed or spaded late in the fall. In this case, the surface should be left worked up roughly or thrown in long ridges to leave it the more exposed to the action of the elements.

HARROWING. After the soil is plowed or spaded, as the case may be, it is necessary to break up and pulverize the lumps as finely as possible. Cultivation helps the soil fertility, as well before the crops are planted as after. (There are several types of harrow to suit various conditions of soil, but the important thing is, that whichever

type is used it should be used enough.) The earth should be cut up and fined, not only upon the surface, but several inches below it. Where the harrow cannot be used, the hoe and the broad-tined fork will have to take its place. Thoroughly pulverized soil is a vital factor towards a successful garden or a fine flower bed.

DRAINAGE. Soil that is low or wet, and consequently "late" in the spring, should be thoroughly underdrained. By all means drain if your soil requires it. Draining a half-acre garden will cost from twenty-five to fifty dollars. The most satisfactory method is to use two and one-half inch round drain tile with collars. The deeper you place them, the more effective they will be; at three feet deep, the lines should be from twenty to thirty feet apart, according to the soil and the slope; if you can put them four feet deep, thirty to fifty feet apart will do. You can do the work yourself or with a digger to help you, but you must take great care that the fall of the pipes is continuous from the highest point of land to the lowest, where the outlet should, of course, be. It is well to put a small flat stone under each joint, to prevent the possibility of sagging, and a piece of inverted sod over it to keep any fine dirt from getting inside of it until after the ground has a chance to settle permanently. A "level" is, of course, used in laying the tiles to see that the proper fall is maintained throughout.

IV

SOWING AND PLANTING

THE first step in making the garden, after the ground is prepared, whether it be a geranium bed, a strip of the home vegetable garden or a ten acre potato field, is to get a smooth, even surface. The purpose in doing this, aside from neatness and convenience in planting, is to conserve the soil moisture, so that the surface soil will dry rapidly on top and will form a dust mulch, which prevents the moisture from the soil below from escaping into the air, as it does rapidly when a hard crust forms. The smoother and finer the surface is made, the more perfect this dust mulch is.

The implement to do this job with is a steel toothed rake. Go over the soil carefully, removing all stones or sods that might be in the way later, and use the rake with a backward and forward leveling off motion so that just as little trash as possible will be dug up. It is best usually to rake at right angles to the way you expect to plant, as the marks left by the rake teeth will then not be confused with your planting marks.

DRILLS — ROWS — HILLS. In drills, the plants are grown in a continuous row, usually quite close together as onions, beets or carrots. In rows, they are grown at regular intervals, usually considerably less than that distance between the rows, and they are cultivated only one way — such as cabbage or potatoes. In hills, the plants are usually far enough apart to be cultivated both ways,

so usually the distance is the same in each direction — such as cucumbers or squash.

Fig. 6 — Different sorts of drills: (1) single broad drill for large seeds; (2) double drill for same; (3) small drill for fine seeds; (4) drill for medium-sized seeds.

SOWING THE SEED. The first step is to have a smooth and freshly prepared surface. For good results, it is necessary that moist soil should be brought in direct contact with the seed. Most seed sowing is now done with a seed drill. If any sowing must be done by hand, or with flower seeds sown in the garden, they should be scattered thinly along the bottom of a freshly prepared drill, pressed down into the soil, if it is at all dry, with the edge of a board or the sole of the shoe, and covered immediately with moist earth, being slightly pressed down again with the surface, to indicate where the row is.

DEPTH TO COVER. The proper depth for the various vegetable seeds is shown in the table on page 40. Most flower seeds are very small and should be covered barely from sight; the general rule, as nearly as can be given is to cover seeds indoors under glass to two or three times the depth of their diameter, outdoors to four or five times.

The proper depth to which to cover seeds will depend also upon the season of planting, the character of the soil and the weather conditions. Hardy vegetables, such as

early peas and beets, which must be planted when the ground is still wet and cold, should be put comparatively near the surface, where the soil is warmer and there is still plenty of moisture for germination. Late plantings of the same things, say in June, should be put deeper than the average depth. In planting in dry soil it is especially desirable that the seed be firmed in the soil *before* covering.

PLANTING. When plants are to be set out, the ground should be just as carefully prepared as for sowing seed. Mark the rows and crossrows out carefully and have everything in readiness, so that the work, when once begun, may be carried through as quickly as possible. A cloudy or rainy day or late afternoon is the best time to set plants. If the work has to be done in the morning or on a bright day, the plants should be protected, if they are likely to wilt, with pieces of newspaper placed over them and held down by stones or earth or by a screening of some sort, such as a wide board placed on edge along the row.

"HARDENING OFF." Plants removed from the cold-frame or hothouse to the garden should be hardened off before being set out, especially any which may have had a rapid, soft growth. Tall, spindling plants are also always to be avoided. Short, stocky specimens, even though much smaller, will take hold more quickly and soon make up for their deficiency in size.

TRIMMING BACK. Nearly all plants, and especially those with a soft, luxurious leaf growth, will stand the operation of transplanting much better if they are trimmed back. The roots too, if long and scraggly, should be cut back to a compact mass which can be handled and inserted into the soil easily. Long, broken

roots which must be twisted and bent in the process of transplanting, are of no use to the plant. But, in taking plants from the flats, be careful not to break off any of the roots. Cut them out with a knife or lift them out carefully, saving as much earth about them as possible.

In setting the plants in the soil, dig a hole with the hand or with a dibble and in placing the ball of earth and roots in it, be careful that the ends of the roots are not turned up towards the surface of the soil, or crowded in a bunch into a small space. The plants should be set deep enough, so that the earth will come about half way up the stem, or stalk, and the earth pressed down about it very firmly with the fingers and knuckles. It is very important to set the plants *firm* in the soil. Potted plants like geraniums, nursery plants like rose bushes or small fruits, or even plants being set in the garden like cabbage or lettuce, may be gone over with advantage after planting and made still more firm by pressing the soil down about them with the balls of the feet; this is especially desirable, if the soil is at all dry.

In very dry weather, it is sometimes necessary to use water when setting the plants, and when this is done, half a pint to a pint as conditions may require, should be put in the bottom of the hole before setting the plant in. It will be of little or no use to pour the water around on the surface after setting the plant.

Special fertilization is often given when setting out plants, either in beds with single specimens or in rows in the garden. Tankage or bone meal or a mixture of both are good for this purpose, or well rotted manure or hen manure may be used. In any case, this extra fertilizer should be well mixed with the soil before the plants are set out.

V

TOOLS AND CULTIVATION

THERE are a few tools essential to the proper care of any garden. Those so fortunate as to have large gardens, may, of course, find use for many others which we need not mention here.

THE HAND TOOLS. These few things, however, you should include in your outfit — a spade, a spading fork, a flat-tined hook, a bow rake, an iron toothed rake, a

Fig. 7 — Spading fork.

Fig. 8 — Spade

Fig. 9 — Shovel.

square pointed shovel, a plow, a trowel, a dibble, a garden line, a combination seed drill and wheel hoe, and a scuffle hoe. The uses for the first few of these have been mentioned in the instructions for preparing the soil. The seed drill, while it save a tremendous amount of labor, must, nevertheless, be used with care. First of all it must be kept scrupulously clean and dry, and never put

away in a wet or dirty condition, or rust will soon prevent its operating accurately. As the size of seeds vary a great deal, before being put in use for any particular crop it should be carefully adjusted. The best way to do this is to get a long, clean board or sweep a place clean on the shed floor where you can sow a few feet of seed and

Fig. 10 — Reel and line.

Fig. 11 — Scuffle hoes.

Fig. 12 — Iron-bow rake.

see whether it is dropping properly. A great deal of trouble will be saved by so planning your garden, that seed of approximately the same size and requiring planting of the same depth are sown together, so that in planting the garden it will be necessary to adjust the machine as few times as possible. In planting large seeds, such as

Fig. 13 — Dibblers.

Fig. 14 — Trowel.

peas or beans which have to go quite deep, the rows may be furrowed out first lightly with a hoe or the plow attachment to the wheel-hoe, and the seeds then sown with the drill in the bottom of this. The trench can be filled in immediately, or after the plants are several inches high, at the time of the first hoeing.

For the first cultivation, after the plants have come up,

the disc attachment of the wheel-hoe, which shaves close to the row without throwing any dirt toward it, or the hoes with the shank turned toward the row should be used, with the machine running astraddle of the row. When the plants get larger, the hoes may be turned the other way so that they overlap and the machine run between the rows. The rake attachments are also very valuable in breaking up the crust where there are no small weeds; in this way, the work can be done with great rapidity, and it is much easier to do this, keeping the weeds down when they are just beginning to sprout, than to wait until they are an inch or two high and then have to go over the garden carefully, doing a good deal of the work by hand. Keep the wheelhoe and its attachments as carefully as you would a sewing machine; keep it well oiled and the cutting edges sharp, and do not be afraid to take the time and trouble to get just the right attachment and the proper adjustment to do the best work for the particular job you may have in hand. For after you have once succeeded, you will know just what to do the next time without wasting any time.

CULTIVATION. The chief purpose of cultivation is to conserve the moisture in the soil by maintaining a dust mulch. In addition to this, it breaks up and pulverizes the soil below the surface, admitting air, and destroys weeds.

Cultivation should begin just as soon as the planting has been done. The rows will, or should be, plainly marked by the roller on the seed drill or where the soil has been pressed down by the back of the hoe after covering the seed. Some seeds come up in a few days, but others take a much longer period. Do not wait for the plant to appear, keep the surface soil stirred continuously,

every week or ten days, between the rows and as near as possible to the rows of little seedlings coming up. The first few cultivations can be quite deep, but as soon as the plant roots begin to spread through the soil it should be kept nearer the surface, so that they will not be cut off or injured. The roots of quick growing plants spread very rapidly; corn, for instance, in the course of only ten or fifteen days, will in favorable weather have sent out roots long enough to touch each other when the hills are planted three and a half or four feet apart.

HAND WEEDING. In soils which are fairly free from weeds, and even where cultivation is kept up constantly, some hand weeding will be necessary to keep the plants clean in the rows. Get this done at once. If you attend to it as soon as the weeds can be seen, they can be taken out very rapidly with a small hand weeder. Also take

Fig. 15 — Hand weeder.

the following hints: do this work while the ground is soft, as soon after a rain as possible; do not merely pull out the weeds but break up every square inch of soil surface, thus killing at the start the weeds that have already sprouted but are not yet above ground. Just before hand weeding, run over the rows with the wheelhoe and bring it up as close as possible to the plants, so that no more work than is necessary will have to be done by the fingers.

LEVEL CULTURE. It used to be the common practice to hill up most row crops and was due largely to the fact that instruments suited to level cultivation had not yet been introduced. This has now to a very large extent been done away with and for most crops, cultivation is kept as level as possible, although especially during the

Fig. 16 — Corn and potatoes, with slight hilling.

latter part of the season of growth, it is desirable in some instances to work the soil up towards the plant, such as corn and potatoes, making a very low, flat hill at the second or third hoeing, and in this way many small weeds are smothered out and an extra mulch is placed around the roots. In wet soils or very wet seasons, hilling is of benefit where it would not otherwise be to advantage.

VI

IRRIGATION

IRRIGATION is of vital importance to the complete success of the garden. Without sufficient water to enable the plant roots to take up the plant food in the soil, dissolving it for them, the crops will fail no matter how rich the soil may have been made nor how good the seed used. Nothing that you can possibly do for the garden will provide such certain and good results as the installation of some sort of a system for watering or irrigating.

If you have a city water supply, the problem is a very simple one. A three-quarter inch or an inch pipe laid through the garden will not be expensive. If you want to you can use "second-hand" pipe, and if you desire you can do most of the work yourself with the use of a couple of pipe wrenches. If the garden is a small one, one hose connection will be enough. If you prefer, however, for convenience, you may have two or more at intervals of fifty feet which will allow you to cover the whole garden with a twenty-five foot hose, along one side or through the center of it. As the pipe, which will not be wanted during the winter, can be disconnected and drained out in the fall, it is not necessary to put it far below the surface of the garden, and in fact it can be laid along the top of the ground but it will then be in the way of the lawn mower and so forth.

OVERHEAD SPRINKLING SYSTEM OF IRRIGATION. Watering by hose, while effective, is still not as thorough and nowhere near as easy as watering with a regular irrigating system. The best system for ordinary purposes is that known as the Skinner or "over-head" system. The pipes are placed fifty feet apart, and the nozzles which distribute the water four feet apart on the pipe. The latter cost only five cents apiece. For a large garden a combination strainer and turning handle which costs a dollar and seventy-five cents or more according to size,

Fig. 17 — Turning device and valve for overhead irrigation.

is convenient; but it is not necessary for small gardens with a supply of city water. Where water is supplied from a gravity tank the fall must be sufficient to produce fifteen pounds or more of pressure at the nozzles. (See accompanying tables for pressures at varying heights.) The brass spray nozzles throw a stream, under thirty to fifty pounds pressure, to a distance of twenty-five feet. The nozzle-line pipes are placed upon supports from a foot to six feet or more above the ground, as may be desirable; upon these supports they may be revolved from side to side, each pipe thus covering a strip fifty feet wide.

It is best to irrigate on a cloudy day or in the afternoon, but with the overhead sprinkling system, I have

never been able to see any bad results even when water was applied in bright sunshine. Water should not be applied until the soil begins to get dry, and then it should be given a thorough soaking, such as would result from a good, thorough rain. It is well to cultivate as soon as possible after irrigating, in order that the water applied will last as long as possible. Irrigation is also a protection against frost, either for sprinkling hardy plants early in the morning after they have been touched, or for protecting more tender things by keeping the water spray turned on continually during the night until after danger of frost is over in the morning.

AMOUNT OF WATER AND TIME REQUIRED FOR
IRRIGATING .

Pound Pressure ..		10	15	20	25	30	35	40	45	50	
Feet Elevation For Tank .		23.1	34.7	46.2	57.8	69.3	80.9	94.2	104	115.5	
One Acre 1-in. Deep	27152 Gal.	18 51	15 17	13 18	11 54	10 52	9 42	9 23	8 54	8 26	Hours Min.

For nozzle lines over 150 and up to 300 ft. long, half the pipe should be 1", the balance $\frac{3}{4}$ ". Galvanized pipe is to be preferred.

The discharge of 100 garden nozzles is, approximately, the following number of gallons per minute; at 10 lbs. pressure, 12 gals.; at 20 lbs., 17 gals.; at 30 lbs., 21 gals.; at 40 lbs., 24 gals.

VII

WEEDS

TROUBLESOME weeds that persist in gravel or earth paths and very often those on lawns or about the grounds or in pasture hay and grain crops can be controlled by spraying with herbicides. For walks, drives, tennis courts, etc., use common salt, either sprinkled on freely dry, or with a watering can at the rate of one pound to one gallon of hot water. Crude carbolic acid, one part to ten to thirty parts water, may be used as a spray, provided the mixture is kept well stirred up.

Individual weeds which can be got at without injuring other plants near them may be treated with carbolic acid pure, or if this is not effective, although it usually will be, sulphuric acid—the latter, however, should be handled very carefully and only in glass containers.

Poison ivy and other wild vines should be cut off, preferably in mid-summer close to the ground; the main trunk and stems grubbed up, and a strong solution of caustic soda poured into the holes wherever the remnants of the vines or roots are visible.

Weeds in lawns, pastures and grain crops can also be controlled by spraying; among those susceptible to the sprays are mustard, dandelion, ox-eyed daisy, red topped thistle, carrots, parsnip, elder, rag weed and most broad leaved succulent rooted weeds. In lawns, spray two or three days before cutting and do not mow again until

two or three days after spraying. Rain will interfere with the effect of the spray and it may have to be repeated. Meadows should be sprayed just before the grass begins heading up. With grain crops the first spraying should be made before the bloom begins to show and again if new leaves begin to develop. Where only one spray can be applied it is best to give it just before the crop covers the land. The two most satisfactory solutions for spraying are as follows: Salt solution — common salt, 150 pounds, water 50 gallons, covering half an acre to an acre. Iron sulphate solution — copperas (iron sulphate) 100 pounds, water 52 gallons, will cover one-half to one acre.

VIII

GRAFTING AND BUDDING

IT is often of advantage to have more than one kind of fruit growing on a tree or to substitute for an unsatisfactory variety one that is better liked. This can be done by grafting, if the stock plant is in good healthy condition. "Budding" is a similar operation, except that in place of the scion or twig used in grafting, a single "bud," with a small slice of bark and little or no wood attached, is used. Commercially either budding or grafting is used mostly to propagate varieties that either will not come true from seed or are weak growing sorts on their own roots.

Unless one has had experience, it is much better to get someone who knows how to do the work; but, as that is not always possible, and, furthermore, as there is a great deal of fun to be had in doing the thing for oneself, here are brief directions: The scion or cutting is made from a new, live branch, usually not larger than a lead pencil in diameter, having two or three buds on it. They should be taken in winter or in very early spring while growth is perfectly dormant, and may be stored in sand in the

Fig. 18.—Scion and cleft graft.

cellar, or any cold place, or buried in the ground until wanted. If allowed to shrivel they are useless. The graft should be made before the trees start in to active growth in the spring.

The stock should be clean and healthy; if changing over a grown tree such as a plum, apple or pear, upon which some other variety is wanted, the "cleft graft" is used. Cut off square the tops of healthy, young limbs, which are preferably two inches or so in diameter; split

Fig. 19 — Whip graft and budding operation.

this carefully across the middle and insert one (or two) of the scions, having cut them carefully to a wedge shape on one end. Success will depend upon getting the cambium or living under-bark layer of growth, in both scion and stock, held firmly together and protected from decay. Each scion must be held firmly in place and the whole wound covered over with grafting wax; in applying which, as it is sticky, the fingers should be greased with tallow. New suckers and sap growths must be kept off the stock plants and it should be pruned back quite

severely each year to throw the strength of the tree into the new growth.

Very small stock, such as seedlings one to three years old, instead of being split, are cut off diagonally, and the whip graft employed. The surfaces of stock and scion must match evenly, and a tongue is cut down in each at the center so that one may be inserted in the other, thus holding them more firmly in place. They are then bound tight with raffia or cord and waxed over.

In budding, a single healthy bud with an elliptical section of bark is used instead of a scion and this is inserted into a T shaped slit made in the bark of the stock tree, where it is bound tight with raffia. Budding is usually done in August or early in the spring.

Grafting Wax can be bought from your seedsman or nurseryman; or made by breaking up and thoroughly melting together four parts of rosin by weight, two of bees wax, and one of tallow. When thoroughly melted, pour into a pan of cold water, and as soon as it hardens, work, as you would molasses candy, until the proper consistency and a light color.

IX

TREE REPAIR

THE injuries to trees are usually abrasions on the bark or broken limbs or splits in the crotches of trunks or branches.

The implements needed for ordinary tree surgery are a good pocket knife, a mallet and chisel, a sharp saw and a can of coal tar or heavy linseed oil or lead paint. Cement for making concrete will be necessary in cases where large cavities exist.

In cases of wounds or broken limbs the first thing to do is to cut back to sound wood or sound bark. Make all the surfaces clean and dry; in cases of limb or branch, unless quite large, cut them off quite close to the trunk.

Fig. 20 — Bracing split tree.

The wound should then be wiped off, clean and dry, and painted over thoroughly.

Splits should be prevented or repaired by tying the parts up temporarily with a rope or chain, which may be

twisted up with a stick or iron bar, to get them close together; then drill a hole through each branch, measure the distances, and have a bolt made at the blacksmith's jointed in the middle, and with a large washer at each end.

Decayed cavities, either at the base of the trunk, or at large limbs resulting from wounds formerly neglected, should be dug out and all semi-rotted wood chiselled back to clean, hard wood; paint this over, and if the cavity is large, fill it with cement, being sure that no rotten or decayed spot is left underneath it.

X

USES OF CONCRETE AND OF IRON PIPE

THERE are a great many opportunities about the average place for advantageously using concrete. It can be adapted for a variety of uses from filling holes in trees and making foundations, to making garden vases, a stone step, a root cellar, or a coldframe. The ingredients are cheap, and what you make out of it is practically indestructible. You can easily learn to do the work yourself, in odd half hours.

The ingredients required (they will keep indefinitely, until you are ready to use them, if stored in a dry place), are Portland cement, which comes in paper bags of 95 pounds net,—clean, coarse builders' sand, and medium-sized gravel, crushed stone, or clean, hard cinders.

All the tools required are a tight floor, platform or large box in which to mix, a square-pointed shovel, and a hoe, with which to handle and mix the material; a peck or larger measure for measuring, and a couple of pails to carry water, or fresh cement in, if it has to be poured into forms.

In making the concrete, these materials are mixed together in varying proportions, according to the requirements of the work to be done. The more cement used in proportion to the other things used, the stronger the concrete.

Medium Mixture. For ordinary work such as walls,

walks, curbs, small foundations, etc., use 1 part Portland cement, $2\frac{1}{2}$ sand, and 5 gravel, by bulk.

For thin walls, posts, troughs, or any materials which must be strong and impervious, use 1 part cement, 2 sand and 4 gravel. For abutments, foundations, retaining walls and other use where bulk rather than great strength is the object, use 1 cement, 3 sand, and 6 gravel.

In making walks care must be taken to have the foundations firm, well drained and even before the top is laid down. Except in good stiff soil a foundation layer of broken stone or very coarse gravel is desirable, if not actually necessary. For a hard smooth surface, or to finish off gutters or curbs, mix thirty shovelfuls sharp sand to a bag of cement (or about three shovelfuls to each ten pounds of cement), and apply before the base has hardened.

Carefully measure out the gravel, sand and cement and shovel them over once or twice to get the cement fairly well distributed before applying the water. Add the latter gradually, working over quickly, until the mass is of an even consistency and thin enough to pour, or spread, and put into place at once. If the wet concrete is allowed to make its initial "set" it should not be used.

Forms. For constructing walls of buildings, and for many other purposes "forms" are used. They may be readily constructed from ordinary boards, free from rough splinters or knotholes. For heavy work plank are better as they do not give so readily. In either case brace all forms thoroughly, so that they will not bulge under the pressure of the wet concrete, which should be tamped down firmly into place. It should set for a day or more, and then the forms should be carefully removed. If the concrete is to be subjected to use or strain at once, the

forms should be left for a longer period. Protect fresh concrete from possible freezing.

In connection with the use of concrete, or even without it, the use of gas or water-pipe, either new or second-hand (which may be bought very cheaply) offers many possibilities in the way of repair or construction. You can order the pipe cut to any desired lengths, so that by the use of "split fittings," which are now made for a

Fig. 21 — Split fittings for pipe.

great variety of purposes, you can put up iron-work that does not have to be water-tight, with no other tool than a monkey-wrench. Even when regular threaded couplings are used, two medium sized Stilson wrenches will be all the tools required, and they will last a life-time. For trellises, supports, columns of all kinds, posts or arches in place of wood, gate-ways, bars, fences, railings, etc., pipe is practically indestructible and when painted a suitable color makes a very neat appearance.

XI

VEGETABLES

THE planting dates given in the accompanying table are an approximate average for New York, Chicago, and Kansas City. Roughly, each one hundred miles difference in latitude will make about a week's difference in the opening of the spring season. Another method for determining the proper time to sow is to divide the vegetables into two general classes, hardy and tender. The former class can be sown from the last of March to the first of May, or when plum and peach trees are in bloom; this class includes beets, carrots, cabbage, cauliflower, celery, endive, kale, kohlrabi, lettuce, onions, parsley, parsnips, peas, radish, spinach, salsify, turnips and water-cress.

The second, or tender class, can be sown from last of April to first of June, or when apple trees bloom, and includes beans, corn, cucumbers, melons (musk- and water-), okra, pumpkins, and tomatoes; and tomato, pepper and egg-plant plants.

A practical method for the small garden is to separate the spring planting into approximately four plantings, as indicated in the table, "Planting the Garden."

Vegetables may also be divided into three groups, according to their habit of growth, and the cultural requirements of each are somewhat different. First are the "root" crops — beets, carrots, kohlrabi, leeks, onions, parsnips, potato, salsify, turnips. With the exception of

VEGETABLE PLANTING TABLE

VEGETABLES	VARIETIES	DISTANCE		SEEDS OR PLANTS FOR 50 FT. ROW	DEPTH (IN.)
		APART IN ROWS	ROWS APART		
EARLY OR HARDY CROPS					
PLANT LAST OF MARCH TO FIRST OF MAY					
ASPARAGUS	Palmetto; Giant Argentcuil.....	1 ft.	3 ft.	50	4
BEEF	E'y Model; Columbia; Crimson Globe; Dark Stinson.	4-6 in.	12-15 in.	100-150	1
BROCCOLI	E'y White; French.....	1 1/2 ft.	2 ft.	35	1 1/2
CABBAGE	Copenhagen Market; Allhead; Succession.....	1 1/2 ft.	2 ft.	35	1 1/2
CAULIFLOWER	Snowball; Best Early; Dry Weather.....	1 1/2 ft.	2 ft.	35	1 1/2
CARROT	Short Horn; Chantenay; Coreless; Danvers.....	3-4 in.	12 in.	1/2 oz.	1 1/2
CELERY	Golden Self Blanching; Winter Queen.....	2-3 in.	12 in.	1/2 oz.	1 1/2
ENDIVE	Giant Fringed.....	12 in.	12 in.	1/2 oz.	1 1/2
KOHLRABI	White Vienna.....	6-8 in.	18 in.	1/4 oz.	1 1/2
LETTUCE (plant).	Mignonette; Grand Rapids; Wayahead; Iceberg; Big Boston.....	8-12 in.	12-15 in.	1/4 oz.	1 1/2
LETTUCE (seed)	All-season's; Brittle Ice; New York.....	12 in.	12-15 in.	50	1 1/2
LEEK	American Flag; Giant Mussleberg sorts.....	3-4 in.	15 in.	1/2 oz.	1 1/2
ONION	White Queen; Prizetaker; Danvers; (3) Southport Globes.....	2-3 in.	12-15 in.	1/2 oz.	1 1/2
ONION (seedling).	Ailsa Craig; Gigantic Gibraltar; Prizetaker.....	4 in.	12-15 in.	150	1 1/2
PARSLEY	Emerald.....	4-6 in.	1 ft.	1/2 oz.	1 1/2
PARSNIP	Improved Hollow Crown; Offenham Market.....	3-5 in.	15-18 in.	1/4 oz.	1 1/2
PEAS (smooth)	Best Ext. E'y; Alaska; Clipper; Pilot.....	2-4 in.	3 ft.	1 pt.	1-2
PEAS (wrinkled)	Laxtonian; Blue Bantam (dwarfs); Gradus; Early Morn.....	2-4 ft.	3-4 ft.	1 pt.	3-4
POTATO	Irish Cobbler; Eureka; Gold Coin.....	13 in.	28 in.	1/2 pk.	3-4
RADISH	Rapid Red; Crimson Globe; Icicle; Chartiers.....	2-3 in.	1 ft.	1/2 oz.	1 1/2
SALSIFY	Mammoth Sandwich Island.....	2-4 in.	15-18 in.	3/4 oz.	1-2
SWISS CHARD	Lucullus.....	8-12 in.	15-18 in.	3/4 oz.	1-2
TURNIP	White Milan; Petrowski; Amber Globe.....	4-6 in.	15 in.	1/2 oz.	1-2

VEGETABLE PLANTING TABLE

VEGETABLES

41

VEGETABLES	VARIETIES	DISTANCE		SEEDS OR PLANTS FOR 50 FT. ROW	DEPTH (IN.)
		APART IN ROWS	ROWS APART		
LATE OR TENDER CROPS					
PLANT LAST OF APRIL TO FIRST OF JUNE					
BEANS (early) ..	Stringless Green Pod; Bountiful; E'y Red Valentine.	3-4 in.	18 in.	1 pt.	1-2
BEANS (wax) ..	Rust-proof Golden Wax; Burpee's Kidney Wax; White Wax	3-4 in.	15-24 in.	1 pt.	1-2
BEANS (lima) ...	Burpee-Improved; Henderson's Bush; Dreer's Bush.	4-6 in.	18-24 in.	1 pt.	1-2
BEANS (pole) ..	Burpee's Stringless Green-pod; Sunshine Wax; Worcester Pole	4 ft.	4 ft.	1/4 pt.	1-2
BEANS (pole lima)	Early Leviathan; Giant Podded.....	4 ft.	4-5 ft.	1/4 pt.	1-2
BEETS	Crimson Globe; Columbia; Dark Stinson.....	4-6 in.	12-15 in.	1 oz.	2
BROCCOLI	Early White French.....	2-3 ft.	2-3 ft.	35	1/2
BROCCOLI S'PS ..	Dalketh; Danish Prize.....	1 1/2 ft.	2 ft.	35	1/2
CABBAGE (late) ...	Perfection Savoy; Danish Roundhead; Danish Red..	1 1/2 ft.	2-3 ft.	25-35	1/2
CARROT	Chantenay; Coreless; St. Valley; Danvers.....	2-4 in.	12-15 in.	1/2 oz.	1/2
CAULIFLOWER ..	Snowball; Dry Weather	2 ft.	2-3 ft.	25	1/2
COEN (early) ...	Golden Bantam; Peep o'Day; Howling Mob; Early Crosby	3 ft.	3-4 ft.	1/2 pt.	2
CORN (main crop)	White Evergreen; Country Gentleman; Seymour's Sweet Orange; Black Mexican.....	4 ft.	4 ft.	1/2 pt.	3-4
CUCUMBERS	Davis Perfect; Vickery's Forcing; Fordhook Famous.	4 ft.	4 ft.	1/4 oz.	1
EGG PLANT	Black Beauty	2 ft.	2 1/2 ft.	25	25
LETTUCE	Allseasons; Salamander; Brittle Ice; New York.....	8-12 in.	12-15 in.	1/4 oz.	1/2
MELONS (musk) .	Emerald Gem; Netted Gem; Henderson's Bush; Montreal; Spicy	4-6 ft.	4-6 ft.	1/4 oz.	1/2-1
MELONS (water) .	Coles' Early; Halbert Honey; Ice Cream; Baby Delight	6-8 ft.	6-8 ft.	1/4 oz.	1/2-1
PEAS (late)	Boston Unrivalled; Royal Salute; British Wonder (Dwarf)	3-4 ft.	3-4 ft.	1 pt.	3-4
PEPPERS	Early Neapolitan; Ruby King; Chinese Giant; Sweet Upright	2 ft.	2 1/2 ft.	25	1
PUMPKIN	Large Cheese; Quaker Pie	6-8 ft.	6-8 ft.	1/4 oz.	1/2
RADISH	Icicle; Charters; White Strassberg.....	2-3 in.	1 ft.	1/4 oz.	1/2-1
SQUASH (summer)	Scalloped Bush; Fordhook Bush; Delicata	3-6 ft.	4-6 ft.	1/4 oz.	1
SQUASH (winter) .	Hubbard; Delicata; Delicious; Blue Hubbard.....	6-8 ft.	6-8 ft.	1/4 oz.	1
TOMATO	Bonnie Best (early); Dwarf Giant; Dwarf Stone; Matchless	3-4 ft.	4-5 ft.	15-20	1/2
TURNIP	Amber Globe (yellow); White Egg	4-6 in.	15 in.	1/2 oz.	1/2

PLANTING THE GARDEN WEEK BY WEEK
APPROXIMATE DATES

VEGETABLE	NOTE	VARIETY	NO. OF ROWS	SPACE, FEET
April FIRST SATURDAY				
Swiss Chard		Giant Lucullus	2	1x1½
Lettuce	B	Grand Rapids, Wayahead....	1	1
Peas	A	Best Early	1	1½
Onion Sets	A	White or Yellow.....	1	1½
Turnip	B	Early White Milan	1	1
Cabbage, Early	A	Jersey Wakefield	1	1½
Radish	C	Crimson Giant		
Spinach	B	Victoria	1	1½
			8	10½

April SECOND SATURDAY				
Cauliflower	A	Best Early; Dry Weather....	1	1½
Radish	C	White Icicle		
Celery	D	Golden Self Blanching.....		
Leek	D	American Flag		
Turnip	B, A	Petrowski; Golden Ball.....	2	1½x1
Carrot	A	Chantenay	2	1x1
Beet	A	Early Model	2	1x1
Onion	W, E	White Queen (½), Prize Taker (4½)	5	1x4
			12	13

April THIRD SATURDAY				
Salsify	W	Mammoth Sandwich Island....	4	1½x4½
Parsnip	W	Improved Hollow Crown....	4	1½x4½
Potato, Early	A	Irish Cobbler	2	2x2
Radish	B	Crimson Giant.....	1	
Cabbage	A	Glory of Enkhuisen; Succession	2	2x2
Peas	A, E	Gradus	1	3
Lettuce Seed	B, D	All Seasons; Iceberg	1	2
Peas		Boston Unrivald	1	2
			16	27

April FOURTH SATURDAY				
Peas	A	Royal Salute	1	2
Radish	B	Crimson Giant; White Icicle..	1	2
Potato (sprouted)	A	Irish Cobbler	1	2
Onion (seedling)	E	Ailsa Craig; Gigantic Gibraltar	1	2x1
Carrots	W	Coreless	4	1x3
Beets	W	Columbia	4	1¼x3¼
Lettuce, Cos	A	Dwarf White Heart	½	1¼
Kohl-rabi	A	White Vienna	½	
			13	18¾

SUGGESTED PLANTING PLAN FOR THE EARLY CROPS, TO TAKE FOUR SATURDAY AFTERNOONS' WORK.

NOTES

A—Crops that will be out of the way in time to be followed by others.

B—Interplanted "companion" crops which will be out of the way before those next to them need all the room.

C—Like above, except that they are planted between *plants* in the row, instead of between rows.

D—Start in a special bed, for transplanting later.

E—A good item to increase, as any surplus will find ready sale.

W—May be stored for winter use.

PLANTING THE GARDEN — THE LATE CROPS

VEGETABLE	NOTE	VARIETY	NO. OF ROWS	SPACE, FEET
May FIRST SATURDAY				
Corn, Ey.	E	Golden Bantam	1½	2x4
Squash, Sum.	E	Mammoth White Bush	½	
Potatoes, late	E	Gold Coin (7), Uncle Sam (3)	10	3x27
Lettuce	A	Wayahead	½	
Radish	A	Crimson Globe (¼), Icicle (¼)	½	1
		Stringless Greenpod (½), Giant		
Bean, Ey.	A	Greenpod (½)	1	1½
			14	38½

May SECOND SATURDAY				
Beans, wax	A	Brittle Wax, New Kidney Wax	2	1½x1½
Beans, lima		Fordhook	1	2
Beans, pole	W	Burger's Stringless, "Sunshine"	1	4
Beets	W	Dark Stinson	4	3x3¾
Carrots	W	Coreless	4	1x3
Peas	E	Blue Bantam, British Wonder	2	2x3
Corn, Ey.		Golden Bantam, Howling Mob	2	2x4
Tomatoes, Ey		Bonny Best	½	
			16½	30¾

May THIRD SATURDAY				
Tomato		Dwarf Giant	2½	4
Cucumber	X	Davis Perfect	½	3
Muskmelon	X	Netted Gem, Spicy	½	
Beans, lima	W	Burpee Improved	2	3x2
Beans, pole	E, W	Giant Podded Pole	1	4
Lettuce		Brittle-ice	½	3
Okra		Klecky's Favorite	½	4
Watermelon	X	Fordhook Early	½	4
Squash	X	Fordhook	½	
			6¾	23

May FOURTH SATURDAY				
Corn	E	White Evergreen	2	4x4
Pepper	E	Ruby King	½	3
Egg-plant	E	Black Beauty	½	
Turnip		Amber Globe	2	2x1½
Brussels Spts.	D	Danish Prize	¼	
Cauliflower	D	Dry-weather (Danish Giant)..	¼	1
Peas Cabbage	D	Savoy, Danish Roundhead....	½	
Peas		Blue Bantam, British Wonder	2	3x3
			8	21½

NOTES

- A—Will be removed in time to be followed by some late crop.
 B—Planted as a companion crop between rows.
 D—Sown in seed-bed, to be transplanted later to permanent position.
 E—Good to increase if a surplus for selling is desired.
 W—Any surplus may be kept over for winter use.
 X—If possible, plant far apart from each other; in rows or hills.

potatoes any of these may be sown, usually early in April, in drills 12 to 18 inches apart. The soil must be rich and finely worked in order that the roots may be even and smooth. They must be thinned out to stand the proper distances apart in the row, which should be done if possible on a cloudy day; weeded as often as required to keep them perfectly clean; and frequently cultivated. All, with the exception of leeks and potatoes, are given level culture. All will be greatly benefited, when about one-third grown, by a top-dressing of nitrate of soda.

Fig. 22 — Leaf, root and fruit crops.

The second group, or "leaf-crops," includes asparagus, brussels sprouts, cabbage, cauliflower, celery, endive, kale, lettuce, parsley, rhubarb, spinach, Whitloof (chickory). The quality of most of these depends largely upon their making a rapid growth without any check, from the seed-bed to the kitchen. They all take kindly to a plentiful supply of nitrogen, and appreciate a liberal supply of barn-yard manure which is usually high in this element. They are still further benefited by light top-dressings of nitrate of soda, one or more applications being made, usually two to four weeks apart, the first a week or so after plants have been set out, or after rowed crops have been thinned. Sprinkle a very little about each plant and work it into the soil with wheel-hoe or hand-hoe.

Where the soil is not very rich, cabbage, cauliflower, celery, and lettuce may be successfully grown by "manuring in the hill."

The third group, the "fruit" crops, include beans, dwarf and pole, corn, cucumbers, egg-plant, melons, musk and water, okra, peas, pepper, pumpkin, squash, tomato. For these vegetables the soil should not be made too rich, especially in nitrogenous manures, as there is then a tendency to too luxuriant a growth of stalk or vine and leaves, and a delay of the maturing of the crop. A shovel-ful of rich compost, or a couple of handfuls of tankage or cotton-seed meal and bone dust in the hills when they are being planted or set out, will help in giving them a quick, strong start. Nitrate of soda may be used, but should be applied during the early stages of growth. They are warmth-loving plants, and nothing is gained by setting them out or planting until all danger from late frosts is over, and the ground is well warmed up. (Peas, and to some extent early beans, are of course an exception.)

The greatest difficulty in raising the vine crops — melons, cucumbers, squash, pumpkins — is to combat the striped beetle and the squash or "stink" bug, and in the case of squashes, the borers. Where only a few hills of each are required, the easiest and most satisfactory way of fighting them will be protecting the plants until they are well started with bottomless boxes covered with mosquito netting or wire, or light-grade plant protecting cloth. Cracker boxes cut once in two are handy to make and use. Look out for the squash vine borer. His presence is shown by a pronounced wilting of the leaves noticed especially at mid-day. Near the base of the vine, slit the stem with a thin bladed knife, dig out the inter-loper and cover the wound with soil.

SEEDS	LONGEVITY	GERMINATION	MATURITY
Bean, dwarf	3	4-10	45-90
Bean, pole	3	4-10	65-100
Beets	6	7-14	60-120
Broccoli (plant)*	5	4-10	50-90
Cabbage (pl.)	5	4-10	70-100
Carrot	4	10-20	70-90
Cauliflower (plant)	5	4-10	60-80
Celery	8	12-20	125-150
Cucumber	10	5-15	60-75
Egg-plant (pl.)	3	8-15	40-60
Endive	10	4-10	75-100
Gourds	6	5-10	75-125
Kohlrabi	5	4-8	65-85
Leek	3	7-20	120-150
Lettuce	5	4-12	40-85
Sweet Corn	2	4-10	80-100
Muskmelon	5	6-15	90-120
Onion	2	7-20	120-175
Oyster Plant	2	7-20	125-150
Parsley	3	7-15	90-110
Parsnip	2	10-20	100-150
Pea	2	5-10	50-75
Pepper (pl.)	4	8-15	40-60
Pumpkin	4	5-12	100-130
Radish	5	3-8	25-50
Spinach	5	7-15	60-75
Squash	6	7-14	100-125
Tomato (pl.)	4	6-15	40-60
Turnip	5	3-8	60-75
Watermelon	6	6-15	100-125

* From 40 to 90 days more must be allowed for growing the plants.

XII

CULTURAL DIRECTIONS

ASPARAGUS prefers a sandy, well drained, early soil. Make trenches 3 or 4 feet apart and 16 to 20 inches deep. Tramp in 6 or 8 inches of well rotted manure; cover with 6 or 8 inches of good garden soil, and on this set 1 or 2 year old crowns, being careful to spread the roots out evenly. Fill in, leaving the roots some 6 inches below the surface. In the fall clear off all

Fig. 23 — Cross-section to trench for planting asparagus roots.

tops and weeds, and apply a good coating of manure. Apply nitrate of soda in spring and give light cultivations. A few stalks for use may be cut second spring. (Asparagus beetle and A. "rust.")

Beans. Well drained, rather light soil. Plenty of potash,—woodashes good. Hill slightly. Never work when foliage is wet. Plant Limas on edge, with eye down, when there is no prospect of immediate rain. Pole sorts on prepared hills.

Beets. For continuous supply of good quality plant seed and set out plants early in April; plant again about May 1st and June 1st. Make last large enough to allow

for winter supply. May be planted as late as July 1st, if medium early variety, and seed is well firmed in soil. (Scab.)

Broccoli. Similar to cauliflower. Requires longer season.

Brussels Sprouts. Extra fine. Very hardy. Splendid to succeed fall crop of cauliflower, as frost does not injure. Sow outside in June, and transplant. If tops of stalks are nipped out when sprouts have formed, latter will grow larger and more even in size. (Root-maggot; cabbage-worm; club-foot.)

Cabbage. Rich deep soil, well limed. Start plants under glass. Sow late crop June 1st to July 1st in open field. Thin out to 3 or 4 inches. Transplant latter part of July. (Insects, see Brussels sprouts.)

Cauliflower. Similar to cabbage. Extra fine quality. Not quite so hardy. Rank feeder and must have plenty of moisture when heads are forming. Keep heads white by tying together leaves to protect from sun and rain. Use as soon as ready. (Insects, see Brussels sprouts.)

Carrots. Fine deep soil. Late crop may be sown in June. Seedlings very small, keep carefully weeded.

Celery. Moist, well drained soil or water-supply in case of drouth. Early crop started under glass. Late about April 1st, inside or out. In either case transplant as soon as large enough, cutting back tops, and long roots. For early crop set out in rows 3 or 4 feet apart, level culture or in shallow trench. As they grow, draw earth in about stalks, to hold upright. In cultivating work earth up towards row and, as the first of it gets about large enough to use, bank it up with a spade so that the stalks are entirely covered and will blanch ready for use. Boards or short drain-tile may be used in place

of the earth bank. In the latter case the same tile may be used several times during the season. Sometimes the plants are set 8 to 12 inches apart *each way*, so that they hold each other upright and blanch themselves to some extent, being finished off by trenching or storing. This method should be attempted only when the soil is *very* rich, and an abundance of water may be given during dry weather. For the winter supply set plants in June or July, give level culture until about mid-August. Then draw earth up as required to hold the stalks upright. For the winter supply, provide boxes about a foot wide and nearly as deep as the celery is high. Three or four inches of sand, wet, in bottoms of boxes. Pack the celery in close, standing upright, with whatever earth adheres to roots in taking up. Store boxes in dark, dry, cold place where temperature will not go more than five or six degrees below freezing. First lot will be ready about Christmas; for succession store from open at two or three different times, two weeks or so apart; the last being just before severe cold weather, as a few degrees of frost will not injure the outside crop. Never handle while wet or frozen.

Corn. If started under glass, do not set out until ten days or so after it is safe to *plant* outside. Frequent shallow cultivation. For continuous supply plant frequently and use succession varieties, to mature one after the other, such as Golden Bantam, Howling Mob, and White Evergreen. Try planting your sweet corn in drills, 3 or 4 feet apart, with the stalks 10 or 12 inches apart. Many people find this more satisfactory than the old hill system.

Cucumbers. Do not set out started plants until after arrival of settled warm weather. For either plants or

seeds prepare special hills. Dig out 6 to 8 inches of soil, $1\frac{1}{2}$ to 2 feet square, and incorporate a couple of forkfuls of good rich compost. A pint of tankage or cotton-seed meal in addition to this will be good to use. Mix thoroughly with soil in the bottom of the hole, keeping it two inches or so below the surface. Make the "hill" about level with the soil, or slightly raised in wet soil or season. *Keep off the bugs* by mechanical protection with boxes, sifted ashes or landplaster, or by kerosene emulsion, tobacco or other sprays. After the vines begin to run the bugs usually are not very troublesome. (Bugs, blight, wilt.)

Egg-plant. Start under glass, and transplant twice, second time preferably into pots, and get as large and sturdy plants as possible to set out. Give rich soil and plenty of water. Keep off the potato-bugs with arsenate of lead and hand picking — foliage too tender for Paris green.

Endive. Salad plant, most grown for fall use, sown in June or July and transplanted. Must be blanched by tying up leaves, or by placing two wide boards, $\wedge$ -shape, over the row. Do not handle when wet.

Kale. For fall use give same treatment as late cabbage. Improved by frost. May be left out and cut as needed even after first snows. Siberian kale is sown in September and wintered over like spinach.

Kohl-rabi. May be started early and transplanted, but usually is sown directly outdoors. Grows rapidly; use when very young, $1\frac{1}{2}$ to 2 inches in diameter. Sow small amount frequently for succession crops.

Leek. Start in seed-bed before the first of May; transplant in late June to heaviest soil available. Should be

hilled up gradually, with each cultivation, to blanch lower part of stalk.

Lettuce. For first crop set out plants started under glass. About April 1st begin to sow outdoors, planting every two or three weeks for continuous supply. Middle of May to August sow hard-heading, heat-resisting sorts, such as Deacon or All Seasons, New York or Brittle-Ice. In August sow butter-head and loose-head types again for fall and frame use, Grand Rapids and Big Boston being good. "Cos" lettuces require tying to blanch properly. Lettuce should be grown as rapidly as possible, using rich soil and nitrate of soda.

Melons. Same conditions as cucumbers. If soil is at all heavy, add sand and leaf mold to the compost, making hills 3 feet or more square.

Melons,—Water. In northern states use early varieties, preferably start under glass to get longer bearing season. Quick, sandy soil and plenty of heat are chief requirements. With limited space plant near edge of garden and pinch back main vines.

Okra. Give rich soil and thin out when well started, or seeds may be planted in hills, and thinned to one plant. Plants are quite ornamental. Pods not needed for soups or stews may be dried and used in winter.

Onions. Green or bunch onions are grown from "sets" or small onions, or from one of the perennial sorts, and used while small. Keep earth drawn up toward the stems. The seedlings started under glass in February or March set out in April or early May, cutting the tops and roots back. The seedling plants should be trimmed back once or twice while growing. Main winter crop may be grown either from black seed sown in

the open, or from transplanted seedlings. Soil should be rich and very finely prepared. Plant as early as possible. Give absolutely clean culture especially while small. Gather when tops wither and die down; put in broad rows or windrows to dry in the sun for a few days; and then spread out in airy place under cover, not more than three or four inches thick. Before severe freezing store in frost-proof cellar or shed. (Maggots, thrips, and blight.)

Parsley. Soak seed in warm water a day before planting. Two or three feet of row will give a large supply. A few plants can be taken up, cut back, put in a pot or box for use in kitchen, during winter.

Parsnips. Thin to two or three inches while small. Improved by frost. Store part of crop in sand in cellar and leave part in ground for spring use.

Peas. Soil should not be too rich. Wrinkled sorts are better than smooth in quality — make only one small planting of former. Make several plantings to secure a constant supply. Late plantings two or three inches deep in heaviest soil available. Small application of nitrate of soda made early will not delay maturity of crop. Dwarf sorts sometimes grown in beds of 3 or 4 rows, 6 to 8 inches apart. Early sorts, sown in August, usually mature before frost.

Peppers. Culture in general same as for egg-plant, but grow larger.

Pumpkin. Sugar and pie varieties good for table use. (See squash.)

Potato. Soil should be deep and mellow. For extra early crop start a peck or so of tubers inside, cutting lengthwise to good sized pieces with two or three eyes, and place on end in a flat of coarse sand, half covering up.

Keep moist. Set out with as many roots as possible and cover sprouts two inches or so deep. For main crop, cut good sized seed to one or two strong eyes, with as much of the tuber as possible to each, and plant 12 inches or so apart in drills 28 to 36 inches apart. Cover 4 inches deep, applying some fertilizer in the drill mixed with the soil. Cultivate frequently, quite shallow after plants are 10 inches or so high. Hill up moderately as vines begin to spread. Do not use fresh manure or lime. (Potato-bugs and blight.)

Radishes. Sow small quantities frequently. Little land-plaster of gypsum worked into soil improves quality. Avoid fresh manure.

Rhubarb. Usually planted from roots. Old clumps may be separated into several parts, and planted in fall or early spring. Nitrate soda applied very early in the spring, is very effective. Keep seed-stalks broken off.

Sea-Kale. Start from either seed or pieces of roots; transplant yearling plants 3 feet apart each way. In fall after frost takes leaves, cover each crown with a shovelful of clean sand, and put on 8 inches or so of soil over this to blanch the spring growth. After this is cut, shovel off the earth and sand, and cultivate to induce growth to store up energy for next season's growth.

Spinach. For spring planting, drouth-resisting sorts, or New Zealand. (Seed of latter should be soaked before planting.) For spring, sow in September and winter over, with mulch. Swiss Chard has largely taken the place of spinach, because one planting will last for the whole season, successive cuttings of the leaves being made.

Salsify. (Vegetable Oyster.) Same culture as parsnips. Deep rich soil finely prepared.

Squash. For early crop, use bush or scollop varieties.

Prepare hills as for cucumbers. Plant extra hills of early sorts, where late are to go, as "traps" for beetles and borers.

Tomato. Start under glass and transplant twice, preferably to pots second time. Manure or compost in hill unless soil is very rich. One or two applications of nitrate of soda, given early. Keep plants well tied up, and most of the suckers cut or rubbed off. (Cut-worms; tomato or "horn" worms; black rot.)

Turnips. Get a succession of crops by frequent plantings, and by using succession varieties. Plant in July for winter crop. Thin out when small.

Fig. 24 — Trellis of 2 x 4 scantling and lath for plant support.

Plant Supports. Peas, pole-beans, and tomatoes require some means of support, to keep them off the ground. For beans and tomatoes ordinary birch, alder, or cedar poles are ordinarily used, trimmed rough to give the vines a chance to catch. A better method is to make supports of lath and scantling, (Fig. 24). Where brush cannot

readily be obtained for peas, hen wire, chicken wire, or prepared wire trellis, held in place by wooden or iron pipe posts, may be used, and if well cared for will last for years.

XIII

FLOWERS

IN making flower beds select a place with naturally good drainage, or else provide artificial drainage (see Chapter III). The beds or borders should also be constructed where they will receive a bountiful supply of sunshine, or, where this is impossible, plants adapted to more or less shade should be selected. Unless the place is naturally well drained, the individual beds should be dug out to a depth of 18 to 24 inches, and put a layer of broken stone or brick, plaster rubbish or some similar rough material, several inches thick, in the bottom. "Borders" are merely long narrow beds, made usually along drives or walks, around the edge of the lawn, or inside of the shrubbery borders. The beds should be thoroughly forked or spaded up, and thoroughly enriched, old, fine manure being the best material for this purpose. Beds for annuals should be deeply dug and prepared each spring, and beds of hardy perennials should be dug up each spring as thoroughly as possible without disturbing the roots of the plants. Bone flour and bone dust are both very good, as they are easy to handle and very effective. Mixed together and used with a generous supply of woodashes they make a complete fertilizer that gives immediate effect and also lasts a long time.

Many of the annuals are planted where they are to grow, but a number of them, such as cosmos and salvia, which require a longer season to bloom, it is much better

to start under glass. Perennials are usually bought from the nursery-man in one or two year plants, but many of them can easily be started at home, either in the cold-frame, or outdoors in early spring, or in early fall,—August or September. In the latter case the seed-bed is usually shaded. They are grown on for a season, being thinned out or transplanted to a few inches apart each way, and then set in their permanent positions. Most flower seeds are very small: the seed bed whether under glass or outdoors should be made of prepared soil and finished off very finely on top; if outside it should be protected from drip or beating rains. Sow the seed very thinly, barely covering it from sight, and press down firmly. Give the seed-bed a thorough soaking the day before planting. Or flower seedlings may be started in “flat” as described on page 4. In any case, if the seedlings come up thickly, thin them out as soon as large enough. Those which are wanted to grow in bushy form, such as snapdragon, salpiglossis or verbena, should be pinched back a third or so to induce lateral growth.

Making Cuttings. Many flowers are propagated from “cuttings,” or short pieces of stem or shoots of the plant, two inches or more in length, which are induced to form roots by placing them in moist sand or water. The usual test for the proper condition of the wood is to bend the shoot to be used between the fingers: if it *snaps*, it is probably all right to use,—if it bends or buckles up, without breaking, it is either too soft or watery, or too old and tough. The cutting should be cut off clean, preferably at or near a joint, or just below or above it; the proper condition is usually found in the new growth or terminal portion of the shoot; nearly all the leaves should be taken off, and those remaining trimmed off or cut

back (Fig. 27). A flatful of clean, coarse sand such as builders use, kept moist but not soaking wet, will do to root the cuttings in. They should be inserted about half way, the sand firmly pressed about them, and shade given from direct sunlight for about a week. The temperature should be kept from 50 to 55 degrees at night if possible; if about 10 degrees or so of bottom heat can be given in addition, so much the better. Where only a few cuttings are to be rooted, what is known as the saucer system is used. The sand is put in a glazed earthen ware dish, 2 inches or so deep, and kept constantly wet to the consistency of mud; the cuttings need not be shaded; the temperature may be warmer than by the other method. When the roots are from a quarter to a half an inch long, which will be in from ten to twenty-five days, place the cuttings singly in small flower pots, or several near the edge in a larger pot, of finely prepared soil. Give one

Fig. 25 — Geranium cutting ready for propagating box.

Fig. 26 — "Crocking" in flower pot to provide good drainage.

good watering, but not a soaking, and then merely wet the foliage for a week or so until the cuttings begin to get established. Keep them shaded from the direct sunlight. After that, water as needed, and when the roots

begin to fill the pots, and while they are still in a white and growing condition, shift to a size larger pot. The pot should be filled not quite full of earth, and the repotted plant should be set a little deeper than it was in the former pot. Pots of four or five inches or so in diameter should be crocked; that is, a piece of broken pot, coarse siftings or something similar placed over the hole in the bottom to insure perfect drainage (Fig. 29).

PROPAGATION OF PERENNIALS. Many of the hardy perennials which grow in clumps may be increased by "division" or separating the clumps up into smaller pieces and planting these. Some will separate readily by the fingers; others will require cutting with a knife, leaving at least one good strong bud or sprout to each piece. This work should be done in the fall or very early in the spring, before much growth has been made. While the roots are out of the soil the beds should be enriched and forked over before they are replaced.

Bulbs and Bulbous Plants. These are of two classes; the spring-flowering bulbs and hardy lillies which are planted in the fall to bloom the following season, and the spring-planted bulbs which bloom during the summer and fall. The fall bulbs are planted usually soon after the first hard frost. (For directions, see Chapter XVI.) The beds must be well drained and sufficiently rounded up so that no water will rest on them, during the winter. As severe weather approaches, about the middle of November, they should be mulched. Most of these bulbs remain in the ground after planting for several years without further attention. A number of them will become "naturalized" and increase and last indefinitely. The spring bulbs, planted from April to June, require wintering over in some frost-proof place, such as the house cellar. When

the leaves die down in the fall, take the bulbs up and store temporarily in an empty frame or an open shed to dry off thoroughly. Then pack away in flats or boxes, carefully *labelled*, to use again next spring.

Window Boxes. These may be bought or made in any size convenient for the place in which they are to be fitted, but the depth should not be less than 6 inches and the width is usually 8 to 12. Cypress is the best wood to use, but pine or other material will do. If the box can be lined with zinc or copper its life will be greatly prolonged. Provision should be made for drainage. The self-watering boxes on the market save a great deal of trouble in taking care of the plants. In the winter, where the climate is not too severe, the boxes may be filled with hardy evergreens, vincas, etc., after the summer flowers are killed. Otherwise the boxes should be emptied out and put away until wanted again in the spring.

Insects and Diseases. Most of the insects and diseases from which the various flowers suffer are identical or similar to those attacking vegetables. They will be found listed under the plants attacked, in Chapter XVIII.

ANNUAL FLOWERS*

BY COLORS

White. Ageratum; Allysum; China Asters; Convolvulus major; Dianthus; Lavatera alba; Malope grandiflora alba; Mirabilis longiflora alba; Phlox; Stocks.

Yellow and Orange. Calendula officinalis; Eschscholtzia Californica; Hibiscus Africanus; Thunbergia; Zinnia.

Blue and Purple. Ageratum Mexicanum; Browallia Czerniakowski; Centaurea Cyanus; China Asters; Convolvulus minor; Gilia achilleæfolia; Iberis umbellata; Lobelia Eri-nus; Phlox; Salvia; Verbena.

* See catalogue descriptions for varieties.

Red and Rose-red. Clarkia; Convolvulus tricolor; Dianthus; Gaillardia; Ipomoea; Papaver (Poppy); Phlox; Salvia; Stocks; Verbena; Zinnia.

BY HEIGHT

Plants 6" to 1 ft. Ageratum; Alyssum; Godetia; Gypsophila muralis; Centaurea Cyanus; Convolvulus minor; Eschscholtzia crocea; Godetia; Gypsophila muralis; Iberis affinis; Lobelia; Mesembryanthemum crystallinum; Mimulus; Phlox; Portulaca; Schizanthus pinnatus; Sedum cæruleum; Silene Armeria; Silene pendula ruberrima; Stocks; Verbena.

Plants 1 to 1½ ft. Ageratum; Browallia Czerniakowski; Calendula sulphurea; Chrysanthemum carinatum; Convolvulus minor; Dianthus; Elsholtzia cristata; Eschscholtzia Californica; Gaillardia picta; Iberis amara; Lupinus nanus; Papaver; Petunia; Phlox; Salvia Horminum; Schizanthus.

Plants 1½ to 2 ft. Adonis æstivalis and autumnalis; Amarantus; Calendula; Calliopsis; Centaurea Cyanus; Delphinium; Gaillardia picta; Helichrysum; Ipomoea coccinea; Linum grandiflora; Lupinus; Oenothera Drummondii; Papaver Mephisto; Zinnias.

Plants 2 to 3 ft. Adonis æstivalis; Ageratum Mexicanum; Amarantus; Calendula; Calliopsis; Centaurea Cyanus; Centaurea Americana; Centauridium Drummondii; Chrysanthemum; Clarkia; Cleome; Cyclanthera; Datura fastuosa; Datura Cornucopia; Helianthus; Helichrysum; Hibiscus Africanus; Hibiscus Golden Bowl; Impatiens; Lupinus; Mirabilis Jalapa; Papaver; Salvia coccinea; Salvia farinacea; Xeranthemum; Zinnia.

Plants over 3 ft. Adonis autumnalis; Helianthus; Ricinus.

ANNUALS

In the following descriptions the first two figures after the names of the flowers indicate the distance apart for planting. The third and fourth figures indicate the height of the plants. NOTE — C. Flowers especially for cutting. S. Flowers thriving in partial shade. P. Flowers that should be started early under glass, or purchased from the florist.

While most of these can be sown in the open ground in May or early June to flower the same year, quicker results will be

had if they are started early in flats, in the hotbed or window, and transplanted. With some (marked "P" above) it is quite necessary to do this. With annuals especially it is important *to keep the flowers cut off* before ripening seed if a long season of bloom is wanted.

AFRICAN DAISY—6-10 in.; 12-15 in.; color rich, various; flowers June to frost. New profuse flowering plants, good for beds and borders.

AGERATUM—6-12 in.; 12 in.; color blue, white; flowers June to frost. Popular old-fashioned plants for edging. P.

ASTER—12-24 in.; 18-30 in.; color various; flowers July-Sept. Protect from aster beetle by hand picking and Paris Green. P. C.

BACHELOR'S BUTTON—6-10 in.; 15-24 in.; color blue, white, pink; flowers July. Old favorite for borders. S. C.

BALSAM—15-20 in.; 10-18 in.; color various; flowers June-Sept. Use in foreground, where individual flowers will show.

CALENDULA—12-18 in.; 18-24 in.; color orange, yellow; flowers June to frost. Very free flowering; masses or borders.

CALLIOPSIS—8-10 in.; 12-18 in.; color yellow (orange-brown); flowers June-Sept. Of very quick growth, and free flowering. C.

CALIFORNIA POPPY—6-8 in.; 12 in.; color orange, yellow; flowers August. Sow early. Beautiful in solid beds. Fine new varieties.

CANDYTUFT—4-12 in.; 6-18 in.; color white, crimson carmine; flowers June-Sept. Good for solid masses of color, especially white. C.

CASTOR BEAN—24-36 in.; 50-90 in.; color foliage; flowers July to frost. Very rapid grower; screening and tropical effects. S.

CHRYSANTHEMUM—12-18 in.; 12-36 in.; color various; flowers August-Oct. Very easily grown and very showy.

CLARKIA—8-10 in.; 18 in.; color white, rose, purple; flowers June-Sept. Bright daisy-like flowers, pretty foliage. C.

COCKSCOMB (*Celosia*)—8-18 in.; 6-18 in.; color white, red, yellow, purple; flowers June to frost. Satisfactory borders, especially for long lines of color.

CORNFLOWER—8-12 in.; 12-40 in.; color, white, blue, lilac; flow-

ers June-Aug. Greatly improved. One of the best *blue* flowers. C.

COSMOS—24 in.; 2-8 ft.; color white, pink, red; flowers August to frost. One of the most beautiful of annuals. Start early. P. C.

GLOBE AMARANTH—10-15 in.; 18 in.; color pink; flowers July. Also for borders and masses. C.

GODETIA—8-12 in.; 12-24 in.; color red, white; flowers July-Oct. Good for masses. C. S.

GOURDS—12-24 in.; 5-15 ft.; color colored fruits; flowers July to frost. Climbers. Fruits of various shapes and colors.

GYPHOPHILA—6-15 in.; 12-24 in.; color white; flowers June to Sept. Valuable for bouquets. Make several plantings. C.

LARKSPUR ANNUAL—6-12 in.; 18-36 in.; color white, blue, pink; flowers June-July. Rich colors. Another of the best blue flowers. C.

LAVATERA—8-12 in.; 3-6 ft.; color rose; flowers July. Another good screening plant.

LOBELIA—4-8 in.; 6-18 in.; color blue, white; flowers June-Sept. Beautiful for low borders and edges; also in mass. S.

LOVE-LIES-BLEEDING—10-15 in.; 3-5 ft.; color yellow to scarlet; flowers June-July. Good for screens and masses. Will self-sow.

LOVE-IN-A-MIST—10-12 in.; 12-42 in.; color white-blue; flowers June-Sept. Old favorite; good for borders.

LUPINE—4-8 in.; 12-24 in.; color white, blue, pink; flowers June. New varieties give a range of colors. C. S.

MARIGOLD—6-18 in.; 10-36 in.; color pale gold to orange; flowers July to frost. Great variety. Dwarf sorts good for edgings.

MIGNONETTE—6 in.; 12-18 in.; color golden to reddish yellow; flowers July-Sept. Prized for its delicious fragrance. Second planting in August. C.

MOONFLOWER—6-18 in.; 15-30 ft.; color white, blue; flowers August to frost. Most beautiful annual climber. Start under glass. P.

MORNING GLORY—4-12 in.; 10-20 in.; color various; flowers July-Sept. Flowering annual for quickly covering fences, etc.

NASTURTIUM—5-12 in.; 12-60 in.; color various; flowers July to

- frost. Wonderful improvements, especially in the foliage. C. S.
- NICOTIANA—8-12 in.; 3-5 ft.; color white, red; flowers July to frost. Unique, pretty flowers with a jessamine-like fragrance.
- PANSY—6-8 in.; 6 in.; color various; flowers May to frost. Get *young*, small plants for best results. P. C.
- PETUNIA—8-12 in.; 12-24 in.; color white to claret, mixed; flowers July to frost. Wonderfully free-flowering and showy. S.
- PHLOX DRUMMONDII—8-12 in.; 12-36 in.; color various, brilliant; flowers July to frost. Splendid for solid beds, or medium height bright edges.
- PINKS (*Dianthus*)—5-8 in.; 10-18 in.; color white to rose; flowers August to frost. One of the most satisfactory of all summer annuals. C.
- POPPY—4 in.; 6-10 in.; color white to scarlet; flowers July-Sept. Will not transplant well. Most effective in mass beds.
- PORTULACA—4-6 in.; 6-10 in.; color white, yellow, red shades; flowers July to frost. Cheery, old-fashioned favorites; full sun, sandy soil.
- SALPIGLOSSIS—6-12 in.; 12-24 in.; color various; flowers June-Sept. Wonderful velvety texture and delicate pencilings. C.
- SALVIA—6-12 in.; 12-36 in.; color scarlet; flowers August to frost. For mass effects the most vivid of all red flowers. P.
- SCHIZANTHUS—8 in.; 24 in.; color mixed—yellow to lilac; flowers July to August. Good for masses when blossoms are scarce.
- STOCK—6-12 in.; 12-24 in.; color various; flowers June-Sept. Beautifully formed; delicate shades; very fragrant. C.
- SUNFLOWER—24-36 in.; 3-7 ft.; color yellow; flowers August-Sept. Very rapid growing; useful for screening fences, etc.
- SWEET ALYSSUM—4-8 in.; 8-10 in.; color white; flowers May to frost. Still the most popular of edging plants. S.
- SWEET PEA—4-8 in.; 2-6 ft.; color various; flowers June-Sept. For best results start inside in pots, and set out in April. C.
- THUNBERGIA—4-10 in.; 3-8 ft.; color white, yellow, orange; flowers July-Sept. Good for low trellises and vases.
- TORENTIA—6-12 in.; 8-15 in.; color blue, white; flowers July-Sept. Unique; good for vases and hanging baskets.

64 THE GARDENER'S POCKET MANUAL

VERBENA—12-18 in.; 6-9 in.; color various; flowers July to frost. One of the brightest, cheeriest and most free-flowering.
ZINNIA—8-12 in.; 12-24 in.; color various, brilliant; flowers July to frost. Brilliant masses of color; dwarf, red sort splendid for borders.

BIENNIALS

These should also be sown every year, that flowers for the year following may be provided. They may be started in May or June and transplanted later to their permanent places. Foxglove and other shortlived perennials, are best treated in the same way.

CAMPANULA—8-12 in.; 18-36 in.; color white, blue, pink; flowers June-August. Still popular for both beds and borders.
FORGET-ME-NOT—6 in.; 6-12 in.; color blue, white; flowers April to July. The best blue edging plant; the most dainty. S.
FOXGLOVE—10 in.; 12-36 in.; color pink, white, various; flowers June. Very easily grown; old favorites for the border.
HOLLYHOCK—12-18 in.; 3-7 ft.; color white, yellow, scarlet, rose; flowers August-Sept. Especially valuable against high walls. Gorgeous colors.
SWEET WILLIAM—6-12 in.; 12-18 in.; color white, pink, red; flowers July-August. Still one of the very best border plants. C.
WALL FLOWER—6 in.; 12-30 in.; color brown, yellow; flowers July-Sept. Fragrant. Early sorts may be treated as annuals. C.

PERENNIALS

Many of these, if sown early under glass, will flower the first year—some, even from seed sown in the open. They should be grown to fair size in the seedbed and then transplanted to permanent quarters. The border of hardy perennials should be one of the most beautiful spots in the garden.

ALYSSUM (*Saxatile*)—6-12 in.; 12 in.; color golden yellow; flowers May-June. Especially useful around rock-work, bases, etc.
AQUILEGIA—10 in.; 12-36 in.; color various; flowers June-July. Greatly improved. Very graceful. C.

- ADONIS—6 in.; 12 in.; color yellow; flowers May-June. Good early flower for border.
- ANEMONE—12 in.; 12-36 in.; color white to rose; flowers August to frost. Should have a place in every garden; extremely beautiful. C.
- BELLIS—4-6 in.; 6-8 in.; color white, pink, red; flowers April-July. Low-growing, beautiful little daisies, extremely attractive.
- BLEEDING-HEART—12-18 in.; 24-30 in.; color purple, pink, white; flowers May-June. Peculiar heart-shaped flowers in graceful sprays. S. C.
- CANDYTUFT (*Iberis*)—6 in.; 9 in.; color white; flowers May-June. A hardy form of the annual above.
- CHRYSANTHEMUM—12-18 in.; 24-40 in.; color various; flowers August to frost. If started early, will flower first year. C.
- COREOPSIS—12-15 in.; 24-36 in.; color golden yellow; flowers June to frost. Free-flowering, for the hardy border. C.
- DAHLIA—24-36 in.; 2-4 ft.; color various; flowers July to frost. Easily grown; likes very rich, heavy soil. C.
- FOUR O'CLOCK—10 in.; 30 in.; color yellow, white, red; flowers July-August. Midsummer; good for border.
- GAILLARDIA—10-12 in.; 18-24 in.; color yellow, crimson; flowers July to frost. If sown early, will bloom first year. C.
- HELIOPSIS—8-15 in.; 3-4 ft.; color yellow; flowers July-Sept. Good for mass effects in background.
- HELIANTHUS—2-4 ft.; 2-10 ft.; color yellow; flowers August to frost. The improved types are truly gorgeous. C.
- IRIS—12-18 in.; 18-30 in.; color various; flowers May-July. Some of the shades beautiful as orchids. C.
- LARKSPUR—12-18 in.; 3-4 ft.; color blues; flowers July-Sept. Best blue flowers for the border.
- MONKSHOOD—10-15 in.; 36 in.; color blue-white; flowers July-August. Good for borders, but poisonous.
- PEONY—24 in.; 24-36 in.; color red, pink, white; flowers May-June. Most showy of all border plants. P. C.
- PHLOX (Hardy)—12-18 in.; 12-36 in.; color various; flowers July-Sept. Permanent and satisfactory border plants. P. C.
- PINK—6-10 in.; 8-12 in.; color various; flowers August-Sept. Beautiful colors; one of the best for cutting. C.

66 THE GARDENER'S POCKET MANUAL

POPPY (Iceland)—6 in.; 12-18 in.; color white, yellow, orange; flowers May-Sept. Flowers on long, stiff stems. Continuous bloomers. C.

POPPY (Oriental)—12-18 in.; 24-36 in.; color crimson shades; flowers June-August. Enormous, brilliant flowers; vigorous growth.

PRIMROSE—4-5 in.; 4-6 in.; color yellow, pink; flowers April-May. Pretty, early flowers for border or edging.

PYRETHRUM—8-12 in.; 12-24 in.; color various; flowers August to frost. Very attractive little edging plant.

RUDBECKIA—12-18 in.; 4-7 ft.; color yellow; flowers August-Sept. Good for screening and mass. Rank grower. P. S.

SCABIOSA—8-12 in.; 15-30 in.; color white, various, and blue; flowers June-August. Fine light-blue flowers for cutting, blooming very freely. C.

SILENE—5-6 in.; 4-5 in.; color white to rose; flowers June-August. Low-growing plant, good for masses or broad edgings.

SNAPDRAGON—8-12 in.; 24 in.; color various; flowers July-Sept. One of the finest flowers for cutting. Hardy with protection. P. C.

VERONICA—8 in.; 24-30 in.; color purple; flowers August. Good for edging.

PERENNIAL FLOWERS

COMING INTO BLOOM	HEIGHT	COLOR	SEASON OF BLOOM
MARCH			
Wind-flower	6 in.	Blue	March-May
Blood-root'	6 in.	White	March-Apr.
APRIL			
Rock-moss	6 in.	White purple	Apr.-June
Daisy	4-6 in.	Various	Apr.-July
Hardy Candytuft...	10 in.	White	Apr.-May
Alpine Lamp-flower, Lychnis	6 in.	Pink	Apr.-May
Early Forget-me-not, Myosotis	6 in.	Blue	Apr.-June
Everblooming F. Myosotis	10 in.	Blue, light	Apr.-June
Blue-bells	1 ft.	Blue	Apr.-May
Moss Pink, Phlox...	6 in.	Pink	Apr.-June
Trilliums	12-15 in.	White-red	Apr.-May

PERENNIAL FLOWERS

COMING INTO BLOOM	HEIGHT	COLOR	SEASON OF BLOOM
MAY			
Alyssum, saxatile ..	1 ft.	Golden-yellow	May-June
Columbine (Aquilegia) ..	1 ft.	Various	May-June
Lily-of-the-Valley ..	8 in.	White	May-June
Bleeding-Heart, Di-centra ..	2-½ ft.	Pink	May-June
German-Iris ..	12-15 in.	Various	May-June
Peony ..	2 ft.	Various	May-June
JUNE			
Achillea Ptarmica..	½ ft.	White	June-August
Wind-flower, Anemone ..	18 in.	White	June-Sept.
St. Bruno's Lily...	18 in.	White	June-July
Columbine ..	3 ft.	Golden	June-August
Astilbe Japonica...	2 ft.	White	June-July
Campanula, Harebell	8 in.	Blue	June-Sept.
Canterbury Bell...	2-3 ft.		
Scotch Pink, Dianthus ..	10 in.	Pink	June-July
Gas Plant, Dictamnus ..	3 ft.	Purple	June
Gaillardia aristata..	2 ft.	Orange-Maroon	June-October
Japan Iris ..	2-3 ft.	Various	June-July
Iceland Poppy	1 ft.	Yellow	June-October
Oriental Poppy	2-4 ft.	Scarlet	June
Pentstemon barbatulus ..	3-4 ft.	Crimson	June-Sept.
Perennial Phlox ..	2-3 ft.	Various	June
Spirea ..	3 ft.	White	June-July
Adam's Needle, Yucca ..	4-5 ft.	White	June-July
JULY			
Hollyhock ..	5-8 ft.	Various	Summer and Fall
Chamomile ..	12-38 in.	Yellow	July-November
Delphinium Chinense ..	3 ft.	Variable	July-Sept.
Heliantha multiflorus ..	4 ft.	Golden	July-Sept.
Lychnis Viscaria...	12-15 in.	Rose-red	July-August
Pentstemon grandiflorus ..	2 ft.	Purple	July-August
Campanula grandiflora ..	3 ft.	Blue	July-Sept.
AUGUST			
Day Lily ..	18 in.	White, Lavender	August-October
Flame Flower, Tri-toma Uvaria	3 ft.	Orange-scarlet	August-Sept.
Cardinal Flower...	2-¼-4 ft.	Cardinal red	August-Sept.
Giant Daisy ..	3-5 ft.	White	July-October
Golden Glow.....	6-7 ft.	Golden yellow	August-Sept.
Goldenrod ..	3-5 ft.	Deep yellow	August-October
SEPTEMBER			
Anemone Japonica.	2 ft.	Red and White	August-October
OCTOBER			
Hardy Chrysanthemums ..	2-3 in.	Various	October-November

XIV

SHRUBS

THE hardy shrubs are to be had in a great variety of shapes, sizes, and colors of bloom and bark. In making selections all these qualities should be given careful consideration.

The best way is to go, if possible, direct to the nursery, where full grown specimens of the various things may be seen, before buying. Most of the shrubs may be set out either in fall or early spring, but the work is usually done at the former time, as there is then not such a rush of other work demanding attention.

Planting. After selecting the various spots where the shrubs are to be set, mark each plainly with a stake, and prepare a hole by spading up the soil, in a circle two feet or so in diameter and enriching it with well-rotted manure or a mixture of bone dust or coarse ground bone. Manure or fertilizer should be kept towards the bottom of the hole to induce the downward growth of the roots. In setting out, keep the roots of the shrubs or trees covered before planting,

Fig. 27—Peach tree pruned back for planting.

so that they will not get dried out or cut. If there are any bruised or mutilated roots, cut them back to firm

wood, and cut the top growth back a third or so if this has not already been done at the nursery. Spread the roots out in a natural position, not cramped or crowded, and fill in the earth about them, and press it firmly down with the fingers. If the soil is dry and water is required, pour a quart or more into the hole, when it is not more than one-third filled. After the dirt is put back into the hole about the roots, press down thoroughly with the foot or with a blunt stick. Any trees or shrubs, especially if they are tall or large, set in an exposed position where they would be likely to be moved by the wind before taking root, should be held firmly in position by a temporary stake and tie.

Mulching. Before severe freezing weather after fall planting, or at the beginning of drouth after spring planting, the soil around the roots of newly set shrubs should be mulched, if one does not wish to take chances.

Fig. 28 — Winter mulch of leaves held in place by chicken wire.

Coarse litter from the stable, marsh hay, or leaves held in place by a narrow strip of wire or a board or two will do. Where a whole bed is to be mulched, a neat and effective method is to run a narrow strip of chicken wire six to twelve inches high, supported by short stakes, around the bed and fill in with leaves. Winter mulches should be used also for the rose garden, the hardy border and the bulb border.

Pruning. Ornamental shrubs require very little pruning. Single specimens on the lawn may need occa-

sional trimming back to keep them in symmetrical shape, but where they are planted in groups or in a continuous border, a better effect is usually had by letting them grow as they will and into each other. Broken or diseased branches should, of course, be cut out; and in an old clump which has become too crowded, the old wood should be cut down to the ground from the center. Shrubs which on wood made during the same season may be pruned in the spring. Those which flower on wood made during the previous season should be pruned in the fall or as soon after flowering as feasible. That is, as a general rule, *shrubs flowering before the middle of summer should not be pruned in the spring; those flowering later than that, and in the fall, may be.*

ROSES. A rose bed should receive special preparation. The spot selected for it should be thoroughly drained and open to the sun, and if it is sheltered from northwest winds, so much the better. Dig the soil out to a depth of about two feet, unless the sub-soil is sandy or gravelly, when it will not be necessary. Put in six inches or so of good drainage material, and then a foot of soil made very rich with manure which can be heavier than that used for ordinary garden purposes, as it will have a chance to decay to a large extent before it is needed. Coarse bone should also be mixed with the soil. The upper six inches or so

Fig. 29 — Dormant
rose pruned back
after planting.

should not be made so rich, ordinary good garden soil doing well enough.

The plants should be set out carefully (see directions above), pruning back as indicated on the accompanying cut if the plants are dormant. The usual time for set-

ting is, in latitudes north of Philadelphia, in the spring. They may be set in the fall, and the hardy varieties will usually come through with proper mulching, but spring planting is, on the whole, the most satisfactory. The bed should be set, kept carefully cultivated, and mulching in excessively dry weather is desirable, and a sharp watch should be kept for insects and diseases, the two chief of which are the rose beetle or slug and mildew.

Pruning is the most important operation in succeeding with roses. At the end of the season's growth, all shoots which would be likely to be whipped around by the wind should be cut back a third or so, and a general trimming up may be given, but is not necessary. Early in the spring, as soon as the leaf buds begin to swell, the plants should be pruned back severely. To get the largest and best flowers for cutting, the most of the garden roses should be cut out to a few canes, with only a few eyes left on a cane. For ordinary garden culture, however, it is better to leave the canes longer and have a greater abundance of bloom, even if the flowers are not quite so large. Each cane should be cut back to new, firm wood, even if the rose beds look, after this treatment, like nothing but a lot of stubs. You should aim to cut just above the outside bud, so that the new terminal shoot, which is usually the strongest, will grow *outward*, leaving an open bush. Most of the garden roses, and especially the tenderer sorts, like the new hybrid teas, need mulching through the winter. This should be put on after the ground has become thoroughly frozen, as the

Fig. 30 — Rose protected with straw for winter.

object is, not to keep the roots from freezing, but to prevent repeated thawing and freezing. Those which are not able to stand the winter otherwise, may be grown in pots which are put into frames in the fall and kept in that way, or wrapped in straw jackets through the winter (Fig. 30).

XV

FRUITS

THE small fruits, the stone and pome fruits, such as apples and peaches, may be grown on any good, garden soil. Good drainage is absolutely necessary. Holes for planting fruit trees may be prepared in the same way as those described for shrubs.

CULTIVATION. Because the fruit trees and small fruits, such as currants and grapes, will stand almost any amount of abuse, without being actually killed, they are frequently neglected. In order to obtain satisfactory results they must be properly cultivated. The cultivation can be very shallow and can be done very rapidly with a wheelhoe or rake, or with a harrow on a larger scale. Where more than a few bushes or trees are kept, it is a good plan to sow some cover crop in August or early September which will not only save cultivation, but will also give the ground protection through the winter, and will furnish humus to spade or plow under in the spring. (See green manures.)

SPRAYING AND PRUNING. In the growing of fruits, both the small fruits and the tree fruits, to give protection from both diseases and insects is perhaps the most important part of the work. This is done most effectually by the means of sprays, and you should make yourself familiar with the things which are likely to cause trouble and their remedies. As soon as you find anything which appears to be wrong, you should immediately

ascertain what is wrong and begin the fight against it, without a day's delay. The tables will enable you to diagnose any of the more common troubles very quickly. Proper pruning is also very important. Cutting back the plants at the time of setting has already been spoken of. The fruit trees, apple, plum, pear, and so forth, are now trained to what is called the open head or vase form, which consists in cutting them back, cutting off the main leader quite low to the ground, when they are planted out a year later, and inducing a lateral or spreading open growth of the lateral branches as a result. If pruning is done properly from the beginning, very little will have to be done each season, except trimming enough to keep the young growing trees in shape with a pocket knife. For larger trees, all broken limbs or those which cross, or where growth has become too crowded through neglect, should be cut off, always being careful to make a clean cut with a sharp pruning knife or saw.

XVI

BULBS

FOR FALL PLANTING

MOST of the fall-planted, spring-blooming bulbs may be planted any time up until severe freezing, but usually the sooner after the first hard frosts the better. In ordering, use care in selecting types and varieties suited to your particular purpose. Replanting the bulbs after 3 or 4 years improves the blooms.

Tulips. Used mostly in long borders or "design" planting, the former being much more artistic and satisfactory. Great variety of colors and markings. The several types bloom through May and June. Plant 4 to 6 inches deep; 6 to 12 inches apart.

Narcissus. Favorites for naturalizing. Several distinct types or "sections," such as Daffodils and Jonquils, all good. Plant September or October, 3 to 4 inches deep, in solid beds, borders, clumps, or naturalized. Flowers mostly white and yellow shades, blooming in May and June.

Hyacinth. Especially good for formal and design bedding. Bulbs vary a great deal in size. Plant 3 to 5 inches deep, 4 to 10 inches apart.

Crocus. Used for naturalizing or borders or edgings. Re-set after 2 or 3 years. Plant 3 or 4 inches deep.

Scilla (Squill) — SNOWDROPS — CHINODOXA. Small bulbs with small, cheery, low-growing flower-stalks, es-

pecially valuable for brightening the lawn or grounds in early spring.

Trilliums. Do well in shade; very pretty but not conspicuous flowers.

Lilies. Among the most showy and satisfactory permanent features of the place. Most of them require winter mulch protection (see page 70). The various types mature at different seasons: a safe rule is to plant in autumn as soon as received from the seedsman. Most sorts should go 4 inches deep to *top* of bulb: *L. Auratum* should go 8 to 10 inches deep. Put a good double-handful of sand under and around each bulb, when planting. In moist soil make raised beds with turf sides, to assure perfect drainage.

FOR SPRING PLANTING

The following, with the exception of gladioli, may with advantage be started under glass before setting out, as they are very tender and will not make headway in the open until settled warm weather has arrived. All must be taken up in the fall, after frost has blackened the foliage, dried half a day or so in the sun, and stored safe from freezing until the foliage dries enough to be taken off, and then stored in a frost-proof cellar or room, preferably packed in sand or sawdust, if where the air is very dry.

Gladiolus. Wonderful range of colors and markings; easily grown; multiplies rapidly. Plant, for succession of bloom, from April to June, smaller bulbs first; 2 to 4 inches deep; 6 to 12 inches apart. Save small new bulb-lets, that form about old ones, to increase stock. Light soil preferred.

Dahlia. Rank feeders. 5 to 8 feet high; should be

staked. Separate or cut up old clumps, first starting in mild heat to show buds. Having but few stalks in a clump will give better flowers; but large, isolated clumps, especially of the single or cactus types, are very effective and decorative.

Caladium (Elephants' Ear). Very tender, but quite tropical in effect. Take up *before* frost in the fall and store in a warm cellar or under bench in greenhouse, in sand. Start before setting out in spring.

Cannas. Favorites for bedding, and centers of mixed beds. Newer sorts valuable for flowers. Grown from seed (started in February or March), but more generally from old roots or cuttings of same, each piece having at least one strong eye. Grows 3 to 8 feet high. Set 12 to 20 inches apart in beds; 2 feet or more for large clumps.

Begonias. Tuberous. Particularly beautiful and satisfactory. Bloom all season. Do well in partial shade. Last many years. Buy started plants or start tubers early. Set bulbs 8 to 12 inches or more apart, very shallow.

XVII

INSECTS AND DISEASES — PROTECTING PLANTS

INSECTS attacking plants, in the garden, in the orchard or in the house, are of two types: those which live by chewing and those which suck the plant juices. It is very evident, therefore, that the punishment must be made to fit the criminal.

The three methods of combating insects are: first, to keep them away altogether, by *mechanical* protection; second, to poison them by poisoning the food they eat; third, to destroy them or drive them off by some contact poison or corrosive which will be effective without being taken into the mouth and stomach.

Insects will give you a great deal of trouble, or little, according as you prepare or neglect to prepare to get ready for them. Most of the common pests can be controlled if taken in time — the hour when you first notice them. To be able to do this, you should have a supply of the most needed insecticides and fungicides on hand. This is now easy to do, for all the things in the following list can now be bought ready prepared in small packages that will keep. A single package will in most cases last for more than one season, so the expense of sufficient protection is very slight compared to the injury done for want of it.

Here is what your insect arsenal should contain:

A compressed air sprayer. A powder gun or bellows. One package of each of the following:

Kerosene emulsion

Tobacco dust

Nicotine extract

Arsenate of lead

Paris green

Hellebore

Lime sulphur

Bordeaux mixture

Tobacco Dust should be strong and made for the purpose; it is about three cents a pound in bulk. For dust-

Fig. 31 — Bellows for applying insecticides in dust form.

Fig. 32 — A good sprayer for liquid sprays.

ing around on the ground about plants set out in the green house or coldframes and for dusting under the leaves of plants; it is especially effective as a preventative where the plants are likely to be infested by plant lice, or cucumber beetles, squash bugs, etc. Can be used in practically any quantity directly on the foliage without injury.

Nicotine Extract. This comes in various patented, commercial preparations which usually contain some oils

besides the nicotine, making a more protective emulsion; if used thoroughly and in time they are very effective. One part of the preparation is usually diluted with twenty to forty parts water. Always follow directions on containers carefully.

Arsenate of Lead. Comes usually in a thick, creamy paste and can be diluted with water and sprayed. Or the powdered materials for making — only two — may be bought. Has the advantage over Paris green that it will not injure the foliage and will stay on much longer. Should be sprayed on several hours before a rain, to give it time to set, when it will not wash off.

Paris Green. A standard insecticide for many purposes. Can be used either in a spray or dry, but should be diluted in the former case with water and in the second with plaster of Paris. It sometimes is used pure on potatoes but must be blown on with a machine made for the purpose, in such small amounts that it cannot be seen.

Bordeaux Mixture. The standard preventative for blights and fungous diseases. Dilute according to directions and spray thoroughly. Arsenate of lead or Paris green may be added and sprayed on at the same time. Where it is desirable not to discolor the foliage such as on ornamental plants, or ripening fruit, use ammonical copper carbonate solution instead of Bordeaux. (See Home-Made Sprays for directions telling the best way for making it.)

Lime Sulphur Wash. Is used as a winter spray for San José scale and in a much weaker solution as a summer spray for rust. Arsenate of lead or Paris green may be used with it.

Hellebore. Is used for currant worms or in other

places where it is not desirable to use Paris green. It is dusted on dry or sprayed.

Kerosene Emulsion. This is a very safe and effective insecticide for sucking insects, such as plant lice and aphids, mealy bugs, cabbage worms, young squash bugs and so forth, and scale. (See Home-made Sprays.)

APPLYING INSECTICIDES. Two chief points in using insecticides successfully, is to use them in time and to apply them thoroughly. Most plant pests multiply so

Fig. 33 — Various types of spray nozzles.

rapidly that if only a few are left, they will very quickly be in full force again. Dusting with powder should, of course, be done when there is little wind and preferably while the dew is still on the foliage in the morning.

In applying sprays, be sure first that your solution is of the right strength for the purpose in hand; second, that it is kept continuously agitated, so that there will be no chance for any of the ingredients to settle; third, that every minutest portion of foliage and bark or fruit is covered. Two or three nozzles should be kept on hand of different types, also an extension pole for spraying of taller trees. Make an examination within a day after the spraying has been done, and if not wholly successful, go over the plants a second time.

CARE OF SPRAYERS. See to it that your spraying machine is kept scrupulously clean, as some of the chemicals used are very corrosive and others will dry and clog up the nozzles or will destroy rubber hose. Have all the various spray materials carefully labeled and kept in one place where there will be no danger of anyone's upsetting them or mistaking them for something else.

XVIII

HOME MADE SPRAYS AND POISONS

KEROSENE EMULSION. Thoroughly dissolve $\frac{1}{2}$ lb. strong soap in a quart or so of hot water. Add this to 1 gal. water and 2 gals. kerosene,—or in these proportions. (For small amounts use 2 cubic inches soap, 1 pt. water and 1 qt. kerosene.) Place in pail or tub and churn or pump until a thick, lathery cream results. This is the “stock” solution. In using, dilute with 5 to 15 parts water — on dormant growth, 5 to 7; for most purposes 10; and for light work 15.

BORDEAUX MIXTURE. (5-5-50 formula.) Dissolve copper sulphate (crystals) in water at the rate of 1 lb. to 1 gal. This should be done the day before, or at least several hours before, the Bordeaux is wanted for use. Suspend the sulphate crystals in a cloth or old bag just below the surface of the water. Then slake the same amount of lime in a tub or tight box, adding the water a little at a time, until the whole attains the consistency of thick milk. (When necessary, add water to this mixture if it is kept long; never let it dry out.) When ready to spray, pour the stock copper sulphate solution into the tank in the proportion of 1 gal. to every 10 of spray required. Add water to amount required. Then add stock lime solution, first diluting about one-half with water and straining.

For small amount, use 1 tablespoonful copper sulphate; $1\frac{1}{2}$ of Lime, and 1 gal. of water.

AMMONICAL COPPER CARBONATE. 6 ounces copper carbonate; 3 pints of ammonia; dilute ammonia in 7 to 8 parts water; make paste of copper carbonate with water; mix the two together until dissolved — add 50 gals. water. For small amounts, use two teaspoonfuls copper carbonate; two ounces (fluid) of ammonia; two gals. water. Must be used soon after mixing; used as a substitute for Bordeaux, as it does not mark the foliage or ripening fruit, but it is not so effective.

POISON BRAN MASH. Used for cutworms; to 25 lbs. bran, middlings or coarse flour, add $\frac{1}{2}$ lb. Paris Green, and mix thoroughly; then add $\frac{1}{2}$ to 1 pt. molasses, or brown sugar, and enough water to make a mash thick enough to spread. Scatter in small quantities where cutworms give trouble. For small amount, use 1 qt. bran, 1 tablespoonful of molasses, 1 teaspoonful of Paris Green.

COMPLETE DIRECTIONS FOR SPRAYING

HOUSE AND FLOWER GARDEN

APHIS—Attacks various plants, mostly indoors. Remedies: nicotine preparations, kerosene emulsion. Two or three applications several days apart will be necessary to get the plants clean; avoid shade, dryness and crowding.

ASTER-BEETLE—Attacks asters mostly. Remedy: arsenate of lead, strong. Usually appear quickly in large numbers; quick work is necessary to save the plants.

MEALY-BUG—Attacks coleus, soft-wooded plants, inside. Remedies: kerosene emulsion, water, hot (for dipping). Hide in leaf axils; if only a few appear kill with match stick and alcohol.

RED-SPIDER—Attacks roses and other plants, indoors. Remedy: syringing. Avoid dry atmosphere; apply water with as much force as possible several times a week to foliage.

ROSE-BEETLE—Attacks roses, out-of-doors. Remedies: arsenate of lead, paris green, strong. Use hand picking into can of kerosene and water in connection with spray.

SCALE—Attacks ferns, palms and hard-wooded plants. Remedies: kerosene emulsion, water, hot (for dipping). Dipping is most effective treatment; rinse carefully afterwards.

THRIPS—Attacks various, mostly outdoors. Remedies: arsenate of lead, paris green, kerosene emulsion. Very small; they eat the leaf epidermis leaving the skeleton.

WHITE FLIES—Attacks various, mostly indoors. Remedies: nicotine preparations, kerosene emulsion.

MILDEW, POWDERY—Attacks roses and others. Remedy: sulphur, flowers of (for dusting). Avoid any sudden shock, such as a cold draft from a window, etc.

LEAF SPOT, ROT OR RUST—Attacks various. Remedy: bordeaux mixture. Before spraying remove and burn all affected leaves or plants carefully.

VEGETABLE GARDEN

APHIS—Attacks melons, cabbage, etc. Remedies: nicotine preparations, kerosene emulsion. Spray must reach under side of leaves, especially of melons; several applications three or four days apart.

ASPARAGUS-BEETLE—Attacks asparagus foliage. Remedy: arsenate of lead. Late in summer all vines should be cut and burned.

CATERPILLAR—Attacks cabbage, tomato and tobacco. Remedies: arsenate of lead, paris green, hellebore.

CUCUMBER-BEETLE—Attacks cucumbers and vines. Remedies: arsenate of lead, tobacco dust. Use bordeaux mixture in connection with arsenate of lead; tobacco dust as preventive.

CUT-WORMS—Attacks cabbage, tomato, onions, etc. Remedy: arsenate of lead, in bran. Make a poisoned bran bait by mixing 1 qt. wheat bran, one teaspoon white arsenate, one teaspoon cane molasses.

FLEA-BEETLE—Attacks tomato, potato; cabbage, turnip seedlings. Remedies: arsenate of lead, tobacco dust. Especially injurious to seedlings of cabbage, turnip and radish; tobacco dust as preventive.

POTATO-BEETLE—Attacks potato, eggplant and tomato. Remedies: arsenate of lead, paris green. Especially injurious to eggplant; hand pick as well as spraying.

86 THE GARDENER'S POCKET MANUAL

SQUASH-BUG—Attacks squashes and vines. Remedies: kerosene emulsion, tobacco dust. Tobacco dust is preventive as soon as plants get above ground; kerosene emulsion for young bugs.

WHITE-FLIES—Attacks tomato, cucumber, etc. Remedies: kerosene emulsion, nicotine preparations, tobacco dust. Tobacco dust as preventive as soon as old flies appear; injury is done by the young Nymphs.

MILDEW—Attacks cucumber, lima beans, etc. Remedy: bordeaux mixture. Keep vines sprayed after middle of July with bordeaux mixture as preventive.

BLIGHT—Attacks cucumbers, potatoes, etc. Remedy: bordeaux mixture. For cucumbers, same as above; for potatoes, begin spraying when about six inches high, and keep new growth coated.

LEAF SPOT, ROT OR RUST.—Attacks beans, tomatoes, celery, etc. Remedies: bordeaux mixture, ammoniacal solution copper carbonate. Keep covered with bordeaux mixture after the middle of July; on celery late spraying should be done with ammoniacal solution copper carbonate, which does not stain the foliage and stalks.

ORCHARD AND FRUIT GARDEN

APPLE-SCAB—Attacks apple, pear. Remedies: bordeaux mixture, lime sulphur (summer). Spray three times: before blossoms open; after blossoms fall; follow up in fourteen days.

BLISTER-MITE—Attacks apple, pear. Remedies: lime sulphur, miscible oil, kerosene emulsion, strong. Spray thoroughly in late fall or early spring.

BUD-MOTH—Attacks apple. Remedy: arsenate of lead. Spray twice; when leaves appear; before blossoms open.

CATERPILLAR, TENT—Attacks apple. Remedy: arsenate of lead. Burn nests before caterpillars begin to spread.

CANKER-WORM—Attacks apple. Remedy: arsenate of lead. Same as for Codlin-moth.

CODLIN-MOTH—Attacks apple. Remedy: arsenate of lead. In addition to spray use burlap bands on trunk for trap during July.

CURCULIO—Attacks cherry, peach, plum. Remedy: arsenate of lead, strong. Spraying not very effective; jar trees every

cool morning and catch beetles on sheet; spread beneath for several weeks after blossoms fall.

CURRENT-WORM—Attacks currant, gooseberry. Remedies: arsenate of lead, paris green, hellebore. At first appearance, usually before blossoming, spray at once. If a second brood appears after fruit forms, use hellebore.

LEAF-HOPPER—Attacks grape. Remedy: kerosene emulsion. Be careful to cover under side of foliage.

SCALE, SAN JOSE—Attacks all fruit trees. Remedies: lime sulphur, miscible oil, kerosene emulsion, strong. Spray during winter or early spring, covering every part of trunk and branches.

SCALE, OYSTER-SHELL—Attacks apple and other fruit trees. Remedy: kerosene emulsion, medium. Kerosene emulsion, medium strength, applied in May or June, when young scale which appear like small, whitish lice, hatch out.

BLACK ROT—Attacks grape. Remedies: bordeaux mixture, ammoniacal solution copper carbonate. Spray bordeaux mixture until middle of July; after that, ammoniacal solution copper carbonate. For one or two vines cover each bunch when half grown with manila "store" bag.

FRUIT ROT—Attacks plum, peach, cherry. Remedies: lime sulphur (summer), bordeaux mixture. Keep fruit thinned so it will not touch. Gather cherries before quite ripe and spread out in a cool, airy place.

LEAF BLIGHT OR CURL—Attacks plum, peach, cherry. Remedies: lime sulphur (summer), bordeaux mixture. In using lime sulphur, be sure not to get it too strong.

MILDEW—Attacks gooseberry, especially foreign sorts. Remedy: potassium sulphide. Keep plants pruned to open form to allow free circulation of air.

RUST—Attacks strawberries. Remedy: bordeaux mixture. Keep plants sprayed during first season and until a blossom second season.

CALENDAR OF OPERATIONS

SPRAY APPLE AND PEAR

When leaves unfold.

Three days after petals fall.

When first worm hole is seen on tiny fruits; watch closely for this and get busy instantly.

Thirty days from this time.

Whenever small caterpillars are seen.

The twenty-fifth of June.

The fifteenth of August.

With arsenate of lead combined with first strength Bordeaux; this makes one application do the work of two.

With arsenate of lead alone.

With arsenate of lead alone.

SPRAY CHERRY, PLUM, PEACH AND APRICOT

When leaves unfold.

When petals fall.

Ten days after petals fall.

Ten days from this application.

Ten days from the last application.

With arsenate of lead combined with second-strength Bordeaux. The latter may be omitted from the second spraying and from the last two sprayings, if trees are in prime condition.

SPRAY ROSES

Before growth has started at all.

When leaves unfold.

May first and on, every week.

As soon as slugs or rose beetles appear.

Whenever aphids (plant lice) appear.

With full strength soap wash, used hot.

With second strength Bordeaux.

With potassium sulphide.

With arsenate of lead.

With the dilute soap wash.

INDEX

- Annuals, 55, 59, 64
Asparagus, 47
- Beans, 47
Beets, 47
Begonias, 77
Biennials, 64
Borders, 55
Broccoli, 48
Brussels Sprouts, 48
Budding, 31
Bulbs, 58
Bulbs, 75
- Cabbage, 48
Cannas, 77
Carrots, 48
Cauliflower, 48
Celery, 48
Chionodoxa, 75
Cold-frame, 1
Compost, 11
Concrete, 36
Corn, 49
Crocking, 57
Crocus, 75
Cucumbers, 49
Cultivation, 23
Cuttings, 56
- Dahlia, 76
Dime, 11
Diseases of Plants, 59, 78, 84
Drainage, 15
Drills, 17
- Egg-Plant, 50
Endive, 50
- Ferbena, 5
Fertilizers, 10, 13
Flats, 4
Flowers, 55
Frost, treatment for, 7
Fruit crops, 45
Fruits, 73
Fruits, when to spray, 89
- Gladiolus, 76
Grafting, 31
Grafting Wax, 33
Green-manuring, 13
- Hardening off, 7, 19
Harrowing, 15
Hills, 17
Hot-bed, 1
Humus, 14
Hyacinth, 75
- Insects, 59, 78, 95
Insecticides, 79
Insecticides, Applying, 81
Irrigation, 26
- Kale, 50
Kohl-rabi, 50
- Leaf-crops, 44
Leek, 50
Lettuce, 51
Level Culture, 25

- Lilies, 76
- Manure, 2, 9
- Mats, 3
- Melons, 51
- Mulching, 69
- Narcissus, 75
- Nitrate of soda, 11
- Okra, 51
- Onions, 51
- Paper pots, 6
- Parsley, 52
- Parsnips, 52
- Parsnips, 52
- Peas, 52
- Peppers, 52
- Perennials, 58, 64, 67
- Pipe fittings, 38
- Planting, 19
- Planting Tables, 40-44
- Plant Supports, 54
- Plowing, 14
- Potato, 52
- Propagation, 57-58
- Protecting cloth, 3
- Pruning, 19
- Pruning, 69
- Pumpkin, 52
- Radishes, 53
- Rhubarb, 53
- Root Crops, 39
- Roses, 70
- Roses, pruning, 71
- Rows, 17
- Salpiglosis, 56
- Salsify, 53
- Sash, 3
- Scilla, 75
- Sea-Kale, 53
- Shrubs, 68
- Shutters, 3
- Snapdragon, 56
- Snow-drops, 75
- Soil, 17
- Soil, testing for acidity, 12
- Sowing, Outside, 17, 19
- Sowing, Under Glass, 4
- Spading, 14, 15
- Spinach, 53
- Spraying, 81
- Sprays, 83
- Squash, 53
- Sub-soil, 14
- Tomato, 54
- Tools, 21
- Top-dressing, 11
- Transplanting, 5, 19
- Trees, 34
- Trenching, 15
- Trilliums, 76
- Tulips, 75
- Turnips, 54
- Use of feet, 20
- Ventilation, 7
- Watering, 6
- Watermelons, 51
- Weeding, 24
- Weeds, 29
- Window box, 59

LIBRARY OF CONGRESS

00009128323