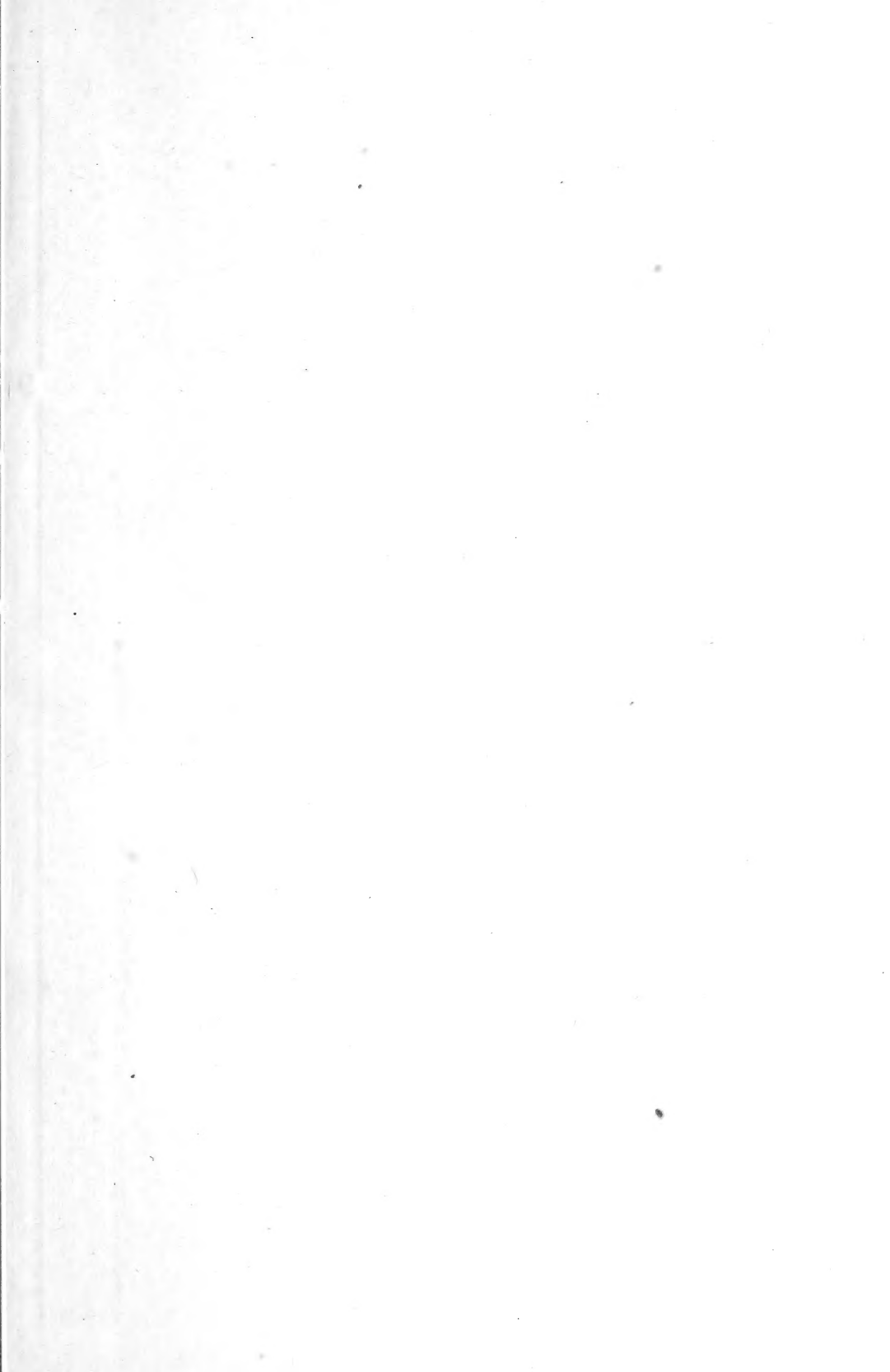


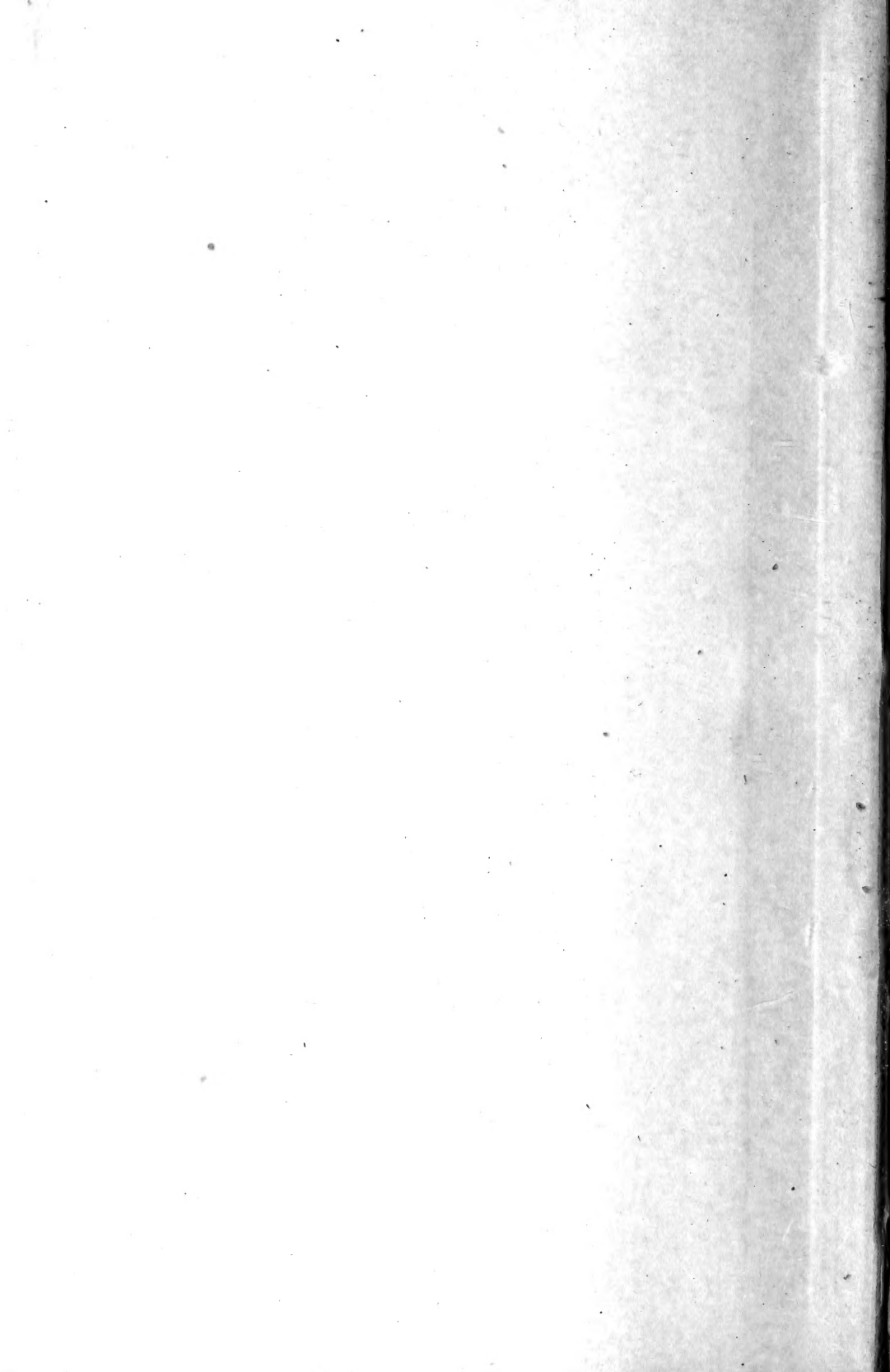
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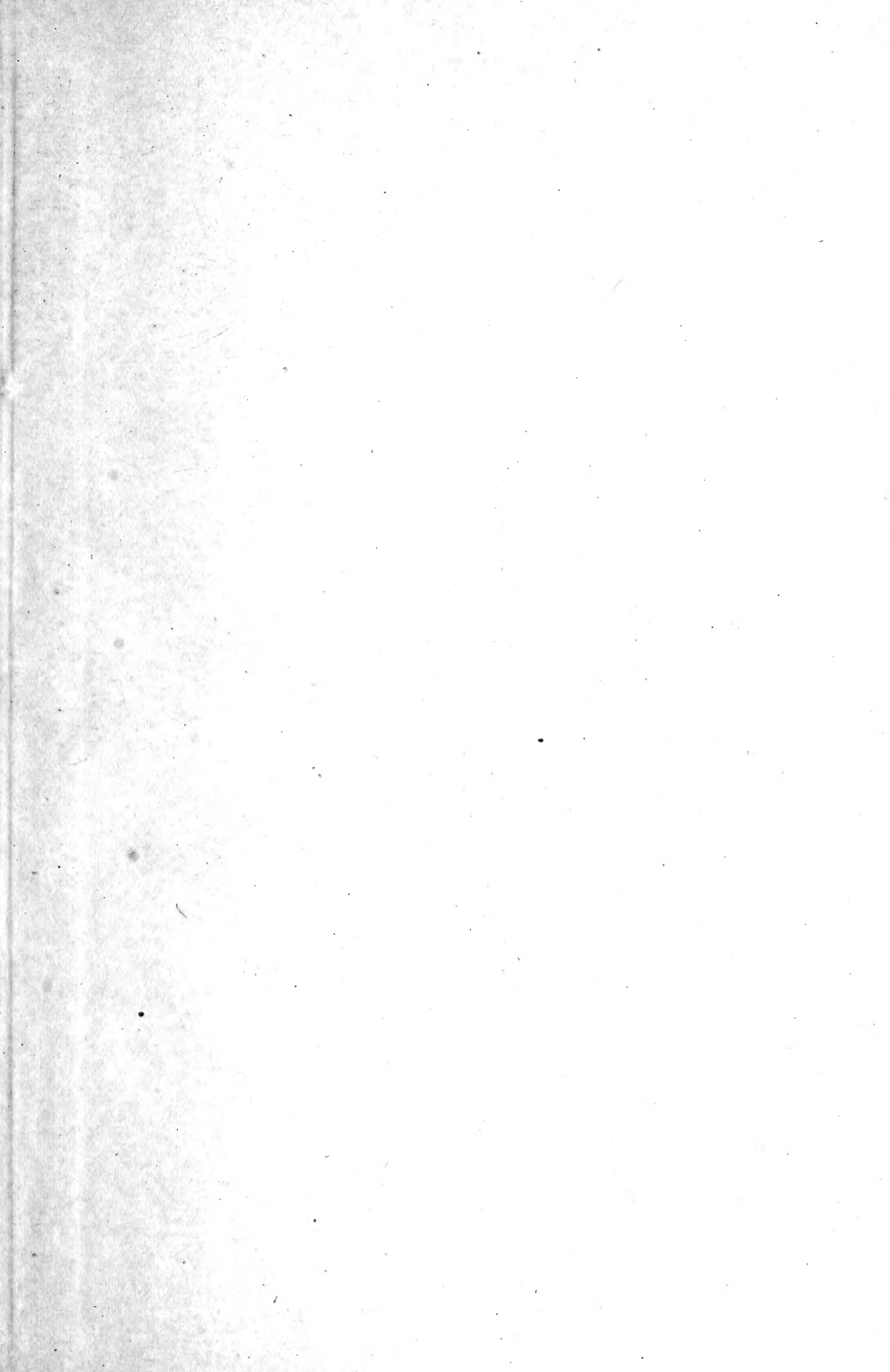
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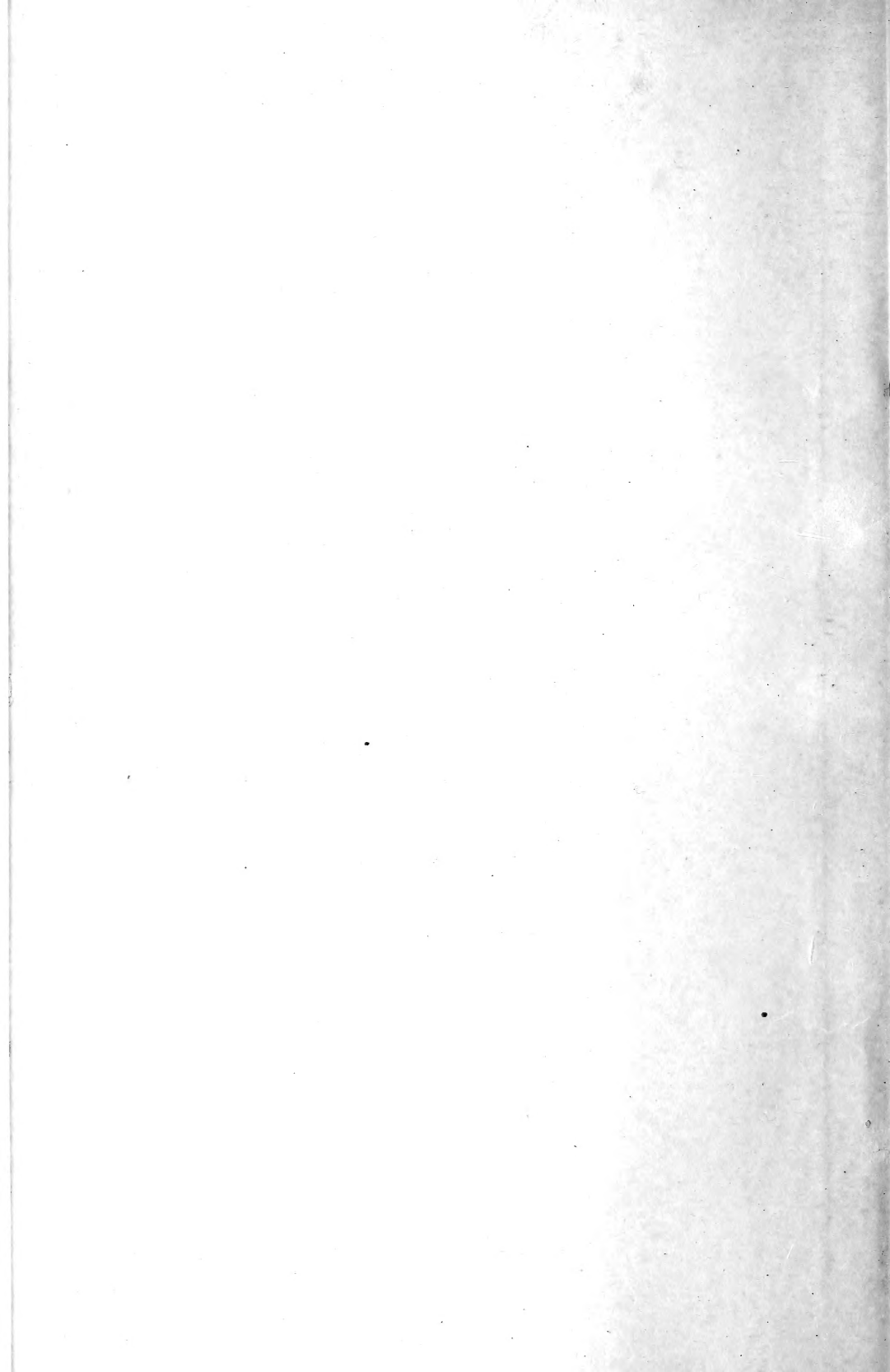
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GARDEN GUIDE

THE AMATEUR GARDENERS'
HANDBOOK





PRACTICAL LANDSCAPE GARDENING

By ROBERT B. CRIDLAND, Landscape Architect

The author freely gave of his great knowledge when he wrote this splendid book. On the theory that "every house in a community should contribute toward the enjoyment of the inhabitants thereof, in some little artistic excellence," the writer goes about showing how to place the house, grade the landscape and plan and plant intelligently. No pages are wasted in useless talk.

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THE AMATEUR GARDENERS' HANDBOOK

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PUBLISHERS' FOREWORD



BOOK must bear a title, a distinguishing name, and so here we have the GARDEN GUIDE, a Handbook for the Amateur Gardener. Its scope will be unfolded in the Introduction of its editors and compilers. The publishers, however, ask a first hearing. The conception of the book was not at all limited to the purpose indicated by its title. It had a higher aim. Through its medium we hope to win thousands from crowded city homes to the free air of the open country. We seek to preach freedom from the very housetops, to induce worthy citizens to cultivate their health as well as their gardens and, in so doing, add to their happiness and the years of their lives, to do their duty by their children through environing their young lives with the surroundings which will make them sturdy, self-reliant and observant, and best fit them for their own battle of life. Fundamentally, there is no excuse for weaklings among those raised in the country and the out-of-doors.

The country (and in this term may be included practically all our suburban towns, boroughs and villages) is the children's paradise, with all Nature's world as their playground.

The hygienic value of fresh vegetables and fruits is beyond question; their value to the family cannot be estimated in terms of money. The writer knows this and thousands of fortunate suburbanites will testify to its truth. A good garden is Nature's antidote for all ills flesh is heir to; it certainly does not make for a source of revenue to the physician. Fresh fruits and vegetables, each in their season, taken from your garden, are something quite different from the much handled and frequently stale products one buys in the city. Nearly every vegetable is an annual and can be grown with the first year's occupancy, the second Summer the taste for all the small fruits can be indulged in to the full and almost before you realize it the young fruit trees you set out are in bearing.

The Cliff Apartment dweller, whose vision is bounded on all sides by straight lines of brick and mortar, cement and stone, whose life is harried by the janitor, whose quietude is disturbed by the noises overhead and below, who cannot enjoy a night's sleep in the open without fear of arrest, whose movements to and from business are made miserable in trolley, subway or "L," must surely envy the commuter, even though the latter be still made the butt of the irrepressible joker, whom we pardon because, poor man, he knows no better.

Advocacy of social advantages has no particular part in this presentation, yet these features have more play in country than in

towns, for the acquaintances made by your children in the former will be more permanent and have a larger bearing on their future because they are more intimately brought together in their school, their play and their daily association.

Suburban public schools are governed to a great extent by men who have come out from the cities. Their advantages are equal to those of the city, perhaps superior, because the classes average smaller; high schools abound, and the education of the youth up to the age of seventeen or eighteen can thus be obtained near home.

Life in the suburbs opens the way to a family home—one's very own, eliminating forever the yearly move. Don't pay rent—own your home so you can do with it as you please. Permanence of location is helpful to well-being, so then make a careful selection. Take time to make an intelligent choice and, where you settle, make the best of it—stick. If you have the funds to pay for the home outright you are among the fortunate ones, otherwise the local building and loan association will take care of you at no greater outlay than rent if you own the ground and are considered a good moral risk. Inside of eleven years the home is yours and the money which would otherwise have gone to a generally indifferent landlord may be applied to betterments, to education or to the purchase of more land.

Whether it is better to buy than to build depends on circumstances. Painstaking investigation is always in order.

The family home, the home for your children and quite likely for some of your children's children, the home wherein the family traditions will linger, surely that is the home that's wanted—the home to which your children may return, and the recollection of which will brighten the toilsome days they may be forced to spend away from it. The family home is the wisest of all investments; it is the foundation which makes for family honor and stability. Pedigree adds to the stability of our country and its institutions, and the family home is the source and foundation of true patriotism.

There is no Springtime in the city, no Autumn. Among the bricks and stone the unfolding glories of Spring are unknown to the toiler and his family. The city is equally unresponsive to the awakening life of the one as it is to the passing glories of the other. A city knows but two seasons, Summer and Winter; the reviving Spring and glorious Autumn are both unknown.

Do not let it be said of you: "The city was his country; he loved better to hear the trolley car rattle than the birds carol." The city may be a good place to work in; it undoubtedly is; but if all our homes could be in the freedom of the country we would be a superior race.

A. T. D.

INTRODUCTION TO FIRST EDITION



WE all have our dream gardens in which stretches of smooth lawns appear, with hedges of sweet smelling shrubs like Brier Roses, Lavender, Rosemary, or of neat leaved Box, such as one sees at the old home of George Washington at Mt. Vernon. We have our scenes of Rose beds encircled by grass or sand covered paths, with a little fountain and bird bath nearby, a cozy arbor or rest house off to one side, borders filled opulently with a variety of old time hardy flowers, fragrant with memories of other days. Here and there a fruit tree stands laden with the promise of luscious fruits, and all around is the busy hum of insect life, with the flutter of birds and butterflies, and the throbbing of a hundred creations from the great storehouse of Nature, that make a garden more than a dreamland, but certainly a place of great refreshing rest, recuperation, peace, happy thoughts. It is the place to commune with friends, either in bodily presence or in books. It is a place in which to plan, to read, to rest, to work, to play. Back of all there is the utilitarian kitchen garden, the drying yard, the chicken run, the place for the household pets, the children's swing and sand heap, and the other happy features and adjuncts that make the house and garden our *home*.

We believe that one chief reason for the paucity of good and bright gardens is the lack of knowing how to set about making them. Gardening is a very large subject. It has formed the study and recreation of the leisure moments of many eminent men from the time of Solomon, Homer, Aristotle, Plato and others of the ancients, to Erasmus and Bacon of the Renaissance, Evelyn of the seventeenth century, to the more modern notabilities, as Pope, Walpole, Cowper, Goethe, Cobbett, our own Nathaniel Hawthorne and Thoreau, with many, many others. The amateur gardener is therefore in excellent company of the present as well as of all past times. Gardening is pleasurable, healthful, intellectual.

We should not forget the purely economical side of the matter that has been dwelt upon in the publishers' foreword. But this GARDEN GUIDE is not intended exactly to be a mentor on making money or saving money. You are willing to pay for your household goods and embellishments, your automobile, your camera and sporting outfits, your concerts and theatres. Expect to pay, therefore, for your gardening; yet we can assure the amateur that well-considered expenditure on the garden more than pays for itself. You can have delicious edible Asparagus on your table day in, day out for weeks in the early part of the year. You can have salads and young vegetables from April until November. Then there are the flowers and fruits over and above, and other assets of and from the garden that are too apparent to need to be mentioned.

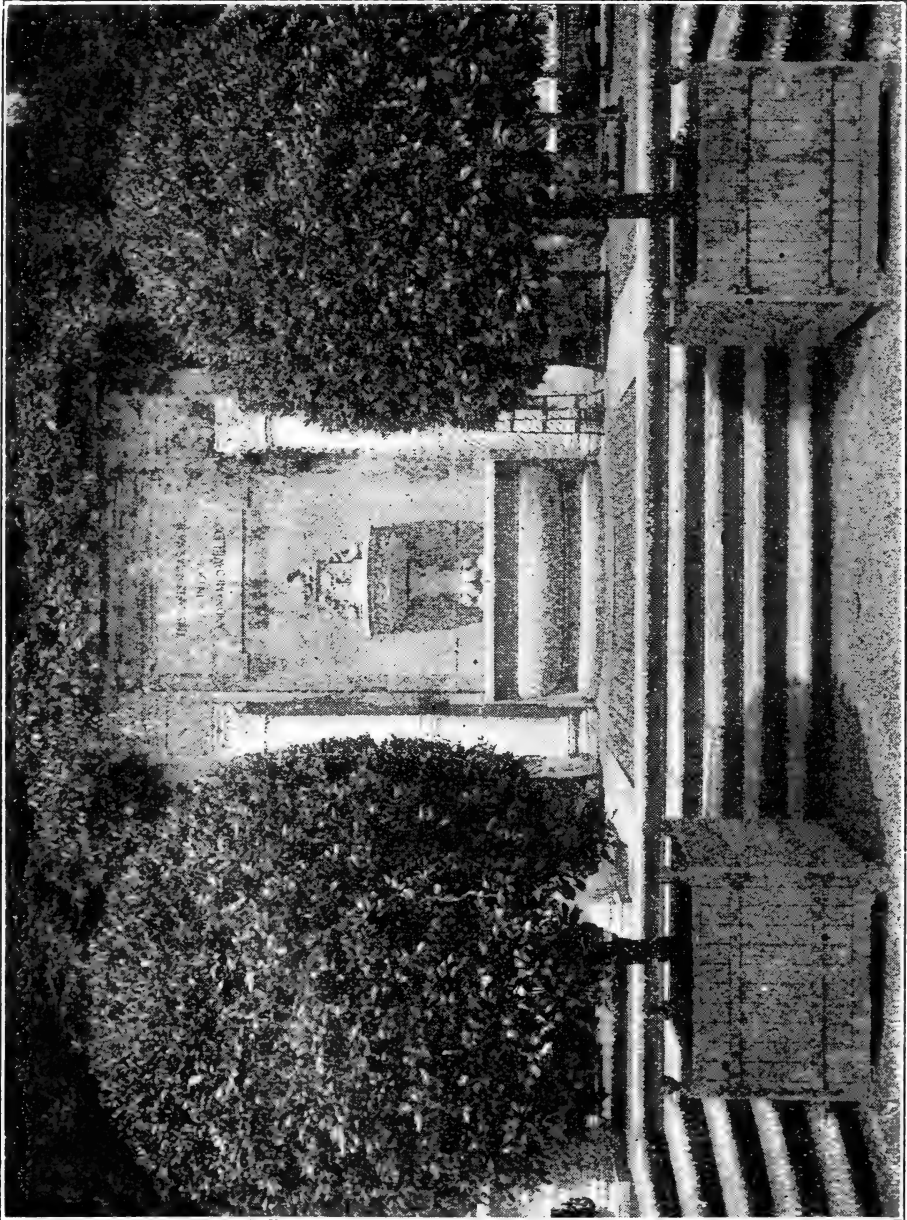
The plan of this book is sufficiently set forth in the table of contents, and we therefore offer this GUIDE confident in the belief that it will be found an excellent introduction to what is unequivocally one of the most delightful recreations that man can pursue.

PRESENTING OUR FOURTH AND PERFECTED EDITION

A quiet editor, upon being told that he ought to be the best judge of the merit of something he had written is said to have replied, in effect: "Not so; did you never realize that it is only the silkworm itself that can never know what the cocoon that it has made looks like" For this reason we would be less confident of our judgment and optimism concerning the practical value of the GARDEN GUIDE were they not reinforced by the sentiments and actions of the public that has absorbed the three large editions which have preceded the present printing. As it is, the continued demand, the undiminished interest, the cordial commendation, tell us that the appreciation of gardening in America is constantly growing and that our efforts are truly filling the need for a compact, comprehensive, usable Garden Manual.

These efforts, however, are not the result of a hasty decision, a sketchy survey of the ground, but of a quarter century of actual gardening experience, of contact with garden lovers, of observation of their activities, and of a study of their needs. We set out to provide those facts that we know they are in search of, in the form and language in which they can grasp and use them. We have written, compiled, eliminated and augmented, not for effect, but for service, out of a personal knowledge, sympathy and enthusiasm that binds all garden lovers together into one great family.

In the present edition the changes, aside from minor improvements in arrangement, type styles, etc., designed to make the book more convenient and pleasing to the eye, have been mainly additions of new and valuable features. We call attention particularly to the chapter on Common Diseases of Garden Plants and Their Control, compiled by two representative plant pathologists of the country, men who stand with the highest. Among other new features covered may be mentioned the Canning of Fruits and Vegetables, Transplanting, The Vegetable Garden in Winter, Lawn and Garden Weeds, Facts about Frost, Bungalow or Mid-Summer Gardening, Animal Life in the Garden, Fertilizer Facts, etc. Needless to say, all data and suggestions have been checked up, verified and, where necessary, revised in accordance with up-to-date conditions and the most successful modern principles.



A Stately Garden Entrance

Planning the Home Grounds

First Considerations in the Composition of a Garden—Drives—Lawns—Locating the Dwelling House—Treatment of the Shrubs, Belts, Borders, Beds—A Plea for Greater Seclusion—Home Planting Plans and Keys thereto

IF one's place is but a small area of so many dozen square yards, it is great fun to do one's own planning, and little can go wrong.

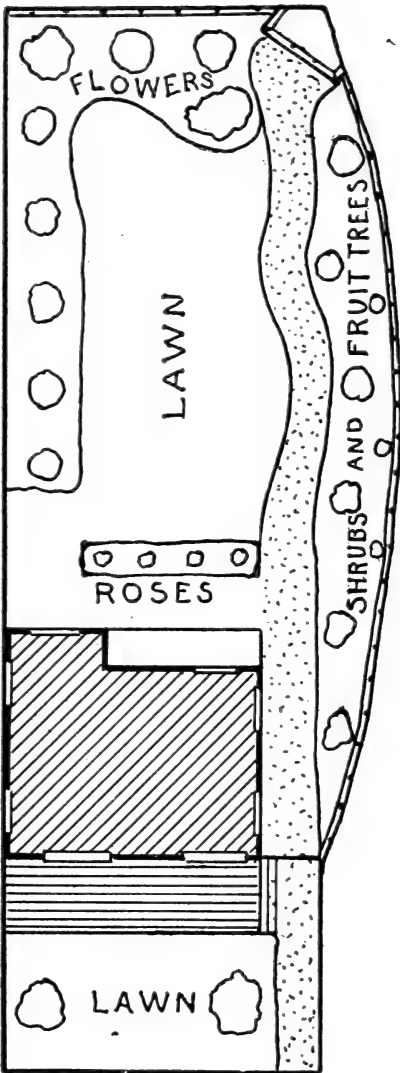
Should the place be more pretentious, running to one or two acres, it might be money in one's pocket to consult a landscape gardener, or an experienced nurseryman or designer. There are several excellent books, too, that can be referred to, and from which valuable information can be got on the laying out of home grounds. One of these is "Cridland's Practical Landscape Gardening."

The first considerations in the composition of a garden or the grounds about one's place are Privacy, Variety, Shelter, Balance.

The planning and arrangement of the features of a garden or of the grounds about the house should be as carefully considered as the choice and placing of the furniture in one's home, or the choosing of a suit of clothes, or a dress to wear. The same idea holds, namely, the planning of a suitable, agreeable, comfortable composition. The garden has been called the outdoor drawing-room.

The arrangement of the drives and the grading of the lawns, the drainage when necessary, and the arrangement of the buildings and outhouses should all be preconceived and settled in an orderly, economical manner. As far as possible there should be no mistake about the main, permanent features. The minor features may be changed quite a great deal in the coming years and almost surely will, as new ideas and points of view assert themselves. This changing of the minor features is a part of the recreation of gardening. Thus one may considerably alter the contour of a shrubbery border, or may indeed eliminate it altogether. The same holds good of flower beds and borders, which are easily altered, removed or added to; but with large trees or the heavier groups of shrubs the expense of removal and shifting prohibits this being done except out of dire necessity.

Where one has the choice of building one's house or choosing its location, the best aspect for it is where the front porch faces southeast, as shown in the diagrams pps. 16 and 17; another good position is facing due south. In any case, as everybody likes abundant sunshine or ought to, see to it that the windows and living rooms face in the direction of abundant light. Those places that are hidden beneath a dense canopy or half a forest of trees may suit, and do suit, some folks, but



Actual layout of a backyard garden fenced, on lot 30x100 ft. Standard Apple, Plum and Pear trees were planted around the divisional fences. They did not unduly shade the hardy flowers. The smooth gravel path terminated in an arbor over which Roses, Ivy and Clematis grew. Rhododendrons, evergreens, hardy Heath, Viburnums, etc., with bulbs between, were used on the right hand border. There was a sun parlor at the back of the house. The garden lay due south

they are terribly depressing to the great majority of us, besides being, one should imagine, not conducive to health. Light, air, and freedom, are good watchwords for the builder and planner.

Character can be given to an entrance by simply having two ornamental pillars built there, with possibly an iron arch over them. If this is planted with creeping vines and is supported at the sides with groups of evergreens, it adds wonderful dignity and seeming value to the property.

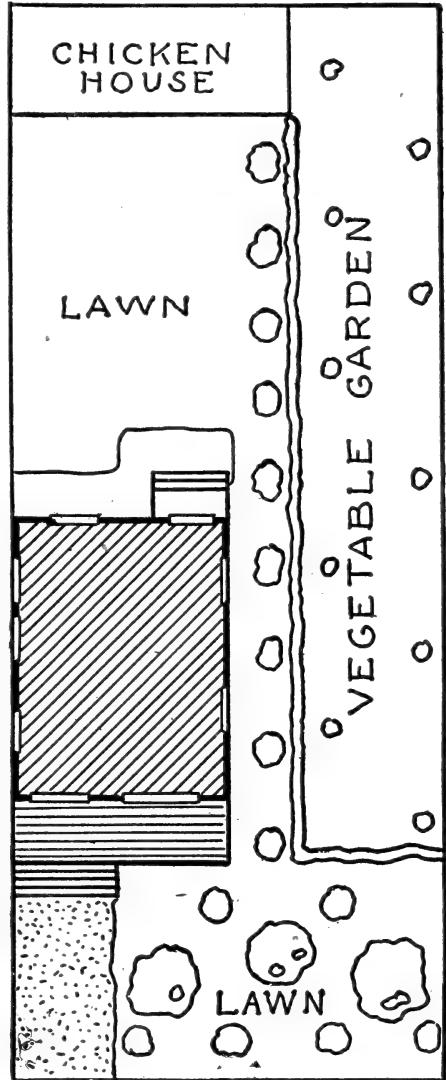
While winding paths or drives are graceful, they should not be made meaninglessly, but are in order where the ground slopes a little or dips, or where irregularity exists. Certainly these can always be added or made in order to get the curved line. Even in small places, as our plans show, the swinging line of beauty can be had. Straight paths may, however, be more convenient, and can still be tasteful and harmonious. They are undoubtedly neat.

No book can tell the reader exactly what may be the best arrangement for his garden or property. Every garden should have a character of its own, and generally does, unless in the case of the very smallest, where nearly all opportunity for variety is extinguished; yet it is remarkable what can be done on a quarter or an eighth of an acre. We have often seen plots of 30 ft. x 100 ft. laid out with much variety and taste, and which were full of interest. In those towns and cities of our own country, and in the old

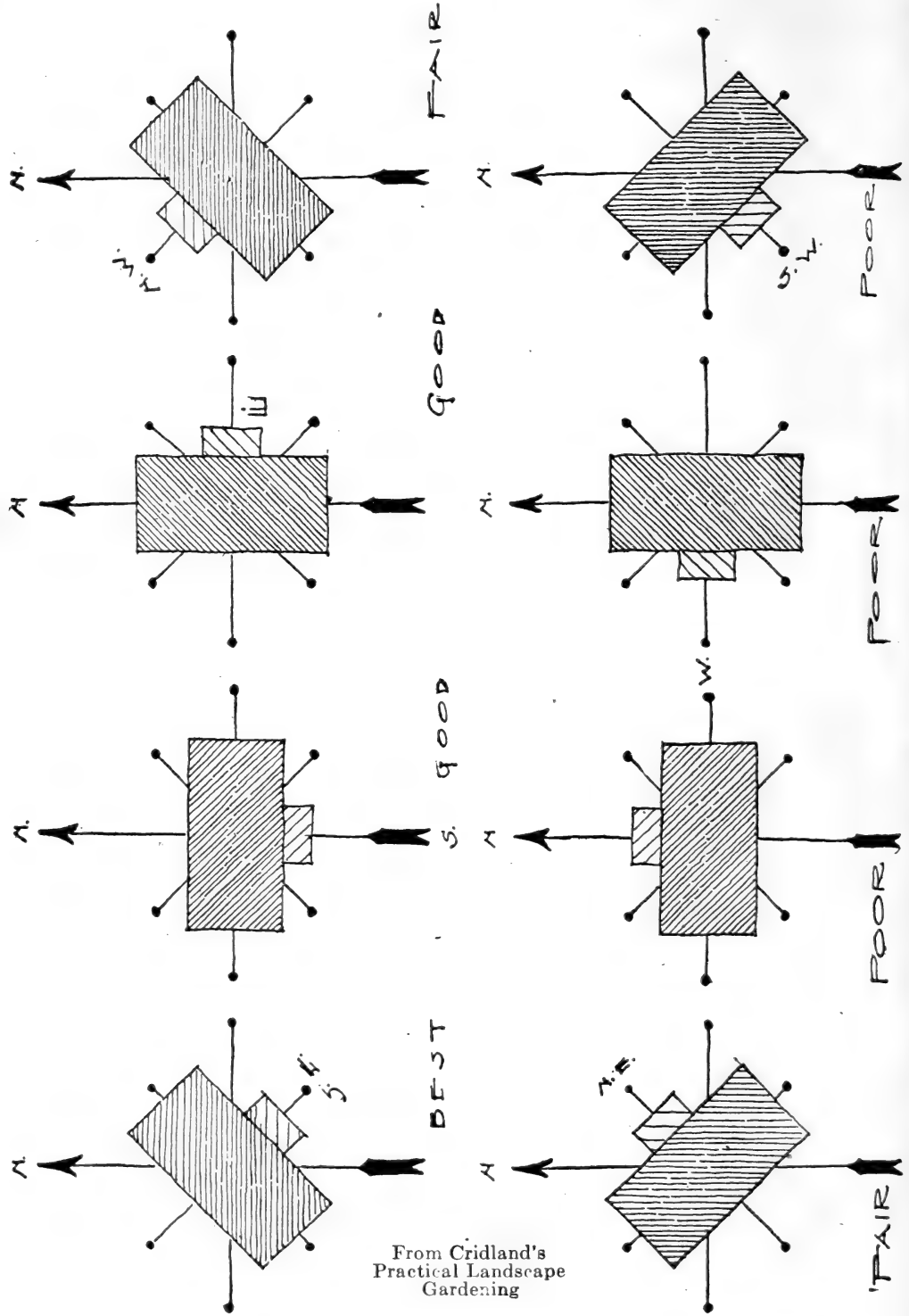
countries where the inhabitants, almost to a man, appreciate the elegancies of gardening, the little places exhibit the utmost variety of character in their composition.

It is all too true that thousands of gardens and grounds all around our American homes are bare to desolation. The democratic idea and feeling against planting of hedges and the lining off of one's property makes for deadly uniformity. The arguments that unhedged or unfenced grounds would be contrary to the best artistic conception and treatment of a city or suburb as a whole, ought not to be allowed to sway the property owner from making the most and the best of his own place. There is a school of landscape gardeners and city planners who seem to set their face against this, encouraging the open community type of home grounds. The latter will never get us anywhere as a nation of garden lovers, and almost entirely precludes the practice of the finer gardening. We plead rather to see places nicely hedged or railed off, so that stray dogs and unceremonious persons may be kept at a proper distance, but most of all for the sake of the enjoyment and encouragement of that quiet privacy without which the true pleasures of gardening cannot be attained.

Which is the best—to have a big, bare lawn and a few trees, or an odd group of shrubs here and there, or the trimly hedged and fenced grounds, with flower borders, specimen trees and shrubs, beds and belts of Roses, arches of Roses and



Suburban lot fenced, on 40x100 ft. A low hedge divided off the vegetable garden. Fruit trees and bushes were lined by the side of this, while pillar Roses, dwarf Roses, neat shrubs and beds of flowers were elsewhere well disposed. The vegetable plot was a model of good cropping, containing Tomatoes, Corn, Beans, Beets, Celery, Carrots, Spinach, herbs and salads. Raspberries lined the fences. This ran east and west



From Cridland's Practical Landscape Gardening

Facing south-east is the best exposure of the house in relation to the sun

other climbers, water basins, an arbor or Rose house where tea or ice-cream may be partaken in the sunny Summer days, or where in

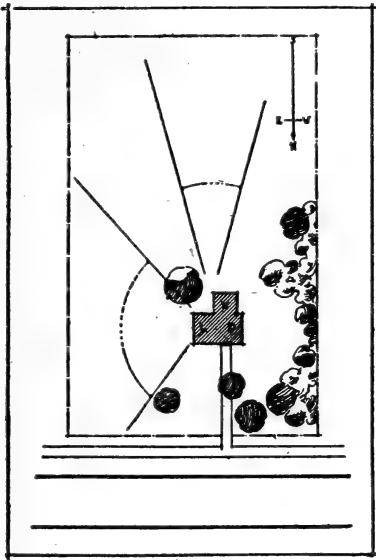


FIG. A — Planting plan to insure best effect of shade, outlook, protection, and privacy on a lot facing north

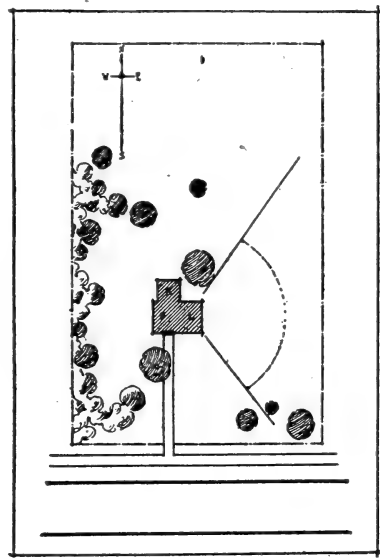


FIG. B — Planting plan to insure best effect of shade, outlook, protection, and privacy on a lot facing south

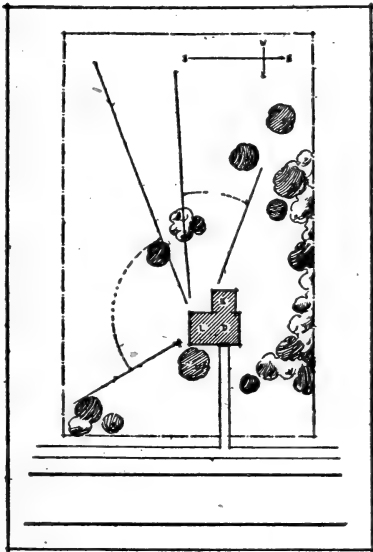


FIG. C — Planting plan to insure best effect of shade, outlook, protection and privacy on a lot facing east

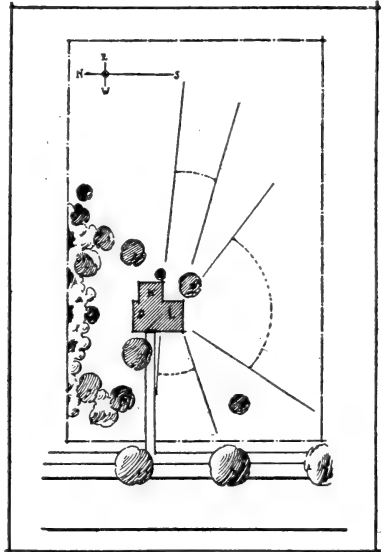


FIG. D — Planting plan to insure best effect of shade, outlook, protection and privacy on a lot facing west



Haven't you seen many working men's houses just like this—gaunt and bare, no neat hedges, no neat lawns, not even a Geranium or a Canna in sight?

some shady corner we can enjoy a siesta or a book in the open air?

The fact is we do not make half enough use of the grounds about our homes; they are left blank in most instances. We warmly urge the planting of light screen belts of trees and hedges around the property, which

need not be so dense as to prevent a neighbor or passerby from enjoying glimpses of your garden. Regel's Privet, California broad-leaved Privet, Golden Privet, Hemlock, Arbor Vitæ, Austrian Pine, White Pine, Norway Spruce, Rambler Roses, Ivy, Ampelopsis, Plane trees, Berberis Thunbergii, are among the easily grown subjects that are useful in such screen belts, and most of which can be increased on one's own place at little expense if the suggestions given in another part of this book are carried out.

The initial expense of planting the outer parts and main features of the grounds or garden need not be large. By the exercise of a little patience one can grow on a good many things for future developments. Poplars should only be used sparingly. They grow fast, it is true, and for that reason are often employed, and in some places are elegant and pleasant enough, but generally they are "messy," losing their leaves early, and their roots often choke up drains. The almost constant rustling of their leaves and other aspects of the trees are disagreeable to many people.

Make provision for a good space of lawn, and treat the lawn well. Water in motion, as in fountains, is often desirable but is a secondary consideration, just as the number and amount of flower beds or borders is, as also the introduction of rock gardens, arbors and such like. The thing of prime importance is to have the main features properly planned at the outset—the garage, the barn, the poultry run, the kitchen or vegetable garden, and the other parts of the place such as have been already spoken of, also the grading and terracing (if any), are among the first matters that require attention. Minor undulations or changes of the surface can be left for a future day. It is not, we repeat, necessary to have a cut and dried plan from the beginning;

far better let it grow with your knowledge of the place. What may be called the adventitious, luxurious or additional features will, practically speaking, take care of themselves. You will gradually come to find out the most appropriate spot for this or that. Do not be in a hurry; allow the place to grow up. It will suit your pocket better and furnish endless recreation and pleasure. It will keep your mind happy and active. You will be interested and learning all the while. This is true gardening, and the meaning and the reward of gardening and garden making.

Some pains should be taken to have clean, well-made paths. Take out 6 in. or 8 in. of soil and fill with clinkers, rough ashes or stones, finishing off with smaller stones, bound or rolled in with a little soil. For a strong, permanent road, concrete may be employed. If a cement surface is objected to, gravel can be strewn over before the cement sets, and be rolled in. Grass paths are comfortable and beautiful. Brick is also good. It is well also to have a tile or slate or wooden edging to the paths, as this makes for neatness and easy up-keep.

You will find that by walking around your district or other districts, your walks are as a book; at every turn you will gain some experiences or suggestions that may be modified or adopted with profit on your own grounds.

Lastly, there is no place so unpromising that it cannot, by dint of knowledge, skill, effort and some small financial expenditure, be made a beautiful or trimly garden.



Is this not a superb setting for a home ?

KEY TO PLAN "A" OPPOSITE

Key No.	Variety	Common Name	Key No.	Quan.	Variety	Common Name
1	3	Syringa Charles X	47	3	Syringa Mme. Lemoine	White Lilac
2	4	Kerria japonica (single)	48	3	Buddleia Veitchiana	Butterfly Shrub
3	5	Hydrangea arborescens grandiflora	49	1	Exochorda grandiflora	Pearl Bush
4	3	Buddleia Veitchiana	49½	9	Carvopteris Mastacanthus	Verbena Shrub
5	6	Spiraea Van Houttei	50	2	Viburnum oxycoccos	High Bush Cranberry
6	2	Hibiscus Lady Stanley	51	3	Syringa Ludwig Spathe	Lilac
7	5	Spiraea Anthony Waterer	52	3	Berberis purpurea	Purple Barberry
8	4	Weigela rosea	53	6	Symphoricarpos vulgaris	Indian Currant
9	3	Syringa Marie Legraye	54	3	Berberis Thunbergii	Japanese Barberry
10	3	Viburnum tomentosum	55	4	Kerria Japonica, single	Corchorus
11	3	Philadelphus, Avalanche	56	4	Hollyhocks, pink.	White Peony
12	5	Berberis purpurea	57	5	Pionia Festiva Maxima	Siberian Pea
13	5	Kerria japonica fl. pl.	58	3	Caragana arborescens	Smoke Tree
14	4	Berberis Thunbergii	59	1	Rhus Cotinus	Tamarisk
15	3	Spiraea Van Houttei	60	3	Tamarix hispida estivalis	Aaron's Beard
16	1	Salisburia adiantifolia	61	7	Hypericum prolificum	Mock Orange
17	7	Hypericum Moserianum	62	5	Philadelphus, Avalanche	Van Houtte's Spiraea
18	7	Berberis Thunbergii	63	5	Spiraea Van Houttei	Japanese Barberry
19	1	Laburnum vulgare	64	6	Berberis Thunbergii	Evergreen Azalea
20	6	Deutzia gracilis	65	6	Azalea amena	Mock Orange
21	7	Abelia grandiflora	66	3	Philadelphus coronarius	Japanese Daphne
22	4	Cercis japonica	67	5	Daphne Genkwa	Sweet Briar
23	5	Stephanandra flexuosa	68	5	Rosa rubiginosa	Foxglove
25	1	Hibiscus celestis	69	16	Chrysanthemum (pink, white and yellow varieties)	Japanese Flag
26	3	Caragana arborescens	70	7	Digitalis purpurea	Larkspur
27	1	Hibiscus Carnation stripe	71	10	Iris Kaempferi	Pink Rose
27½	50	Berberis Thunbergii (Hedge 18 in. apart)	72	6	Delphinium elatum	Sweet Briar
28	3	Cotoneaster Simonsii	73	3	Rosa Ferdinand Meyer	Larkspur
29	8	Deutzia Lemoinei	74	3	Rosa rubiginosa	Flag
30	1	Hibiscus celestis	74½	5	Delphinium hybridum	Yellow Chrysanthemum
31	7	Abelia grandiflora	75	10	Iris pallida dalmatica	False Indigo
32	8	Hydrangea arborescens grandiflora	76	5	Chrysanthemum Boston	Yellow Chrysanthemum
33	8	Berberis Thunbergii	77	12	Baptisia australis	Yellow Chrysanthemum
34	1	Quercus rubra	78	10	Chrysanthemum Soleil d'Or	Pink Phlox
35	7	Ligustrum Regelianum	79	6	Phlox Elizabeth Campbell	Japanese Flag
36	1	Laburnum vulgare	80	10	Iris Kaempferi	Flag
37	6	Symphoricarpos racemosus	81	6	Azalea Hino-de-giri	Japanese Barberry
38	4	Deutzia gracilis	82	15	Iris Louis Van Houttei	Mock Orange
39	1	Viburnum tomentosum	83	7	Berberis Thunbergii	Japanese Snowball
40	3	Forsythia viridissima	84	5	Philadelphus, Avalanche	Bridal Wreath
41	5	Hydrangea paniculata grandiflora	85	6	Spiraea Thunbergii	Pink Viburnum
42	1	Magnolia Soulangiana	86	1	Spiraea prunifolia fl. pl.	Purple Barberry
43	4	Weigela rosea	87	1	Viburnum plicatum	Golden Bell
44	1	Cornus florida rubra	88	5	Viburnum Carlesii	Purple Barberry
44½	3	Deutzia Pride of Rochester	89	1	Magnolia purpurea	Golden Bell
45	1	Deutzia crenata	90	3	Forsythia viridissima	Purple Barberry
46	5	Kerria japonica (single)	91	7	Berberis purpurea	Snowberry
			92	3	Viburnum Opulus sterilis	Sweet Gum
			93	3	Liquidambar styraciflua	

PLANTING PLAN "A" FOR TWO HOUSES ADJOINING

On this plan, representing a width of 80 ft. by a depth of 200 ft. stand two semi-detached houses.

The entire boundary is arranged in plantations of shrubbery and are of such varieties as will give a sequence of bloom from early Spring until late Fall, followed by a little interest of color in the berry bearing plants, such as the Barberry, Coral Berry, Snowberry and Cotoneaster.

The perennials are placed along the base of the house, and the varieties suggested, while limited, will provide a goodly quantity of cut flowers for table decoration.

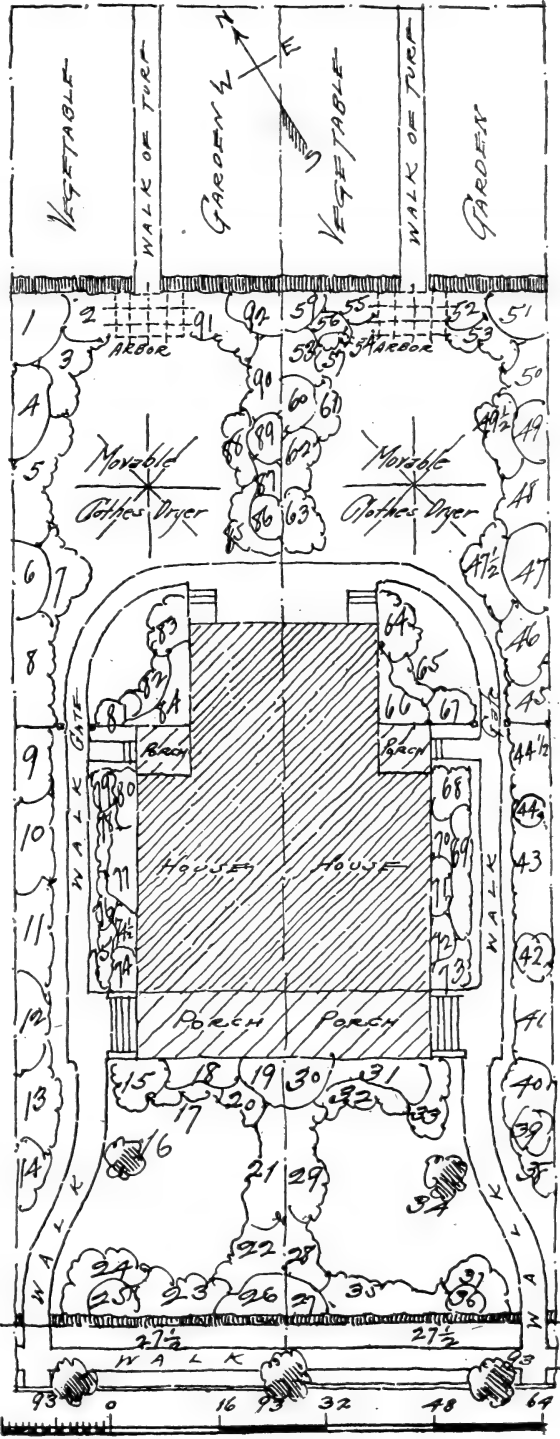
The front lawns may be treated as one lawn to advantage by omitting numbers 21 and 29, while the rear, for reasons of privacy, is better enclosed by the shrub borders.

A small vegetable garden is placed at the rear, separated by a hedge, which will also form a background to the plantations in front of it.

Between the rear lawn and the vegetable garden a small arbor is suggested in which seats may be placed at the sides.

Either climbing Roses, Clematis or annual vines should be planted as the decoration for the arbor.

For laundry purposes a movable drier is indicated in the center of the grass plot. This is easily put up and taken down as occasion may require, and is infinitely better than the unsightly posts.



Planting Plan herewith and Planting Key thereto on opposite page, are reproduced from Cridland's PRACTICAL LANDSCAPE GARDENING, the most complete textbook on the subject ever published at the price. We will forward this book on application for \$2.15, postpaid.

KEY TO PLAN "B" OPPOSITE

Key No.	Quan.	Variety	Common Name
	47	Hybrid Tea Roses	
	4	{ Cratægus, Double white	Hawthorn
		{ plena Double red, Paul's Scarlet }	
3	4	Salisburia adiantifolia	Maidenhair Tree
4	3	Abelia grandiflora	Hybrid Abelia
5	1	Buddleia Veitchiana	Butterfly shrub
6	7	Bocconia cordata	Plume Poppy
7	10	Delphinium hybridum	Larkspur
8	10	Phlox Mrs. Jenkins	White Phlox
9	10	Phlox Elizabeth Campbell	Pink Phlox
10	7	Pæonia Festiva Maxima	White Peony
11	1	Spiræa Van Houttei	Van Houtte's Spiræa
12	1	Abelia grandiflora	Hybrid Abelia
13	1	Mahonia aquifolia	Oregon Grape
14	1	Aucuba japonica	Japanese Laurel
15	1	Cotoneaster Simonsi	Shiny leaved Cotoneaster
16	1	Mahonia japonica	Japanese Evergreen Barberry
17	2	Juniperus hibernica	Irish Juniper
18	5	Retinispora obtusa	Japanese Cypress
19	1	Thuyopsis dolabrata	
20	16	Retinispora squarrosa Veitchii	Japanese Blue Cypress
21	2	Acer saccharum	Sugar Maple
22	1	Cotoneaster Simonsii	Shiny leaved Cotoneaster
23	1	Mahonia japonica	Japanese Evergreen Barberry
24	1	Aucuba japonica	Japanese Laurel
25	1	Abelia grandiflora	Hybrid Abelia
26	1	Mahonia aquifolia	Oregon Grape
27	1	Berberis Thunbergii	Japanese Barberry
28	1	Deutzia gracilis	Dwarf Deutzia
29	1	Spiræa Anthony Waterer	Pink Spiræa
30	1	Spiræa callosa alba	Dwarf white Spiræa
31	1	Amygdalus fl. pl. rubra	Flowering Almond
32	1	Coryopteris Mastacanthus	Verbena Shrub
33	6	Buddleia magnifica	Butterfly Shrub
34	5	Hydrangea arborescens grandiflora	Large flowered Hydrangea
35	3	Thalictrum dipterocarpum	Meadow Rue
36	4	Aconitum Park's hybrids	Monkshood
37	5	Anemone Queen Charlotte	Windflower
38	15	Iris Kaempferi	Japanese Flag
39	8	Stokesia cyanea	Stokes' Aster
40	15	Iris Queen of May	Flag
41	6	Pæonia Jean d'Arc	Rose Colored Peony
42	11	Platycodon Mariesii	Chinese Bell Flower
43	5	Phlox Struthers	Cherry Red Phlox
44	6	Pentstemon barbatus	Beard Tongue
45	6	Iris King of Iris	Yellow Flag
46	15	Phlox Mrs. Jenkins	White Phlox
47	8	Funkia lancifolia	Plantain Lily
48	10	Chrysanthemum Henry Sesquier	Violet Rose Shades
49	6	Pæonia Charlemagne's	White Peony
50	10	Campanula calycanthema	Bell Flower
51	10	Chrysanthemum Jardin des Plantes	White Chrysanthemum
52	6	Pæonia lutea variegata	Pink Peony
53	15	Iris Kaempferi	Japanese Flag
54	12	Platycodon Mariesii	Chinese Bellflower
55	8	Stokesia cyanea	Stokes' Aster
56	5	Aquilegia cærulea	Columbine
56½	4	Aconitum, Park's variety	Monkshood
57	5	Anemone Queen Charlotte	Windflower
58	6	Pæonia Festiva Maxima	White Peony
59	10	Chrysanthemum Jardin des Plantes	White Chrysanthemum
60	15	Phlox Elizabeth Campbell	Pink Phlox
61	10	Campanula latifolia macrantha	Bellflower
62	7	Pæonia Cytharee	Flesh White Peony
63	6	Iris pallida dalmatica	Blue Flag
64	6	Pentstemon barbatus	Beard Tongue
65	5	Phlox Miss Lingard	White Phlox

PLANTING PLAN "B" FOR A PLOT 50 x 100 FT.

This garden is planted with an assortment of hardy perennials, and the whole is enclosed with hybrid Tea Roses. The diagram represents a plot 50 ft. wide by 118 ft. deep to the curb.

On the transverse axis of the garden a Summer house is located. This little open area is necessary to provide a suitable drying area for laundry purposes. The drier, however, is of a movable type and when not in use should be removed.

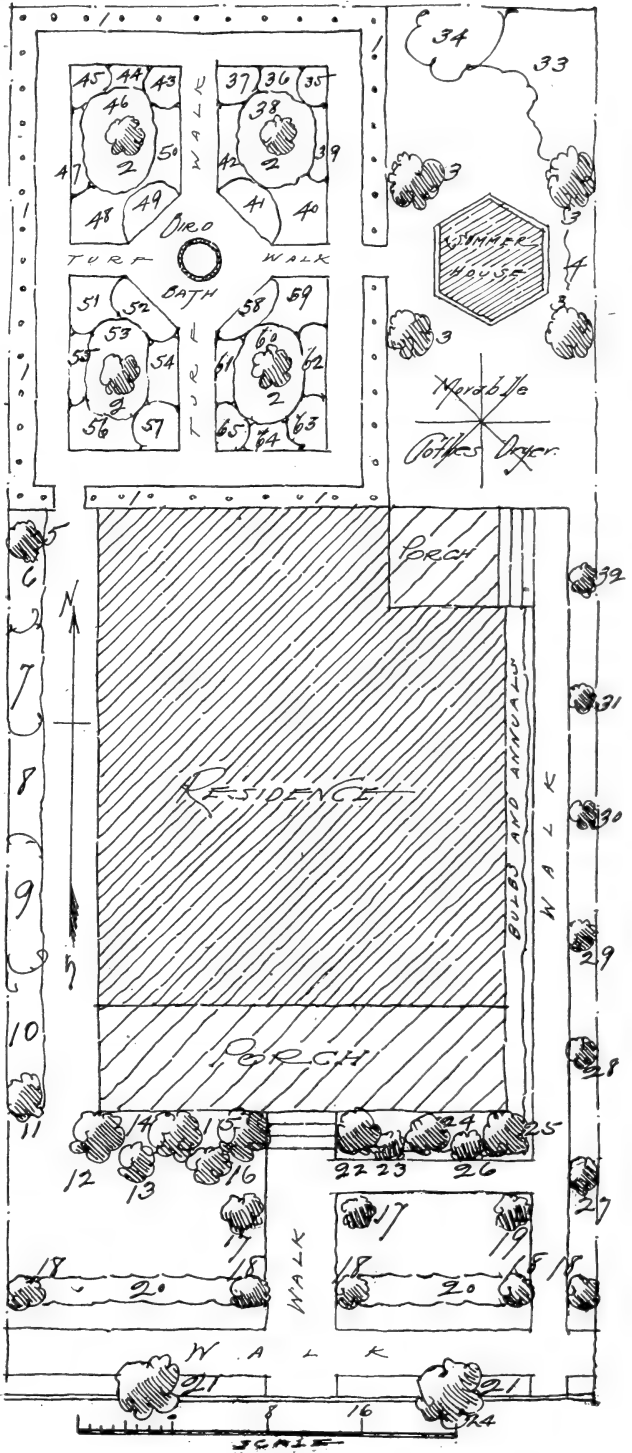
The Summer House is surrounded by the Ginkgo, one of the most picturesque of trees. Small arches spanning the two entrances to the garden would be a desirable feature, and climbing Roses should be planted on either side of the arch, using Silver Moon, Dr. Van Fleet, Tausendschoen and Farquhar.

The side line, west side, is planted in hardy perennials, with a flowering shrub at each end as a terminal feature.

On the eastern boundary line dwarf flowering shrubs are planted at equal intervals.

The planting at the base of the house consists of broad-leaved evergreens.

The hedge along the front is the silvery grey Japanese Cypress, with the green variety at the ends and entrances for contrast and to emphasize those points.



Planting Plan herewith and Planting Key thereto on opposite page, are reproduced from Cridland's PRACTICAL LANDSCAPE GARDENING, the most complete textbook on the subject ever published at the price. We will forward this book on application for \$2.15 postpaid.

KEY TO PLAN "C" OPPOSITE

Key No.	Variety	Common Name	Key No.	Variety	Common Name	Key No.	Variety	Common Name
1	<i>Retinispora obtusa</i> , Japanese Cypress		1	<i>Juniperus virginiana</i>	Red Cedar	80	<i>Stokesia cyanea</i> , Stokes' Aster	
2	<i>Jasminum officinalis</i> , Jasmine		10	<i>Tritonia pfitzeriana</i>	Redhot Poker Plant	81	<i>Inula laciniata</i> , Fiebabane	
3	<i>Juniperus pfitzeriana</i>		7	<i>Caterina officinalis</i> , Garden Heliotrope		82	<i>Iris florentina</i> , White Flag	
4	<i>Juniperus tamariscifolia</i>		3	<i>Boltonia asterifoides</i> , False Chamomile		83	<i>Hemerocallis flava</i> , Day Lily	
5	<i>Thuja Warreana</i> , Siberian Arborvitae		9	<i>Iberis sempervirens</i> , Candytuft		84	<i>Anemone Queen Charlotte</i> , Windflower	
6	<i>Clematis coccinea</i> , Scarlet Clematis		5	<i>Helianthus Miss Willmott</i> , Sunflower		85	<i>Paeonia Festiva Maxima</i> , White Peony	
7	<i>Juniperus Sabina compacta</i>		1	<i>Physostegia virginica</i> , False Dragon's Head		86	<i>Boltonia latisuavama</i> , False Chamomile	
8	<i>Retinispora squarrosa</i> Veitchii, Japanese Blue Cypress		10	<i>Platyodon Mariesii</i> (white), Chinese Bellflower		87	<i>Delphinium hybridum</i> , Larkspur	
9	<i>Clematis paniculata</i> , Japanese Clematis		12	<i>Cerasus rosea pendula</i> , Japanese Weeping Cherry		88	<i>Gypsophila paniculata</i> , Baby's breath	
10	<i>Juniperus japonica aurea</i> , Japanese Golden Juniper		1	<i>Juniperus Schottetii</i>		89	<i>Hibiscus</i> , Marvel Mallow	
11	<i>Thuja vervaencana</i> , Golden Arborvitae		2	<i>Cerasus tosea pendula</i> , Japanese Weeping Cherry		90	<i>Anchusa italica</i> (Dropmore's) Italian Alkanet	
12	<i>Jasminum primulinum</i> , Yellow Jasmine		8	<i>Delphinium Albion</i> , White Larkspur		91	<i>Iberis sempervirens</i> , Candytuft	
13	<i>Retinispora obtusa</i> , Japanese Cypress		12	<i>Iris flavescens</i> , Yellow Flag		92	<i>Hollyhocks</i> , Yellow	
14	<i>Juniperus pfitzeriana</i>		8	<i>Delphinium Lize Van Veen</i> , Larkspur		93	<i>Delphinium Albion</i> , White Larkspur	
15	<i>Juniperus Waukeegan</i>		8	<i>Pentstemon barbatus</i> , Beard's Tongue		94	<i>Platyodon Mariesii</i> , Chinese Bellflower	
16	<i>Juniperus canadensis aurea</i>		12	<i>Iris Kaempferi</i> , Japanese Flag		95	<i>Papaver orientalis</i> , Oriental Poppy	
17	<i>Tsuga canadensis</i> , Hemlock Spruce		7	<i>Juniperus Schottetii</i>		97	<i>Asclepias tuberosa</i> , Butterfly weed	
18	<i>Aesculus glabra</i> , Horse Chestnut		1	<i>Heliospis Picheana semi-plena</i>		98	<i>Hollyhocks</i> , Pink	
19	<i>Thuja pyramidalis</i> , Pyramidal Arborvitae		12	<i>Polymonium Richardsoni</i> , Jacob's Ladder		99	<i>Lupinus polyphyllus</i> (blue), Lupine	
20	<i>Hypericum Moserianum</i> , St. John's Wort		15	<i>Juniperus virginiana</i> , Red Cedar		100	<i>Campanula pyramidalis</i> , Bellflower	
21	<i>Viola Blue Perfection</i>		1	<i>Aster novae-angliae Roycrofti</i> , Pink Aster		101	<i>Paeonia chrysanthemiflora</i> , White Peony	
22	<i>Chamaecyparis erecta viridis</i> , Pyramidal Cypress		5	<i>Stokesia cyanea</i> , Stokes' Aster		102	<i>Buddleia magnifica</i> , Butterfly Shrub	
23	<i>Iris pumila</i> , Dwarf Flag		8	<i>Delphinium Rev. E. Lascelles</i> , Larkspur		103	<i>Retinispora obtusa</i>	
24	<i>Iris Gypsy Queen</i> , Golden Flag		5	<i>Aconitum</i> , Park's varieties, Monkshood		104	<i>Aconitum</i> , Park's varieties	
25	<i>Plumbago Larpentae</i> , Leadwort		12	<i>Aquilegia caerulea</i> , Columbine		105	<i>Faonia Fottsi Kosea</i> , Pink Peony	
26	<i>Iris Kaempferi</i> , Japanese Flag		4	<i>Juniperus virginiana</i> , Red Cedar		5	<i>Delphinium persimmon</i>	
27	<i>Heuchera sanguinea</i> , Alum Root		6	<i>Phlox R. P. Struthers</i> , Red Phlox		12	<i>Hollyhocks</i> , yellow	
28	<i>Phlox Elizabeth Campbell</i> , Pink Phlox		12	<i>Iris Queen of May</i> , Rose Lilac Flag		7	<i>Thuja pyramidalis</i>	
29	<i>Chamaecyparis erecta viridis</i> , Pyramidal Cypress		14	<i>Lavendula vera</i> , Lavender		1	<i>Funkia japonica</i>	
30	<i>Retinispora obtusa aurea</i> , Japanese Cypress		5	<i>Rudbeckia purpurea</i> , Cone Flower		5	<i>Funkia japonica</i>	
31	<i>Juniperus Cannarti</i>		10	<i>Juniperus Cannarti</i>		5	<i>Funkia japonica</i>	
32	<i>Stokesia cyanea</i> , Stokes' Aster		1	<i>Iris King of Iris</i> , Yellow Flag		5	<i>Funkia japonica</i>	
33	<i>Phlox Miss Lingard</i> , White Phlox		7	<i>Iris Kaempferi</i> , Japanese Flag		111	<i>Funkia japonica</i>	
34	<i>Retinispora obtusa</i> , Japanese Cypress		8	<i>Desmodium penduliflorum</i> , Bush Clover		112	<i>Delphinium Mrs. Thompson</i> , Larkspur	
35	<i>Gaillardia grandiflora</i> , Blanket Flower		1	<i>Sedum spectabile</i> , Showy Sedum		113	<i>Chrysanthemum Henry Sesquier</i> , Pink Chrysanthemum	
36	<i>Phlox Mrs. Jenkins</i> , White Phlox		12	<i>Achillea</i> , The Pearl		2	<i>Juniperus Annarti</i>	
37	<i>Sciadopitys verticillata</i> , Umbrella Pine		10	<i>Eupatorium barbatus</i> , Beard's Tongue		1	<i>Lonicera Halleana</i> , Hall's Honeysuckle	
38	<i>Hemerocallis flava</i> , Day Lily		14	<i>Eupatorium ageratooides</i> , White Shakeroot		1	<i>Lonicera brachypoda aurea</i> , Golden Honeysuckle	
39	<i>Delphinium hybridum</i> , Larkspur		8	<i>Chrysanthemum Golden Pheasant</i> , Yellow Chrysanthemum		1	<i>Lonicera sinensis</i> , Chinese Honeysuckle	
			8	<i>Phlox Mrs. Jenkins</i> , White Phlox		1	<i>Lonicera belgica</i> , Dutch Honeysuckle	

PLANTING PLAN "C"

For a property 50x100 feet.

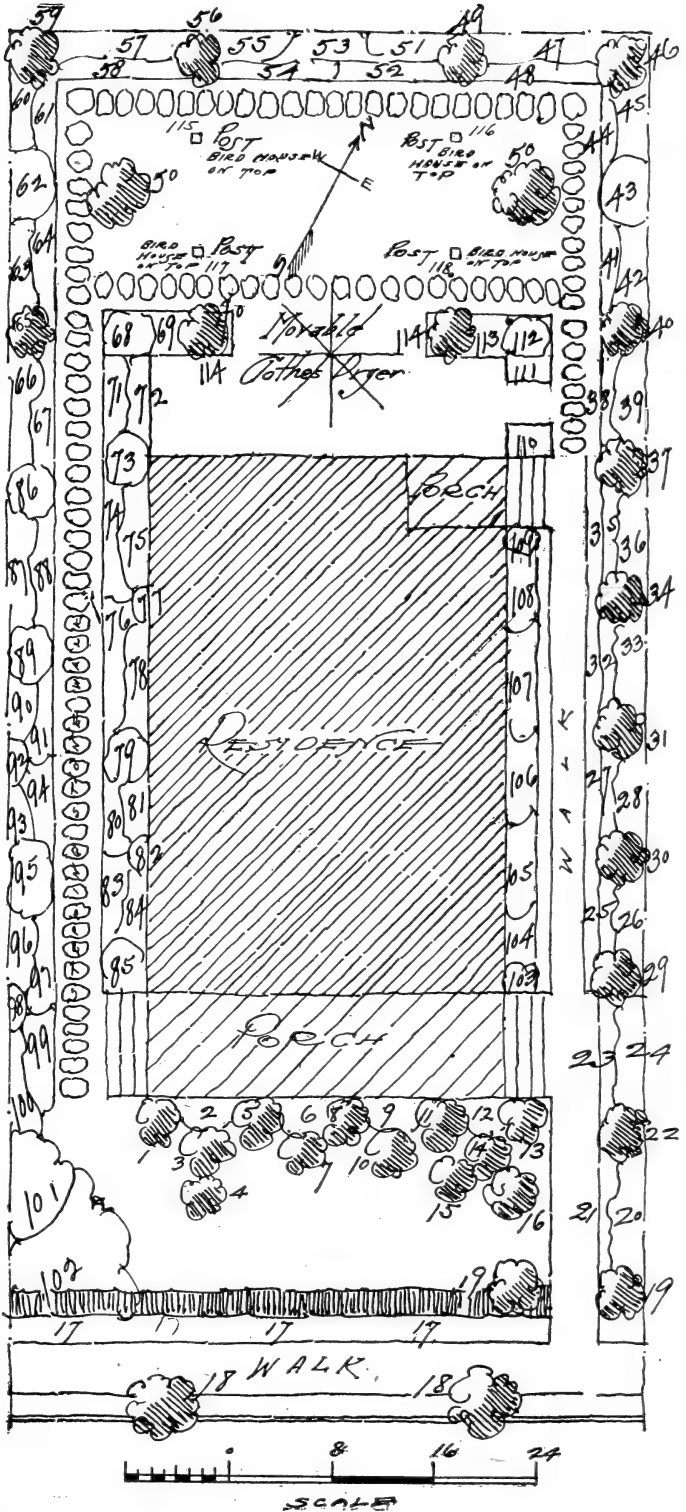
In this scheme the treatment is of formal character the only informal part being in front of the porch, and the small plantation at the south-west corner. The diagram represents a property 50 ft. wide by 118 ft. deep to the curb.

The stepping stone walk on the west side is placed between two borders of perennials and leads to the enclosure at the rear.

Shrubbery has been placed at intervals in the beds to lift them up and break the monotony. This feature is continued along the eastern fence line, while at the base of the house the planting is confined to the hardy perennials with the exception of two evergreens placed at the ends of the beds.

The plantation in front of the porch consists of an assortment of conifers, in back of which a variety of vines are placed for color effect. Bulbs for Spring, followed by low growing annuals, would give an additional interest to this plantation.

The hedge along the front is the Hemlock Spruce, and it should be kept at a height of three to four feet.



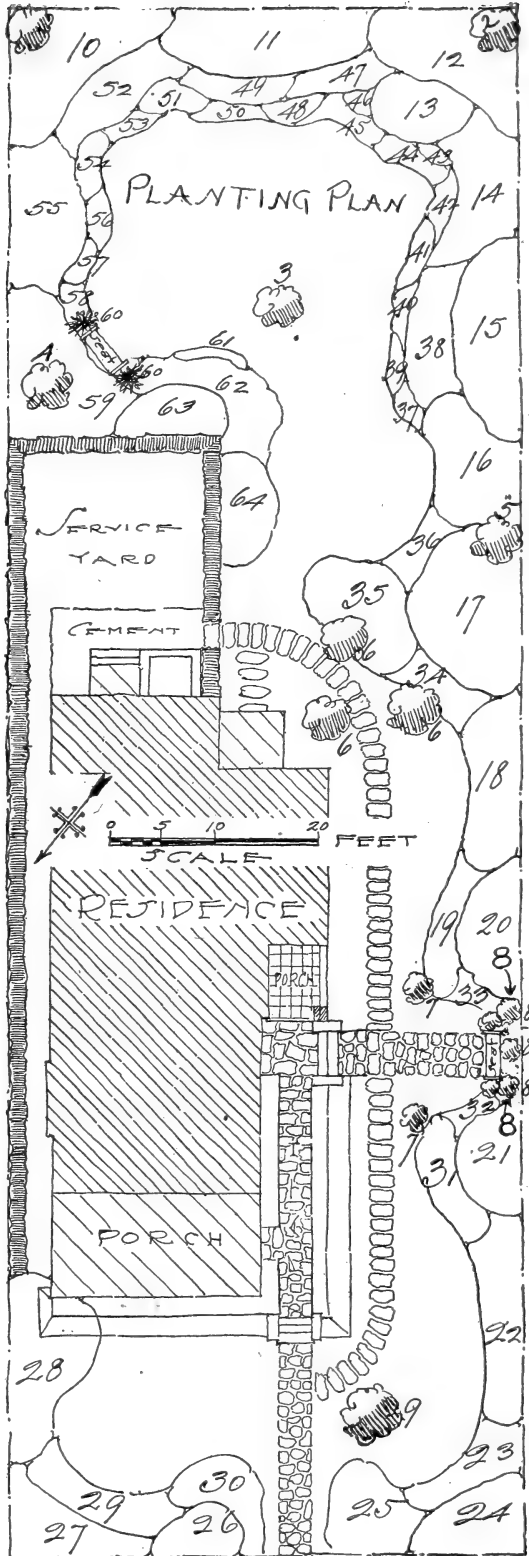
KEY TO PLAN "D" OPPOSITE

Key No.	Quan.	Variety	Common Name
1	1	<i>Populus fastigiata</i>	Lombardy Poplars
2	1	<i>Populus fastigata</i>	Lombardy Poplars
3	1	<i>Quercus palustris</i>	Pin Oak
4	1	<i>Fraxinus americana</i>	American Ash
5	1	<i>Acer saccharum</i>	Sugar Maple
6	3	<i>Ginkgo biloba</i>	Maidenhair Tree
7	2	<i>Acer polymorphum dissectum rubrum</i>	Cut-leaved Japanese Maple
8	3	<i>Thuya plicatum</i>	Fern-leaved Arborvitæ
8	2	<i>Juniperus elegantissima</i> Leei	Golden Juniper
9	1	<i>Liquidambar styraciflua</i>	Sweet Gum
10	5	<i>Viburnum tomentosum</i>	Single Japanese Snowball
11	6	<i>Lonicera fragrantissima</i>	Early Bush Honeysuckle
12	5	<i>Syringa</i> , named varieties	Lilacs
13	5	<i>Hydrangea paniculata</i>	Late Hydrangea
14	6	<i>Philadelphus coronarius</i>	Mock Orange
15	7	<i>Rosa rugosa</i>	Japanese Rose
16	6	<i>Buddleia Veitchiana</i>	Butterfly Plant
17	5	<i>Viburnum plicatum</i>	Japanese Snowball
18	6	<i>Lonicera Morrowi</i>	Bush Honeysuckle
19	7	<i>Abelia grandiflora</i>	Hybrid Abelia
20	9	<i>Rhododendron album elegans</i>	White Rhododendron
21	8	<i>Rhododendron roseum elegans</i>	Pink Rhododendron
22	7	<i>Lonicera Morrowi</i>	Bush Honeysuckle
23	6	<i>Rosa rugosa</i>	Japanese Rose
24	4	<i>Spiræa Van Houttei</i>	Drooping Spiræa
25	5	<i>Spiræa Thunbergii</i>	Snow Garland
26	3	<i>Weigela Eva Rathke</i>	Red Weigela
27	5	<i>Philadelphus Lemoinei</i>	Mock Orange
28	6	<i>Spiræa Van Houttei</i>	Drooping Spiræa
29	6	<i>Hydrangea paniculata grandiflora</i>	Large flowering Hydrangea
30	8	<i>Spiræa Thunbergii</i>	Snow Garland
31	9	<i>Abelia grandiflora</i>	Hybrid Abelia
32	7	<i>Azalea Hinodégiri</i>	Japanese Azalea
33	7	<i>Azalea Hinodégiri</i>	Japanese Azalea
34	5	<i>Spiræa arguta</i>	Hybrid Spiræa
35	6	<i>Kerria japonica</i> , single	Yellow Kerria
36	12	<i>Iris Silver King</i>	White Flag
37	7	<i>Hypericum Moserianum</i>	St. John's Wort
38	6	<i>Rosa multiflora</i>	Dwarf Japanese Rose
39	10	<i>Phlox divaricata</i>	Early Blue Phlox
40	10	<i>Aquilegia flabellata nana alba</i>	White Columbine
41	10	<i>Stokesia cyanea</i>	Stokes' Aster
42	8	<i>Iris pallida dalmatica</i>	Lavender Flag
43	3	<i>Pæony Festiva maxima</i>	White Peony
44	10	<i>Aster amellus</i> Beauty of Ronsdorf	Michaelmas Daisy
45	12	<i>Chrysanthemum Julia Lagravère</i>	Red Chrysanthemum
46	3	<i>Pæony Richardson's grandiflora</i>	Peony
47	16	<i>Delphinium formosum</i>	Indigo Larkspur
48	5	<i>Dicentra spectabilis</i>	Bleeding Heart
49	18	<i>Helenium Hoopesii</i>	Early Sneezewort
50	12	<i>Veronica longifolia subsessilis</i>	Speedwell
51	10	<i>Phlox Miss Lingard</i>	Early Phlox
52	6	<i>Kerria japonica</i> , single	Single Kerria
53	10	<i>Hesperis matronalis</i>	Sweet Rocket
54	12	<i>Chrysanthemum Golden Mme. Martha</i>	Yellow Chrysanthemum
55	6	<i>Weigela Eva Rathke</i>	Dark Red Weigela
56	12	<i>Aquilegia chrysantha</i>	Yellow Columbine
57	8	<i>Phlox Rheinstrom</i>	Pink Phlox
58	8	<i>Phlox Ardense Grete</i>	Early White Phlox
59	5	<i>Syringa</i> , named varieties	Lilac
60	2	<i>Juniperus virginiana</i>	Red Cedar
61	9	<i>Phlox Elizabeth Campbell</i>	Pink Phlox
62	8	<i>Lonicera Morrowi</i>	Bush Honeysuckle
63	5	<i>Hibiscus syriacus</i> , single	Pink Rose of Sharon
64	5	<i>Philadelphus Mont Blanc</i>	Mock Orange

PLANTING PLAN "D"

Shows a good treatment of a property 50x150 ft., using broken flagstones with mortar joints for the main walk and stepping stone walk to the service quarters and the rear lawn. The service yard enclosed by hedge

(See Planting Key on page 26)

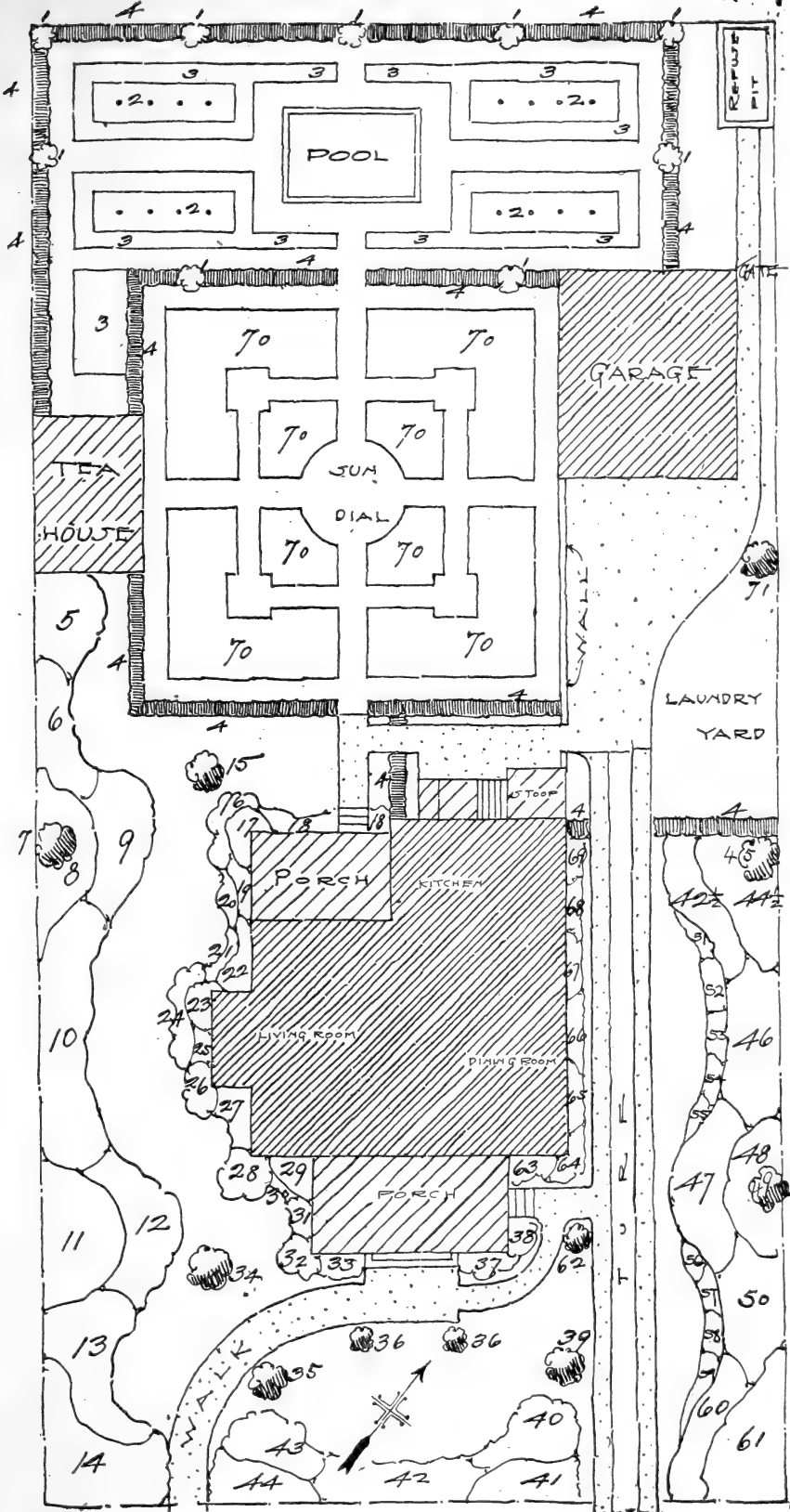


For a complete work on the subject of this chapter we recommend

PRACTICAL LANDSCAPE GARDENING, by Robt. B. Cridland. Everybody loves a garden. Not every one, however, can employ a landscape architect to lay out his grounds. It is to fill this need that Robt. Cridland has written this helpful book which goes carefully into all the details of planning a garden with reference to the location of the house, the character of the land to be utilized, the kind of trees and plants best suited to the particular location, and hundreds of other necessary operations. The author is clear and concise in his directions and explanations and is, above all, practical. Book consists of 266 pages, contains 91 photographs, 67 sketches and 33 planting plans (with keys to plans). Price \$2.15, postpaid. Secure this book where you bought your Garden Guide.

KEY TO PLAN "E" OPPOSITE

Key No.	Quan.	Variety	Common Name
1	9	Juniperus virginiana	Red Cedar
2	16	Roses, Hybrid Tea (Standards)	
3	125	Hybrid Tea Roses	Everblooming Roses
4	350	Ligustrum ovalifolium	California Privet
5	3	Spiræa Van Houttei	Drooping Spiræa
		Lonicera Morrow; { Key Nos.—6 9 22 28 38 63 } { No. Plants—5 6 5 5 3 3 }	Bush Honeysuckle
7	1	Magnolia acuminata	Cucumber Tree
8	5	Viburnum Opulus sterilis	Snowball
10	10	Buddleia Veitchiana	Butterfly Plant
11	3	Biota orientalis conspicua	Columnar Chinese Arbory
12	10	Desmodium japonicum	Purple Bush Clover
13	6	Hydrangea quercifolia	Oak-leaved Hydrangea
14	5	Forsythia suspensa	Drooping Golden Bell
15	1	Red Siberian Crab	Crab Apple
16	14	Dianthus barbatus	Sweet William
		Berberis Thunbergii; { Key Nos.—17 18 31 64 } { No. Plants—9 9 5 7 }	Japanese Barberry
19	6	Deutzia Lemoinei	Lemoine's Deutzia
20	8	Phlox W. C. Egan	Hardy Phlox
21	10	Iris Silver King	White Flag
23	8	Rose Pink Baby Rambler	Everblooming Rose
24	12	Rose White Baby Rambler	Everblooming Rose
25	6	Rose Hermosa	Everblooming Rose
26	8	Rose Pink Baby Rambler	Everblooming Rose
27	5	Rosa rugosa	Japanese Rose
29	3	Lonicera fragrantissima	Early Honeysuckle
30	8	Phlox Miss Lingard	Early Phlox
32	5	Juniperus Sabina	Savin Juniper
33	3	Taxus cuspidata	Japanese Yew
34	1	Larix europæa	European Larch
35	1	Cornus florida rubra	Pink Dogwood
36	2	Buxus arborescens (Globe)	Globe-shaped Box
37	4	Taxus cuspidata	Japanese Yew
39	1	Magnolia conspicua	White Magnolia
40	15	Hypericum Moserianum	St. John's Wort
41	5	Forsythia suspensa	Drooping Golden Bell
42	9	Abelia grandiflora	Hybrid Abelia
42½	7	Hydrangea radiata	Silver-leaved Hydrangea
43	8	Xanthorrhiza apiifolia	Yellow Root
44	6	Spiræa Thunbergii	Snow Garland
44½	4	Syringa vulgaris	Lilac
45	1	Apple, Grimes' Golden	
46	5	Philadelphus coronarius	Mock Orange
47	9	Spiræa Margaritæ	Pink Spiræa
48	3	Juniperus virginiana glauca	Blue Cedar
49	1	Liquidambar styraciflua	Sweet Gum
50	5	Hydrangea paniculata	Late Hydrangea
51	9	Oenothera missouriensis	Evening Primrose
52	10	Iris Blue Boy	German Flag
53	9	Chrysanthemum St. Illoria	Pink Chrysanthemum
54	6	Pæonia Van Houttei	Crimson Peony
55	6	Funkia cærulea	Plantain Lily
56	6	Phlox Diadem	Hardy Phlox
57	3	Pæonia festiva maxima	White Peony
58	7	Delphinium chinense	Chinese Larkspur
59	10	Iris pumila aurea	Dwarf Flag
60	8	Spiræa Thunbergii	Show Garland
61	5	Pyrus Maulei	Pink Japanese Quince
62	1	Juniperus Cannarti	Pyramidal Cedar
65	9	Phlox Eugene Danzanvilliers	Lilac Phlox
66	12	Iris aurea	Yellow Flag
67	6	Pæonia grandiflora	Pink Peony
68	12	Iris pallida dalmatica	Lavender Flag
69	8	Chrysanthemum Julia Lagravère	Red Chrysanthemum
70		Annuals and Perennials	
71	1	Populus fastigiata	Lombardy Poplar

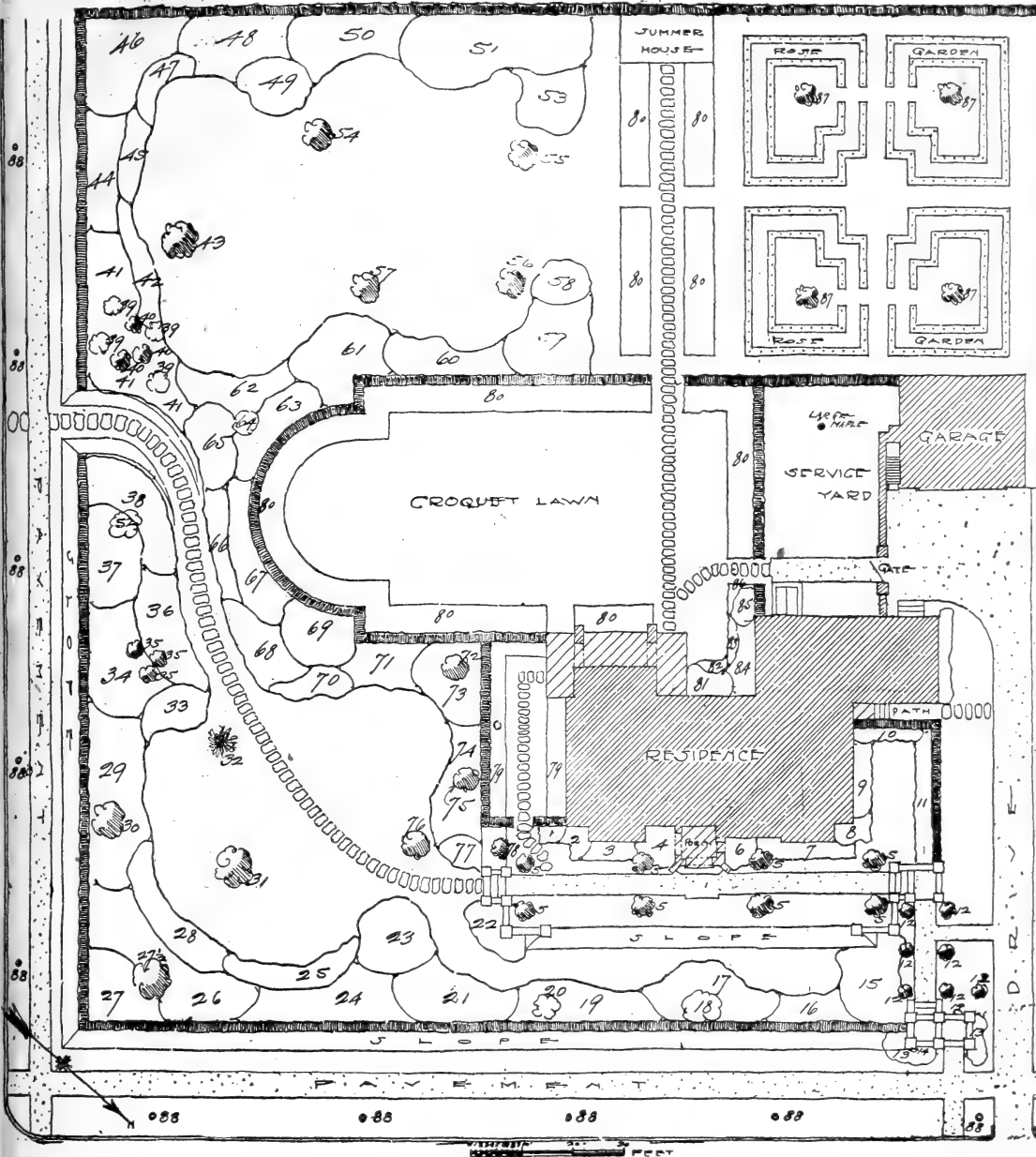


Planting Plan "E." Plot is 75 ft. wide by 150 ft. deep.

Provides space for Flower and Rose Garden, Tea House, Pool, Garage, etc. Two cement tracks into garage with turf between.

KEY TO PLANTING PLAN "F" OPPOSITE

Kc	No.	Variety	Common Name	Key No.	Variety	Common Name
1	5	Mahonia aquifolia	Holly-leaved Barberry	42	Abelia grandiflora	Hybrid Abelia
2	6	Bambusa Metake	Evergreen Bamboo	12	Apple Maiden's Blush	Apple
3	15	Funkia carulea	Plantain Lily	43	Calycanthus floridus	Sweet Shrub
4	7	Rhododendron roseum elegans	Pink Rhododendron	44	Spiraea Thunbergii	Snow Garland
5	8	Buxus (Globe Shape)	Box Bushes	45	Syringa, named varieties	Lilac
6	7	Rhododendron Sargentii	Hybrid Rhododendron	46	Abelia grandiflora	Hybrid Abelia
7	10	Rhododendron Mrs. Milner	Hybrid Rhododendron	9	Viburnum plicatum	Japanese Snowball
8	8	Funkia carulea	Plantain Lily	5	Viburnum nudiflorum	Yellow Jasmine
9	30	Rhododendron atrosanguineum	Crimson Rhododendron	49	Jasminum	Blue Spirea
10	25	Ferns	Lily of the Valley	12	Caryopteris mastacanthus	Late Hydrangea
11	7	Woodland plants, collected		51	Hydrangea paniculata	Sweet Gum
12	7	Quercus macrocarpa	Lombardy Poplar	12	Liquidambar styraciflua	Bush Cyprip
13	10	Wisteria floribunda	King's Privet	1	Apple-Smoketree	Red-leaved Norway Maple
14	2	Wisteria chinensis	Chinese Wisteria	54	Prunella chinensis-Schwedleri	White-flowering Cherry
15	8	Clematis paniculata	Japanese Clematis	1	Quercus alba	Pin Oak
16	7	Lonicera Morrowi	Bush Honey-suckle	7	Quercus palustris	Stephanandra
17	6	Callicarpa purpurea	Purple-fruited Callicarpa	6	Hibiscus syriacus, blue and white	Rose of Sharon
18	1	Spiraea prunifolium fl. pl.	Bridal Wreath	8	Spiraea Billardi	Pink Spirea
19	20	Spiraea A. Waterer	Red-flowering Dogwood	6	Rhodotypos kerrioides	White Kerria
20	1	Fraxinus Ornus	Hybrid Spirea	6	Kerria japonica, single	Yellow Kerria
21	20	Spiraea Van Houttei	Flowering Ash	5	Syringa, named kinds	Lilac
22	12	Berberis Thunbergii	Drooping Spirea	1	Picea pingens Kosteriana	Koster's Spruce
23	7	Hydrangea p. s.	Japanese Barberry	4	Viburnum tomentosum	Single Snowball
24	7	Syringa Pekinensis	Large-flowering Hydrangea	20	Yucca filamentosa	Adam's Needle
25	15	Deutzia gracilis	Chinese Lilac	67	Spiraea A. Waterer	Dwarf Pink Spirea
26	18	Weigela Eva Kathke	Dwarf Deutzia	8	Abies balsamea	Balsam Fir
27	5	Cercis canadensis	Red Bud Weigela	5	Syringa, named varieties	Lilac
28	1	Chalaba speciosa	Dark Red Weigela	10	Palafoxia mollis, yellow	Giant Azalea
29	5	Viburnum Sieboldii	Western Catalpa	71	Philadelphus coronatus	Mock Orange
30	3	Viburnum Sieboldii	Chinese Snowball	2	Sakaki	White Lilac
31	1	Quercus coccinea	Scarlet Oak	6	Syringa vulgaris alba	Fragrant Bush
32	1	Fraxinus Ornus	Flowering Ash	1	Acer polymorphum atrosan-	White Lilac
33	10	Azalea mollis, red	Koster's Spruce	76	Quercus rubra	Red Japanese Maple
34	3	Ligustrum Iboia	Japanese Azalea	77	Deutzia gracilis	Red Oak
35	3	Sophora japonica	Iboia Privet	78	Acer poly. dissectum	Slender Deutzia
36	12	Ligustrum Regelianum	Photinia	79	Annuals	Cut-leaved Japanese Maple
37	8	Cercis japonica	Japanese Sophora	80	Perennials	Lavender Hardy Aster
38	20	Berberis Thunbergii	King's Privet	10	Aster laevis	Yellow Evening Primrose
39	4	Tsuga canadensis	Japanese Red Bud	8	Gnaphalium missouriensis	Yellow Columbine
40	3	Betula nigra	Thunberg's Barberry	15	Phlox Eugene Danzanvilliers	Lavender Phlox
41	15	Symphoricarpos racemosus	Hemlock	10	Iris Blue Boy	German Flag
			Red Birch	6	Ceanothus	English Hawthorn
			Coral Berry and Snowberry	4	Crataegus Oxyacantha, standards	Sugar Maple
			Cluste Tree	88	Acer saccharinum	



PLANTING PLAN "F"

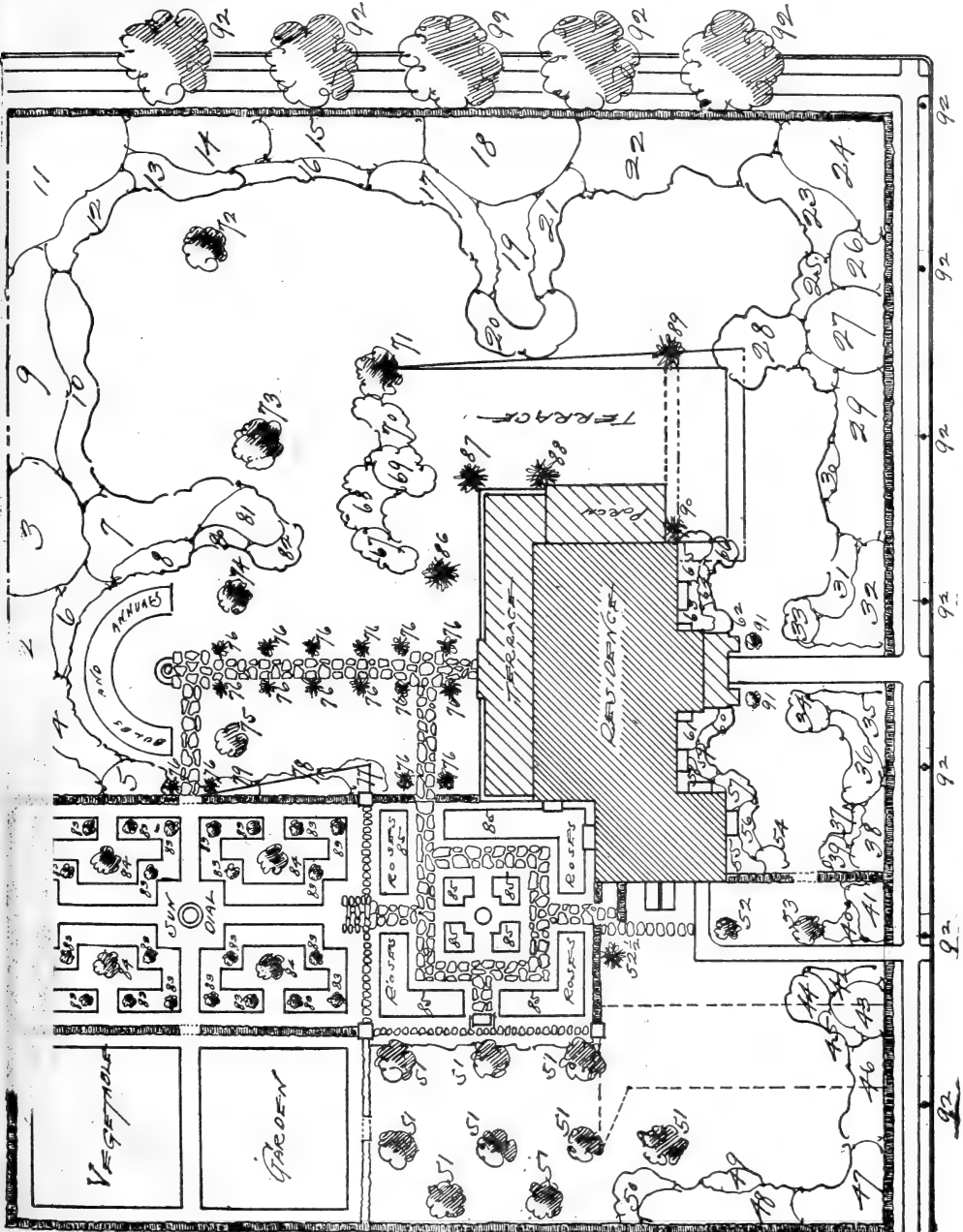
Lot 190x190 ft. Residence lot designed to provide a flower garden, garage, enclosed service yard and croquet lawn. The interesting features are a terrace walk, stepping stone walk in lawn, and unique entrance arrangement

KEY TO PLAN "G" OPPOSITE

Key No. Quan.	Variety	Common Name
1, 2 and 3	Syringas in variety	Lilac
4	Spiræa Van Houttei	Van Houttei Spiræa
5	Hydrangea arborescens grandiflora	Large Flower Hybrid
6 and 31	Kerria japonica, single	Corchorus
7	Forsythia viridissima	Golden Bell
8	Amygdalus nana	Flowering Almond
9	Exochorda grandiflora	Pearl Bush
10	Pyrus japonica	Japanese Quince
11	Lonicera grandiflora	Bush Honeysuckle
12 and 31	Spiræa Frœbelli	
13	Symphoricarpos racemosus	Snowberry
14	Berberis vulgaris	Barberry
15	Lonicera Marrowi	Bush Honeysuckle
16	Deutzia gracilis	Dwarf Deutzia
17	Viburnum Carlesii	
18	Retinispora plumosus	Japanese Cypress
19	Viburnum dentatum	Arrowwood
20, 33 and 34	Berberis Thunbergii	Japanese Barberry
21	Spiræa sorbifolia	Ash-leaved Spiræa
22	Weigela rosea	Pink Weigela
23	Deutzia Pride of Rochester	Pink Deutzia
24	Syringa Pekinensis	Chinese Lilac
25	Cercis japonica	Japanese Red Bud
26	Caragana arborescens	Siberian Pea
27	Juniperus virginiana	Red Cedar
28	Viburnum tomentosum	Single Japanese Snowball
28½	Rosa rubiginosa	Sweet Brier
29	Spiræa Thunbergii	Thunberg's Spiræa
30	Hypericum moserianum	St. John's Wort
32 and 35	Ligustrum Regelianum	Regel's Privet
37 and 54	Azalea Hino-de-giri	Evergreen Azalea
38	Berberis purpurea	Purple-leaved Barberry
39	Philadelphia Avalanche	Mock Orange
40	Viburnum Carlesii	
41	Syringa Mme. Casimir Perrier	White Lilac
42	Spiræa Anthony Waterer	Pink Spiræa
43	Syringa Pres. Grevy	Blue Lilac
44	Hydrangea paniculata grandiflora	Large Flowering Hybrid
45	Desmodium penduliflorum	Bush Clover
46	Weigela Eva Rathke	Red Weigela
47	Viburnum Opulus sterilis	Snowball
48 and 49, 11	Hibiscus	
51	Dwarf Fruit Trees (4 Apples and 4 Pears)	
50	Forsythia Fortunei	Golden Bell
52	Populus fastigiata	Lombardy Poplar
53	Pyrus Ivensis (Bechtel's)	Flowering Crab
55	Cotoneaster Simonsii	
56 and 57, 11	Ilex	Holly
58	Rhododendron roseum elegans	Rose Bay
59	Mahonia japonica	Evergreen Barberry
60 and 62	Azalea amœna	Evergreen Azalea
61	Ilex crenata latifolia	Japanese Holly
63	Ilex crenata	Japanese Holly
64	Mahonia aquifolia	Evergreen Barberry
65	Rhododendron purpureum elegans	Rose Bay
66	Ilex glabra	Ink Berry
67	Rhododendron roseum elegans	Rose Bay
68 to 70	Juniperus virginiana and other Junipers	
71 to 72	Quercus, Red Oak, Pink Oak and Mossy Cup Oak	
74 and 75	Cerasus	Flowering Cherry
76	Juniperus Cannarti	Pyramidal Juniper
77	Lycium barbarum	Washington Bower
78	Berberis Thunbergii	Japanese Barberry
79	Symphoricarpos racemosus	Snowberry
80	Callicarpa purpurea	Beauty Shrub
81	Ligustrum Regelianum	Regel's Privet
82	Deutzia gracilis	Dwarf Deutzia
83	600	Assorted Hardy Perennials and Bulbs

PLANTING PLAN "G"

Key No.	Quan.	Variety	Common Name
84	4	Standard Crataegus roses fl. pl.	Hawthorn
85	200	Tea and Hybrid tea Rosea, 20 inches apart	
86	1	Picea Kosteriana	Colorado Blue Spruce
87 and 88	88	Retinispora filifera aurea	Japanese Golden Cypress
89	1	Juniperus Pfitzeriana	Spreading Juniper
90	1	Taxus cuspidata	Japanese Yew
91	2	Buxus pyramidalis	Pyramidal Box
92	7	Acer saccharum	Sugar Maple
93	1	Abies Veitchii	



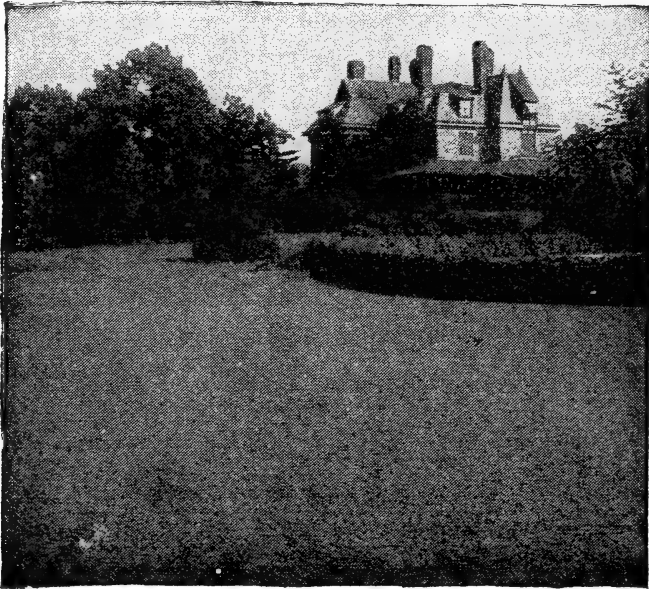
Planting Plan "G" for a property of two acres.

CHAPTER II

Lawns and Grass Plots

Seed Mixtures—Sowing—Yearly Care—Mowing—Rolling
Weeding—Turving

THE lawn furnishes the setting for a house, and if it is trim, smooth and of a healthy green, will add the finishing touch to an attractive home which no amount of planting can give. Wide spreading slopes or level terraces of turf are the delight of many of both the



A well kept lawn, furnishing a splendid setting for the house, with its trees and borders to right and left

simplest and the stateliest residences. Neat lawns are ever the sign of thrifty people.

The main difficulty, generally, is that too frequently the surface is cut by meaningless and inappropriate beds. Such beds, in large lawns, sometimes detract from the feeling of repose, and in small lawns the beds may often be left out with advantage. Trees and shrubs which are arranged haphazard and thickly about a lawn are

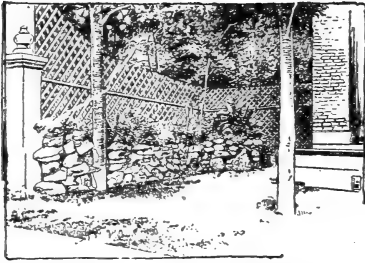
also objectionable. Many a home yard is utterly spoiled by this spotty appearance. The suggestion is to let the lawn stand for a feature by itself, and to arrange the trees, shrubs and flowers at the margins. In many cases no better effect can be gained than by allowing the cool green lawn to run directly up to the brick or brown stone houses.

In establishing a lawn it should always be remembered that the first preparation is the important one; because it will remain for years before being dug up again. If the soil is a heavy clay, it must be drained, for the grasses most used in lawns do not tolerate "wet feet." If grading has been done, soil which was at the surface must be provided for a surface layer, because subsoil does not contain the proper organisms for good growth. If top-soil is not obtainable, it is better to seed for a year with Peas and Oats which should be spaded or plowed under when in juicy growth. Any soil will benefit by an application of well decayed manure. Fresh manure contains weed seeds and will always prove troublesome. Besides manure, there is nothing better than ground bonemeal. This will continue to supply the beneficial food substances for a great length of time. Before the seed is sown, the soil must be raked very smoothly and the stones removed. It should be firm and perfectly level, for every hollow will show later. A little rolling will compact the soil just enough for seeding.

Seed Mixtures

No one variety of lawn grass is the best. In order to get results we must not depend on one grass alone, but must so mix our varieties that a thick turf is formed not only quickly, but permanently. Some grasses live but a year, and require an annual re-sowing. Cheap mixtures contain some of these. It is interesting to know that the roots of some grasses go deeper than others; for this reason good mixtures utilize the whole top-soil most advantageously. Reputable seedsmen can be depended upon to supply proper mixtures for various purposes. Go to them, tell them your soil conditions, and they will give you the proper mixture.

Kentucky Blue Grass is no doubt the most used. It does not make a good sod the first year, but improves in subsequent years. It succeeds admirably on the limestone soils. In Midsummer, it is apt to become somewhat brown. Canada Blue Grass is useful for dry and clayey soils and seems able to resist drought. Many of the Fescues are extremely valuable. The Fine-leaved Sheep's Fescue has the narrowest blades. The Hard Fescue is useful in forming a dense mat and stands drought. Besides these, the Creeping, the Sheep's and the Meadow Fescues all form sods, and are useful for mixtures.

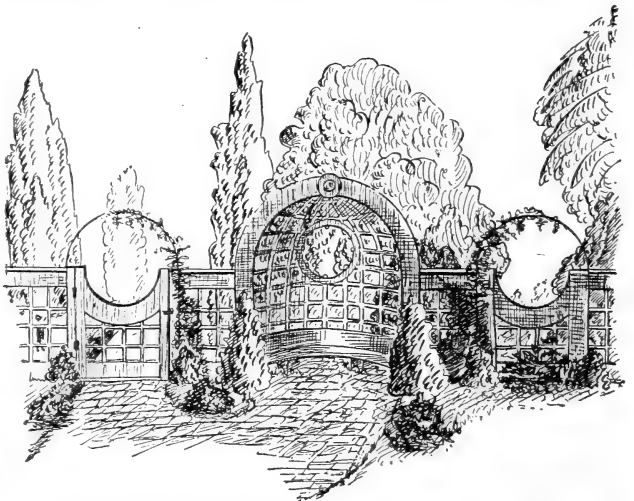


A lattice screen, supported at the base by a wall. Between the chinks of the stones and in a channel along the top, suitable plants are grown

For immediate results, but not lasting, a little Italian Rye Grass can be used. The Rye Grass is an annual and will give a good appearance the first year. Oats sown upon a new lawn not only help the appearance but shade the tender perennial grasses and allow them to get a good start. Red Top seems to succeed even on slightly acid soils, and forms a dense mat. The Sweet Vernal Grass is odorous and gives a softness to the lawn. Wood Meadow and Rough Stalked Meadow Grass both succeed well in the shade. White Clover is also useful in mixtures; it forms a dense ground cover and thrives in most soils and climates. A quart, which is a little over half a pound, should be used for every three hundred square feet of surface. The Clover is to be sown separately, as the seed is heavier.

When and How to Sow

Grass may be sown as soon as the snow has gone and the ground warmed slightly. It is an advantage to get it well started before the trees begin to shade the soil, perhaps as early as April. If sown later, especially in Midsummer, the hot sun will make it difficult for the grass to start. The soil will need careful and thorough watering. Grass seed may also be sown in the Autumn, from mid-August to October, with good results. If a day just before a rain can be chosen it will be found that the grass will be up in a few days. If no rain is in sight, give a thorough sprinkling of water, but not with force, else the seed will be washed out. If it is windy, the seed will scatter badly, and will not come up evenly.



Some flower gardens are so situated that it becomes necessary to run a lattice-work fence around them. A dainty, ornamental fence like the above, if painted white, is very suitable

When large areas are to be sown it is best to divide the lawn into approximately ten-foot squares and treat each separately, else it will be difficult to sow uniformly. To cover the seeds, the areas should then be raked in two directions, after which the lawn should be thoroughly rolled. This will compact the soil so that the seeds are in contact with the soil particles.



An effective disposition of a lawn.

There is a tendency here to overdo through too heavy a planting. This arrangement entails much labor to keep in condition

Mowing

When the young grass has been up for perhaps two weeks it is often best to roll it and defer the first cutting until the plants are about three inches tall. The new lawn should not be cropped too closely, but should be cut regularly. The grass will then be induced to spread out rather than grow tall. If cut weekly, the clippings should not be removed; they will be useful to protect the roots against the sun as well as to furnish an excellent mulch. If, however, the grass has grown long, the clippings should be raked and will be a good mulch for use about perennials in the borders.

Care of the Lawn

The yearly care of the lawn consists first of a slight mulch of thoroughly rotted manure in the Winter. This not only protects the grass from the cold, but supplies plant food as well. In the Spring, when growth first starts, the coarser material should be removed and the lawn given a dressing of bonemeal. An application of nitrate of soda, which is best applied in solution (one oz. to two gallons of water), will give the lawn a good start. To renovate the lawn, seed can usually be sown about one-half as thickly as for new lawns.

Frequently bad spots are found. These are often due to the fact that in grading some large stone has been left in the soil which cuts off the supply of water from below. At other times the soil becoming a

little sour, causes the bare spot. Dig up such an area deeply and remove the stones. Place in fresh soil, a little lime and decayed manure. It is advisable to give an extra heavy seeding also.

Rolling the Lawn

Not only on the newly seeded areas is the roller useful, but all the lawns should be thoroughly rolled in the Spring. The Winter frosts cause more or less heaving of the soil, exposing the roots to drying as well as leaving an irregular surface. The best rollers for the purpose are the water ballast rollers; they are made of hollow iron and can be readily filled with water, thus increasing or diminishing the weight for the various soils and their changing conditions.

Exterminating the Weeds

Many of the objectionable weeds on new lawns are annuals, and they may be entirely eradicated in one year if they are prevented from seeding. Many other weeds, such as Docks, Dandelions and Canadian Thistles, are perennials, and are provided with underground fleshy roots which must be dug deeply and pulled up. Cutting them just below the surface aggravates the situation, because three or four shoots start in place of one.

Overcoming Lawn Troubles

TURFING

It often becomes necessary to establish a lawn under very adverse conditions, in which case it is best to use sod or turf which can be removed from a pasture or vacant lot. With a spade the turf can easily be cut into twelve-inch squares and moved. Especially is this advantageous for bordering newly established paths and roads, or where narrow strips are wanted between beds of flowers. The soil should be as carefully prepared and put in as good physical condition as for new lawns. In edging walks, the cut sod should be a little lower than the adjacent sown area, which in time will settle. The sod should be thoroughly firmed and watered so that the grass roots are immediately encouraged to start growth into the soil below.

For a complete work on the subject of this chapter, we recommend

LAWNS AND HOW TO MAKE THEM, by Leonard Barron. Will aid any one to establish a greensward in any sort of soil where grass can be made to grow. Flexible cloth, 174 pages. Profusely illustrated. Price \$1.35 postpaid. Secure this book where you bought your Garden Guide.

Hedges and Fences

Hedges of Privet, Berberis, Siberian Dogwood, Box, Yew, Ilex, Buckthorn, Cratægus Oxyacantha, Hemlock, Arbor Vitæ and Norway Spruce—Location—Soil—Fences with Climbers

MUCH has been said of late regarding the wholesale manner in which fashion has dictated that every sort of fence and boundary should be removed. The word "garden" carries with it the meaning of enclosure. We in America are getting more and more away from having even our own dooryards to our-



When this property of one acre was purchased there was not a tree or a plant on the place. The frontage on the main road is 120ft., on a side road some 400ft. The ground rises splendidly from the main road; the house was placed 200ft. from that road. Judicious planting has made these home grounds "a thing of beauty and a joy forever." From the very first plantings of very small stock the attractiveness of the place has improved from year to year

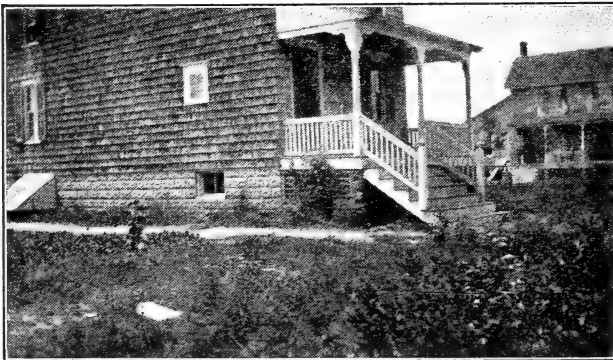
selves. Often we cannot tell where our province leaves off and the next begins. Marauders have full sweep. There is something home-like about an enclosure with some degree of privacy. Because the city is abolishing every means for such privacy we wish at times to be by ourselves, and the country is chosen. Hedges or boundaries need

not be emphasized, but let us not fear to put up some little shrubbery to shield us from the public gaze, and let us enclose parts of our own domain by a low hedge. Formidable fences are not advocated, but private areas bounded by hedges are always interesting.

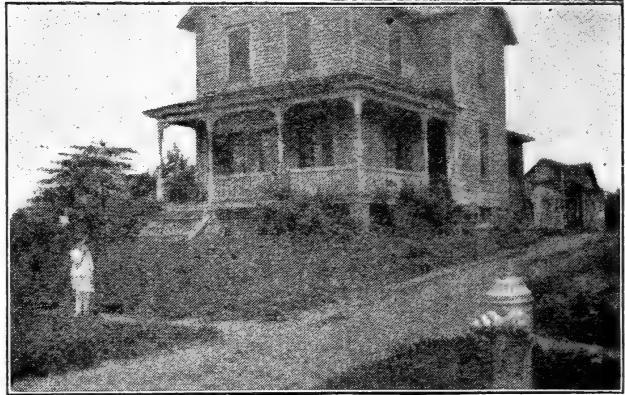
Low hedges of the graceful *Ligustrum Regelianum*

(Regel's Privet) are very handsome; or *Berberis Thunbergii*, with its red berries and Fall coloring; or the Siberian Dogwood (*Cornus alba sibirica*). For an evergreen hedge, nothing has been used more than Box. This is not hardy in all parts of the North, and is a very slow grower. For starting the hedge old plants may be broken apart and set out. The Dwarf Japanese Yew (*Taxus cuspidata* var. *brevifolia*) is very hardy but has hardly become known as yet in American gardens. *Ilex crenata microphylla* can also be used.

Taller hedges are best made of the Iboya (*Ligustrum Iboya*), common Privet (*Ligustrum vulgare*), or the California Privet (*Ligustrum ovalifolium*). The California Privet is seen at its best in the Eastern coastal states, from Maine south, and succeeds admirably from the very edge of the beach up to ten miles inland, where it is one of



Rough, neglected surroundings—no planting attempted, no lawn, no shrubs, no flowers. How much the dwellers miss



Ungainly and displeasing. The grass is unkempt; the shrubs in front are wild growths that have sprung up of their own accord, yet the situation is ideal for gardening

the best materials to use, but in many inland northern localities it freezes to the ground every few years so that the character of the hedge is destroyed. The Golden Privet is very bright and cheery, but hard to buy. The Buckthorn (*Rhamnus cathartica*) is a useful and not easily pene-

trable hedge. *Cratægus crus-galli* and *oxyacantha* are also useful. They will require close pruning when small to induce branches at the base of the plants. *Cratægus crus-galli*, on account of its dangerous needle-like thorns, should not be set out where there is a sidewalk. Hedges of Hemlock, Arbor Vitæ and Norway Spruce are substantial when the taller ones are wanted. The Hemlock is the finest, since each plant merges into the next admirably.

A common blunder with hedges is to locate them too near walks so that they are injured by the constant brushing against them by the passersby.

The soil should be prepared deeply and well as for ordinary shrub planting. The practice is not advised of placing two rows of shrubs for a hedge. The hedge can be kept cleaner of weeds and its growth is more symmetrical by planting only one row. It is advisable in setting a hedge to set the plants so that they touch at planting time. This means that the smaller plants, as Barberry, will be planted six to eight inches,



Privet put to good use and charming city street arrangement

and Privets ten to twelve inches apart. The soil must be thoroughly firmed around the plants at setting.

For pruning hedges, see chapter on Pruning.

Board or picket fences are employed between the smaller suburban yards. These can be covered with Rambler Roses, Honeysuckle in variety, or other climbers. By proper pruning and thinning these will not get too heavy or cumbersome, and can readily be held back if the fence requires to be painted. Iron fences and galvanized or alumina plated fences are also used, the latter being strong and durable. Or again, a soil bank can be thrown up and be planted with trees and shrubs. The consideration of brick and stone walls hardly comes within the scope of this book.



Hemlock Hedge. *Tsuga canadensis*. Imposing, yet the greenery is soft and pleasing

For a complete work on the subject of this chapter, we recommend

HEDGES, WINDBREAKS, SHELTERS AND LIVE FENCES, by E. P. Powell. Planting, growth and management of hedge plants for country and suburban homes. Gives accurate directions concerning hedges; how to plant and treat them; and especially concerning windbreaks and shelters. Price 80c., postpaid. Secure this book where you bought your Garden Guide.

Always consult Index to Contents. Familiarize yourself with it. There are hundreds of good things in this book that will escape your attention if you do not use the Index freely

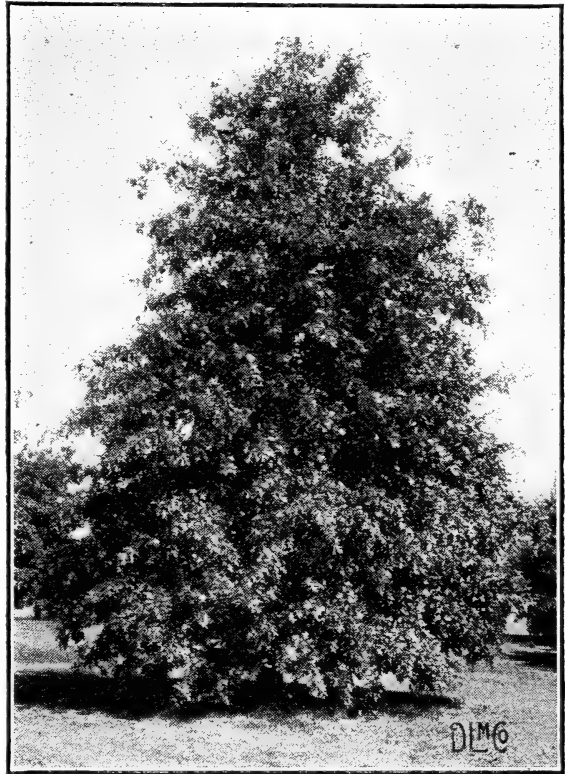
Trees and Shrubs

Trees for Shade and Shelter Upon the Lawn—Street Trees—Evergreens—Planting Trees—Best Shrubs—Shrubs with Edible Berries—Evergreen Shrubs—Ground Cover and Low Growing Shrubs—Low Growing and Trailing Shrubs for Various Purposes—Bushes for Wet Places—Flowering the Branches of Shrubs Indoors—Blooming Dates of Trees, Shrubs and Climbers—How to Treat Nursery Stock and Material Gathered from the Wild

TREES

THERE is nothing more exalting than a great tree, and as Prof. Bristow Adams suggests: "The wonderful thing about the tree is that it keeps growing year after year and thus takes its place as the oldest living thing." As such we should revere it as a choice heritage, or if we find no trees growing on our land we should plant them for our posterity.

Not only should we plant trees, but we should care for them properly and prune and spray them intelligently. Because we are neglectful one year, an Elm which has grown for a hundred years may be so damaged by the Elm beetle, that recovery will be slow. We owe it to the community to try to save it. Do not allow the removal of trees by telephone companies. When excavating for building foundations or grading give careful thought for their protection.



The Pin Oak in all its beauty.

As a street tree, even with the necessary trimming of its lower branches, it is still imposing. Hard and long lived

Trees for Shade and Shelter Upon the Lawn

The trees each of us would choose for our lawn decoration would most probably be those for which we have a personal liking. From childhood, we reverence a certain type of tree either because of fruits it bears, its shape or its Fall colors. Nothing compares with the



The Oriental Plane. *Platanus orientalis*
Much used in street planting and best employed where the houses stand 60 to 80 feet apart across the street

American Elm for restful beauty; especially so are the forms which are vase-shaped and with foliage to the soil. The Tulip tree makes a strong appeal; the foliage is glossy bright green above and pale below, and the tight bark of older trees is beautiful. What is more effective than a huge Red or Black Oak with its strong and often crooked branches, which so often grow out at right angles to the trunk? Such a tree is in mind which takes up as much room as the little Dutch house beneath it. Specimen Beeches,

which are branched to the soil, though usually very formal in shape, are yet graceful. All persons progressive enough to read garden books, of course, would never spoil the beauty of the lawn trees by removing the lower limbs. This especially applies to the Beech. It is peculiar, but many persons have not realized that if they prune off the limbs of a young tree it is very difficult ever to get new branches to start out from below again. The white Birch is graceful and dainty, but it is being attacked by a borer to such an extent that it is best not to advise planting it. To this brief list might be added a host of others according to personal preference.

Besides the larger trees, there are a great number of very useful

smaller growing trees. There are many Crab Apples which are most excellent; one of the prettiest, with double pink flowers, is Bechtel's Crab. A very handsome variety of Japanese Crab, has deep red buds which on opening become white or a blush pink. The beauty of this tree in bloom is overpowering. Many of the Thorn Apples are handsome. They require a great deal of water and should not be planted where they can rob the perennials.

A tree known but little and valued because of its very superior Autumn tints, is the Sorrel tree (*Oxydendron*). For Autumn effect, the Maples are excellent, as is also the Sweet Gum.

One must avoid great spots of vivid color in trees, for too great an abundance of purple Plums and Beeches, Japanese Maples and variegated yellow forms are going to destroy the dignified beauty of your garden.

Evergreens

We must now say a word about the evergreens. They are ever beautiful and ever graceful as well as evergreen. To no other trees does the injunction to let the lower limbs grow apply so much as to the evergreens. How different are our tastes! In the evergreens some of us enjoy the informal, look-as-though-they-were-weather-beaten sorts. We enjoy Pines which have had some accident when young and have four or five trunks instead of one. We admire the Austrian Pine at any stage of its growth; the Pitch Pine when it becomes old and picturesque, with its sturdy short branches, and persistent globular cones, and the long, heavy foliage of the Red Pine. Others will much prefer the conical Firs and Spruces. The greatest beauty is seen in a perfect specimen of Norway or Oriental Spruce, branching to the soil and hung with huge cones; or perhaps the blue-green or grayish-green foliage of the Silver Fir (*Abies concolor*) is a great attraction, for this is one of the most beautiful trees of this type. The latter is prettier than the Colorado Blue Spruce, which some



American Arbor Vitæ
Thuja occidentalis filiformis. Highly decorative, standing singly at any appropriate point



The Colorado Blue Spruce

There are more delicate and softer appearing evergreens, it is true, but even so the Blue Spruce has a place all its own as a sturdy, hardy and beautifully colored specimen tree

think is over planted; it is a trifle bright and has such stiff foliage that, in the minds of many, it does not compare with the softer and more graceful foliage of the Silver Fir.

Among smaller growing evergreen trees we have the Japanese Cypresses or *Retinisporas*, the foliage of which is graceful and the habits charming. The *Arbor Vitae*, especially the Chinese species, are very handsome. For mass planting, the Hemlock is admirable; the foliage is most dainty; the trees merge into one another very nicely. Because of the interesting bristly appearing cones and the soft foliage, the Douglas Fir is to be admired. The Rocky Mountain forms are hardy, but the Coastal Plain form is not in the East. The Irish Juniper is most slender and vertical, but it is an inferior tree because the Winter snows spread the branches and often

break them or ruin the shape of the tree. It would seem well to tie the trees up a little before Winter. The pyramidal forms of *Juniperus virginiana* are superior to the Irish Juniper. They are a substitute for the popular Cypress effects seen in France.

Street Trees

All trees are not adapted for street planting. Some of them are too rapid growing, so that the wood is soft and the trees short lived. The poplars well illustrate this class. They are miserable trees, for they break easily in storms; their roots enter the sewer pipes and they heave up sidewalks. Cities which have good forestry control are making the planting of this tree a misdemeanor. The soft Maple, the Sycamore Maple, the European Ash, Birches, Willows, Tulip Tree and the Box Elder come in this class. Other trees are objectionable

because their attractive fruits and flowers are apt to be picked. In this case, the form of the tree is usually spoiled. Examples of trees of this class are Chestnut, Hickory, Horse-Chestnut, Catalpa, Black or Common Locust, Magnolia, Dogwood, Mountain Ash. The Catalpa and Horse-Chestnut are really objectionable because of their mussy habit of dropping flowers, young fruits or bud scales.

Good street trees stand adverse conditions, are more or less free from insects and diseases and furnish shade, but not too dense; they are long lived, and those which are arching are preferred by many to the more formal globular forms. Prof. Curtis of Cornell University, advises the following trees for various widths of street.

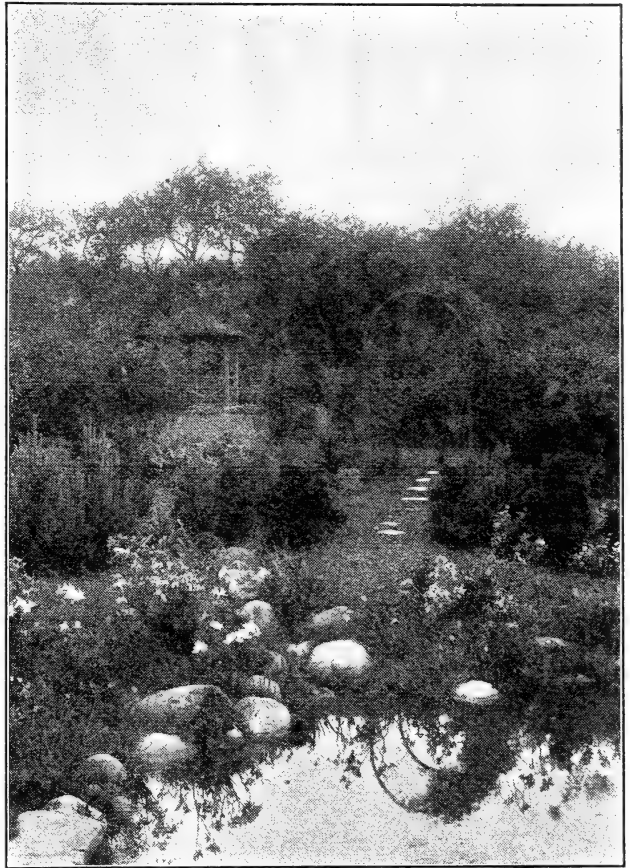
For narrow streets (less than sixty feet between buildings), the trees should be planted alternately and spaced forty feet apart. The following may be used:

PIN OAK. A tree of medium size, more slender than most Oaks; one of best trees for narrow streets. Especially likes moisture, but will adapt itself to other conditions.

GREEN ASH. A small but hardy tree. It is the species *Fraxinus pennsylvanica*, var. *lanceolata*.

TREE OF HEAVEN (*Ailanthus glandulosa*). This tree is excellent for dry paved tenement sections of cities, enduring smoke and dust. The wood is brittle and the trees are dangerous when they are old. Because the flowers of the male tree emit a disagreeable odor the female form only should be planted.

For medium width streets (from sixty feet to eighty feet be-



A good garden composition.

A free use is made of Pine trees and conifers as well as deciduous subjects. The arch of Roses, the airy Summer house, the flower-fringed water pool and other features here are well placed and excellent

tween buildings), the trees should be spaced forty feet apart. The following may be used:

ORIENTAL PLANE. An excellent street tree. It is of rather rapid growth; stands smoke.

NORWAY MAPLE. A drought-resistant and smoke-enduring, symmetrical and tough tree. It is too low-headed for streets with wires.

MAIDENHAIR TREE, or GINKGO. When young, this tree is very erect, but when it becomes older, the head broadens out.

For wide streets (over ninety feet between buildings), the trees should be spaced fifty feet apart, and where possible they should be planted on the lawn six feet inside the sidewalk line. This should be agreed upon and carried out uniformly by all property owners on the street. The following may be used:

AMERICAN ELM. The best of all street trees when given room, good air and water. The tree grows 80 to 100 feet tall.

RED OAK. It cannot grow in pavements, but is very well adapted to wide suburban streets, where it stands poor and dry soil, but does not thrive in wet situations.

SUGAR, or HARD MAPLE. An excellent tree needing moisture and suffering from heat, smoke and dust. It should only be used on the wider streets.

Planting Trees

The best method of ascertaining how to plant a tree properly is to observe the carefully prepared sketches. More can be seen in these pictures than can be expressed in words. The main object is to have a hole large enough for the roots, and to get the trees just a little deeper than they stood in the nursery. An important necessity for newly set trees is a support. The wind whips the tree about and the young roots are easily loosened. Stakes should be set deeply and be a real support; or the tree may be supported by wires, taking care that these wires are in contact with rubber packings on the branches so that they are not girdled; pieces of old rubber hose may be used for this purpose.

Shrubs

(Take our advice and pick out a few varieties that no one in your town has; don't limit yourself to what everyone sees everywhere, Hydrangeas, Snowballs, common Lilacs, etc. If you are thinking of going into shrubs, get a catalog from a reliable dealer and study it carefully for its illustrations and letterpress. Bear in mind that the cheapest is not always the best; also that the larger plants are naturally dearer than the smaller ones. Where nearly every shrub is so beautiful it is a comparatively easy matter to select two or three out of the ordinary.)

For the garden, whether large or small, some shrubs are necessary. They not only furnish a good foliage background, but some are very beautiful for their flowers, which are not only decorative in a landscape way, but are highly useful for cutting. They are the proper sort of plants for hedges and for screening unsightly objects.

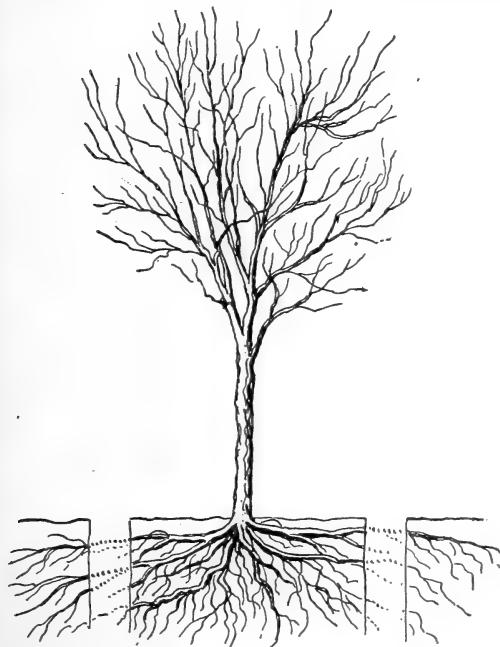
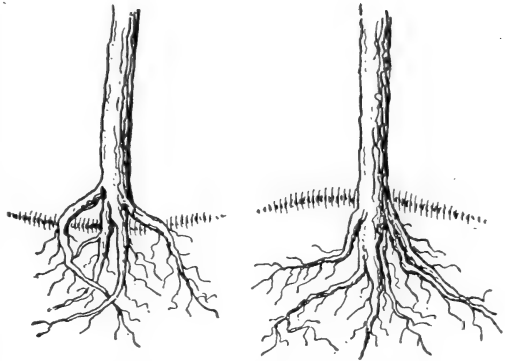
In establishing a new planting of shrubs give the soil good, deep preparation and spade in a liberal supply of stable manure and bonemeal. Let the planting be done either in Spring or Fall. In the Spring shrubs should be set out as early as the soil can be worked. After the growing season begins they are somewhat weakened by not being in the soil; besides, they should be well established before the hot weather arrives.

Many gardeners prefer to plant

in the Fall because often there is less work which is urgent at that time of the year. All such stock should be given ample time in which to have an opportunity to get their roots established before permanent freezing and should be thereby protected during the Winter by a good mulching of manure. For an immediate effect the shrubs should be planted almost twice as closely as they are to stand per-

Wrong method of planting.

In the left hand picture the tree is obviously placed too high, and its roots are also cramped. In the other case the soil is mounded up too much, thus shedding off the water



This tree is correctly planted, each root well spread, and neither too deep nor too high. The dotted lines show where to dig if it is required to transplant it

manently. It is, therefore, advised to plant only part of your place the first year and plant it thickly. By the time you are ready to plant the other part you can draw upon the first planted beds for your stock. Gardens, unlike houses, can be changed and rearranged easily. Shrubs rarely suffer from transplanting if done at the right time and watered thoroughly.

The proper time for pruning is very important. See chapter XVIII on this subject.

Certain of the Best Shrubs

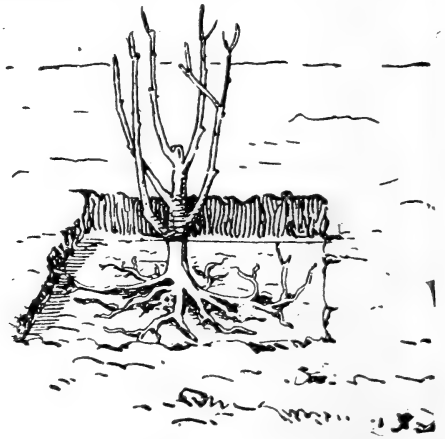
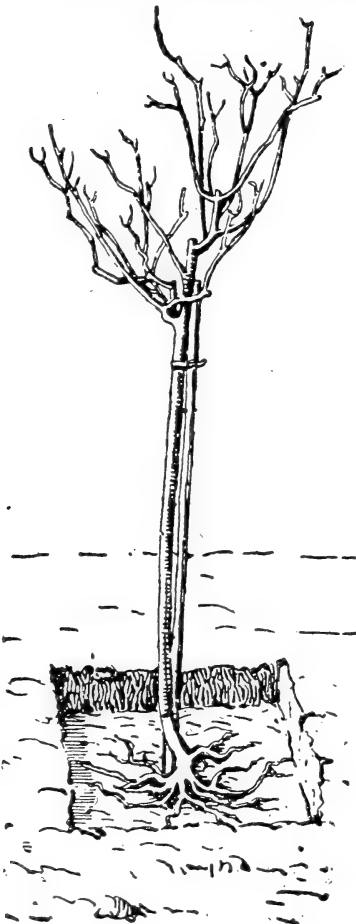
For general screen planting few shrubs compare with

the Lilac. It is exceedingly hardy and the flower is always a favorite. If the good varieties of Lilacs are used, the individual blooms will be important. The only way to grow good, large blooms is to keep all the suckers from the base of the plant removed; plants so treated will resemble trees.

Here is a selection of good varieties of *Syringa vulgaris*, the garden Lilac, flowering in late May: Single—Marie Le Graye, white; Charles X, rosy lilac; Frau Bertha Dammann, white; Ludwig Spaeth, deep purple-red; Gloire des Moulins, rosy lilac; Alba grandiflora, white. Double—Mme. Lemoine, white; Miss Ellen Willmot, white; La Tour d'Auvergne, violet-purple; Mme. Casimir-Perier, creamy white; President Grévy (semi-double), bluish lavender; Antoine Buchner, light pink.

Van Houttei's *Spiræa*, also known as Bridal Wreath, is unrivaled for prolificacy and grace of bloom. While the long sprays of white blossoms are soon shattered by the rains and the plant does not give a very permanent flower effect, yet, with its beautiful green foliage and bushy growth, when properly pruned, it remains a most satisfactory shrub.

For the early Spring display there is nothing so cheery as the bright yellow flowers of the Golden Bell (*Forsythia*), of which there are several forms; the one known as *suspensa* is most effective when planted at the top of a wall or rock



A planting diagram of the National Rose Society.

The whitened parts of the stem indicate the depth to which a standard and a dwarf Rose should be planted; that is, the same depth as they were when in the nursery

ledge and allowed to grow down. Even after flowering the foliage retains a good color. The upright forms need to be massed, as individuals are not graceful.

A popular Summer-flowering hardy shrub is the *Hydrangea paniculata grandiflora*. It has handsome dark green foliage and bears in great profusion immense panicles of white flowers, which gradually change to rose and bronze. The shrub should be severely pruned in early Spring.

The Snowball (*Viburnum opulus sterile*) is one of the best of flowering shrubs, bearing clusters of handsome globular pure white flowers in May.

Bush or Shrub Honeysuckles (*Loniceras*) are attractive shrubs of upright habit and very desirable for mass and border planting. They produce showy flowers which are often followed by bright-colored berries.

No shrubbery is complete without a specimen or two of the Japanese Maple (*Acer palmatum*), of which there are several forms. They are beautiful little trees or shrubs of graceful habit, their delicately cut leaves of various shades of color being especially attractive in Spring and Autumn.

Excellent beds or borders are arranged, using tall shrubs, such as Red Bud (*Cercis*) and Hawthorns at the back, with Mock Orange (*Philadelphus coronarius*) and Wiegela at the midground and edged with *Deutzia gracilis* or *Spiræa Thunbergii*; or for lower beds, the use



Grouping of *Spiræa Van Houttei* and *Viburnum plicatum* (Snowball)

of *Berberis vulgaris* at back with *Berberis Thunbergii* and *Mahonia* in the foreground.

For a bed remaining attractive during the Winter use a few *Kerria japonicas*, which have green twigs, or *Cornus alba sibirica*, with its red twigs, both of which retain their color all Winter.

There is a large group of shrubs with beautiful foliage. None equals the graceful horizontal branching of Regel's Privet. The flowers are not very conspicuous, being white, but they are followed by attractive black berries. The dainty narrow, minute foliage of the *Spiræa Thunbergii* is excellent; the tiny white flowers coming in early May add an extra charm. In the region of central New York the tips of branches Winter-kill, so that they need to be dressed a little in the Spring.

Certain shrubs are fascinating because of peculiar flowers, seeds and bark. The Sweet Shrub, *Calycanthus floridus*, or, as it is also called, the Strawberry Shrub, is very interesting; the twigs are aromatic all Winter and the leather-petaled, dull red flowers are very individual in fragrance. Picked today they have one fragrance, perhaps that of Strawberries; tomorrow, the fragrance is more like that of Apples. Closely resembling *C. floridus* is *C. lævigatus*, but the flowers of the latter are not so sweet. The Winged Spindle-Tree (*Euonymus alata*) bears peculiar corky angles on the twigs, and a funny little orange fruit inside of a hard red husk.

Shrubs with Edible Berries

Shrubs which, though ornamental, produce berries which are good to eat, are interesting not only to you, but to the birds they attract. Many persons do not know that Barberries make a very good jam, especially palatable served with the Thanksgiving turkey or wild game, being appropriate as well as tasty. Goumi, or *Elæagnus longipes*, produces an elongated red berry in June or July which is excellent picked from the plant and eaten. The Vacciniums, Blueberry or Huckleberry, besides being ornamental, are, as we all know, of an excellent flavor. Elderberries to some tastes make a pie superior even to Huckleberries. The red-fruited variety should not be eaten. The Nannyberry (*Viburnum Lentago*) bears a black fruit very freely. It has somewhat the flavor of Bananas. Besides, there are the Blackberries, the Raspberries and the Currants, species which are often ornamental.

Broad-Leaved Evergreen Shrubs

There are a number of interesting evergreen shrubs. None are so popular as the Rhododendrons, which should have a soil free from



Mixed but effective planting of Iris, Peonies, Rhododendrons and *Juniperus stricta* on top of terrace. Lombardy Poplars are seen in the background at rear of house

lime. If you live in a limestone region, before you attempt to grow them dig out the beds to a depth of three feet, filling in with good wood-soil or leaf-mold. Provide good drainage by putting a layer of ashes at bottom of the trench. The secret of success with Rhododendrons is to keep the roots cool and moist. In Winter they should be deeply mulched with leaves. In Summer they must have an abundance of water. In some Rhododendron plantations a "syringe" of water plays upon the beds continually. They like shade usually, but often by a proper choice of plants, plantations may be successful even in the sun. In Winter a framework of burlap gives the protection from the wind. They should always be massed, for Rhododendrons, unless in beds by themselves, are either apt to receive too much fussy care or none at all. The best early varieties are *Roseum elegans*, an old rose colored variety and *Everestianum* a lavender, both flowering in late May. Then in early June we have *Album elegans*, a large white; *Mrs. C. S. Sargent*, a pink; *Caractacus*, a red; *purpureum*, a purple; and *Lady Grey Egerton*, a silvery gray lavender.

There are a number of Azaleas which are most brilliant, the best being *Azalea pontica* and *A. mollis*, in the various colors, and *Azalea amoena*, which is a superb claret pink.



A garden scene in Summer.

In this bosky dingle are shrubs of many kinds and tall umbrageous trees. The Bananas are grouped for the season only; likewise the Yuccas; filamentosa is the hardiest of the Yuccas

A shrub which has proved perfectly hardy is the Japanese Holly (*Ilex crenata*, var. *microphylla*); it grows about four feet tall and is excellent. The American Holly is hard to transplant but seems hardy as far north as Cape Cod. The leaves should be removed and plants transplanted in the Spring. The Mountain Laurel (*Kalmia latifolia*), is, perhaps, the best evergreen shrub grown; it succeeds a little easier than Rhododendrons and without protection of the tops retains a good appearance all through the Winter. The Mahonia, or Oregon Grape (*Mahonia aquifolium*), is an excellent shrub; it succeeds perfectly if planted so that leaves are shaded from Winter sun. It surely looks fresh, green and glossy in Midwinter.

Ground Cover and Low Growing Shrubs

Oftentimes one wishes a ground cover of very low shrubbery in the shade, and few plants are as valuable as *Pachysandra terminalis* for this purpose. *Vinca minor* is also useful; but the leaves are not so large. The common Juniper (*Juniperus communis adpressa*) is also valuable; it requires sun. All of these three plants are evergreen. Several excellent low deciduous shrubs for ground cover in the sunshine are the aromatic Dwarf Sumach (*Rhus aromatica*) and Yellow Root

(*Xanthorrhiza apiifolia*), which spreads rapidly by underground stems; it does not thrive in limestone soils. Sweet Fern (*Myrica asplenifolia*) will thrive on the driest, sunniest slopes; Memorial Rose (*Rosa Wichuriana*) is excellent, bearing numerous white flowers in late June or July; English Ivy; and *Euonymus radicans* var. *vegeta* may also be used. The English Ivy, though very beautiful, is often rather tender; it enjoys a moist soil and shade in Winter.

Climbing Vines

Nothing contributes more to the charm of the home surroundings than a good show of hardy climbing vines, judiciously placed for covering walls and tree stumps, adorning the veranda and Summer-houses or creeping up the walls of the house. The well-known Japanese or Boston Ivy (*Ampelopsis Veitchii*) is a fast grower and clings to wall or tree, its leaves turning to a dark red in the Fall. Very satisfactory as coverings for arbors or trellises are the dark- and bright-leaved Silver Vines (*Actinidia*). The hardy *Clematis paniculata*, with its wealth of beautiful foliage and masses of small, pure white, fragrant flowers which cover the upper portion of the plant in early Autumn, is particularly useful for growing about the porch or on trellises. An excellent vine for covering brick or stone walls and draping trunks of trees is the Climbing Hydrangea, *H. petiolaris*, the value of which is not as generally realized as it should be. It is a plant of Japanese origin, of unique and graceful appearance, especially when in flower; propagates readily from either Summer cuttings or layers, begins to grow early in the season, and is reliably hardy, though it should be afforded some Winter protection in the colder sections.

Other vines which may be used to advantage are: *Akebia quinata*, purplish brown flowers; Climbing Honeysuckles (*Loniceras*), handsome foliage and sweet-scented flowers; *Aristolochia siphon* (Dutchman's Pipe), brownish colored flowers, resembling a pipe; *Bignonia* (Trumpet Vine), bearing large, trumpet-shaped, orange-red flowers.

Low Growing and Trailing Shrubs for Various Purposes*

Deciduous.

Cotoneaster horizontalis. For edging; semi-evergreen.

Daphne Mezereum. Flowers light purple, appearing in early April before the leaves. There is a white variety. An erect shrub 3 feet high, with stout branches, which are flexible and leathery like those of Leatherwood (*Dirca palustris*).

Hypericum Buckleyi. Forms neat, compact mats. The earliest of the *Hypericums*. Flowers yellow, early July.

Lonicera spinosa [—*L. Albertii*]. Has slender twigs and narrow linear leaves. Flowers pink, late May. Plant low, from 1 to 2 feet high.

Rhododendron canadense (Rhodora). A slender shrub, 2 feet high. Is good in a rock garden with a ground cover of the following species. Flowers rosy purple, appearing before the leaves in late April and early May.

Vaccinium pennsylvanicum (Early Low Blueberry). From 6 to 12 inches high. Should make good dwarf edging. Flowers white in early May.

Evergreen.

Arctostaphylos Uva-Ursi (Bearberry). A creeping, vine-like shrub with small leaves, abundant in Canada, forming broad mats over rocky ledges and slopes. Berries red.

Bryanthus (See *Phyllodoce*).

Calluna vulgaris (Scotch Heather). Flowers pink, July and August. There is a white variety.

Chimaphila umbellata (Prince's Pine, or Pipsissewa). Somewhat resembles *Pachysandra*. *Cotoneaster adpressa* and *C. microphylla*. Resemble *C. horizontalis*, mentioned above, but are more dwarf and evergreen. Both have a neat habit and glossy foliage. May not be hardy everywhere, but should be tried for low, stiff edging.

Daphne Cneorum (Garland Flower). Dense and compact. Pink flowers in May. Excellent for edging. From 6 to 12 inches high. Twigs flexible and leathery, as those of *D. Mezereum*, described above.

Dendrium [—*Leiophyllum*] *buxifolium* (Sand Myrtle.) A dense shrub, to 3 feet high. There is a low, tufted form, var. *prostratum*. Flowers white or blush in May.

Empetrum nigrum (Black Crowberry).

Erica carnea (Hardy Spring Heath.) Pink in April and May. From 6 to 12 inches high.

Gaultheria procumbens (Wintergreen, or Checkerberry.) Red berries. Leaves have good flavor.

Gaylussacia brachycera (Box Huckleberry). Very dwarf and compact.

Juniperus Sabina var. *tamariscifolia*. A very neat Juniper for edging.

Lycopodium obscurum (Ground Pine). A native Club Moss related to Trailing Christmas Green (*L. complanatum*), but with stems erect and treelike, to 12 inches high.

Mitchella repens (Partridge Berry). This and the preceding are two creeping, vine-like plants excellent for the rock garden. Moneywort has bright yellow flowers in June, and Partridge Berry has handsome red berries all Winter.

Phyllodoce [—*Bryanthus*] *cærulea* (Mountain Heath). A low alpine shrub, from 3 to 6 inches high. Flowers pinkish purple, July.

Potentilla tridentata. Plant from 4 to 8 inches high, forming thick mats. Foliage bronzing in Winter. Flowers white, Strawberry-like.

Rhododendron [—*Azalea hinodegira*.] A low shrub, better than *R. amæna*, leaves large, and flowers a brilliant red. Late May and early June.

*List revised from Curtis, Cornell Bulletin 361.

Bushes for Wet Places

When planting grounds it is often desired to obtain shrubs for planting in wet places, some that will attract either by their flowers, berries or other features.

There is a shrub which always comes to mind when this subject is thought of, *Clethra alnifolia*, because of the profusion and fragrance of its flowers. It blooms in Midsummer or later, the bush is usually covered with panicles of white flowers of peculiar fragrance. In its wild state it is usually found on the banks of streams, or otherwise near water, so that it is well suited when planted in similar positions. There is another native *Clethra*, the *C. acuminata*, but the *alnifolia* is the best for the purpose.

The White Fringe, *Chionanthus virginica*, is at home in a wet place. It is wild in situations which are almost under water at times. This has white flowers, too, but they come early in Spring with the

leaves, and because of the fringe-like appearance of the flowers the shrubs are called Old Man's Beard in some portions of the South.

Another shrub of great merit is the *Magnolia glauca*, the one of our swamps and low grounds, which is almost evergreen, and famous everywhere for the fragrance of its flowers. It is often found side by side with the White Fringe. Both of these, though often listed as shrubs, grow to the size of a small tree in time, if kept to one shoot when young.

The Bayberry, *Myrica cerifera*, is a good wet position shrub, delighting in damp ground, although it can be found growing wild on light gravelly soil. When grown in groups where one plant shelters the other they are somewhat evergreen in character. The flowers are greenish white and small, making no display to attract, but the berries when ripe are covered with a white, waxy substance, making their clusters conspicuous and attractive.

Found in similar situations to the above mentioned shrubs is the *Azalea viscosa*, a species renowned for the fragrance of its blooms. The flowers are pure white, expanding in July and August. It is one of the most admired of Azaleas, yet not at all common in cultivation.

In *Vacciniums* (Blueberries), a good one for wet ground, is *V. corymbosum*. It delights in such situations. In Spring it presents to view beautiful clusters of white flowers. Edible, dark colored berries follow; later on, with the approach of Autumn, the foliage becomes of a lovely orange bronze color. It is then foremost of all the foliage shrubs famous for their Autumnal display of color.

The Sheep Laurel (*Kalmia angustifolia*) with its purplish pink flowers may also be used; as also the *Chamædaphne*, the *Andromeda* and *Ledum*.

These shrubs would give one a good start in planting a wet place, but they do not exhaust the list; many more could be added.

Flowering the Branches of Shrubs Indoors

Many persons know that the buds of Pussy Willow and Golden Bell when brought into the house open nicely when placed in water, but few avail themselves of the pleasures in store for them by cutting the branches of a great many shrubs and trees early in the Spring or late Winter, and bringing them indoors. The nearer Spring the sooner will the buds burst into bloom. Shrubs should be chosen which bloom upon wood of previous season and many of the early Spring blooming trees and shrubs can be used. The shoots may simply be placed in water and allowed to start naturally, but if they are placed in a basement and sprayed several times a day with warm water they will open

much more quickly. The forced branches lend themselves to "Japanese" arrangements and have an airy grace which is very charming.

The following shrubs and trees are useful for above treatment:

- | | |
|--|---|
| Bladder Senna (<i>Colutea arborescens</i>). Light yellow. | <i>Kerria japonica</i> . Yellow. |
| Cornelian Cherry (<i>Cornus Mas</i>). Yellow. | Mock Orange (<i>Philadelphus</i>). White. |
| <i>Deutzia gracilis</i> . White. | Parkman's Crab (<i>Pyrus Halliana</i>). Deep pink. |
| Flowering Almond. (<i>Prunus triloba</i>). Pink. | Pea Tree (<i>Caragana frutescens</i>). Yellow. |
| Flowering Currant (<i>Ribes aureum</i>). Yellow. | Pearl Bush (<i>Exochorda grandiflora</i>). White. |
| Fragrant Honeysuckle (<i>Lonicera fragrantissima</i>). White and pinkish. | Pussy Willow (<i>Salix discolor</i>). Gray. |
| Golden Bell (<i>Forsythia suspensa, viridissima, Fortunei</i>). Forces very quickly. Yellow. | Forces very quickly. |
| Hazle (<i>Corylus americana</i>). Brown. | Red Bud (<i>Cercis canadensis and japonica</i>). Pinkish lavender. |
| Japanese Cherry (<i>Cerasus rosea plena</i>). Pink. | Shad Bush (<i>Amelanchier canadensis and botryapium</i>). White and pink. |
| Japanese Quince (<i>Cydonia japonica</i>). Pink and red, very beautiful. | Thunberg's Spiræa (<i>Spiræa Thunbergii</i>). White, light and airy; very good. |

BLOOMING DATES OF TREES, SHRUBS AND CLIMBERS

T-TREE

S-SHRUB

C-CLIMBER

*Indicates that blooming period is likely to extend beyond the date under which it is classed.

(Revised from a list by Samuel N. Baxter and compiled for the latitude of Philadelphia, North and south of that city the blooming dates will be respectively later and earlier.

April 1 to 15

Botanical Name	Common Name	Group	Height (ft.)	Color of Flowers
* <i>Daphne Mezereum album</i>	Mezereon Daphne	S	3	White
<i>Lonicera fragrantissima</i>	Bush Honeysuckle.....	S	6	White



A clump of White Lilac

Cornus Mas.....	Cornelian Cherry.....	S	15-20	Yellow
*Magnolia stellata.....	Dwarf Magnolia.....	S	5-8	White
*Forsythia suspensa.....	Weeping Golden Bell.....	S	8	Yellow
*Acer rubrum.....	Red Maple.....	T	15-100	Pink
*Acer platanoides.....	Norway Maple.....	T	100	Yellow
*Benzoin aestivale.....	Spice Bush.....	S	10-15	Yellow
Spiræa Thunbergii.....	Thunberg's Spiræa.....	S	5	White

April 16 to 30.

Magnolia conspicua.....	Yulan.....	T	50	White
Magnolia Soulangeana.....	Soulange's Magnolia.....	T	15	Pink
Magnolia Kobus.....	Japanese Magnolia.....	T	80	White
Cerasus Avium alba, and rosea plena.....	Double-flowering Cherry.....	T	25	White, pink
Cerasus Sieboldi rubra plena.....	Double-flowering Cherry.....	T	15-25	Red
*Cercis japonica.....	Japanese Judas Tree.....	S	15-50	Pink
*Cercis canadensis.....	Red Bud.....	T	20	Pink
*Andromeda japonica.....	Japanese Fetter Bush.....	S	10-30	White
*Leucothoe Catesbæi.....	Leucothoe.....	S	6	White
*Pyrus japonica.....	Japanese Quince.....	S	3-4	White, red
*Spiræa prunifolia.....	Bridal Wreath.....	S	6	White
*Citrus trifoliata.....	Hardy Trifoliolate Orange.....	S	15-20	White
*Prunus (Amygdalus) Persica.....	Flowering Peach.....	T	10-25	White, yellow, pink
*Prunus (Amygdalus) nana.....	Flowering Almond.....	S	5	White, pink
*Sassafras officinale.....	Sassafras.....	T	30-60	Yellow
*Amelanchier Botryapium.....	Juneberry, or Shad Bush.....	S	25	White
*Exochorda grandiflora.....	Pearl Bush.....	S	6-8	White
Ostrya virginiana.....	Ironwood (catkins).....	T	30	
*Syringa oblata.....	Early Lilac.....	S	12	Blue
*Ribes aureum and sanguineum.....	Flowering Currant.....	S	4-5	Yellow, red
*Prunus Pissardi.....	Purple Plum.....	S	15-25	White
Corylopsis pauciflora.....		S	2-3	Yellow
*Rhus aromatica.....	Aromatic Sumac.....	S	3-8	Yellow

May 1 to 15

*Staphylea colchica.....	Bladder-nut.....	S	12	White
*Rhodotypos kerrioides.....	White Kerria.....	S	6	White
*Kerria japonica.....	Globe Flower.....	S	5-10	Yellow
*Cornus florida and rubra.....	Flowering Dogwood.....	T	20	White, pink
Wistaria sinensis and alba.....	Chinese Wistaria.....	C	20	White, blue
Pyrus (Malus) Parkmannii (Halliana).....	Flowering Apple.....	T	20	Pink
Pyrus coronaria, Ioensis.....	Flowering Apple.....	T	20	Pink
Pyrus floribunda atropurpurea and Schiedeckeri.....	Flowering Apple.....	T	10-15	Red
Magnolia Lennei and Meehanii.....	Purple Magnolias.....	T	10-15	Purple
Magnolia Fraseri.....	Fraser's Magnolia.....	T	40	White
Magnolia gracilis and purpurea.....	Bush Magnolias.....	S	10	Purple
*Æsculus Hippocastanum.....	White Horse Chestnut.....	T	60-80	White
*Æsculus rubicunda.....	Red Horse Chestnut.....	T	20-40	Red
*Xanthoceras sorbifolia.....	Chinese Flowering Chestnut.....	S	15	White
Azalea amœna.....	Evergreen Azalea.....	S	1-8	Pink
Azaleas pontica and mollis.....	Ghent and Chinese Azaleas.....	S	3-5	White, yellow
Azalea nudiflora.....	Wood Honeysuckle.....	S	5-8	Pink
Azalea Vaseyi.....	Carolina Azalea.....	S	5-8	Pink
Rhodora canadensis.....	Rhodora.....	S	2	Pink
*Elæagnus longipes and umbellatus.....	Silver Thorn.....	S	6-12	White
*Cerasus Padus, pennsylvanica and pumila.....	Bird and Dwarf Cherries.....	T	10-15	White
Cratægus coccinea.....	White Thorn.....	S	15	White
Caragana arborescens and pendula.....	Siberian Pea.....	S	6-8	Yellow
Halesia tetraptera.....	Silver Bell, or Snowdrop.....	S	20	White
*Berberis vulgaris, purpurea and Thunbergii.....	Common, Purple and Japanese Barberry.....	S	4-6	Yellow

Asimina triloba.....	Pawpaw.....	T	10-40	Brown
Akebia quinata.....	Akebia.....	C	12	Purple
*Lonicera grandiflora rosea and Morrowii.....	Bush Honeysuckle.....	S	6	White, pink
Mahonia aquifolia.....	Oregon Grapes.....	S	2-4	Pink
*Paulownia imperialis.....	Empress Tree.....	T	40	Purple
Pavia rubra.....	Dwarf Horse Chestnut	T	5-7	Red
*Viburnum Opulus sterilis.....	Common Snowball.....	S	8	White
*Viburnum tomentosum.....	Single Japan Snowball.....	S	6-8	White
*Viburnum Sieboldi.....	Siebold's Snowball.....	S	6	White
*Viburnum Lantana.....	Wayfaring Tree.....	S	10-15	White
*Robinia hispida rosea.....	Rose Acacia.....	S	4-5	Pink
*Weigela rosea and candida.....	Diervillas.....	S	4-5	White, pink
*Deutzia Lemoinei and gracilis.....	Dwarf Deutzia.....	S	3-5	White
Daphne Genkwa and Cneorum.....	Daphne.....	S	1	Pink
*Calycanthus floridus.....	Sweet Shrub.....	S	3-5	Reddish brown
*Sorbus Aucuparia.....	Mountain Ash.....	T	30-40	White
*Fraxinus Ornus.....	Flowering Ash.....	T	25	White
*Genista scoparia.....	Scotch Broom.....	S	3	Yellow
*Syringa vulgaris and alta.....	Common Lilac.....	S	12-15	White
*Syringa rothomagensis (chi- nensis).....	Rouen Lilac.....	S	10-12	Blue
*Syringa, French named va- rieties.....	Improved Single and Double Lilac.....	S	10-12	White, pk., etc.
Sambucus pubens.....	Red-berried Elder.....	S	6-8	White
*Tamarix africana.....	Tamarisk.....	S	15	Pink
*Spiræa Van Houttei.....	Van Houtte's Spiræa.....	S	5-6	White
Xanthorrhiza apiifolia.....	Yellow Root.....	S	10-20	Brown

May 16 to 30

Azalea calendulacea.....	Flame Azalea.....	S	4-10	Red
Staphylea trifoliata and Bu- malda.....	American and Japanese Bladder-nut.....	S	6-8	White
*Clematis Named Hybrids.....	Large-flowering Clematis.....	C		White, pk., blue
*Robinia pseudo-acacia.....	Yellow or Black Locust.....	C	80	White
*Crataegus Oxyacantha and Paul's Scarlet.....	English Hawthorns.....	S	15-20	Red, white, pk
*Chionanthus virginica.....	White Fringe.....	S	20-30	White
Neviusia alabamensis.....	Snow Wreath.....	S	3-6	White
*Laburnum vulgare.....	Golden Chain.....	T	20	Yellow
*Rosa rugosa and alba.....	Japanese Roses.....	S	3-5	White, pink
*Rhododendron hybrids.....	Named Hybrids.....	S	6-12	White, pk., red
*Viburnum plicatum.....	Japan Snowball.....	S	6-8	White
*Syringa persica and alba.....	Fersian Lilacs.....	S	5-10	White, blue
Syringa emodi (villosa).....	Lilac.....	S	8	Pink
Syringa pubescens.....	Lilac.....	S	6	White
Cerasus serotina.....	Wild Cherry.....	T	80	White
Spiræa Reevesiana.....	Reeves' Spiræa.....	S	4	White
Cornus alba.....	Red-stem Dogwood.....	S	8-10	White
*Viburnum Opulus.....	High Bush Cranberry.....	S	12	White
*Viburnum prunifolium.....	Sheepberry.....	S	15	White
Photinia villosa.....	Photinia.....	S	15	White
*Liriodendron tulipifera.....	Tulip Tree.....	T	150-190	Yellow
Magnolia tripetala.....	Umbrella Tree.....	T	40	White
*Weigela Eva Rathke.....	Crimson Diervilla.....	S	5-6	Blue
Wistaria multijuga and alba.....	Japan Wistarias.....	C		White, purple
*Styrax obassia.....	Storax.....	T	30	White
*Stephanandra flexuosa.....	Stephanandra.....	S	5	White
*Philadelphua coronarius.....	Mock Orange.....	S	8-10	White
*Philadelphus Lemoinei.....	Lemoine's Mock Orange.....	S	3-6	White

June 1 to 15.

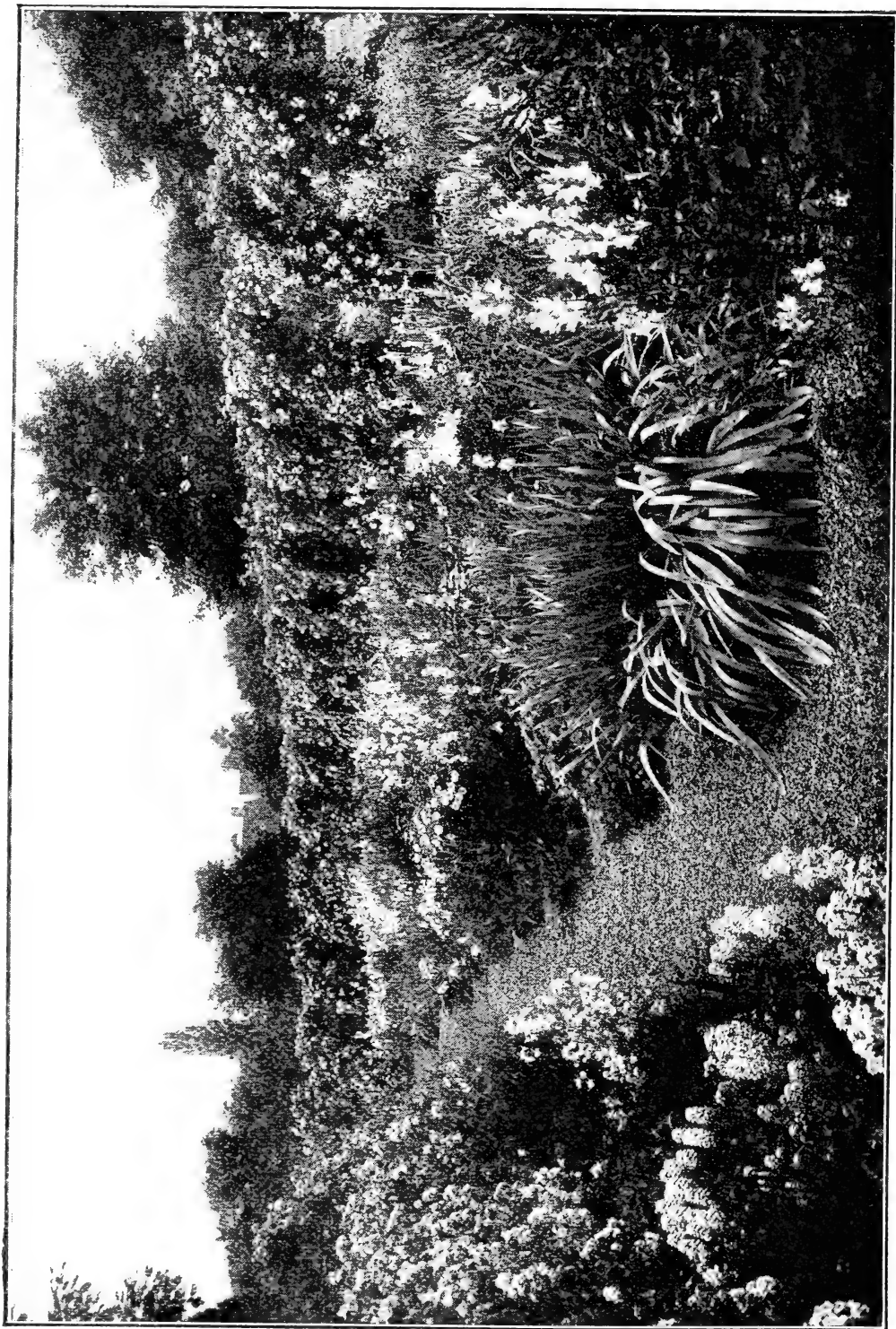
*Bignonia capreolata.....	Trumpet Vine.....	C	50	Yellow
*Hydrangea scandens.....	Climbing Hydrangea.....	C	80	White
*Lonicera Halleana.....	Hall's Honeysuckle.....	C	15	White, yellow

BLOOMING DATES, TREES, SHRUBS, CLIMBERS 61

* <i>Lonicera sempervirens</i>	Coral Honeysuckle.....	C	30	Red
<i>Robinia viscosa</i>	Clammy Locust.....	T	30-40	White
<i>Gleditsia triacanthos</i>	Honey Locust.....	T	70-140	White
<i>Andromeda (Pieris) Mariana</i>	Stagger-Bush.....	S		White
<i>Halesia diptera</i>	Silver Bell, or Snowdrop.S		30	White
<i>Cladrastis tinctoria</i>	Yellow Wood.....	T	30-40	White
<i>Crataegus crus-galli</i>	Cockspur Thorn.....	S	15-20	White
<i>Kalmia latifolia</i> and <i>angustifolia</i>	Mountain Laurel.....	S	5-8	Pink
<i>Syringa pekinensis</i>	Chinese Lilac.....	S	15	White
<i>Syringa Josikæa</i>	Lilac.....	S	12	Purple
<i>Magnolia acuminata</i>	Cucumber Tree.....	T	90	White
<i>Magnolia macrophylla</i>	Broad-leaf Magnolia.....	T	50	White
<i>Magnolia glauca</i>	Sweet Bay.....	T	10-12	White
* <i>Deutzia crenata</i> and <i>Pride of Rochester</i>	Tall Deutzia.....	S	6	White, pink
* <i>Ligustrum Regelianum</i> and <i>vulgare</i>	Regal and Common Privet.....	S	8-10	White
<i>Viburnum dentatum</i>	Arrow-wood.....	S	15	White
<i>Viburnum acerifolium</i>	Maple-leaved Viburnum.....	S	6	White
<i>Styrax japonica</i>	Japanese Storax.....	S	30	White
<i>Stuartia japonica</i>	Stuartia.....	S	50	White
<i>Pterostyrax hispida</i>	Wistaria Tree.....	T	25	White
* <i>Sambucus racemosus</i> and <i>laciniata</i>	Elderberry.....	S	10	White
<i>Rosa multiflora</i> and <i>rubiginosa</i>	Japanese and Sweet Brier Rose.....	S	10-12	Pink
<i>Colutea arborescens</i>	Bladder Senna.....	S	10-15	Pink
* <i>Cornus paniculata</i> and <i>sericea</i>	Cornel and Silky Dog-wood.....	S	5-8	White
<i>Wistaria frutescens</i>	Native Wistaria.....	C	30-40	Blue
<i>Wistaria magnifica</i>	Native Wistaria.....	C	30-40	Blue
<i>Physocarpus (Spiræa) opulifolia</i>	Nine Bark.....	S	9-10	White
* <i>Spiræa Billardi</i>	Billard's Spiræa.....	S	5-6	Pink
* <i>Amorpha fruticosa</i> and <i>canescens</i>	False Indigo and Lead Plant.....	S	10-15	Blue
* <i>Ceanothus americana</i>	Jersey Tea.....	S	2-3	White
<i>Gymnocladus canadensis</i>	Kentucky Coffee.....	T	100	White

June 16 to 30.

* <i>Hydrangea quercifolia</i>	Oak-leaf Hydrangea.....	S	6	White
* <i>Hydrangea grandiflora alba</i>	Hydrangea.....	S	25	White
* <i>Spiræa sorbifolia</i>	Ash-leaf Spiræa.....	S	4	White
* <i>Rosa lucida</i> and <i>setigera</i>	Prairie Rose.....	S	4-6	Pink
* <i>Rhododendron maximum</i>	Rosebay or Great Laurel.S		10-35	Pink
* <i>Spiræa Bumalda</i> and <i>A. Waterer</i>	Spiræa.....	S	2	Pink
* <i>Tilia americana</i>	American Linden.....	T	80	White
<i>Catalpa speciosa</i>	Catalpa.....	T	100	White
<i>Catalpa bignonioides</i>	Catalpa.....	T	20-50	White
* <i>Rhus Cotinus</i>	Purple Fringe or Mist Bush.....	S	10-20	Purple
* <i>Rubus odoratus</i>	Flowering Raspberry.....	S	3-6	Pink
* <i>Hydrangea paniculata</i> (Early flowering).....	Single Hydrangea.....	S	20	White
* <i>Hydrangea radiata</i>	Wild Hydrangea.....	S	6	White
* <i>Hydrangea arborescens</i>	Wild Hydrangea.....	S	4-10	White
* <i>Hydrangea hortensia</i>	Japanese Hydrangea.....	S	8	Pink, blue
* <i>Hydrangea japonica cærulea</i>	Japanese Hydrangea.....	S	8	Pink, blue
* <i>Yucca filamentosa</i>	Adam's Needle.....	S	5	White
<i>Azalea arborescens</i>	Fragrant Azalea.....	S	8-20	White
<i>Azalea viscosa</i>	Small White Azalea.....	S	4-8	White

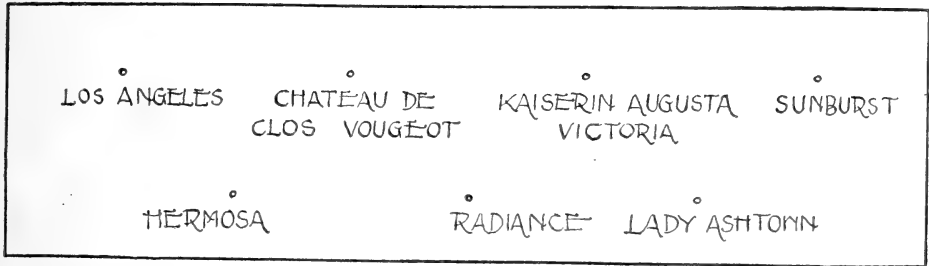


Small rectangular flower garden surrounded by arches of Rosee,

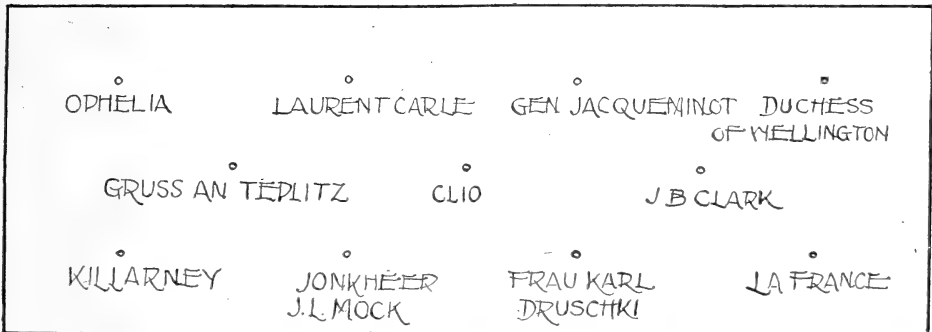
How to Treat Nursery Stock and Material Gathered from the Wild

Trees and shrubs in nurseries are so cultivated and transplanted that their roots make a symmetrical growth. The roots are thus short and branching because they search equally on both sides of the row for food. In the case of forest specimens they may have to go several feet for an opportunity to get food; furthermore, the only opportunity for food may be in one direction. The roots are often very long and unbalanced, and when the trees are dug the few, long roots are seriously shortened. The precaution in using material from the woods should be carefully to prune the tops proportionately, supply water and give extra, painstaking treatment.

Two Rose Bed Designs



A Rose bed, 4 ft. by 16 ft., showing a planting of Hybrid Tea and China Roses



A Rose bed, 6 ft. by 16 ft. Contains both Hybrid Perpetuals and Hybrid Teas. It is planned to be surrounded by grass paths. As the Hybrid Perpetuals do not bloom throughout the Summer, the Hybrid Teas will serve to continue to give a touch of color to the bed

Always consult Index to Contents. Familiarize yourself with it. There are hundreds of good things in this book that will escape your attention if you do not use the Index freely

The Rose Garden

Best Soils—Width of Beds—Preparation of Soil—Time to Plant—Distance Apart—Summer Treatment—Insects—Diseases—Kinds of Roses—Brier Roses—Climbing Roses—Tea Roses—Hybrid Teas—Hybrid Perpetuals—Pernetiana, Moss and Polyantha Roses

NO one really has a garden without some Roses. All sorts of Roses are admirable. Everyone says the same things about the location of the Rose garden—that it must be sheltered from the wind, but not surrounded, so that the air may have some circulation. It must not be in the proximity of large, water-robbing trees. It should have sun the greater part of the day. But everyone cannot locate his Rose garden in an ideal spot. Fortunately a few hardy, robust kinds can be grown under rather adverse conditions.

Soils

The soil best suited for Roses is usually considered to be a medium heavy clay loam, especially for Hybrid Perpetuals, Briers and climbers. The Hybrid Teas and Teas prefer a lighter soil. The Hybrid Perpetuals, Hybrid Teas and Teas require perfect drainage.



Rose walk at a country home.

This arbor is covered with Prairie Roses, vars. Baltimore Belle and Queen of Prairie.

Width of Beds

Roses are best planted in beds. If they are to be worked from both sides, five or six feet is wide enough and three feet is the proper width for beds against the walls. Beds that are too wide necessitate



A rustic pergola.

Such pergolas can be made of peeled Oak or Pine, or of any durable branches one can get—but never Birch; that won't last beyond a season. A variety of vines can be trained here

stepping in them when picking the blooms or when cultivating. Narrow beds are poor because of the intrusion of grass roots upon the nourishment which would otherwise go to the Roses. If possible it is best to reserve the Rose beds for Roses alone and not attempt growing any other plants in these beds.

Preparation of Soil

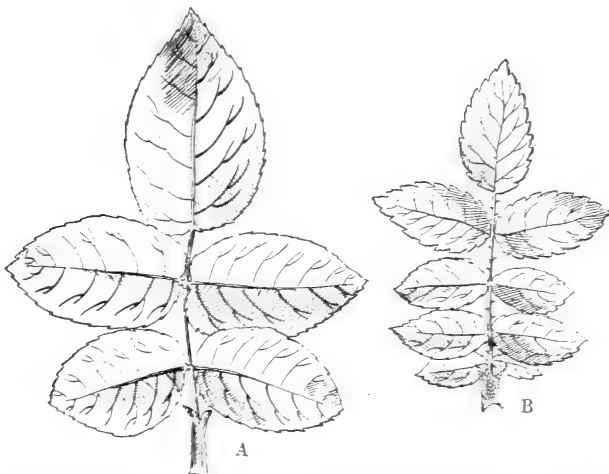
Dr. Huey has said that it is much better to put a fifteen-cent Rose bush in a fifty-cent hole than to put a fifty-cent Rose bush in a fifteen-cent hole. The preparation of the beds should take place in the Fall in order that the soil may have an opportunity to settle.

All Rose beds should be dug eighteen inches or two feet deep. The subsoil should be loosened and thoroughly manured, then fill in to over half the depth with manured top-soil over which spread a good layer of compost. By compost we mean soil which has been thoroughly enriched by manure (one barrow of manure to three of soil) and bone-meal; this should be allowed to become thoroughly incorporated with the soil, piling alternate layers of soil and manure and allowing to

remain for a few months or a year. When the bed is finished it should be two or three inches above the normal level. The main secret of successful Rose growing lies in the proper preparation of the bed.

Time to Plant

Spring is the best time to plant the Hybrid Teas and Teas. If the beds have been carefully prepared the previous Fall, the soil will get into good condition quickly. The nursery stored plants can be set out as soon as land can be worked. The pot-grown stock, if it is not crowded, can well be kept till May. These latter plants are growing and there is no necessity for giving a check by planting in open ground sooner. If the stock is frosted when received, cover the whole plant with soil until the frost is drawn out. The plants are often rather dry when received; the bark is shriveled and the roots brittle. If the whole plant is either buried in soil or placed in water before planting, it will be greatly benefited. In planting budded or grafted Roses remove all buds which may be present upon the stock below the soil and prune the



Showing the difference in foliage between a sucker "B" and a good strong shoot "A"

A—Typical Rose leaf with five leaflets. B—Typical leaf of a "sucker" or Brier with nine leaflets

broken roots. All tops should be severely cut back so that each bears three to four eyes; this is especially necessary and should not be neglected. The roots should be spread naturally and in the case of budded plants, so placed that the point budded is two or three inches below the surface of the soil. It is absolutely necessary to plant very firmly; the soil must be filled in about the roots most carefully

and made solid. The hole should not be entirely filled, but the plant should be watered, after which dry soil is placed on top to prevent baking.

Distance Apart

Teas are best planted fifteen inches, Hybrid Teas eighteen inches, Hybrid Perpetuals three feet and Rugosas or Moss Roses four feet apart. Varieties will differ greatly as to the amount of space needed.

Summer Treatment

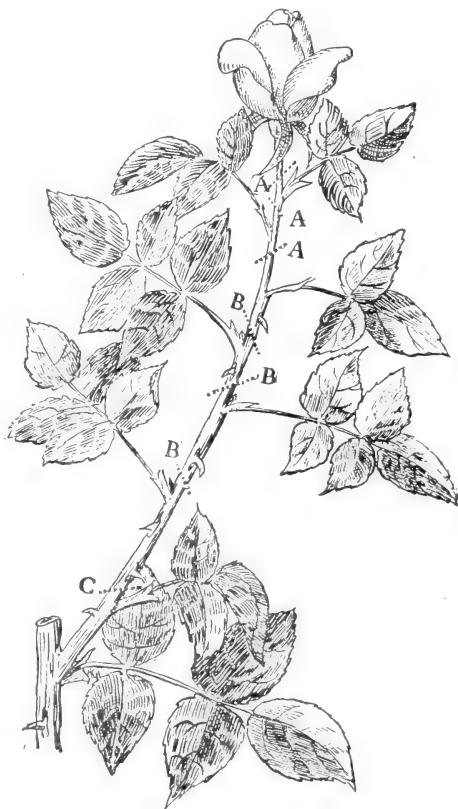
Keep the soil continually cultivated to retain as much moisture as possible; the stirring need not be deep, otherwise roots are injured. A mulch of lawn clippings is beneficial. Each time a new supply is ready the other will have been dried and worked into the soil. After every rain the soil should be loosened. A good syringing of water every day from the start of the season will go a long way toward keeping the insects off. The time for syringing is morning or evening. At midday it is rather injurious to the foliage. All through the Summer watch for suckers; they usually have more leaflets—five to seven, the garden varieties having but three to five. They should not be broken off but cut down to the roots. (See cut).

Cutting Roses

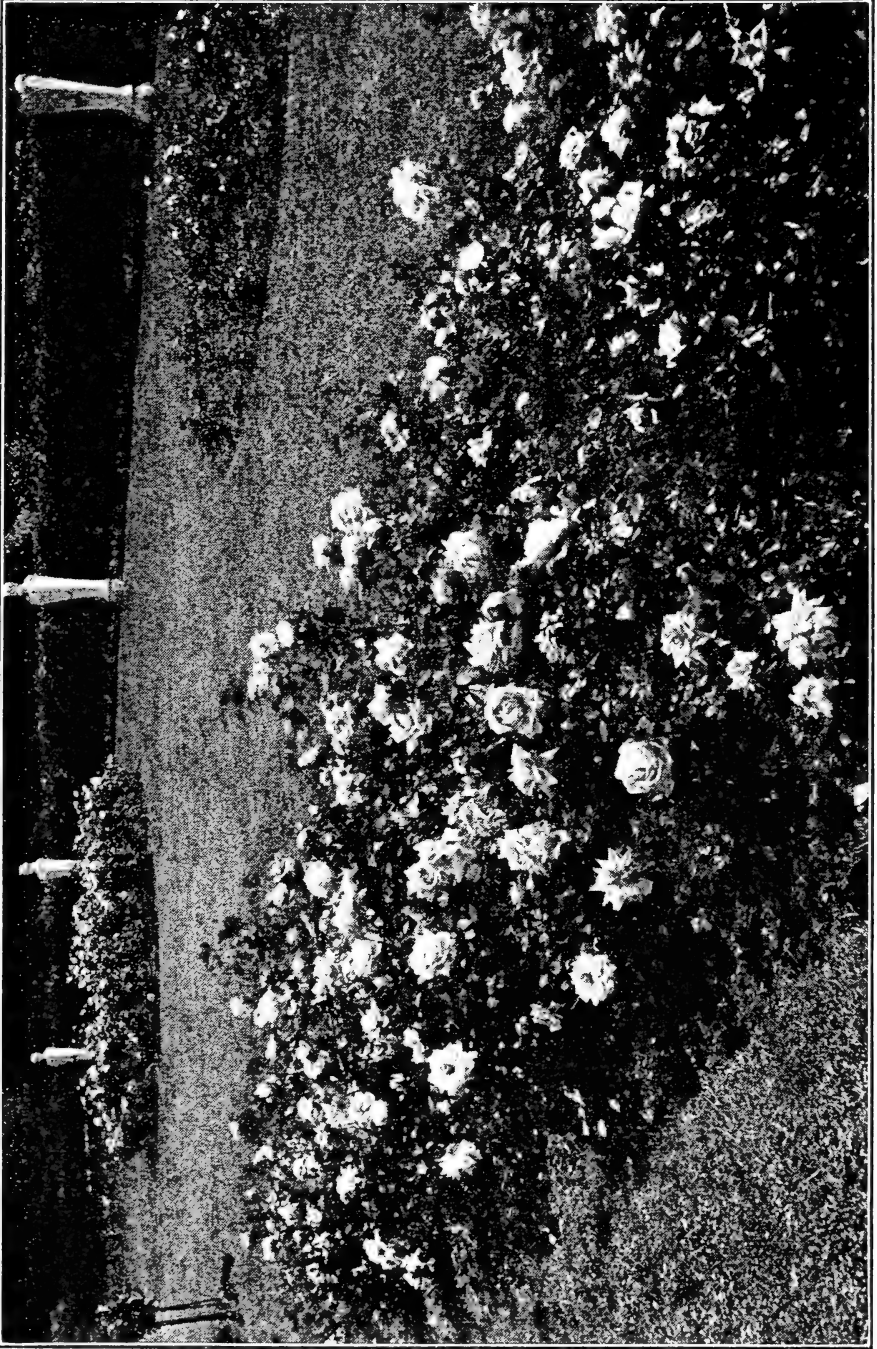
If the Roses are cut properly many varieties will continue to bloom until Autumn. The bud should be cut so that five-leaf foliage is left upon the stem. Refer to the sketch below. If the Rose stem is cut at C there is only a three-leaf remaining upon the stem; such cuts rarely give such good flower stems. Cut at any B there are five-leaves left and flower buds will start growth very soon. Cut at any A other flower stems develop slowly, if at all. Cut Roses then to a five-leaf.

Rose Insects

The Rose plant louse or aphid is one of the commonest pests; it appears on the young growths and reproduces with great rapidity, soon covering the plants. The tips of branches are stunted and the buds only produce deformed flowers. The daily syringe advocated elsewhere will do much to lessen the attacks, for the insects will be washed off the plants. Whale oil soap (one pound to ten gallons of water), or some reliable nicotine preparation will surely kill them.



Showing where to cut a Rose to obtain more flowers. See paragraph above "Cutting Roses"



Bed of the pink tea Rose Lady Ashtown and other Rose beds on lawn with Yew hedge behind. The statuary adds finish, dignity and interest

There are several Rose slugs. In each case they are worms which skeletonize the leaves and even attack the plant when the leaves first unfold. Arsenate of lead (one pound arsenate of lead to twenty-five gallons of water) is effective, but even water will check them if applied with force. Hellebore is good dusted on the leaves; it should first be diluted to half its weight with flour or plaster.

The leaf hoppers can be controlled by spraying with tobacco extract on under side of leaves. The Rose leaf roller can be controlled with arsenate of lead. There is also the Rose scale, which can easily be washed from the canes with corrosive sublimate or on a large scale sprayed with lime sulphur, or the canes burned.

The Rose beetle is especially prevalent on sandy soils. It appears in early Summer, feeding on leaves and flowers. Hand picking is really necessary. They should be dropped into kerosene. The larvæ feed on roots of Rose plants. Some persons have lessened the injury from Rose bugs by allowing chickens to have the run of the Rose beds for several hours a day in May, when the larvæ are coming out of the ground.

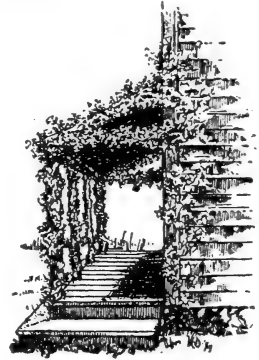
Rose Diseases

Mildew causes a powdery effect upon leaves. It is especially prevalent upon the Crimson Ramblers and Moss Roses. It appears when the nights are cool and days are hot and sultry, and disfigures the plant, but does not affect the next year's crop of flowers. Powdered Sulphur upon the leaves is used as a control.

Black Spot is the most serious disease of the American Beauty and other Hybrid Perpetuals. It is confined to the foliage and appears in Midsummer. It looks like a black or purple spot one-quarter inch in diameter; the blotches more evident on the upper surface. When the patches are examined they will be found to have a fine mycelium growing on them which causes premature defoliation. The leaves should always be removed if possible. Spray with Bordeaux mixture (3-5-50), or other copper fungicides.

Leaf-scroch, when severe, causes the infected areas of the leaf to drop out. The canes are also attacked. The wild Roses, too, are infested. The best control is to use copper fungicides.

Rose Rust is especially prevalent on hardy varieties. It has Summer spores and Winter spores and attacks canes as well as leaves.



Screen for the side or back of a house.

Grape vines may be used, but they must be kept free of insects and other "crawly things." Ampelopsis, Clematis or Wichuriana Roses also can be recommended

The best preventive is the removal and burning of all rusted canes.

Rose Canker appears as a warty growth on the canes; excrescences on wood. It can only be cut out when found. It is caused by a fungus.

Kinds of Garden Roses

Most of the Roses mentioned in the following pages are favorites in the North; many other varieties can be tried in less severe climates—which refers also to the northern part of the Pacific coast.

BRIER ROSES. There is a huge group of shrubby or Brier Roses. On the whole, they are hardy and grow under adverse conditions. Some of them will be useful for making a hedge. If a Rose garden is to be made, plan it in the Winter and make preparations to surround it with a row of Briers.

No Rose is hardier, freer-blooming and more disease-resistant than the Japanese Rugged Rose, or *Rosa rugosa*. Bearing single



Rambler Rose Covered Summer House

Such a structure as is shown here can be made by the man of the house or a local handy man with tools

and double, crimson, pink or white flowers, it is the first one to place in the hedge. There are a number of rugosa hybrids which are admirable.

Of charming fragrance and exquisite colors are the Penzance hybrids. Lord Penzance, a hybridizer of Roses, used the standard

garden varieties of Roses and crossed them with the Sweet Brier. The result is a wonderful group of Roses with Apple-scented leaves and delicate pinkish orange, salmon and rose-pink single flowers.

We must not pass over the early yellow Roses, two of which are of great importance. The earliest and lighter yellow Rose seen in every old-fashioned garden is the Persian yellow and a few days or weeks later the golden yellow variety, which is slightly tinged with red on some of the center petals, is Harrison's Yellow. The foliage of this latter Rose is charming; it is a pity that these two Roses bloom but once a year. Another fine Brier well worthy of selection is the Prairie Brier, *Rosa setigera*, and as it has a tendency to climb, should be given some sort of a trellis or fence. It blooms late and bears huge pink single flowers in large trusses.

CLIMBING ROSES. While we are speaking of a trellis for the Prairie Rose, let us also say a word for the climbing Roses. They can well be planted around our little garden or they can be trained on poles, or on the porches. The old Crimson Rambler is disliked by many people because it gets buggy and mildewed. Instead, plant *Excelsa*, which is the hardiest and most brilliant crimson climber we have. The finest light pink is without doubt the Dorothy Perkins; its clean foliage, dainty buds and abundance of bloom are highly admired. *Tausendschön*, or *Thousand Beauties*, is indeed another peerless pink; the individual flowers are large and stand out prominently in the trusses; the color, which is deep pink upon opening, changing later to white, is exquisite. A beautiful climbing Rose, with clusters of single deep crimson flowers, is *Hiawatha*.

A large-flowering variety, and one on which the flowers are produced very profusely, is the *Christine Wright*. The blooms are in small clusters and are of a clear wild-rose pink. The plants are sometimes not great climbers, but they are effective, at least at the base of the pillar. *Dr. W. Van Fleet* is a leader in the hardy climbing class—a sturdy, rapid grower, with healthy, deep green foliage and bearing a great profusion of large flowers, the long, pointed buds opening a delicate flesh-pink color.

The yellows are rather too tender to be really climbers. *Aglaia* is beautiful, being deep golden yellow in bud. *Gardenia* is the finest yellow climber and succeeds nicely in central Ohio. The flowers are like *Gardenias* and the foliage is glossy, firm and brilliant. The pretty glossy foliage of many of these Roses has been derived from the *Memorial Rose* (*R. Wichuraiana*). The *Memorial Rose* is very useful as a ground cover, being unexcelled for covering waste land, and trespassing upon steep banks can be successfully prevented by planting this Rose.

THE TEA ROSES. The Teas really are perpetual blooming; they have exquisite colors and thick, leathery petals; besides this, their buds are pointed, but they are tender and should receive good protection. The snow-white Maman Cochet is large, fragrant and productive; the color becomes a trifle pink in the Fall. The buds of Lady Hillingdon, deep apricot-yellow in color, are certainly irresistible for cutting. Marie Van Houtte, whose color can be described either as a pink shaded cream white or *vice versa*, is also charming.

THE HYBRID TEAS. In the Hybrid Teas are combined some of the hardiness of the Hybrid Perpetual as well as the more or less perpetual blooming quality, and the richness of coloring and beauty of form of the Teas. The array of good varieties is almost endless. Among the pinks the first that deserves to be recognized is Jonkheer J. L. Mock, that beautiful Rose, the outside of the petals of which are much lighter in color. The flowers are very fragrant and the stem erect and strong. The Killarney Brilliant is much superior to the Pink Killarney, but it is rather more single than the other pink varieties; although it opens quickly it remains for some time before shattering and is remarkable for its freedom of bloom. We cannot pass Lady Alice Stanley without recognition. The color is a lovely coral-rose, the inside a little lighter. The flowers are nearly perfect in form, color, fragrance and size. The popular Caroline Testout, which is used extensively upon the streets of Portland, Oregon, is a superb bedding variety. Other fine pink varieties are Mrs. A. R. Waddell, Souvenir du President Carnot, Mrs. George Shawyer, Lady Ashtown, Dean Hole, La France.

The most superb lemon white variety is, no doubt, Kaiserin Augusta Victoria; it is constantly in bloom and has a superior elegance which makes it the best white Hybrid Tea.

In reds we have, first, Gruss an Teplitz, a velvety rich glowing crimson and very sweet. It is never out of bloom from Spring until frost. A dazzling color is displayed by the variety Chateau de Clos Vougeot; it is not a strong grower but a continual bloomer. Laurent Carle is much lighter than the other red varieties mentioned; it is a carmine and intensely fragrant. Etoile de France bears a very double, cup-formed flower of deep crimson. Other good reds are Lieutenant Chaure and Mary Countess of Ilchester.

Among the salmony or coppery shades, Sunburst is one of the most successfully grown. It is superior to Mrs. Aaron Ward in color and form. Another is Ophelia, a more decided pink salmon than Sunburst, and a variety which has been received throughout the Rose world with enthusiasm. Mrs. Arthur Robert Waddell is free flowering; though rather small, it is a superb salmon rose with a golden sheen.

It is difficult to know where to place some Roses, such as the in-

comparable Mme. Edouard Herriot, the "Daily Mail" Rose, which is described by its introducer, Pernet-Ducher, as "coral red, shaded at the base with yellow." Another has described the color as appearing like "sunshine upon a copper-red metal." It is a splendid variety and worthy of acquaintance. One variety, a rich yellow, suffused carmine,



The sort of garden we all delight in. Baby Dorothy Rose and Baby Tausendschön Roses are massed around the sundial

commands the attention of all; it is Marquise de Sinety, a semi-double and very fragrant.

THE HYBRID PERPETUALS. The word "perpetual" in the title of this group is a misnomer; they are not perpetual. They have resulted from a cross between the Tea, a perpetual Rose and the various groups

of very hardy Roses, so that they are hardy, but not in many cases do they bloom a second time. They are the vigorous varieties for general use. It is difficult to say of this class of Roses "Here is a list of the best twelve." Someone will surely remark: "Why, he does not even know the best variety of them all." Nevertheless, we all agree that Frau Karl Druschki is the finest white. The buds are handsome and it seems to bloom for a longer season than most. If you leave out Clio from your planting you would miss a very beautiful flesh pink. Another, and a free bloomer, is Mrs. R. G. Sharman-Crawford. A bright cherry red, a fine and rather new Rose, which is always successful, is Gloire de Chedane Guinoisseau; perhaps an improvement upon Ulrich Brunner. Prince Camille de Rohan and Hugh Dickson are both deep velvety crimsons. Paul Neyron is the largest deep pink variety, frequently criticized for being too coarse and large. The Jack Rose, or, as it is called in the catalogs, General Jacqueminot, does well everywhere; it is a brilliant scarlet crimson. Another excellent strong grower and a deep scarlet is J. B. Clark. A very sweet and perfectly formed crimson carmine is the variety Captain Hayward. Mme. Masson is a Hybrid Perpetual which produces blooms at intervals during Summer and Fall. It is a sweet-scented crimson. Captain Christy bears a full flower which is tinted white and pale blush. Magna Charta is always admired for its vigor of growth and its bright, rosy pink flowers, which possess great substance.

PERNETIANA. A group of Roses of recent interest has been developed by crossing Harrison's Yellow with other types. The result is a group of yellowish Roses known as Pernetiana Roses, from their introducer, Pernet. Two deep yellow varieties of great beauty are Soleil d'Or and Rayon d'Or.

MOSS ROSE. The Moss Rose, with its bud encircled by a delicate mossy covering, holds a strong attraction for all. It is surprising that the interesting variety, Hat of Napoleon, is not more planted. In France it is called Chapeau de Napoleon. It is mossier than others. The large, pure white buds of Blanche Moreau are classical examples of the Moss Rose. The pink Crested Moss and the bright red Henry Martin are also splendid varieties.

Polyanthas

The Polyanthas are the Baby Ramblers. How useful they are for low beds or when used as a sort of hedge in an intimate area. The common variety is Baby Rambler, or Mme. N. Levasseur, but there are many superior sorts, such as Triomphe Orléanais and Erna Teschendorff, of this color. In pink Clothilde Soupert and Mrs. Cutbush are the best. Catherine Zeimet is the standard white.

CHAPTER VI

Hardy Perennials for the Permanent Garden

Combinations of Perennials—Considerations for a Perennial Border—Situation of Border—Preparation of Soil—Planting—Spring Planting—Autumn Planting—Cultivation—Staking—Removal of Old Flowers and Seed Pods—Necessity for Replanting—List of Indispensable Hardy Perennials—General Selection of Hardy Flowers—Medium Tall Perennials—Dwarf Perennials—Plans for Perennial Borders

BY hardy plants we mean those perennial herbaceous plants which will live a number of years and will stand the cold in the Northern regions. We use the word "herbaceous" to contrast them with shrubs and trees, for it means that they die down to the soil each year. Their growth is soft, not woody.

It may be asked why we talk so much about the proper care of this or that perennial when on the whole the commonest ones merely need a medium good soil and their competitors, the weeds, removed. The reply is that we should not be content with Pconies, Phlox, or Iris unless they are grown to perfection, or unless we have the finest varieties.

We are interested in a particular flower often because it seems to possess a certain shape, color, or thrifty habit, which we admire. Our interest broadens when we prefer to get a great many varieties of the same flower. Finally, we are even interested in its botanical relatives. It is then that we become "cranks" and thoroughly know and truly enjoy a chosen favorite.

Perennials are adapted to such a range of soils and climates that we can surely find something beautiful to suit our situation exactly. If our land is very rocky and shallow we must govern our selection of perennials accordingly, and we can follow nature quite closely in choosing the sort of plants to use.

Each garden should be our own, and should express our likes in color and combination, but we must be governed by good taste, with the possession of which some are born, while by others it must be acquired. The observations of others often make us able to choose wisely for ourselves.

Combinations of Perennials

A planting of delicate pink Hollyhocks, in front of which we place a good clump of white Phlox, is to be much commended. Similarly, the Phlox will combine nicely with Delphinium.

A bed of Peonies, in which have been planted some *Lilium speciosum*, *rubrum* and *album*, is good; the Peonies will have finished flowering before the Lilies begin.

Huge beds of German Iris of one variety are shown by themselves, but since they are out of bloom before July 1st it is well to have something to maintain the beauty. A few attractive shrubs are then useful. Especially decorative are *Viburnum Opulus* and some of the Honeysuckles which produce ornamental berries.

Coreopsis lanceolata and a deep violet blue *Delphinium* make an excellent contrast.



Long borders of hardy flowers growing freely and in great luxuriance. The arch in the garden wall focuses the view. No straight trim edges, yet there is abundant room to walk. These borders run right up to the dwelling house

Another yellow and blue combination is Speedwell (*Veronica spicata*) with Evening Primrose (*Oenothera missouriensis*). The slender spikes of the Speedwell contrast nicely with the large, brilliant yellow flowers of the Evening Primrose.

Probably no flower of the Autumn is so graceful and welcome as the lovely Japanese Anemone. Excellent white and pink varieties are available. As they make no effect till mid-September they are best combined with a tall, ornamental grass which will give a good background.

The large group of perennial Asters, or Michaelmas Daisies, should not be forgotten; they are the charm of the real late Fall garden. Planted at the rear of borders they make an

excellent foliage background for the earlier flowering plants. Especially noteworthy is the *Aster ptarmicoides*, a very erect, strong-growing white species which blooms a trifle earlier than some of the others. A truly beautiful light blue is the Beauty of Colwall and a good pink is *A. Novi-Belgii* St. Egwin. A very late species, five to six feet tall, is *A. tataricus*; it possesses excellent clean foliage and bluish violet flowers. One of the largest flowering sorts is *A. grandiflorus*.

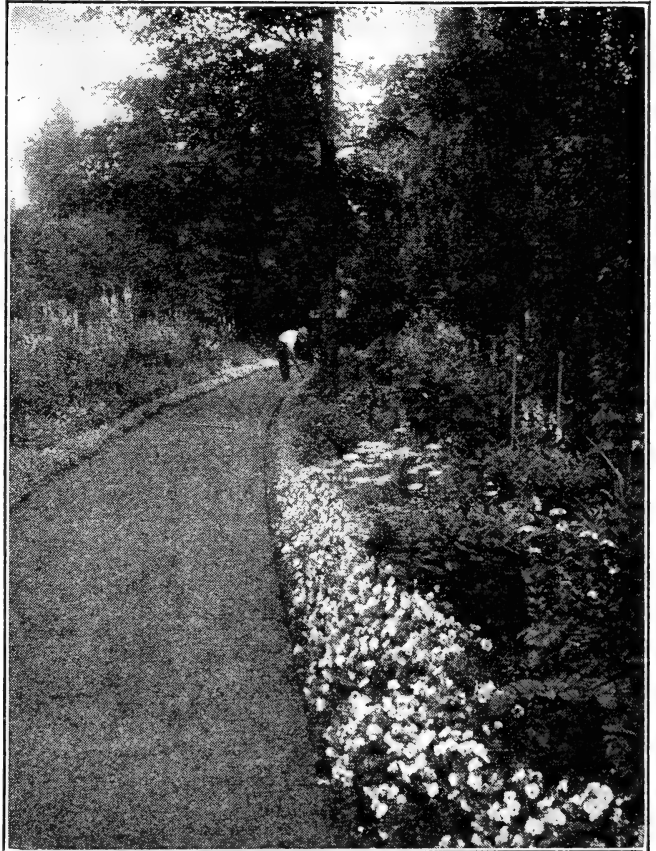
The Larkspurs and Monkshoods (*Aconitum*) are planted to advantage in conjunction with Madonna Lilies (*Lilium candidum*). Spring bulbs are often combined with a few *Adonis amurensis*, a very pretty little yellow-flowering plant with finely cut leaves.

Under trees where grass will not grow, plant some *Ajuga reptans*. *Vinca minor*, called variously Myrtle and Periwinkle, is very useful as it spreads rapidly, is evergreen and bears pretty blue flowers.

In every home yard there is a certain small area, between perhaps the walk and the wall, which it would be advantageous to have filled nicely with plants; such an area is nicely planted to Bishop's Weed (*Ægepodium*). This plant has green and white variegated leaves and thrives in any soil. It is rapid growing, but only attains a height of twelve inches.

Excellent contrast combinations can be had by the intense blue *Anchusa italica* and the Yellow Marguerite (*Anthemis tinctoria*), placing the *Anchusa* at the back.

Another good combination is that of German Iris, among which is planted the Summer Hyacinth (*Hyacinthus*, or *Galtonia candicans*), with its long spikes of white bells and its broad leaves. The bulbs of the Summer Hyacinth are placed in the soil in the Spring; when they bloom the Iris will have finished its blooming but will furnish a foliage base.



Does not this charming border planting make you feel like having one of your own ?

An effective use of the blue *Aquilegia*, or Columbine, is to place a number of these plants at the base of a yellow Rose; for example Harrison's Yellow, or Persian Yellow.



Bringing the flower garden up to the house

Note also the brick path and other architectural features.

Considerations for a Perennial Border

We have a great many classes of perennials, some of which are so wild and aggressive that they should only be planted among the shrubbery. We have others which are very dainty and tender and whose growth must be carefully watched and their special needs for protection attended to.

We must scatter plants through the length of the border which will bloom throughout the season. We should, furthermore, attempt to get good color

combinations. The heights to which the plants will grow should be known, otherwise the taller ones may be in front and the more dwarf ones in the background. It is always well in an informal border to let the back line be somewhat broken; plants at some points are a little shorter.

Situation of Border

Choose a southern exposure where it is not in too close proximity to large tree roots. It should be somewhat protected from the direct

force of the wind, otherwise fragile flowers will not be very lasting. Most perennials enjoy a medium light loam.

Preparation of Soil

As with annuals, but perhaps more so with perennials, the soil for borders should be deeply and thoroughly prepared; two to three feet is none too deep, for plants must remain in one place for a long time. In the case of Peonies it is detrimental to move them often and it is frequently two years, and in some soils three years, after moving a Peony plant before it blooms normally. Manure and a complete fertilizer should be well worked into a new border. All perennial borders profit by an application of bonemeal, hardwood ashes and sheep manure every year or two. Perennial borders which have been flowering year after year and to which much manure has continually been added, become somewhat sour and an application of slaked lime every two years is very beneficial. Many of the perennials do not attain their proper maturity before the Winter when they have been excessively fertilized and forced into continued sappy growth. They then suffer from cold. All soils for borders should be loose, so that they can be easily kept stirred. Soils are made light or loosened by manure, sand or fine coal ashes. Clay soils surely need some such treatment.

Planting

A rule which has been given in setting perennials is to put them a trifle closer than half their height. For example, Columbine grows two feet tall; for good clumps place young plants one foot apart. This rule will not apply in subsequent years, for as the plants grow they must be thinned out. A good liberal planting is always the better plan.

Plants should usually be set a little deeper than they were when growing in the nursery. Care must be exercised not to bury them too deeply, however, for some perennials, as Violets and German Iris, are almost surface creepers. In placing the perennials in the soil, spread the roots symmetrically; do not wad them and cram them into a little hole.

Spring Planting

The planting of perennials is best done in Spring when the tops are just about to start into growth. There is danger in planting when the soil is too moist, especially in clayey soils, which if they become caked are difficult to pulverize during the whole growing season.



A mixed border of hardy flowers

Autumn Planting

In the Autumn most perennials can be transplanted successfully if set out in time so that their roots get established before cold weather. If perennials must be moved in full growth they should always be cut back; especially is this the case when much soil is removed from the roots. All newly set stock should be watered. There is usually less work in Autumn than in the Spring, hence this season is often preferred for planting.

Cultivation

Through the growing season the surface soil should be loosened so that air may enter in order to encourage root action, as well as to conserve the moisture, and keep the weeds in check. Under the heading of "Lawns" we have mentioned the value of lawn clippings as a Summer mulch to conserve moisture. We very strongly recommend well decayed stable manure and leaf mold, where these are obtainable.

Watering

Watering, although beneficial, is less necessary if the soil is always kept loose. In dry seasons water may be applied, using plenty at one time. Little drippings of water are bad for all plants, for such a method of watering only destroys the surface looseness. Syringing the foliage is beneficial; in many cases it serves to keep insects in check if done vigorously. Wherever possible, water pipes should be laid with faucets at regular intervals for use in the garden.

Staking

Many of the perennials will become tall and some support will be necessary. Do not make it conspicuous. Paint the stake green and tie with green cord or raffia, but do not use an old mop handle nor tie with brilliant calico. A light, but long stake placed at the center of the plant is effective. Twiggy branches of trees may also be used. In that case scarcely any tying is needed. Let the stakes be placed early; when the plants have made a great growth they cannot be effectively supported, so that a natural appearance is lost. The whole beauty of a garden is frequently marred by the absence of stakes or a poor method of staking.

Removal of Old Flowers and Seed Pods

All old flowers, seed pods and dead leaves should be removed from time to time. They should be burned. Old flowers harbor thrips, a

very minute insect which is usually found in the heart of a Rose bloom, they cause a shabby appearance of the petalage. Seed production is a most debilitating process; the plant therefore should be prevented from doing this excessive labor. When the old flowers are picked the energies are often turned to a second crop of bloom. Many dead leaves are diseased and are a menace to the other plants. Besides this, old flowers, dead leaves and seed pods give an air of untidiness to the garden.

The Propagation of Perennials is discussed in a separate chapter, "Plant Propagation," which see.

Necessity for Replanting

Some of the later blooming perennials, especially Helianthus, Rudbeckia, Asters, Boltonia, Physostegia, Achillea, need to be replanted or parts of them removed each year. Five to eight shoots of these perennials can be left and the rest dug up and moved to another place. This is the only way to keep some of the weedier growers in subjection. Perennials which bloom from crowns in the early Spring are usually impatient of being moved often, examples being Bleeding Heart, Oriental Poppy, Dictamnus, Red Hot Poker and Peony. Iris reproduces rapidly and is best divided every two or three years; Phlox every three or four years and Peony only every three to five years. Many perennials, as Delphinium and Columbine, increase by a gradual enlargement of the crown.

*For a worthy book on hardy flowers,
we recommend*

A WOMAN'S, HARDY GARDEN, by Helena Rutherford Ely. With illustrations from photographs by Prof. C. F. Chandler. Mrs. Ely gives copious details of the cost of plants, the exact dates of planting, the number of plants required in a given space for beauty of effect and advantage to free growth, the protection needed from sun and frost, etc. Illustrated, Cloth, 12mo. \$1.90 postpaid.

Secure your copy where you bought your Garden Guide.

LIST OF THIRTY INDISPENSABLE HARDY PERENNIALS

Judged from hardiness, color, profusion of bloom or particular seasonal value.

1. TEN TALL. (Above 3½ feet tall.)

- Althea rosea (Hollyhock). Great range of colors.
- Anchusa italica, Dropmore variety (Italian Borage). Deepest blue.
- Aster. Tall species (not China Aster), often called Michaelmas Daisies.
- Delphinium. Tall, deep blues.
- Digitalis purpurea, var. gloxiniaeflora. Excellent foliage.
- Echinops ruthenicus, or Ritro (Globe Thistle).
- Helianthus decapetalus, var. multiflorus. Forms huge clumps, excellent for screening.
- Rudbeckia laciniata, var. Golden Glow. Golden yellow.
- Thalictrum aquilegifolia. Feathery flowers, lilac in color.
- Yucca flaccida. Tall spikes of white, bell-shaped flowers.

2. TEN MEDIUM TALL. (Between 1½-3½ feet tall.)

- Anemone japonica. Chosen as best late white flower.
- Aquilegia chrysantha. Long-spurred, golden yellow Columbine.
- Campanula persicifolia. Blue or white, erect, clean growth, handsome spikes.
- Delphinium Belladonna. Indispensable, medium light blue.
- Dianthus barbatus (Sweet William). Various colors, fragrant.
- Gypsophila paniculata. Fine airy flower, white, graceful.
- Iris germanica pallida dalmatica. Excellent, light blue.
- Papaver orientale. Gorgeous scarlet and orange flowers.
- Peony, var. Festiva maxima. White, with dash of red at center.
- Phlox suffruticosa Miss Lingard. Pure taffy white flower.

3. TEN DWARF. (Below 1½ feet tall.)

- Arabis alpina. One of best early white perennials.
- Dianthus plumarius (Clove Pink). White to purple, very fragrant.
- Geum coccineum (Avens). A very clear scarlet; likes sun.
- Heuchera sanguinea (Coral Bells). Long, graceful spikes of white or scarlet bells.
- Iberis semperflorens. (Perennial Candytuft); excellent white.
- Iris pumila (Dwarf Iris). Good yellows, purples and whites.
- Phlox subulata (Moss Pink). Excellent Spring bloom, lavender pink.
- Primula polyantha and veris (Spring Cowslip). Excellent fresh colors.
- Sedum spectabile (Showy Sedum). Fleshy leaves, rose to crimson flowers.
- Chrysanthemum maximum (Shasta Daisy). Though it does not succeed well everywhere, it is an excellent improved white Daisy.

GENERAL SELECTION OF HARDY FLOWERS

† For cutting. * Shade enduring. ° For rock garden. ‡ For moist ground.

TALL PERENNIALS (Above 3½ feet)

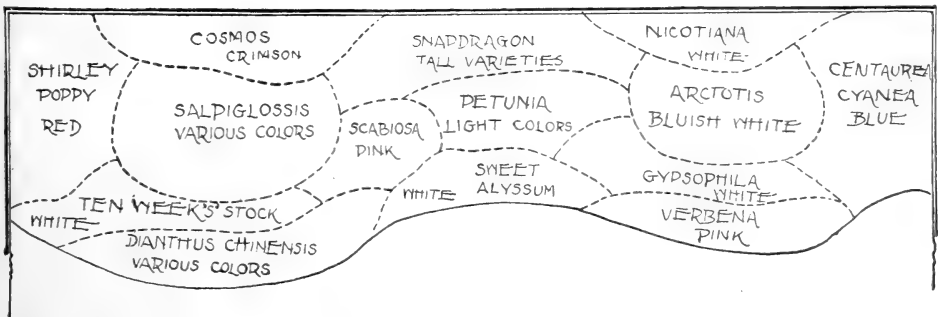
- °† Achillea filipendula
- *°† Aconitum autumnale (Autumn Aconite).
- *°† Aconitum Fischeri (Monk's-hood).
- *°† Aconitum lycoctonum (Wolf's-bane).
- † Althea rosea (Hollyhock).
- *°† Anchusa italica Dropmore (Italian Borage Alkanet).
- *° Aruncus Sylvester (Goat's Beard).
- *° Asters, numerous species.
- *° Bocconia cordata (Plume Poppy).
- † Boltonia asteroides (False Chamomile)
- ° Boltonia latisquama.
- ° Campanula pyramidalis (Chimney Campanula).
- †*° Cimicifuga racemosa (Bugbane).
- *°† Delphinium hybrids.
- *°† Digitalis purpurea, var. gloxiniaeflora (Foxglove).
- *°† Digitalis ambigua (Larger Yellow Foxglove).
- *°† Echinops ruthenicus (Globe Thistle).
- † Helianthus decapetalus (Perennial Sunflower).
- † Helianthus orgyalis (Narrow-leaved Sunflower).
- †† Helianthus tuberosa (Jerusalem Artichoke).
- *°† Lupinus polyphyllus (Lupin).
- †† Rudbeckia laciniata, var. Golden Glow.
- † Senecio clivorum.
- †*° Thalictrum aquilegifolia (Meadow Rue).
- *°† Tritoma Pfitzeri, properly called Kniphofia aloides (Red Hot Poker).
- † Valeriana officinalis (Valerian).
- *°† Yucca flaccida (Bayonet Plant).

MEDIUM TALL PERENNIALS (1½-3½ feet)

- °†*Achillea Ptarmica* (Sneezewort).
- °†*Aconitum Napellus* (Monk's-hood).
- °†*Anthemis tinctoria* Kelwayi (Chamomile).
- *°†*Anemone japonica* (Japanese Anemone).
- *°†*Aquilegia* (Columbine).
- *°†*Aquilegia canadensis*.
- *°†*Aquilegia chrysantha*.
- *°†*Aquilegia cærulea*.
- *°†*Aquilegia sibirica*
- *°†*Aquilegia vulgaris*.
- ††*Asclepias tuberosa* (Butterfly Weed).
- °†*Aster ptarmicoides* (Frost Weed).
- °†*Baptisia australis* (False Indigo).
- †*Campanula glomerata*.
- †*Campanula Medium* (Canterbury Bells).
- †*Campanula Medium*, var. *Calycanthemum* (Cups and Saucers).
- °†*Campanula persicifolia* (Peach-leaved Campanula).
- °†*Campanula Trachelium* (Throatwort).
- °†*Callirhoe involucrata* (Poppy Mallow).
- °†*Centaurea dealbata* (Cornflower).
- °†*Centaurea dealbata macrocephala* (Knapweed).
- °†*Centaurea montana* (Mountain Bluet).
- °†*Centranthus ruber* (Red Valerian).
- °†*Chrysanthemum coccineum* (Pyrethrum).
- °†*Chrysanthemum Parthenium* (Feverfew).
- °†*Clematis Davidiana*.
- °†*Clematis recta*.
- °†*Coreopsis lanceolata grandiflora* (Tickseed).
- °*Coreopsis verticillata* (Narrow-leaved Tickseed).
- *°*Corydalis nobilis*.
- †*Delphinium Belladonna* (Larkspur).
- °†*Dianthus barbatus* (Sweet William).
- °*Dicentra spectabilis* (Bleeding Heart).
- *°*Dictamnus Fraxinella albus* (Gas Plant).
- °†*Dimorphotheca aurantiaca* (Cape Marigold).
- *°*Dracocephalum moldavicum* (Moldavian Balm).
- †*°*Doronicum excelsum* (Leopard's Bane).
- *°†*Echinacea* (*Rudbeckia*) *purpurea* (Purple Coneflower).
- ††*Epilobium angustifolium* (Fire Weed).
- °*Erigeron speciosus* (Fleabane).
- °†*Eryngium planum* (Sea Holly).
- °†*Eryngium amethystinum* (Sea Holly).
- ††*Eupatorium purpureum* (Joe Pye Weed).
- °*Eupatorium perfoliatum* (Boneset).
- ††*Euphorbia corollata* (Flowering Spurge).
- ††*Filipendula hexapetala* (Meadow Sweet).
- °†*Gaillardia aristata* (Blanket Flower)
- °†*Galega officinalis* (Goat's Rue).
- *°†*Galium boreale* (Northern Bedstraw).
- °†*Gypsophila acutifolia* (Baby's Breath).
- °†*Gypsophila paniculata* (Baby's Breath)
- ††*Helenium autumnale* (Sneezeweed).
- °†*Helenium* (*Dugaldia*) *Hoopesii* (Sneezeweed).
- °†*Helianthus Maximiliani* (Maximilian Sunflower).
- °†*Helianthus mollis* (Downy Sunflower).
- °*Hemerocallis aurantiaca* (Orange Day Lily).
- °*Hemerocallis flava* (Lemon Lily).
- °*Hemerocallis fulva* (Day Lily).
- °*Hemerocallis Thunbergii*.
- †*Hesperis matronalis* (Sweet Rocket).
- °†*Iris germanica* (German Iris).
- °†*Iris Kämpferi* (Japanese Iris).
- °†*Iris sibirica* (Siberian Iris).
- °†*Liatris pycnostachya* (Blazing Star).
- †*°†*Lobelia cardinalis* (Cardinal Flower)
- †*°†*Lobelia syphilitica* (Blue Lobelia).
- °†*Lychnis chalcedonica* (Maltese Cross).
- ††*Lysimachia clethroides* (Pepperbush Loosestrife).
- ††*Lysimachia punctata* (Dotted Loosestrife).
- ††*Lysimachia vulgaris* (Common Loosestrife).
- ††*Lythrum Salicaria roseum superbum* (Purple Loosestrife).
- †*°†*Mertensia virginica* (Virginia Bluebells).
- ††*Monarda didyma* (Beebalm).
- †*°†*Oenothera missouriensis* (Missouri Evening Primrose).
- °†*Oenothera speciosa* (Evening Primrose).
- †*Pæonia albiflora*.
- †*Pæonia officinalis*.
- †*Pæonia tenuifolia*.
- †*Papaver orientale* (Oriental Poppy).
- °†*Pentstemon barbatus* Torreyi.
- °†*Pentstemon gloxinioides*.
- *°*Phlox maculata*.
- °†*Phlox paniculata* (Hardy Phlox).
- °†*Phlox suffruticosa*.
- °†*Physostegia virginiana* (Obedient Plant).
- °†*Platycodon grandiflorum* (Chinese Balloon Flower).
- †°*Rheum palmatum* var. *atro sanguineum* (Ornamental Rhubarb).
- °†*Salvia azurea* (Blue Sage).
- °†*Salvia pratensis* (Common Meadow Sage).
- °†*Scabiosa caucasica* (Scabious).
- °†*Sidalcea candida*.
- †*°*Smilacina racemosa* (Solomon Seal).
- °†*Solidago* sp. (Golden Rod).
- °*Spiræa*.
- °†*Thalictrum adiantifolium* (Meadow Rue).
- °†*Thalictrum dipterocarpum*.
- °†*Thermopsis caroliniana*.
- ††*Tradescantia virginiana* (Spiderwort).
- °†*Veronica longifolia* var. *subsessilis* (Speedwell).
- °†*Veronica spicata* (Spiked Speedwell).

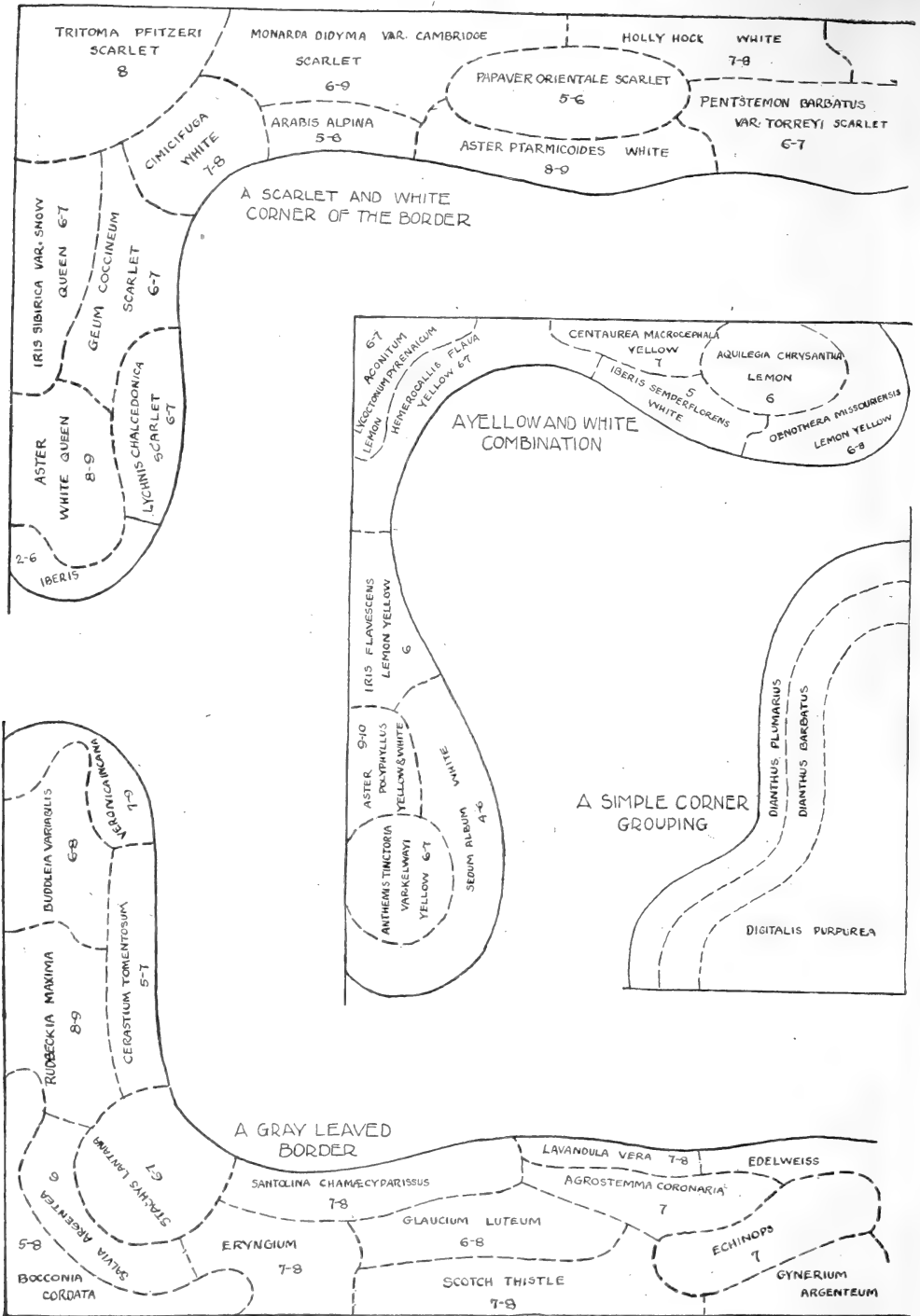
LIST OF DWARF PERENNIALS. (Less than 1½ feet.)

- *°Adonis æstivalis (Pheasant's Eye).
- *°Adonis vernalis (Spring Adonis).
- †*°Ægopodium Podagraria (Gout Weed).
- *°Ajuga reptans (Bugle).
- *°Ajuga genevensis (Bugle).
- °Alyssum rostratum (Gold Dust).
- °Alyssum saxatile (Gold Dust).
- *°Arabis albida (Rock Cress).
- *°Arabis alpina (Rock Cress).
- *°Armeria maritima (Sea Thrift).
- *°Armeria formosa (Sea Thrift).
- *°†Asperula odorata (Sweet Woodruff).
- *°Astrantia carniolica (Masterwort).
- °Aubrietia deltoidea (Purple Rock Cress).
- *°†Campanula rotundifolia (Harebell).
- °Campanula carpatica (Carpathian Harebell).
- °†Centaurea nigra (Knap Weed or Hard-head).
- *°Cerastium tomentosum (Snow-in-Summer).
- °†Chrysanthemum arcticum.
- °†Chrysanthemum maximum (Shasta Daisy).
- *°Claytonia virginica (Spring Beauty).
- °Coronilla varia (Crown Vetch).
- *°Dianthus deltoides (Maiden Pink).
- *°Dianthus latifolius (Pink).
- *°†Dianthus plumarius (Clove Pink).
- *°Dicentra eximia (Wild Bleeding Heart).
- *°Dicentra formosa (Chinese Bleeding Heart).
- *°Dicentra cucularia (Dutchman's Breches).
- †*°†Epimedium alpinum.
- *°†Epimedium pinnatum.
- †*°Funkia subcordata.
- *°Gentiana Andrewsii (Closed Gentian).
- *°Geranium sanguineum (Crane's Bill).
- °†Geum coccineum (Avens).
- °†Helenium autumnale pumilum (Sneeze-weed).
- *°†Helleborus niger (Christmas Rose).
- *°†Hepatica triloba (Mayflower).
- *°†Hepatica acutiloba (Mayflower).
- *°†Heuchera sanguinea (Coral Bells).
- °†Iberis semperflorens (Perennial Candy-tuft).
- °†Incarvillea Delavayi.
- °†Iris cristata, pumila, and verna (Dwarf Iris).
- °†Lychnis coronaria (Mullein Pink).
- °Opuntia vulgaris (Prickly Pear).
- °†Papaver nudicaule (Iceland Poppy).
- °Phlox Arendsii.
- †°†Phlox divaricata (Wild Sweet William).
- †*°†Phlox subulata (Moss Pink).
- °†Plumbago Larpentæ (Lead Plant).
- †*°†Podophyllum peltatum (May Apple).
- *°†Polemonium cærulea (Jacob's Ladder).
- °†Potentilla Miss Willmott.
- †††Primula japonica.
- °†Primula polyantha.
- °†Primula vulgaris.
- *°Pulmonaria saccharata (Lungwort).
- *°†Ranunculus acnitifolius fl. pl. (Double Buttercup).
- °Sagina glabra (Pearlwort).
- °†Saxifraga pyramidalis (Saxifrage).
- †*°†Sedum spectabile (Showy sedum).
- *°Sempervivum arachnoideum (Spider-web Houseleek).
- *°Sempervivum Brownii.
- *°Sempervivum pyrenaicum.
- *°Sempervivum tectorum (Old Man and Woman).
- *°†Statice latifolia (Sea Lavender).
- °†Stokesia cyanea (Stokes' Aster).
- †*°†Trillium grandiflorum (Wake Robin).
- †*°†Trillium sessile.
- *°†Trillium erectum (Red Trillium).
- †*°†Trollius asiaticus (Globe Flower).
- †*°†Trollius europæus.
- †*°†Trollius excelsior.
- †*°†Trollius giganteus.
- *°†Tunica (Petrohagia) Saxifraga.
- °†Veronica incana.



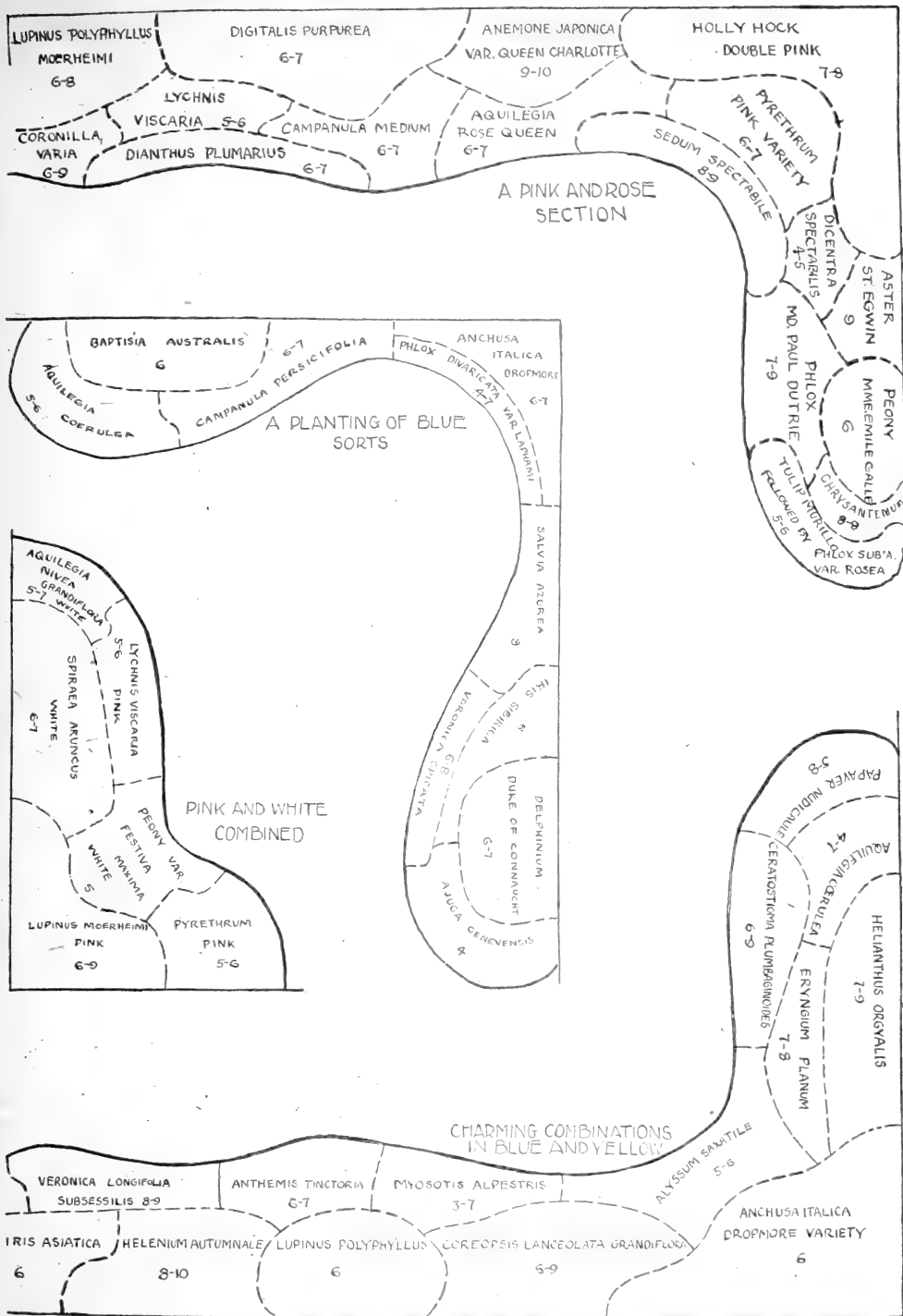
A scheme for a border of Annual Flowers. This bed is approximately 6 ft. by 20 ft.

Plans for Perennial Borders of



Each sketch represents the corner of a perennial border at the margin of the lawn. Those plants at the back are usually taller, those at the front are more dwarf. Each section is arranged to be approximately three to four feet wide. The larger

Attractive Color Combinations



corners are 25 feet on one side and 10 or 15 on the other. The numbers accompanying the plant names refer to the months during which the plants bloom; thus 6-9 means that the plants are flowering usually from June until September

CHAPTER VII

Annuals and Biennials

Care in Purchasing Seed—Sowing—Transplanting—Time to Sow
Out-of-Doors—Preparation of Soil—Keeping Seed Pods Removed
—Vines—Combinations of Annuals—Everlasting Flowers—
Annuals Useful for Cut Flowers—Lesser Known Annuals—
Annuals for Edging Beds of Other Plants—Foliage Annuals—
Biennials—Germination Table

ANNUALS are plants the seed of which must be sown each year. Some plants, although they live more than one year, are not at their best after the first year and should be considered as annuals. The Pansy is such a plant; it is perennial, but is best when sown each year. Annuals are not permanent, it is true, but they fill a great need for profusion of bloom for garden effect. In few ways can a few cents be spent so profitably as in the purchase of a package of seeds of annuals. They bloom so quickly and make such excellent fillers for the bare spots between our shrubs and other perennial plants that they are truly indispensable. For cut flowers they are unexcelled; sorts may be easily chosen with long, strong stems and excellent keeping qualities, together with the daintest or gayest colors. They commend themselves to planting near rented houses where investments for plants would otherwise be somewhat wasted.

For pot culture upon porches and areas where little space is available the annual fits in nicely. In window boxes the dwarf, compact plants are just as useful as the tall climbers. The annual vines are unrivaled in their ability quickly to cover unsightly buildings or rough ground, as well as serving for shade upon rustic arbors and porches.

Care in Purchasing Seed

The buying of flower seeds is an investment to be undertaken with unusual discretion. Seeds should be bought only from reliable dealers who handle, in the right way, seeds procured from the best plants, and those bearing the finest flowers. The matter of getting good seed must depend entirely upon our confidence in the dealer. The wise gardener avoids wasting his ground space by sowing seeds which have lain about grocery stores for any length of time.

Sowing

Many annuals, such as Petunia, Phlox, Verbena, ornamental Tobacco, China Asters, Snapdragon, Cosmos, Sweet Alyssum, Pansy,

annual Larkspur, Salpiglossis, Scarlet Sage, Swan River Daisy and Torenia, benefit by being sown indoors in order to give them a growing start before placing in open soil.

March is the best time to sow. This necessitates procuring a good loam in the Autumn and storing it in the basement. The soil need not be rich, but it should be loose, which can be accomplished by the addition of well-rotted manure, or if this is not available, sifted coal ashes or sand will be useful. This soil should not be allowed to become dry in the basement, but should be moistened every month or oftener, according to its condition. It must not be kept too wet, otherwise it will sour badly.

Seed must always be sown thinly; thick sowing is a general cause of failure with annuals. Some seeds, as Petunia, Verbena, ornamental Tobacco, Salpiglossis and Portulaca, are very minute, and should not be covered with soil. A newspaper and a pane of glass placed over the pot or box will retain the moisture and keep the sunlight from the seed. When the seed is not covered, the soil should be thoroughly watered before sowing. Larger seeds are best sown in rows and should be covered with soil about three times their diameter. To keep out the light and prevent the pots from drying, the use of newspaper over the pots is excellent. As soon as the seedlings get above the soil, they should be given the best light conditions, otherwise they will become very spindling and weak. Good light and rather cool conditions indoors, together with thorough but not too frequent watering, should produce stocky plants.

Excepting such as Mignonette, Sweet Sultan, Love-in-a-Mist, Heliotrope, and the Poppy-like plants, as Eschscholtzia, Argemone and Papaver, most annuals can be successfully transplanted. When seeds of these latter are sown they are best placed in very small pots, using only two or three seeds in a pot.

Transplanting

Seedlings may be transplanted when very small; in fact, after the appearance of several leaves, if the plants are becoming crowded, they should be transplanted into boxes about three inches deep, setting them several inches apart each way. The earliness of sowing the seed will govern the amount and need for transplanting. Transplanting is beneficial to many seedlings because it causes the root tips to branch, making a well balanced root system.

Time to Sow Out-of-Doors

When the soil is warmed a little in the Spring most annuals can be sown directly in the open soil; but a few are tender, that is, they will



A garden of annual and perennial flowers

stand very little cold and should never be planted until all danger of frost is past. Among these are: Amaranth, Browallia, Celosia, Torenia, California Poppy, Gourds, Butterfly Flower. These are all tender.

Preparation of Soil

The soil should not merely be loosened by a rake, but if good flowers are wanted, thorough preparation should be given and decayed manure added. After many of the annuals have grown two or three leaves tall, they will benefit by being pinched back; in other words, the main shoot should be cut out. This will cause the plants to become branchy and bear three times as many flowers. Especially successful is pinching such plants as Stock, Nemophila, Butterfly Flower, Petunia, Baby's Breath, annual Chrysanthemums, Clarkia, Cosmos, Godetia, Salpiglossis, Swan River Daisy and Calliopsis.

Keeping Seed Pods Removed

Annuals soon accomplish their growth and hastily decline if their seed pods are not carefully removed. Many of them may continue to bloom throughout the Summer if careful attention is given this detail.

Vines

The annual vines form an important garden adjunct. The most important plant in this class is the Sweet Pea (*See Contents*) perhaps; the next in value is the Nasturtium, which not only has excellent foliage, but at the same time is without a competitor for profusion and elegance of bloom. The Morning Glory (*See Contents*) would be more valued but for the fact that inferior varieties are too often grown. Excellent giant forms, clear blue in color, are on the markets, which for a morning effect upon the garden fence are very attractive. The Cobæa is really a tender perennial, but does best sown in pots and started indoors each year. The seeds are flat and should be planted edgewise. The flowers are greenish purple and followed by attractive pods. The plants make a phenomenal growth. Another vine with inflated pods is the Balloon Vine. Although the flowers are inconspicuous, the balloons are borne very freely. The Cypress Vine and the Cardinal Climber both possess deep red flowers and fine foliage. The seeds of both are rather difficult to start, but if those of the Cypress Vine are scalded there should be little difficulty. The familiar Hop, Scarlet Bean and Gourds should not be forgotten. If one prefers something rather extraordinary and unique, the Canary Bird Vine (*Tropæolum peregrinum*) with its peculiar yellow fringed flowers and delicate foliage, should be grown.

Combinations of Annuals

It is hardly ever advisable to buy mixed colors of flowers; it is much better to buy packages of good separate colors and mix them. Nothing is prettier than huge masses of one color. Bicolor or variegated flowers are to be avoided, because they often give a dull appearance as seen in beds.

Let us make a few recommendations for combinations of annuals or ways in which they give the best effects:



Foxgloves (*Digitalis*) are hardy biennials; they seed and reproduce themselves freely—See also page 116

In making beds for annuals they should not be too wide; if against a fence, four or five feet, and if in the open, six or seven feet, is sufficient; otherwise, they cannot be handled easily either for picking the flowers or for cultivating and weeding. Few annuals can be sown so that they are exactly the proper distance apart when they bloom. They must, therefore, be thinned. According to the variety they all need from six to eighteen inches between plants. Poppy beds are always too thickly

planted, for Poppy seed is very fine and difficult to sow properly. They must be thinned if the Poppies are to attain their proper development.

A bed of blue Bachelor's Buttons can be nicely edged with Sweet Alyssum or Candytuft, both of the latter being white. The Bachelor's Buttons will furnish a constant supply of cut flowers.

Snapdragon, of which a delicate pink variety, perhaps, is chosen, will be excellent combined with Dusty Miller.

Another bed will be showy, composed of California Poppies planted in front of the taller pot Marigolds. This will be in tones of orange-yellow.

Entire beds, perhaps five by ten feet, of Verbenas, planted 12 inches apart each way, will prove very effective.

Grow a fine lot of young Drummondii Phlox plants, a white variety, and after filling a bed with them placed eight inches apart, plant bulbs of the pink variety America Gladiolus between the plants.

Into your bed of Pansies transplant a few of the dainty blue Browallia demissa; this will cast a very light and airy effect over the whole bed.

On some narrow strip, where there is little room, try Godetia Rosamond with its satiny pink flowers by itself. You will be rewarded by a very pretty display.

A huge bed of *Nicotiana sylvestris*, the ornamental Tobacco, near a porch where you can get the great fragrance in the evening, is very satisfactory. The *Nicotiana* self sows and it will be necessary to keep these in check.

In a hot, sunbeaten, dry place, sow the *Portulaca* or Sunplant. The metallic seeds self sow and the plant will come up year after year. This is the old-fashioned "Seven Sisters" plant which some persons fancy bears seven colored blooms on one plant.

In some pots, to be placed on posts or on a wall, plant a few of the trailing *Lobelias* (*Lobelia erinus*) or a few *Nasturtiums*.

In a corner where you want something out of the ordinary, plant a few seeds of the Giant Spider plant (*Cleome*). The flowers are rosy crimson, and possess long filaments and pistils followed by long, slender seed pods. They are strong, attractive, but a trifle weedy.

Edge a bed of Cannas or other tall plants with Fountain Grass (*Pennisetum*).

To combine with bouquets, grow a little clump of Cloud Grass (*Agrostis nebulosa*).

For the Sweet Pea bouquets do not neglect planting some Baby's Breath (*Gypsophila elegans*). This will look well grown in a bed with annual Larkspurs or with Stocks. Baby's Breath must be planted several times during the season if a continuous supply is needed.

Some persons admire small hedges of Summer Cypress, or *Kochia*, but this plant turns a very bad bluish-crimson color in Autumn—a color which harmonizes with nothing.

When the season does not prove too moist, or when planted upon sandy soils, the dwarf or cupid Sweet Peas are excellent. They bear rather long stems and very good flowers.

No annual flower blooms for so long a time as the *Petunia*. If the colors can be selected before setting the plants into the bed, the results will

be better. It will be unnecessary to combine them with anything else, as they are all-sufficient, and are as useful for beds two feet square as for huge borders a hundred feet long and four wide.

Where a dainty blue edging plant is wanted, use Swan River Daisy, (*Brachycome*), placing the plants about six inches apart.

If you must neglect your garden, but want a good show of color, try huge beds of Zinnias or Marigolds.

If you wonder what to use for edging any bed, decide to use Sweet Alyssum; it is a most adaptable border plant. When it appears to be nearly through blooming, cut it back and it will start up again.

Everlasting Flowers

It is always interesting to grow a few everlasting or "straw" flowers. If they are picked in their proper stages, the leaves removed and the blooms hung upside down to dry, they will present a pretty appearance all Winter. The principal annual specimens are:

HELICHRYSUM BRACTEATUM (Straw Flower). One of the largest everlasting flowers. There are many shades of yellow and red. They grow two to three feet tall and need to be planted one foot apart if they are to develop properly. They should be picked before they are fully open.

HELIPTERUM ROSEUM. Bears dainty white and rosy pink flowers. They should be cut when quite in bud; they open a little after being picked, otherwise the centers are visible and being brown give a shabby appearance to the otherwise attractive flower. It is pretty for the border, aside from its being good for the Winter bouquet.

HELIPTERUM MANGLESII (Rhodanthe) (Swan River Everlasting). The flowers are pink and white; the stems are very graceful.

HELIPTERUM HUMBOLDTIANUM. Bears a yellow flower, smaller than others but numerous.

GOMPHRENA GLOBOSA (Globe Amaranth). The straw-like heads resemble Clover. The two colors are a crimson and a rather muddy white.

NERANTHEM ANNUM (Everlasting or Immortelle). Bears rose, purple, and white flowers. As a garden subject they retain their bloom from early Summer till frost.

CATANANCHE CÆRULEA. Blue and yellow varieties are available. Somewhat resembles Bachelor's Buttons.

Useful for Cut Flowers

Many of the annuals are useful for cutting because they have long stems, good keeping qualities or excellent colors. They commend themselves admirably for arrangements in the low bowls which are beginning to be used and are of such great value for a proper loose display of flowers.

ACROCLINIUM (See *Helipterum roseum* in list of Everlasting Flowers).

AFRICAN DAISY (See *Arctotis*).

ANTIRRHINUM (Snapdragon). This is gaining greatly in its deserved popularity. Almost all the colors are good.

AMETHYST (See *Browallia*).

ANNUAL LARKSPUR appears in superb pink, blues, lavenders and has dainty foliage and good keeping qualities.

ARCTOTIS GRANDIS (African Daisy). This is a very handsome Daisy-like annual, the flowers of which are a bluish white, the under surface being rather bluish gray. The buds open nicely after the flowers are cut.

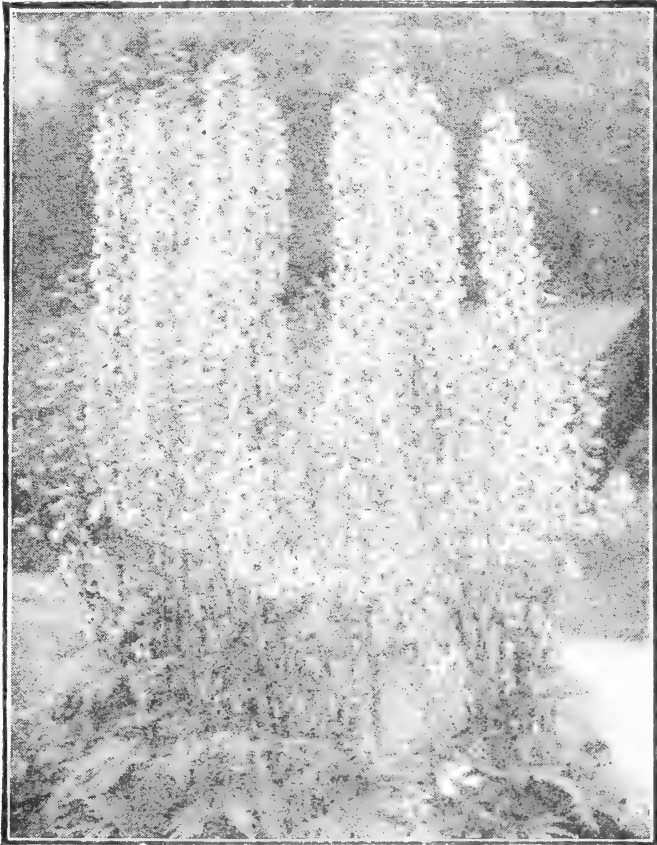
BABY'S BREATH (See *Gypsophila*).

BACHELOR'S BUTON (See *Centaurea*).

BLANKET FLOWER (See *Gaillardia*).

BROWALLIA DEMISSA (Amethyst). A very graceful little blue or white annual which is prettily used in bouquets.

BUTTERFLY FLOWER (See *Schizanthus*).



Larkspur (*Delphinium*)

CALENDULA OFFICINALIS (Pot Marigold). Bear strong, golden orange and lemon colored flowers. They will bloom for a long season if the seed pods are kept off.

CANDYTUFT. The varieties are pure white as well as lavender and crimson. They are very useful for all sorts of cut flower purposes.

CENTAUREA CYANEA (Bachelor's Button). Furnishes some of finest blues. Is an excellent keeper when cut.

CENTAUREA IMPERIALIS and **AMERICANA** (Sweet Sultan). Dainty rose, light lavender and white thistle-like flowers; long stems; excellent for vases and baskets. *C. maritima* is often called Dusty Miller.

- CHINA ASTER.** This is perhaps the very best annual for cutting.
- COREOPSIS TINCTORIA, DRUMMONDII** (Coreopsis, or Calliopsis). Appears in excellent golden and maroon color combinations. The stems are long and wiry.
- CORN, VARIEGATED** (See Zea, under "Foliage Annuals").
- COSMOS.** One of best tall annuals, and one of the latest to bloom, is Cosmos. Procure the earliest varieties for Northern planting.
- DUSTY MILLER.** Unexcelled for gray effects.
- EUPHORBIA** (See Poinsettia, under "Lesser Known Annuals").
- EVERLASTING** (Applied to Helichrysum, Helipterum, Xeranthemum and some others).
- FORGET-ME-NOT.** This dainty blue flower has a greater hold upon our sentimental admiration than almost any flower except the Rose.
- FOUNTAIN GRASS** (Pennisetum). Dainty, hairy spikes.
- GAILLARDIA** (Blanket Flower). Resplendent in shades of orange and scarlet.
- GLOBE AMARANTH** (See Gomphrena, under "Everlasting Flowers").
- GODETIA.** Excellent satiny petals and some very good colors appear.
- GYPSOPHILA** (Baby's Breath). Unexcelled for bouquets. The fine, misty, white flowers lend to any decoration a grace which cannot be duplicated by any other annual.
- IMMORTELLE** (See Xeranthemum, under "Everlasting Flowers").
- LOVE-IN-A-MIST** (See Nigella).
- LOVE-LIES-BLEEDING** (See Amaranthus, under "Foliage Annuals").
- LUPINES.** Free flowering. There are excellent pink, blue and light yellow varieties.
- MARIGOLD, African.** This flower is rather coarse, but always thrifty.
- MARIGOLD, Pot.** (See Calendula).
- MIGNONETTE** is indispensable because of its supreme fragrance. The less beautiful kinds are apt to be the most fragrant.
- NASTURTIUM.** For brilliancy of color, prolificacy of bloom and novelty of form, few flowers can rival the Nasturtium.
- NIGELLA DAMASCENA** (Love-in-a-Mist). Excellent fine foliage and pretty blue flowers.
- PANSY.** It must be borne in mind that the Pansy only grows during the cool, early days of Spring or Fall. It must be planted accordingly, best when sown in August.
- PAPAVER RHÆAS** (Shirley Poppies). With their silky petalage and good colors, these make good cut flowers if picked when in bud.
- PHLOX DRUMMONDII** (Phlox, Drummond's). The real, brilliant, clear colors of this annual Phlox are admirable for small vases.
- POPPIES, SHIRLEY** (See Papaver Rhæas).
- RHODANTHE** (See Helipterum Manglesii, under "Everlasting Flowers").
- RIBBON GRASS** (See Phalaris, under "Foliage Annuals").
- SCABIOSA** (Scabious). Excellent long stems—good colors lend themselves to pretty vase decorations.
- SCABIOUS** (See Scabiosa).
- SCHIZANTHUS** (Butterfly Flower). One of the fairy-looking flowers. Give a little shade in the garden.
- SENECIO CINERARIA, var. candidissimus,** also generally known as Dusty Miller.
- SNAPDRAGON** (See Antirrhinum).

- SQUIRREL'S TAIL GRASS** (See *Hordeum*, under "Foliage Annuals").
SUMMER CYPRESS (See *Kochia*, under "Foliage Annuals").
STRAW FLOWER (See *Helichrysum*, under "Everlasting Flowers").
SWEET PEAS. An ideal annual; see Contents for special article.
SWEET SULTAN (See *Centaurea imperialis*).
TARWEED (See *Madia elegans*, under "Lesser Known Annuals").
WISHBONE FLOWER (See *Torenia*, under "Lesser Known Annuals").
YOUTH AND OLD AGE (See *Zinnia*).
ZINNIA (Youth and Old Age). A universally admired flower because of its rich appearance and ease of culture.

Lesser Known Annuals

For those who have tried the commonest annuals, a few others of interest should be mentioned. Each year the catalogues list a new introduction from other countries or a unique series of hybrids. These novelties are sometimes excellent, but being expensive and of doubtful value for the changed climates and soils, they should be bought only as experiments and not planted directly into beds in which a good show must be depended upon.

The plants in the following list are not especially new, but are rarely seen in our gardens, although they have a value.

- ALONSOA ACUTIFOLIA**. Attractive coral colored flower; compact plants.
ANCHUSA CAPENSIS (Cape Alkanet). Very pretty, minute blue flowers, but tend to go to seed rapidly.
ARGEMONE GRANDIFLORA (Mexican Prickly Poppy). Foliage spiny; flowers yellow.
CACALIA COCCINEA (See *Emilia*).
CERINTHE RETORTA. A unique annual bearing spotted leaves and yellow tubular inverted flowers, tipped with purple.
DIASCIA BARBERÆ. Bears a rose or orange colored spurred flower.
EMILIA FLAMMEA (*Cacalia coccinea*) (Tassel Flower). An intense scarlet. Should be planted at least four inches apart. Self sows.
ERYSIMUM PEROFSKIANUM. One of deepest orange colored annuals. Earliest culture.
GILIA CAPITATA. The light drab flowers are borne in miniature heads.
LAYIA ELEGANS. Pretty dwarf yellow annuals, with flowers about an inch in diameter.
MADIA ELEGANS (Tarweed). Very distinct yellow flowers and glandular heavily scented foliage.
MENTZELIA LINDLEYI (*Bartonia aurea*). Yellow flowers. Plant where they are to grow. Fragrant in evening.
NEMOPHILA INSIGNIS. Excellent pure deep blue.
PHACELIA CAMPANULARIA. Bears blue flowers resembling the Canterbury Bells.
POINSETTIA HETEROPHYLLA, or **PAINTED LEAF**. Leaves are dark green, except the upper, which are bright red at the base.
SALVIA FARINACEA. Very pretty foliage and almost white flowers.
SANVITALIA PROCUMBENS. A dwarf, compact annual, useful for edging; very prolific of blooms.
TORENIA FOURNIERI (Wishbone Flower). A very pretty blue or white, yellow spotted flower.

Annuals for Edging Beds of Other Plants

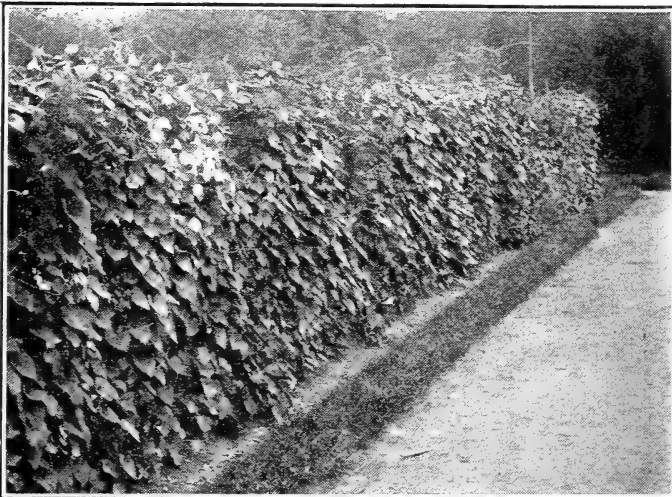
AGERATUM	DWARF SNAPDRAGON	PETUNIA
ANNUAL PHLOX	FRENCH MARIGOLD	PORTULACA
CALIFORNIA POPPY	LOBELIA (<i>Lobelia eri-</i>	SANVITALIA
BABY'S BREATH	<i>nus</i>)	SCARLET FLAX
CALLIOPSIS (Dwarf)	MADAGASCAR PERI-	SWAN RIVER DAISY
CANDYTUFT	WINKLE (<i>Virca io-</i>	SWEET ALYSSUM
DWARF MARIGOLD	<i>sea</i>).	VERBENA
(<i>Tagetes signata</i>	NASTURTIUM	TOM
<i>primula</i>)	THUMB	

Foliage Annuals

- RICINUS COMMUNIS** (Castor Oil Bean). One of the tallest, most rampant growing annuals.
- SENECIO CINERARIOIDES** and **CENTAUREA GYMNOCARPA** (Dusty Miller). Unexcelled for gray effects.
- PENNISETUM** (Fountain Grass). Dainty and graceful hairy spikes.
- AMARANTHUS CAUDATUS** (Love-Lies-Bleeding). Foliage deep maroon often.
- MEXICAN HORNED POPPY**. The deep green leaves are veined with white.
- PHALARIS ARUNDINACEA**, VAR. **PICTA** (Ribbon Grass). A very useful grass for bouquets as well as landscape effect.
- HORDEUM JUBATUM** (Squirrel's Tail Grass). Spike resembles a squirrel's tail. Adds a very graceful touch to the border or bouquet.
- KOCHIA TRICOPHYLLA** (Summer Cypress). Makes a formal cypress-like plant. In Autumn turns a bluish crimson, at which time it seems a poor color.
- ZEA MAYS JAPONICA** (Variegated Corn). Useful for bouquets of Gladioli or Red Hot Pokers.

Biennials

This is a class of plants which lives but two years. The seed can be sown in the Summer or early Autumn one year; the young plants form a rosette of leaves but do not bloom until the following year, after which they usually die. One of our common-



Hedge of Ipomoeas, or Morning Glories. Sow out of doors at the end of May

est garden plants is a biennial, namely, Foxglove. Many other plants are best treated as biennials, as, for example, some Campanulas, Hollyhocks, Anchusa and Sweet William, all of which decline after two years. There are few plants to rival the Foxglove; it possesses such excellent foliage that nothing need ever be planted at its base; besides, the stately spires of inverted glove fingers are most attractive.

Biennials are best protected for the Winter by pulling the leaves together and packing straw between them, in which case they seem to stand the cold nicely. If poorly protected the center of the plant decays, leaving it hollow; the stems then do not become strong enough to bear the truss of bloom; at the same time the excellent foliage is entirely gone. This is too often the case with the beautiful Canterbury Bells (*Campanula Medium*), which should not be too thickly covered but properly handled.

Always consult Index to Contents.
Familiarize yourself with it. There
are hundreds of good things in this
book that will escape your attention
if you do not use the Index freely.

*For a complete work on the subject of this
chapter we recommend*

THE BOOK OF ANNUALS, by Henry H. Saylor. Fifty of the most dependable annual flowering plants are shown in full-page photographic reproductions, opposite each of which is given a page of descriptive text that tells just what the gardener wants to know about that plant—how high it grows, the color of its flowers, when to plant seed, and so on. Price, \$1.30 postpaid.

Secure your copy where you bought your Garden Guide.

GERMINATION TABLE OF FLOWER SEEDS†

* Represents an Indefinite Number of Days.

	Days		Days		Days
Abutilon.....	20	Cockscomb.....	20	Ivies.....	*
Acroclinium.....	15	Coix lachryma.....	*	Jack-and-the- Beanstalk.....	15
African Golden Daisy.....	15	Coleus.....	20	Japanese Bean.....	15
Agapanthus.....	20	Columbine.....	15	Japanese Hop.....	15
Agathæa cœlestis.....	20	Commelina.....	10	Japan Iris.....	*50
Ageratum.....	5	Coreopsis.....	20	Jerusalem Cherry.....	*20
Alyssum.....	5	Cornflower Aster.....	*	Job's Tears.....	*
Ampelopsis.....	15	Cosmos.....	5	Kenilworth Ivy.....	5
Anchusa.....	20	Crimson Flax.....	8	Kochia scoparia.....	15
Anemone, St. Brigid.....	15	Cuphea.....	*8	Kudzu Vine.....	15
Antirrhinum.....	20	Cyclamen.....	25	Lantana.....	15
Aquilegia.....	15	Cyperus alternifolius.....	25	Larkspur.....	15
Arctotis grandis.....	20	Cypress Vine.....	5	Lathyrus.....	25
Asparagus.....	30	Dahlias.....	5	Lavender.....	20
Asters.....	8	Daisies.....	20	Lemon Verbena.....	8
Asters, Perennial.....	15	Daturas.....	15	Linaria.....	5
Baby's Breath.....	20	Delphinium.....	15	Linum.....	8
Ball of Fire.....	15	Dianthus.....	5	Lobelia.....	8
Bachelor's Button.....	*5	Digitalis.....	20	Love-in-a-Mist.....	8
Balloon Vine.....	25	Dimorphotheca.....	15	Lychnis.....	20
Balsams.....	10	Dolichos.....	15	Mallow Marvels.....	*15
Begonias.....	15	Dusty Miller.....	*5	Marigold.....	5
Bellis perennis.....	5	Echinocystis.....	*30	Marvel of Peru.....	5
Boston Ivy.....	15	English Double Daisy.....	5	Maurandya.....	*25
Blanket Flower.....	20	Eschscholtzia.....	5	Mexican Fire Plant.....	20
Blue-eyed Daisy.....	20	Euphorbia.....	20	Mesembryanthemum.....	*5
Blue Day Flower.....	20	Evening Primrose.....	5	Mignonette.....	5
Blue Salvia.....	*15	Everlasting Flowers.....	*	Mimosa.....	8
Brachycome.....	8	Feverfew.....	20	Mimulus.....	8
Brazilian Morning Glory.....	8	Fire-Cracker Plant.....	*8	Mina lobata.....	5
Browallia.....	20	Fire-on-the-Mountain.....	20	Mirabilis.....	5
Brugmansia arborea.....	15	Forget-Me-Not.....	15	Monkey Flower.....	20
Bush Eschscholtzia.....	8	Four O'Clock.....	5	Moonvines.....	20
Butterfly Pea.....	15	Foxglove.....	20	Morning Glory.....	5
Cactus.....	30	Fuchsia.....	*30	Mountain Honey- suckle.....	20
Calendula.....	10	Gaillardia.....	20	Mourning Bride.....	20
California Poppy.....	8	Geraniums.....	20	Musk Plant.....	20
Campanula.....	8	Gloxinia.....	15	Nasturtium, Dwarf Tall.....	8
Canary-bird Flower.....	*	Godetia.....	15	Nicotiana.....	20
Candytuft.....	5	Gourds.....	15	Nigella.....	8
Cannas.....	*15	Grass Seed.....	*	Oenothera.....	5
Canterbury Bells.....	*15	Gypsophila.....	20	Ornamental Grasses.....	*
Cardinal Climber.....	5	Helianthus.....	15	Ostrich-Plume.....	20
Carnations.....	8	Helichrysum.....	5	Oxalis.....	20
Carnations, Perennial.....	8	Heliotrope.....	15	Palm.....	15
Castor Beans.....	15	Heuchera sanguinea.....	20	Painted Tongue.....	5
Celostia.....	20	Hibiscus.....	*15	Pansies.....	8
Centaurea.....	*5	Hollyhocks.....	5	Passion Flower.....	50
Centrosema.....	15	Hop, Japanese.....	15	Peas, Sweet.....	15
Chinese Bellflower.....	20	Horn of Plenty.....	15	Pelargoniums.....	20
Christmas Orchid Flower.....	20	Humble Plant.....	8	Pentstemon.....	20
Chrysanthemums.....	5	Hunnemannia.....	8	Perennial Peas.....	25
Cigar Plant.....	*8	Hyacinth Bean, Jap- anese.....	15	Petunias.....	20
Cineraria.....	5	Ice Plant.....	*5	Pheasant-Eye Pink.....	5
Clematis, Tuberous.....	*30	Impatiens Sultani.....	15		
Cleome pungens.....	20	Ipomœas.....	5		
Cobæa scandens.....	15	Iris.....	*50		

(†From the Catalogue of Conard & Jones)

GERMINATION TABLE

	Days		Days		Days
Phlox.....	20	Scarlet Sage.....	*15	Sweet Peas.....	15
Pinks.....	5	Schizanthus.....	20	Sweet Sultan.....	*5
Platycodon.....	*30	Seeds for Vases and		Sweet William.....	10
Poppies.....	20	Baskets.....	*	Ten-Weeks Stocks....	
Portulaca.....	20	Sensitive Plant.....	20	Umbrella Plant.....	
Primroses.....	*15	Shasta Daisy.....	20	Verbena.....	8
Primulas.....	*15	Smilax.....	15	Vinca.....	*
Pueraria Thun-		Snapdragon.....	20	Violas.....	*
bergiana.....	15	Solanum.....	*20	Violets.....	*
Ragged Robin.....	20	Spider Plant.....	20	Wallflower.....	5
Ricinus.....	15	Stocks.....	5	Water-Lilies.....	*
Rose.....	*	Stokesia.....	*	Wedding Bells.....	15
Rose, Moss.....	20	Straw Flower.....	5	Wild Cucumber Vine..*	30
Salpiglossis.....	5	Summer Bush Cypress	15	Youth and Old Age...*	5
Salvia.....	*15	Sunflower.....	15	Yucca.....	*
Scabiosa.....	20	Sun Plant.....	20	Zinnias.....	5
Scarlet Runner.....	8	Swan River Daisy....	8		



An early Summer scene



D.M.C.

most pleasing combination of garden favorites

Some Garden Favorites and How to Grow Them

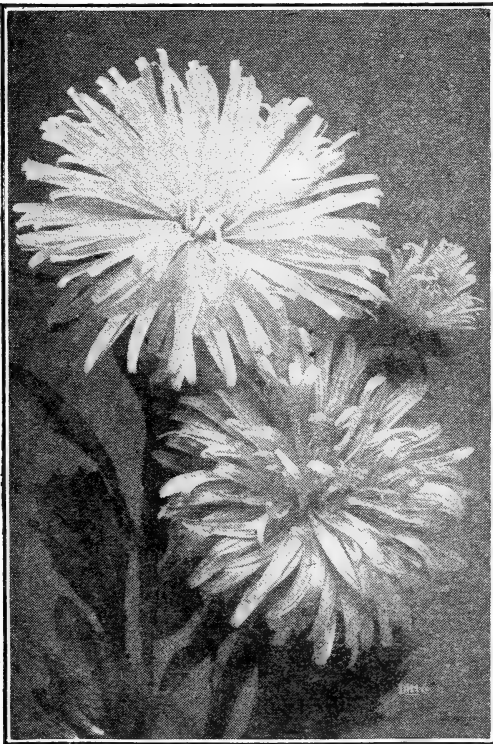
Asters—Cannas—Campanulas—Coleus—Columbines — Dahlias
Chrysanthemums and Daisies—Delphiniums—Foxglove—
Geraniums — Gladioli — Hibiscus — Irises — Lathyrus — Lilies
—Marigold — Pansies — Peonies — Petunias — Phlox — Pinks
—Poppy—Salvia—Snapdragons—Sweet Peas—Sweet William—
Tritomas—Tuberous Begonias—Zinnias

THE ASTERS

ASTERS as they are recognized today are what have resulted from the development and improvement of the China Aster. The real Asters are small, Daisy-like flowers, resembling the single-flowered China Aster and known in England as Michaelmas Daisies.

There are all sorts of types of China Asters, all of which have been improved from one single-flowered sort. They are annuals, easy of culture, and with their profusion of bloom and color make a brilliant garden display, particularly in the Autumn. The best types to grow are the Branching, with long, strong stems; the Crego, Hohenzollern, and Comet, all of which are flat-flowered; the King, which has long needle-like petals, and the ball-like sorts, as Victorias, Truffaut, and Peony-flowered Perfection. There are early, medium and late kinds. The later flowering sorts are most successful with the home gardener.

The seeds of the earlier varieties may be started in the hotbed or window in March. For late Summer and Autumn



China "Comet" Asters
To be had in all sorts of types and a
multiplicity of colors

flowers sowings may be made in the open ground in April or May. Vigorous growth is encouraged by two transplantings. When the seedlings are large enough to handle transfer to flats or beds. Transplant again when the plants are three or four inches high, setting them where they are to bloom, twelve to fifteen inches apart; the branching sorts need more room to develop. Do not let the plants get a check in any way due to want of water, or cramping of root system. A rich, well prepared soil suits them best. Wood ashes or slaked lime incorporated with the soil will do much to prevent root and stem diseases to which Asters are liable.

THE CANNAS

These handsome subjects mark a wonderful development by the plant breeder. At first the Cannas were only prized as foliage plants; the petals were narrow and the flower was very unattractive. Now we have an excellent series of wonderful Cannas with superbly colored gigantic flowers, all of which are of easy culture and great value for the garden, where they are planted in formal beds or mixed in the perennial border.

Starting Cannas

In March the roots, which have been stored during the Winter, are best cut up so that there are one to three buds or eyes on each piece. They can then be planted in boxes of sand or sandy soil and placed in a light window. If the season is late and the plants get rather large, they should be placed in pots; those four inches high are generally large enough.

Cannas are tender and should not be planted in the open ground before all danger of frost is past. There is no advantage in planting too early, for they do not make good growth till the ground becomes thoroughly warm.



Cannas are easy to grow and well repay the slight labor required

Preparing Canna Bed

Spread a wheelbarrow load of well-rotted manure over each square yard of soil and dig deeply: the soil should be loosened to a depth of fifteen to eighteen inches. The deeper the digging the better will the bed absorb water. Large-leaved plants always require lots of water. Careful attention must be given to the question of the planting of varieties of harmonious colors as well as of the proper heights. We give herewith a list of select varieties:

Eureka, white, 4½ ft. high. Sensation, pink, 3 ft.; City of Portland, pink, 3½ ft. King Humbert, red, 4½ to 5 ft.; Meteor, red, 5 ft.; Firebird, red, 4 ft.; Fiery Cross, red, 4 ft. Favorite, yellow and variegated, 4½ ft.; Panama, yellow and variegated, 3 ft.; San Diego, yellow and variegated, 4 ft.

A supplementary list of equally fine varieties contains the following: Wyoming, reddish bronze leaves and ochre colored flowers; tall and good; Richard Wallace, soft creamy primrose trusses and green foliage; effective and desirable; compact habit; Venus, deep pink flowers, dark green foliage, sturdy grower: Souv. de Anthony Crozy, brilliant scarlet and gold, flowers large, a free bloomer and dwarf; J. D. Eisele, rich orange scarlet, 5 ft., one of the very best. Rosea Gigantea, has immense flowers of a deep old rose color; one of the finest and most beautiful; Mrs. Alfred Conard, salmon pink, large and fine; Feurnur, intense orange, 5 ft., a good Canna; Gustav Gump-



Even as a foliage plant, without flowers, the Canna is beautiful

per, the best golden yellow. Others of prime excellence comprise Florence Vaughan, tall growing, flowers rich yellow and scarlet. Mme. Crozy, dwarf brilliant scarlet with gold center; Prof. Myers, dark foliage, crimson flowers; Gladiator, resembles Florence Vaughan, or vice-versa, but not so tall and has more red splashes on the yellow; Wm. Saunders, reddish foliage and scarlet trusses; Queen Charlotte, matures early, flowers crimson with yellow edge; Jean Fiscot, one of the dwarfest, flowers crimson; Reubens, medium grower, dark foliage and crimson flowers.

For the sake of its handsome shining green foliage, and its general stateliness, *Canna gigantea* is recommended. It is very handsome next to the walls of one's house.

Cannas usually spread a little and, as they are large growing, should be planted at least eighteen inches apart. The Orchid-flowering varieties require from twenty to twenty-two inches between the plants. In planting firm the roots well and cover with four to five inches of soil.

Cannas from Seed

Because of the extreme hardness of the shells, *Canna* seeds should be soaked for a few days before planting. The seeds are also frequently nicked with a file or sharp knife. Sow half an inch deep in a sandy loam in a box or pot and place in a hotbed or some other warm location. When large enough to handle pot off singly and keep under glass until the open beds are ready to receive them.

DIGGING AND STORING. When the tops are killed by the frost the roots can be dug in the morning, and if the day is sunny they can be left to dry. They must be stored where they can be kept warm, for if they are cold and damp they decay. They may either be buried in sand or soil, although sand is preferable. If a greenhouse is available the roots may be stored under the benches. It is really unnecessary to wait until the tops die down, for the beds may be wanted to plant with bulbs, in which case let the Cannas grow as long as possible and then dig them.

THE CAMPANULAS • Bellflowers

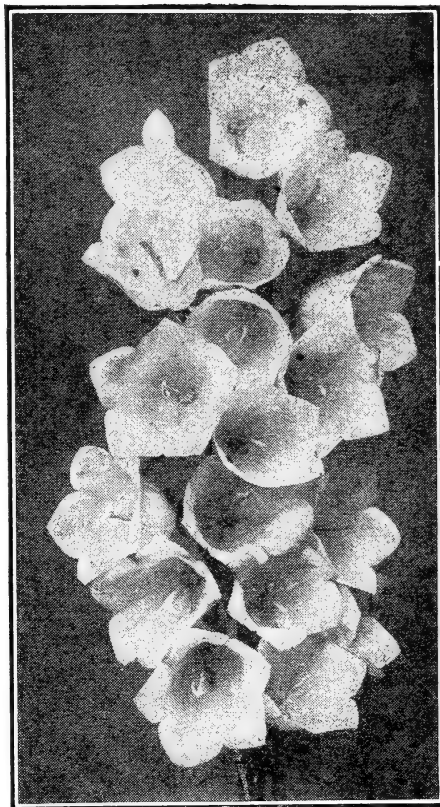
The Bellflowers have ever been popular; the form of the bell appeals to everybody. All round the world these Campanulas have been christened with names which show the admiration of the folks for them.

The number of species under cultivation is great. None is more popular than the huge Canterbury Bells (*C. Medium*) and form known

as Cup and Saucer (*C. M. calycanthema*) from its having saucers beneath the flaring chalice. Bearing smaller flowers and less cup-like is the graceful Peach-leaved Campanula (*C. persicifolia*), named from its narrow leaves. There is also the stately Chimney Campanula (*C. pyramidalis*) the tallest growing sort.

Two smaller-growing but very ornamental sorts must be mentioned, namely, the Carpathian Harebell (*C. carpathica*) and the Rocky Mountain Harebell (*C. rotundifolia*).

Canterbury Bells are biennials, i. e., they are sown one year and bloom and die the next. Sow seed in the Spring and transplant in late Fall, putting the seedlings where they are to remain permanently, or in cold frames until time for planting out. Protect during the Winter with leaves or stable litter, but avoid covering the tops or crowns.



Canterbury Bells

COLEUS

For grouping on lawns, ribboning and carpet bedding the Coleus is one of the most useful and attractive of ornamental plants. It is a tender perennial, grows from a foot to two feet high, and the colors and variegations of its foliage are rich and beautiful. Using shallow pots or pans, sow the seed in March or April in good, mellow soil, covering lightly with earth; maintain an even temperature and do not allow the soil to become dry. When the weather is settled and warm, transfer the seedlings to the open ground, preferably in a sheltered situation. Under favorable conditions, they will attain perfection the first season.

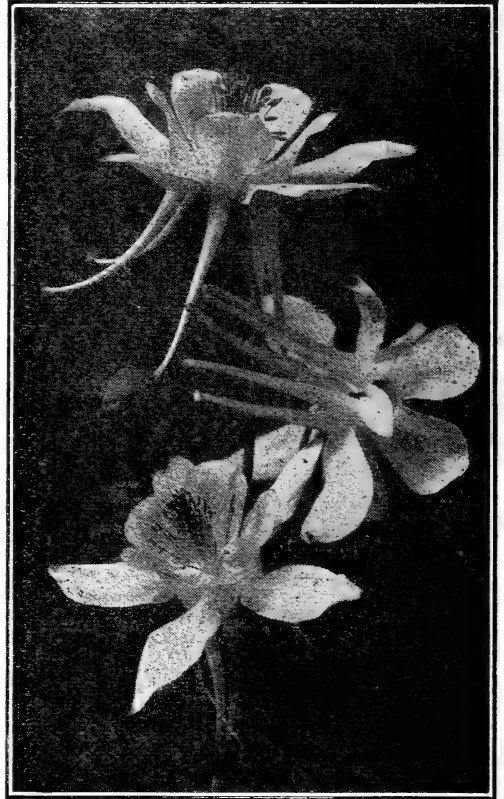
As a border for beds of flowering plants, Coleus stands without a rival, and, by judicious pinching out of the tips of the shoots, the plants can be maintained at any desired height, to conform to the size of the other plants in the bed, and still retain their beautiful color effects. The Coleus always does best when planted out in the full sunlight, yet, at the same time, it is a plant that can be recommended for partially shaded situations as well.

THE COLUMBINE · *Aquilegia*

Columbines are so frail, yet so strong; the forms are so numerous and the flowers so varied in color, that they are deserving of a prominent place in every garden.

Seed sown one year blooms the next. The crowns gradually increase in size until huge clumps are formed. Sow the seed in a prepared bed or in the cold-frame in early Summer and wait until the next year for results.

Some of the most charming forms to grow are the Rocky Mountain Columbine hybrids (*Aquilegia caerulea*), deep blues and pinks, long spurred; *A. chrysantha* hybrids superb clear lemon yellow long spurred sorts; *A. canadensis*, the yellow and red wild Columbine of the East; and *A. vulgaris*, a short-spurred form.



The Columbine

Seed sown one year blooms the next

THE DAHLIA

There is little question why the Dahlia has gained in popularity. The newer varieties win our admiration as soon as we see them. Should you insist that the Dahlia is very formal and stiff we should answer that the ones to which you refer are perhaps stiff because they were carefully bred for regularity and symmetry, and you would look upon them as triumphs of the breeder's art if you knew that the modern varieties have been evolved from several wild Mexican species. Near Mexico City, at an altitude of one thousand to two thousand feet above that of the city, we find the wild forms on the sides of the deep ravines in partial shade. It is hot in the daytime, but really gets cold

at night. How nicely this explains why our varieties bloom best in the cooler days of Autumn.

It was at the end of the eighteenth century before the Dahlia reached Europe and soon after three varieties were known. Soon doubles were produced. The flat ones were first very popular; then the ball-shaped blossoms of the show type were greatly in evidence. Between 1830 and 1860 the interest in Dahlias became intense, and great premiums were paid for good varieties. Then in 1870 fol-

lowed varieties which were flatter, less formal and delicately colored. In 1872 a new species, Dahlia Jaurezii, was introduced. This is the progenitor of the Cactus Dahlias, a type universally admired at present because of its graceful form and delicate coloring. The Cactus types are combined with the singles to produce the Peony-flowered forms from which have been eliminated the weak stems, resulting in an exalted form, and well-shaped blooms of matchless colors borne upon wonderfully strong plants. The large-flowered singles are having a great wave of popularity now, for they are often beautifully colored. In 1899 there was a pretty type produced in France in which there is a row of smaller and much more slender petals, of a different color, surrounding the central disk of an otherwise single flower. This type has been termed the Col-larette Dahlia.



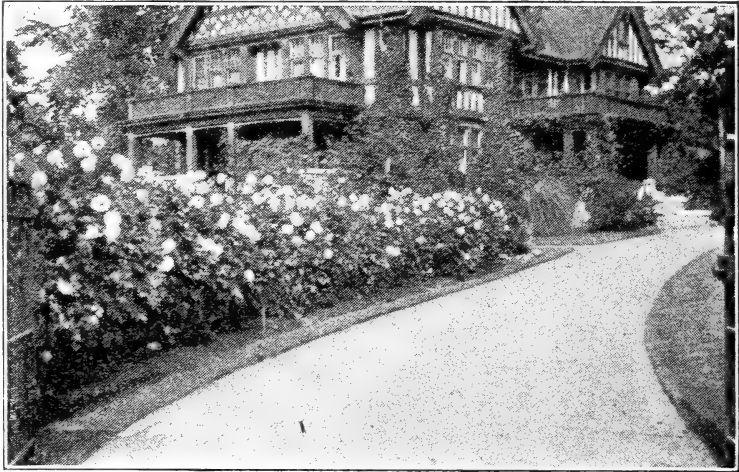
Duplex Form of Dahlia

The Dahlia is essentially the poor man's flower and most nobly does it respond, in its innumerable types, to its really trivial needs

Cultivation

The Dahlia is typically Fall blooming and succeeds in any location where killing frosts do not come too early. If the plants are not seriously checked in their growth by frosts, they will usually bloom very nicely

in most parts of New York State, New England and the Central West. The soils best adapted to Dahlias are those which are somewhat sandy, but they will grow on heavy clay. The regions which are influenced more or less by the ocean, that is, where cool nights are prevalent, are perhaps the most noted for Dahlia growing, especially Long Island, New Jersey, Rhode Island, Maryland and Massachusetts in the East, and without a doubt the best Dahlias we have ever seen were in British Columbia, Northern California, Washington and Oregon. Heavy soils may be lightened by coal ashes, sand, and coarse manure. Sandy and lighter soils will benefit by manure or clay to make them more moisture-retaining. Nitrogenous fertilizers are rarely applied, because they cause too great vegetative growth and a retarding of the flowering period.



Hedge of Dahlias surrounding a typical home in Victoria, B. C.

Starting the Tubers

The tubers should be started about April 1st in a warm, light room, merely placing them in a shallow box of sand or light soil. When the young shoots begin to show, they should be so cut that one or two eyes are allowed to remain on each piece; the eyes start from the collar (see Contents Plant Propagation.)

Time and Distance of Planting

They may be planted late in April or May, according to the season. It is better to set them out late than too early. As the Dahlia makes a large plant it should be given plenty of room; even four feet by four

feet is not too much if the variety is a large one. Planted much closer the plants are difficult to tend. The tubers should be placed about four inches deep, planting them flat or in such a position that the growing point is faced up toward the surface of the soil. Firm the roots well.

Supporting

The average root will make several shoots. Allow them to grow until they make the first set of leaves; by that time the strongest can be selected and the others cut away below the surface of the soil. Sometimes two shoots may be allowed to grow, but never more; as a rule one shoot is sufficient. Tie the shoot to a stake when about a foot high and do not neglect tying as the plant develops, for this is very important. To cause the plants to branch at any certain height, the tip is pinched out; this causes lateral shoots to start.

For Attaining Large Flowers

If the soil is carefully and diligently cultivated there will be little need for watering, which is detrimental unless consistently practiced. Thorough watering should be given each time and at regular intervals; otherwise plants will be checked and flowers will suffer.

In order that each individual flower may be as large as possible, especially in the case of the show and fancy types, which produce a great many flowers of medium size, it is best to disbud the main branches leaving only the terminal bud. It is often best to allow only six or eight branches. The singles, collarettes and pompons are rarely pruned or disbudded, the idea being to get plants with as many flowers as possible. The cactus varieties are apt to have their weak neck habit intensified by excessive pruning and disbudding, so that they should be cautiously disbudded, removing only part of the buds.

Flowers are best cut in the morning or evening and any foliage not wanted should be removed. The stems should then be placed in water up to the base of the flowers and removed to a cool place. Hard-stemmed varieties are best placed in hot water and allowed to remain until the water cools, when they should be removed to fresh cold water. Under no circumstances attempt to ship for exhibition without the pre-cooling.

Storage

When the Autumn killing frosts arrive, perhaps in mid-October, and the foliage is killed, take up the plants at once and allow them to

dry a little in the sun. Cut off the stems so that a stub of three inches is left. Then place them in a cellar where temperature will surely remain above freezing, about forty to forty-five degrees F. They may best be placed with the stems down on shelves and covered with soil or sand. When storing large tubers it may not be necessary to cover them; merely place them in a heap on shelf or floor, keeping the stems to outside. Do not let them get dried out; if they shrivel, sprinkle a little water over them. If kept too moist they will soon mildew.

The Raising of Dahlias from Seed

This is fascinating work, particularly the single forms. Of these, if the seed is sown in a frame or greenhouse in March, the plants will come into bloom in July; they will also flower if the seed is sown where it is to remain, the same as most of the annuals. The seed of the double Dahlias should be sown in February or March, and the plants grown on the same as if from cuttings. With good care they will come into flower early in September, when the pleasure commences. The certainty of getting something good and the possibility of getting a flower worthy a name, possibly better than any of the existing forms or varieties, makes this branch of floriculture of extreme interest.

The young seedlings should be set close together, not more than two feet apart; when they come into flower weed out such as are not desirable to keep. Another reason for close planting is that except for the single varieties, the plants do not attain in their first season as large growth as if from tubers.

Chrysanthemums and Daisies

The word *Chrysanthemum* has been derived from the Greek *chrysos*, gold, and *anthemon*, flower.

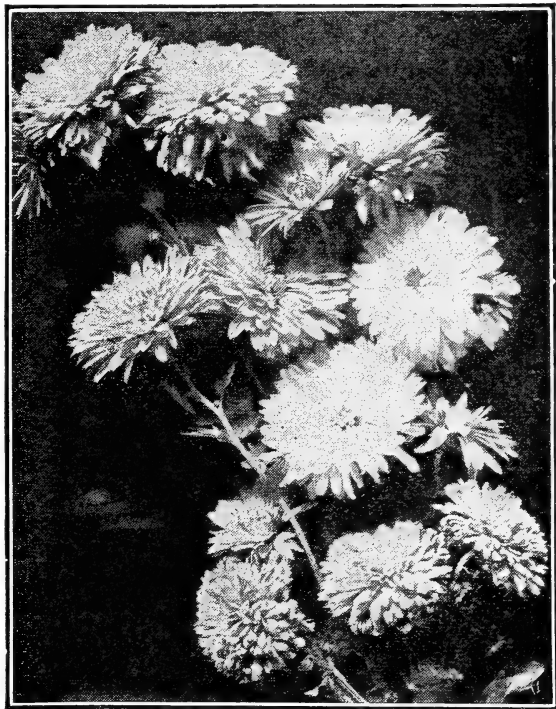
It is very interesting to see just how many plants are really Chrysanthemums. The wild Ox-Eye Daisy, the Shasta Daisy, the Pyrethrum (from which insect powder is made), the Feverfew of our grandmother's garden, the Marguerite, or Paris Daisy of the florist, as well as the monster decorative blooms of the expert culturist indoors, are all Chrysanthemums.

Some of the Chrysanthemums, or 'Mums, as the gardener affectionately calls them, are annuals. In the case of most of the annual species the blooms resemble huge Daisies. They are white or some shade of yellow, and often, as in the case of *Chrysanthemum carinatum*, they have a maroon or red ring of color at the center. The annual types can be sown in April, in the open ground, where they should be thinned to eight inches, or, if large plants are wanted, pinch

them back when several leaves tall, and place twelve inches apart. A rich, sandy loam suits them best and they surely love the sun.

They bloom profusely throughout the Summer and early Fall. The species known as Golden Feather (*Chrysanthemum præaltum* var. *aureum*) should be sown indoors in March and though really a perennial, it is treated as an annual. It is used as a yellow-leaved border plant.

An excellent characteristic of some perennial Chrysanthemums is that they reproduce themselves so nicely by the production of suckers or underground stems. One of the species which multiplies itself in this manner is the Feverfew (*Chrysanthemum Parthenium*). It is a very old plant, but it certainly bears an interesting little tufted white and yellow flower in clusters which, coming in June, is well worthy of a place in the garden. It self-sows its seed, but rarely becomes a nuisance.



A Cluster of Hardy Chrysanthemums
Propagated by cuttings or by division of the root, and also of great interest to grow from seed

Two white Daisy-like species are well worth cultivating. The first is the Shasta Daisy (*Chrysanthemum maximum*), a gigantic white field Daisy of very vigorous growth and producing flowers from June throughout the Summer. They have very good keeping qualities and are effective in the border or as a cut flower. Another species, a shrubby Daisy (*Chrysanthemum nipponicum*), blooms in the Fall and produces its flowers on the stems from the old shoots of the previous year.

The class known as the Hardy Chrysanthemums and which resemble the indoor varieties, are of two types, the button-like varieties or pompons, and the Aster-like or large-flowering varieties. Most of the varieties are hardy if protected in the Winter by dry leaves. They enjoy constant cultivation and a rich soil which has been deeply pre-

pared. They are best planted in the Spring and advice is frequently given that all old plants should be divided up and reset each year, for they exhaust the soil. Good seed is now available of this type and they may be grown successfully by this method.

As soon as the plants have grown four inches tall, especially if few plants are available, and a good display is wished, they should be pinched. This will cause them to branch freely, each shoot bearing a number of buds. From the very start in growth the plants must be staked. The greatest fault with this group is that they all fall down near blooming time, and the whole beauty of the plant is destroyed unless carefully staked. The shoots can easily be tied to stakes if the stakes are once in place. If the very largest flowers rather than the greatest quantity of bloom are wanted, feed with liquid manure when buds begin to show, and remove many of the smaller buds on each stem. Chrysanthemum blooms will be much better if a covering is placed over them during the cold Fall rains or on the nights of frosts.

THE DELPHINIUMS · Larkspurs

The charming and immensely popular Delphinium, which is better known, perhaps, by its common name, Larkspur, is well adapted for beds and borders. There are both perennial and annual sorts. For variety and beauty of blossoms, few other plants can equal the perennial Delphiniums, especially the improved English or hybrid kinds. Growing to a height of from three to six feet, they bear on their erect stems long, graceful spikes of magnificent flowers, ranging in color from pure white through all shades of blue, while the clean, curiously cut foliage shows off to advantage. If the stems are cut off close to the ground when the flowers begin to wither, second and third crops will follow and the season of blooming is thus prolonged until late Fall.

Delphiniums are easily cultivated. They succeed best in deeply dug, loamy soil, enriched with fine manure, but any well-fertilized soil will give good results. Seed sown in the hotbed or indoors in February will produce plants which should begin to bloom in the garden about the middle of June. When seed is sown in the open ground flowers may not come until the second season. As soon as the weather is favorable for transplanting, set the young plants from two to two and one-half feet apart in the bed. Apply a little bonemeal to the soil around the plants during the Summer, and in very dry weather give them a copious supply of water. Dusting the crowns with coal ashes before Winter sets in will protect them from insects. Among the

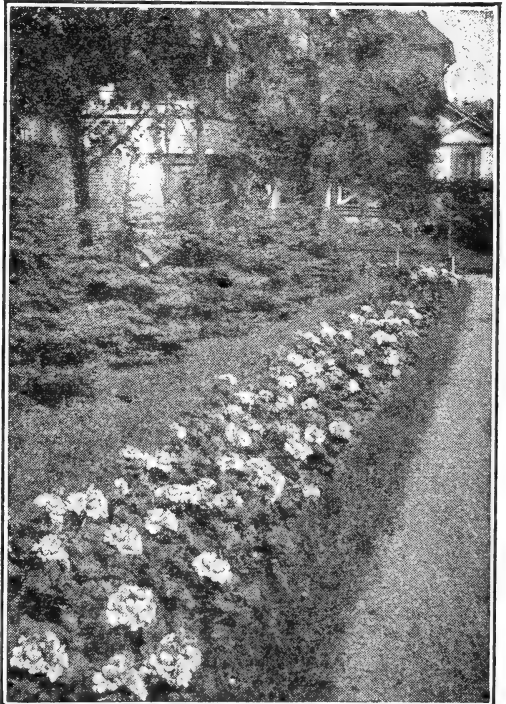
good varieties are: Belladonna, turquoise blue; Chinense, gentian blue; Formosum, deep blue with white center; Moerheimi, pure white. There are many others with larger flowers.

The annual Larkspurs bear spikes of handsome flowers and their fine colors are strikingly effective in the bed or shrubbery border. They grow two to three feet high and in a sunny situation bloom all Summer. Seed should be sown in the open ground in April.

THE GERANIUMS

An ideal plant for pots and bedding, the Geranium has always been a great favorite in both house and garden, and well deserves its commanding place among the most attractive and satisfactory of old-fashioned flowers. In every section of the country it is popular as a bedding plant and its magnificent trusses of single, semi-double or double flowers, surmounting a wealth of bright green, healthy foliage, furnish a decorative feature which never fails to gain the highest admiration. It is of vigorous habit and a profuse and continuous bloomer, the colors comprising a great number of shades and combinations, with pure white, rose, salmon pink, scarlet and crimson predominating. For many years the Geranium has periodically gained acquisitions of wonderful novelties from both European and American introducers, with the result that today it carries a longer list of varieties than most other plants in cultivation. Among the interesting and beautiful types are the Cactus-flowering, the Ivy-leaved, the scented-leaved and those bearing variegated foliage.

Geraniums may be propagated by sowing seeds in a hot-bed, but for ordinary garden purposes the method of raising plants from cuttings is generally preferred. The best time



The Geranium well deserves its commanding place among the most satisfactory of old-fashioned flowers

to take cuttings is when the plants have ceased flowering and they may be successfully struck in a propagating house or a frame, using pure loam mixed with sand and lightly pressed into small pots well drained with potsherds. Side shoots which have not flowered, cut close to the stem, are considered the best cuttings. They should not be placed in the pots before the wound has dried up. When the pots are filled give them a gentle watering and keep them in a temperature of fifty to fifty-five degrees. Nipping off the top buds will induce symmetrical and bushy growth. Another way to increase by cuttings is to place the cuttings in shallow pans and then give them the usual treatment. In the garden bed the soil should be thoroughly pulverized at the time of digging and mixed with well-rotted manure. Transplanting may be done as soon as the weather has become warm and settled. Established plants cut down in the Fall are transferred to pots and held during the Winter in a temperature of about forty-five degrees.

Among the best varieties are S. A. Nutt, scarlet; Beaute Poitevine, orange rose; Mrs. Lawrence, salmon pink; Mme. Jaulin, peach pink; Mrs. E. G. Hill, orange and white; La Favorite, dbl. white; Alphonse Ricard, orange scarlet; Jean Oberle, soft flesh color with pink center; Mme. Buchner, snow white; and Dina Scalarandis, blush.

THE FOXGLOVE · *Digitalis*

For garden and shrubbery borders the dignified and stately Foxglove has always been a great favorite. It is also extensively planted for naturalizing along the edges of woods and in other suitable places, where it self-seeds and flourishes. Rising to a height of three to five feet from masses of broad, dark green foliage, the robust stalks produce long spikes of beautiful tubular flowers, which give a highly ornamental effect to any garden. The colors are bright and varied, most of the strains being prettily spotted or blotched. Some of the newer introductions rival Gloxinias in shadings and markings.

The Foxglove, which is a biennial, does well in any good garden soil, and prefers shady situations. Sow the seed outdoors in Spring and transplant the seedlings where they are to remain permanently or into a coldframe, where they make extra strong plants for a second transfer. They will produce their flowers the next season.

THE GLADIOLUS

Here we have a regal flower stately enough for the finest mansion, as well as a democratic flower charming for the cottage window and home garden. Each year finds new uses for the Gladiolus, which now holds first place among the Summer blooming bulbs. First, because of the

great range of color; secondly, because of wonderful keeping qualities, each spike keeping over a week; thirdly, because of its easy cultivation, primarily the same as that for Potatoes; and, fourthly, by the proper choice of established varieties they can be commended because of their cheapness. This flower is extensively utilized for all kinds of decorative work. Large vases or baskets of the stately flower spikes fill a place quite distinct from any other flower. As a garden subject the Gladiolus is unexcelled for furnishing a long season of bloom, extending from mid-July until frost, either in a bed, in which case the plants should be very close, or in clumps in the herbaceous border.

The best soil for the Gladiolus is a medium loam. It appreciates good fertility, but seems sensitive to any manure in contact with the bulbs. Manure is good if applied in the Autumn previous to planting. The best fertilizer for general use is one that would be called a Potato fertilizer, rich in potash and phosphoric acid, both chemicals being useful in the proper formation of good bulbs. Bonemeal is also extensively used. Liquid manure, when the buds are forming, seems beneficial.

Gladioli are not hardy, except some varieties of Lemoinei, and even these require protection in New York State. Planting should be deferred until all danger of frost is past. A well-planned succession in planting is advisable. The depth to plant is determined by the character of the soil. In the lightest soil seven or eight inches is not too deep, but in a heavy clay four or five inches would be a sufficient depth. There are two reasons why the bulbs should be planted as deep as the character of the soil will permit: First, the Gladiolus is moisture-loving, and in deep planting its roots are in the cooler moist soil; secondly, the soil acts as a support, no other support for the stems being necessary ordinarily. Commercially, the bulbs, or as they are more properly called, the corms, are usually planted in rows, often two rows, about six inches apart, in the furrow.



There should be given space in every garden for a planting of Gladioli

Upon the approach of frost the corms are dug, but the stems are not removed. They are then stored in an airy place to dry thoroughly. After several weeks the last year's exhausted corms and the old stems may be removed and the stock cleaned. The best storage temperature is from 40 to 45 deg., and in a rather dry atmosphere. If the corms become heated they start prematurely; if too humid they rot or start into growth. A shallow tray three or four inches deep insures the corms against heating.

Propagation

(1) By seeds. By this method new varieties are obtained, but the standard varieties, being hybrids, do not come true when started from seed. (2) By cormels, or "spawn" (the small, hard-shelled little cormels borne upon the old ones). These, if planted (preferably in a 3-in. flat) during the Spring following the season in which they were produced, will bloom one or two years later, or usually one year sooner than from seed. (3) By the annual renewal of corms of which there are from one to six, produced above the old corm each year.

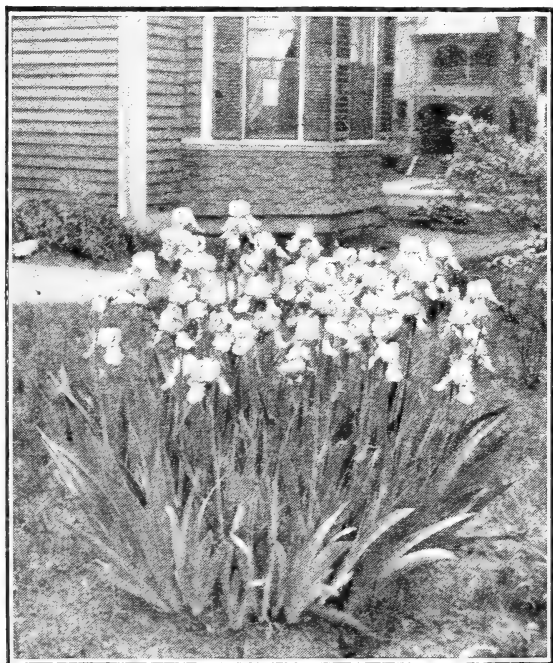
THE HIBISCUS • Marshmallow

Blooming in August and September, the Hibiscus is one of the hardiest of garden perennials and as it attains almost the dimensions

of a shrub it is especially effective when planted along the shrubbery borders. The plants are very vigorous, with ample foliage, and produce immense single flowers, ranging in colors from pure white with deep pink eye to bright crimson. They are easily raised from seed and are rapid growers and free bloomers.

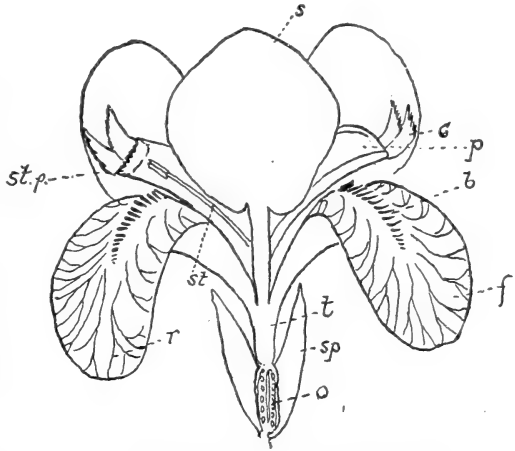
THE IRIS

Could the real beauty of the coloring of the Iris be expressed in words, such a description would be a masterpiece. The word "Iris" has come from the Greek for rainbow.



Year after year these Irises give prodigal returns for minimum care

It is the colors of the rainbow we deal with in growing Iris. When the form of the Iris bloom is considered we realize that it is most dainty and elegant and surpassed by few other flowers. The fragrance of many varieties is so dainty that it vies with that of any Rose. The adaptability to varying conditions, such as excessive moisture, continued drought, extended freezing and almost perfect baking, is remarkable. The rapid reproduction of most varieties is an important point in its favor. Because of all of these favorable attributes we commend the various forms of this incomparable flower.



Typical German Iris Bloom

s, standard, p, pistil; c, crest of pistil; st. p. stigmatic pocket; st, stamen; f, fall; t, tube; sp, spathe valve; o, ovary; r, reticulation; b, beard.

We shall mention only the forms of easiest growth. They will be sufficient until one realizes the true range of excellence which is found in the roll of its one hundred and forty species; then you will grow Californian Iris from seed, you will erect frames especially for the proper drying of your *Oncocyclus* Iris and no amount of labor will be too much if the new variety can only be made to bloom for you. That is for the future.

To appreciate the Iris one should have a little idea of what its parts are. The flower consists normally of three petals which stand upright, and three which droop more or less; these are well named, respectively, the standards and the falls. Inside of the standards are noticed three petal-like parts; these are actually lobes of the pistil, the female parts of the flower; it is a most peculiar formation, especially when we know that the little fringed pocket at the apex of each is really the stigma or part which receives the pollen. The two-forked tip of the pistil is called the crest. Just beneath the pistil is a stamen, the male part of the flower. If we look at a German Iris we will find a very heavy beard on the base of the fall, while the Japanese and Siberian Irises do not have this tuft of hairs. In some Irises the standards are very small, often smaller than the crests of the pistil. Many times the standards, though large, do not stand upright at all.

There is a notion that Irises are all water loving; this is not true. Two Irises only can be planted in the water; these are the common Blue Flag (*Iris versicolor*), our little wild Iris, and the yellow European Iris (*Iris pseudacorus*). These two Irises may well be used in water gardens, but they will succeed perfectly in ordinary garden soil. The wild Iris is hardly as beautiful as some of the others that might be grown, but the yellow European Iris has luxuriant foliage and large, clear yellow flowers, and deserves wider popularity.



The wonderful Japanese Iris (*I. laevigata*, or *I. Kaempferi*), colonized. While enjoying a moist, open situation this Iris does well in a variety of soils and positions

The Japanese Iris (*I. Kaempferi*) and the Siberian Iris (*I. sibirica*) thrive very nicely at the edges of pools; they will not grow with their crowns submerged, however. The flower of the Japanese Iris differs from the others in being flat, the standards not being upright. There are several forms of the flower; some have six petals and others, because the standards are much abbreviated, are called three-petaled Iris. The flowers are very large. They enjoy good fertility and a constant stirring of the soil, which should never bake over the roots. The

Japanese Iris likes to be flooded when in bloom, but at no other time. They bloom later than the other sorts and varieties can be selected which bloom from mid-June till nearly the end of July.

The Siberian Iris, with its blue or white flowers and grass-like foliage, is indeed a beautiful garden subject. The spikes are also effective in vase arrangements. The white variety, Snow Queen, with its golden blotch on the falls, is excellent, as are also the intense blue *orientalis* varieties. Neither the Japanese nor the Siberian Iris is insistent upon being planted in moist soil.

Under "Bulbs" we have given a discussion of the Spanish and English Irises.



Iris border backed with shrubs in a semi-wild garden

Perhaps no group is so easily grown, requiring as little care as does the German Iris group. They are very hardy and stand all sorts of adverse conditions, growing in the parched soil under the eaves of houses, thriving where children tramp the soil to the hardness of a cement pavement, blooming under trees choked by grass, and still give flowers as pretty as an orchid. They should always be planted quite on the surface of the soil, not deeply, and are best placed in bold groups. So rapid is the multiplication that if a fine variety costs a dollar it usually produces so rapidly that the same plant will give

five or ten dollars worth of stock for another year. The dwarf varieties of German Iris are known as Pumila Hybrids. When the tall varieties were crossed with the dwarf varieties an intermediate group resulted, known as Intermediate or Interregna varieties. The blooms are large and most exquisite in color. The range of colors in German Iris is extraordinary, varying from pure white to deepest yellow, purple and violet and including delicate lavender, blue and even approaching pink. The Pumila varieties are the earliest to bloom in this group, usually in early May. They are followed by the Intermediate, then last, the tall, a few of which open in late May or early June.

It is interesting to know that *Iris florentina*, the old-fashioned sweet, early-blooming, pale lavender-white species, is the orris-root of commerce and believed to be the original of the *Fleur-de-lis*, or French national floral emblem. The belles of ancient Greece grew it both for flowers and root, and the growing of this root is a leading industry of northern Italy. The rhizomes are dug in the Summer and peeled to remove the outer bark. The separate joints are laid aside to dry until the end of two years, when they will have acquired a delicate fragrance of Violets. The root pieces, which have a white appearance, are brought to the market by perfumers who powder them for dentifrices or sachet powders, or when distilled with water form the oil of orris, the basis of many perfumes.

Almost all Irises like sun. The best fertilizers for them are wood-ashes and bonemeal. The German Iris likes lime; the Japanese Iris is thought not to like a calcium soil. Most Irises are sensitive to active manure. After the first year there will be little need for protecting any but the weakest plants.

They are best transplanted after blooming, when the leaves have matured; this will be in August or September, not much later, for roots should become established before freezing. The Spring is considered a poor time to move them. When Iris clumps begin to choke themselves out by covering the ground so that young shoots have difficulty in establishing roots, they should be broken up and set in another place. Due to the prolificacy of German Iris this will be necessary every third year.

LATHYRUS · Everlasting Pea

The *Lathyrus latifolius*, or Everlasting Pea, is a native of England, where it is extremely popular. Considering its great value as a decorative climber, it is not as extensively cultivated in this country as it should be. To all who love a flower garden it can be recommended as a most desirable plant. It is very hardy, thrives in common garden soil, and the vigorous, leafy vines, which attain a height of six to eight feet, rapidly cover the trellis, wall or stump against which they

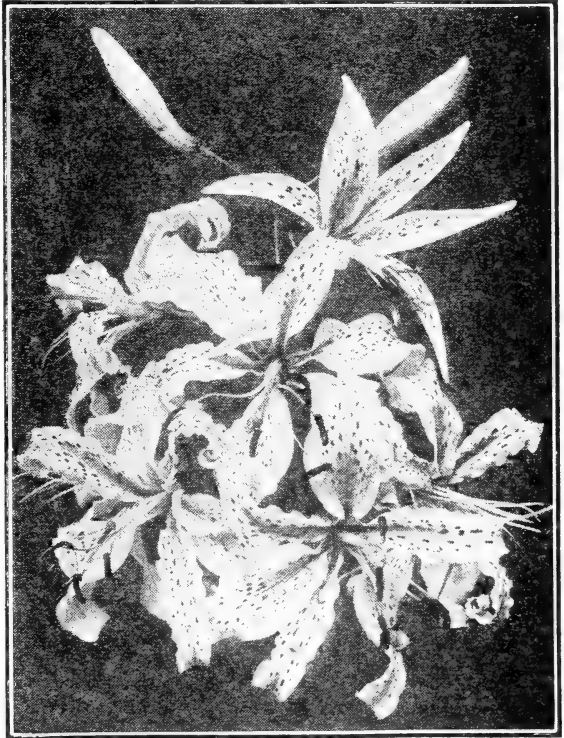
may be growing. Beginning early in the season, the plants bloom all Summer. The flowers, resembling Sweet Peas, are freely produced in clusters, the colors including white, bright pink, rose and crimson; they are very showy and fine for cutting.

Roots can be bought from the nurseryman in March or early in April, to be planted immediately. A deep, cool soil, that is, one that does not dry out readily in Summer nor get fiery hot, is best adapted. A moderately sheltered or slightly shaded place is recommended. Given a deep, fertile, moist, but not water-logged soil, these Everlasting Peas will flourish year in and year out. A mulching with barnyard manure is good in Summer or applications of weak liquid manure. Two that deserve special attention are the Pearl, white; and rotundifolius, with carmine flowers.

THE LILIES

Everyone who has a pretty garden, some time, sooner or later, takes up the growing of Lilies. They are the charm of the border wherever they are planted. Success with Lilies is not difficult if one confines himself to a few sorts which he can grow. Lilies are of such

diverse requirements that it is only by careful preparation of soils and individual study of their needs that all kinds can be grown successfully in any one location. The Tiger Lily seems to grow as easily as most weeds and is not even choked by them. Other Lilies prefer good soil, usually light and enriched heavily with peat and leaf mold. Manure should not be used except as a mulch. In planting Lilies, then, it seems best to either add the needed sand, peat and leaf mold, or to actually remove the native soil to a depth of two and a half feet. A good thick layer of leaves or leaf mold is always beneficial as a Winter mulch



Lillium auratum

One of the largest and handsomest of all the Lilies

unless there is a growing ground cover. In Spring the young shoots are frequently injured by late frosts and it is well to use a few evergreen boughs for protection. For the landscape they are easily combined with shrubbery or the herbaceous border, where they are perfectly at home. The wild yellow or Canada, the Turk's Cap and the yellow speciosum or Henryi succeed admirably in beds of Rhododendrons; especially when the Rhododendrons do not crowd them too much. The Gold-banded Lily should be planted among shrubs so that the roots are continually shaded, and where a fair degree of moisture is maintained. The Coral and the Thunbergian Lily are excellent planted among ferns, which furnish an excellent landscape effect besides. The Madonna grows nicely by itself and is most useful for clumps under pergolas or as an edging for walks.

The following are species which should succeed with a little care in many gardens:

CANADA LILY. (See *Lilium canadense*.)

GOLD-BANDED LILY. (See *Lilium auratum*.)

HANDSOME LILY. (See *Lilium speciosum*.)

LILIUM AURATUM (Gold-banded Lily). White, spotted brownish red and with a yellow band on each petal; three to twenty-five flowers on each stalk; flowers often a foot across; July to August; four to eight feet. One of the largest, but it is very capricious and may last only a year or two. Does well in Rhododendron beds, but it must not be crowded. Plant six to ten inches deep. Mulch with very well decayed manure. Likes the sandier or the more peaty soils.

LILIUM CANADENSE (Canada Lily, or Wild Yellow). Light orange, spotted brown; flowers drooping; July; three feet; very hardy. Prefers moist soil. Will thrive under garden conditions. Plant three inches deep.

LILIUM CANDIDUM (Madonna Lily). White, yellow anthers; June-July; four feet; hardy. Thrives well in ordinary gardens. Dislikes being moved. Transplant in August. Leaf growth takes place in September. Excellent garden subject. Superb combined with Delphinium or Aconitum. Plant four inches deep.

LILIUM CHALCEDONICUM (Scarlet Martagon Lily). Bright red; small; July; three feet. One of the best small-flowered Lilies. Does not flower well first season after being transplanted. Do not transplant later than October. Ordinary garden loam, good drainage. Plant four inches deep.

LILIUM ELEGANS (Thunbergian Lily). Red and orange; erect; May to July; only a foot or two tall. Likes full sunshine, and plant as deep as six to eight inches. Thrives in garden soil but prefers peat, light loam and leaf mold. Closely resembles *L. davuricum* and *L. croceum*, but the latter is taller.

LILIUM HENRYI (Yellow Speciosum, or Henry's Lily). Deep salmon orange; August to September; six to twelve feet; very vigorous; excellent for border; very hardy. Give lots of water at blooming time. Any good soil. Plant six to eight inches deep.

LILIUM PHILADELPHICUM (Wood Lily, or Wild Red Lily). Scarlet, yellow center, dotted maroon; erect flowers; July to August; eighteen inches; very hardy; sun or shade; good loam. Best specimens found in wild; often hard to cultivate. Plant three inches deep.

LILIUM REGALE (**MYRIOPHYLLUM**) (Regal Lily). White, slightly suffused pink, and canary yellow at center; fragrant; hardy and vigorous. Thrives in any peaty soil when it becomes acclimated.

LILIUM SPECIOSUM (Handsome Lily). Pink, white, red varieties, spotted crimson; petals very reflexed; rubrum is most common variety; August; two to three feet. Does well in either sun or shade. Likes a sandy loam best, deep and rich. Succeeds admirably when planted among other perennials which shade the soil.

LILIUM SUPERBUM (Turk's Cap). Orange, flushed scarlet, spotted brown; ten to thirty flowers on a stem; July to August; six to eight feet; hardy. Good for border if soil is rather rich and moist. Excellent among low, shrubby growth. Plant four inches deep.

LILIUM TENUIFOLIUM (Coral Lily). Deep scarlet; strong, recurved; six to ten flowers on stem; leaves fine; June to July; one and one-half feet. Treat as a garden subject. Give partial shade. It is short-lived and soon declines after its best production of bloom. Grows readily from seed. Plant three inches deep.

LILIUM TRIGINUM (Tiger Lily). Orange red, spotted purple; large; petals reflexed; July to August; six feet; very hardy. Thrives in any soil; prefers sandy or peaty loam. Plant five to six inches deep. Stake or plant against wall to protect against winds.

MADONNA LILY. (See *Lilium candidum*.)

REGAL LILY. (See *Lilium regale*.)

SCARLET MARTAGON LILY. (See *Lilium chalcedonicum*.)

THUNBERGIAN LILY. (See *Lilium elegans*.)

TIGER LILY. (See *Lilium trigrinum*.)

TURK'S CAP. (See *Lilium superbum*.)

WOOD LILY. (See *Lilium philadelphicum*.)

YELLOW SPECIOSUM. (See *Lilium Henryi*.)

THE MARIGOLD

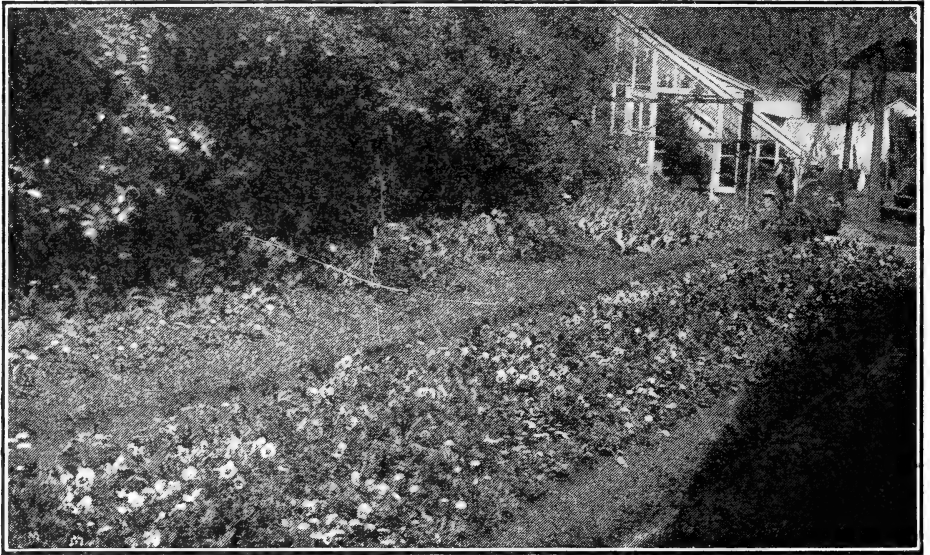
There is something captivating even about the name Marigold, and all the plants bear yellow or golden flowers. Most of us, after all, love the gold.

They can be had in heights from cushion-like dwarf (*Tagetes pumila*) of the French type, and the coarser, taller Scotch Marigold or Pot Marigold, to the three and one-half foot of the robust African ones. Like the Zinnias, they bloom profusely and for many weeks. They all love a sunny position and do reasonably well in light soil, albeit, a fairly fertile one. Seed can be sown in May where the plants are to grow, or seedlings may be raised in hot frames in boxes to be transplanted at the latter end of April.

THE PANSY

Favorites with all, Pansies are rarely omitted from the flower garden, be it large or small. Everybody loves the Pansy. The reason is

that the rich, velvety substance and brilliant colors of the flowers make it so radiantly beautiful and attractive. Nothing is more effective in Spring and Summer than a design or bed composed of a good selection of Pansies in full bloom; the dainty flowers also make charming table decorations. Hybridization and scientific culture have produced many wonderful strains, as shown in the lists annually presented to the public by the various seed firms. For instance, we now have the Giant Trimardeau Pansies, the Ruffled Pansies, the Mottled Pansies, the Butterfly Pansies and a hundred and one other sorts, all bearing flowers of a more or less gorgeous character.

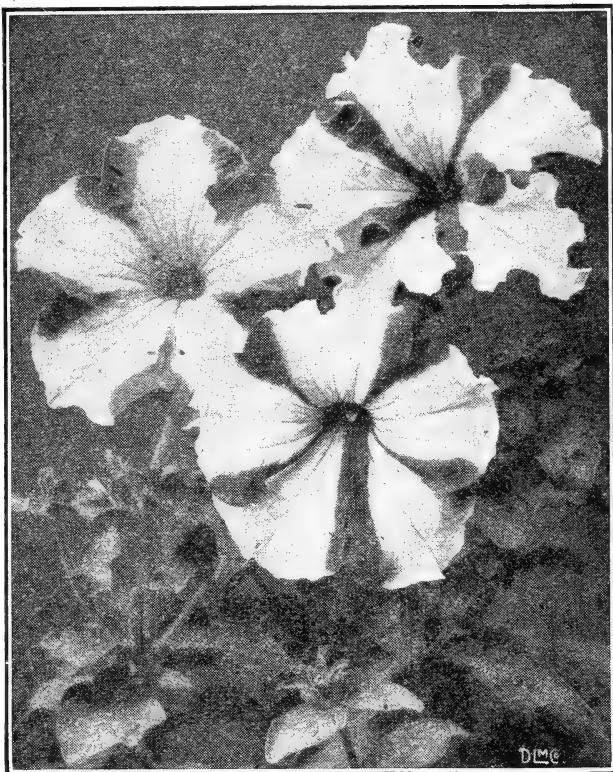


Pansies are rarely omitted from a flower garden, be it large or small

Pansy seedlings may be propagated in Spring for Summer blooming, or in the Autumn for early Spring use. Select beds sheltered from cutting winds, with the soil rich, cool and moist, but well drained. For outdoor bedding in the early Spring sow the seed in August in drills, covering one-sixteenth to one-eighth inch deep. When the seedlings are large enough to handle, thin out or transplant to stand eight or nine inches apart. Cultivate and keep the ground free from weeds, and apply water freely in dry weather. Protect the young plants during the Winter with straw or other light litter; they are sometimes carried over in coldframes. In extremely hot weather temporary shade should be provided, as the rays of the midday sun tend to injure the colors of the blooms.

THE PETUNIA

This most pleasing annual may be fittingly described as everybody's flower. It succeeds everywhere, even under unfavorable conditions, and no garden, however small, is complete without it. Given a sunny location, it can always be depended upon to furnish blooms in abundance from early Summer until late Autumn. It grows twelve to eighteen inches in height, produces single or double flowers of many exquisite shades and colorings, and makes a grand show in beds, borders, window boxes or vases. In recent years new and beautiful strains have been added to the Petunia



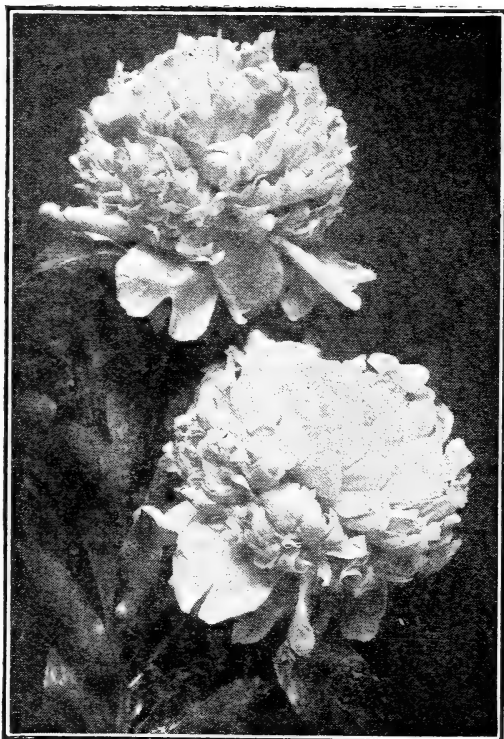
Single Petunias

Petunias succeed everywhere, even under unfavorable conditions, and no garden is complete without them

list, the blossoms being of exceptionally large size and in many cases finely ruffled or fringed. Seed is best started in March or April in a hotbed or in a box placed in a sunny window of the house. Set out the young plants, when ready, one foot apart each way. The weaker seedlings should not be thrown out, as they often bear the finest double flowers. In sheltered positions the Petunia will sometimes seed itself and come up the following season.

THE PEONY

Like many other plants intensely interesting because of their charming blooms, the Peony first came to the attention of the world as a medicinal plant. It was named after Paeon, a mythological doctor, for the roots of the species *officinalis* have been used in the making of a broth.



Mons. Jules Elie

Be sure to include this one in your collection

Peonies are easy to grow; they are permanent and when once established are impatient of being moved. They are perfectly hardy wherever Apples can be grown and can easily be protected in the colder regions. They bear large and showy flowers, of a great range of colors; some are delicately scented. The plants are so free from insects that they prove themselves to be ideal for cut blooms or landscape flowers.

There are a number of interesting species of the Peony. The most seen is the Chinese Peony (*Pæonia albiflora*). This is the standard Peony of which we have so many matchless varieties. The plant of the narrow-leaved or Fennel-leaved Peony (*P. tenuifolia*) is very beautiful, but the blooms last a short time. It blooms in

May, the pretty scarlet flowers nestling among the dainty dissected foliage. At about the same season the shrubby or hardy tree Peonies (*P. Moutan*) open their enormous glossy single or double flowers. The shrubby Peony grows very slowly. It should be planted where it is sheltered from the wind. Closely following in season are the European Peonies (*P. officinalis*). These are the old-fashioned crimson Pineys of the garden; they produce very satiny-petaled blooms, which possess a not unpleasant soapy odor.

The last groups to bloom are the albiflora varieties. These often begin to bloom in New York State for Memorial Day. For a succession of varieties to bloom, the Rev. C. S. Harrison, who might be called the Chaplain of American Gardeners, recommends the varieties *P. umbellata rosea*, *l'Esperance*, *Edulis Superba*, *Monsieur Dupont*, *Richardson's Rubra Superba*, *Henry Woodward*, *Richardson's Grandiflora*. Mr. Harrison, speaking further of prologing the blooming of the Peony, says: "There is also a system by which the blooming of a single variety can be prolonged. Take a row, say of *Festiva maxima*;

wait until the ground has frozen solid; leave the end of the row uncovered. Then, farther on, put on mulching and increase the depth until, at the other end, it is a foot to eighteen inches deep; leave this on. The covering keeps the frost in; then the plant will take some time to push up through the mulching. You can apply this system to the later varieties and so lengthen the flowering season considerably."



Peonies are glorious in a massed bed, equally striking when brought into the home, with their long stems and massive flowers

A word may be necessary to explain the method of doubling in the Peony. The normal or single flower is composed of *petals* (we shall call all the petals, *guard petals* in this case); *stamens*, or the male part of the flower (these are yellow at the tip and bear pollen); and the *pistil*, each section of which we call a *carpel* (this is often red and bears the seed). In doubling, the stamens become wider and wider until they resemble the petals; then we call them *petaloids*. In the same way the seed-bearing power is lost by the female parts, changing to resemble petals at the center of the flower.

The following are the types recognized by the American Peony Society:

1. *Single*. There are a few broad petals, the center being filled with stamens.

2. *Anemone-flowered*. The stamens are a trifle widened, closely resembles the Japanese.

3. *Japanese*. In this type doubling has just begun; the filaments of the stamens have widened; the anthers are also much developed. The guard petals, the petals at the base of the flower, are the same as in the single varieties.

4. *Bomb*. The petaloids, or the transformed stamens, have become still wider and thickly set; the petals approach the guards in form, but are still distinguishable from each other.

5. *Semi-double*. Several rows of large petals and some with petaloids in all stages of transformation. A loose bloom.

6. *Crown*. When the carpels, the parts of the pistil, transform into petals they may form a different center from the guard petals

and petaloids, giving the appearance of a small Rose in the center of the flower.

7. *Semi rose*,

8. *Rose*. A fully double form. The stamens and carpels are both transformed. It is really a developed Bomb, for in this case the petaloids are merely wider and indistinguishable from the guard petals.

The following is a list of best varieties for home grounds:

FESTIVA MAXIMA. White, center carmine; medium early.	MARIE LEMOINE. A very late sulphur white.
COURONNE D'OR. A late-blooming, semi-double white.	MODESTE GUERIN. Bright rose pink; mid-season.
MONSIEUR JULES ELIE. An early silvery pink.	MME. DUCEL. Silvery pink, flushed salmon; vigorous dwarf; midseason.
GRANDIFLORA. Late, bright flesh pink.	MME. VERNEVILLE. Rosy white, with sulphur white guard petals.
DUCHESSE DE NEMOURS. Deep pink, early; a fine double.	BARONESS SCHRÖDER. Flesh changing to white; vigorous; excellent.
EDULIS SUPERBA. An early dark pink.	LIVINGSTONE. Fine late flower of silvery pink.
FELIX CROUSSE. Midseason; a brilliant red.	MONSIEUR DUPONT. Ivory white with lively carmine border on central petals.
JEANNE D'ARC. Large, soft pink; mid-season.	LA TULIPE. Semi-double; almost white; mid-season.
AVALANCHE. Milk white, with creamy center.	DELACHIE. Dark red; semi-double; mid-season.
EUGENE VERDIER. Salmon pink, changing to clear pink.	

Planting and Cultivation

The soil should preferably be heavy rather than light; a clay loam is excellent if it can be worked deeply. The Peony is a gross feeder and enjoys a good mulch of well rotted manure in the Winter. The time for planting is August or September, right after the plant has completed its growth. If transferred in the Spring many of the feeding roots will be torn from the plants. The roots of the Peony are thick, almost no fibrous roots being formed; instead very fine, delicate feeding roots start from the main roots.

The plants should be planted at least three feet apart and the crowns should be buried three inches below the surface, and if planted too deeply, the plants will not flower freely. If they are planted too shallow the Winter frosts will heave them from the soil. The stalks should be cut off a few inches above the soil just before Winter. A Winter mulch of from four to six inches of well decayed manure will also prevent heaving and Winter injury. When the plants have finished blooming, the cultivation must not be neglected since they must make a good growth and mature their foliage, else the crop of bloom for the next year will suffer. Every five years the Peony should be divided and replanted, unless the plants stand far enough apart to allow root development. It takes two or three years for a commercial three- to five-eyed root to throw characteristic blooms.

Preserving the Blooms

Preserve the blooms after bringing into the house by stabbing or slitting the stems below the water line.

Disbudding

The albiflora varieties produce many buds in a cluster; if the best size blooms are preferred, all but the main or crown bud should be re-



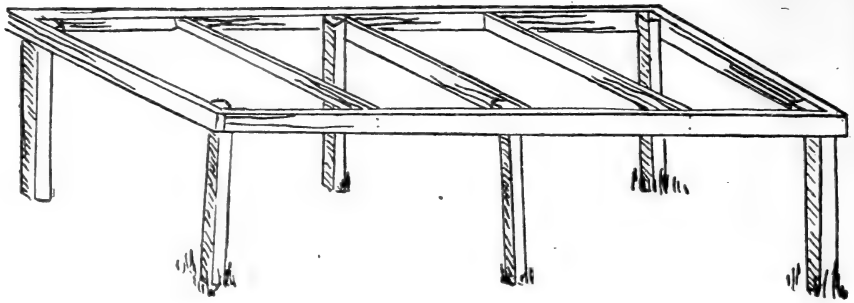
Types of Peonies

- S.**—Single, showing (g), guard petals; (s), stamens; (c), carpels or lobes of pistil.
J.—Japanese type; stamens wider than in Single.
B.—Bomb type. The stamens become narrow petals, called petaloids.
SD.—Semi-double. Many petaloids are quite wide and are mixed among the stamens
C.—Crown. The stamens are wider and petal-like. The carpels, which before have remained unchanged, are now petal-like.
R.—Rose. In this type there is an entire transformation of that bloom.

moved while they are yet small. Some weaker growing varieties are especially benefited by this practice. Single varieties are not disbudded.

Staking

Certain very floriferous varieties will need some sort of support. One of the best and most permanent methods is to build a rack of wood over the Peony border and train the young shoots inside of this rack. For individual plants there is no better way than to use a barrel hoop supported on three uprights



Rack for supporting Peonies. Also used as a Tomato support

Diseases

There are several diseases which attack the leaves, buds and stems. They are easily kept in check by spraying with Bordeaux mixture when the plants first start into growth in the Spring. Besides this, the diseased parts and all stems should be burned each Fall, for only by careful sanitation can the trouble be lessened

PHLOX



Phloxes give a mass of color and a fragrance welcome in every garden

There are Phloxes and Phloxes, dwarf sorts, and tall sorts, perennial kinds and annual kinds, huge flowering species and dainty, miniature-flowered species. They are all beautiful.

The Perennial Phloxes or Hardy Phloxes, with their huge heads of gorgeous bloom, are the most commonly grown and give a mass of color and fragrance welcome in every garden. They are of easy culture and should be divided every three years. The superior named varieties should be grown.

The following varieties are highly recommended by C. L. Thayer, special Phlox investigator at Cornell University:

- ASIA. Light mallow purple, with small eye of amaranth purple.
- B. COMTE. Vivid aster purple, with small eye of a darker shade.
- BARON VON DEDEM. Near begonia rose, with small eye of near rhodamine purple.
- BRIDESMAID. White with large eye of rhodamine purple.
- ECLAIREUR. Near aster purple, halo of light mallow purple and small eye of aster purple.
- ELIZABETH CAMPBELL. Begonia rose, shading lighter toward center with small eye of rhodamine purple.
- F. G. VON LASSBURG. White.
- FRAU BOSCH BADER. White, with small eye of near rhodamine purple.
- HERMINE. White (10-12 inches).
- INSPECTOR ELPEL. Thulite pink, with small eye near rhodamine purple.
- JEANNE D'ARC. White (Late).
- LE MAHDI. Pansy violet, with small eye of violet purple.
- MISS LINGARD. White with faint markings at center of mallow pink.
- MISS COOK. White, with aster purple eye.
- MME. PAUL DUTRIE. White, lightly suffused with deep rose pink, with small eye of rhodamine purple.
- MODESTY. Light mallow purple, with rhodamine purple eye.

The annual Phlox, *Phlox Drummondii*, are more dwarf and are found in more excellent colors than even the perennial sorts. Best success is attained by sowing the seeds indoors and giving them a little start before putting them in the open border. There is a group with fringed petals which are known as Star Phlox, or Quedlinburg Phlox; they are novel but less attractive than the type sorts.

For the rockery and front of the borders of perennials a number of species is very useful. Of primary consideration is the Moss Pink (*P. subulata*) and its varieties. This species forms huge mats of color in the Springtime; pink, lavender, bluish and white sorts are obtainable. *Phlox divaricata* is the wild Sweet William of our woods. It is most attractive, especially the varieties derived from the form *Laphami*.

THE PINK · *Dianthus*

The hardy Pinks rank with the time-honored gems of the old-fashioned garden. Splendidly adapted for beds and borders, they deserve a place in every garden, not only on account of their great beauty and free-blooming qualities, but also for their usefulness as cut flowers. Throughout the Summer months they yield a profusion of single and double blooms which for brilliancy and variety of contrasting tints are unsurpassed; many of them are delightfully fragrant. They grow about a foot high, and there is nothing that shows to better advantage in bouquets or in house decorations. The varieties classed as annuals include the well-known China Pink (*D. chinensis*), the Japan Pink (*D. Heddewigii*), and the Diadem Pink (*D. diadematus*); while among the hardy perennial sorts the old-time popular Garden Pink (*D. plu-*



Hardy Pinks

Splendidly adapted for bed and borders

marius) still stands out as one of the handsomest, and an excellent subject for massing in the bed and ornamenting the border.

There is now a strain of perpetual blooming hardy Pinks. Inquiry should be made for these from the first-class nurseries. The best annual varieties with double flowers furnish a blaze of color throughout the Summer. They love sunshine.

Pinks are propagated and cultivated in light soil enriched with well-decayed stable manure. Seed may be sown under glass in early Spring, or directly in the garden as soon as the frost has gone. Select a sunny situation.

THE POPPY · Papaver

The Poppy should be given a place in every garden, it is so graceful and delicate and beautiful. The Shirley Poppy is rightly considered the finest of the annuals. There is nothing more fairy-like than a bed of these grand single Poppies, with their long, slender stems surmounted by silken blooms of the most charming tints. As cut flowers in the house they are most attractive and will last for several days if gathered before expanding. There are many more splendid strains of annual Poppies, notably the double Peony-flowered, the fringed varieties and the dainty yellow-petaled California.

The hardy perennial Oriental Poppy, with its gorgeous dark scarlet flowers, blotched black at the base of each petal, makes a highly pleasing show about the beginning of June. The stately Iceland Poppy (*P. nudicaule*), also a hardy perennial, with light green, fern-like foliage, bears a wealth of brilliant flowers on slim stems. These Poppies will bloom the first year from seeds.

Seeds of annuals should be sown early in the Spring, scattered not too thickly and covered with a light sprinkling of soil. Thin out to five or six inches apart. They do not bear transplanting. When sown

in the Spring Oriental Poppy plants die down in July and August, but reappear in the Fall, when they should be removed to their permanent quarters.

SALVIA

A favorite annual for bed or border is the Flowering Sage (*Salvia*), which is remarkable for its sturdy, bushy growth and freedom of bloom and keeps the garden bright with color from July until smitten by frost. The best of the Scarlet Sages are *S. splendens* and *Bonfire*. Seeds may be started in flats or hotbeds and the seedlings transplanted when the weather becomes warm and settled.

SNAPDRAGONS • *Antirrhinum*

It is very interesting to grow amusing looking flowers; the Snapdragon is such, for each flower is a lion's head; one must merely press the sides of the head and the mouth opens. Snapdragons are available in such a variety of excellent colors—yellow, orange, red, pink, deep maroon, lavender and white—that they are adaptable for all situations in the garden. There are both tall and dwarfs; the medium height varieties are best.

Snapdragons are of easy culture. The seed is best sown indoors in March or April and the seedlings transplanted. When about three inches tall the top should be pinched out; this causes the plant to branch. Subsequent pinching will also be of value. If the Snapdragon plant seems to get rather sprawling upon the soil give it a stake, slender and inconspicuous. Cut the spikes freely, it will encourage others to grow.

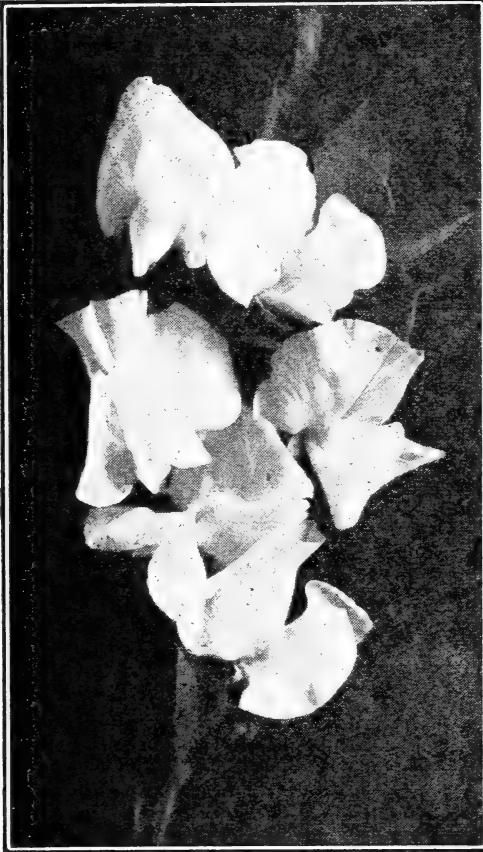
The plants may be troubled with aphid; if so, spray with nicotine. See chapter on Insect Pests for formula.

SWEET PEAS

The poet has a jingle upon Peas. He says:

“Peas along the border, Peas upon the lawn,
Peas against an eastern wall to welcome in the dawn.
Peas among the Roses, Peas behind the Pinks;
Peas to catch the western glow when evening sunlight sinks.
Peas upheld with Chestnut, Peas held up with Ash;
Peas asprawl on Hazel spray, Peas on Larchen brash.
Peas on stiff, unyielding wire, Peas tied up with string;
Peas upon the trellis work where Rambler Roses swing.
Oh! merry, merry, merry, are the gay Sweet Peas;
Plant them when and how you will, it's certain they will please.”

It would appear from the foregoing that the answer to the question of where to plant Sweet Peas is “Everywhere,” but the fact remains that Sweet Peas to give a measure of pleasure require much care. They should be planted on a well drained soil only, or one in which the excessive rains of Spring will not cause water to stand around the roots and start mildew. They endure little shade, for the plants



The Sweet Pea—perhaps the most dainty of all flowering annuals

should make a sturdy growth. In the shade the growth is weak and spindly and but few flowers are produced.

Place Peas, then, in the open, giving them all available light and air, although a little shade from midday suns of June and July is, of course, beneficial. Hot weather causes short stems on Peas and the best hay and grain weather ends them.

Preparation of the Soil

This is an important point. Peas like the cool soil and attempt to strike down deeply. Dig a trench two or three feet deep, break up and turn over the subsoil. Do not use if for top soil if it is poor. Put in a liberal amount of stable manure and work in a heavy dressing of bonemeal. This preparation should be made in the Fall and the bed left all Winter. When working over in the Spring

give a good, liberal coating of well decayed manure or some fertilizer. If the soil is deficient in lime, dust the surface with fresh lime in Fall or Winter, using it as soon as slaked. As early as the ground can be prepared in the Spring, dig a trench or furrow five to six inches deep and six inches wide. Sow the seed on the bottom and cover with two inches of soil. As the vines grow up fill in the soil until level with the garden surface. Sweet Pea specialists advise using a liberal quantity of seed, enough to make sure of securing a good stand, and when well started, thin the plants out to two to five inches apart. Sweet Peas are often sown in double rows five inches apart in the trench, with trellis or other support placed between.

Sowing Seeds in Pots

In order to gain a month in season Sweet Peas may be sown in three-inch pots in February and placed in a coldframe. But they are generally sown a month before wanted for outdoor planting and a smaller pot is used. Four seeds are sown in each pot. The frame should



Roses on arches and Sweet Peas on trellises between. On either side are Rose beds in the lawn. Iris beds in the foreground

be thoroughly cleaned and dusted with soot or lime. They can stand quite a lot of cold, but do not have them wet at the same time. Transplant outdoors when possible; this is usually about mid-April. Normally, the seed should be sown in open ground as early as March. As soon as the soil is warm enough the seeds will germinate.

Fall Sowing

For the Autumn sowing of Sweet Peas a piece of soil should be selected which will warm quickly in the Spring. Spade it up to good depth, two to three feet, but use no manure. Make a trench two inches deep and sow the seed thickly and cover with loose soil. When the seedlings have germinated and freezing weather has begun, cover with four inches of coarse litter or straw, which must be removed in the early Spring after heavy frosts are past. The seed should be sown so that the shoots are just at surface of the soil when Winter sets in; therefore, sow in late October or early in November, according to latitude.

Summer Treatment

Give frequent cultivation and when the plants are nicely budded work bonemeal into the soil along the rows. If conditions are very hot and dry give the plants frequent syringings, which will keep down the red spider, and will not allow aphids a chance to multiply.

Staking

Perhaps no method is so successful as the use of brush. Stretching string from pole to pole is an easy way. Such cord can be easily removed when the Peas are through blooming. Coarse poultry yard netting is rather useful for supporting the vines, but has two objections: it must be cleaned each year, and it is thought to become heated a little too much, causing the Sweet Pea vines to dry prematurely.

Gathering the Flowers

The flowers should be kept closely picked during the blossoming season, as the vines cease to bloom when the seed pods are allowed to set.

SWEET WILLIAM

Old-time gardens always provided a place of honor for the well-known Sweet William (*Dianthus barbatus*), and among flower-lovers of the present day they are also held in high esteem. They are easily grown in any good soil and their trusses of bloom of bright and varied colors produce a beautiful effect. The Sweet William is classed as a perennial, but better results are obtained when it is treated as a biennial. It flowers the second year from seed.

TRITOMA

Among hardy perennial plants the Tritoma, with Red-hot Poker, Flame Flower and Torch Lily, as common names, occupies a prominent

place in the Autumn garden, where it is exceedingly effective grown in single clumps or mingled with shrubbery. It throws up spikes, two to four feet long, each bearing a compact cluster of dazzling scarlet or orange-red flowers, which present a most unique and picturesque appearance. The plants are very sturdy and remain in bloom after most other flowers have faded away. Raised from seed sown early in heat they may be expected to bloom the first year, but if immediate results are desired the purchase of strong roots is recommended. The variety *Pfitzeri* is especially good. Protection in Winter is essential for the roots in all Northern gardens.

TUBEROUS BEGONIAS

Gigantic and clear colored flowers of wondrous freshness and beauty, are the proper words to describe the Tuberous Begonia.

Tubers may be purchased in March and are best potted in a mixture of sand, loam, and leaf mold. Plants can also be purchased from the florist. Planting in the open ground should be deferred until all danger of frost is past. They like the shade; the north side of the house is, therefore, ideal. They must have a loose, highly enriched situation, otherwise they will not be at their best. Planted among Rhododendrons in the leaf mold they succeed admirably. Take up the tubers in the Autumn and store through the Winter in sand or a sandy soil.

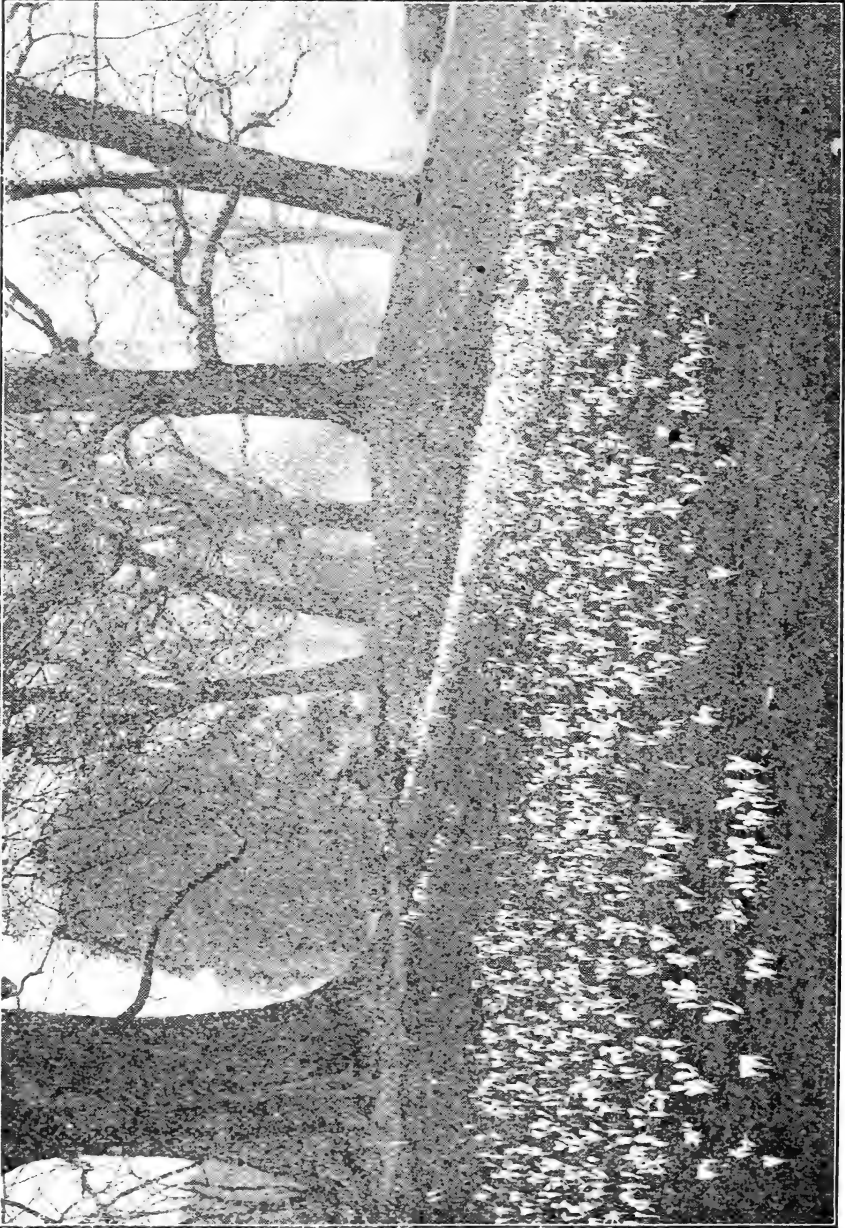
ZINNIA

Familiarly known as Youth and Old Age, the Zinnia stands in the front rank of garden favorites. It is, in fact, an indispensable annual, and never fails to give satisfactory results. Plants are readily raised from seed sown in the open ground early in Spring and make a luxuriant growth in beds and borders, attaining a height of two to three feet and blooming abundantly and continuously the entire season. The perfectly-shaped double flowers, many of them of immense size, embrace a wide range of beautiful colors. Those who have never tried the newer orange and scarlet varieties do not know what acquisitions they have missed.



The Tritoma

It throws up spikes 2 to 4 ft. long of dazzling scarlet or orange red.



Although it is not often that we see Crocuses naturalized in the grass in such a burdandance as shown in this photograph, yet they, with Tulips and Daffodils, can be successfully grown in this way

Bulbs and Tuberos-Rooted Plants

Notice that the Federal Horticultural Board at Washington has prohibited the importation of all bulbs except these six: Lily, Lily of the Valley, Narcissus, Hyacinth, Tulip and Crocus. Lovers of bulbs should stock up at once as even these six may be prohibited before long.

Preparation of Beds—Time of Planting—Planting—Naturalizing
—Culture During the Season—Mulching After Planting—
Descriptive List of Bulbs with Cultural Notes

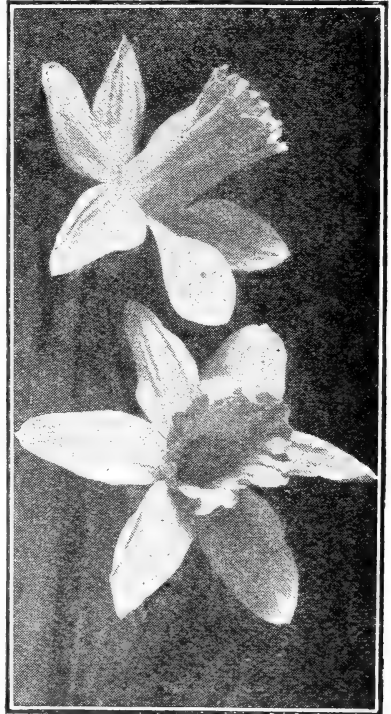
BULBS are not, as usually thought of, seeds or roots, but nearly mature plants already grown when we buy them; many of them even have stored in them the food for the leaves, flowers and roots.

All we need to do is to place them under some favorable conditions for growth; then they send out their roots and by merely absorbing water produce their blooms. They are useful for the woods, the lawn, the border, the water garden, the rockery and the window in Winter; in fact, they have a most unusual range of adaptability.

Many readers will never try a single new bulb nor even read about any plant which is strange to them. They will never try an attractive clump of *Eranthis hyemalis*, the Winter Aconite, that very bright, cheery yellow flower of February or March; nor would they know of the striped *Scilla*, the *Puschkinia libanotica*, a dainty blue and white flower, which is of value but little known. Our suggestion is to try a few of the bulbs in the list that closes this chapter. They have been chosen because they are really good.

Preparation of Beds for Bulbs

Nearly all bulbs succeed especially well on the sandier loams, but will even grow on nearly pure sand or heavy clay. The heavy clay soils are easily loosened by the addition of sand or coal ashes. Manure if used at all must be so thoroughly incorporated with the soil that it is



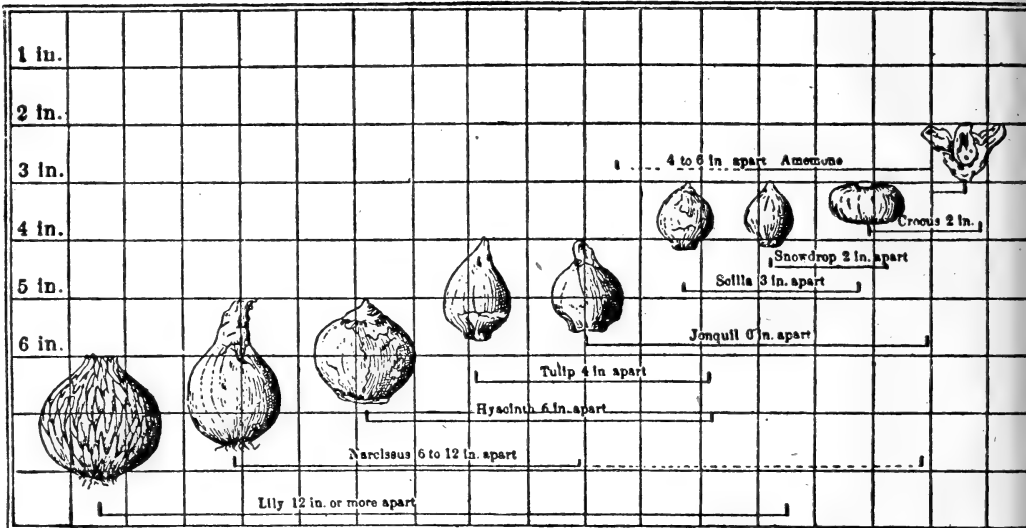
Narcissus Glory of Leiden

This is but one of scores of wonderful varieties

impossible for any of it to be in contact with the roots or bulbs, both of which appear to be very sensitive to manure. Bonemeal, spread over the soil at planting, is excellent. Leaf mold is ideal for mixing with the soil if it is obtainable.

Time of Planting

Some bulbs do not stand the cold; they are planted in Spring and must be dug before Winter each year. Examples of such bulbs are: Gladiolus, Summer Hyacinth (*Galtonia candicans*), Montbretia, Tigridia, Tuberose, Zephyranthes, tuberous Begonia, Canna, Dahlia. Most other bulbs should be planted in the Autumn. It is best to plant



This diagram shows approximately how deep and how far apart to plant the different kinds of hardy bulbs in light soil. In heavy soil plant an inch to an inch and a half nearer the surface

them as soon as they can be obtained from the dealer. If they remain out of the soil too long much of the nourishment is evaporated. Especially susceptible to deterioration due to deferred planting are Crocus, Lilies, Snowdrops and Fritillaria. This will bring the greater share of bulb planting in October.

Planting Bulbs

The rule for depth of planting is that they should be planted twice their diameter deep in the soil. This does not always apply, for it is usually better to get them a little deeper. The useful chart given on this page shows the depth to plant. It is advisable in planting choice sorts to set them on a layer of one or two inches of sand. This will insure good drainage and keep bulbs from decaying.

Naturalizing Bulbs

For parks, groves, meadows and wild outlying grounds beyond the closely clipped lawn, a very pleasing style of naturalizing bulbous plants is coming much in vogue. Such bulbs should be used as can be planted in quantity, twenty-five to a hundred or more of a kind in a patch, and only sorts should be used as are hardy and will flower and thrive and increase with neglect; fortunately, in bulbous plants there are many that succeed even better in such rough places than in the prim garden; among them we will mention hardy Anemones, Crocus, Chionodoxas, Camassias, Convallarias, Daffodils, Dicentras, Erythroniums, Funkias, Liliiums, Narcissi, Scillas, Snowdrops, Trilliums, and some of the late-flowering Tulips. The bulbs may be dibbled in when the ground is moist and soft during the Fall rains, but it is better to cut and turn back the sod here and there, place the bulbs under and press the sod back again.

Culture During the Season

When the bulbs are in bud a little liquid manure is very beneficial, resulting in a larger sized bloom. After blooming, the leaves must mature if the bulbs are to be depended upon for bloom another year. If it is absolutely necessary to remove the tops before they are brown the bulbs should be dug and heeled in or replanted in an out-of-the-way spot. They can remain here till the Fall planting time.

Mulching After Planting

When cold weather has set in and there is a crust frozen over the bed, a mulch of leaves, straw or like material should be used to the depth of three or four inches. It serves to protect from the destructive alternate freezing and thawing. (See Chapter XXI for discussion of Winter Protection.)

CAMASSIA ESCULENTA (Indian Quamash). This is a very dainty blue-flowering bulb, perfectly hardy. It blooms in the latter part of Spring and makes a good border subject. Plant the bulbs about three inches deep where they may have abundant moisture.

CHIONODOXA (Glory of the Snow). Species: *Luciliae*, light blue, white center; *sardensis*, dark blue. The Chionodoxas are very closely allied to the Scillas and might easily be confused with them. They are early flowering, March or April, and are very effective when planted in huge clumps in the border. They may be planted quite deeply—four to five inches is not too deep. Replant every third year, else they run out.

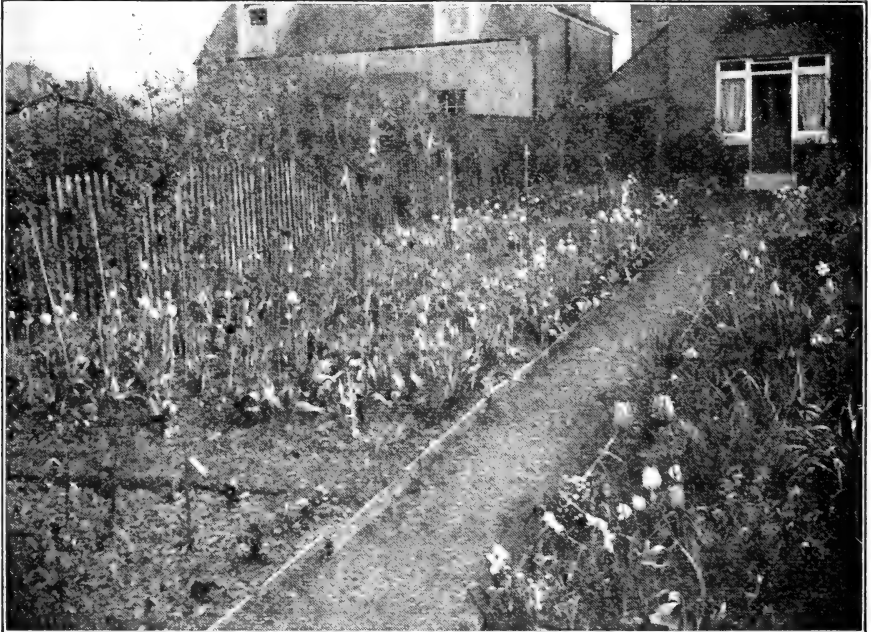
CROCUS. Species: *vernus* and *susianus*. The Crocus is as universally admired as any bulbous plant because it can be planted in great profusion without much expense. The varieties are so bright and cheerful that they are excellent planted either in lawns, in the herbaceous border or under trees. Especially attractive are bold clumps of one variety near evergreens. Crocuses must be planted in an open place

where they can get the sun in order to have them flower. New bulbs are produced above the old ones each year and the plant becomes higher and higher in the soil; they should thus be transplanted every third year. Good varieties are: King of Whites, white; Sir Walter Scott, white, reticulated, lavender; Albion, purple; Cloth of Gold, yellow.

CROWN IMPERIAL. (See *Fritillaria imperialis*.)

ERANTHIS HYEMALIS (Winter Aconite). This yields very cheerful yellow, star-shaped flowers and is very hardy, liking best to be planted in partial shade. It blooms as soon as the frost is out of the ground, whether it is February or April. Plant the small bulbs in clumps.

EREMURUS (The King's Spear). Species: *robustus* and *himalaicus*. This is a very stately subject for the garden. The spikes are frequently six



Even the small backyard gardens can have a delightful display of choice Tulips, Narcissi and other bulbs. Just buy them and plant them

to eight feet tall and are covered with white, pink or yellowish flowers, which continue to open for nearly a month. For some reason they are difficult to grow. Certain of the plants rapidly multiply and bloom, while others die out entirely. The bulbs should be planted rather shallow, in a fairly rich but very well drained soil. These plants are native to desert spots of Western and Central Asia. The matter of Winter protection is important, for the plants should be covered with leaves during the Winter and left till quite late, otherwise the young shoots will often be injured. The roots are quite fleshy and spread out in several directions; they should be planted as soon as received in November.

FRITILLARIA IMPERIALIS (Crown Imperial). The Crown Imperial, which was such a familiar feature of the gardens of our grandfathers' time, has been very much neglected of late. It is so stately that this is extremely strange. In the Spring, when the bulbs start into growth,

the stem elongates very rapidly until finally it is surmounted by a crown of flowing bells and a tuft of leaves. They are very interesting as seen in the distance, but even more so when examined carefully close at hand. The bulb seems very susceptible to any sort of injury and should not be kept out of the soil for any length of time. They should be planted about four or five inches deep and on their sides, because they often decay easily. The bulbs should be set on several inches of sand. They enjoy a rather rich soil and when once established grow very easily. If the flower stem is a trifle weak give a little staking of some sort. Single and double, orange, scarlet and yellow varieties can be had.

Crown Imperials are often called Skunk Lilies. The reason is easily guessed but the fact is hardly objectionable, if one does not get too close to the plants.

GALANTHUS (Snowdrop). Species: *nivalis* and *Elwesii*. Not that the Snowdrop is really pretty, but because it is the first flower of Spring to bloom, we admire the little white inverted bells as they peep through the snow. We plant it usually in huge clumps, for the individual flowers or plants are too tiny for a show. The clumps increase rapidly. Plant in different exposures for succession of bloom.

GALTONIA CANDICANS (Summer Hyacinth). Here is a bold, stately, bulbous plant which is very admirably used in the back line of a border. The tall spikes of inverted white bells give a very pleasing effect, and seem to contrast most exquisitely with many of the medium tall growing perennials, such as *Monarda* and *Coreopsis*, or with annuals such as *Bachelor's Buttons* and *Snapdragons*. The bulbs are not strictly hardy and must be dug each Autumn and planted the following Spring. Placing the bulbs about five inches deep serves to give the tall stems the proper support. It is frequently noted that the bulbs are not sure blooming, year after year. After blooming one year they frequently rest a year before blooming again. It is perhaps advisable to buy a new stock each year.

GLORY OF THE SNOW. (See *Chionodoxa*.)

GRAPE HYACINTH. (See *Muscari*.)

HYACINTHUS ORIENTALIS (Hyacinth). For garden culture many persons feel that the Hyacinth is a trifle stiff and formal, but there is a group known as miniatures, which are useful. They are cheaper and graded from the larger size bulbs. The spikes of the miniatures are graceful and produce a very pretty, loosely arranged spike of bloom. They are adapted to informal planting in the border and are useful for cutting. The larger varieties are known as Dutch Hyacinths and are adapted for more regular and formal planting. The Hyacinth appreciates a lighter soil than most bulbs, and it is advised to set the bulbs on a thin layer of sand. They, of all the bulbs, need protection in Winter.

INDIAN QUAMASH. (See *Camassia esculenta*.)

IRIS XIPHIODES and **XIPHIDIUM** (English and Spanish Iris). Unlike the German and Siberian, this class of Iris is bulbous. The bulbs are cheap, and yet so few of this class of Iris are planted that we wish to commend this excellent group. Plant them in good, friable, well drained soil the latter part of September. They will bloom the next Spring in May. The Spanish Iris will start into growth immediately upon being planted. The English will wait till Spring before sprouting. The two sorts are easily distinguished. The English have wider petals

and are found in shades of blue and white only; the Spanish are often yellow as well as blue, white, and other shades, and have comparatively narrow petals; they also bloom two weeks earlier. They are quite susceptible to a certain disease and to lessen its damage it is advised to take up the bulbs soon after their leaves have died down to the ground; they could then be planted again in September.

LILIES. (See Contents.)

MUSCARI (Grape Hyacinth). Species: *botryoides* and *plumosus* var. *monstrosum*. Here is a little gem for the garden. The blue and white miniature bells, when seen in mass, are most attractive either in the border or when naturalized in grass or woodland. There are several other forms which are intensely interesting, especially the plumed or feathery Grape Hyacinth (*Muscari plumosum* var. *monstrosum*). In this the floral parts



This represents a typical flower of a single Daffodil often, but wrongly, called Jonquil. The Jonquil much more resembles the Paperwhite, except that it is yellow. Daffodils are a large study in themselves

are much elongated and appear very feathery. It grows only six or eight inches tall and needs to be planted in front of border or in rockery.

NARCISSEUS. There are a great many types and species of Narcissus. So great is the difference of opinion concerning them, even by botanists, that we will not try to present any complete outline of them, except to say that the following may help to classify the various types:

Long Trumpet. To this class belong all varieties with distinct tubular centers which are as long as the outer parts of the flower. There are



Narcissus poeticus, naturalized
Does not this lovely scene stir you to emulation?

two groups of the long trumpet Narcissus; the self colors and the bicolors; besides these there are singles and doubles. The doubles are termed Daffodils.

Doubles—Von Sion, properly called *Telamoniuss plenus*; very showy; an old variety; the flower usually referred to when the Daffodil is mentioned.

Pure White—*Albicans odorata*; perhaps the commonest white; the flowers are nodding. Madame de Graaff, largest; late.

Pure Yellow—Ard Righ; early. Golden Spur; also early and is a sure bloomer. Emperor; excellent flower; good keeping qualities. Glory of Leiden; late; very fine; large.

Bicolors—Empress; large, fine, rich yellow trumpet; companion in season to Emperor. Victoria; the earliest good, lasting one. Horsfieldi; good appearance in garden.

Medium Trumpet. To this class belong all varieties with distinct tubular centers, which are about half as long as the outer parts of the flower. When the flower doubles the tubular centers are really present but are much divided. Some of the principal of the incomparabilis and Leedsii varieties are: *Barrii* conspicuous, light yellow bloom, the crown being edged orange red; Sir Watkin, large, bold, free flowering, most effective for garden; Autocrat, very prettily shaped canary yellow bloom which succeeds nicely. Mrs. Langtry, pale creamy yellow, good for cutting. Duchess of Westminster, a yellow and white flower, large and beautiful.

Short Trumpet. To this class belong all varieties in which the tubular center is a mere cup or even a ruffle. The flowers of some of the varieties belonging to this group are borne in bunches of from three to ten blooms. They are called Tazetta or Polyanthus varieties. They are not hardy and should not be planted out of doors. Varieties representative of this group are: the Chinese Sacred Lily, the Paperwhite Narcissus (which is so easily grown in pots), and the yellow Soleil d'Or. Varieties which merely have a frill at the center are Poet's Narcissus. They are very adaptable to garden culture and often spread very rapidly. The catalogues term them poeticus varieties. They should not be confused with the Poetaz varieties, which are hybrids between poeticus and Tazetta; these are not very hardy. A third class are the Jonquils. Jonquils have very slender leaves; the flowers are either single or double, yellow and very fragrant; two to six flowers are borne on each stem; the trumpet is a little longer than the Tazetta varieties. The chief variety of Jonquilla is *rugulosus*. Jonquils are small and not hardy unless protected; they are worthy of pot culture.

Cultivation.—Narcissus is one of the most persistent bulbous plants when once established. It, therefore, lends itself admirably to be planted by the thousands in grass for a naturalistic effect. Its natural method of rapidly dividing year after year insures its spreading widely. They also do well in beds and borders.

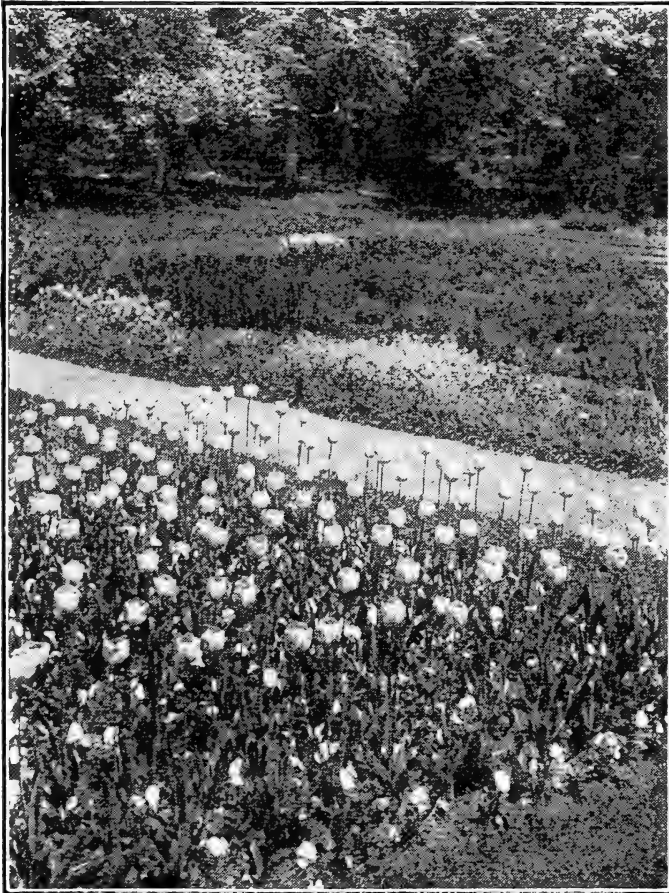
SCILLAS, or SQUILLS. Species: *sibirica* (Siberian Squill), *campanulata* (Wood Hyacinth), and *bifolia*. The Siberian Squill bears an intensely blue flower which is unexcelled for the planting of entire beds. The bulbs are extremely hardy, the beds needing almost no care. The Wood Hyacinths are white, light pink or blue, and are very showy used as clumps in borders or woodland. They much resemble the Hyacinth, except that the blooms are much more sparsely arranged.

SNOWDROP. (See *Galanthus*.)

SUMMER HYACINTH. (See *Galtonia candicans*.)

TULIPS. The finest garden subject among the Dutch bulbs is, in the opinion of many, the Tulip. It is so hardy, the colors are both dainty and vivid, the form is exquisite, and the ease of success commends it to every garden. The name has been derived from the Persian *toliban*, or turban, which the flower resembles. There are a number of forms of Tulips, all of which are interesting. The earliest Tulips are of the Duc Van Thol group (*Tulipa suaveolens*). The stems are rather short and they would not be commended for garden culture except for the fact that they are very early. They are usually characterized by

rather pointed or laterally rolled petals. The mid-season Tulips occupy most of the garden interest. Hundreds of varieties are pictured and described in the catalogues. This main group is often termed the Gesneriana Tulips. It includes the peculiar fringed petaled group, known as the Parrot or Dragon, together with the Darwins with their subtle colors and long stems, as well as the May-flowering or Cottage varieties, which possess the long stems of the Darwins, but the blooms, instead of being globular, are more or less bell-shaped, the tips of the petals being reflexed. With excellent effect we have seen



Tulips—Bouton d'Or

The most handsome of the long-stemmed yellow Tulips

the exquisite scarlet Pride of Haarlem, a Darwin variety, growing in a bed of blue German Iris (*pallida dalmatica*). When the Tulips have finished flowering the Iris begins and the color scheme is entirely changed in a few week's time.

WATER LILIES. (See Contents.)

WINTER ACONITE. (See *Eranthis hyemalis*.)

CHAPTER X

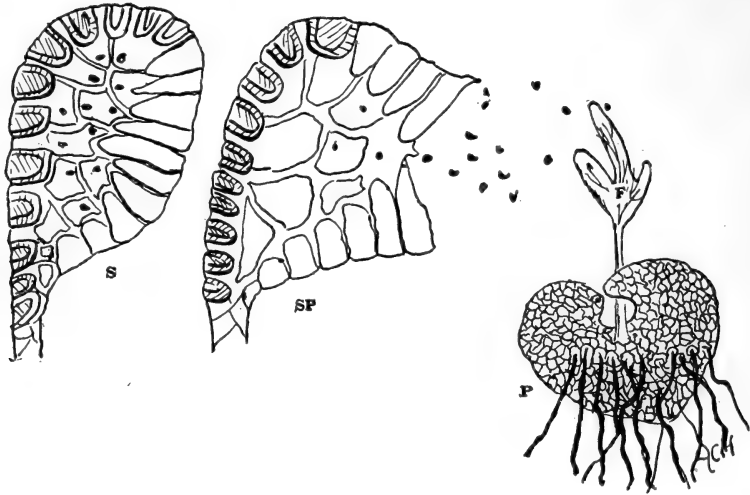
Hardy Garden Ferns and Water Plants

Fern Culture—Spores—List of Ferns—Waterside Plants—
Water Lilies

NORTHERN exposures and moist places always suggest Ferns. They are usually somewhat fragile and must be protected from high winds. They need an abundance of water, but prefer good drainage. Furthermore, they should be planted where water will not continually drip upon them. Under trees they are especially successful where they take care of themselves nicely. They should be transplanted in early Spring or Fall—those in exposed places better in Spring. They may be planted in clumps of all of one species or they may be mixed. Among rocks, on a slope, is a very good place for them. They vary in height from four inches to four feet. Ferns possess creeping underground stems; some are deep, others are merely surface creeping; a few have thick, upright stems, which are hard to pull up.

The soil that Ferns will like varies greatly. The best method of knowing what soil they need is to note where they grow naturally. In general, most ferns like a deep, rich, not too heavy soil—better with little peat in it. In their native habitat they have few or no enemies, but in the garden they are attacked often by wood lice, slugs, snails, caterpillars and the grub of the daddy longlegs.

The Fern spores are very peculiar for they are produced in little sling shots which are so small as to appear like brown spots on the lower sides of the leaves. Some persons have thought their Ferns unhealthy when they have seen these brown areas, but this is not the case, for it is the normal procedure to produce spores. When these sling shots ripen they burst open and scatter their contents. These spores, shed from the ripe sporangia, are thinly sprinkled on the surface of soil contained in well-drained pots, which are covered with glass and placed in saucers filled with water. The spores, instead of growing into a Fern that we would recognize, produce little green plants like a heart-shaped leaf, usually the diameter of a lead pencil. These green plants produce spores and it is from them that the characteristic Fern grows. The young plants should be pricked out into pans and when large enough transplanted to three-inch pots. The roots in time fill these pots and the plants are then ready for removal to more permanent



S.—Unripe spore case of a fern (greatly magnified)

Sp.—The spore case burst and throwing its spores

P.—The green growth that comes from a spore and which give rise to the little fern plant (f)



1.—Fern plant bearing a frond. Each division of the frond is called a pinnule (plural, pinnæ) (P.) This frond is covered with dot-like masses which are the spore cases (Sp.) At the base of the plant is a young frond (c) growing from the root stock (R)

2.—Pinnule of *Dryopteris*. 3.—Pinnæ of *Adiantum*

4.—In certain ferns the leaflets or pinnæ that bear spore cases are much changed, as for example in *Osmunda regalis*, the Royal Fern

quarters in larger pots. The best time for repotting Ferns is just before growth starts in Spring. If the crowns are numerous they can be divided. Care must be taken that the pots are well drained by means of broken crocks. There are many kinds of Ferns. We name the following:

ADIANTUM PEDATUM (Maidenhair). Prefers a well-drained, light soil. It is of a poor color when grown in the sun.

ASPIDIUM. (See *Dryopteris*).

ASPLENIUM ACROSTICHOIDES. Moisture loving; some shade. Endures sunlight if cool.

ANGUSTIFOLIUM. Avoid the removal of old fronds. New crop springs up and weakens the plant.

ASPLENIUM FILIX-FÆMINA (Lady Fern). Good, rich loam, moist. Excellent, well formed fronds, which are very variable.

PINNATIFIDUM. A small evergreen fern found in depth of glens. Useful for planting between stones.

PLATYNEURON (Ebony Spleenwort).

TRICHOMANES. A rock garden plant.

CAMPTOSORUS RHIZOPHYLLUS (Walking Fern). Prefers dry ledges.

CHEILANTHES LANOSA. Prefers deep shade.

TOMENTOSA. Prefers less shade; more moisture.

FENDLERI.

CYSTOPTERIS BULBIFERA. Plant in shade upon a moist bank.

FRAGILIS. Fronds die early in August.

DENNSTÆDTIA (*Dicksonia*) **PUNCTILOBULA** (Hay-scented Fern). Heavy growth. Grow for cutting for Summer.

DRYOPTERIS (*Aspidium*)

BOOTHII. Does not need Winter shade.

CRISTATA, var. **CLINTONIANUM**. Swampy ground.

FILIX-MAS (Male Fern). Rich soil; deep shade.



Moisture loving plants bordering the water



Flagstone path through bog-garden and semi-wild garden. Good use can be made of Gunneras, Spiræas, Japanese Irises, Knot-grass, Giant Reed and similar plants

- STRUTHIOPTERIS** (Ostrich Fern). Burns in full sunshine.
- OSMUNDA CINNAMOMEA** (Cinnamon Fern). Moist, rich.
- CLAYTONIANA** (Interrupted Fern). Move while dormant.
- REGALIS**. Peaty; branching; edges of brooks.
- POLYPODIUM VULGARE** (*Common polypody*). Can be planted up the ledges of gorges.

GOLDIEANA. Cool, rich soil. Good in acid soil or leaf mold. Large, heavy growth.

MARGINALE. When transplanted in full leaf the plants rarely survive. Like a rich, moist soil and deep shade.

NOVEBORACENSIS. Not good for cutting. Easily transplanted.

SPINULOSA, var. **INTERMEDIA** (*Spinulose Shield Fern*). Good in wet, and under trees as well.

THELYPTERIS. Partial shade in marshes.

LYGODIUM PALMATUM (The Climbing Fern; Hartford Fern). This fern is difficult to establish. It is moisture loving.

ONOCLEA SENSIBILIS (Sensitive Fern). Wet ditches and rich, moist soil; partial shade.

WATERSIDE PLANTS

The selection of plants suitable for the water and waterside is a large one, chief among the first named being, of course, the true Water Lilies or *Nymphæas*, while the Rice Plant, or *Zizania*, the Flowering Rush, or *Butomus*, also various of the Reed Maces or *Typhas* can be used with success,

Among the waterside plants (frequently spoken of as bog plants) are the Globe flowers (*Trollius*), the stately scarlet Lobelia in several varieties, a selection of Loosestrifes, particularly the one called *Lysimachia clethroides*, and the gay Monkey-flowers (*Mimulus*), including *cardinalis* and *Lewisi*. The beautiful Moccasin Flower, called *Cypripedium spectabile* and other hardy orchids are suitable for the drier parts of the ground. The list, however, could be greatly enlarged.

Water Lilies

A Lily pond or tank, its surface covered with the charming flowers of its aquatic plants, is regarded as an indispensable acquisition in any well arranged garden, for it furnishes a decorative effect as unique as it is handsome. The culture of new kinds of Water Lilies has made great progress in recent years and there are now to be had a large number of varieties which produce flowers of unusual beauty, ranging in color from pure white to red, rose, pink, crimson and blue.

William Tricker, of Arlington, N. J., who specializes in Water Lilies, says: "These are universally grown, at least where horticulture is one of the fine arts. They are indigenous to all parts of the world, but in no part can all species and varieties be grown to equal such as is possible in our own clime. Here, in a well appointed garden, or in our public parks and gardens, can be seen our own native species, the European and the many hybrids, the Japan and Egyptian Lotus, the Mexican species, the African, Zanzibar and Australian species and hybrids which are various shades of blue, also specimens from tropical India, where the flowers open at night shielded from the burning rays of the sun and, last but not least, the giant Victorias from South America, *V. regia* from the region of the Amazon and *V. Trickeri* from Argentina, the tributaries of the Parana river.

"Water Lilies are as indispensable as hardy perennial and other decorative plants. Associated with ornamental sub-tropical plants they lend a most pleasing and charming effect to the landscape. They are also valuable as cut flowers, especially the tender varieties, both day and night bloomers. The day bloomers furnish superb flowers on long stems in red, white and blue colors. The night blooming varieties possess a charm distinct from all others, the colors varying from pure white to pink with shades of red, carmine and crimson, which are very brilliant under artificial light. They are of simple culture, requiring a moderately rich soil, water and sunshine. The hardy varieties should be planted in May in this latitude, and on until the middle of

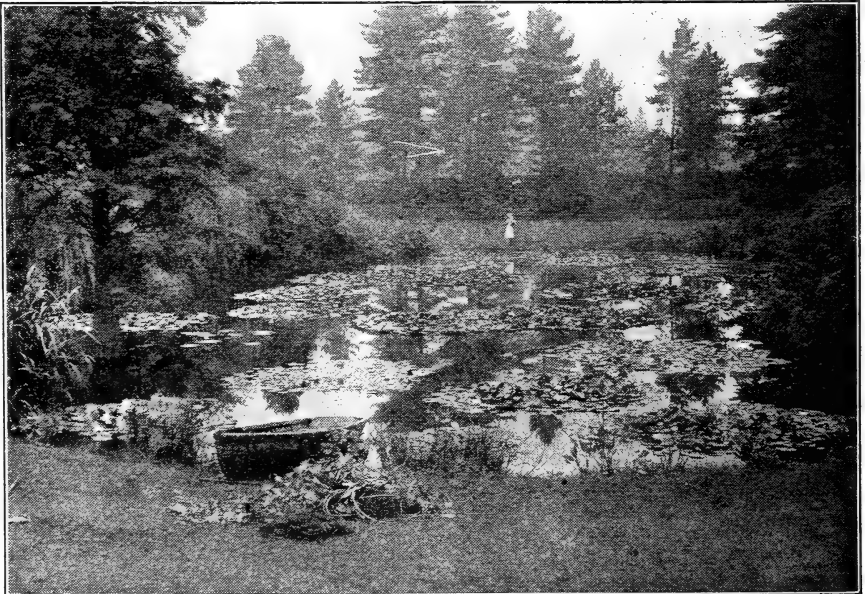
August. The tender Water Lilies should be planted about the first of June, when warm, settled weather is assured. Keep the pond filled with water to supply loss by evaporation, but springs and running streams must be avoided as they lower the temperature of the water to a dangerous degree."

Most seed houses will supply plants and complete cultural directions on application.

*For a complete work on the subject of this chapter,
we recommend*

THE BOOK OF WATER GARDENING, by Peter Bisset. Contains all the practical information necessary to the selection, grouping and successful cultivation of aquatic and other plants required in the making of a water garden and its surroundings. Illustrated. 200 pages. 7¼x10 in. Price, \$2.65, postpaid.

Secure this book where you bought your Garden Guide.



Pond with Water Lilies

There are many places that could be converted into pools for Water Lilies, even in small gardens. The pools or ponds should be 2 ft. to 2½ ft. deep. The plants can be placed in boxes or hampers of a size 2x2x1 ft., or a system of half-barrels or hogsheads can be arranged in a chain, with water running between each. Sometimes a number of barrels are arranged together, either sunk in the soil or grass, or arranged a little above, sufficiently close to have soil filled between them, and Papyrus, Reeds, and other plants planted therein

The Rock Garden

Region adapted for Rockeries—Japanese Gardens—Construction of Rock Gardens—Material for Rock Gardens

THOSE persons who like imported products of every kind will prefer to call these Alpine Gardens. There are so many parts of the United States where rocks abound that it is very peculiar that more really good rock gardens are not to be seen.

We do not wish to advocate the establishment of a garden of this sort where the rocks must be moved a great distance. We feel that such a feature as this in the prairie region is rather incongruous; besides, the cost is prohibitive. There are, however, certain regions which are well adapted for informal rockeries. Central Park, at the center of New York City, has wonderful outcrops of granite, in which are all sorts of crevices and holes for plants. Rochester, N. Y., has an abundance of peculiarly weathered limestone formations which are very useful. Each vicinity has a different sort of native rock formation, so that the type of planting will greatly differ. Rocks should hardly be placed for a definite display of themselves, for they should be the background.

We have only to visit Japan or read of her gardens; they are rock gardens; they are really rock landscapes. In them we find that rocks are as important as plants. We discover their arrangement studied. We hear that imperial edicts have been sent out from time to time prohibiting the price which may be paid for rock. It seems that during one of the dynasties the interest in foreign rocks was so great that such an edict was necessary. If we should remark to the Japanese gardener that a collection of rocks such as he has in his landscape is mere geology, he would ask us what difference it made so long as the whole was beautiful and meant something. He would continue to say that our own American gardens do not have any real significance. Few of the Japanese gardens in America have the real essential features. The American wants to use the Japanese material, but not understanding the Oriental arrangement he prefers an arrangement which he has imagined is the real way the Japanese gardens look. For one who cannot read Japanese, two pages of a Japanese book look enough alike to be equally well covered with interesting characters. So with a garden; one which is American using Japanese plants and receptacles looks superficially like the real Japanese arrangement.



Who would not wish to have a rock garden like this? A placid stream runs through it

We have digressed, but we must return to our own country where the conditions are really quite beneficial for rock features. An ideal situation is one where the plants are protected with snow during the Winter and not subjected to extremely hot conditions in Summer. The moist, cool rock crevices lend themselves most admirably to this treatment.

Construction

The amount of construction necessary will vary according to what is at hand to begin with. Let us suppose that we have a rocky bank which may even be a sort of supporting wall; perhaps we have a small brook whose sides we would like to plant, or we may have to construct the garden from the start.

The first case, that of a rocky bank or wall, is the simplest to manage. It may be necessary to use a wedge to open up some of the cracks so that they become larger; these should be filled with a rather rich, not too light, soil consisting of good loam and one-fourth manure. It is advisable to have all the crevices open into areas of soil. This we cannot do upon natural rock banks. With these natural rock gardens we must take a chance as to the depth of the crack and soil.

In planting a brookside, boulders and rocks will be available usually. The problem here is to build up the rocks informally and with soil between them. Many an innocent Summer brook is a bad marauder in the Spring. Confine your efforts to the areas above the flood and perhaps sow a few annuals near the water. Do not spend too much energy arranging the rocks nicely in the basin of the brook. The water will no doubt destroy all your efforts.

When we must construct an entirely new rockery the problem is greater. It should run nearly north and south; this will provide various exposures for different plants. Above all things, avoid any cut stone, brick or anything artificial. Statuary is never at home in a rock garden. If the garden must be made from flat land the best thing to do is to dig out a little valley, running it very irregularly. The soil removed can be used to build up on the sides, so that the little vale appears deeper than it is. Shrubs can be planted about the mound on the outside. It must be added that there is danger in having a wet hole instead of a beautiful rock garden if the created valley has poor drainage. This building up of the soil must be done in a very irregular way and care should be taken that the top soil is saved from the land which will be covered, for it will again be needed to cover the subsoil laid bare.

When the soil has been removed the rocks can be placed. They should never be arranged in correct tiers, nor should the direction of

the strata in the rock be seriously changed. The sketch shows the strata of the rocks naturally arranged and provided with a dip which will catch the moisture. Leave plenty of soil space between the rocks and plan little pockets to catch the water. Provide drainage by the use of a quantity of ashes or fine gravel in the center of the mound. The rocks get very hot and some plants may dry readily. If a little water can be provided it should be conducted to the top and allowed to seep down through the crevices. In Winter a protection of straw and decayed manure over the plants will be beneficial. It is best not to remove this protection too early. Neglect it a bit. Evergreen branches are excellent for those covering plants which do not die down each year.

Material for Rock Garden

The rock garden is essentially a wild feature and a great deal of native material should be used. No variegated or freak horticultural varieties should be introduced. Even fancy and well bred varieties are better when absent. We refer to dressy varieties as the Mme. Chereau German Iris or, in fact, anything of this sort. It is well to grow in the rockery the interesting little plants which need special attention to be seen properly.

Bulbs are excellent. Snowdrops, Narcissus, Scillas, Fritillarias, and Crocuses are all quite necessary.

Large trees should be avoided and some

trees especially; for example, Hawthorns and Elms require much water and should never be planted. The smaller evergreens, Junipers, Arbor Vitæ, broad-leaved evergreens, Yucca and Cacti are excellent.

If the rock area is extensive and a very quick result is wished, the use of annuals is excellent. Dr. Southwick has used annuals most effectively in his "Garden of the Heart" in Central Park, N. Y. The otherwise objectionable colors of Petunia are there very cheery. Lobelia erinus is indispensable. California Poppies, either the golden, the crimson or the white ones, are very pretty. Baby's Breath (Gyp-

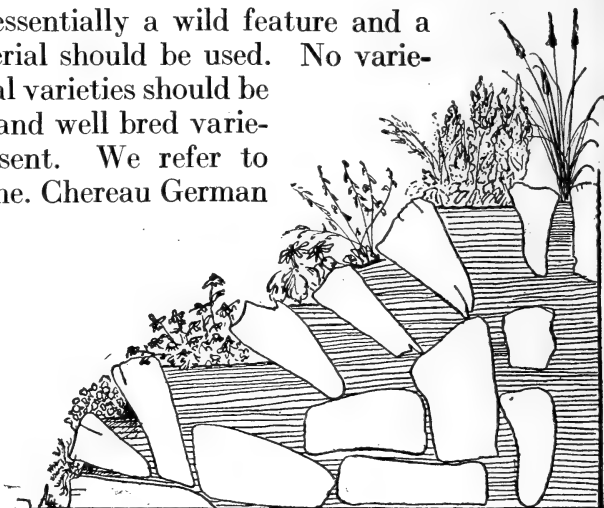


Diagram to show, in a general way, the placing of the boulders or large stones in the making of rock garden. A shelving arrangement is adopted, leaving spaces, called pockets, between the stones. These should be arranged so as to catch the rain. At the same time the water must pass readily away through drainage channels

sophila muralis, the pink, or elegans, the white) adds a graceful touch. The ornamental grasses look well combined in various places with the various blooming perennials. The annual Larkspurs and Lupines are both good blue subjects. Portulacas, Sanvitalias, Bouncing Bet (*Saponaria ocymoides*) and *Nemophila* are of just the proper habit



This picture shows a closer, more intimate view of a rock garden. In this instance it is employed most fittingly as an ornamental feature between the inner flower garden and the outer semi-wild parts

for the rockery. Speaking of rock gardens in California, even as far south as Los Angeles, a writer in a paper there says: "These rock gardens are positively alluring, for if one but follows a bank having a turn in direction of but a quarter circle he may find at one end the Edelweiss of the European Alps, and at the other, through gradual transitional plant zones, cacti from the desert sands. Next to the alpinists is often brought in fern dells with trickling streams and waterfalls."

(For Perennials useful for Rockery, see Contents.)

Always consult Index to Contents. Familiarize yourself with it. There are hundreds of good things in this book that will escape your attention if you do not use the Index freely.

Garden Furniture

Benches—Rustic Chairs, Seats, Screens, Trellises, Pergolas,
etc.—The Garden House—Fountains—Bird Baths

A GARDEN of any size should not be without a garden seat, a bird bath and similar adjuncts. Convenient seats and appropriate garden accessories should be a great joy. Inappropriate and mean-nothing garden features should always be avoided. Pergolas which lead nowhere nor do not hold up vines are out of place. Garden fences which are too fantastic are like the too frequent highly ornate vases used in our homes for the simplest flowers. Furthermore, the style of the house and the manner of planting will largely determine the propriety of every garden seat, bird house or fence.

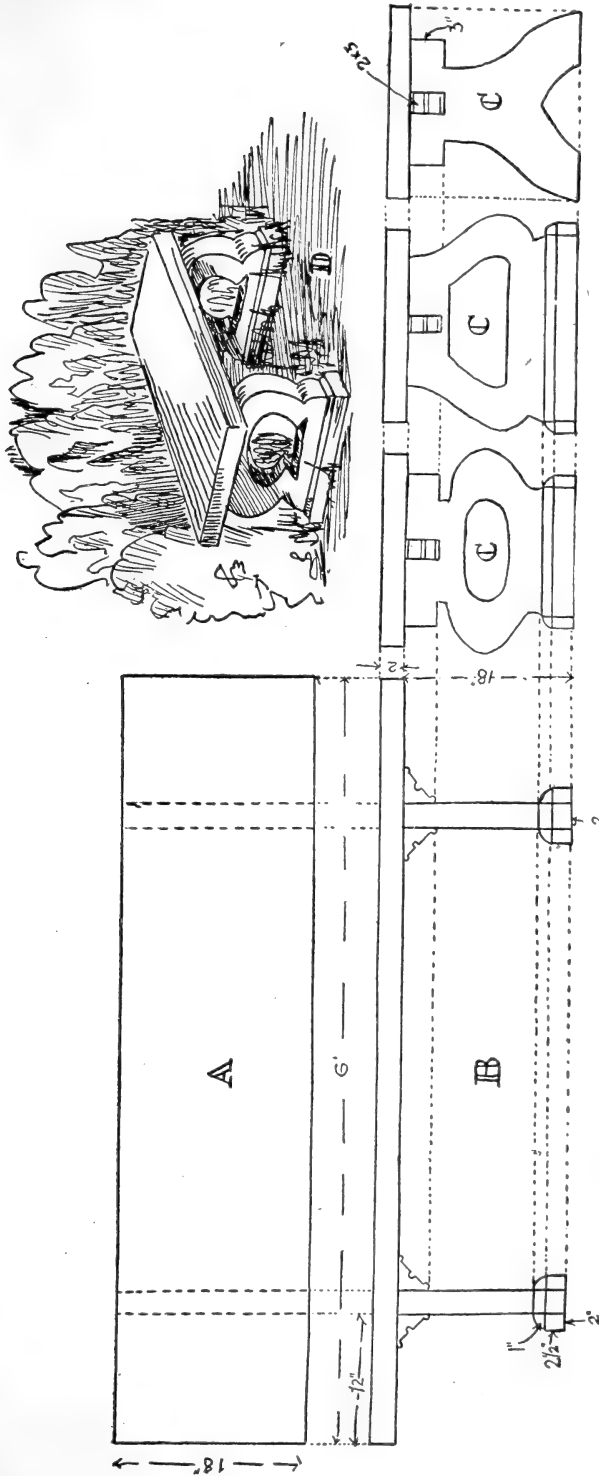
Garden Benches

An excellent, substantial garden bench may be constructed quite cheaply. A working drawing for such a bench is shown. It is made entirely of three-inch stuff, and can be either longer or shorter than six feet. It has been thought best to place the legs one foot from each end of the bench, unless the bench is shorter, when it will be better to have them six inches from the end. Four designs are here found for the ends. They are merely suggestive; others may be used just as well, but they should be simple and in every case should be wide at top and bottom. Small brackets are placed under the top on each side of the legs. They are made of two- or three-inch material, being three inches on a side. If one prefers, three long screws may be placed through the top of the bench into the standards. In order to give the legs a good standard, they are faced on all sides at the base with a strip of two by two and one-half-inch stuff. The bench may be painted white, light gray or green.

Rustic Woodwork

For this work there are a number of good sorts of wood. Some are used with the bark and other wood is peeled before using. Hickory, red Cedar, Cherry, Blackthorn, Birch, Larch and Fir are used with the bark. Such wood should be used only when dry and is best cut in the Winter, when little sap is flowing. It is stored to dry and season.

To make the chair (on p. 163), select two back poles which have nearly the same curve, then the front posts which are nearly straight. There are two ways the parts may be joined, the first way being to bore holes in both of the uprights and crosspieces and fit pegs or dowels of



Garden Bench

A, top. B, side. C, ends—a choice of patterns. D, completed bench

ash or elm into them. The other method is to make a tenon at the end of the one piece and a hole to receive it in the other. This latter method is not as strong and is usually harder to make. In both cases the parts should fit very tightly. When putting together finally, coat all joints with white lead thinned with boiled linseed oil. It is best to put a nail or screw in all important joints and wipe off the surface white lead which may remain. The seat is made of split wood beveled at ends to fit on the main stays. If the seat does not seem perfectly solid, a brace or two can be fitted in from below and the seat nailed to it. Many ingenious garden benches, screens, trellises and pergolas may be made in this way. Care must be taken that all such furniture or bridges are perfectly strong. Our recollection of rustic things is that they are frequently out of repair. All sharp twig stubs must be removed and care should be exercised to keep all nails from sight or from doing injury.

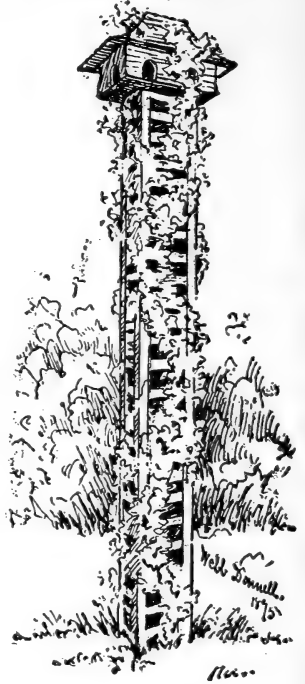
Garden House

The garden house offers possibilities for the enjoyment of the mistress of the house as well as furnishing an ideal playhouse for the children. Every child likes a playhouse. He thinks it is his own house. It is well to place the garden house in the shade of a large tree where it will be cool afternoons. It should be built so that it can receive air from all sides.

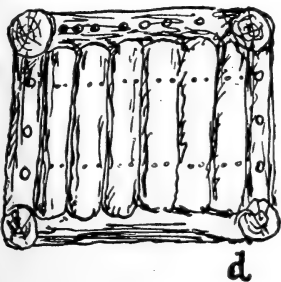
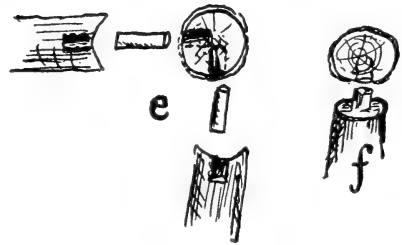
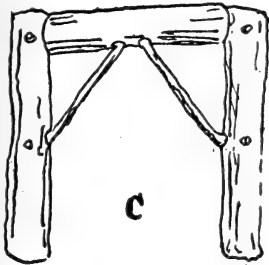
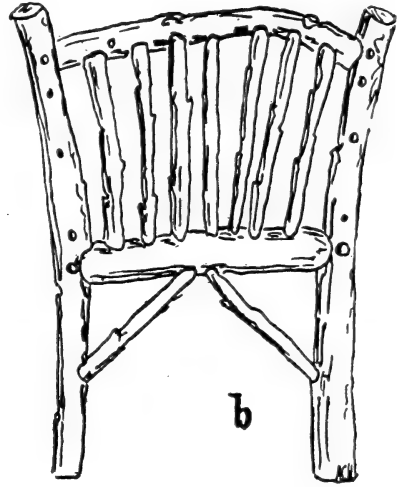
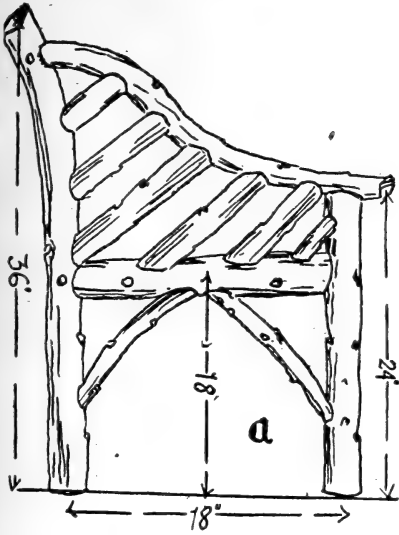
For the man who is handy with tools there is ample scope through the Fall and Winter for the exercise of his talent in the fabrication of all manner of garden furniture. If one possesses a comfortable cellar, that will be found a good workroom in the short days, the material having been accumulated prior to Winter weather.

Sun-Dial

An interesting object among the furnishings of a formal garden is a sun-dial mounted on a decorative pedestal. This is an instrument that measures time by means of the shadow of a gnomon or style thrown on a metal dial plate upon which the hour lines are traced. Writing of the sun-dial, Charles Lamb remarks: "It was the primitive clock—the horologe of the first world—and stood as the garden god of Christian gardens."

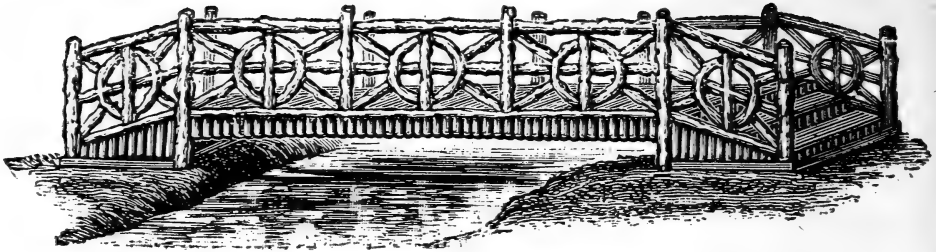


A "step-ladder" column supporting a dove cote and bearing a climbing plant

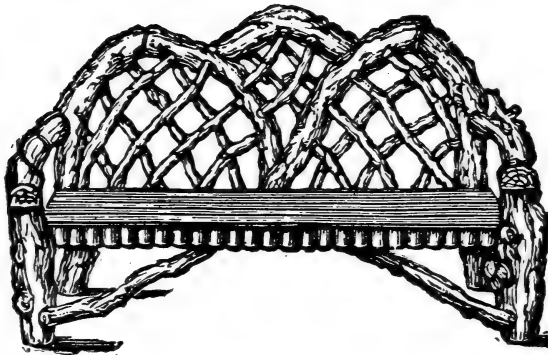


Making a Rustic Chair

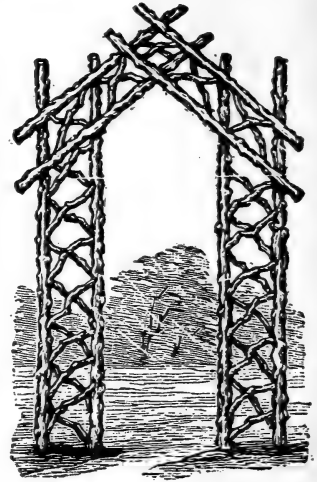
A, side; b, back; c, front; d, seat; e, method of holding chair together by use of pegs, filled into holes bored into corresponding parts; f, method of making tenons without boring holes for insertion of pegs



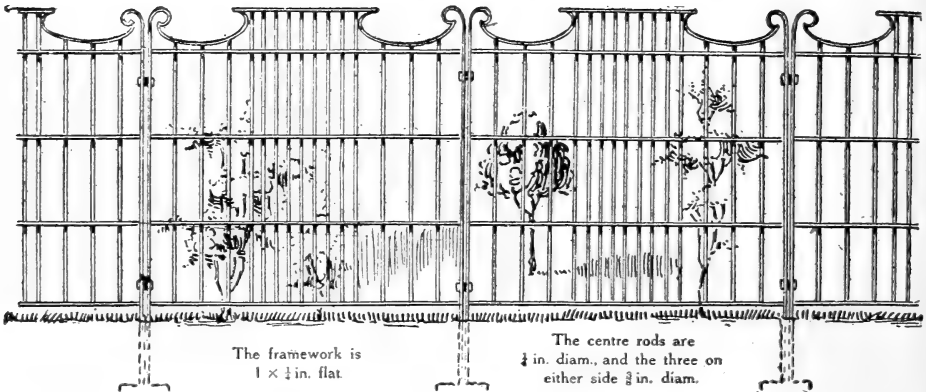
Design for a Rustic Bridge



A Rustic Garden Seat

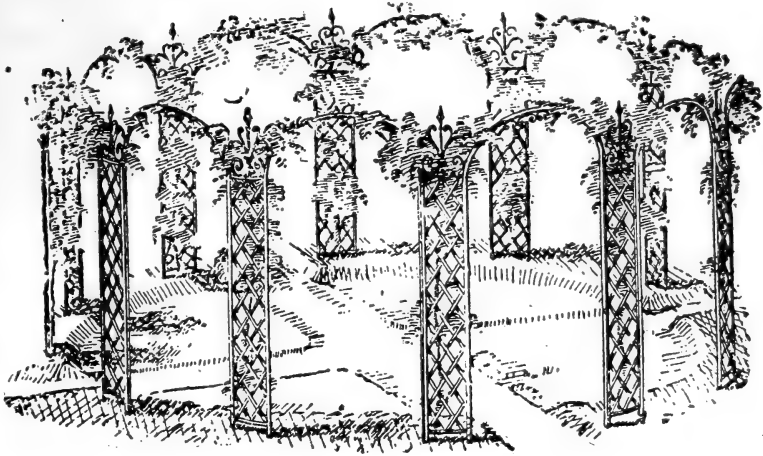


A Rustic Arch



A dainty Trellis, which can be made in wrought iron or wood

This design we reproduce from the country estate catalogue of the London firm of Wood & Son. The hurdles are 6 ft. long, with a stay to each, bolted with nuts, and are painted any color. The height is 5 ft. from the ground.



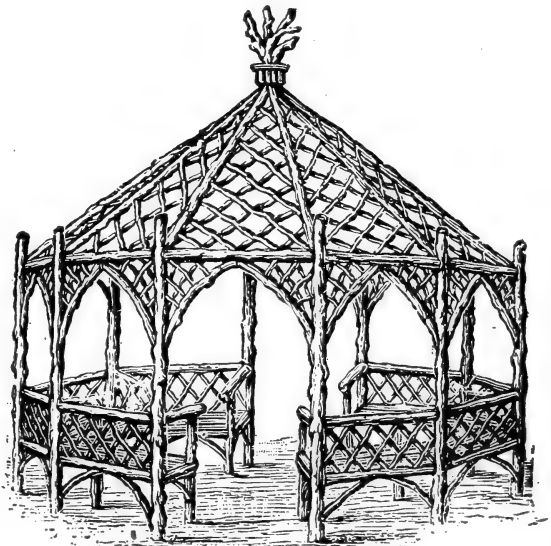
Trellised Arches

Another of Wood & Son's designs. These can be made in wood or wrought iron. The arches are 9 ft. high, composed of ornamental standards, the width of the arches being 6 ft.

Fountains

The fountain need not be the possession of the large estate owner alone, for it may merely be an inch pipe conducted underground to a convenient spot where a pool can easily be constructed of concrete.

In many places the pool should not be the conventional circular pool, but the border should be irregular and covered with a naturalistic planting. Fountains may be of the gurgly, squirty or spray sort; all are pretty. To some the squirty sort have an air of impatience or nervousness which makes them only useful at some distance from the garden seat. On the other hand, certain fountains give a restful, cool aspect to the garden, which is greatly enjoyed. There



An airy, rustic pavilion

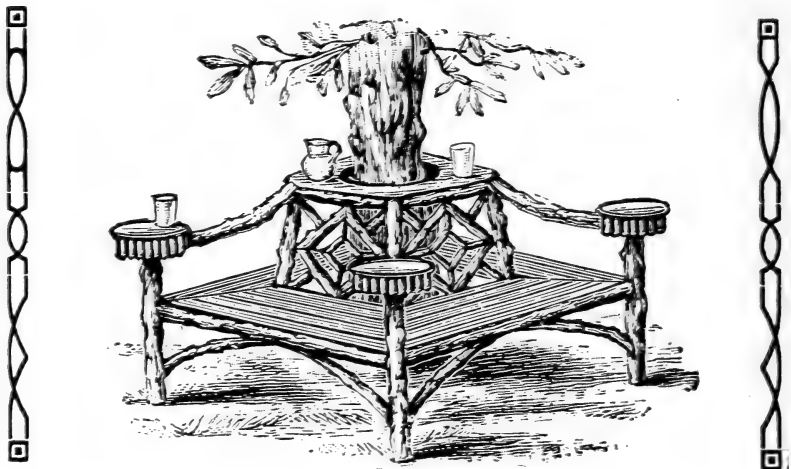


A Bird Bath

in the garden in the form of a basin set upon a stone pedestal or column. Some dwarf, neat growing water plants may be kept in the basin, such as Umbrella Plant and Parrot's Feather. A stone in the bowl affords a place for the birds to stand.

seems a universal enjoyment of water. Here the birds come, here plants may be grown, and here goldfish may be kept, and being fed at a certain time each day will become tame enough to take the food from the hand.

By one or all of these various adjuncts, appurtenances, garden ornaments, garden furniture, the beauty and comfort of the place can be considerably enhanced. The making of many of these things will, like the garden work itself, furnish agreeable recreation for many a holiday, Saturday afternoon or other period of one's leisure.



Rustic Seat

Always consult Index to Contents. Familiarize yourself with it. There are hundreds of good things in this book that will escape your attention if you do not use the Index freely.

Window Boxes and Porch Plants

Self-Watering Boxes—Porch Boxes—Hanging Baskets—Concrete Boxes—Wicker Window Boxes—Plants for Window Boxes

THERE are many enthusiastic gardeners for whom the force of circumstances rules that the window or porch garden is their only form of flower growing possibility. To others the porch decoration has much to do with the whole appearance of the house. One word before we mention the kinds of plants and boxes to use. Many persons of exceptionally good taste in their home and garden seem to think that a discarded water tank for a receptacle, and a



A gay scene at Portland, Oregon. The boxes are filled chiefly with Petunias

straggly display of hideous colors are the requirements for a porch garden such as we are to consider. This is not true. The container for the flowers should be of the same color as the house, or else of a harmonious shade. The plants should be thickly set in the box and, contrary to the most common usage, the colors should be an excellent contrast or a perfect harmony.

The porch box should rarely be deeper than nine inches, from nine to twelve inches wide, and of any length. It will be much easier to handle a box not longer than three feet. It is suggested, therefore,

that a number of boxes be used if the area to be decorated is longer. The boxes should always be made rather solidly. Often they can be bracketed to the porch; when this is not possible some simple standard can be devised. If legs are placed on the box they should be a trifle wider apart at the floor. Round urns or hanging baskets are preferable to most boxes which must stand on the porch.

Self-Watering Boxes

Self-watering boxes made of iron are on the market. There is a small reservoir for water at the base; sponges communicate the water to the soil. The boxes need watering only every week or ten days. They cost from \$1.50 to \$4, according to their size and amount of ornament. Care must be taken that drainage is good and the reservoirs are not filled too full of water.



Green latticework against a white house, with the Geraniums and Scarlet Sage. This makes all the difference between elegance and bareness

Porch Boxes or Hanging Baskets

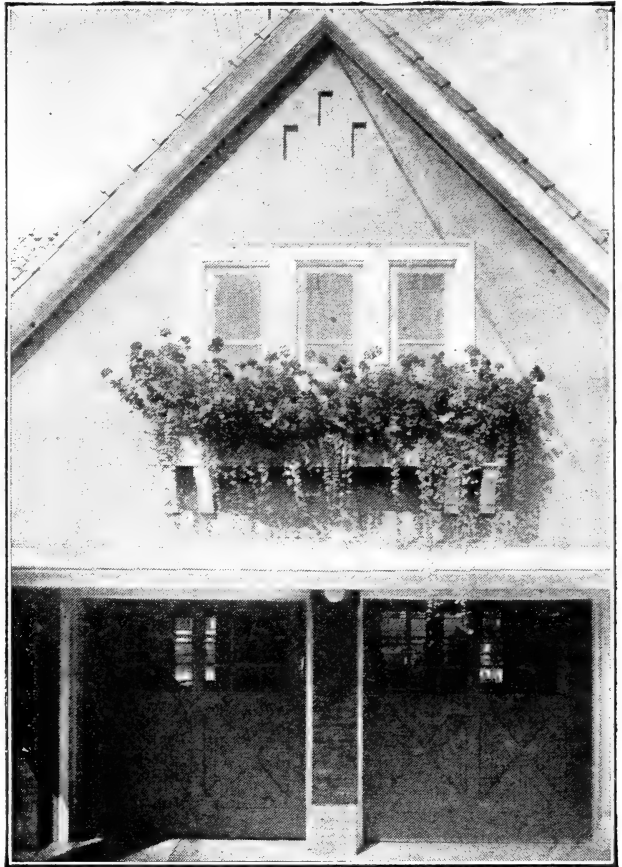
Porch boxes or hanging baskets are easily made. White pine, red cedar or cypress are the best woods. They are less injured by the continual moisture required in a box of this sort. When finished they may simply be painted to match the house or they may be covered with cedar or other bark. They may be slightly decorated by using crosspieces of fine twigs.

Excellent hanging baskets are made from heavy ox muzzles. Bend the muzzle so that it is flatter and more basket-shaped, attach three

wires or chains, and the hanging basket is ready for use after lining with pieces of moss to that soil may be retained. The same type of wire basket may also be purchased. Special hangers may be bought which can be attached to the ordinary flower pot, converting it into a hanging basket. They are useful for specimen Ferns or trailing plants.

Concrete Boxes

Concrete boxes or urns are very heavy but are good, the main difficulty being that very simple designs are essential, otherwise the boxes appear very clumsy. If very fine sand is used in their manufacture, or when given a fine finish, they are very attractive.



Concrete window box as an integral part of the building; in this case a garage .

Wicker Window Boxes

For either indoors or outside, the wicker window boxes present a good appearance. They are excellent filled with Boston Ferns and cost from \$3 to \$15, according to height and length. Excellent long plant baskets are now offered for sale by all florists which are very handy to place upon the window sill. For the indoor window garden receptacles made of plaster of Paris are rather pretty, but are very easily chipped and broken and are not to be advised.

Excellent boxes are made up entirely of Geraniums, the tall varieties for the background and a row of the Ivy Geraniums for the front. Nothing is more effective than a box composed of pink and white Geraniums, never pink and red. Fuchsias can be used likewise in combinations of several varieties.

Plants for Window Boxes

For Shady Situations

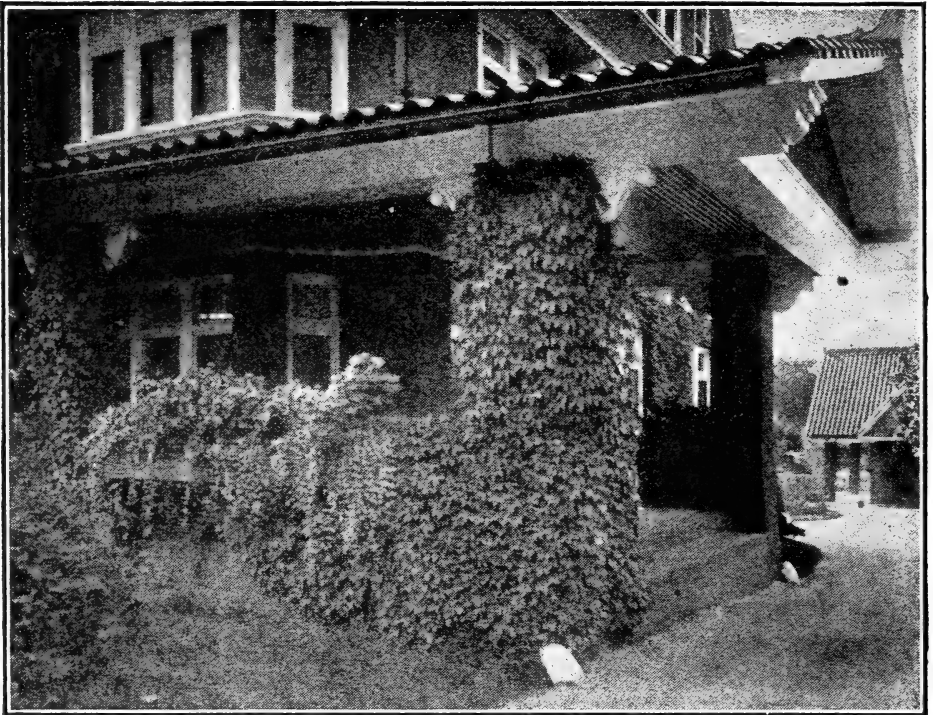
Tuberous Begonias
 Begonia semperflorens
 Fuchsias
 Cobæa scandens
 Vinca
 Foliage Geraniums
 Crotons
 Funkia variegata
 Ferns
 Palms
 English Ivy
 Trailing Euonymus
 Wandering Jew

For Winter Effect

Box (Buxus)
 Dwarf Thuya
 Dwarf Retinispora
 Irish Juniper
 Hemlock, small plants
 White Pine, small plants
 English Ivy
 Trailing Euonymus
For Sunny Situations
 Geraniums, tall
 Ivy Geranium
 Petunia
 Ageratum Houstonianum

For Sunny Situations

Cobæa scandens
 Phlox Drummondii
 Nasturtiums
 Verbena
 Lobelia erinus
 Coleus
 Lantana
 Cigar Plants (Cuphea)
 German Ivy, or Wandering
 Jew
 Portulaca
 Mesembryanthemum
 Sweet Alyssum



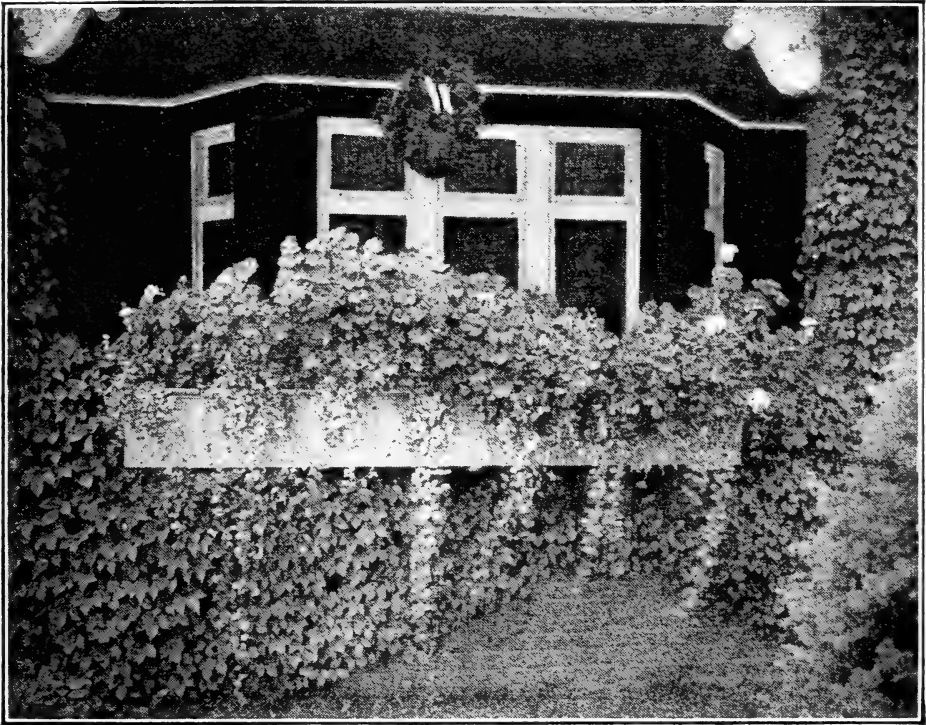
Entrance porch and window box. *Ampelopsis Veitchii* is well and freely used

Dracæna indivisa is always useful in the porch box. When its usefulness in the box is over it may be potted and kept all Winter.

The excellent clear colors of Verbenas are always admirable when used alone or in combination. They flower profusely and continue fresh in appearance.

The Nasturtium is incomparable for filling urns or for porch decoration. For a northern exposure the tuberous *Begonia* is excellent. The colors of the single as well as the double varieties are very effective. They should always have the best soil available.

The best vine for trailing over the edge and extending downward for five or six feet is the German Ivy. If this has grown into quite a jungle when procured from the florist, cut it back and let it start out gracefully. Vinca, or Periwinkle, a variegated green and white vine of exceeding long growth, is everybody's favorite. It stands adverse conditions. Cobæa scandens will trail down or climb up. Creeping Jenny (*Lysimachia Nummularia*) succeeds admirably in shade and,

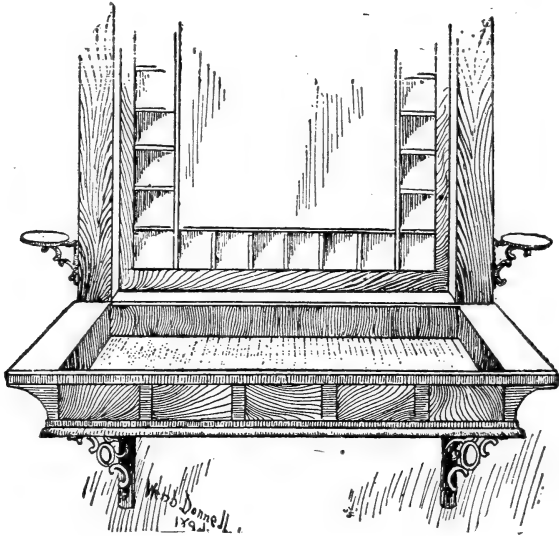


Nothing better bespeaks home joys, grace and comforts than a well-filled window box

furthermore, in some sections of the country it can be gathered from the wild. Kenilworth Ivy (*Linaria Cymbalaria*), a neat, nearly hardy, lavender-flowered trailer, can be tried, also *Asparagus Sprengeri*, a plant popular with the florist and very useful in the window box.

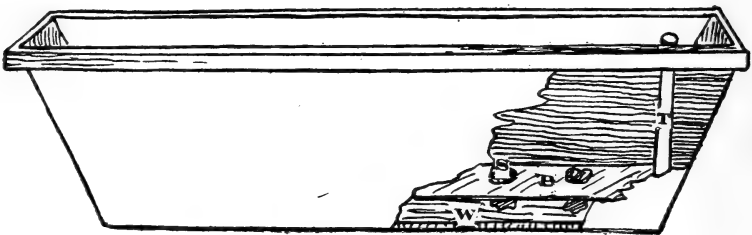
Trailing plants of less rampant growth include: *Lobelia erinus* (not the compacta variety); the flowering habit is unexcelled. Another blue is the *Ageratum*, which, like *Lobelia*, is always in bloom, and it is fragrant. The trailing varieties of *Coleus* have a good habit, but the colors are much mixed. *Verbenas* and *Petunias* are useful by themselves as well as the front margin of the box.

A little plant useful for the more personal porch boxes is the Forget-me-not. It is not very permanent but will bloom when many of the other plants have only started growth. When it finishes blooming it may be dug up. The remaining plants will, no doubt, keep up the foliage and flower effect.



Paneled window box showing bracket supports, also side brackets above, for plants

For the green and more formal window box, plants of Aucubas can be procured from the florist. In Winter the plants are useful on enclosed porches.



Self-watering window box

This shows body of box, false bottom. (B) Above water chamber or reservoir, (W) and two sponges (S) by which the water passes up to the soil. The water supply is replenished through a tube in the right-hand back corner (T)

All boxes should be raised a little above the base or sill on which they rest, otherwise both box and sill quickly rot. The self-watering type prevents dripping, but even they require attention on hot days, especially when in sunny positions.

The Vegetable Garden

Growing Plants for Setting Out—Digging and Preparing the Soil—Sowing and Transplanting—Watering—General Principles of Cultivation—Harvesting and Storing—Companion Crops—Succession Crops—Cultivation of the Chief Vegetables—Useful Pointers for the Vegetable Grower—Labeling Plants

[It will be noted that we have not mentioned varieties throughout this chapter. These are chosen from the catalogs of your favorite seedsmen to suit soil, location and individual preferences.]

WHEN the Spring comes everybody thinks, or ought to think, about gardens. Professor L. H. Bailey says: "The nature-desire may be perpetual and constant, but the garden-desire returns with every new Springtime." The possibilities of the garden are very great, and the home or kitchen garden has become a national and economic necessity as an adjunct to every home with a plot of round, no matter how small. A bountiful provision of clean, newly gathered produce, secured within a few yards of the kitchen door, tends to diminish burdensome grocery and meat bills; and as they are not subject to deterioration in transportation and by exposure on the markets, home-grown vegetables are always crisp and tender and retain their characteristic flavor.



An Amateur's Vegetable Garden
All the space utilized and everything growing luxuriantly

While the home gardener should never be satisfied with anything but abundant crops of the best quality, let him also bear in mind that the garden should be an expression of orderly arrangement. No garden can do its best without intelligent care. A well thought out scheme must be followed if complete success is to be achieved. Have the plot properly laid out before beginning its development. Mark on the plan the location and quantity of each vegetable to be grown and the dates for sowing and setting. Companion and succession crops should be indicated. With the ground thus planned for utility, the crops may be so arranged that there will be a continuous supply of fresh and superior vegetables for the family table.

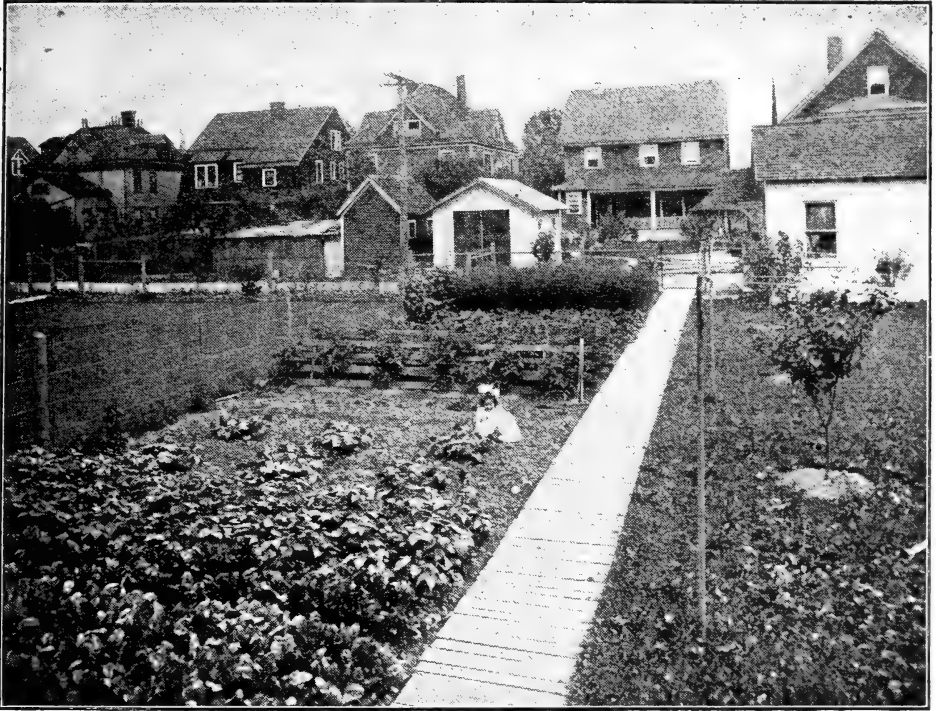
In some instances, a vegetable garden is objected to on the ground that it interferes with the beauty of the surrounding effects. But the latter can be made to fit in with the general scheme. A well-planned and neatly-kept vegetable garden need never detract from the general appearance of the place; usually it is a decidedly attractive feature; it lends an air of simplicity and "hominess" which flowers alone cannot furnish. On a "dollars and cents" basis alone, the vegetable garden is, or can almost always be made, a paying factor. Even where that side of the matter is to be disputed there is no question that to get the very best quality of vegetables you must grow your own.

The commercial grower must be guided in his choice of varieties by the market demands, and by the factor of big yields, even though the varieties which meet these requirements may not be those of the best table quality. The home gardener, on the other hand, may select varieties which satisfy his own personal taste. Furthermore, there are many vegetables which, to be had at their very best, must be gathered only a few hours before they are used. As an old saying has it: "The pot should be boiling before you pick your Corn."

As a healthful recreation, nothing surpasses the cultivation of culinary vegetables. It never gets monotonous, for the work changes from day to day, and every day brings its own problems. The work involved may be made as mild or as strenuous as is desired. If one fears that not enough exercise is to be had with a hoe, a few hours' "trenching" with a spade will give him as big an appetite for his dinner as anything he can find to do.

It is not necessary to hesitate about having a vegetable garden because such a location as you may have available is not naturally the most ideal for the purpose. The plot of ground which cannot, with intelligent preparation, be made to grow successfully practically every one of the garden vegetables, is by all means the exception and not the general rule. At the same time it pays well to take advantage of any

favorable natural conditions that may be at hand. The best soil is what is termed a "sandy loam," that is, a good clay soil in which there is enough material of a sand-like character to keep it friable and workable at all times of the year, while moisture is retained by it for a long time. If you have only a heavy clay soil, it can be improved by adding sand, wood ashes, sifted coal ashes, lime and humus. If the soil is light and sandy, heavy loam or muck added to it will improve it, and humus will also be very beneficial.



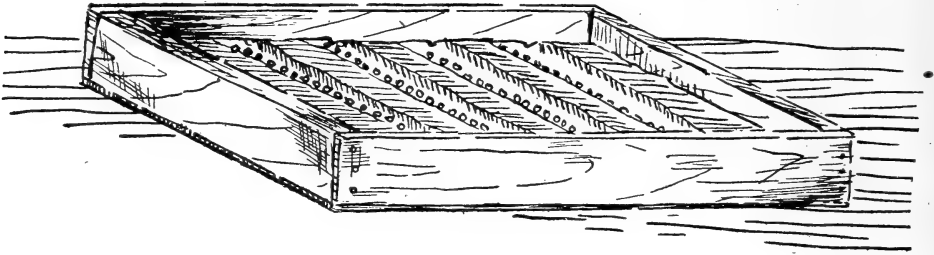
Small vegetable garden on suburban lot, with neat wire fence on left and wooden pathway

Drainage is one of the most important factors. If your garden spot is low and wet, by all means put in a drain tile at the first opportunity. Deep spading, and in extreme cases, loosening up the subsoil with agricultural blasting powder, will tend to overcome this difficulty.

If the garden can be located in a spot where it is protected from prevailing Winter and Spring winds the earliness of the crops will be advanced very noticeably. A good, thick hedge of Hemlock, Spruce, or Privet to the north and west of the garden, if it is not naturally sheltered, may be made to serve the double purpose of providing a wind shield, and of screening it from other parts of the place.

Growing Plants for Setting Out

Hotbeds and coldframes are really miniature gardens under glass and are highly esteemed by the progressive gardener. The hotbed is artificially heated from beneath, usually by a deep layer of clean stable manure, while in the coldframe the only heat is that supplied by the sun's rays. Frames and hotbeds are fully discussed in Chapter XXV.



Box for the transplanting of seedlings

If you utilize your frames to advantage, your first plantings of Cabbage, Cauliflower, Lettuce, Beets, Onions, Tomatoes, Peppers, Egg Plants, Lima Beans, Corn, Cucumbers, Melons and Squash will be well started by the time it is warm enough to plant them out of doors.

If you have only coldframes, a few plants may be started in the house in a warm, sunny window to be put into the frames when they are large enough to transplant. A supply of suitable soil should be brought indoors in the Fall and held for this purpose. Take a box 18 in. by 24 in. and 4 in. deep and bore a few holes in the bottom for drainage. Mix the soil with well-rotted manure and sand and fill the box to within one-half inch of the top. Sow the seed thinly in shallow rows and firm the surface.

In making a hotbed begin a week or ten days before you expect to make your first sowing of seed. Procure horse manure that has not yet fermented, allowing one-sixth of a cord to each sash to be heated. Unless the manure has some considerable straw or bedding mixed in with it, it will be better to add one-fourth of leaves to the manure when it is piled up. Build it up in a square heap, tramping it down solidly as it is built. After three or four days, fork it over and restack, putting what was the outside of the heap in the center. Sprinkle with water any parts of it that may seem dry. Fork the heap over again within three or four days. In this way the whole mass may be made to fer-

ment evenly, and will be in just the right shape to put into the frames for your hotbeds. Fork out the old soil to a depth of from four to six inches; put in the manure, tramping it down firmly to a depth of eighteen inches or so. The amount of manure required will depend upon the climate and upon how early in the Spring the bed is made.

If soil that is not frozen is available, it will be well to put an inch or so of fresh soil on top of the old in which to sow the seeds. Any soil which has been removed should be put back on top of the manure and thoroughly fined and raked level. Then put on the sashes and let the frames stand until a thermometer hung inside recedes to a temperature of 70 deg. to 80 deg., when it will be ready for the first sowing of seed.

Digging, Manuring and Preparing the Soil

With the soil adequately enriched and thoroughly prepared, success is half won before you begin. Insufficient preparation, no matter how good your seeds may be, will remain a drag and a handicap throughout the entire season. The soil is the sole source of nourishment for the tremendous development plants will have to make through the comparatively few weeks of the growing season. All their food is absorbed in the form of a weak solution. We have already spoken of the necessity for thorough drainage. The soil must also be well pulverized. It pays, therefore, to take time to prepare, just as thoroughly as you possibly can, your garden soil, no matter how impatient you may be to get at the more interesting tasks of seed sowing and planting.

If your garden plot is sufficiently large for a horse or team to turn in plowing will be much cheaper and on the whole much more satisfactory. Unless your soil is very light and sandy, it will pay to plow as deeply as possible without digging up the subsoil. If possible, plow or spade up in late Fall, leaving the soil in ridges, harrowing in Spring. If not able to do this, then plow early in the Spring. If the garden has to be dug by spade, you will have to watch carefully to see that the job is done thoroughly. It is hard, slow work and nothing is to be gained by trying to skimp it. The garden that is dug shallow, left lumpy or merely fine on the surface, cannot give good results. Dig at least ten to twelve inches deep. Manure should be spread evenly over the ground before spading. It is usually best to throw the first row or furrow of soil out entirely, and then put the manure from the next strip on the bottom of the furrow dug out, proceeding in this manner across the piece.

When planting or sowing is to be done the whole plot should be raked over. It may be that only a small part of it will be wanted for

immediate use for the hardiest seeds or plants, but if it is all given the same treatment the moisture will be conserved. It pays to take a good deal of care and time to get all trash and stones raked up and removed before you think of getting the surface ready for planting.

For practical results the enriching of your garden can be accomplished in no better way than by the application of all the manure you can conveniently get. It should be well rotted and not green and lumpy. Horse and cattle manure mixed that has been kept under cover and has thoroughly fermented but not "fire-fanged" or burned out, is the best. If you can get enough of this to spread it three or four inches deep all over your garden, you will have the foundation for big crops.

Chicken manure is particularly powerful, but should have been kept so that it is fine and dry, and not stuck together in a pasty mass. If you have only a small quantity, it is wise to keep it just for use in hills and for transplanting rather than to spread it over the whole garden. Sheep manure, like chicken manure, is very high in nitrogen, and should be used in the same way. Within recent years it has been possible to purchase cattle, horse and sheep manure in standardized, prepared forms which are dry and convenient to handle. Where yard manure cannot be conveniently obtained, these can be used.

Because it has been increasingly difficult to get manures in sufficient quantities, commercial fertilizers have come more into use. As it is more convenient, the small gardener usually buys his fertilizer in the form of a completely mixed preparation. See Fertilizer chapter.

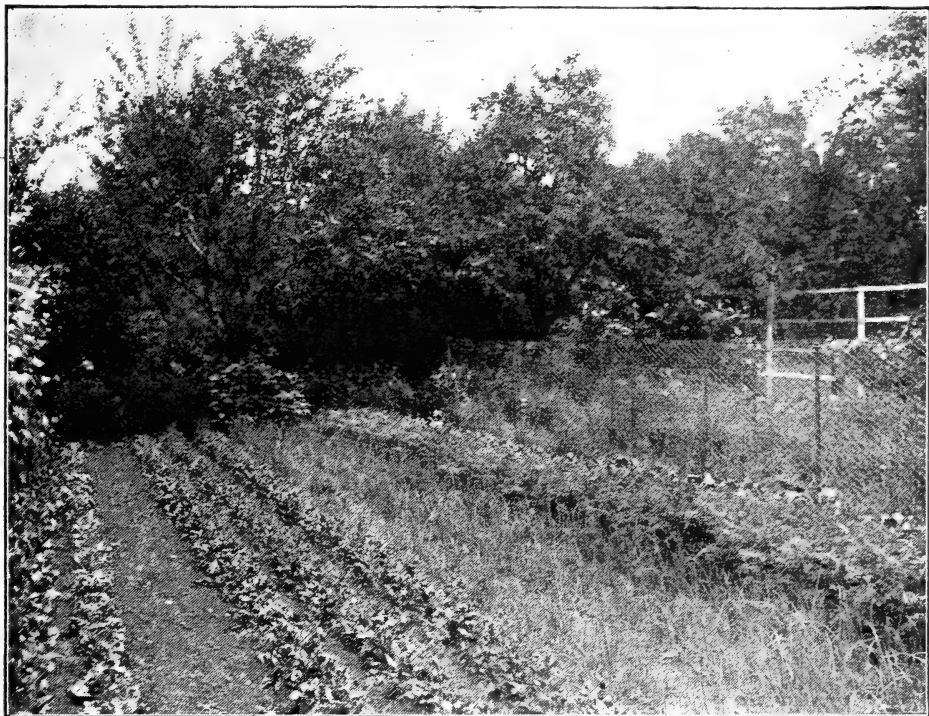
It will be well to have on hand, however, a small quantity each of fine ground bone, guano or dried blood. These are all quick acting fertilizers which can be used in hills or drills. You can also use all the wood ashes you can get. Dustings of lime are also helpful. Commercial "humus" or prepared decayed vegetable matter is inexpensive and will prove very beneficial. It is often advertised.

Sowing and Transplanting

The operations of planting and transplanting are two at which the gardener must become expert as soon as possible. The first step is to have a thoroughly prepared seed bed or planting surface. Have the soil thoroughly pulverized. It may then be left until ready for use. Just before you sow or plant, the surface should again be gone over with an iron rake. Make it as smooth and fine as you possibly can.

Directions for Sowing

It is best to buy seed from a good, reliable seed house rather than to depend upon what you may find at the local hardware or grocery store. Small seeds such as Lettuce, Radish and Onions may be merely raked into the surface; medium size seeds, such as Beets, Spinach and Parsnips, from one-quarter to one-half inch and the comparatively large seeds, such as Cabbage, Carrots and Pumpkins, about one-half inch deep. In showery weather the seeds should be covered more



Lettuce, Beets, Onions, Carrots, Peas and wire netting support for Peas. This garden is a model of good keeping

lightly than in normal conditions, in a very light soil, or in hot, dry weather, cover more deeply. In extra early sowings of Peas, put the seeds in a little deeper but not much.

As a general guide, sow Onions, (also plant Onion sets) smooth Peas, early Beets, Radishes, Spinach, Turnips and Cabbage just as soon as the ground can be worked in the Spring. When Peach and Pear trees are in bloom, the medium hardy seeds, including Beets, Carrots, Kohl-Rabi, Lettuce, wrinkled Peas, Parsnips, Salsify, Tomatoes, Swiss Chard may be sown and also Lettuce, Cauliflowers, Beets and Onion plants from the coldframes may be set out.

When the apple trees are in blossom, sow the tenderest seeds—Beans, Sweet Corn, Cucumbers, Okra, Melons, Pumpkins and Squash.

After all danger from late frost is past, set out growing plants of Tomatoes, Peppers, Egg Plants, Pole Beans, Melons, Cucumbers, Sweet Corn and Okra.

Poor germination results are often due to the fact that seeds are loosely covered in the soil. They should be well firmed and covered. Firming can generally be done well enough with the back of the hoe or rake.

For neatness make every row straight, using your garden line and reel frequently. Tag every row as soon as it is sown or planted, marking on the date as well as the name of the variety. You will thus be able to keep track of the time required for the different varieties to mature, which will be of great value to you in succeeding years.

Transplanting

Transplanting should be done preferably during showery weather, or in the late afternoon, and the plants will take hold more quickly. If they are shaded in some way for a few days, especially if the weather is windy and sunny, all the better. An irrigation system is of the greatest benefit, in transplanting or planting, as the work can be done at any time with an almost positive certainty of success. In all transplanting the soil ought to be pressed firmly.

Seeds may be sown directly in the soil, but usually it is better to sow in "flats" or seed pans, which can be moved about from one sash to another and handled more conveniently in transplanting. Small seeds should be barely covered from sight, while larger ones should be covered to the depth mentioned a few paragraphs back. It is important to press the seed firmly into the soil when sowing. Label each variety carefully and water with a fine spray so as not to wash out the seeds.

As soon as the little seedlings are up it will be necessary to give some fresh air every day or two to keep them healthy and vigorous, the temperature being kept at from 60 to 75 deg. according to the things being grown. As soon as the first two or three true leaves appear, the seedlings should be transplanted, either into other "flats" or into the frames, setting them from two to three inches apart each way so they will have plenty of room.

During this season watering should be done only on bright mornings so that the soil will have a chance to dry off before night, as this will lessen the danger of "damping off." Avoid over-watering, as the soil dries out very slowly when the sashes have to be kept on most of the time.

Tomatoes, Peppers and Egg Plants should be transplanted a second time, preferably to pots, before being set out of doors. If they have been given plenty of room at the first shift in the frames or flats, they can be put into three and a half- or four-inch pots, and be in bud and blossom when set into the garden.

It is very important that all plants, whether hardy or tender, should be "hardened off" carefully before being moved from the frames to the open garden. To do this, leave them uncovered all the time for several days and nights before you set them out, putting on the sashes only if frost threatens. Should plants inadvertently get touched by frost, watering them with ice-cold water in the morning and keeping them shaded from the sun will often enable them to recover when they might otherwise be lost.

Watering—Irrigating

Within the last few years there have been developed several systems for applying water artificially. Any gardener who has a water supply with thirty pounds pressure available can get his own rain whenever he wants it by installing an irrigation system, at a very slight cost.

The type that has been most widely used consists of horizontal piping supported a few feet above the surface of the garden and perforated at regular intervals. These pipes can be turned by a handle and a valve turns the water on or off as needed. A single line of pipe will water a strip of ground twenty-five feet wide on both sides, or a total of fifty feet.

Another system which is slightly more expensive and applies the water more rapidly, has adjustable circular sprays placed every twenty-five or thirty feet along the line of pipe. It also does excellent work.

Watering with a hose by hand is not to be compared with water applied by a modern irrigating system. The soil can be soaked evenly and to as great a depth as desired, the water being put on whenever and wherever wanted by simply turning a valve and occasionally turning the pipe. For very small gardens a portable system of both types can be had.

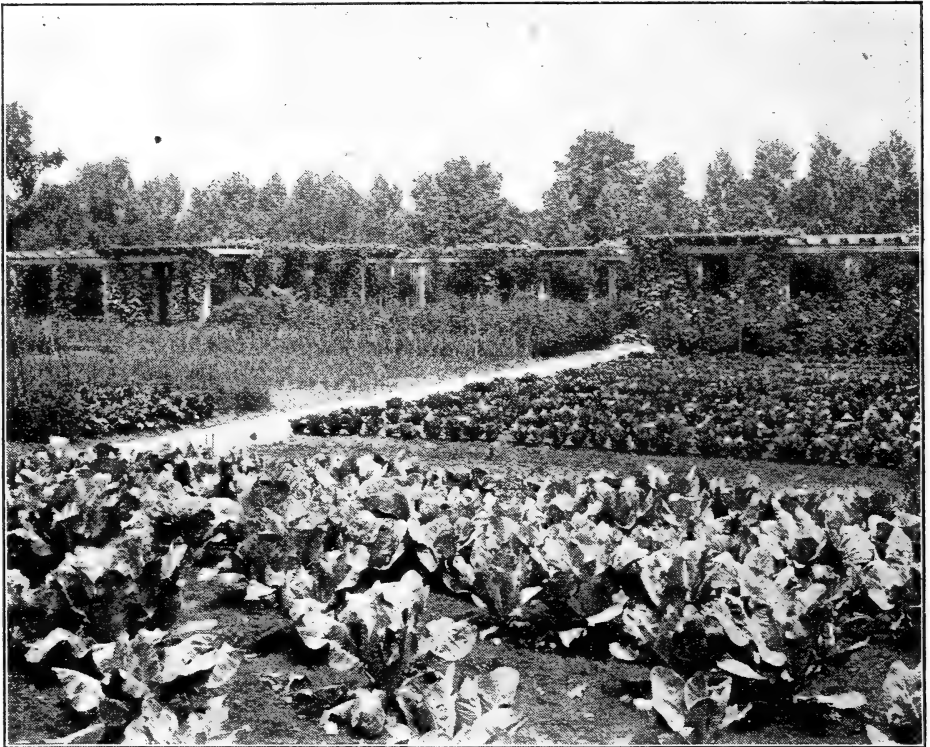
General Principles of Cultivation

Late afternoon or evening is the best time for watering vegetables. If a hand hose is used, wet the ground thoroughly by letting the spray rise in the air and fall in a fine shower. To produce a similar result hold the sprinkling can as high as possible.

What is "cultivation?" Why do we do it and what does it accomplish? We cultivate to keep down weeds that might rob the growing

crop of sunlight, air and nourishment; to conserve the moisture in the soil; to keep the soil open and aerated, and to pulverize the soil or break up its particles and thus assist the chemical and bacteriological changes in the soil. Cultivation brings these results. It also creates what is called "a soil mulch," i. e., a layer of dry soil on the surface which checks the loss of moisture from the lower layers to the surface where it evaporates rapidly.

The cultivation work required on any crop will depend largely on whether or not you get the first hoeing and weeding done just as soon as it is possible to do it, or let it go for a few days or a week later.



A vegetable garden for supplying a large household. Here, as in the smaller gardens depicted on other pages, cleanliness and careful cultivation are pre-eminent. Observe the handsome pergola around the exterior

Within a week or ten days the soil between the rows will have begun to form a crust again, and new crop of weed seedlings may have sprouted. This means another hoeing promptly. We do not think that it is any exaggeration to say that eighty per cent. of the work in taking care of gardens is due to the fact that these hoeings and hand weedings are allowed to go for several days after they should have been attended to. The tedious task of hand weeding may be lessened considerably by using one of the small hand weeders.

Cultivation should be kept up frequently enough to maintain a dust mulch at all times. Cultivation with a wheel hoe should be kept up as long as it is possible to get between the rows. Then you should substitute for it a double or slide hoe. The types with runners or wheel to guide the blade and hold it even do much better and easier work. By all means, provide yourself with one.

Rotation of Crops

Garden rotation—that is, changing the location of vegetable plantings each season—is of much importance and should be carried out as far as possible. An excellent plan to follow is to raise surface crops one year on a plot where root crops were grown the year before.

Insects and Diseases

There are a number of insects which are almost certain to put in appearance every season. One important thing in combating insects and diseases is to be prepared to ward off attack. In cases where preventive measures are not possible, be prepared to act immediately if trouble appears. Owing to the large number of remedies, cures and poisons which the gardener sees advertised or hears about, he is likely to get the idea that the question of plant pests is such a complicated one that no simple and systematic measures are possible. As a matter of fact, warfare with plant troubles, while it is always serious enough, is by no means as complicated as at first appears. The first step to take and the most important thing to know is what kind of enemy you are fighting in any particular case. While their number is legion, they can be classified into three or four groups (as spoken of in a chapter on Insect Pests and Fungous Diseases, which see), against each of which the same weapons are effective.

Harvesting and Storing

There are thousands of amateur gardeners who leave enough fruit and vegetables on or in the ground at the end of the season to make all the difference between profit and loss on their season's operations. Learn to utilize everything you grow. Every head of Cabbage that splits, every ear of Corn, or handful of Beans that gets too old to use, every root that is left to freeze in the ground, is just so much waste. While many things can be successfully stored through the Winter, or a large part of it, others must be canned. The usual mistake is to try to do all the canning in a rush at the end of the season. The prejudice against canned things is largely due to the fact that they are not canned until they are already old and tough. See Chapter on Fruits and Vegetables for Winter.

In storing vegetables, a few things need an exceptionally dry and warm place, such as a corner of the attic near the chimney. The storage room must be perfectly clean. Get it ready early. Some folks like to provide containers to hold the different fruits or vegetables and so make them easy to handle. Some vegetables demand a free circulation of air about them, while others must be kept barely moist by some packing material. Ordinary cracker boxes and slatted vegetable or Onion crates, each of which holds about a bushel, level full, are cheap, clean and convenient, and can be obtained at any grocery store. The boxes are also excellent for keeping Apples and other fruit, and for packing root crops such as Parsnips, Salsify, Turnips, Beets, Carrots and Winter Radishes in sand or sphagnum moss, and also for packing Celery for Winter. Slatted crates are good for Onions, Squash, Cabbage, and for handling Tomatoes, Melons, Egg Plant and so forth, which can be kept for some weeks in a cool place. Directions for storing and harvesting the individual crops are given in paragraphs that follow, but the fuller general information is given in this paragraph on storage. *See also Storage Cellar Diagram and accompanying notes.*

Fertilizers for Fruits and Vegetables

This subject is fully discussed in a separate chapter, which see.

Gardening Tools

One of the first requirements of the gardener is an assortment of tools with which to till the ground. If the garden is very small, what the catalogues list as a "ladies' set," which comprises a hoe, a rake and a fork of good quality, will be found convenient and satisfactory. Garden tools are dealt with in a later chapter.

VEGETABLE GARDENING, by F. L. Watts,

This complete, concise and authentic book covers every phase of vegetable gardening and is especially well organized as a textbook and equally valuable as a handbook for practical growers. It treats fully the questions regarding soils fertilizers, manures, irrigation, insect enemies, and fungous diseases, construction of hothouses, coldframes, seed growing, vegetables under glass, marketing, etc., etc. Illustrated. 5½ x 8 in. 525 pages. Cloth. Price, \$2.15, postpaid

Secure your copy where you bought your Garden Guide

Sowing and Planting Table for Vegetables

	Seeds or Plants 50-ft. Row	Apart in Rows	Distance Between Rows	Depth of Planting	Time of Planting	Ready for Use after Planting
Asparagus, Seeds.....	½-1 oz.	3-5 in.	1-2 ft.	¾-1 in.	Spring	3-4 years
Asparagus, Roots.....	40-50 rts.	1 ft.	3 ft.		Spring	2-3 years
Beans, Bush*	1 pt.	3-4 in.	2-2½ ft.	1½-2 in.	May to Aug.	45-75 days
Beans, Pole.....	¼ pt.	3-4 ft.	3-4 ft.	1½-2 in.	May-June	50-80 days
Beans, Lima*	¼ pt.	4-5 ft.	4-5 ft.	1½-2 in.	May-June	70-100 days
Beets*	1 oz.	4-in.	12-15 in.	1 in.	Apr.-Aug.	60- 70 days
Broccoli*	25 plds.	18-24 in.	30-36 in.	¼-½ in.	Mar.-June	100-130 days
Brussels Sprouts*	25 plds.	18-24 in.	30-36 in.	¼-½ in.	May-June	90-120 days
Cabbage, Early*	35 plds.	16-18 in.	30-36 in.	¼-½ in.	Mar.-Apr.	90-130 days
Cabbage, Late.....	25 plds.	18-24 in.	30-36 in.	¼-½ in.	May-June	90-130 days
Cardoon.....	¼ oz.	12-18 in.	24 in.	1 in.	Apr.-May	150-170 days
Carrots.....	½ oz.	3-4 in.	12-15 in.	½ in.	Apr.-June	60- 85 days
Cauliflower*	20-25 plds.	24-30 in.	30-36 in.	¼-½ in.	Apr.-June	100-140 days
Celeriac.....	½ oz.	6-8 in.	18 in.	¼ in.	May-June	100-150 days
Celery.....	¼ oz.	6 in.	3-4 ft.	½ in.	May-June	125-150 days
Chard, Swiss.....	¾ oz.	6-8 in.	15-18 in.	1 in.	Apr.-May	60- 80 days
Chicory, Witloof.....	¼ oz.	6 in.	18 in.	½ in.	May-June	5-6 months
Chinese Cabbage.....	½ oz.	18-20 in.	24-30 in.	¼-½ in.	July-Aug.	60- 90 days
Collards.....	25-35 plds.	18-24 in.	24-30 in.	½ in.	May	100-120 days
Corn.....	½ pt.	12 in.	36 in.	1½-2 in.	May-July	60-100 days
Corn Salad.....	1 oz	3 in.	12-15 in.	½ in.	Mar.-Aug.	60- 70 days
Cress.....	¼ oz.	Br'dcast	12 in.	¼ in.	Mar.-Sept.	30- 40 days
Cucumbers*	¼ oz.	4 ft.	4 ft.	½ in.	May-June	60- 80 days
Egg-plant*	25 plds.	24 in.	2½-3 ft.	½ in.	Apr.-May	100-140 days
Endive.....	½ oz.	12 in.	12-18 in.	¼-½ in.	April	75-100 days
Horse Radish.....	40-50 rts.	12-15 in.	24-30 in.		Spring	130-150 days
Kale (Borecole).....	¼ oz.	18-24 in.	24 in.	½ in.	Mar.-Apr.	70-100 days
Kohl Rabi*	½ oz.	6-8 in.	18-24 in.	½ in.	Mar.-May	60- 80 days
Leek.....	½ oz.	4 in.	18 in.	½ in.	Mar.-May	120-150 days
Lettuce*.....	¼ oz.	6-8 in.	12-15 in.	⅛-¼ in.	Mar.-Sept.	60-100 days
Melons, Musk*	¼ oz.	4-5 ft.	4-5 ft.	¾ in.	Apr.-June	90-120 days
Melons, Water.....	½ oz.	6-8 ft.	6-8 ft.	¾ in.	May-June	100-125 days
Mustard.....	¼ oz.	8-12 in.	15-18 in.	¼ in.	Mar.-Sept.	60- 90 days
Okra.....	1 oz.	18 in.	2-3 ft.	1 in.	May-June	80-120 days
Onions.....	½ oz.	2-3 in.	12 in.	½ in.	Apr.-May	120-175 days
Parsley*.....	¼ oz.	3-6 in.	12-18 in.	¼-½ in.	Apr.-June	90-120 days
Parsnip.....	¼ oz.	3-4 in.	18 in.	½ in.	Apr.-May	100-150 days
Peas, Dwarf.....	1 pt.	2 in.	3 ft.	1-2 in.	Mar.-July	50- 80 days
Peas, Tall.....	1 pt.	2 in.	4 ft.	2 in.	Mar.-July	50- 80 days
Peppers*.....	25 plds.	2 ft.	2½-3 ft.	½ in.	May (Mar. in hotbed)	100-140 days
Potatoes.....	½ pk.	12-15 in.	2½-3 ft.	3-4 in.	Mar.-May	70-120 days
Pumpkins.....	¼ oz.	8 ft.	8 ft.	1 in.	May-July	100-130 days
Radish.....	½ oz.	1-2 in.	8-12 in.	½ in.	Mar.-Sept.	25-50 days
Rhubarb, Seed.....	¼ oz.	10-12 in.	12 in.	½-1 in.	Mar.-Apr.	3-4 years
Rhubarb, Roots.....		3 ft.	3-5 ft.		Mar.-Apr.	2-3 years
Rutabaga.....	¼ oz.	6 in.	18-24 in.	½-1 in.	May-June	80-100 days
Salsify.....	¾ oz.	3-4 in.	12-18 in.	½ in.	Apr.-May	120-170 days
Sea Kale, Seed.....	¼ oz.	6 in.	15 in.	½-1 in.	May-June	3d year
Sea Kale, Roots.....		3 ft.	3 ft.			2-3 years
Spinach.....	½ oz.	4 in.	12-18 in.	½ in.	Mar.-Apr.	60- 80 days
Squash, Bush.....	¼ oz.	4-5 ft.	4-5 ft.	½-1 in.	Apr.-June	50- 60 days
Squash, Running.....	¼ oz.	7-8 ft.	7-8 ft.	½-1 in.	Apr.-June	70-100 days
Tomato*.....	25 plds.	18-24 in.	3 ft.	½ in.	Mar.-May	100-140 days
Turnip.....	¼ oz.	4-6 in.	15-18 in.	½-1 in.	Apr.-July	60- 80 days
Vegetable Marrow.....	¼ oz.	5-8 ft.	5-8 ft.	1 in.	Apr.-June	100-140 days
Watercress.....	¼ oz.	2-3 in.	6-in.	⅛-¼ in.	Apr.-Sept.	60- 80 days

*For early crops start in hotbeds or coldframes February, March or April, according to location and season. Bean seeds should not be planted before April.

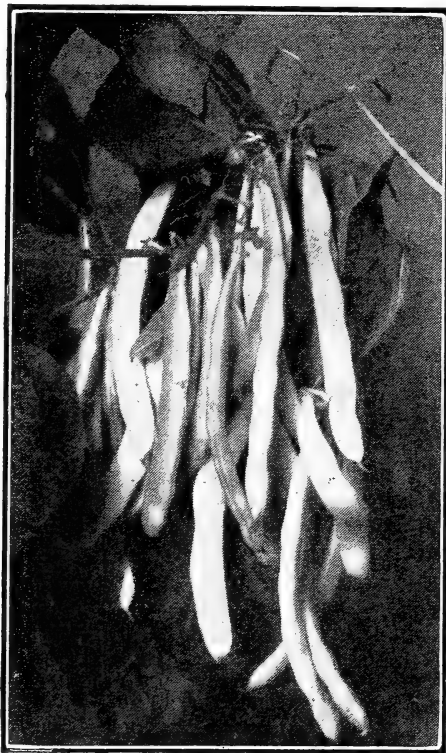
NOTE.—Planting dates are given for the latitude of New York. Farther South the sowings should be made earlier in the year, and farther North correspondingly later as soil becomes warm and weather settled. Over a great area of the United States owing to weather conditions, sowings that were made one year on April 1 it might not be possible to make until May 1 the next year in the same section, owing to backward season, or again the reverse may take place. The lesson is obvious: the gardener must stand ready to plant his seed or set out his young plants the moment the opportunity offers.

CULTIVATION OF THE CHIEF VEGETABLES

The principles of fertility and culture, which have been covered in the previous chapters, apply alike to all vegetables.

ASPARAGUS

This excellent vegetable may be grown from seed, but as it does not come into full bearing until the third or fourth year from sowing it is more satisfactory to purchase two-year-old roots. A hundred or two Asparagus plants, well cared for, will supply the home table. Select well drained soil in which to plant this crop, preferably one a little sandy. Dig out



Refugee Wax Beans

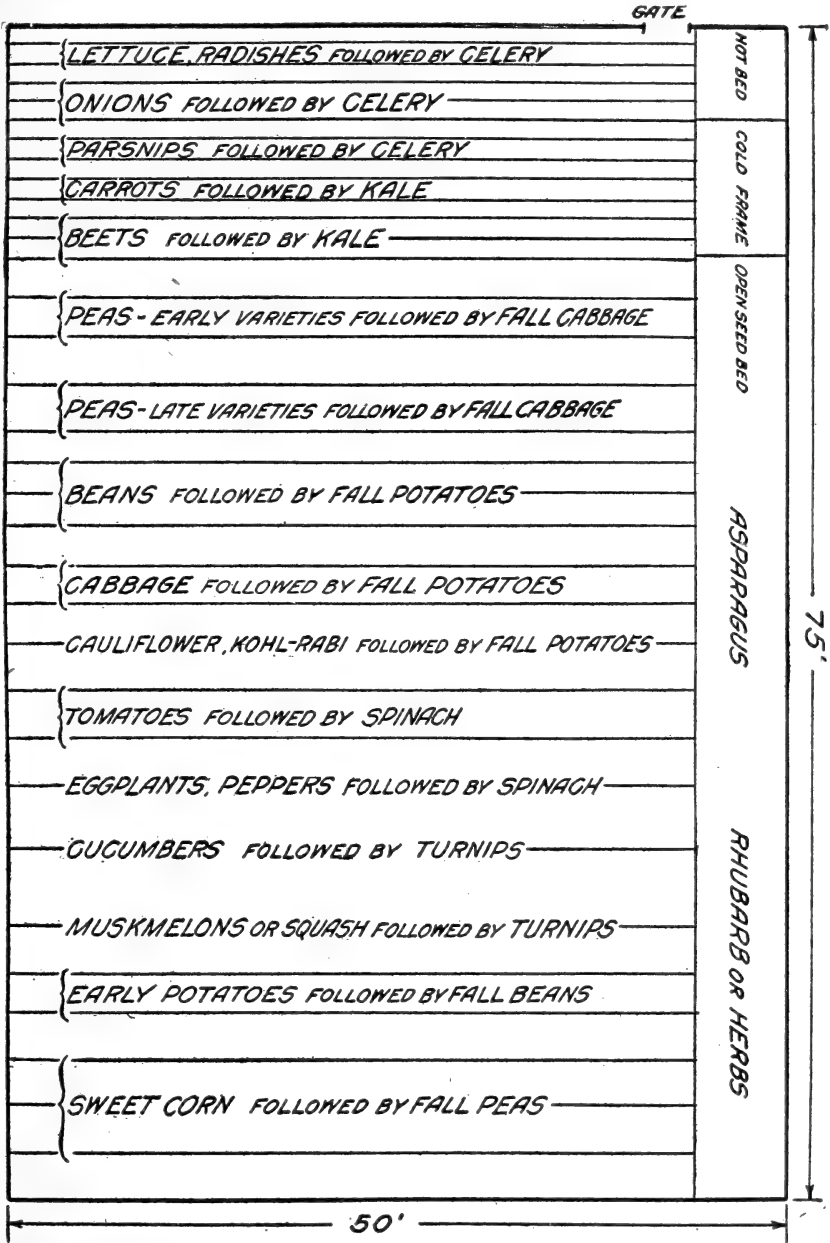
trenches about eighteen inches deep and three feet apart. Tread into these six inches or so of manure, and cover this with good soil to within six inches of the surface. On this prepared bed, during the late Autumn or early Spring, set the roots a foot apart, spreading them out evenly. Fill the trench only two-thirds or so at first, and work the rest of the soil in until it is level as the plants develop. Beans, Beets, Carrots, Lettuce, can be grown between the rows of Asparagus during the first part of the season. As the shoots or growths develop in the Spring, a few of the largest may be cut, but only for a few weeks the first year. Cultivate thoroughly, however, to get as vigorous a growth of plants as possible. Cease cutting when the shoots become tough or stringy (about June 24 in the latitude of New York) and allow the tops to grow, removing and burning them in the late Fall. Then cultivate the soil and apply manure or fertilizer. This is to throw strength into the crown for the early Spring

growth, as the succulent roots act as storehouses of plant food.

BEANS

Always select a warm and fertile soil if available. Avoid nitrogenous manures or fertilizers near the seeds. As Beans will not withstand cold weather, it is quite useless to plant before the ground is reasonably warm. Bush Beans are planted in rows 24 to 30 in. apart, $1\frac{1}{2}$ to 2 in. deep; thin out to 3 or 4 in. between each bean. Good results are obtained by planting in double rows 5 to 6 in. apart. As the plants develop hill them slightly.

Cultivate the soil frequently, but never while the foliage is wet, as hoeing when the vines are moist spreads disease and often results in a failure of the crop. Pick the pods before they attain full size; they are then tender and almost stringless. For a continuous supply make successive sowings every ten days or two weeks.

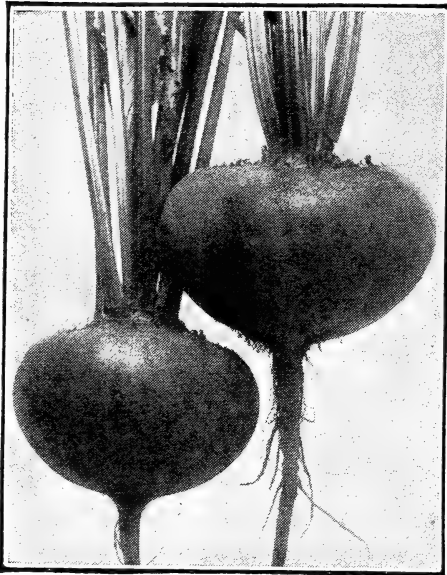


Plan for the cropping of a Southern garden 50ft. by 75ft. From U. S. Farmers' Bulletin 647

The Dwarf Limas are only partly dwarf, and should be given more space than the Green and Wax Beans. Put the seed in edgewise with the eye down, and if possible, avoid planting within two or three days of rain.

Pole or running Beans are usually planted in specially prepared hills 3 to 4 ft. apart, and supported on rough poles or stakes with cross pieces. A better way is to grow them in rows, and support them on a continuous trellis. For a long bearing season keep all pods picked off as fast as they are large enough. Many varieties, however, are good as shell Beans after they mature.

Pole Limas should not be planted until the ground is thoroughly warm. Set the seed, eye downward, in hills 4 to 5 ft. apart. In each hill place 8 to 10 beans, 1½ to 2 in. deep, and when the plants are established thin to 4 or 5. Many gardeners now use the Bush Lima instead of the Pole; they are just as satisfactory and require no support.



Egyptian Beets

BEETS

Beets thrive in well enriched, moist soil. Sow the seed 1 in. deep in drills 12 to 15 in. apart, and thin out early to 4 in. The thinnings from the crop make excellent greens. As with all the root crops, especially when planted early in the season, growth will be greatly stimulated by a slight application of nitrate of soda. Make two or three sowings between April and the latter part of June when the crop for Fall use and Winter storage is put in.

BROCCOLI—BRUSSELS SPROUTS

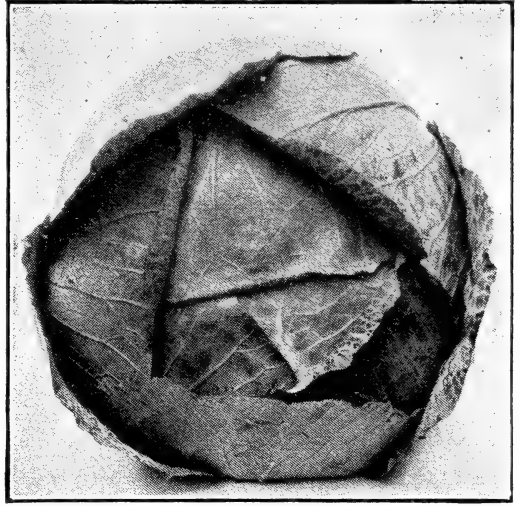
Broccoli is a crop similar to Cauliflower, but much hardier. Give same culture as Cauliflower and grow for Fall and Winter use, as it does not thrive in the hot season.

Brussels Sprouts, an extremely delicious vegetable, is grown in much the same way as Cauliflower or Cabbage. The "buttons" or small heads which form along the stalk may be grown to a larger size by pinching out the crown of the plant after the "buttons" have formed. These plants are extremely hardy and the "buttons," which are improved by frost, may be left on the stalk and gathered when wanted until Midwinter.

CABBAGE

Use deep and very rich soil which is not lacking in lime, and in addition to this, put manure or fertilizer in the hills or rows. Cover the seed $\frac{1}{4}$ to $\frac{1}{2}$ in. deep. The early varieties may be set as close as 16 in. or 18 in., the rows being 30 to 36 in. apart. For late varieties leave 18 to 24 in. between plants. Plants started under glass are set out early in April, and seeds planted at the same time will give plants for a succession crop. Plants for the late crop are started in the latter part of May or early during the first half of June. As a rule, the earlier the better. One of the most important points in

growing strong plants for transplanting is to thin them out to several inches apart as soon as they are well started; also keep them thoroughly cultivated at all stages of growth. A slight hilling up as they develop is desirable. Two or three light applications of nitrate of soda given a week or so after transplanting, and again in from ten to fourteen days, will help wonderfully in giving the crop a strong start. Very palatable "greens" can be obtained by leaving the stalks of early cabbage in the ground to produce "sucker growths." Keep a sharp lookout for insect pests. During the growing season the plants may be troubled by a destructive green worm, which can be controlled by a weak spray of arsenate of lead early in their growth, but just before the heads begin to form it is safer to use a non-poisonous remedy; Slug Shot is very effectual as a destroyer of these troublesome pests; apply it when the plants are moist from dew.



Cabbage—Fresh and tempting

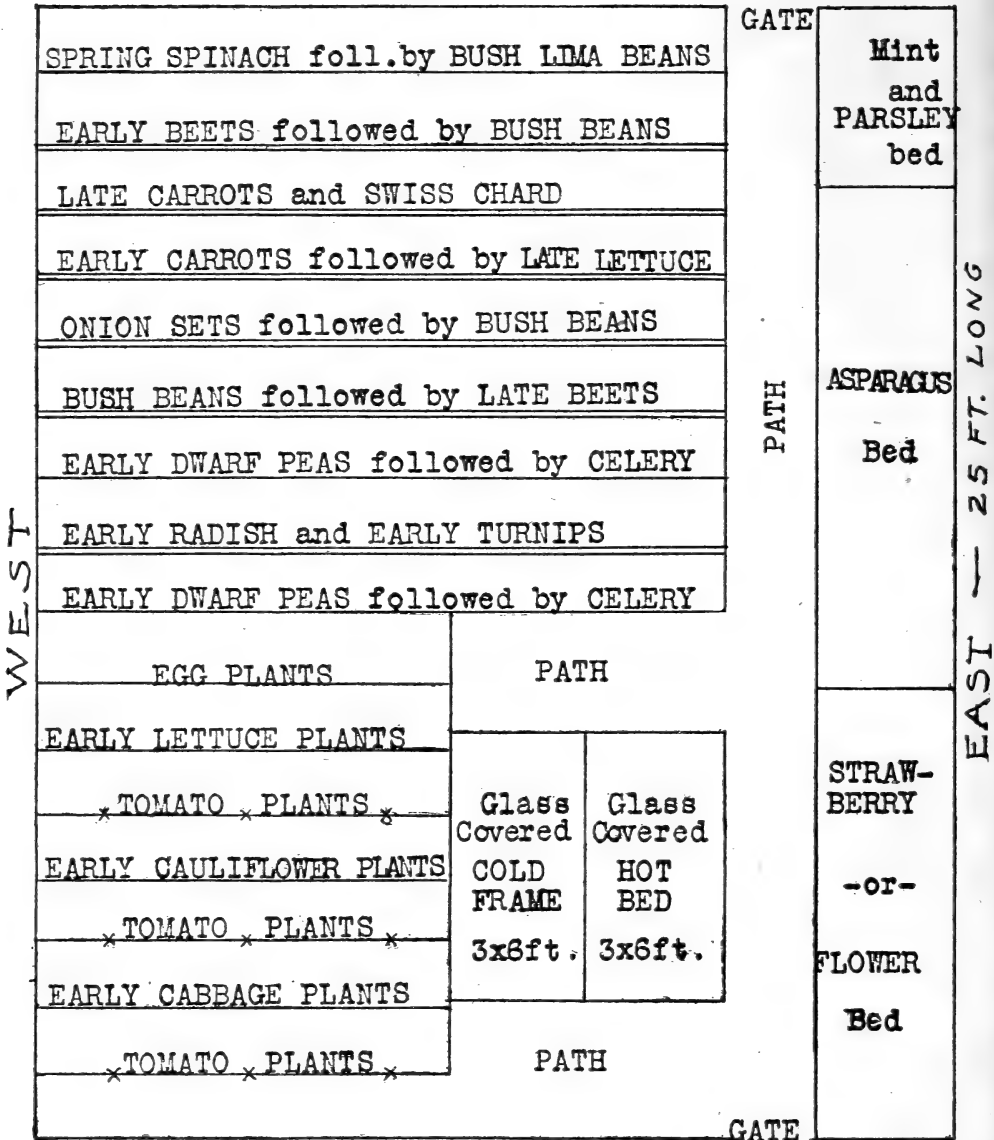
CARROTS

The general cultural requirements are similar to those recommended for Beets, with the exception that the ground can hardly be made too rich for the latter, while Carrots will often do excellently on ground which is not of so good tilth. For instance, if part of your garden is new ground, Carrots will be all right there, while Beets would do better on the old soil in the highest state of cultivation. Cover seed $\frac{1}{2}$ in. deep. For the earliest crop sow a variety recommended for forcing in the hotbed or cold-frame in rows 12 in. apart, setting Radishes between. The Radishes will be out of the way in time for the Carrots to develop. Where space is limited, a late planting of Onions for Winter use may be put in between the

Garden Plan for a City or Suburban Plot

20 ft. wide by 25 ft. long

NORTH



SOUTH — 20 FT. WIDE

Further details of Garden Plan above:

If there are no fence divisions a low wire netting will keep out dogs and cats from the garden. Seed is to be planted excepting where "plants" are mentioned. All rows are 18 in. apart. The path is 2 ft. wide. Beds to the right are 3 ft. wide.

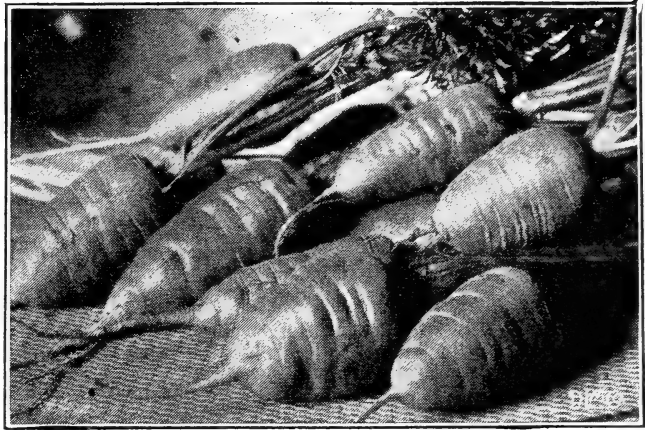
After Spring plants are out of the frames, two hills of Cucumbers may be planted in the hotbed, and two hills of Bush Squash in the coldframe.

The Lettuce, Cauliflower, and Cabbage Plants will mature before the Tomatoes overshadow them.

x—Indicates a Tomato plant, three plants to a row.

= (Double parallel lines)—Indicate that the seed of Beets, Carrots, Onions, Radishes, and Turnips, may be planted in double rows about 3 in. apart.

rows in late June, omitting every second or third row, giving room to dry and harvest the Onions. It will prove successful only if the ground is free from weeds, and soil moisture from irrigation or otherwise is to be relied upon. Give careful attention to the thinning of the young plants, leav-



Early Scarlet Horn Carrots

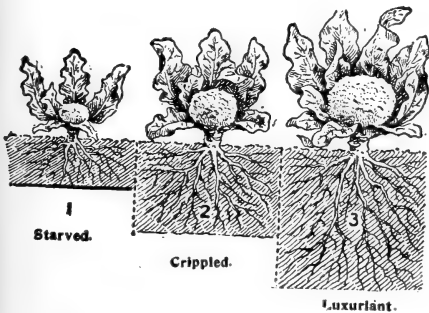
ing sufficient room between each for the carrots to attain their full size. Look out for the striped carrot worms. The most effective and easiest way of dealing with them is to pick them off the tops and destroy them.

CARDOON

Used principally as a Winter vegetable. Sow in May in drills 2 ft. apart and 1 in. deep; thin to 12 to 18 in. The soil should be rich, with plenty of moisture. In the Autumn the fleshy leaves are blanched by being drawn together.

CAULIFLOWER

This crop is handled in much the same way as Cabbage, with the following additional cultural requirements. The plants are more tender and should not be set out until a week or so after the first planting of Cabbage.



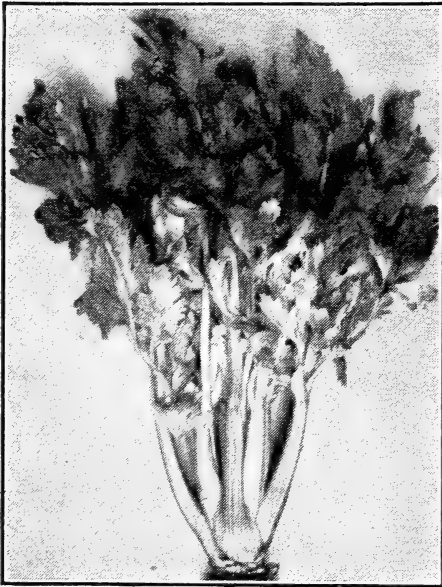
Cauliflower—Proving that shallow cultivation cripples all plants. Deep cultivation is essential to healthy, luxuriant growth

Cauliflower is a very gross feeder and even larger quantities of manure and fertilizer can be applied with advantage. An abundance of water is also of the greatest importance. To be kept white and tender the "heads" or curds must be protected from the sun soon after they begin to form by tying the leaves together over them. The "heads" remain in the best of condition for only a few days and should be examined frequently when about ready to prevent "going by."

CELERIAC—CELERY

Celeriac is a turnip-rooted form of Celery used for cooking. Its cultivation is similar to that for Celery, but it does not need banking or blanching. Sow about $\frac{1}{4}$ in. deep in drills 18 in. apart and thin out to 6 to 8 in.

The first requirement in growing good Celery is a good supply of water. The soil can hardly be made too rich. Early Cabbage and early Beets, Peas, Lettuce, etc., are usually out of the way in time to put in the Celery, so that the same ground can be used, but an additional dressing of fertilizer



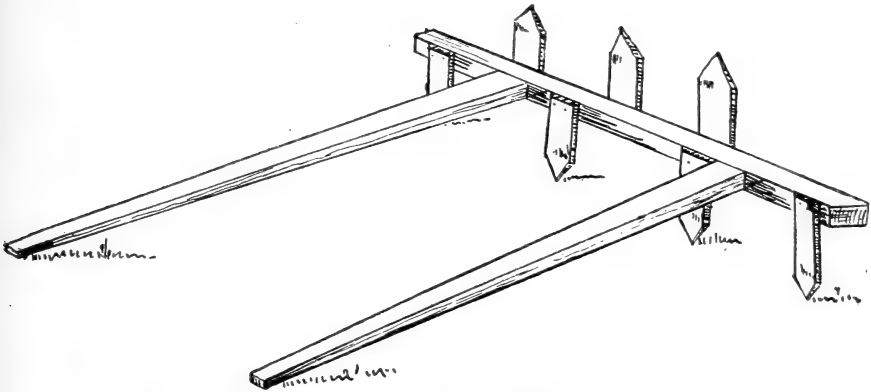
Golden Celery

should be given. For early use set out strong plants in April or May, putting the rows 3 to 4 ft. apart, and the plants 6 in. in the row. Where irrigation is available the plants are sometimes grown in beds, being placed 8 to 10 in. apart each way; many more sorts may be grown in the same area but they never are as heavy as those grown in rows. The early crop is blanched where it grows, either by backing up with soil which is drawn in carefully about the stalks to hold them in an upright position as they develop, or through a more convenient means; that is, Celery blanchers of various types which are now obtainable. For late Fall and Winter use the seed is sown one-eighth of an inch deep in April and the plants set out in June or July. Stronger plants can be obtained by transplanting from

the seed-bed to give the plants several inches apart each way. This makes them stocky and develops a fibrous root system which will give quicker and better results than if they are set out in the garden. When raised in a frame sow your seed in a shaded position. In transplanting water thoroughly and shade from the midday sun for a few days. Be careful not to get any soil over the hearts of the plants. Give clean culture and one or two top dressings of nitrate of soda as the plants develop, and throw enough soil up to them to hold the stalks upright. The celery crop should never be worked or handled while the foliage is wet as this will tend to augment any disease there may be. Blanching is accomplished by taking up the plants with such soil as adheres to the roots, and packing them close together and upright in a trench 12 to 15 in. wide, and deep enough so that the tops of the leaves come about on the level of the soil. As cold, freezing weather approaches, the trench is covered with a mulch or with boards; a portion of the crop left for Winter use may be transferred to boxes and stored in the cellar. See Winter care of Celery.

CHICORY—CHINESE CABBAGE—COLLARDS

Sown in Spring one-half inch deep in rows 18 in. apart and thinned to 6 in. apart, the Chicory (or Witloof) plant yields long, Parsnip-like roots by Fall, when they are dug and shorn of leaves to within $1\frac{1}{4}$ in. of the neck. The roots are then replanted $1\frac{1}{2}$ to 2 in. apart in trenches and covered with 8 in. of fine soil. Here they produce an abundance of blanched leaves which make a splendid Winter salad; they can also be cooked as greens.



Handy device for marking off rows in the vegetable garden

Chinese, or Celery Cabbage (Pe-Tsai) is a very desirable vegetable, a native of China, is easily and rapidly grown in good garden soil. It requires about the same treatment as Cabbage, but as it has a tendency to run to seed in the hot Summer months, sowing should be deferred until July or early August. Cover seed $\frac{1}{4}$ to $\frac{1}{2}$ in. in rows 24 to 30 in. apart, and thin the young plants to 18 to 20 in. The heads, which are easily blanched, resemble well-grown Cos Lettuce. They make a very palatable dish when cooked like Spinach or Cabbage, or they can be used raw as a salad.

Collards are of tall growth and produce a loose cluster of leaves. The variety known as Georgia, which endures extreme heat, is largely grown in the Southern States and used as a substitute for Cabbage, the leaves being tender and of fine flavor. Sow seed in rows 24 to 30 in. apart and cover to depth of $\frac{1}{2}$ in., allowing the plants to stand 18 to 24 in. apart in the row.

CORN

To get an extra early crop, a hundred or so plants may readily be started in small paper pots in a coldframe, not to be planted until a week or two before it would be safe to plant outdoors. For this purpose, Golden Bantam, which is extra hardy and also dwarf in growth, is particularly good. As Corn remains at its best but a few days, succession should be provided for,

(Continued on page 196)

Plan of a Practical Vegetable Garden 36 ft. by 48 ft.

A garden plan must of necessity be arbitrary as to area. It is easily made adaptable to any given piece of ground, through a little mental effort. Either enlarge or reduce to fit the case, but do not fail to follow the details of locating the various rows; correct position of one row of plants in relation to its neighbor row, is an essential feature in the vegetable garden; this for air, sunshine and succession crops.

The Asparagus bed is 6 by 14 ft.; the Strawberry bed 6 by 19 ft., with a 3-ft. path between. The distance between each row is given in inches. The sections devoted to Hybrid Tea and Tea Roses and to Annual and Perennial Herbaceous Flowering Plants are each 4 by 19 ft., while the Hotbed and Coldframe section is 12 ft. by 6 ft., with 3 ft. path below, all other paths being 2 ft. wide.

This garden is intended to be shut in by a wire-netting fence, not less than 4 ft. high. The ground for the "following" or "succession" crops must be dug as deeply, and be as well pulverized and as freely fertilized as for the first crops, not merely raked over.

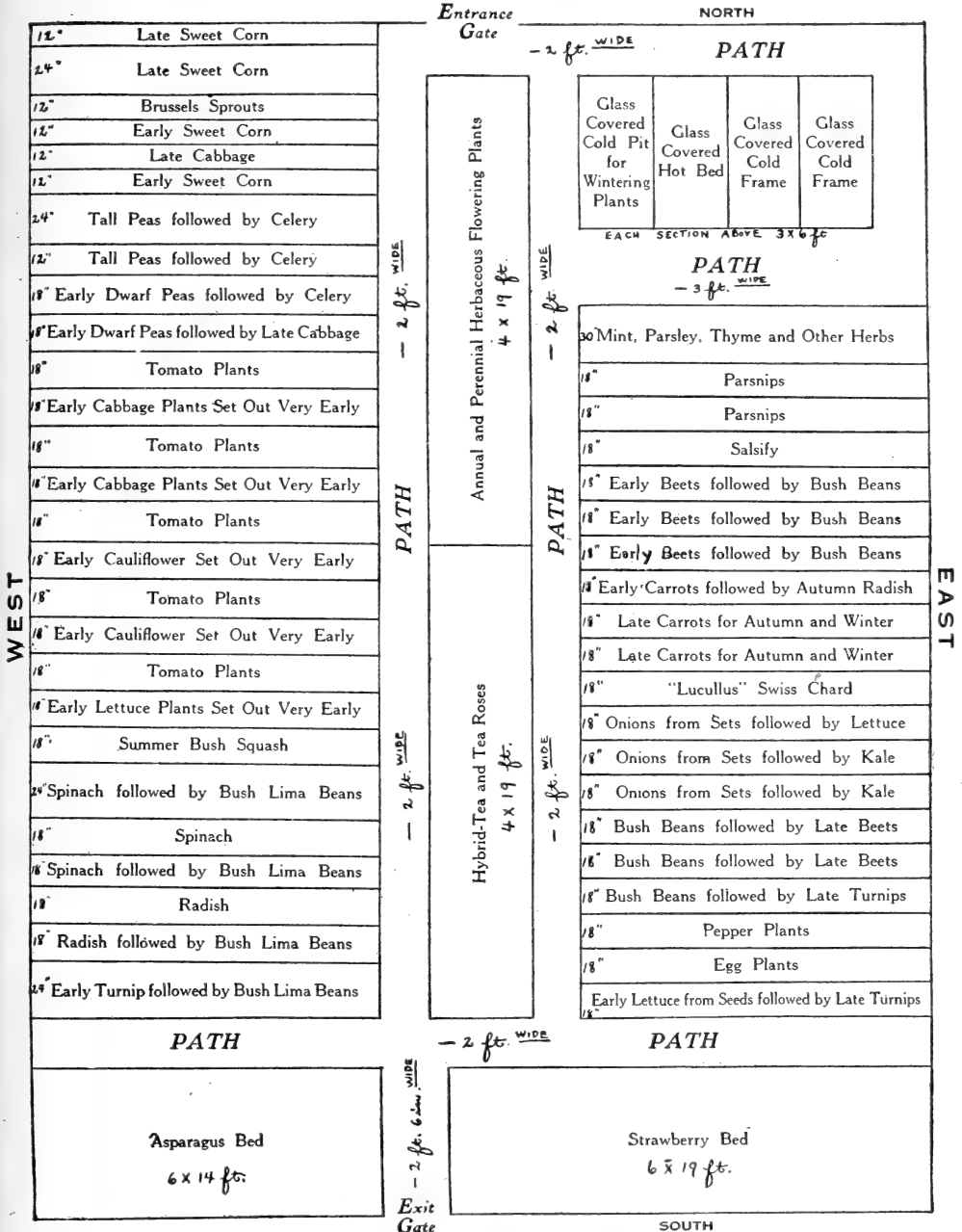
The planting of certain seeds in the various rows has been carefully thought out so as to obtain necessary light and space and with a view to the "succession" crops, for no garden can be considered a successful garden which does not give at least two crops in a season over the greater part of its area. Thus, the early Cabbage, Cauliflower and Lettuce plants will have matured before the Tomatoes overgrow them. The early Sweet Corn should be pulled out as the ears are gathered to let in the light on the Cabbage and Brussels Sprouts. Cucumbers in Summer can be grown in coldframes and hotbed.

As regards Tomatoes, early Lettuce, Cabbage, Egg Plants, Cauliflower, Brussels Sprouts, Kale, and Peppers, the seeds of these should not be sown directly in the garden rows, but plants raised from seeds sown in hotbeds or frame, should be transplanted into these rows.

This is one of the most practical garden layouts ever prepared for the amateur and we trust the amateur will appreciate it. It was planned by Joseph H. Sperry, a veteran gardener.

Plan of a Practical Vegetable Garden

This Garden is 36 ft. wide by 48 ft. long



For description of this Garden see page 194

(Continued from page 193)

either by making a small planting every week or ten days, or planting an early, a medium and a late variety at the same time, early in May, early in June, and early in July. In the open ground plant 5 or 6 seeds $1\frac{1}{2}$ to 2 in. deep in hills 3 ft. apart each way. A mistake that is sometimes made is to leave too many stalks in a hill. Thin out to three or four for best results. Give good clean culture with a slight hilling up when the plants are 12 or 18 in. high; this is about all the plants require. It is often more convenient to plant and cultivate, and just as good results can be obtained by sowing in continuous rows or drills 3 ft. apart instead of in hills, the plants being left to stand about a foot apart. Remove all suckers which develop from the base of the main stalk. A disease known as smut, which appears in a sooty mass on Corn, is very destructive. Remove and burn the affected parts as soon as discovered.

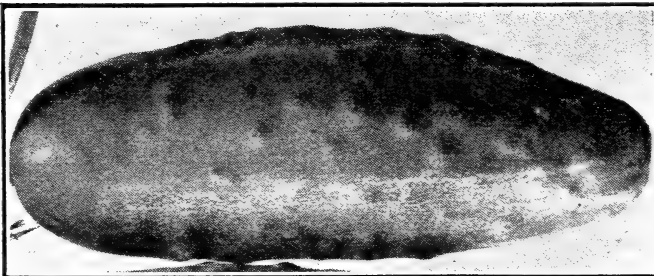
CORN SALAD—CRESS

Corn Salad, or Fetticus, is grown as a substitute for Lettuce during the late Fall months as it does not thrive during warm weather. Sow thinly in late August or early September, in drills 12 to 15 in. apart and about $\frac{1}{2}$ in. deep. Thin the seedlings to 3 in. It is very hardy, and with a light mulching of hay, may be had after other salad plants are gone.

Cress, the refreshing, pungent little salad or garnishing plant, sometimes called Pepper Grass, may be easily grown throughout the season. Successive sowings should be made, as it quickly runs to seed. For a continuous supply, make small plantings every two weeks in rows 12 in. apart, covering the seeds $\frac{1}{4}$ in. deep.

CUCUMBERS

For Cucumbers a light, warm soil is preferable, but they will succeed in almost any garden soil, provided there is good drainage. When all danger of frost is past sow the seed about $\frac{1}{2}$ in. deep in hills 4 ft. apart each way. Much earlier crops and better results may be had, by starting the plants in paper pots in coldframes as recommended for Sweet Corn. It is well, however, to use larger pots—say, 4 in. square. Fill each about half full with a compost of light soil and old, thoroughly rotted manure. Thin out to three or four plants, and after they have been set out long

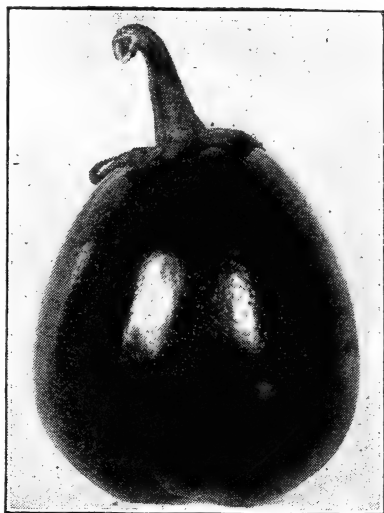


Emerald Cucumber

enough to become established, thin to two plants to a hill. Keep the soil between the plants well cultivated until the vines cover it. In setting out started plants the hills or rows should be enriched with well rotted manure

or guano or blood and bone, the same as when planting seeds. A method of insuring a good standing from seed is to soak half of the seed you have to plant over night in warm water, dry it off in fine dust or land plaster, and mix with the rest, planting two together, covering some preferably a little deeper than others. The advantage of this is that whatever the conditions that follow planting may be, enough of the seeds to make a good stand are pretty certain to come through. If the vines are wanted to continue bearing for a long time, pick off fruits as they mature, whether they are needed or not. For late use and for pickling, a second planting may be made the latter part of June.

The greatest difficulty in succeeding with Cucumbers and other curcubits or vine crops, is to protect them from the striped yellow beetle, the Melon louse and the black wilt. In order to make sure of a crop give a general purpose spraying every ten days or two weeks, using a soapy-nicotine spray. As it is essential to cover the under side of the leaves as well as the surface, an angle nozzle should be used and a sprayer sufficiently strong to produce a good mist spray. Where such a sprayer is not available, dry spraying or dusting may be substituted, keeping the plants well covered from early growth.



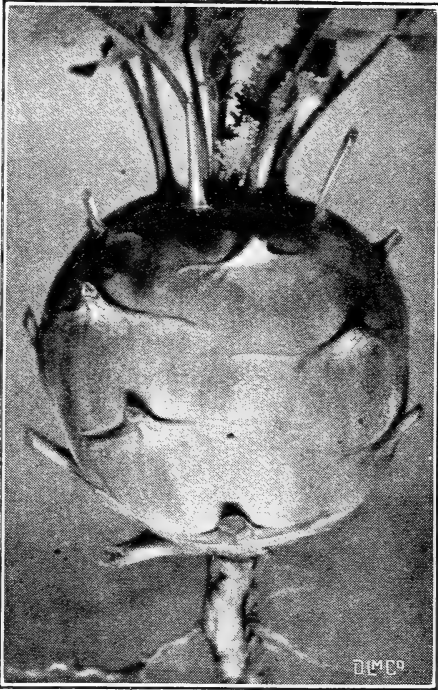
Egg Plant

EGG PLANT

The Egg Plant is another vegetable which revels in the richest soil and an abundance of moisture. General culture is the same as that recommended for Tomatoes, except that the plants do not have to be staked up or pruned. The plants should be grown in pots and for best results repotted once or twice so that they are in three and a half or fours when set outdoors, which should not be until after Tomatoes are planted. If the hotbed or coldframe is used for propagation, sow the seed one-half inch deep and transplant once or twice before transferring the plants to their permanent place in the garden. Set the plants 2 ft. apart in rows $2\frac{1}{2}$ to 3 ft. apart. The most dangerous enemy to be encountered in growing Egg Plants is the striped Potato bug. Arsenate of lead paste may be used, but if a few plants are grown, hand picking (knocking the beetles off with a small stick or paddle into a pan half full of kerosene and water) will prove effective and will give little trouble, as the beetles are killed *before* they eat.

ENDIVE—HORSE RADISH

Endive is another salad grown mostly for Fall use. Sow the same as Lettuce in June or July, and thin to about 12 in. It requires blanching to be ready for use. The individual heads may be tied up loosely with



Kohl-Rabi, White Vienna

raffia, or two 6- or 8-in. boards temporarily nailed together in an inverted V shape may be placed over the row, blanching a section at a time. Do not work crop when the leaves are wet.

While only a small quantity of Horse Radish may be needed for home use, a few plants may be grown as easily as not. Instead of seeds, sets or small pieces of roots are planted. They are perfectly hardy, and can be taken up in Fall or early Spring, just as wanted. Two dozen roots will give an ample supply for a small family. Its chief cultural requirements are plenty of moisture and a deep, rich soil. Set plants 12 to 15 in. apart in rows 24 to 30 in. apart.

KALE—KOHL-RABI—LEEKS

Kale or Borecole is a vegetable which may be described as a loose-leaf Cabbage. It is cooked as greens. It is improved by frost and it is so hardy it may be had from outdoors in the garden when all other greens have long since perished. It is given about the same treatment as late Cabbage. Sow seed $\frac{1}{2}$ in. deep in rows 2 ft. apart and thin to 18 to 24 in. apart in the row. Only extra hardy varieties may be sown in September and wintered over, like Winter Spinach.

Kohl-Rabi, a comparatively little used vegetable, is very easily grown, and if cooked before the roots or bulbs get too large, is very good. Sow in drills 18 to 24 in. apart. Cover the seed $\frac{1}{2}$ in. deep and thin the young plants to 6 to 8 in. For an extra early crop it may easily be started under glass and transplanted. To have it for use throughout the season, sow succession crops, as for Turnips. Kohl-Rabi flourishes best in the Spring, early Summer and Fall.

The Leek, to obtain full development, requires a long season of growth. Sow in drills 18 in. apart, covering the seed $\frac{1}{2}$ in. deep. Thin the plants to stand 4 in. apart. Leeks transplant readily, and seedlings started in the hotbed or coldframe in April or early May may be transplanted in June, preferably to drills which have been enriched with old manure or the starting mixture. The lower portion of the stem should be blanched for use like Celery. This may be done by keeping the earth drawn up to it, or the plants may be taken up and stored in a trench like late Celery. They are very hardy and the flavor is greatly improved by freezing.

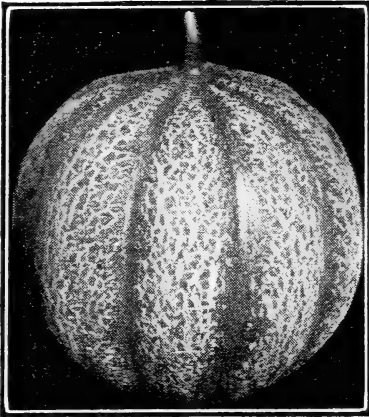
LETTUCE

While Lettuce can be grown from early Spring until late in the season (and with the use of frames the year around), success with it will depend very largely upon using the right type for the particular season or conditions under which each successive crop is to be grown. The number of varieties in general culture is so great that it is rather confusing, but if the gardener gets the several distinct types fixed in his mind, he can make his selection intelligently. All varieties can be classed in general in two groups: the loose-leaf and the headed. The former are the easier to grow, but as a general rule, the latter are considered of better quality, although that is mostly a matter of taste. The loose-leaf type is suitable for growing under glass, being for this purpose much less subject to the dreaded rot, which quickly destroys head lettuce under glass, and also for growing outdoors in Spring, early Summer and Fall. With irrigation it can be grown easily throughout the Summer months, but in dry weather runs quickly to seed. The head types of Lettuce may be considered in three sections: the butter head, the cabbage head and the tub. Of these, the loose-leaf is suitable for Spring and Fall use. The hard or crisp heading sorts take longer to mature but form heads which resist the heat and are slower to run to seed, and are good for mid-Summer growth; they are not suitable for forcing. The Cos type, most varieties of which have to be tied up to blanch thoroughly, is quite distinct in appearance and flavor from the other types, but is easily grown and should be given a place in most gardens, even in small gardens, for variety. It is suitable for use during mid-Summer and early Fall. To be of the best quality Lettuce must be quickly grown. It requires an abundance of moisture and a high percentage of available nitrogen in the fertilizer or manure. Well-rotted horse manure is particularly adapted to the growing of this crop. The best method of growing Lettuce in the garden for ordinary family use is to sow the seed thinly $\frac{1}{8}$ to $\frac{1}{4}$ in. deep in rows 12 to 15 in. apart. A mistake often made in sowing the seed in drills in the open is to let the plants stand too thickly. Thin them out as soon as they are well started to 6 or 8 in. in the row, or even more in rich soil under irrigation. To have a succession of crops around the year start plants in January or February for setting out into the frames, and make a small sowing every two weeks or so thereafter, changing the type you use according to the changing seasons. Partial shading during the hot Summer months will help to improve the quality of the Lettuce.



Tender Lettuce

MELONS



Muskmelon

Melons are delicious in the hot Summer days, and quite easy to grow. Make a little mound about 2 ft. in diameter, slightly above the surrounding ground and, in its center, plant four or five seeds, about 6 in. apart and 2 in. deep. Two seeds may be put in each hole, but finally thin out to four plants on each hill. When these have made growth, about 2 ft. long, pinch out the top. This will accelerate lateral growth, and on these you will soon see the young female or fruit blossoms, which develop with amazing rapidity. A piece of glass, slate or shingle put under each fruit will keep them

off the ground and assist in hastening the maturity of fine, well-netted specimens. When the fruit will leave the vine without being forced, it is ripe and ready for the table. In northern locations where the seasons are short, it is always a good plan to start at least part of the crop early in paper pots or in frames. Heavy soil should be avoided, if possible. If it must be used, add plenty of sand and leaf mold to the soil in the hill when preparing it, and raise the hill slightly; keep it flat but bring it a couple of inches above the ground level. Should any fungous diseases develop a spraying with arsenate of lead will usually be effective. Among good varieties are Honey Dew, Rocky Ford, Emerald Gem, Hackensack; but there are many others. Sometimes a local variety is the very best to plant; watch your neighbors and adopt any variety which shows improvement, or some special worthy feature. Never plant Melons near Cucumbers, Gourds or Squash, as they cross-fertilize and become worthless.

MUSHROOMS

This crop is of such a character that unless one has patience and a good deal of time and attention to bestow upon it, its cultivation had better not be attempted. A liberal quantity of stable manure is necessary. This has to be collected, the long strawy material removed, the heap fermented, and then the whole trodden firmly into a box, case, frame or bed in a dark, moist cellar, or under the benches of a greenhouse. Dryness is deadly. The bed must be kept moist and warm, and the air of the place where the beds are should be moist; at any rate not dry. The temperature should be 55 deg. to 60 deg. or 70 deg. in warm weather.

Spawn, in the form of dry cakes a foot or so square, can be got from the seedsman. He can also explain the general methods of cultivation or one of a number of excellent books or Experiment Station publications can be consulted. The cake is broken into pieces an inch square and these are buried in the hotbed, which should be 12 in. to 18 in. deep. The heat in the bed should have receded to 80 deg. Then place a layer of 4 in. of soil over the bed and beat this level. Whenever it gets dry, or before it gets dry, water with tepid water. In five to ten weeks the mushrooms should appear. Sometimes the surface of the bed is covered with straw. Beds can be made out of doors early in April.

MUSTARD—OKRA

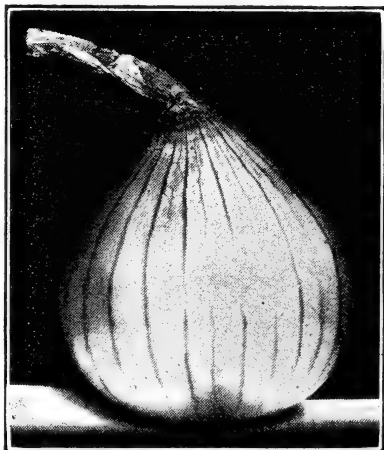
The leaves of the newer, larger growing varieties of Mustard can be used either as a salad or as greens, some of which attain a foot or more in height. Three or four crops may be sown during the season to supply a succession. Those planted in Summer or early Fall will usually give the best results. Sow thinly in drills 15 or 18 in. apart, and cover the seed $\frac{1}{4}$ in. deep. Thin out and cultivate as you would Lettuce.

Okra may be grown easily if a rich soil and a sunny position are provided. It is very tender and should not be planted until the ground is thoroughly warm. The rows should be from 2 to 3 ft. apart. Sow the seed one inch deep and thin the plants to 18 in. or more, to give room for ample development. The pods should be used while they are still young and tender.

ONIONS

Onions are used in all stages of development, from seedlings as big as a pencil, eaten raw, to the mature, dried bulb. They may be grown from seed, from pricklers (seedlings started under glass and set out later in the garden), sets (which are very small bulbs of standard varieties, grown small especially for this purpose), or from the perennial multiplier, the Potato or Egyptian Onion. The last three propagate themselves by multiplying, either at the roots or at the top of the seed stalks, the cluster of bulblets being divided up and set out for the following crop. They may be planted either in early Spring or in late Fall.

Onions from seed yield very heavily in rich soil, but the preparation of the seed-bed must be of the best as the seed is fine. Sow $\frac{1}{2}$ in. deep in drills 1 ft. apart and cover firmly; eight to twelve seeds are drilled in to the inch of row. Thin to 2 or 3 in. The young onions thus pulled out are most appetizing eaten raw with a dip of salt. In addition to rich and very thoroughly prepared soil, the most important thing in growing Onion seed is to keep ahead of the weeds. The plants when they first come up are very small, not much bigger than blades of grass, and the whole crop may very easily be lost through neglect in this regard. Go through it with the wheel hoe and also by hand within a week or ten days after they break ground. Continued clean culture and occasional light applications of nitrate of soda will keep the crop developing vigorously till mid-Summer. Lime in the soil and soot sprinkled along the rows will tend to mitigate the damage done by the Onion maggot. The most certain remedy for the



Onions are indispensable
Those thinned out from the rows make a dandy break-fast relish

maggot, however, is a poison spray or bait for the flies, which can be applied only with a strong pressure sprayer. When the plants get too large to go through them with the wheel hoe, the slide or scuffle hoe should be used, the kind with guides or runners in front of the blades, which hold it at an even depth, making the work easier and lessening the danger of injury to the bulbs. As soon as the tops die down the bulbs should be pulled and laid in windrows, and raked over every day or two until thoroughly dried; then they may be taken and the tops cut off, and spread out on a floor, or in an open shed, or packed in slatted Onion crates, which hold about a bushel apiece, to dry off thoroughly before being packed away for the Winter.

For transplanting, to get large bulbs, the seeds should be started under glass in February or early March, and transplanted in April or early May, setting the plants about 3 in. apart. Seed should be sown very thinly in flats, with rows 3 or 4 in. apart. Keep them as near the glass as possible, and transfer them to the coldframes as soon as it is safe, so as to get hardy, stocky plants. In transplanting the roots are trimmed back to within three-quarters of an inch or so, and half of the tops removed, when they can be handled readily, and practically none will drop out if the work is properly done. Sets planted early in the Spring by pushing the bulbs down into ground until they are slightly covered will make a quick growth and give Onions ready for use before those from "prickers" or seed sown in the open. Rich soil and two or three hoeings is all that will be required.

PARSLEY—PARSNIPS

For Summer use sow Parsley seed $\frac{1}{4}$ to $\frac{1}{2}$ in. deep in rows 12 to 18 in. apart early in Spring, first soaking it thoroughly a day or two, for it is very slow to germinate. Thin the plants to 3 to 6 in. apart when they are well started. Give plenty of water to keep the growth succulent and tender. For Winter use sow a packet of seed in late July or August, and when the little plants have become well established, transplant to pots or a small box, or to a coldframe. A flat of Parsley in a sunny kitchen window will furnish garnishing throughout the Winter. Fresh sowings of Parsley should be made each Spring, as it runs to seed the second year.

Parsnips are easily grown, but to produce long, smooth roots requires deep, rich soil. Another essential is to get them sown very early in the Spring, as the



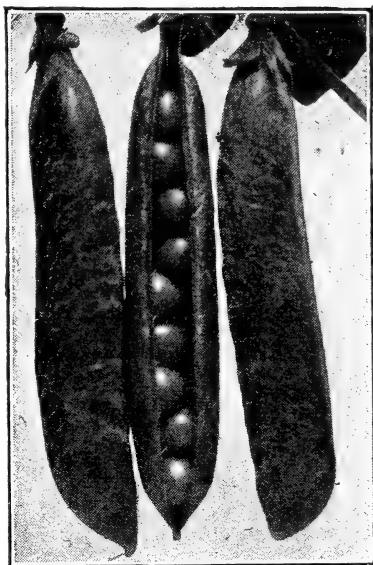
Hollow Crown Parsnips

longer the season the better the crop resulting, as a rule. Sow the seed in drills 18 in. apart, covering $\frac{1}{2}$ in. Thinning to 3 to 4 in. apart in the row should be done early, as the long roots and side branches

get tangled together, and those that are left are apt to be seriously injured by the process of thinning if it is not promptly attended to. They will be ready for use in the Fall and can be used from the ground until freezing weather, when enough to last through the Winter should be stored, the remainder being left in the ground for Spring.

PEAS

Peas from any one planting will remain in the best of condition for use only for a comparatively short time. To have a constant supply throughout the season, a succession of plantings should be made. Under irrigation they can be had from early June until frost, otherwise dry weather is pretty sure to cause a failure of the crop during late July and August, so that it does not pay to plant after late May until the latter part of July.



Note nine (9) Peas in pod. It does not pay to grow inferior sorts

The dwarf varieties do not bear as heavily nor for as long a period as the climbing sorts, but for small gardens they have the advantage that they are economical in space and do not require support and consequently are grown exclusively by many home gardeners. One or two good dwarf sorts sown every ten days or two weeks will maintain a supply. If the tall varieties are used, each planting will bear for two to three weeks, so that fewer plantings are required to maintain the succession.

The smooth, extra hardy varieties may be planted as early in the Spring as the ground may be worked. The others, however, should not be put in until a week or two later. If the soil is wet and somewhat heavy, make early plantings near the surface. If well dried out, they may be planted at the bottom of a trench 4 or 5 in. deep, and covered only 1 to 2 in. deep at first, being filled in as the plants grow. Get the roots well below the surface so that they do not feel so quickly the effects of dry weather. The rows for dwarf Peas should be 3 ft. apart and for the tall sorts 4 ft. In small gardens Peas are often grown in double rows with a 6-in. space between. Do not allow Pea vines to lie on the ground. Tall varieties can be effectively staked up by brush or poultry netting, while the dwarf-growing sorts give better results when provided with low brush to climb upon. A good, clean culture and protection with kerosene emulsion or nicotine spray (if the Pea louse puts in an appearance) and getting the brush or trellis in as soon as the plants break ground (in the case of the tall or climbing varieties) are the main points in achieving success with this crop.

PEPPERS

The instructions given for Egg Plants apply also to Peppers. Be sure, however, to choose a variety or type suitable and adapted to your conditions and purposes. In the Northern States, it is well to stick to the earlier

sorts, unless you grow your own plants and can have extra large ones ready for setting out. The small, pungent varieties are grown for pickling and flavoring, and the large, mild ones for stuffed Peppers and other table dishes.

POTATOES

Of all field and garden products the Potato is the most valuable. On the menu of at least one meal every day in the year the humble Spud appears as the leading vegetable.



Making provision for Winter

In preparing seed Potatoes for planting, much attention should be paid to the eyes or buds, these being the vegetative parts of the tuber. They are clustered mainly at the flower or seed end. The other end, called the stem end, usually has only one or two eyes. A test of the producing capacity of the eyes, carried out by the Monmouth County (N. J.) Farm Demonstration Office, showed that, calculated on the acre basis, the flower or seed ends had an advantage in yield of eighty per cent. over the stem ends, and twenty per cent. over the middle eyes, while the latter produced fifty per cent. more than the stem ends. It is advisable then, for the home garden, to reject the stem ends unless you have ample room. In case they are used, a good eye from the middle of the tuber should be included in the piece to be planted. Too many eyes make for foliage, but not for Potatoes.

The Potato should be cut so that two strong eyes are left on each piece. Penetrate as deeply into the tuber as possible, as the plant in its early stages of development depends largely upon the mother Potato for its sustenance. Some gardeners favor the use of small whole Potatoes for seeds, but those of medium size, cut to two good eyes, are generally preferred. The blossom ends are the first to start growth and yield the earliest crop.

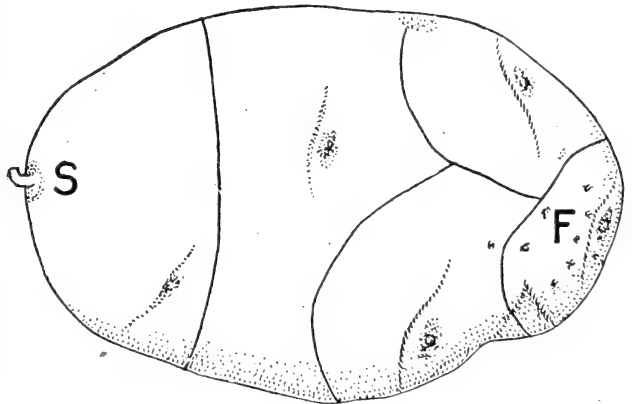
To get extra early results select clean, medium sized Potatoes of an early variety, and cut in quarters or halves, pushing the pieces down into a flat of sand till they are nearly covered and as close together as they will go. If these are kept in a sunny place, protected from frost and watered, the roots will make a vigorous growth, while the tops will remain very short and stocky, so they will be only 2 to 4 in. in length when they

are ready to set out. An astonishing growth will result during the first two or three weeks.

A well-enriched sandy loam is best suited to the raising of Potatoes, though they may be successfully grown in any good, well-drained garden soil. Prepare the ground in the same way as for general crops. Planting should begin as early in the Spring as the ground can be worked. Late or main crop Potatoes are planted in May or early June. The row or trench method is decidedly the best and most economical for the ordinary home garden. Dig a trench 5 to 7 in. deep. Apply a good dressing of well-rotted stable manure or fertilizer. Cover with two inches of soil, upon which set the seed Potatoes 12 to 15 in. apart. Then finally cover with soil to a depth of 3 to 4 in. The distance between the rows should be 2½ to 3 ft. Work up the soil about the plants when they have made a good growth. To keep the ground clear of weeds and at the same time conserve the moisture, cultivation should be maintained throughout the growing season. The hand hoe is the most convenient tool to use in this operation.

When the vines die off the Potatoes are ready for harvesting, which should be done in fine, dry weather, and completed before the advent of frost or very cold weather. Cold rains cause Potatoes to become sodden and of inferior quality. Potatoes soon become green and unsuitable for table use if they are allowed to lie exposed to the sun after digging. Store them in a darkened, dry, well-ventilated, frost-proof cellar that has a relatively low and even temperature.

To make sure of success it will be necessary to protect the Potato plants from early and late blight and the Colorado beetle, known as the Potato bug. Saving the vines means saving the Potatoes. Every ten days or two weeks after the foliage has well developed, spray with Paris Green or Bordeaux mixture, to which arsenate of lead has been added; this combination spray, while combating insect pests, is effective as a preventive of disease. Careful watch must be kept for all insect troubles, and particularly for the aphid, which, unchecked, will ruin a crop in less than a week. Use a nicotine solution for aphid. *Consult also Insect Chapter.*



Potato tuber, considerably reduced

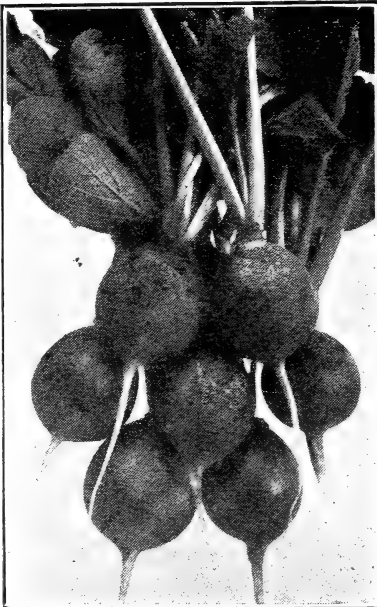
S, stem end, or end to which it was attached to the parent plant the previous season. F, the so-called flowering or growing end; here there are usually too many buds or eyes—several of these had better be scooped out before planting. The lines show how this particular tuber may be cut up for planting, but the eyes vary in each and every tuber

PUMPKINS

A few hills of sugar Pumpkins, planted in the Sweet Corn, among pole Beans or along the edge of the garden, where they can run over the grass or trained over bush, etc., will give plenty of material for a number of pies. The culture is the same as that recommended for Winter Squashes, running varieties, except that they mature more quickly, and can, therefore, be planted later. Avoid planting Pumpkins near Melons, Squashes and Cucumbers, as they are liable to cross-fertilize and produce inferior fruit.

RADISHES

These are easily grown in almost any soil, but for the best quality the soil should be rather sandy, and a good coating of land plaster or gypsum incorporated with it before seed is sown. Avoid manures and fertilizers rich in nitrogen, as these are apt to cause misshapen roots and too great leaf growth in proportion. Sow broadcast or in drills 8 to 12 inches apart and cover $\frac{1}{2}$ in. deep; thin to 1 to 2 in. Two mistakes most often made in growing Radishes are to sow too many at a time and not to thin them enough or early enough to have them sufficiently far apart in the row. Give each plant room to develop. Radishes are easily raised under glass, requiring only 40 to 45 degrees temperature. The quick maturing kinds may be sown between rows of Carrots, Lettuce or Beets and gathered before the latter need all the room. A succession of roots in the best of condition, under glass or outside, may be had by sowing every ten days or two weeks.



Scarlet Globe Radish

RHUBARB

One of the most valuable of our garden products, requires a minimum of care for a maximum of yield.

Six to a dozen plants will supply a medium sized family. The soil should be made very rich and dug as deep as possible. Crowns taken from old established clumps are usually used for planting. Put them 3 to 4 ft. apart each way. The crowns themselves should be planted quite shallow, being covered with about 4 in. of soil. Plants set out in the Spring will bear quite abundantly the following season; or young plants sown from seed in the Spring, and transplanted in June to temporary rows in the garden, may be set out the following Spring in their permanent place.

which should be, if possible, a sheltered spot, where they will not interfere with the cultivation of other things. In the seed bed the rows should be one foot apart and the seed sown $\frac{1}{2}$ to 1 in. deep, the seedlings being thinned out to 10 to 12 in. Rhubarb, like Asparagus, stores much of its early-Spring plant food in the thick root stalks over Winter. Therefore, manuring or fertilizing in the Fall will help the following crop. Dressings of nitrate of soda in Spring also produce splendid results, but be careful to keep it off the leaves. To bring one or two stools into early bearing, cover at opening of Spring with 4 or 5 in. manure. Set anything around the plants which will keep the heat in; a melon frame is ideal. Do not neglect to remove all seed-bearing stalks as quickly as they form.

RUTA BAGA—SALSIFY—SEA KALE

Rutabaga, the Swedish or Russian Turnips, differ from the ordinary kind in that they grow much larger and have a longer season in which to mature properly. They should be sown early in July, in drills 18 to 24 in. apart with a covering of $\frac{1}{2}$ to 1 in. As the ground is frequently dry at this time, firm the seed well in, pressing the soil over the row with the back of a hoe or with the sole of the foot. Thin out to 6 in. or more apart, according to size of the variety grown and the richness of the soil.

Salsify, or Vegetable Oyster, has a very decided flavor from which it gets its common name. Unless you have used it and know you like it, plant only a small quantity. Its culture is easy as it is free from injury by either insects or disease. The only trouble in growing it is that it tends to become undesirably forked. If possible, plant only on soil manured the previous season, and avoid fertilizers that are rich in nitrogen. It requires about the same season of growth and about the same general culture as Parsnips, but the rows may be put nearer together as the foliage is not so large.

Sea Kale, which shares with Rhubarb and Asparagus the great advantage of being a perennial plant, yielding year after year, may be grown easily from seed or from sets—pieces of the roots such as are used in planting Horse Radish. To grow from seed sow in April $\frac{1}{2}$ to 1 in. deep in drills 15 in. apart; thin out to 6 in. Plant early the following season as you would Rhubarb, except that 3 ft. will be far enough apart between the plants. The Spring growth must be blanched for use. This is accomplished by shoveling around the crown of each plant in the Fall a peck or so of clean sand, and then throwing up over this, soil from between the rows. This banking up is left in place until after the Spring growth has started; then the soil is hoed or shoveled away, the ground enriched with bone and manure, and cultivated occasionally during the rest of the season, or the plants when grown may be taken up and forced in frames, hotbeds, or the greenhouse. In this case they are handled in much the same way as Witloof Chicory.

SPINACH—SQUASH

As with Lettuce and some other crops, success with Spinach depends largely on choosing a variety suitable for the season for which it is wanted. For Spring use Winter Spinach is sown the previous Fall and carried over with a mulching of hay, straw or dried litter. In Spring two or three suc-

(Continued on page 210)

Model Vegetable Garden

50 feet wide, 100 feet deep
(Describing the Model Vegetable Garden shown herewith)

On large estates, where a gardener is employed, it is customary to plant for an excess of every vegetable. This simplifies matters—for the gardener.

On restricted areas, what to plant and how much space to allot to each vegetable or fruit, becomes a problem which each gardener must solve for himself or herself. Some families want a little of this, and a lot of that. And the planter should provide accordingly, erring, if at all, on the liberal side. Peas, Beans, Corn, one can get away with a lot of these. The appetite comes with eating.

The main point to realize is that from the day you get on the ground until frost comes, your garden can be made to furnish some food—fresh, wholesome food—for your table.

Comparatively few old hands at the game make garden plans. They simply put in their seed as fast as the season allows, having due regard to space requirements, height of plants, so one line will not overshadow the other, cropping conditions, etc., until their plot is filled. Just as quickly as a crop matures the ground is cleared, re-prepared, and another sowing made. It is here that the hotbed or coldframe plays well its part.

Early in the season, many weeks before you can get on the ground, your frame can be working for you. This will average, in the early Spring, a gain of at least four weeks. After you have transplanted into the garden the contents of the frame, you seed it up again, so that when your first crops have matured in the open ground, your frame will furnish another lot of plants ready to set out.

Well up out of the way--in this section if possible--plant
 EARLY SPINACH
 WINTER CORN
 WINTER BEANS

SPINACH. Two rows. This will be gathered before squash over-spreads row.
SWISS CHARD. One row as far as possible from squash and melons.

SWEET CORN. Early. Midseason. Late.
 Start a few seeds in your frame (in 2 in. paper pots preferably) for a first planting; transplant to the open ground as soon as possible.
 In this 9ft. section you have ample room for three rows. Plant half a row every 10 days or so. Be guided by the weather. Wait for warm weather before you make your first planting.

TOMATOES. Early and Midseason.
 Plant in the proportion of one early to two midseason.
 You can get three rows in an 8ft. wide space: a sprawling row each side of a row trained upright to heavy stakes.
 Properly handled, this bed will give you fresh fruit from close of July until frost, and canned fruit to carry you through the Winter. Pick maturing fruit just before frost, and cover them with hay or straw.

WINTER POTATOES. Another full row. To be planted three to four weeks after your first Winter row.
POLE or BUSH LIMA BEANS. Not to be planted until weather has settled for warm. The bush Limas do not have to be staked.
NAVY BEANS. Two rows. (These to be dried for Winter use.)

ONIONS.
 There is ample room here for five or six rows.
 A worthwhile garden product. Entails much care but is worth it.
 Plant at very earliest possible. Use seed and sets.
 Follow with any late crops.

12ft.
 RASPBERRIES, 2 rows
 8 to 10 plants

15 ft.
 BLACKBERRIES, 10 plants
 Can be set in 2 rows; trimmed up close.

12ft.
 GOOSEBERRIES, 4 plants

12ft.
 WHITE CURRANTS
 4 plants

12ft.
 FRUITS where they will form a natural boundary to next door property, and not be in way of plow

12ft.
 WINTER POTATOES. One full row. Try an early planting.
 EARLY POTATOES. A 2nd row.

100 FT. LONG
 40 FT. WIDE
 THE GARDEN

PARSNIPS for winter and following spring. Plant them among your earliest seeds.

LEEKs, 1/4 Row. SALSIFY, 1/4 Row. CARROTS (Early) 1/4 Row. RADISHES, 1/4 Row.
 OKRA, 1/3 Row. BEETS, 1/3 Row. LETTUCE, 1/3 Row. Pick and replant.
 CABBAGE (Midseason) 1/2 Row. KOHLRABI, 1/2 Row. (Eat it young, and put in another 1/2 row from cold frame).

EARLY CABBAGE, 1/2 Row. Follow with BEETS.
 EARLY CAULIFLOWER, 1/2 Row. Follow with WINTER CARROTS.

BEANS. (7x42ft.) Ample space for two rows is left here. There are 100 varieties of beans. Consult your seedsman as to his best table varieties. When your first row has matured, put in another row, and keep planting until about Aug. 15, according to your location.

GREEN PEAS.
 Devote this space of 8x42ft. to Green Peas. Plant mainly dwarf varieties, the best obtainable. Plant thickly. You have room for three single rows. Chicken wire, 2ft. high will be found serviceable for staking, and will last for years. Make first planting as early as you can get ground ready. Follow planting directions carefully. Don't fail to tread in the seed if ground is dry. Plant rows 10 or 14 days apart.
 As the Peas come off, use this space for CELERY.

LEAVE ABOUT 18ins. to 24ins. here so plow will not injure the Asparagus Roots.

AN ASPERAGUS BED
 Yields the biggest returns in the garden for the least effort and expense. If the family enjoys Asparagus, set out a good big bed right here where it will not interfere with the plowing of the rest of the garden. For a family of six persons, a bed this size, 42x6ft., is none too large.

P A T H -- About 2ft. wide.

FIRST SECTION OF OUR GARDEN (10x40ft.) This space could be planted with a few small FRUIT TREES widely separated, for instance, a Cherry tree or two, Plum, etc. GRAPE VINES on trellises could be placed here if no other place is available. Room, too, can perhaps be found here for a STRAWBERRY BED.
 A low boundary HEDGE of Privet regeliana will be serviceable here between house and garden. This variety does not freeze back. It leaves out before the California Privet, stays green longer; then it has attractive berries in Winter.

EAST - 50 FT. WIDE

ON THIS BORDER LINE, 5ft. wide x 90ft. In length, may be placed an asparagus bed & plants

9ft. BLACK CURRANTS

3 plants

12ft. RHUBARB, 4 or 5 roots

6ft. PEACH tree

9ft. QUINCE or

10 ft

T H I S P A T H W I L L N O T I N J U R E T H E A S P A R A G U S R O O T S .

your frame, by degrees.

1. (Of these you will need the most) —Lettuce; Tomatoes; Cabbage; Cauliflower; Egg Plants; Peppers; Kohl-Rabi; Celery (where it will be partly shaded); Sweet Corn (in 2 in.-paper pots).
 2. (Raise a few to make a start on) —Onions; Beets.
 3. (Plant on pieces of thick sod, grass side-down) —Lima Beans; Melons; Squash; Cucumbers.

As you empty the frame of the first lot of young plants you can put in Lettuce, and more Lettuce, late Cabbage, late Cauliflower, Brussels Sprouts Kohl-Rabi, Carrots, Beets.

You should let Celery attain a fair size before you transplant it, and if you are partial to Tomatoes, Egg Plant, Peppers, or other favorites, you may allow a few of each to develop right in the frame after you have forced your early plants for the garden.

Later, this same frame will give you Lettuce until long after the early frosts. Celery will fit best into the space allotted to green Peas, after these have passed. Likewise, Turnips and Brussels Sprouts may follow in the Onion section along with other late plantings.

Notice that the Asparagus, Rhubarb and small fruits are planted in areas where they will not be disturbed by spading or plowing, also that the fruit trees are not planted among the vegetables where their roots might be injured and where the trees would cast too much shade.

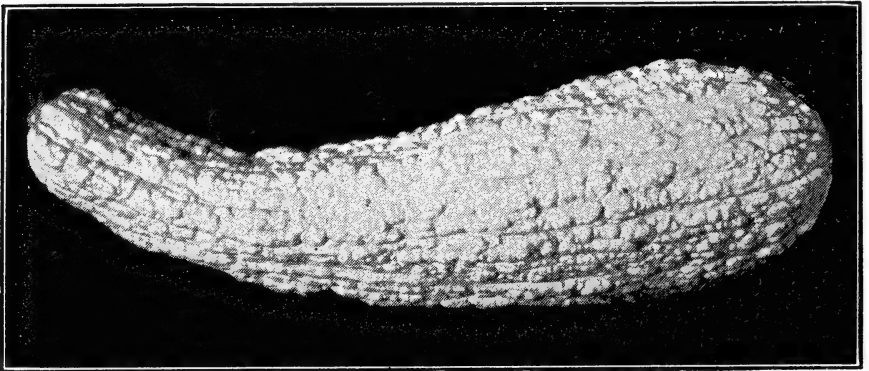
The garden we have plotted out here is 50 ft. x 100 ft. By doubling the width of the spaces you can fill a plot 100 ft. x 100 ft., or by halving to 25 ft. x 100 ft. you can reduce pro rata.

To fully supply a family of six persons with all the small fruit and vegetables it can consume, you will require 10,000 to 15,000 sq. ft.; the latter surely if you want to have plenty of vegetables for canning to carry you over the Winter.

cession plantings can be made to maintain the supply until Summer. Sow about $\frac{1}{2}$ in. deep in rows 12 to 18 in. apart, and thin to 4 in.

New Zealand Spinach is a distinct type, its greatest charm being the fact that it resists heat and grows luxuriantly during hot weather. It is of branching habit, spreading 3 or 4 ft., and thrives in any good garden soil. The seed is very hard and should be soaked in tepid water for several hours to aid germination. When the ground has become warm in May, sow in rows about 3 ft. apart, covering the seed one inch and thinning to 12 to 18 in. in the row. Another method—and a good one—is to sow in hills 2 ft. apart, leaving 2 or 3 plants in each hill. Pick off the thick, succulent leaves and tender shoots, preserving the main stems; the plants will immediately start out into new growth, yielding delicious greens until frost.

Squash should be planted or started in frames, as recommended for the Cucumbers and Melons already discussed. For earliest use, plant a



Crookneck Squash !

few hills of Scalloped or Crookneck type of Summer variety. These may be had in the bush form, thus taking up comparatively little space. There are a few varieties, such as Fordhook and Delicata, which will serve for both Summer and Winter use. Bush varieties may be planted in hills 4 or 5 ft. apart each way, while for running sorts the hills should be 7 to 8 ft. apart to allow for proper development. Cover the seed $\frac{1}{2}$ to 1 in. deep. Put 8 or 10 seeds in each hill and thin to 2 or 3 of the strongest plants. If the plants are kept well dusted with tobacco or wood ashes during the early stages of growth, it will help to discourage the appearance of the insects likely to attack them. Success of the late or Winter varieties may be made much more certain by starting them in paper pots in frames and setting out. The first sign of the deadly Squash borer is likely to be a slight wilting of the leaves on a hot, bright day. Make a thorough examination at once at the base of the stem, and if you find a small hole from which a gummy, yellowish matter has exuded, slit the thin cavity lengthwise until you find the intruder. Then cover the joints of the stem with a little soil; new roots will form and the plant will go on growing.

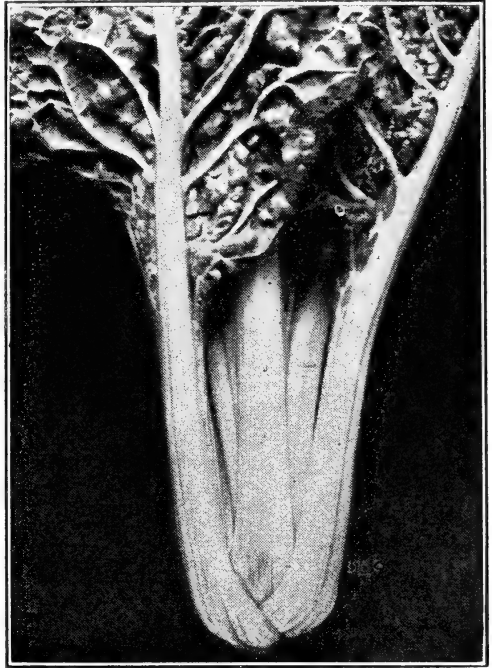
SWISS CHARD,

Swiss Chard, or Spinach Beet, is now used by many gardeners in preference to Spinach. One great advantage is that from a single planting in

the Spring greens are available in abundance until hard freezing weather. If the outside leaves only are taken in gathering a picking may be made every few days, or the large, mid-ribs may be stewed or creamed like Celery. Give the same culture as you give Beets, and thin the plants out to 6 or 8 in. in the row.

TOMATOES

As soon as danger from late frost is over, set out the strongest, stockiest plants you can find, even if you have to pay several cents more apiece for them. A half handful or so of bone or guano in each hill will produce a strong start. However, a little chicken manure, or a well rotted compost may be used for this purpose. Set the plants deep, even if you cover several inches of stem, as new roots will be formed all the way up, and you will be



Swiss Chard

better prepared, therefore, for dry weather. For garden culture the plants should be supported by 4 to 5 ft. stakes, a trellis, or the specially prepared circular Tomato supports now available. Set them from 18 in. to 2 ft. apart in rows 3 to 4 ft. apart. As soon as the plants reach the tops of the stakes, nip off the terminal buds. This strengthens the vine and gives more nourishment to the fruit. Two dozen plants or so, if they are well cared for, will provide an abundance of fruit for the average family. If you intend to can for Winter supply, fifty plants is none too many for a family of five or six persons. To get the earliest and the smoothest fruits, keep the vines tied up to stakes or trellis with raffia, strips of cloth, or soft twine, as they grow. Train each plant to not more than 3 or 4 stems by pinching off the side shoots which appear in the axils of the leaves. Avoid injuring the flowering or fruit buds. An intensive method of culture is to set plants 16 in. apart in a double row 18 in. apart, leaving a space of 3 ft. between the rows. The plants are pruned to single stems and trained to stakes 4 to 5 ft. long. By this method the fruits which do set will have more nourishment and more sunshine than if the vines are allowed to grow bushy and sprawl on the ground. Remove all suckers from the base of the plant. The newly set plants must be protected from cutworms with paper collars or poison baits, but strong, pot-grown plants are likely to defy them, as they are too large and tough to be eaten through readily. By the proper choice of early and late varieties a succession of good Tomatoes may be had. Just before danger of frost pick all the mature fruits and pack them in straw in a coldframe to ripen up. In this way they may be had for

several weeks after frost. A green Tomato is excellent for pickles and preserves or it can be ripened in the cellar. It is highly advantageous to start Tomatoes from seed in a coldframe or in a box placed in the sunny window of the house. A small packet of seed will yield all the plants you require for transplanting, and there will be some left to fill up gaps. Sow in March, broadcast or in drills 5 in. apart, covering $\frac{1}{2}$ in. deep. In order to secure strong, vigorous plants transplant once or twice before planting in the open ground. If Potato bugs appear on the Tomato plants pick



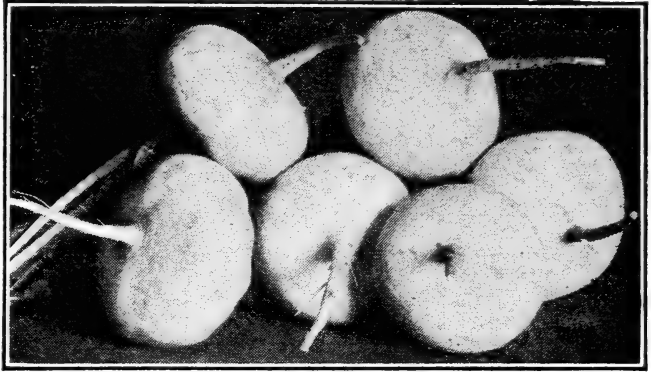
Tomatoes trained to a fence

them off by hand. Light sprayings of Bordeaux mixture should prevent leaf-blight and leaf-curl. Fruits showing signs of rot on the blossom end must be removed as soon as discovered.

TURNIPS—VEGETABLE MARROW

Seed for the first crop of Turnips may be put in as soon as the ground can be made ready in the Spring. Sow the seed $\frac{1}{2}$ in. to 1 in. deep in drills 15 to 18 in. apart and thin out the plants to 4 to 6 in. As they are at their best for table use only for a short time, it is a good plan to plant an early

and a medium or late variety about the first of each month through the season; in July a larger planting can be made for Winter use. While the tender seedlings are very small when they first come up, they grow very rapidly, and unless thinning out is done at once, it is likely to



White Milan Turnips

give the crop a severe setback when it is attended to. Freshly manured soil should be avoided, and if there is a spot in the garden which is light and sandy, it is apt to produce roots of a milder flavor than heavy soil.

Vegetable Marrow is another member of the curcubit family, very similar in habit of growth to the Summer Squashes, there being also bush, dwarf and running varieties. It is planted and grown in the same way. The fruits should be used while comparatively young.

WATERCRESS

There may be opportunities for the cultivation of fresh young plants of this delightful, pungent, and health giving salad. It delights in a slow-running brook, but may be also cultivated in beds where there is a very slight flow of water. It is easily raised from seeds, but more generally perhaps from cuttings. A good method of propagation is to sow the seed broadcast in a box or pan of very moist soil, covering about $\frac{1}{4}$ in. When the seedlings are well started they can be transplanted near to the edges of a running stream or in the brook or pond. A bunch of the stems one buys from a greengrocer, stuck in the wet soil, will root readily, and the young tender sprouts from these will furnish the supply throughout the Summer.

WATERMELONS

The requirements of Watermelons are in general the same as those of the other curcubits already mentioned, except that much more space is demanded by them. The hills are put 6 to 8 ft. apart each way. In a small garden space can sometimes be saved by putting Watermelons (the same idea applies to Winter Squash and Sugar Pumpkins) near the edge of the garden where the vines can be allowed to run out over the grass, or supported on old Pea Brush or something similar along a fence, thus saving space. Plant only a variety adapted to your locality. In the Northern States the season is not long enough for any but the early varieties to mature, while this advantage can be overcome to a great extent by starting the plants in paper pots in frames two weeks or so earlier than the seeds could be planted outside.

Useful Pointers for the Vegetable Grower

Don't be discouraged by failures. Keep at it and you'll win out.

Poor germination is often due to the fact that the seeds are loosely covered in the soil. See that the earth about the seeds is well firmed or packed. This prevents air-spaces and the seed is brought in close contact with the soil.

If transplanted during cloudy or showery weather, or in the early evening, plants will take hold more quickly.

Tomatoes, Celery, Egg Plants and Peppers become more stocky and vigorous by being transplanted a second time, preferably to pots, before being set out in the open ground.

Precautions to keep vegetable plants healthy and robust, especially by frequent cultivation, weeding and watering, will repay both time and expense.

Where artificial watering is necessary, a good rule is to "water much and seldom—never little and often." Light watering in hot weather results in a baked surface.

Always aim to procure seeds of the best quality. Poor seeds are expensive. The very best culture cannot make up for inferior seeds.

Green Peas and Sweet Corn, freshly picked and eaten, yield all their delicacy of flavor and sweetness. These two, alone, will well repay for all your work on the vegetable garden.

Aphids usually congregate on the under sides of the leaves. Direct your spray accordingly.

Vegetables should be gathered before they become too ripe. This will ensure better quality and prolong the yielding period of the plants.

Rutabagas, or "Swedes," have a richer flesh than ordinary Turnips and are better Winter keepers.

Such vegetables as Tomatoes, Beans, Peppers and Egg Plants are heat lovers and grow much faster in the warmth and moisture of June than if an attempt is made to start them in the open ground a month or so earlier.

All vegetables respond readily to good treatment. The more quickly they are grown the more tender, crisp and nutritious they are.

Don't transfer young plants to the open ground until soil and weather conditions are favorable for them to start and to keep on growing.

It pays to raise and eat Beans. They contain more food elements than most other crops. Fine canned, too.

Plant food in the form of liquid manure accomplishes wonders in a garden during mid-Summer.

When Onion tops begin to fall it is a sign that they are ripe for gathering. The bulbs

should be pulled, laid in windrows until thoroughly dried and then packed away for the Winter.

To promote the success of garden crops, the soil must be finely prepared and the operation of seeding carefully and properly done. Select seeds that are of high vitality and facilitate germination and growth by providing continuous moisture, keeping the surface of the soil from baking or crusting. Practice early and persistent cultivation.

Parsnips may remain in the ground all Winter without injury.

On hillsides, be the slope ever so slight, plant rows across the hill, not up and down. They will thus escape washouts by heavy rains.

Commence cultivating as soon as the plants appear above the ground. Give close attention to thinning and pack the soil around the roots of the plants to remain in the row.

Potatoes may be dug any time after the vines are dead. Do not allow them to lie exposed to the sun.

When ants appear in the garden you can get rid of the nuisance by smothering them in the nest. Pour into it a little carbon bisulphide, cover with damp cloths, and the fumes will do the rest.

Swiss Chard and New Zealand Spinach are among the most profitable vegetables of the home garden. They furnish delicious greens and from early Summer till frost are inviting the gardener to "cut and come again." Excellent canned.

Crops should be rotated annually. By following one crop with another of an entirely different nature the soil is benefited and plants are not so liable to suffer from disease and injury by insects.

Potato crop cultivation should cease when the vines are in flower. The small Potatoes are then developing and the cultivating tool might damage them.

If possible, arrange the rows in the garden so that they run from north to south. Each row will in this way get its share of sunlight.

It is impossible for plants to grow to perfection unless they are properly thinned or transplanted. Thinning should be done when the seedlings are very small, but if wanted for transplanting they may be left until large enough to handle.

Kohl-Rabi is at its best for family use when young and before the skin of the bulb toughens. It is then tender and of fine flavor.

Plant everything in rows. This is better than sowing seeds broadcast. The weeding and cultivation will be much more easily and effectively done.

Because of their great value as destroyers of numerous garden pests, you should not interfere with the activities of such visitors as frogs and toads, ground and lady bug beetles, bees, tree crickets, dragon flies, wasps, hornets, lizards, lace-wing flies, garden spiders, etc.

Poultry and sheep manures are much more powerful than horse or cow manure in their action. They should be used cautiously, for it is possible to get the application so strong that the vegetables will be burned rather than improved.

The use of slaked lime will be found highly beneficial. It seems to loosen the heavier soils; it affects the sandier soils and makes them more moisture-holding; it sweetens the sour soils, and by its chemical influence with certain of the substances in the soil it renders available a liberal share of the earth's storehouse of food. It should be applied very early in Spring or in the Fall. A 50-lb. sack to a plot 30 ft. by 40 ft. will be sufficient.

When plants are first transplanted during hot weather they should be protected from the sun's rays for a few days, otherwise they are liable to wilt and die off. Use cheese-cloth, shaded sash or boards for shading.

On no account allow your soil to bake. A rain shower or watering during extremely hot weather will often produce a hard crust over the soil. This is detrimental to plant growth and should be broken up without delay.

When battling to suppress weeds, the gardener will find that early morning cultivation will aid him materially. Exposure to the drying influence of the sun will wither most weeds before they have an opportunity to revive in the moist atmosphere of the evening.

For essential hand tools in the garden, see Contents.

Planting for succession: for instance, to have one crop of green Peas follow another by planting a first row say, April 15 and another April 25, is all too often, much of a fallacy, yet all good gardeners strive for that result. The fault lies with our variable climate.

In making up formulas for the small garden, bear in mind that eight teaspoonfuls make one fluid ounce, sixteen ounces make a pint and there are eight pints in a gallon.

THE VALUE OF DRAINAGE

There are few places where some amount of drainage is not necessary. It may be merely the drainage around greenhouses to keep them dry and prevent rot, or it may be the improvement in land, or proper drainage of benches. All land that holds water for a day or so after heavy rain requires drainage. The benefits derivable are the sweetening of the soil, making it accessible to roots to a much greater depth,

freeing it of stagnant water, and allowing healthy action to take place. Cylindrical tiles of 2½ in. diameter, set from 2½ ft. to 3½ ft. deep, according to the stiffness or sogginess of the soil, are recommended; these to be 30 ft. apart.

METHODS OF TESTING SOILS FOR ACIDITY

Probably the simplest test for ascertaining whether a soil is acid, that is, lacking in calcium carbonate, is by the use of litmus paper which can be obtained at any drug-store. Buy a few slips of the blue kind and be careful to keep it in a tightly corked glass vial and not to handle with the fingers which themselves may contain sufficient acid to turn it pink. A reliable way to make the test is to place one or two small pieces of the blue paper in the bottom of a glass tumbler. Upon these lay a piece of blotting paper cut to exactly the size of the glass and on this place an inch or two of the soil to be tested. Moisten this soil thoroughly with rain or distilled water until it is wet enough to saturate the blotting paper, then cover the tumbler and leave it for from half an hour to an hour. At the end of this time turn it upside down and notice the condition of the paper. If it has turned from blue to pink the soil is acid. If it has remained blue, the soil is either neutral or more probably alkaline.

The only disadvantage of this test is that it gives no idea as to the degree of acidity. For that matter it may not always be accurate, in that careless handling or other local conditions may cause the paper to turn pink even though there is no appreciable amount of acid in the soil. For these reasons, persons who have occasion to test soils for acidity would do well to familiarize themselves with a more recently evolved method and one which is only slightly more complicated than the litmus paper test.

This test was designed by Prof. E. Truog, of the University of Michigan, and not only detects positively the presence of acid in the soil, but also indicates the degree of that acid and, consequently, the amount of lime required to neutralize it. It is based upon the chemical principle that when zinc sulfid comes in contact with any form of soil acid, hydrogen sulfid gas is formed; and when this gas comes in contact with lead acetate, lead sulfid, a black chemical is formed.

In making the test, one simply places a small, measured quantity of the soil in a glass flask and adds to it a solution composed of 20 per cent calcium chloride and 2 per cent zinc sulfid. The mixture is heated to the boiling point over an alcohol lamp and the boiling allowed to continue for a few minutes to drive off any carbonic

acid gas which may be liberated. The boiling is then continued but the mouth of the flask is covered with a piece of paper which has previously been soaked in a solution of lead acetate, then dried and again moistened with clear water just before being used in the test. If the soil is acid, the chemical reaction between the fumes and the paper, described above, turns the paper from white to light brown or black, depending upon the amount of acid in the soil. By comparing the color of the paper at the end of a definite number

of moments with a color scale or chart which has been prepared by the inventor of the test and which can be obtained from the University of Wisconsin at Madison, any observer can quickly determine the approximate degree of acidity in the soil and thereby the approximate need of lime exhibited by it. This test has been described in detail in a bulletin issued by the Experiment Station of the Wisconsin University, from which copies can be obtained free as long as they are available.

Wintering Celery in a Trench

Celery properly stored in an outdoor trench will keep in better condition and longer than in any other place. The trench should be made in a well drained spot, preferably across the higher part of a sloping field. A regular spade should be used in making the trench, which should be a spade wide, and have vertical sides, and as deep as the celery is tall, when measured after it is dug, from top of leaves in their usual positions to the bottom of root clump. Place the plants, beginning at one end of the trench (and working backward) one by one in an upright position, crowding both root clumps and stalks tightly together. This close packing is important, since Celery will not keep well when loosely packed.

When the trench is filled it should be covered with boards each 12 in. to 14 in. wide and 3 ft. to 5 ft. long, laid on lengthwise of the trench. Thin boards should be laid across the cracks where the ends of the

boards meet. At first only two to three inches of soil should be placed on top of the boards, but when freezing weather is at hand, a foot or more of soil in all should be heaped above the boards, and for a foot beyond each side of these and, when the ground begins to freeze, above the soil should be heaped straw or hay or coarse strawy manure, or leaves, to the depth of about a foot; the thickness of soil and straw covering depending upon the latitude. The Celery can quite easily be taken out any pleasant day in Winter by opening one end of the trench. The short lengths of boards make it necessary to uncover only a small part of the trench at one time; in fact, one can reach under the end of the board, and take out Celery for part of its length the first time and, on the second visit, remove the board entirely and take out the rest of the plants under that board. Always recover closely the portion of the ditch next to the remaining plants.

Labeling Plants—Memorandum Book

There are two main reasons why labels are useful in the garden. First, it is well to know just what has been planted in each row of the vegetable garden, and when it was planted. The date of planting is always useful.

The second reason for labeling plants is one of great interest in the garden. It enables you to give choice plants extra attention.

There is little fun in gardening without labels when one has a lot of strange plants in the yard. Find out their names, get acquainted and label them before you forget the name.

Labels. An 18 in. wooden label is strongly recommended for use; it will last longer because it is stronger, cannot be lost because it is of fair size and can be used year in and year out. Write names on

them, using a heavy blue pencil. Affix day of month, month and year. This will be found of value for reference all through the season. In the following year partially efface with the edge of a sharp knife the blue pencil marks, and your label is ready for use all over again. Such labels should last 10 to 15 years, and as they stand well above the ground, they are most serviceable. Zinc labels upon which the name is written with indelible ink are useful.

Garden Memorandum Book. A small note book in which can be recorded the name of plant, the date sown or planted, and the first and last pickings, will form an interesting record of the vegetable garden. The notebook is useful too, year after year, in comparing the qualities of certain varieties of flowering plants. Let this book be the repository of garden receipts and suggestions from friends.

The Vegetable Garden in Winter

As the harvesting season draws to a close and the inactive period of Winter approaches, some very important things can be done in the garden to insure maximum results the next year. The best possible program at this time is as follows: 1. Harvest everything that can be used either fresh, pickled or preserved. This includes green Tomatoes, immature Squash, small, late-sown Carrots and Beets, etc. 2. Pull up, rake together and remove all dead vines, haulms, stubble, etc. All that is free from disease and not too woody should go on the compost pile or first into the chicken yard or pig-pen if there is one. Anything that may be infested with disease spores or insect eggs should be burnt at once. 3. Spade up, plow, or even simply harrow or cultivate the whole garden, turning under any manure that you may have available. 4. Sow on the rough surface a cover crop and rake well to cover the seed. Such a mixture as Rye and Vetch, that will live over Winter and make added growth until plowed under in the Spring, is best. Red or Alsike Clover is good, and where there is time for considerable Fall growth Field Peas and Oats, or either one alone, is satisfactory.

Whatever you use, the aim is to get the ground covered with a crop that will (a) keep the soil from washing during the Winter; (b) add humus and plant food when plowed under; and (c) smother out weeds or prevent them from becoming established. Consequently, if the above program cannot be carried out, it is better to leave most of the vegetable stubble or even a crop of weeds standing than to clear away every vestige of plant life and leave the soil bare and empty over Winter.

Every bit of leaf, stem and root tissue turned under to rot, adds not only the plant food it took from the soil, but also a good deal that it secured from the air; in short it is real "green manure." Again, the extra stirring that it gets when a Winter cover crop is sown benefits the soil, and if some commercial fertilizer, a dressing of lime or wood ashes, or an application of manure can be worked in at the same time, so much the better. The manure can, however, be applied at your leisure during the Winter to be plowed under with the cover crop; and an especially good time to lime the soil is just after such a plowing and before the ground is harrowed or raked.

The Home Food Winter Storage Cellar

See diagram on opposite page

Our diagram of a Winter food storage cellar shows a corner in the cellar, which should preferably be a northwest corner. The partitions shown must be finished off so that no heat can penetrate the storage cellar from the furnace; to that end, a brick partition is undoubtedly the best, but if this cannot be had, the next best would be a double partition of seven-eighth inch boards, with building paper and an air space between, and with a door built in the same way, having a bevelled edge. If strict economy rules at least use a single thickness of boards, as shown in plan, with heavy building paper on one side. This paper should be well held in position by means of large-headed tacks, liberally used.

• Cellar walls of brick, stone or cement, protected on the outside by a coat of tar or other material to make it impervious to dampness, are perfectly all right for Winter storage, but if your wall is of hollow tile, dampness will certainly have to be guarded against, especially during the untoward warm days which come to us in Winter.

According to the compass exposure of this storage cellar (window facing south, for instance) it will be advisable to reverse the arrangement shown in diagram.

Fashion your bins to suit your requirements. They are of best advantage for preserving vegetables when made of slats so as to allow for circulation of air. It would then be better to use many more slat shelves for Apples and Potatoes than are indicated on plan.

Whitewash your entire cellar once a year.

A window in this Winter storage cellar is not a vital necessity. If there is a window it should be heavily curtained, if facing the south or west.

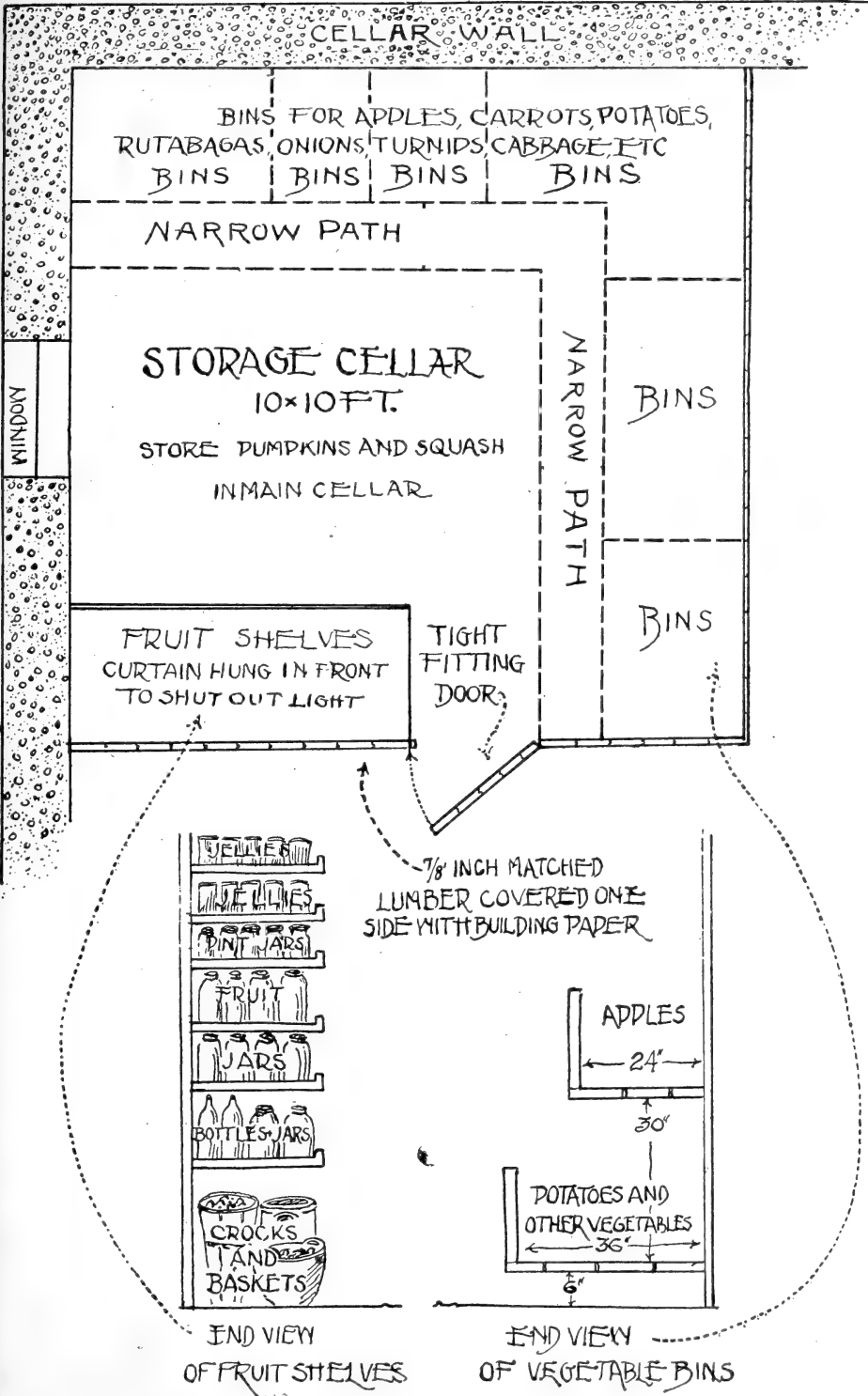
Pumpkins and Squash should be laid on boards if the cellar does not have a cement floor. Squash, however, can stand fifty degrees.

Potatoes—If these show signs of rotting in the bin, through dampness, sprinkle with slaked lime.

The ideal temperature for such a cellar would be from 35 to 40 degrees; understood, of course, a freezing temperature would be fatal to some of your stored supplies.

In such a repository can also be placed away for Winter, all your bulbs and tuberous-rooted stock, such as Gladioli, Dahlias and Cannas; the two last mentioned should be slightly covered with a layer of sand.

The Home Food Winter Storage Cellar



Herbs

From time immemorial herbs have been used for medicinal and flavoring purposes, some being grown for their seed, some for foliage, others for flowers and roots. It is always a genuine pleasure to be able to supply your own wants, pure and unadulterated. The varieties listed herewith, the uses of which are fully explained, will enable a selection to be made of the most desirable kinds essential for home use.

The culture of herbs requires no particular skill; they all like a fairly rich soil, and may be grown from seeds or purchased as plants or dormant roots. A bed 20 x 4 ft. should accommodate all the species required for the average household, but more room may be given, if desired, and beds 3 x 2 ft. devoted to each separate kind.

The annual varieties should be grown by themselves. The perennial varieties should be planted in permanent beds, as they come up each year after being cut down in the Fall.

All herbs grown for their foliage should be cut when the growth is mature, or when the flowers show, tied in small bundles, and hung in a dry place. When thoroughly dry, they can be put in paper bags, and hung in the attic until required for use. Those grown for seed should be allowed to blossom and produce seed which, when ripe, should be carefully gathered and dried before storing away. Those whose roots are to be used, should be dug in the Fall and thoroughly washed and dried.

Each variety should be carefully labeled to aid identification.

WINTER PROTECTION.—Herbs require some protection during Northern Winters and should be covered with straw, leaves, or manure. The perennial varieties are to be cut down within a few inches of the ground, except Lavender, Rosemary, Thyme, Sage and Wormwood. These should be left about six inches above ground. Lavender and Rosemary being shrubs, require particular protection, until the wood becomes hard, say until their second or third year.

HERBS FROM SEED.—All the appended list are easily raised from seed, except Tarragon, which does not seed and consequently roots must be planted. Sow your seed in a small prepared bed, then plant the seedlings into permanent quarters as they become large enough to handle. If planted on a dull day and watered, success will be assured, or the seed may be sown where it is to remain, and generously thinned out to allow room for development.

LIST OF HERBS

(A indicates Annuals. P indicates Perennials)

- ANGELICA (*Angelica Archangelica*). A. Leaves and stalks are sometimes eaten raw, or boiled with meat and fish. The seeds are used for flavoring wines and cakes.
- ANISE (*Pimpinella Anisum*). A. For garnishing and flavoring; also in making cordials.
- BALM (*Melissa officinalis*). A. For making Balm tea for fevers, also Balm wine.
- BASIL, SWEET (*Ocimum minimum*). A. Largely employed by French cooks for flavoring purposes.
- BONESET (*Eupatorium perfoliatum*). P. Popular remedy for fever and ague.
- BURNET (*Sanguisorba canadensis*). P. Leaves used in salads and soups.
- CARAWAY (*Carum Carui*). A. Grown for its seeds, which are used for bread, pastry and flavoring.
- CATNIP (*Nepeta Cataria*). P. For medicinal purposes. Much relished by cats who will roll in it with great delight.
- CHAMOMILE (*Matricaria Chamomilla*). P. Used as a blood medicine.
- CHIVES (*Allium Schænoprasum*). A. Used for flavoring sausages and salads.
- CORIANDER (*Coriandrum sativum*). A. Seed used for flavoring.
- DILL (*Anethum graveolens*). A. Seeds with aromatic odor and hot pungent taste. Used for flavoring vinegar when making dill pickles.
- FENNEL (*Feniculum officinale*). P. Seeds aromatic for flavoring. Boiled leaves are used in sauces.
- FEVERFEW (*Pyrethrum Parthenium*). A. Used medicinally; a good blood tonic.
- HOREHOUND (*Marrubium vulgare*). P. Leaves used as remedy for colds, for dyspepsia, and in expelling worms.
- HYSSOP (*Hyssopus officinalis*). P. Leaves and young shoots used as a pot herb; leafy tops and flower spikes used for medicinal purposes.
- LAVENDER (*Lavandula vera*). P. Leaves and flowers emit a delightful perfume; much used in the wardrobe to give the linen a delicate perfume.
- MARIGOLD, POT (*Calendula officinalis*). A. Medicinal and flavoring.
- MARJORAM, SWEET (*Origanum Majorana*). P. A tonic and stomachic.
- MARJORAM, POT (*Origanum Onites*). A. One of the most useful of all the herbs, the leaves being employed as greens and also dried for flavoring.
- MINT, SPEAR (*Mentha viridis*). P. Used for flavoring.
- MINT, PEPPER (*Mentha piperita*). P. Good for stomach and intestinal troubles; also used as a stimulant.
- MUSTARD, WHITE (*Sinapis alba*). A. Young seedlings used as a salad.
- PARSLEY (*Carum petroselinum*). A. Flavoring and decorations for salads, and fancy garnishing.
- PENNYROYAL (*Hedeoma pulegioides*). A. Used medicinally as a stimulant and carminative. Good for keeping mosquitoes away.

- ROSEMARY (*Rosemarinus officinalis*). P. Leaves make Rosemary tea for relieving headache.
- SAGE (*Salvia officinalis*). P. Leaves used for seasoning meats and poultry; also used as a tonic.
- SAVORY, SUMMER (*Satureia hortensis*). A. Leaves and flowers used for flavoring.
- TANSY (*Tanacetum vulgare*). P. Used in bitters, and as a remedy against worms.
- TARRAGON (*Artemisia Dracunculus*). P. Leaves impart a delicious flavor to salads, soups, pickles, etc.
- THYME (*Thymus vulgaris*). P. Grown in every garden for seasoning.
- VALERIAN (*Valeriana officinalis*). A. Leaves very efficacious in the cure of wounds. Heal-all is an old name for it.
- WORMWOOD (*Artemisia vulgaris*). P. Used medicinally as a bitters.

Remedies and Preventives Against Mosquitoes

There are several forms or species of mosquito; certain of them breed only in tree holes, others in crabholes or sea beaches, certain others breed in marshes, while others seem to breed only in the pools formed by melting snow. One of the best means of abolishing mosquitoes is to screen all likely breeding places, and to drain marsh ground or fill in places where water collects. Disused wells in gardens are frequent sources of a mosquito supply; fountains and ornamental ponds also, and here the introduction of fish is usually all sufficient, as these eat the eggs and larvæ; even urns in cemeteries are breeding places for mosquitoes. As in most other things, cleanliness will be found to pay. Wherever there is a stagnant pool that cannot be drained or filled in, and is known to be a home of mosquitoes, spraying the surface with kerosene is advised. The heavier grades of oil will not spread readily, but will cling together in spots, and the coating will be unnecessarily thick. The rapidity of spread of the film is important. As to quantity: under still conditions an ounce of kerosene to 15 sq. ft. of surface water is about the right proportion, and in the absence of wind such a film may remain persistent for 10 days or slightly longer. The oil can be sprayed through an ordinary spray nozzle. Various larvicides are also used, especially in the South and in tropical countries. Smudges and fumigants are also employed to drive away mosquitoes.

The burning of pyrethrum powder in rooms is a good practice, or dusting the powder into crevices frequented by the insects is performed. Sulphur, two pounds for each 1000 cubic feet of space is an efficient mosquito destroyer, where fumigation in the case of possible disease-bearing mosquitoes is desired. There are many remedies for mosquito bites, one of the most satisfactory being moist soap gently rubbed over the puncture. Others recommended are household ammonia, alcohol or glycerine.

For protection on the piazza at night burn Chinese punk

*For a complete work on the subject of Herbs
we would recommend*

CULINARY HERBS, by M. G. Kains. The only book devoted to the flavoring plants of home and business gardens. Besides the comprehensive general discussions of cultivation, harvesting, curing and uses, the author devotes special attention to each of the thirty-five species popular in Europe and America. Price, \$1.10 postpaid. Secure your copy where you bought your Garden Guide.

Always consult Index to Contents. Familiarize yourself with it. There are hundreds of good things in this book that will escape your attention if you do not use the Index freely

Fruit for the Small Garden

Apples—Apricots—Cherries—Grapes—Pears—Plums—Peaches
Quinces—Strawberries—Currants—Gooseberries—Raspberries
Blackberries—Dewberries—Loganberries—Cordon and Espalier
Training Systems—Ideal Fruit Garden

SPREAD the truth far and wide, the country over, by every means available. Sufficient emphasis can never be laid on the health-giving advantages to be derived from the free use of fresh fruit. It is beneficial to the adult, but doubly so for the children. It is an insurance against disease. Nothing will assist the processes of nature in such a rational and effective way as the habitual use of fruit. "An Apple a day keeps the doctor away," is an old saying but, nevertheless, a most true one, as many have proved to their own satisfaction, and when one can practice the habit from one's own garden, the pleasure is more than doubled.

Fruit gathered fresh from the plants is quite a different article to that which has been picked and packed, traveled and finally exposed to the dust and atmosphere of a public market or store. Then, too, another phase of the satisfaction of growing fruit for your own use and to give to your friends is in the pleasure derived from watching its development from the bursting buds on through the period of flowering to the ripe, luscious, perfect fruit.

It is surprising how much more fruit can be eaten in the garden "out of hand," than when served in the home, and this without the slightest injurious effects. It is the unripe and stale fruit which should be avoided; if you care for your fruit garden it will reward you with fresh, ripe fruit in abundance.

In considering a collection of fruit trees for a suburban garden, particular attention will be given those varieties which produce a maximum amount of fruit, in a minimum of space and which are designed to supply the family with fruit for the table and culinary purposes the greater part of the year. Available space must, of course, be considered in planting a fruit garden, and location must determine to a large degree the manner of planting and arrangement of the different fruits so as to allow each kind the greatest amount of light and air possible. Apples and Pears, Peaches, Plums and Cherries, therefore, should be planted to avoid casting too great a shade on the smaller fruits such as Strawberries and Currants. Raspberries, Blackberries and Grapes should be confined to trellises and not allowed to extend beyond certain limits, but to accomplish this, regular atten-

tion to pruning and thinning is absolutely necessary. A small fruit garden judiciously planned and planted will be a source of pleasure and profit, and well repay all the attention that can be bestowed upon it.

Depths for Planting

A good rule to follow in planting a fruit tree is to set it deep enough so that it will stand up firmly without artificial support. In sandy soil deeper planting may safely be practiced, while on heavy or wet soils shallow planting is recommended. As a general rule six inches is quite deep enough for all small fruits, and eight inches for Apple, Pear, Plum, Peach and Cherry trees.

Dwarf trees can safely be planted to the depth they have been previously grown in the nursery, but not deep enough to afford any possibility of the scion or graft taking root in the soil, otherwise your dwarf tree will cease to be such, as the rooting scion will cause a very strong growth. Undue vigor in fruit trees should be checked by root pruning.

Having chosen a location, proceed at once thoroughly to cultivate the ground, using a subsoil plough, or digging as deeply as possible; then cover the whole with a liberal dressing of well rotted farmyard manure, and a liberal sprinkling of bonemeal, and dig over again. In this plant your fruit trees. Should your soil be a rich loam it will be well adapted for the small fruits as well as Cherries and Apples, but heavy or clayey soils will produce fine Pears, while sandy soil will grow luscious Peaches. A careful study of conditions previous to planting will save a large amount of inconvenience, labor, expense and regret later on. Apple and Pear trees take about six years to come into bearing, but after that the crop increases annually. Pruning will accelerate fruit production to a large extent and providing a good selection of varieties has been made, it is possible to have Apples nearly every month in the year, the proper facilities being available for Winter storage. Good cultivation is beneficial to the growth of fruit in general and liberal treatment will increase results.

Following is a table showing how many trees or plants may be planted on an acre at various distances apart:

Feet apart	Number of trees	Feet apart	Number of trees	Feet apart	Number of trees
40	26	16	170	6	1,210
35	34	15	194	5	1,744
30	49	14	224	4	2,722
25	70	12	304	3	4,840
20	109	10	435	2	10,890
18	135	8	680	1	43,560

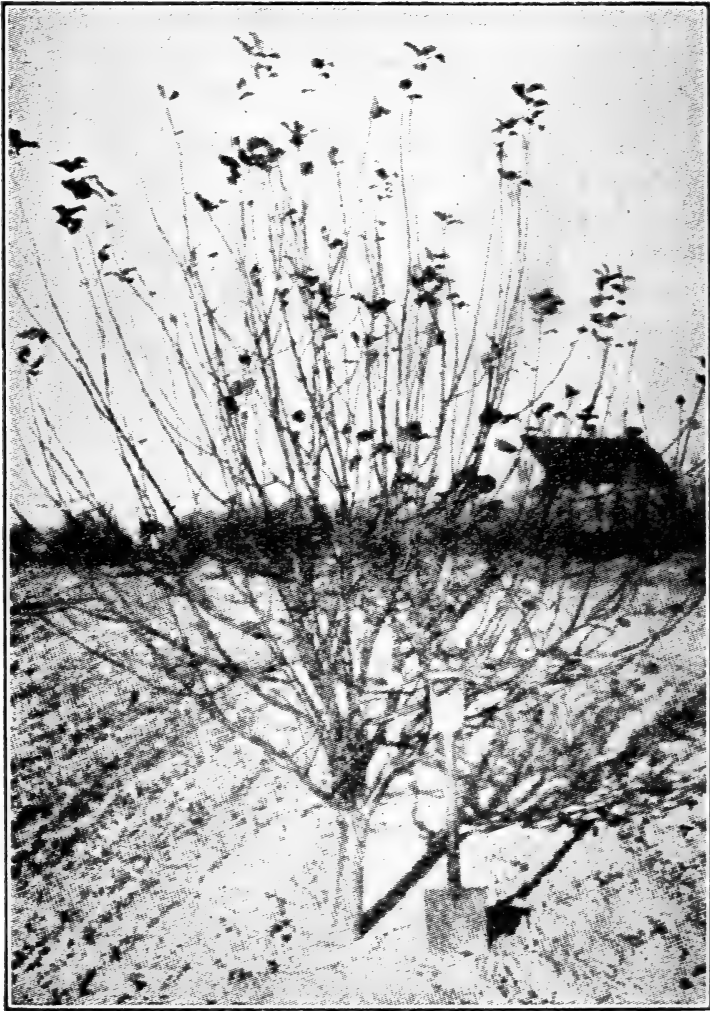
It has been thought unnecessary to include, in a book of this nature, a large number of varieties, but rather to give the names of kinds that have been proved of real merit, and while those mentioned are not all of the good ones, they have been selected for their superiority in vigor and production.

APPLES

These do best in a rich, loamy, well drained soil, in a position preferably facing the east or southeast. This situation protects the trees from north and west winds and retards blooming in Spring, thereby often preventing the destruction of the blossom by late Spring frosts, and the consequent failure of the crop. In planting, select a three-year-old tree, which can be procured at any reliable nursery, and insist on this being true to name, because a mistake at this point means years of disappointment. Do not make the common mistake of planting your tree in a small hole, or planting too deeply, but be liberal in all your treatment, and your tree will respond accordingly. Prune all broken and damaged roots, and after spreading the remaining roots evenly in the hole, cover with fine earth and give the tree a slight shake. Allow the earth to sift down among the fine roots, then put on more soil and tread in firmly, finish filling the hole, and put on a generous mulching to keep the soil about the tree moist, for upon this mulching often depends the life of the tree. After the tree is firmly planted, prune in the head to five or six branches and reduce these to half their original length. Attach a label to the tree and it is ready to take a permanent place in the garden.

During its first season of growth all superfluous shoots should be cut out, keeping in mind the future form of the mature tree. The second season the previous year's growth should be cut back about half, and after this the tree will usually need only thinning out the center and such shoots as cross each other, to secure abundance of light and sunshine. The shoots which come out of the stem should be rubbed off as they appear. This treatment applies to standards, which should be planted at least twenty-five feet apart, but in a small garden trees known as pyramids, cordons, and espaliers may be grown with success. These can be purchased in that form, and are used for covering arches or for growing against buildings, walls or fences. They have the advantage of producing fruit quicker than standards and in taking less space in which to grow, a consideration where room is limited. Pyramids could be planted in a row ten feet apart, cordons three feet apart against a wall or to form an arch over a walk, and

espaliers along each side of a walk or against a wall or building, thus making the most of restricted space. Their pruning is more severe and may be done in July and in Spring, the production of fruit bearing spurs being the end in view.



Typical half standard Apple tree suitable for the amateur's garden

The prevention of San José scale is necessary to success, and a spraying with any good insecticide sold for that purpose must be given while the trees are dormant in Spring; lime and sulphur mixture treatment is very good. Then the familiar codling moth has to be dealt with. Arsenate of lead, three pounds to fifty gallons of

water, sprayed through a fine nozzle, has proved the very best treatment for this pest, but many egg clusters can be gathered from the trees if carefully scrutinized while pruning. The trees should be sprayed as soon as possible after the blossoms fall, the object being to get some of the insecticide into the calyx before it closes up tight, or the fruit turns downward. Avoid spraying the poison on the fruit.

Another spraying is necessary for fungous growth on the fruit. This should be done with arsenate of lead as soon as possible after the woolly down begins to come off the young fruit. No particular time can be stated, as in different localities the season varies, but by taking notice of the condition of the fruit, no mistake can be made. If green or black aphid appear on the growth of the young trees, spraying with what is known as "Black Leaf 40" is the best remedy. It is a preparation of nicotine in a concentrated form, and should be used according to directions supplied with each can.

Apples are seldom propagated except in nurseries, where large quantities are raised from seed and the many varieties in demand are then grafted on these seedlings while they are quite small. Grafting is sometimes practised in gardens for introducing a new variety on an old or objectionable kind.

In giving a list of varieties, due attention has been paid to sorts designed to keep the family supplied for a greater part of the year. In almost every locality, there are varieties which do particularly well, and which are general favorites; because of this fact, it is always well before planting, to inquire from some of the older settlers, whom you know raise good fruit, what special variety succeeds best with them. The following list, however, covers a wide range, and the varieties named are adaptable for general planting. Make a selection for early, medium and late.

EARLY HARVEST. Fruit pale yellow, tender and good. Bears early. Late July and August.

RED ASTRACHAN. Fruit largely covered with light and dark red. A good early, and bears young. August and September.

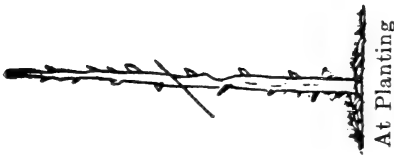
SWEET BOUGH. Fruit greenish yellow. The best early culinary variety. August and September.

YELLOW TRANSPARENT. Fruit clear yellow; tender, juicy, with a pleasant flavor. July and August.

DUCHESS OF OLDENBURGH. Fruit red striped, crisp, tender, juicy, aromatic. A good culinary variety. Late August and September.

GRAVENSFEIN. Fruit yellow striped, good size, attractive appearance, excellent quality. September to November.

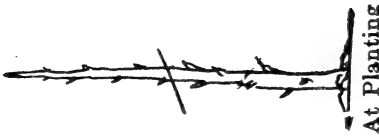
TOLMAN SWEET. Fruit pale yellow, decidedly sweet. A good dessert Apple. November to January.



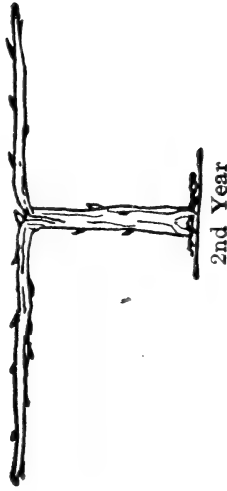
At Planting



2nd Year



At Planting



2nd Year

Single Cordon

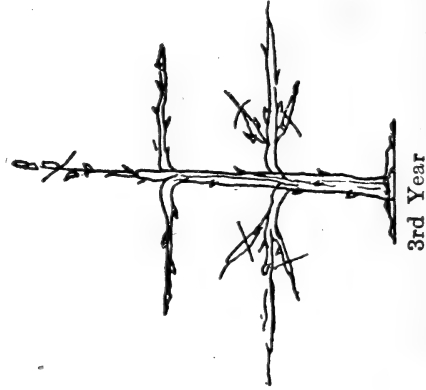
Double Cordon



At Planting



2nd Year



3rd Year



4th Year

Evolution of the Espalier Trained Tree

Prune as shown; remove weak growths. In June pinch back all side growths to the fourth leaf to hasten the formation of fruit-bearing spurs

Growing and Training Cordon and Espalier Fruit Trees

[Growing fruit trees in these shapes is an endless source of delight to the gardener and we recommend giving the art a trial if only commenced with a few trees, their first cost being but a trifle and the reward great.]

Cordons and Espaliers are not difficult to train and, by following the diagrams shown on opposite page, nicely grown specimens can soon be obtained. Sometimes a young tree can be bent down to form a single cordon, thereby saving a season's growth, but a double cordon would have to be formed the first year as shown in the diagram.

A single galvanized wire, anchored firmly at each end, and drawn tight, standing one foot above the ground, is necessary to support the cordon, the height being a matter of choice, as the tree can be started at any height desired. Should the young tree make very strong growths these should be shortened back in Spring and carefully watched and tied to ensure a straight branch when new growth commences.

All side growth should be pinched back in June or July, leaving three or four leaves; these will form the fruiting spurs later. The spurs should not be allowed to crowd or weak growth will result. The trees can be allowed to reach each other and are easily kept within a restricted space. They come into bearing early and produce fine fruit.

An espalier is an amplified cordon, the treatment being identical in the first stage. Branches at equal distances up the stem look best, and three good growths must be encouraged at the first pruning, two for lateral branches, and one for a continuation of the main stem; these should be tied and kept straight, as the future appearance of the tree depends upon it.

The third year spurs will begin to form on the lowest branches, these should be treated the same as those on the cordons. Fine fruit will reward the labor bestowed upon them.

Upright or oblique cordons consist of a single stem, allowed to grow slowly by cutting back a portion of the matured growth each year in order to encourage the formation of fruiting spurs at close intervals all up the stem. The side shoots should be treated same as for single or double horizontal cordons, but a straight leading shoot must always be assured for the continual development of the tree.

These may be planted two feet apart, against a fence, building, or wall, or to cover an arch in the fruit garden.

Espaliers may be trained on ordinary garden stakes, 4 to 5 ft. high, placed one foot apart; or, iron rods may be used, or an ordinary piece of wire fence, in fact any material that will keep the young growths in the proper position during training.

(Continued from page 227)

- MAIDEN'S BLUSH.** Fruit lemon yellow with crimson cheek; very attractive. September to November.
- SUTTON BEAUTY.** Fruit attractive, red, fine grained, crisp. A good dessert Apple. November to March.
- RHODE ISLAND GREENING.** Fruit green. The very best culinary Apple. October to March.
- BALDWIN.** Fruit red. The well-known Winter Apple. October to May.
- NORTHERN SPY.** Fruit splashed with red; very crisp; of fine flavor. December to June.
- WAGENER.** Fruit red, large, subacid. An Apple of superior excellence. October to March.
- SIBERIAN CRAB.** The Crab Apple furnishes a most delightful jelly; none better. It is also ornamental and might be planted where non-fruiting trees are planted now. Other Crab Apples are Golden Beauty, Hyslop, Martha and Transcendent. September and October.
- JONATHAN.** Fruit brilliant red; very highly flavored, juicy, fine grained. October to March.
- MCINTOSH.** Fruit bright deep red; flesh white; juicy, with slight acid flavor. September to January.
- STARK.** Fruit large, round, greenish yellow, with red stripes; flesh yellow, mildly acid. November to January.
- WILLIAMS.** Fruit rich dark red; large, with tender crisp white flesh. July to August.

APRICOTS

The delicious Apricot should be grown in every garden. Bush plants are preferable, as being a very slow growing tree, it requires little pruning, except for the purpose of keeping it in shape. Flowering early it is subject to injury by late frosts, but the fruit sets much better in a cool temperature.

Culture and treatment the same as the Peach. The varieties are few, but the very best are:

MOORE PARK Rich orange color, the best, ripening in August.

HARRIS. Deep golden yellow. July.

BLACKBERRIES

The culture of Blackberries is similar to the directions given for Raspberries. They grow stronger, however, and require more room, and owing to their sharp thorns they are not so desirable in the small garden. Some object to the many seeds they contain, particularly if grown on poor soil, but a few varieties are almost seedless:

TAYLOR. Without core and one of the best.

ERIE. Of very good quality.

ICEBERG. Produces white berries of good flavor.

CHERRIES

Cherries are enjoyed by all; even the birds love them, but as they grow in such abundance there are usually enough for all. Early Cherries are a great temptation to birds, and a slight protection with mosquito netting may be a necessity. The sour Cherries come later and need no protection. Cherries are not particular as to soil; they do well in a good sandy loam.

Black aphid always attack Cherry trees and the ends of the new growths are frequently covered with them, but a good hard spraying with Black Leaf 40 will usually clean them off. This should be applied as soon as possible after the fruit is set, when the young growth commences. Cherries mature quickly and their season is short.

This list of varieties include the favorites:
GOVERNOR WOOD. Light, yellow and red. June.



Standard (or tree) Red Currant

This form of bush has special merits, being ornamental as well as utilitarian

BLACK TARTARIAN.
Large purple. June.

MAY DUKE. Large red, juicy. Early June.

BIGARREAU. One of the best. July.

CURRANTS

Currants are used principally for culinary purposes, and unless wanted for preserves, a few plants will generally be sufficient for ordinary use. The red and white varieties are the ones usually grown, but some like the black, and a few of these should be included. The reds are the most popular. but they all make

delicious jelly; the black particularly so. Served on the table freshly picked, the white and red, mixed, make an appetizing dessert.

Any soil of a medium rich nature will grow good Currants and they are not particular as to situation. They prefer a light, open space preferably to one that is shaded by trees. They may be planted in Spring or Fall, and must be attended to in the matter of pruning to insure a good crop of fruit annually. All young shoots should be pruned back about half, and only a few left to form the bush, care being taken annually to remove all young growth which springs from the base of the bushes, otherwise they will get too thick and small fruit will result. Standards are in every way preferable as they can be more easily pruned and the fruit is kept up out of the dirt, a great advantage on sandy soils.

If planted four feet apart they will soon grow up and fill the space between each plant. As Currants admit of hard pruning, they may be used for bordering garden walks, or planted against fences to utilize space, where this is a consideration.

The Currant worm is one of the worst pests we have to deal with. Powdered hellebore dusted on the plants is a good remedy, but they should be watched for carefully as soon as the foliage appears, and kept destroyed until the foliage becomes hard. Ordinary road dust, air slaked lime, or any fine dust, has been used successfully in

destroying the Currant worm, but it should be applied quite early in the morning, or late in the evening when the foliage is damp with dew; it is then very evenly distributed and most effective. There is some danger in using a liquid insecticide because the fruit is small and it is almost impossible to wash off all traces of poison.

Currants are usually propagated from cuttings made of the ripened shoots, and root quite freely if put in during the Fall. The best varieties are:

Red.—FAY'S PROLIFIC, sweet, large and very productive. CHERRY, large and very prolific. POMONA, a new variety; keeps long after getting ripe.

Black.—CHAMPION. Berries large, of good quality BOSKOP GRANT.

White.—BAR-LE-DUC, WHITE GRAPE.



Pruning Currant shoots
1. Twig should be cut back to bud as shown in Fig. 3. No. 2 shows torn snag

DEWBERRY

These follow Strawberries in ripening and are a welcome addition to the list of early fruit; delicious, and superior to Blackberries. The vines should be tied to a wire for support and to facilitate gathering the fruit. The young growths spread on the ground and, after fruiting, the old canes should be cut out and the young growths tied in their place and thinned to prevent overcrowding. The same treatment required as for Raspberries.

LUCRETIA. The best variety; fruit large and handsome.

GOOSEBERRIES

This luscious fruit is not much grown, but serves a purpose as a culinary fruit. It makes a good subject for planting between plots, as a fence, or along walks, as it can be pruned hard and kept within limits, trained on a wire fence for support. Planting may be done in the Fall and a crop of fruit can be had the first year. Very little pruning is required, as the plants usually grow short jointed wood, and keeping the plants thinned out so that the fruit may have exposure to the sun and air is all the pruning necessary. Like Currants, the Gooseberry is subject to the attack of worms (caterpillars), which soon denude the plants of foliage and make them unsightly, as well as preventing the proper maturity of the fruit. Dusting with powdered hellebore is one of the best remedies and should be applied as a preventive as soon as the foliage expands. Mildew often attacks the Gooseberry and causes trouble, but spraying with a solution of sulphuric acid, one part to one thousand parts of water, will control this disease. It may be borne in mind that eight teaspoonfuls make one fluid ounce, 16 ozs. make a pint, and there are eight pints in a gallon. A teaspoonful of sulphuric acid to a gallon of water is therefore a safe amount.

Propagation of the Gooseberry is done by cuttings of the ripened shoots. The following varieties are each good:

DOWNING. Large, pale green, soft and juicy; quite prolific.

INDUSTRY. Large, dark red; good cropper.

RED JACKET. Large, red, good flavor.

WHITE LION. One of the finest.

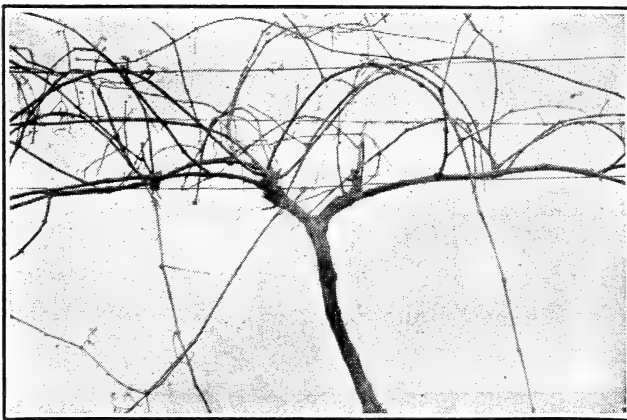
GRAPES

Grapevines may be trained on arbors, pergolas, fences, buildings or trees, but to secure the most and the best fruit trellises are desirable.

The simplest trellis is the Munson or canopy. Erect it as follows:

Set end posts, preferably of locust or red cedar, five inches in diameter at their bases so as to be below the "frost line." Place others, three or four inches in diameter, 24 to 30 ft. apart in the rows. Saw the tops off square at 4 to 5 ft. above ground. Bore a small hole 6 or 8 in. below the top of each post for the lowest wire (size No. 11) to pass through. Spike or wire on crosspieces of 2 by 4 scantling 24 in. long on top of the posts. An inch from their outer ends saw a slot half an inch deep for the other two wires to rest in. Fasten the ends of the wires firmly to one end post but loosely to the other so they may be loosened in Winter and tightened in Summer. The trellis will not be needed until the vines are a year or two old.

When the vine is planted cut off all side shoots and reduce the main cane to two or three joints, each with a plump bud. When young



Munson System of Grape Training.
Vine Unpruned. Courtesy Kentucky Exp. Station

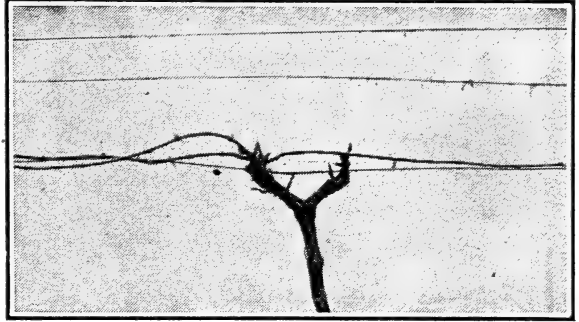
shoots develop tie them to stakes 5 or 6 ft. tall. Tie again during Summer when necessary to keep the vines off the ground. In mid-Winter cut off all side shoots. If the main cane is weak cut it back to 15 to 20 in. and manage as the first season. If it is sturdy, tie to the lowest wire of the trellis and cut off all above this wire. To

steady the cane, coil a stout cord around it two or three times in a spiral and fasten to the base of the vine and to the wire. When growth starts in Spring, destroy all shoots except those from the uppermost two buds. Train these in opposite directions along the lowest wire. Better not allow any fruit to develop this year so the two "arms" will become very strong. Allow no shoots to develop below these arms on the main trunk.

In the second mid-Winter cut off all side shoots and shorten the arms or main canes to 4 to 8 joints—few for weak canes, more for strong ones. Each bud will produce a shoot and each shoot should bear one to five clusters of grapes. As the shoots grow, raise their ends and let them hang over the upper wires. They do not need to be tied.

Before the blossoms open decide upon two sturdy shoots to form next year's arms. They should start near the trunk. Pinch off all clusters of fruit on them to make them strong. At the same time shorten each of the other shoots to two or three joints beyond the outermost clusters. In a couple of weeks go over the vines again and cut back to one or two joints those shoots missed the first time, also growths that have started in the meantime.

In the third mid-Winter cut each of the main arms an inch or so above the two sturdy new arms developed previous Summer and remove them



Munson System of Grape Training.
Vine Pruned. Courtesy Kentucky Exp. Station

and all their shoots from the trellis. Take care not to injure the two new arms in doing this work. Shorten these arms to four to eight or ten joints. Gently braid each with the lowest wire to right and left, respectively, and tie firmly in two or three places to the wire. During the growing season proceed as in the previous Summer, except that from the third year forward you may allow three or four arms to develop instead of two on strong vines.

Grapes delight in a well drained rich soil. Old bones are excellent to place beneath the vines before planted. Clean cultivation is desirable. Set strong growing Northern varieties 10 ft. apart, small ones 6 or 8. Southern kinds often need 20 ft.

Good Northern black varieties are: Eumelan, Worden, Barry, Wilder, Moore's Early and Concord. Red ones: Agawam, Brighton, Brilliant, Delaware, Jefferson, Salem, Vergennes and Catawba. White: Dutchess, Empire, Goethe, Winchell (or Green Mountain) and Prentiss. Popular Southern varieties are Scuppernong, James and Herbemont.

PEACHES

To those in the warmer parts of the country where the Winters are not too severe, a few Peach trees will add much to the revenue of the garden, and who does not like Peaches? They can be served in so many appetizing ways. The Peach is not a long-lived tree, and will not produce profitably for more than five or six years. After the fruit begins to get small, new trees had much better be planted.

Peaches thrive in a light, well drained soil and preference should be given to a northern aspect, as this tends to retard the date of flowering and prevent a total loss of the crop which would result if subjected to a freezing temperature while the trees are in bloom. At best Peaches are a precarious crop unless well protected from cutting winds. During Winter, if the temperature falls to ten degrees below zero, the blossom buds will generally be killed although in a dormant state, and no fruit can be expected under such conditions. Peach trees come into bearing early, and for this reason young plants should be selected for planting and careful attention given to pruning to get the tree into shape.

Early Fall is the best time to plant, as the trees have a chance to get rooted a little before the ground becomes severely frozen. The roots being very fine, the trees should be planted as near the surface as consistent with firm and secure planting, and a stake put at each tree, if necessary, to prevent its moving. Peaches like the ground around them cultivated, and much better fruit will result.

They require little pruning except to cut back strong growths, and to thin out if the branches become too crowded. Dwarf standards are preferable, but in small gardens trees can be trained against a building or on a fence. Under this method of culture they produce fine fruit, and ripening is assured in unfavorable seasons.

A spraying with arsenate of lead will check any tendency of fungous growth if done while the leaves are quite small; if done after the fruit gains size the woolly down which covers it holds the spraying solution and may cause some disfigurement. Aphids usually attack the young leaves and if planted against a wall frequent severe syringing with force enough to dislodge the insects will keep them in check. A solution of nicotine may be used effectively against this black aphid, but is almost sure to leave a stain on the fruit and should not be applied in any case after the fruit is half grown.

Early varieties are the best to plant as the season is none too long for the maturing of the fruit.

New varieties are raised from seed and their perpetuation is secured by budding. This is done when the stock is quite small and usually close down to the ground.

The best kinds are those which are known to do well in particular localities, but those named are known to be generally good, and can be safely recommended, and are all freestone varieties:

ALEXANDER. Medium size, white flesh, rich flavor. July.

BELLE OF GEORGIA. Large, showy, red cheek; flesh white, firm and sweet. August.

EARLY CRAWFORD. Large, yellow, of good quality. Early September.

HALE'S EARLY. Melting and rich flavor. August.

ELBERTA. Large, yellow with red cheek; of fine quality. September.

CHAMPION. Very large, white flesh; very productive. August.

PEARS

Successful Pear culture is only practicable where the condition of the soil permits a free growth of wood. The trees may be planted closer together than in the case of Apples, because the tendency of the Pear tree is to grow tall rather than to spread out. Where an Apple orchard is planted, Pear trees may be planted between the rows until the Apple trees require the room, when they should be cut out rather than encroach upon the room allowed for the Apple trees. Pears come into bearing much quicker than Apples, and the trees never assume large proportions. It is well to bear this in mind when planting, but a small Pear tree will produce liberally, and a careful selection of varieties will give a long season of fruit. Pears delight in a heavy soil, and as they bloom early in the season a sheltered position should be selected where some protection may be had from a windbreak of tall evergreens or group of buildings, or from the natural formation of the place chosen, such as the shelter afforded by a hill. The tree should be planted on the eastern slope when many are to be grown, but in the small garden pyramids or espaliers should be used. These give the best results, yielding a large amount of fruit in a restricted space. Pears respond to good cultivation and will stand closer pruning than Apples. The tall growing varieties should have the heads cut hard to prevent the trees reaching too great a height, which makes the gathering of the fruit difficult. It is good policy, therefore, to keep the trees low and bushy. Pears make spurs freely, and in pruning, this fact should be held in mind. Encourage a free, open, branching habit, and prune to clothe the branches with fruit-bearing spurs, cutting out all superfluous growth at the Spring pruning.

Probably the worst enemy of the Pear is rust and fungus, an attack of which causes the fruit to grow deformed and unsightly. A frequent spraying with arsenate of lead, three pounds to fifty gallons of water, will keep the foliage and fruit in good condition. This should be applied immediately after the blossoms fall, and again about three weeks later, and should any sign of fungous growth appear later, another spraying should be given to insure good looking fruit and a clean, healthy growth to the trees.

Pears are usually grafted, and trees can be purchased much more cheaply than they can be grown to a fruiting age.

The following tried and popular varieties will prove a valuable addition to the garden:

CLAPP'S FAVORITE. Large, pale yellow; flesh fine, juicy and buttery. August.

BARTLETT. A very popular variety; large, shapely, melting; luscious flavor. September.

SECKEL. Fruit small but very sweet and melting. One of the best.

KIEFFER. Large; golden yellow when ripe; juicy, with Quince flavor. October and November.

SHELDON. Large, russet and red; aromatic flavor; rich and delicious. October and November.

BEURRE d'ANJOU. Large and handsome; flesh melting, extra fine. November.

Pears should be gathered as soon as the seeds are black, and stored in a dry, airy room until fit for use.

PLUMS

No garden is complete without a few Plums, so useful for table and culinary purposes. The Japanese Plums are wonderful bearers, and produce annually large quantities of fruit. Their abundance makes it necessary to thin out the fruit to prevent rotting in clusters on the branches. Plums are not particular as to soil, as their roots spread so much nearer the surface than Apples or Pears, and any fairly good loamy soil that is well drained will produce fine fruit, but cultivating around the trees is very beneficial. Plant early in the Fall; be liberal with the spade, make large holes, spread the roots out evenly, and plant firmly.

Plums should not be pruned except for conserving the shape of the trees, particularly the Japanese varieties, which usually grow very strong the first season, and pruning back is a temptation, but if pruned they only produce another strong growth. If left alone they will form fruit buds all along these strong growths and so check excessive vigor. Plums are the earliest fruits to flower, and a sheltered position should be given them, or plant them on a northern exposure where the buds will be retarded until danger of freezing is past. Spraying to be effective, should be done very early, and again as soon as the blossoms fall, because the fruit is eaten without removing the skin. Plums intended for the table should be allowed to ripen fully on the tree, but for preserving and culinary purposes they may be gathered earlier. Should Plums insist on making a strong, rank growth, the best remedy is root pruning. Lift the trees in the Fall and shorten back all strong roots, keeping the roots exposed as short a time as is possible to complete the work.

Some Plums can be raised successfully from seed, the Greengage being one of these; but they are usually budded or grafted on the wild Plum stock.

The curculio is the worst pest we have to deal with, and the only way to fight this insect is to gather up all the fruit which falls prematurely and burn it, as in these fallen fruit the larvæ remain until full grown, when they eat their way out and enter the ground, where they change into the pupa state. The full grown beetle emerges in about four weeks and hides under the bark of the tree or some other protection until Spring business opens up.

Another insect which sometimes causes trouble is aphis. Spraying with a nicotine solution will destroy this pest, or the tops of the young infested growths can be cut off.

Some of the very choicest Plums for eating are:

OULLIN'S GOLDEN GAGE. Large, delicious flavor. August.

TRANSPARENT GAGE. Very large, round, juicy and rich. July.

GREENGAGE. Medium size, round, green, rich. August.

COE'S GOLDEN DROP. Very large, golden yellow, rich flavor. September.

VICTORIA. Large, oval, red. Useful for every purpose. August.

MAGNUM BONUM. Large red. Good culinary variety. September.

For culinary purposes: ABUNDANCE, BURBANK, RED JUNE, SATSUMA and WICKSON.

LOGANBERRY

A few plants of the Loganberry may be grown as a useful novelty. The fruit has a very flat taste, but looks very pretty as a dessert, on the table. There should be no reason why this easily cultivated fruit, which was raised by a Judge Logan in California, should not be tried in many gardens. In England it has become a general favorite. Its treatment in all respects is similar to that of the Raspberry.

MELONS · See Vegetables, Chapter XV

QUINCE

A few Quinces are desirable in the small garden, and a tree or two will usually produce sufficient fruit for the average family. Not being an edible fruit, it is used only for canning purposes, and makes the most delicious jelly, with a flavor all its own.

In variety there is not much choice, but that known as APPLE OR ORANGE produces large, roundish fruit, of a bright golden color, and is very productive, even when quite small.

They are best grown in bush form.

RASPBERRIES

The popular Raspberry is always welcome in the home, and only when freshly gathered has it that lovely flavor peculiar to this fruit and which makes it so desirable in the home garden. Raspberries must be handled with the greatest care or the fruit will become bruised and soon ferment. Small baskets should be used when picking, to prevent excessive weight, which invariably crushes the tender berries, and they soon become unfit for use.

The plants are not particular about the kind of soil they grow in, nor the location. They grow best in a good, rich, well drained, loamy, cultivated garden soil, and should be planted in rows two feet apart and four feet between the rows. They are best tied to a wire trellis for support and to facilitate ease in gathering the fruit.

The young growths which spring from the base of the plants, should be thinned out to four or five, and after the season's fruit is over, the old fruited wood should be cut out close to the ground, and the young shoots given every chance to ripen before Winter sets in, when they may be tied together in bunches of five or six canes and left in this way until Spring, when they must be tied to the wires and trimmed evenly along the top to make them look neat.

Raspberries are not subject to much trouble from insects or diseases.

They are propagated by division of the roots or from cuttings, which should be taken from the ripened shoots and inserted in the ground in September, and will commence to grow the following Spring.

There are red, yellow and black Raspberries, but the red varieties are the most popular. A few well tried varieties follow:

CUTHBERT. Red, large and sweet; the most popular of all Raspberries.

BRANDYWINE. A large, bright red berry; a good cropper.

GOLDEN QUEEN. Large, amber color; fine quality.

CUMBERLAND. Very large, black, glossy berries, juicy and sweet.

STRAWBERRIES

No garden is complete without Strawberries, and as they are so easily grown, no garden should be without them. What is nicer than a dish of Strawberries picked fresh from your own garden? Strawberries like a rich soil and well repay a very liberal application of fertilizer. The best time to plant a bed is in September, when the young plants are just ready. Select an open piece of ground away from tall trees or shrubs; dig in a liberal dressing of well rotted farmyard manure,

with a sprinkling of bonemeal, and in this plant your Strawberries one foot apart in the rows and two feet between the rows.

After the first hard frost throw over them some light protection—straw, old hay or anything that will not be liable to pack down on the plants too tightly. The object of this covering is not to keep the plants from the cold, but to protect them from the sun, which causes more failures than the cold. This covering should be removed after Spring opens up, but not too early, as a little growth may have already started, and if exposed to a late frost may cause much injury. The plants which will have become loose by the action of the frost, should be gone over and firmly pressed into place, the beds lightly forked to prevent the growth of weeds, and when they are in bloom, some straw or salt hay should be placed around and between the plants to prevent the soil from splashing on the ripe fruit.

To lengthen the season of fruiting, the first blossoms may be picked from some of the plants, and these will fruit about three weeks later. Strawberries are sexual and bi-sexual, that is to say, in some the flowers have pollen and seed organs, in others only one set of these. To insure fruiting it is necessary to plant some of each kind, unless the bi-sexual varieties alone are selected. A bed once planted is good for at least three years, when it should be renewed. If at all possible start a new bed one year before the old bed is to be destroyed.



Good Sized Strawberries

All runners should be cut away annually as soon as the fruiting season is past, unless some are wanted to make a new bed, in which case the strongest plants should be left until wanted and the runner should be stopped at the first strong plant to accelerate rooting.

Strawberries, fortunately, are not troubled with many insect pests or fungous diseases, and their propagation by runners is very simple, as they root freely of their own accord and can be cut off and planted where they are to remain.

There are many fine varieties and their selection is largely a matter of preference. The following are bi-sexual and are all good, tested sorts:

Early.—CLYDE, MARSHALL, BEDERWOOD.

Mid-season.—ABINGTON, MCKINLEY, SHARPLESS, NICK OHMER.

Late.—COMMONWEALTH, GANDY, BRANDYWINE.

Autumn or Perpetual.—AMERICUS, PROGRESSIVE. These have small fruit and very little of it. To give results they must have extra care.

Plan for an Ideal Fruit Garden

On the opposite page we show a diagram of a Fruit Garden, prepared for the readers of "Garden Guide" by Alfred J. Loveless, one of the best known and most successful garden fruit growers in the United States. This fruit garden has been carefully laid out so as to get the maximum amount of fruit from a minimum of space.

The garden embraces an area of 50 x 100 ft. scaling. If it is not possible to give this much area to a distinctively fruit garden, it can be modified to fit requirements. The one thing essential is to study the plan and the descriptive matter which follows so as to arrive at the arrangement by species. The reader can then modify the plan to suit his own requirements.

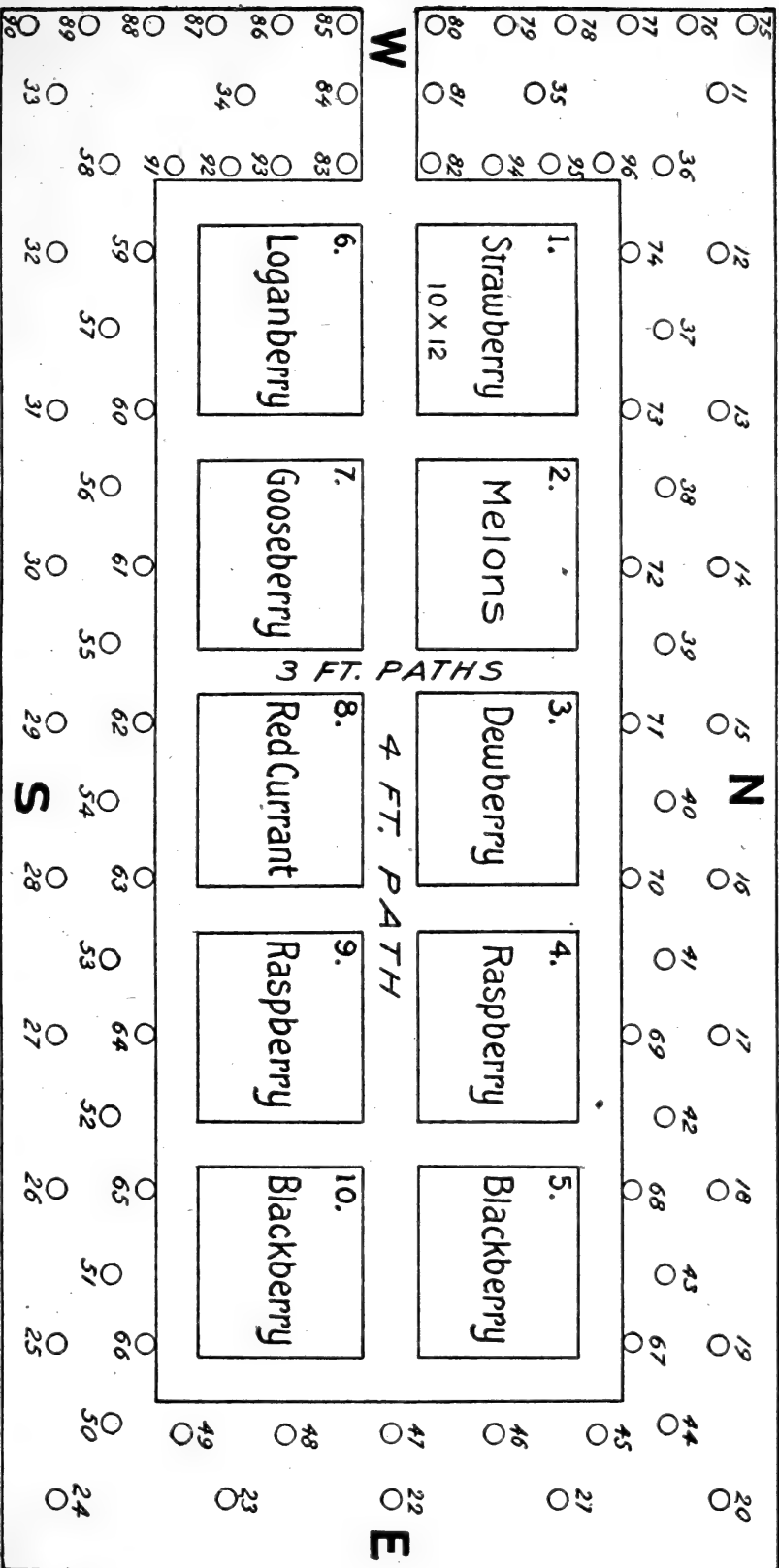
Of one thing you can rest assured, which is that if you follow the instructions given all the way through this chapter you will have a fruit garden second to none.

The ten squares in the center represent areas 10 x 12 ft. each. No. 1 is devoted to Strawberries; No. 2 to Melons; No. 3 to Dewberries; Nos. 4 and 9 to Raspberries; Nos. 5 and 10 to Blackberries; No. 6 to Loganberries; No. 7 to Gooseberries; No. 8 to Red Currants. These will stand variation to meet requirements.

Key to area surrounding the center ten sections:

11 and 33	Quince
12-14-16-18	Standard Apples
20 and 24	Crab Apple
13-15-17-19	Bush or Pyramid Apples
21-22-23-34-35	Cherries
25-27-29-31	Standard Peaches
26-28-30-32	Standard Plums
36 to 44	Bush or Pyramid Pears (9)
45 to 49	Espalier Apples (5)
50 to 58	Bush Peaches and Apricots (9)
59 to 74	Cordon Apples, double or single, trained low on a single wire (15)
75 to 90	Grapes (16)
91 to 96	Standard Currants (6)

For Fruit Troubles, see Chapters on Insect Pests and Diseases.



Plan for an Ideal Fruit Garden—By Alfred J. Lovelless

There is no fence or wire around the 10 by 12 ft. plots, but Raspberries, Blackberries and other plants should be staked and tied, as told in cultural directions. The outside of the fruit garden may be surrounded by a wire fence but that is not necessary; if one is erected—cordons and espaliers should not be trained against it, as the larger (standard) Apples and Pears would cast too much shade. Tomatoes could be profitably trained to such a fence until the shade became too dense. The area is 50 by 100 ft. The scale is slightly less than $\frac{1}{4}$ in. to the foot. On another page we illustrate methods of growing fruits in espalier and cordon form. These methods are particularly desirable where area is limited.

Bungalow, or Mid-Summer Gardening

ON the heels of an increased interest in country life, and an increased appreciation of what it offers, there has come, during recent years, a noticeable increase in the custom of spending one or more of the Summer months in a bungalow up in the mountains or down near the seashore. For families that live in cities rather than suburbs or small towns, and that are unable to maintain real country homes in addition to their flats or apartments, this arrangement is a god-send; but too often it is accompanied by inconveniences which, accepted as unavoidable, are in reality, entirely unnecessary. It is commonly expected, for instance, that unless one's bungalow is located close to a friendly farmer's place, or a large central hotel or boarding house, there can be no hope of fresh vegetables during the vacation and that canned goods must be relied upon during the very months when the permanent country dweller is revelling in fresh picked Peas, Beans, Lettuce, Tomatoes, etc. Then, too, the idea of a flower garden around a bungalow is almost unheard of, the thought being that unless the Summer sojourn begins in April or early May it is impossible to prepare for and plant flowers that will bloom before Labor Day sees the family on its homeward way. How can one arrange so that this shall not be the case?

One way is to have someone who lives nearby get the ground prepared and the seeds planted as soon as need be—say in April or early May—that is, providing the bungalow site is within convenient reach of a community where such labor can be obtained. However, unless it is done as a personal favor by a friend or acquaintance, it is impossible to guarantee that such work will be entirely satisfactory or in line with the wishes of the occupants of the bungalow. Another possible plan sometimes, is to visit the place during each of two or three week-ends before the vacation season opens and do all the preliminary work at these odd times. This involves a not too distant location, a bungalow that is not occupied by other persons previous to the opening of the Summer season, and an owner or landlord who is willing to have the tenant make these preparations in advance.

The commoner and simpler course, however, is to put all the effort into a real Summer garden—one in which the work is not started till

the middle or end of June, and from which results are wanted as soon as possible and only until early in September. As can easily be imagined, the methods needed to obtain these results are not necessarily such as will do the garden the most good in the long run; in other words, they are temporary both in effect and in future prospects. Moreover, since most bungalow sites are clearings in the midst of woods, or scrubby, rocky land, the spaces available for gardening are likely to be small, scattered and workable only with hand tools and not with wheel hoes and other labor savers. The aim, in short, should be simply to get the most with the least outlay for tools the smallest waste of time, etc.

Fitting the Land .

There being no opportunity to Fall plow or manure the soil, it is usually easiest to dig up the sod and remove it (after shaking it free of all the soil possible). It can be piled away somewhere on the chance that the next year's occupant of the bungalow will use the compost it will provide. If some well rotted manure can be obtained and dug in so much the better; usually, however, it is necessary to rely on commercial fertilizer. Fifty or 100 pounds of a ready mixed brand, fairly rich in nitrogen will be plenty for all the season's gardening. From time to time wood ashes from the bungalow range and fireplace can be worked into the soil with benefit, especially if it is of a heavy, moist nature tending to be sour.

Seeds and Plants

While some crops can be grown to maturity from seed in two or three months, it is much the best plan to buy plants of as many sorts as are available and as can be afforded. These will include, among the vegetables, Cabbage, Tomatoes, Lettuce and, if the location is warm enough and sunny, a few Peppers and Egg Plant. Some of these crops would doubtless have to be left behind at the end of the season, but enough should be obtained to pay for the trouble. Of the vegetables that it will not pay to plant at all, there may be mentioned Celery, Parsnips, Oyster Plant, Potatoes (unless a few early ones can be started not later than April 10), Winter Squash, Watermelons, Cauliflower, Leeks, Onions (from seed), Pumpkins, late Turnips and Cabbage.

Vegetables to Grow from Seed

Depending on weather conditions, the following may be started as late as June 30, while some of them, as indicated can be planted suc-

cessively. In every case when buying seed specify the earliest varieties, that is, the quickest maturing sorts offered.

BEANS. Bush, stringless green-pod, or snap. Can make two or even three plantings at intervals of a week or ten days.

BEANS. Bush, Wax or Yellow. Same as preceding.

BEANS. Bush Limas.

BEETS. Succession planting can be made up to July 10th, the final sowings can be harvested for greens even if the roots don't mature.

CARROTS. Can plant until about July 5th.

CORN. Early variety planted July 1st may be ready by September 1st.

CUCUMBERS. In warm spot may ripen some fruits by August 15th.

ONIONS. Sets may be planted and harvested as green or bunch Onions.

PEAS. If season and location are cool, a planting of an early wrinkled sort may be tried.

RADISHES. If cool, the earliest sorts may be used; otherwise plant the so-called mid-Summer varieties only.

SPINACH. This is another crop that can be planted if the weather is cool. Otherwise use only the New Zealand sort which thrives in hot weather.

SUMMER SQUASH. A hill or two may ripen some fruits before September if grown rapidly in a sunny place and given occasional doses of manure water.

SWISS CHARD. Even though the stalks may not be fully grown if planted as late as June 20th, this crop should give fair returns.

In harvesting quick-season crops of this kind, pick as soon as they are big enough to eat. In the case of Beans, etc., this will stimulate continued production, and in any case it will give you products of the finest, tenderest quality.

Flowers for July Planting

If you are able to put some money into Aster, Pansy, Salvia, Geranium and other Summer blooming plants, you can be sure of a supply of blossoms. But even if you have to start seeds there are several sorts from which, under fairly favorable conditions you should be able to get good results. Of course they are all annuals. There may be mentioned:

BALSAM. White, through pink to red.

CALLIOPSIS. Yellow.

CANDYTUFT. White.

CATCHFLY. White, through pink to purple.

COBÆA. White and purple. An attractive climber.

CORNFLOWER. Blue.

GYPSOPHILA. White and rose.

MIGNONETTE. Yellowish or greenish white.

MORNING GLORY. Various. A splendid climber for screening, covering trellises, etc.

NASTURTIUM. Yellow, orange and red in various shades and combinations.

PHLOX. White, pink, red.

PORTULACA. White, through yellow and pink to purplish. Good for sandy soils.

TEN WEEKS STOCK. White, through rose to crimson and purple.

In June and July plantings sow seed somewhat deeper than in earlier planting so that the roots will be down in the cooler, moister, layer of soil, unless the plants can be kept watered whenever necessary. A little nitrate of soda dissolved in water at the rate of an ounce to a gallon will hasten the development of both vegetables and flowers alike. To keep the plants blooming, pick the flowers as soon as they appear, unless, of course the planting has been made for its mass effect outdoors.



The edging is Dwarf Ageratum; middle row, Mme. Salleroy Geraniums; third row, Zonal Geraniums. These, with the vines and the Geraniums in tubs impart an air of refinement and comfort to the house fronts

Fertilizers

Essential Elements—Sources of Supply—Animal Manures—Green Manures—Commercial Fertilizers—Bonemeal—Nitrate of Soda—Poultry Manure—Lime—Humus—Where and How to Use Fertilizers—Home Mixing of Fertilizers—Suitable Fertilizers for Vegetables and Fruits—Fertilizing Table—Scarcity of Stable Manure—Some Commercial Fertilizers in Common Use.

IT is incumbent upon every gardener that he or she should have at least an elementary knowledge of fertilizers; their necessity, their composition and their use. Prof. Thos. H. White, in the chapter which follows, has given in clear, concise form, this necessary information and has also demonstrated the advisability of using certain forms of fertilizers for defined purposes. We might add that where well rotted stable manure is still available, it will fulfill nearly all garden purposes on soil that has been kept in fair cultivation. For limited areas we advise consultation with and direct purchase from your seedman.

Essential Elements

When considering the cultivation of plants it is highly important that some thought be given to fertilizers. Some soils are naturally fertile, others are very infertile and need judicious fertilizing. Trees and shrubs will grow very well on soils that are moderately fertile, but the soft, quickgrowing plants of the garden must have very fertile soil. This is especially true of all annual plants that are grown from seed. The little seedlings, with their small, tender rootlets, must be properly supplied with food before it is possible for them to make rapid growth.

Nearly everything that is in the air or on the earth supplies something, either directly or indirectly, to the soil as fertilizer. All organic substances, that is, substances which have or have had life, are of

prime importance as fertilizers. The inorganic substances, or mineral elements of the earth, are also important but not nearly as much so as the organic. The basis of all soil is mineral, and it is the decay of living matter upon and within it which enriches and makes it capable of producing good crops.

The oldest forms of organic fertilizers were the remains of plants that followed each other on the earth's surface. After these came animal excreta. The dead bodies also of the animals themselves all helped to add organic matter to the ground-up rock of which the soil is composed. Material that is of organic origin is very beneficial to the life of the soil. Soil is not exactly what it appears to the eye to be; simply dead, inert matter. In fact, if there is any organic material in it, it will be found to be teeming with life, from the small bacterium that can only be seen under the highest powered microscope to the common angle worm that supplies the fisherman's bait. This life of the soil is all doing its part in changing the organic matter into such shape that the plants may use it for food. This bacterial and other life of the soil all require just the right amount of air, water, minerals and organic matter in order that they may carry on their important work. Some of the most important of these are the nitrifying organisms. These change the decaying vegetable matter into such form that it can be dissolved in water and thus be taken up by the plants. Some of the essential elements for plant growth are calcium, iron, phosphorus, potash, magnesium, sulphur, silica and nitrogen. Most soils contain enough iron, magnesia, silica and sulphur, as the plants use very little of these, but nitrogen, phosphorus, potash and calcium have to be constantly supplied in order to replace that which has been taken out by the plants grown upon it. Heavy clay soils contain more potash than the sandy soils.

Sources of Supply

There are three main sources from which fertilizers can be obtained: animal manures, green manures, and commercial fertilizers.

Animal Manures

Animal manures of all kinds are what are called complete fertilizers; this means that they supply all the essential elements of plant growth; properly saved and composted so that the strawy material that is used in bedding the animals is well decayed, they are as good as anything which can be supplied. Since the advent of automobiles, however, stable manure is getting scarce and difficult to obtain.

Green Manures

Green manures are so named because they are plants of various kinds that are grown upon the soil, preferably when no other crop could occupy it, and are spaded or plowed under in a green condition.

Any kind of plant will make green manure, but the preference is always given to those of the legume family. The blossoms of plants of this family are, almost all of them, pea-like in character. All of the Peas, Beans, and Clovers are legumes. Remarkable characteristics of these plants are the knots or tubercles on the roots. Bacteria live in these tubercles and store up in them the nitrogen existing in the form of gas in the air. None of the other plants but those of the legume family take nitrogen from the air and store it in the soil. If any other green plants, such as Rye, Rape, Kale or Turnips are used for green manure they simply return back to the soil what they have taken from it. Even then they are of great benefit as they help, like manure does, to bind the particles of sandy soils together and make clay soils friable. They also furnish organic matter which, in turn, makes humus that is of great value in holding the moisture in the soil.

Commercial Fertilizers

Commercial fertilizers are so called because they are bought and sold and gathered together from all parts of the earth. The dung of sea birds that had collected on some of the rocky coasts and islands of South America was one of the earliest forms of commercial fertilizers. It is called guano. Another was the bones of animals that were collected in the desert places of the world and brought home and ground into fine dust. Three of the important sources of the present day, are the phosphate rocks of Tennessee, Florida, and South Carolina; the nitrate beds of Chili, and the potash mines of Germany. The slaughter houses and the garbage collected in the large cities also add their quota to the commercial fertilizer groups. Other materials, such as the meal from Cotton seed, after the oil has been pressed out; the bones and other portions of fish after the oil has been removed; the sulphate of ammonia that is a by-product in the manufacture of coke, all help to increase the fertilizer supply. There is also being manufactured at the present time calcium nitrate, which is nitrogen that is taken from the air (by means of electricity) and combined with lime.

These materials are all used and are apportioned and mixed so as to supply varying proportions of the main food requirements of plants.

Commercial fertilizers are sold under the inspection of the state chemists. They are sold according to the amounts of nitrogen (ammonia), phosphoric acid and potash which they contain. The dealers have found that it pays to make up special brands for special crops containing such varying amounts of the three important elements as may seem to be of special benefit to the crop to be grown. They are, therefore, put up in bags and labeled with special reference to the crop they are suited to.

The manuring of any crop must always be with reference to the fertility of the piece of land being used. If the soil is almost devoid of organic matter nothing much but trees and shrubs will grow upon it and these make but poor growth. If plenty of water can at all times be supplied, commercial fertilizers will give good results where the humus content of the soil is low, but under ordinary conditions the commercial fertilizers do best where there is an abundance of organic matter. It is always advisable, when possible, to use all three of the different kinds of fertilizers.

The most expensive element in fertilizers is the nitrogen. For this reason do not buy cheap or low priced fertilizers. Crops like early Potatoes, Cabbage, Lettuce, Beets, Tomatoes, Sugar Corn, Spinach, Egg Plant, Peppers, Melons, Cucumbers and Squash should be fertilized with a fertilizer that contains at least five per cent. of nitrogen, seven or eight per cent. of phosphoric acid and five or six per cent. of potash. For Beans and root crops and all fruit trees or bushes, fertilizers containing two per cent. of nitrogen, eight per cent. of phosphoric acid and four or five per cent. potash will be found good.

Any of these commercial fertilizers can be supplied at the rate of two ounces to the square yard of land before planting the crop. The material should be well mixed in with the soil. If the land is quite poor, and has had no other manure, the same amount can be scattered over the soil around the plants when they are half grown, and hoed or cultivated in.

Bonemeal

Raw animal bonemeal is a good fertilizer. It contains both nitrogen and phosphoric acid and can be used at the rate of a quarter-pound to the square yard. This is a good fertilizer to keep on hand as it does not lose its value by being stored. It is quite dry and if kept in a dry place, it will not get into hard lumps like some of the other fertilizer ingredients. It is somewhat slower in its action than a fertilizer made up to analyze the same from acid phosphate and nitrate of soda.

Nitrate of Soda

Nitrate of soda is valuable to use alone, or it can be mixed with its equal weight of acid phosphate and used on any crops where tenderness of leaf is desirable. It should be used as a top dressing at the rate of one ounce to the square yard in the early Spring, and again when the plants are half grown.

Most of these fertilizers, either the made up brands, or the separate ingredients can be purchased at the seed stores in large cities and at general stores in the country towns.

Poultry Manure

Poultry manure can be used effectively in the garden. It is a complete fertilizer, but for crops like Potatoes, Turnips, Beets, Onions, and Beans, it is well to use some acid phosphate with it. Poultry manure should be kept dry so that it can be scattered over the soil at the rate of one pound to the square yard. Acid phosphate can be mixed with it at the rate of twelve pounds to the hundred of poultry manure, or applied directly to the soil along with the poultry manure at the rate of two ounces to the square yard.

Lime

Calcium or lime is quite valuable in gardens where green manures are used considerably. It will also be of much benefit on vacant building lots or fields intended to be used for gardens. Lime can now be obtained from the same dealers as the fertilizers, either in the form of ground limestone or hydrated (slaked) lime. Both of these forms are convenient to apply. The hydrated lime is quicklime that has been slaked by the action of steam. It is quick in its effect and should be used at the rate of half a pound to the square yard of freshly plowed or dug soil. The ground limestone should be used in the same way but at the rate of one pound to the square yard. Lime is used to "sweeten" soil. For instance, some soils become too rich owing to over-heavy manuring. In such case, the manuring should stop for a season but a coating of lime should be given instead. This of itself, is not a fertilizer; it unlocks other plant food that is in the soil, making it available for the roots. Lime ought not to be applied along with manure (dung), but be forked in early in the Spring. It has the property of making clay more open or friable, and conversely, of firming a sandy soil. It neutralizes the acids that are in soils. It is good for all vegetable soils.

Miscellaneous

There are some other manures on the market that are handled more especially by seedsmen and others who supply greenhouse men. These are the dried cattle, hog and sheep manures that are collected in cattle pens and cars. They are quite valuable in promoting plant growth and may be used at the rate of half a pound to the square yard. The rates of application given here are moderate and safe. Commercial fertilizers should always be carefully weighed and not guessed at, not only for the sake of economy but for the fact that some of the highly concentrated kinds may do more harm than good if applied injudiciously. When applying as a top dressing avoid spilling the fertilizers on the leaves of the plants.

Humus as a Fertilizer

Humus is the name given by gardeners to decomposing vegetable matter. In many ways it is like dung. This matter may comprise lawn mowings, leaves from deciduous trees, and all the odds and ends of vegetative growth that one cleans up or gets from the garden. Too often this material is bundled out of sight or pitched away as useless. It is a gold mine. Have a place for it and accumulate all you can. Turn it over once or twice to facilitate rotting. Every Spring, spread it on the soil and dig it in or keep it in reserve for particular purposes. If the humus heap has had lime applied, it will be still better. Whatever has not been thoroughly decomposed can be held back. Humus darkens soil and dark soil absorbs the warmth of the sun. Humus holds moisture, therefore is liked by the roots. It opens up a stiff soil and aerates it. Moreover it furnishes an essential medium for the bacteria that teem in all fertile soils and which manufacture food for the use of the plants. It is invaluable, and many derelict soils could be made to yield crops if humus and dung were applied. It is especially valuable on sandy soils.

WHERE AND HOW TO USE FERTILIZERS

The animal manures from the stable, those from the horse, cow and pig, can be spread on the land and plowed under for the coarser feeding crops, such as Cabbage, Corn, Melons, Squash, etc. Ten or twelve pounds to each square yard would be a fair dressing of these manures. Stable manure should never be put directly on land upon which Parsnips, Carrots or Salsify are to be planted. It will invariably induce

them to form prongy, inferior roots. These crops should go on land that was manured the season previously or else be fertilized with commercial fertilizer. The green manures can be sown on pieces of land which would otherwise lay bare in Winter. Rye is the latest crop of these that is worth while to plant; this can be sown after the final crops come off, just before freezing weather. The clovers and Vetch must be sown earlier. Frequently, this is done at the last cultivation that is given to the later Summer crops; such as Tomatoes and Sugar Corn. Any plants that are planted for green manures should be plowed or spaded into the soil early in the season while they are soft and succulent for much of the value of the green manures is in the decayed vegetable matter it supplies to the soil. The process of decay is very much more rapid if the material is turned under when the plant is quite tender. This is especially true of Rye. If the Rye gets tall and woody it will not decay rapidly enough to be of any benefit to the crop following it.

Commercial fertilizers should always be applied just a little before planting or shortly after the crop gets started. The elements they contain are very soluble in water and the nitrogen is quite easily leached out through the drainage. On account of this solubility care should always be observed in applying them. Only a very slight amount should come in contact with the germinating seeds so it is always best to thoroughly mix them with the soil. The fertilizing of the garden with commercial fertilizers is not so complex a proposition as it often appears to the novice. The confusion in the matter has come about largely through there being such a multitude of brands with such varying percentages of nitrogen, phosphoric acid and potash. There are a few essentials that must be known about commercial fertilizers; after these are understood the rest is easy.

Manufacturers of fertilizers use as a basis for most of their goods the phosphate rock which has been dissolved by being mixed with sulphuric acid. To this is added tankage, nitrate of soda, muriate or sulphate of potash, dried garbage, or any other material that has high fertilizing value. It is then all ground and mixed by machinery, after which it is analyzed by the chemist.

All fertilizer manufacturers have certain brands that are put out for some special purpose; such as, "special corn grower," or "potato fertilizer," or "special truck crop grower." The name is not important but the percentage of nitrogen, phosphoric acid and potash is very much so.

HOME MIXING OF FERTILIZERS

If it is of any advantage to mix fertilizers at home all that is needed is to purchase acid phosphate, nitrate of soda and tankage and, when it can be obtained, muriate of potash. These can be mixed so as to supply any per cent. of the plant food essentials. For instance, one hundred pounds of acid phosphate contains fourteen pounds of phosphoric acid, fifty pounds of nitrate of soda contains eight pounds of nitrogen, twenty-five pounds of muriate of potash contains twelve pounds of potash, and twenty-five pounds of eight per cent. tankage contains two pounds of nitrogen. This, all mixed together, would make a splendid fertilizer for garden crops and would contain about five per cent. of nitrogen, seven per cent. of phosphoric acid, and six per cent. of potash.

SCARCITY OF STABLE MANURE

Owing to the almost universal use of automobiles and motor trucks, the rapidly increasing demand for farm tractors, and the consequent enormous decrease in the number of horses employed on farms and elsewhere, the supply of stable manure has diminished to such an extent that it is all but unobtainable for gardening, or even farming purposes. Well-rotted manure, so generally advocated in "Cultural Directions" as a means of increasing soil productiveness, has therefore been largely supplanted by commercial fertilizers, upon which raisers of crops will, mainly, have to rely to meet their needs in the future. As an all-round soil-improving material stable manure is particularly effective, but it is now well established that land may be enriched without its use, providing the humus element in the soil is maintained and commercial fertilizers are carefully selected and judiciously applied. See "Humus as a Fertilizer," on page 253.

MESSAGES OF FLOWERS, OR THEIR FLORAL CODE AND DICTIONARY, by George H. O'Neill. *Lovers of flowers and their lore will find a treasure house in this interesting and comprehensive manual which gives the language of flowers and a variety of other information. Paper, postpaid 35c.; cloth, postpaid \$1.00. Secure your copy where you bought your Garden Guide.*

Always consult Index of Contents. Familiarize yourself with it. There are hundreds of good things in this book that will escape your attention if you do not use the Index freely.

SOME COMMERCIAL FERTILIZERS IN COMMON USE

The appended list will serve as a helpful guide to gardeners when the season calls for the application of fertilizers to the soil. Directions are usually labeled on fertilizer packages. As a general rule the use of commercial fertilizers is advocated only when a plentiful supply of good stable manure is not available. In some cases, however, the addition of a commercial or chemical fertilizer will prove advantageous.

ASHES, HARD- WOOD,	Unleached hardwood ashes contain potash and lime and are valuable both as a fertilizer and as a means of destroying some insects and controlling diseases. They are an excellent top dressing for lawns.
BLOOD, DRIED	Rapidly soluble, therefore quickly beneficial; valuable for all vegetable crops. Essentially a nitrogenous fertilizer.
BLOOD AND BONE	A high-grade, well-balanced fertilizer, of considerable value for all garden purposes.
BONEMEAL	Decomposes rather slowly and is therefore of lasting benefit. A safe and effective source of potash and phosphoric acid.
BONE, CRACKED	For Grapevines, fruit trees and shrubs of all kinds. Apply when planting out and mix well with the soil to a depth of a foot or more.
CATTLE MANURE, SHREDDED	For general fertilizing; good to mix with compost.
COMPLETE FER- TILIZERS	Various brands are procurable from most dealers. They combine the essential plant food elements in convenient form, which justifies their increased price over the materials if bought separately.
HORSE MANURE, DRIED	A general all-round soil enricher; promotes rapid, steady growth.
HUMUS	Humus, rotted vegetable matter, valuable for its beneficial effect on the physical condition of soils, especially sandy ones. (See "Humus as a Fertilizer" on another page.) Various brands are offered. They are handy for making rich, light potting soil, compost, etc.
LAND PLASTER	Of value as an absorbent of liquid manures in stable; also as an insecticide for Cucumber, Melon and Squash pests. Has no plant food value.

LIME	Neutralizes the acidity of soils and increases availability of plant food. Apply as far in advance of planting as possible. A few crops are injured by its presence.
NITRATE OF SODA	An active, quickly soluble, nitrogenous fertilizer, stimulating the leaf growth. Can be used alone as top dressing or in solution, or mixed with other fertilizers. Use at rate of one ounce per square yard; work well into soil and keep off foliage.
PHOSPHATE	Name sometimes given to any commercial fertilizer, but strictly some form of ground phosphatic rock; and phosphate is the most soluble form. Promotes seed development and fruit development.
POTASH, MURIATE AND SULPHATE	Two closely similar sources of the essential element, potassium, needed for the best development of all crops.
SALT, AGRICULTURAL	Used as a top dressing for Asparagus beds in the Spring. Also a good weed killer.
SHEEP MANURE,	A popular natural manure, dried and pulverized for easy handling. Gives good results in the vegetable garden and as lawn dressing. Makes a rich liquid manure.
SOOT, SCOTCH	Stimulates growth, improves color of foliage and flowers and is an effective remedy for slugs, grubs and cutworms.
SULPHATE OF AMMONIA	A soluble, quick-acting, nitrogen carrier, not greatly different from nitrate of soda and used like it.

FERTILIZING TABLE

Dealers in cataloguing fertilizers generally advise the application of a given quantity per acre. As this often puzzles persons who have only a small garden to cultivate, the following table will prove useful :

Quantity per acre	Equivalent per 10 sq. ft.	Quantity per acre	Equivalent per 10 sq. ft.	Quantity per acre	Equivalent per 10 sq. ft.
100 lbs.....	$\frac{1}{3}$ oz.	800 lbs.....	3 oz.	1,500 lbs.....	$5\frac{1}{2}$ oz.
200 lbs.....	$\frac{3}{4}$ oz.	900 lbs.....	$3\frac{1}{3}$ oz.	1,600 lbs.....	$5\frac{9}{10}$ oz.
300 lbs.....	$1\frac{1}{4}$ oz.	1,000 lbs.....	$3\frac{2}{3}$ oz.	1,700 lbs.....	$6\frac{1}{4}$ oz.
400 lbs.....	$1\frac{1}{2}$ oz.	1,100 lbs.....	4 oz.	1,800 lbs.....	$6\frac{3}{5}$ oz.
500 lbs.....	$1\frac{4}{5}$ oz.	1,200 lbs.....	$4\frac{2}{5}$ oz.	1,900 lbs.....	7 oz.
600 lbs.....	$2\frac{1}{5}$ oz.	1,300 lbs.....	$4\frac{3}{4}$ oz.	Ton.....	$7\frac{1}{3}$ oz.
700 lbs.....	$2\frac{1}{2}$ oz.	1,400 lbs.....	$5\frac{1}{7}$ oz.		

SUITABLE FERTILIZERS FOR VEGETABLES AND FRUITS

The table shows some of the important vegetables and fruits arranged in groups with the suitable fertilizers for any vegetable in the group. *Any one or all three of the different fertilizers can be used. If all three are used take one-third of each or, if two are used, one-half of each.*

Name of Vegetable	Suitable Fertilizers	Rate per Square Yard	When Applied
Corn Cabbage Cauliflower Egg Plant Tomato Lettuce Peas Squash Celery Melons	Stable manure.....	10 or 12 pounds	Before plowing or digging
	or		
	Poultry manure.....	1 pound	After plowing
	or		
	Commercial fertilizer containing: nitrogen 5%, phosphoric acid 8% and potash 4%	2 ounces	Just before planting
Potatoes Turnips	Stable manure.....	10 or 12 pounds	Before plowing for previous crops
	or		
	Poultry manure.....	1 pound	
	or		
Radish Beans Parsnips Onions Carrots Salsify Beets	Commercial fertilizer, nitrogen 2%, phos- phoric acid 8%, pot- ash 4%	2 ounces	Just before planting
Grapes Currants Gooseberries Rhubarb Strawberries Asparagus	Stable manure.....	10 or 12 pounds	Between the rows in Winter
	or		
	Poultry manure.....	1 pound	
	or		
	Commercial fertili- zer: nitrogen 4%, phosphoric acid 8%, potash 4%.	2 ounces	Just before cul- tivation com- mences in the Spring

Green Manure—Last cultivation

*For a complete work on the subject of this
chapter we would recommend*

MANURES AND FERTILIZERS, by H. J. Wheeler. A clear and unusually full discussion of the practical utilization of manures and fertilizers of all kinds, and of their relations to the plant and to the soil. Cloth, illustrated. Price, \$1.90 postpaid. Secure your copies where you bought your Garden Guide.

Pruning

Its Advantage—Pruning Briers and Roses for Landscape Effect—Climbing and Polyantha Roses—Hybrid Perpetuals—Hybrid Teas—Shrubs—Hedges—Fruit Trees—Evergreens—List of Subjects with Pruning Instructions

PRUNING, when practiced properly, is an aid to trees and shrubs. It not only stimulates growth, but increases fruitfulness at certain seasons; it keeps the plant full of healthy, disease-resistant growth, and gives us the privilege of changing the habit. We do admire symmetrical, dense trees, graceful shrubs or stocky hedges, all of which are maintained by pruning. Many times we even admire the picturesque results that can be obtained by making a tree grow out of its natural development. Pruning does stimulate growth because it tends to send the energy to the part of the plant in which it is most wanted. It is well known that a pruned plant inclines to resume its natural habit and that there is always a tendency to grow from upper buds. Checking growth usually causes an increase in flower production.

What Pruning Includes

Besides the general removal of large branches, pruning includes the process of pinching, or removing undeveloped eyes to check growth in a certain direction; trimming, shortening top and roots at transplanting; topping, removing the leader or a flower stalk to retain the energy in the plant rather than in making a strong leader or seeds; suckering, the removing of shoots at base of plant to throw the strength into the plant itself. This would include the cutting of shoots from the stock in grafted plants; disbudding, removing of small buds at sides of main ones to throw the food into the perfect production of the larger flower; ringing, the cutting out of a narrow ring of bark from a branch of a tree (in the case of fruit the result is the production of a large specimen due to the fact that the food is all kept at the place beyond the ring); root-pruning, the cutting of roots at planting time so that they may be symmetrical and have clean, undecayed surfaces, but the top must always be shortened proportionately when this is done; sprouting, the cutting out of all sterile, unfruitful branches, which are usually called water sprouts.

Roses

If we observe Rose bushes we will be able to see that they bloom from what were the strong shoots the previous season, and that these shoots become weaker when another shoot begins to grow lower down. There is an annual renewal of wood, therefore, and this is why pruning is necessary. Most Roses must be pruned severely at planting. Some climbers are ruined from the start by too little pruning. In order to keep the bushes opened nicely, the cut must always be made to an outside bud. Take care not to leave stubs above a bud either; the tips always die back and may die back farther than preferred.

Briers and Roses for Landscape Effect

Those Roses which are to be seen in mass and with which a profusion of bloom is to be preferred to a few slightly larger blooms should be pruned but little. The main work is to improve the shape of the bush and cut out the very oldest wood. Wood which has flowered year after year should be cut out from the base of the plant so that the younger shoots may be given a chance. Prune in March.

Climbing and Polyantha Roses

Little pruning is necessary in Spring except to cut out any branches which have been killed. The old wood can usually be gradually removed year after year. All new canes should be carefully tied up. Prune in March.

Hybrid Perpetuals

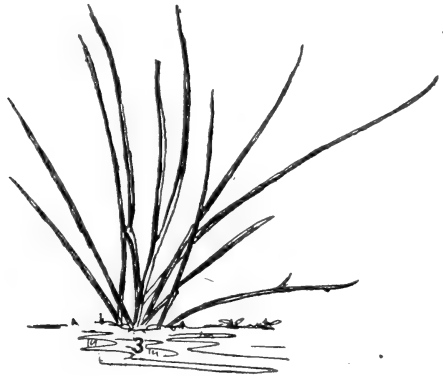
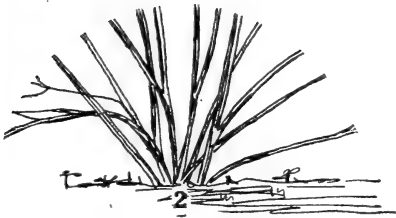
Various soils and climates cause the Hybrid Perpetuals to be either very tall bushes or, in other localities only to attain a height of three feet. The varieties differ greatly in height and amount of pruning needed. The weakest shoots should be pruned the most severely; in the same way the strongest varieties need the least pruning. Never leave a weak shoot. Care must be exercised that all shoots are not



Pruning a Dwarf Rose

The dotted lines show the growth or stems that are to be cut away. As a rule amateur gardeners are too much afraid to prune hard. "The weaker the growth the harder the pruning," is a fairly safe rule to follow

pruned to the same height. Prune early in Spring for main pruning, because the shoots are apt to freeze back if done in Fall or Winter, The canes of the strongest varieties, which may be eight or nine feet



Pruning Shrubs

1, An unpruned example. 2, Pruned so that all the branches are of equal length. This is improper but all too commonly practiced. 3, Growths thinned out and shortened. This is the correct method. It is the same shrub in each case

long, should be shortened a third in Autumn to prevent the injurious whipping by the Autumn winds.

Hybrid Teas

The Hybrid Teas should hardly be pruned as severely as the Hybrid Perpetuals, otherwise the treatment is the same.

The Teas

The Teas often freeze back to the soil; if so, remove all wood which is the least bit browned. Take care to prune very severely; the plants will appreciate it and reciprocate by producing good blooms. All shoots which live through the Winter should be shortened one third. Never make the mistake of thinking that there is so little bush left that it will be best not to prune at all. Nothing could be more faulty. Teas must be carefully watched for suckers from the stock, which should be removed from their point of origin. The leaflets of the grafted stock are often paler green and not so glossy, and have five to seven leaflets, instead of three to five, as with many varieties. Never prune before eyes start because some may be frozen back if done too early.

Shrubs

There are essentially two classes of shrubs—the Spring and the Summer blooming ones. Those which bloom in the Spring have their flower buds all formed on the bushes by the previous Autumn; they are usually near the top of the plant. Any pruning in late Winter or early Spring causes a removal of these flowers.

The most pernicious habit is the one which so many enthusiastic gardeners have of pruning everything in the Spring, and not only that, but making the graceful Barberries, Spiræas and Mock Oranges into formal, stiff shapes, due entirely to cutting their bushes with shoots all the same length.

Many Spiræas and Golden Bells never bloom well, while the Hydrangea blooms perfectly, merely because every one prunes in the early Spring, which is not at all the proper time for, say Golden Bells, but exactly proper for Hydrangeas. Spring blooming shrubs must be headed in a trifle after flowering, which will cause the production of flowering wood for another year.

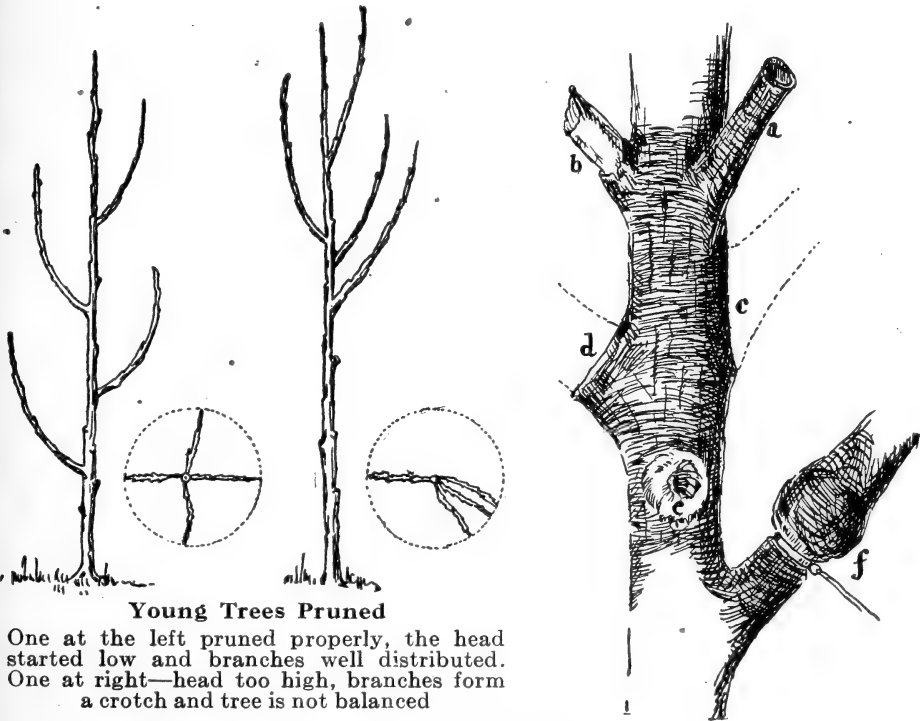
Hedges

A hedge, in order to give the best light conditions to the lower branches, should be broad at the bottom and narrower at the top. It is best not to be flat on top for snow quickly lodges in this sort of hedge and spreads it so that the true beauty is spoiled. Hedges should be trimmed before growth starts in the Spring and again lightly in late Summer or Fall. The young growth is best kept its proper length

before it grows very long, otherwise the cut ends of the branches are large and over conspicuous.

Fruit Trees

In pruning fruit trees for home grounds there should be an effort to keep them always low headed and open. This means that from the start the branches should be encouraged to grow out from the main trunk. Avoid allowing the branches to start so that a crotch is formed and have them distributed around the tree so that when they bear fruit there will be a natural balance. As the years pass, less pruning is necessary on fruit trees, except to keep the center open so that some light can get in to color the fruit. Dead or crowded branches must be removed. Any appearance of disease is better cut out than any treatment that can be given it. A tree once in good bearing condition seldom needs extensive pruning.



Young Trees Pruned

One at the left pruned properly, the head started low and branches well distributed. One at right—head too high, branches form a crotch and tree is not balanced

Pruning a Limb

a, Branch cut off too long. b, The branch (a) after several years, has died back but cannot heal. c, A branch cut properly. d, A branch which is cut so that a little pocket is left in which water can settle and cause decay. e, A wound healing properly. f, A branch being strangled by a wire-tie

Evergreens

Evergreens need little pruning except to correct any lack of uniformity of growth. Many times in Pines, among the young growths some appear to be away ahead of others; if care is exercised they may be slightly pinched to check growth in that direction. Even if the leader of Spruces or Firs is lost, they seem capable of making a new one. If, however, these and other conifers whose leaders having lost their terminal buds fail to develop naturally, a new leader can often be made to replace one lost by taking a top branch, bending it to a vertical position and maintaining it in that position by tying it, not too tightly, to the stub of the old leader. In due course this branch will assume an upright form and the tie can then be cut. Much can be done by staking and training of evergreens, assisted by pruning. The latter operation may lead to gumming if done carelessly or at an improper time.

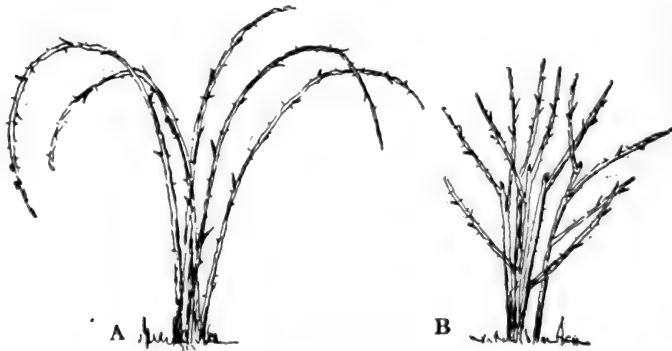
Directions for Pruners

Below is given a list of some seventy-five of those plants in general use, with directions how and when to prune. By following the directions given the amateur gardener will be able to show good and satisfactory results.

<i>Name</i>	<i>How to Prune</i>	<i>When</i>
AKEBIA AMORPHA FRUTESCENS APPLE	Give only a little pruning.	July Jan.-Mar. Feb.-Mar.
AZALEA GHENT and MOLLIS BERBERIS THUNBERGII VULGARIS BLACKBERRIES	Requires pruning each year. For home garden Apple tree heads should be low so that the fruit may be readily picked. Keep the tree open in center by removing all branches which interfere, those which cross or shade each other. Remove old wood. Remove only oldest shoots to retain form.	July July
CELASTRUS CERASUS, Ornamental CERCIS CANADENSIS JAPONICA CHERRY, Sour	Remove old canes after fruiting; tip back in Spring to 6 ft. or 8 ft.	July July
CHERRY, Sweet	Need little pruning except to remove branches which are crossed or broken. Keep head low because they have tendency to grow tall, and also to prevent the damage often caused by sun and wind. Requires very little pruning. Rather vigorous pruning.	July Feb.-Mar. Feb.-Mar.
CHIONANTHUS VIRGINICA CLEMATIS COLUTEA ARBORESCENS CRATÆGUS OXYACANTHA CURRANTS	Canes bear two or three times, cut out few oldest canes each year, otherwise fruit becomes small. Unless over long do not cut back shoots.	July Jan.-Mar. Jan.-Mar. July Feb.-Mar. Late Summer
DEUTZIAS DOGWOOD DWARF HORSE CHESTNUT ELÆAGNUS LONGIPES	Needs to be looked over each year for removal of old wood and straggling branches.	July July Jan.-Mar. July

Name	How to Prune	When
<p>EXOCHORDA GRANDIFLORA (See Pearl Bush)</p>	<p>Cut back just after flowering.</p>	
<p>FLOWERING CURRANT (<i>Ribes aureum</i>)</p>	<p>Encourage vigorous young growth. Trim out older wood.</p>	<p>July</p>
<p>FLOWERING PLUM</p>		<p>July</p>
<p>FORSYTHIAS</p>	<p>Thin out branches and trim back others immediately after flowering.</p>	
<p>FRINGE TREE</p>		
<p>(See <i>Chionanthus</i>)</p>		
<p>GOLDEN BELL</p>		
<p>(See <i>Forsythia</i>)</p>		
<p>GOLDEN CHAIN</p>		
<p>(See <i>Laburnum</i>)</p>		
<p>GOOSEBERRIES</p>	<p>Remove oldest shoots annually. In July or Aug. cut back each a bit; it causes more fruit buds to form.</p>	<p>Late Summer</p>
<p>GRAPES</p>	<p>Persons who have inherited tangles of Grape vines should exercise care in pruning the first year. Do not remove too much at the start, otherwise no Grapes will be produced. When possible, all unmaturing canes should be pruned back to a single eye if the vines are very large, but two eyes may be left if the vines are quite small. When the Grapes have nicely set we seem to think that they are benefited by cutting off the tips of each bearing cane two leaves away from each bunch. The canes usually branch in this case, and they may be cut back a little even then. Should one acquire or have to buy new vines, it is well to have a definite simple system of training. Grapes at planting and the year after should have the vines cut back two to three eyes. Then head back to 20 to 24 in. long. Several systems of training are good.</p>	<p>Jan.-Mar</p>
<p>(See illustration pages 234, 235)</p>	<p><i>Munson System.</i> Will be found illustrated and described in full in fruit chapter. Claimed to be the easiest for the amateur.</p>	
	<p><i>Kniffin System.</i> Good if wind is not too strong; simple. Single trunk is carried to the upper of two wires and two canes are taken out at an eye for each wire. Each year all the canes are removed except a shoot from each; spurs are chosen from the trunk. A vine may carry 40 buds usually. The fruit canes are produced on shoots of previous year's growth.</p>	
	<p><i>Chautauqua System.</i> Two short, permanent branches are established at the lower wire; two or three canes are left on each arm and tied up to upper wire; these canes are renewed each year from buds at their base. When arms get too old, new ones are easily established.</p>	
<p>HIBISCUS SYRIACUS</p>		
<p>(See <i>Rose of Sharon</i>)</p>		
<p>HONEYSUCKLES</p>	<p>The climbers and the bush Honeysuckles, except <i>Spring flowering Standishii</i> and <i>fragrantissima</i> which two latter prune in July.</p>	<p>Jan.-Mar.</p>
<p>HYDRANGEA</p>	<p>Hydrangeas bloom upon wood produced the current season from older wood. They must, therefore, not be cut down wholly to the ground, otherwise they bloom poorly.</p>	<p>Jan.-Mar.</p>
<p>HYDRANGEA PANICULATA</p>	<p>These shrubs should be large because they are old; they should not be allowed to get into a monstrous size when young; their beauty is entirely spoiled by such treatment. If one does not admire the flower stalks, they are best pruned in Nov.</p>	<p>Jan.-Mar.</p>

Name	How to Prune	When
INDIAN CURRANT JAPANESE QUINCES KERRIA JAPONICA KÆLREUTERIA PANICULATA LABURNUM VULGARE	Require only that old wood shall be removed. Shorten any straggling shoots after flowering.	Jan.-Mar. July Jan.-Mar. July July
LIGUSTRUMS LILAC	Prune out old wood if specimen flowers are preferred, also prune out all the sprouts from the base.	Jan.-Mar. July.
MAGNOLIAS	Require only that old wood shall be removed. Tar over all scars.	July.
MAHONIA AQUIFOLIA MATRIMONY VINE MOUNTAIN LAUREL	Require only that old wood shall be removed.	July. Jan.-Mar
NEVIUSIA ALABAMENSIS PÆONIA MOUTAN PAVIA (See Dwarf Chestnut)	Requires only that old wood should be removed.	July July



PRUNING RASPBERRY CANES

Remove all the old canes in Winter as shown at A. Canes of black Raspberries, when growing, can be tipped to produce laterals as at B. These will fruit the following year.

PEACH	The Peach bears on shoots of previous year. The tree must, therefore, never be headed back; whole branches should be removed when pruning. Heading in does cause production of new wood but method advised is better.	Feb.-Mar.
PEAR	Low heads, keeping them open if possible. Keep all branches free from water sprouts.	Feb.-Mar.
PEARL BUSH PHILADELPHUS PLUM	Moderate pruning to remove old branches and new ones if tree becomes overloaded.	July Jan.-Mar. Feb.-Mar.
PRIVET (See Hedges) PRUNUS		July.
Double flowering Almond Dwf. dbl. flowering Almond P. tomentosa P. triloba		Feb.-Mar. Feb.-Mar.
QUINCES	Head very low. Cut back ends of branches. Fruit borne on wood of current season.	Feb.-Mar.
RASPBERRIES, Black	Bear on wood which grew previous year.	After fruiting.

Name	How to Prune	When
RASPBERRIES, Red	Remove old canes after fruiting, leaving young canes. Do not head back as with Blackberries, or black Raspberries; suckers start too freely. Early Spring clip back ends of shoots so that ends are 30-36 in. long or do not prune if trained on trellis.	July-Mar.
RED BUD RHODODENDRONS RHODOTYPOS KERRIOIDES RIBES (See Blackberries and Raspberries)	Remove oldest wood; remove seed pods.	July July July
ROSE OF SHARON SNOWBALL (Viburnum Opulus sterilis)	This is naturally a badly shaped shrub; prune to improve form.	Jan.-Mar. July
SNOWBERRY SPIRÆA VAN HOUTTEI	Remove old wood; shear off old seed capsules. Cut away half the branches that have bloomed.	Jan.-Mar. July
SPIRÆA THUNBERGII	In north the tips freeze; they need a little Spring pruning. Main pruning after flowering.	July
SPIRÆAS (Summer-blooming)	Thin them out in winter. Cut back shoots that have flowered.	Jan.-Mar.
STAPHYLEA TRIFOLIATA	Require only that old wood shall be removed.	July
TAMARIX VARNISH TREE (See Kœlreuteria)	Prune hard back.	Jan.-Mar.
VIBURNUM	Includes Hoble Bush, Arrowwood, Snowball.	July
WEIGELA (DIERVILLA)	Cut out old wood. Remove seed vessels.	July
WISTARIA WITCH HAZEL		July July July

For a complete work on the subject of this chapter we recommend

THE PRUNING MANUAL, by L. H. Bailey. This book, first published in 1898, is now thoroughly revised and reset and appears in its eighteenth edition, with many new illustrations. The experiments of the last eighteen years have made changes in some of the conceptions of pruning, and these are incorporated in the new treatment. The author remarks that pruning is much more than the cutting off of limbs and the shaping and training of plants. The practice really rests on a sound knowledge of the way in which plants grow and how they respond to treatment (and a person is not a horticulturist until he understands these questions and as well those of fertilizing, spraying and propagation. Secure this book where you bought your Garden Guide.

Price, \$2.65 postpaid.

Always consult Index to Contents. Familiarize yourself with it. There are hundreds of good things in this book that will escape your attention if you do not use Index freely.

Plant Propagation

Hardwood Cuttings—Soft-wooded Cuttings—Making Cuttings of Perennials—Leaf Cuttings—Root Cuttings—Division of Perennials—Seed Sowing: Perennials and Annuals—Vegetables—Starting Flowers Indoors—Shrub and Tree Seeds—Grafting—Budding—Layering

(Readers who desire to fully inform themselves on this most fascinating of pursuits are advised to obtain a copy of "Commercial Plant Propagation," by Prof. A. C. Hottes. Obtainable where you bought your Garden Guide).

WHY don't you propagate more of your plants and share your good ones with your neighbor? Nothing is more interesting than to get a slip from a neighbor. Plants of this sort carry with them memories of your friend which add to the charm of the plant itself. By doing so you will add to the number of garden lovers.

Hardwooded Cuttings



A hardwood cutting (Currant)

People are afraid to cut up plants. They wish they had a whole hedge of a certain shrub instead of one plant. If that is true in your case, do this: In the Fall, cut up in six-inch lengths the good, strong, whip-like branches of such plants as Privet and Hydrangeas; tie them in bundles and either bury them in a sandy knoll, or place them in a box of sandy soil in the cellar. Absolutely cover them. Water them occasionally. By Springtime the wood will have healed over a bit at the base and the cuttings should then be placed in a well prepared soil so that only two buds are above ground. Climbing Roses, Grapes, Currants, Golden Bell, Spiræas, Lilacs, Willows, Mock Orange, Dogwoods and Deutzias are quite easily propagated in this manner. Note the illustration; it shows how wood should not be left above the top bud, and how the base of cuttings should be cut clean just below a bud or buds.



A soft wood (Chrysanthemum) cutting. Such cutting may be 3 in. long—the best size

If the leaves are on the plant, cut them all off.

Soft-wooded Cuttings

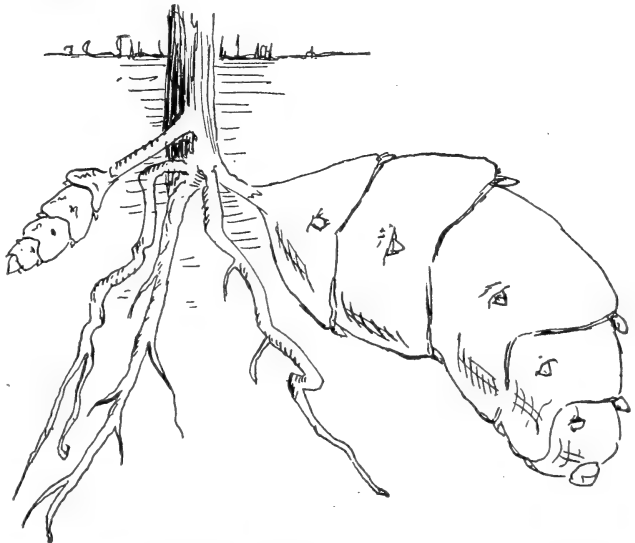
You can easily multiply your shrubs and even Roses during the Summer if you will make slips, and be sure to get them short. Three inches is long enough. The slip should have a few leaves at top; the others should be removed. This type of cutting is called a soft-wooded cutting. Cuttings have no roots, no method of taking up food from the soil so that food stored in the stem and leaves which should produce roots is lost by evaporation if too much foliage remains on the cutting; if the leaves are large they are often trimmed smaller. The cuttings,

when made, should be placed in a box of sand or directly in the soil if it is sandy. Put the cuttings in rather deeply and firm them in very solidly. If there is a large glass jar or bell-glass handy, use it to cover those plants which you usually think are a little more difficult to root, such as Roses. But all cuttings, whether



Dahlia root, showing young shoots starting and where to cut apart (c)

covered with glass or not should have a shading. A good place for the cuttings would be under the Grape vines where there is always ample shade. Water them thoroughly. Firm them in sand solidly, give them shade, and water carefully. Cuttings of any sort should not be placed right where they are to grow.



Jerusalem Artichoke-tuber. Note the eyes; unlike those of the Dahlia they are on the tuber itself

Making Cuttings of Perennials

This sort of cutting can be made of hundreds of perennials. If you wish to increase your stock, merely take little slips in the Spring when the plants are six or seven inches tall. Be sure to leave a few buds below where the cutting is taken; it will not injure the plants in the least, but will cause them to become branchy. Choose wood that is a little ripened.

Perennials which are readily propagated by cuttings are:

Arabis	Dahlia	Hollyhock	Lotus
Asclepias	Eupatorium	Iberis	Perennial Sunflower
Cerastium	Helenium	Larkspur	Phlox
Chrysanthemum	Hesperis	Lobelia	Pink
Clematis	Heuchera	Loosestrife	Potentilla

Leaf Cuttings

Leaf cuttings are rarely made in the garden, but if some friend has given the reader a slip of a Rex Begonia he may attempt to root it. Remove all but one leaf and oftentimes that leaf needs shortening. The leaves removed can be cut up in small pieces so that each piece has a portion of the heavy midrib at the base. When inserted in sand, several inches deep in a warm greenhouse, the base will root and a young plant starts.

Root Cuttings

Root cuttings are interesting to make. Plants with rather thick roots can usually be propagated by this method. A box will be necessary for such propagation; it should be about three inches deep and nearly filled with a light loam. The roots are cut into pieces an inch and a half long, and are scattered over the surface of the soil and covered about one-half inch deep with light soil. The box should then be placed in shade, watered and covered with a paper. In a short time shoots will start and the young plant can be transplanted to another location. The following plants can be propagated by this method: Polygonum, Euphorbia, Plumbago larpentæ, Saponaria, Coronilla varia, Achillea, Japanese Anemone.

There are a number of perennials propagated by root cuttings which succeed better when the roots are planted perpendicularly with a little piece of the end protruding. They are usually fleshy rooted sorts. Among the plants are: Italian Borage (*Anchusa*), Plume Poppy (*Bocconia cordata*), Dodecatheon, Stokes' Aster (*Stokesia cyanea*), Bee Balm (*Monarda*), perennial Phlox, Gaillardia, Gypsophila, *Helianthus rigidus*, *Thermopsis*, Papaver, Statice, Bleeding Heart, Peony. Lily of the Valley is increased by separating the pips or individual crowns. Among the vegetables, Horseradish is so

propagated. Scotch and Moss Roses, Calycanthus, Lilacs and Blackberries may all be propagated in this way.

Division of Perennials

Perhaps the commonest method of propagation of perennials and the one which is easiest, is the division of the clumps, the main crowns being cut into a number of pieces. The plants should be divided very early in Spring before growth starts, or late in the Fall. This is the most used method of propagating Iris, Peonies and Phlox. German Iris should be so divided every three, Phlox every four, and Peonies every six or seven years, while Michaelmas Daisy, Achillea Ptarmica and millefolium roseum, Helianthus, Cedum, some Veronicas, Chrysanthemums, Oenothera, and all perennials which sucker badly should be moved and divided every year. Artemisia, Boltonia, Campanula, Geum, Funkia, Doronicum, Armeria, Thalictrum are all propagated by division.

SEED SOWING

Perennials and Annuals from Seed

If we possess coldframes and hotbeds we can sow many of the perennials in March and get them to bloom the same year. We can sow annuals also and have them of excellent size for setting in open ground. We may also sow perennials and annuals out of doors, in which case some will bloom the first year, but with others a longer time will be required.

The following are a few of the perennials which will bloom the first year from seed: Gaillardia, Iceland Poppy, Chinese Larkspur (*Delphinium chinense*), Lychnis, Shasta Daisy, Platycodon.

On the other hand, there are many perennials which wait a year before flowering, namely: Cardinal Flower, Golden Alyssum, Campanula, Aquilegia (Columbine), Foxglove, Loosetrife, Physostegia, Hollyhock, Sweet Rocket.

The main advantage of growing perennials and annuals from seed is that it saves the cost of buying plants, which runs up pretty high when quantities of plants must be bought from nurseries. Many of the best varieties do not come true to seed, however, for seedlings often vary in color and habit. This is true especially of highly bred plants, hybrids which have resulted from the incorporation of several species. Peonies, Phlox, Iris and such perennials should be purchased, not raised from seed.

Vegetables

The hotbed or coldframe is more essential for the vegetable garden than it is for the flower, since we can get the crops so much earlier.

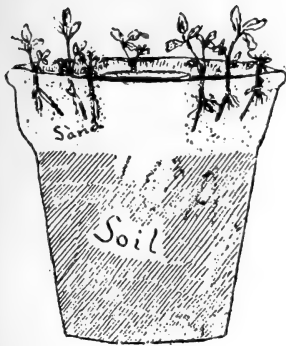
Everything is so tender and as it seems out of season tastes so good that all the pains of regulating the hotbed are worth while. Lettuce can be matured in such structures and Tomatoes, Egg Plants, Beets, Onions, Muskmelons, and even Corn can be started. The space is valuable, so that careful planning is necessary to utilize every bit in the hotbed. (Hotbeds are discussed in a separate chapter.) Many persons will not have hotbeds, but will need to depend upon the windows for their early start.

Starting Flowers Indoors

There is always a danger in advising a very early start for sowing seeds indoors for the reason that the plants are apt to become very spindling owing to the diminished light most of us can supply plants in our houses. For the early Spring sowing we shall need to save the soil in the cellar. It should not be too rich but should be loose, made so by the addition of sand, coal ashes, or leaf mold. It should be in a fine condition. Small, shallow boxes, three inches deep, are best for seed sowing. The bottom should have a number of cracks and should be covered with some coarse drainage material, as broken crockery, sod or stones. The flats should be filled even full, then drills should be made, the depth varying according to the sort of seeds that are to be sown. A depth equal to twice the diameter of the seed is all that is necessary indoors. The reader is referred to the Garden Calendar (page 339) for the proper time to sow each vegetable or flower. The seed may be sown thinly, so that each seedling will have plenty of air and space. When sown, the seed should be covered and the soil firmed by the use of a board. After watering carefully with a fine spray, the box should be covered with glass and a newspaper, and put in a suitable place for growth. Just as soon as the seeds have germinated the shading of paper should be removed so that the plants may get the full light.

Shrubs and Trees from Seed

When the fruits of many of the trees and shrubs, as Regel's Privet, Hawthorns, Rhodotypos, Roses, Barberries, Boston Ivy, Euonymus, and Viburnums, are thoroughly ripe they should be gathered and so placed that the mass of berries will ferment a little. The pulp of the fruit can then be washed from the seeds. Boxes should then be procured in which a layer of sand is placed; the seeds are sown broadcast and covered by at least an inch of sand. The flats are watered thoroughly and placed in the basement until February, when they are taken out of doors and allowed to freeze. This is necessary to break their heavy coverings. This process is known as stratification; the



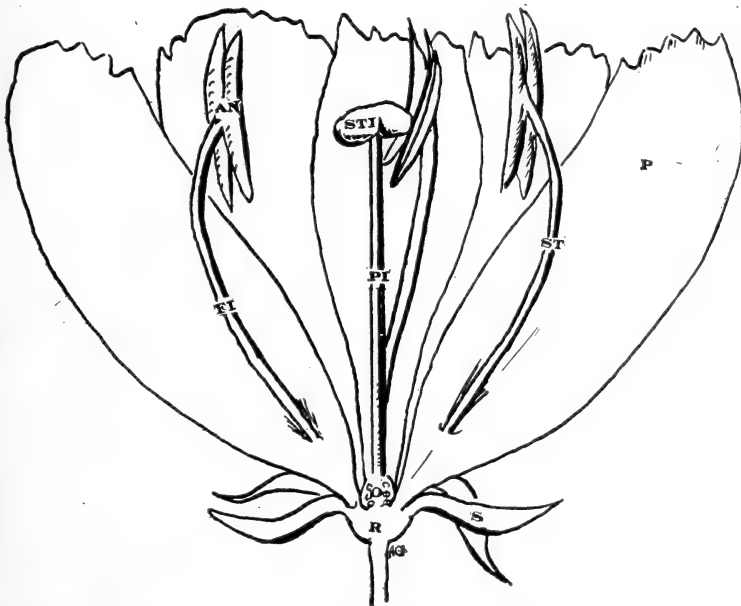
Flower pot filled with soil and sand, the sand at the top. Soft wooded cuttings root most readily if placed around the edges of the pot. Seedlings transplanted may be placed similarly

following shrubs should be so treated: Barberry, Sweet Shrub, New Jersey Tea, Snowdrop Tree, Shadbush, Privet, Honeysuckle, Styrax, Snowberry, Indian Currant, Hawthorn and the Viburnums. When the ground is in condition for planting, sift the seeds from the sand and sow in rows. Planting should not be delayed or else the seeds will have sprouted and will be injured by the handling at this time. They should then start rather readily.

Tree seeds are treated the same as those of shrubs. Seeds which, though hard, will not stand freezing are often filed or nicked with a knife. The following tree seeds need to be placed in sand and frozen: Maples, Ailanthus, Birch, Catalpa, Chestnut, Beech, Ash,

Hickory, Butternut, Black Walnut, Locust, Basswood; and besides these are the fruit trees, namely: Apple, Cherry, Peach, Pear, Plum. A number of tree and shrub seeds should be sown immediately after ripening. The principal ones are: TREES—Birch, Chest-

nut, Elm, Hackberry, Horse-Chestnut, Magnolia, Maple, Oak, Poplar, Ptelia, Sweet Gum. SHRUBS—Bayberry, Honeysuckle, Nemophantes, Rose, Spiræa.



Section of a typical Flower: p—Petal: The petals taken together are called the corolla. s—Sepal: Sepals taken together are called the calyx. st—Stamen: The male part of plant. fi—The filament or thread-like part of stamen. an—The filament or pollen producing part of stamen. pi—Pistil or female part of flower. sti—the stigma or part receiving the pollen. o—The ovary which bears the seeds. r—Receptacle, often helps to make up the fruit

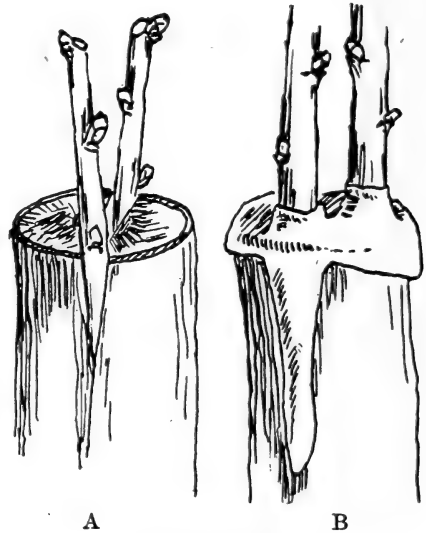
Seeds differ greatly in their germinating power. The White Oak germinates quickly, the Black Oak slowly. The

Ash seed is rather oily and benefits by being treated to a weak acid bath.

There are a number of reasons why seeds fail to germinate. They may have been immature when gathered. Pansy seed matures so that some of the seeds are ripe while others are not. Some seeds upon becoming too dry, are killed. Seeds have often been stored while moist and heating has resulted which killed the vital germ of growth; while still other have been injured by insects and fungi before or after maturing.



Cions for Cleft Grafting



A Cleft grafting B

A, The completed graft. B, Properly waxed. The methods of grafting are explained in the text on the following pages

Grafting

Trees which belong to the same variety or species may be grafted. In other words, a Baldwin Apple may be grafted upon a Baldwin or any other Apple. Sometimes plants of different species but of the same genus may be grafted; other times this is not true. Apples may not usually be grafted upon Pears; yet Quinces (of the genus *Cydonia*) have Pears (*Pyrus*) grafted upon them to impart the dwarf habit. We could never expect Cherries on Pear trees, or red Raspberries on Grape vines, for it is only those plants which are very closely related that will allow grafting.

We have seen, as in the preceding case, that Pears may be kept dwarf by working them upon the Quince stock. We may, likewise, increase the vigor of a variety by grafting it upon a stronger growing species. A familiar example of this is the grafting of certain Roses

upon the Manetti Rose. Many times plants are grafted in order to render them more adaptable to adverse soils and climates. An example here is found in the case of Apples which are often grafted upon the Siberian Crab in order to render them better able to withstand intensely cold climates. (Sometimes) double grafting has to be practised especially with fine Pears, but that is a part of the subject we need not enter upon here.

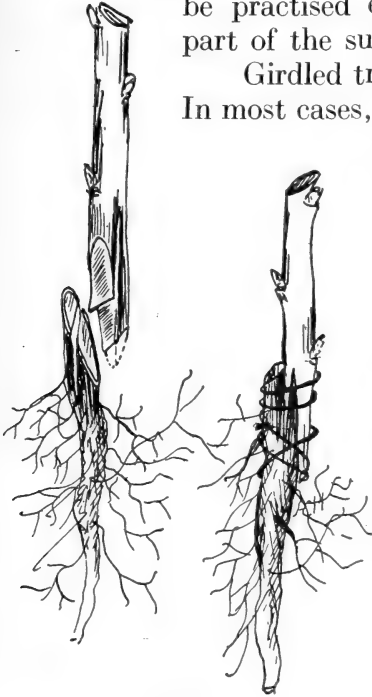
Girdled trees may be grafted with a bridge graft. In most cases, however, the process of grafting is used simply to multiply the variety. Baldwin Apples are wanted; they do not come true to seed; cuttings are slower; so that some form of grafting is used.

When only a bud, instead of part of a shoot, is transferred, the process is called "budding."

There is a fundamental necessity in all grafting work: The layer just between the wood and bark, the line where the bark peels, of both stock and cion, must be in contact. The *stock* is the plant grafted upon; the *cion* (also spelled scion) is the shoot or graft that is inserted.

Cleft or Cion Grafting. There are a number of simple sorts of cion grafting. The method most used upon trees in which the stock is over one inch in diameter is called cleft grafting. The branch of the stock which is to be grafted is cut off short. It is split through the center and the crack opened to receive a short cion. The

cions are best cut during the Fall and stored through the Winter in moist sand, but they may be taken directly from the trees very early when the sap starts in the Spring but before the buds have burst. The best length is three buds long, the top bud being the top of the cion; the lower end is beveled at each side to form a perfect wedge as shown in the cut. This wedge must have the cut surfaces perfectly straight, not hollowed out, if the union is to be a good one. In inserting the cion two cambium rings must be together; this is the part between the bark and the wood. To be sure of this, slant the cion just a trifle. Then cover over the whole cut area with grafting wax.



Whip or Tongue Grafting

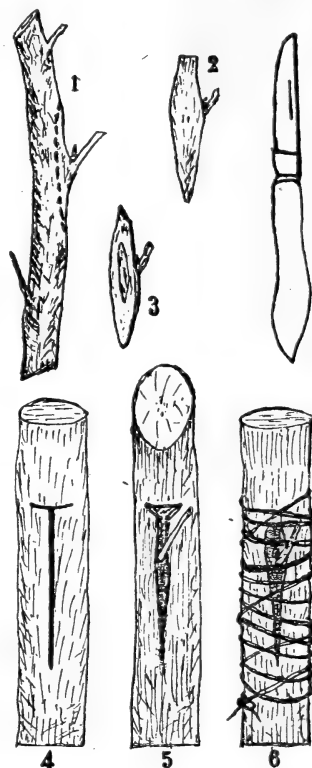
In grafting the stock and cion must be firmly bound around with broad raffia or other ligature. The above drawing is intended to show how to fix the graft, but the binding must cover the union thoroughly to exclude the air

Whip or tongue grafting is the next most common method. It is especially used upon small branches or for grafting seedlings. Apple seedlings may be nicely grafted by this method. Branches to be grafted must be nearly the same size. The stock should be beveled off with a long plane surface; the cion should be beveled the same way. Then each should be split so that the two tongues fit together nicely. Practice a bit upon some other wood and you will learn more by the experience than words can tell in description. As in all grafting, the layer between the bark and wood of each must be in contact on one side at least. This sort of grafting, like the former, should be done in Spring before growth starts. This graft may not be covered with wax, but merely tied firmly. A cord used for this purpose is usually No. 18 knitting cotton soaked in grafting wax. This is just strong enough to break when it should, before the branch is strangled.

Budding

The simplest method of budding is known as shield budding. It consists of placing a shield-shaped piece of bark bearing a bud, beneath the bark of the stock. A good, healthy, well budded branch is chosen; the buds are cut from it, holding the branch upside down. A T-shaped cut is made in the stock near the base of the plant; the free edges are carefully peeled back and the bud inserted as shown in the cut. The budded stock is then tied with yarn or raffia so that the bud is held firmly; all should be covered except the bud. Budding may be employed whenever the bark peels nicely.

Prof. U. P. Hedrick, the expert horticulturist of the Geneva Experiment Station, gives the following dates for budding: Rose, July 1 to 10; Pear, July 10 to 15; Apple, July 15 to Aug. 1; Plum (St. Julian stock), July 15 to Aug. 1; Plum (Myrobalan stock), Aug. 15 to Sept. 1; Cherry (Mazzard), July 20 to Aug. 1; Cherry (Mahaleb), Aug. 20 to Sept. 1; Quince, July 25 to Aug. 15; Peach, Aug. 20 to Sept. 10.



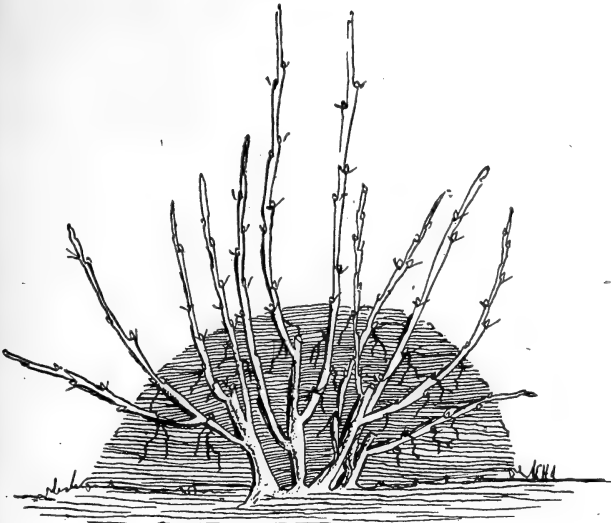
The budding of Roses

1. Rose shoot showing where bud should be cut out. (see dotted line.)
- 2 and 3. Buds as prepared for insertion, No. 2 having the wood removed behind the eye.
4. T-shaped cut in shoot.
5. Eye inserted in shoot prior to binding.
6. Shoot when bound up. Raffia is used and only the bud is left exposed.

Layering

This is the placing of some portion of a branch in contact with the soil so that it may root. It is a very convenient, perfectly simple and certain, method of increasing many plants. Grape canes, for instance, are merely bent down and a node or two covered with soil. They root readily and the new plants can soon be separated from the old one.

In another type of layering suited to Goose-

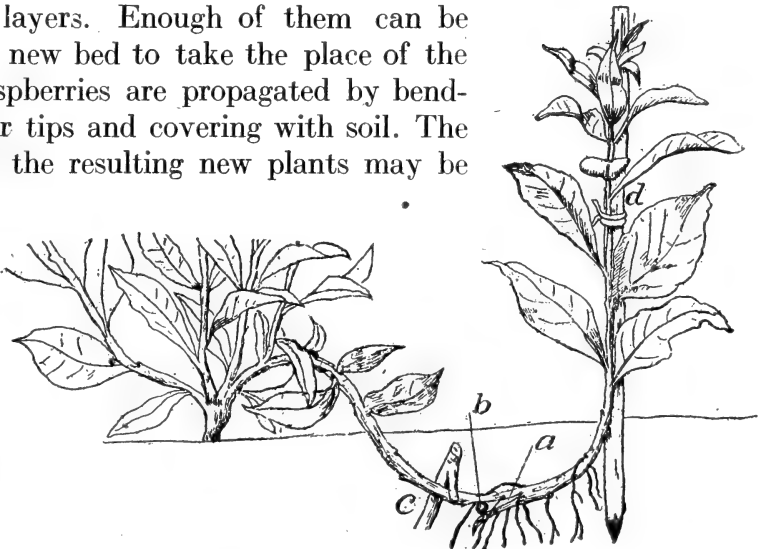


Mound layering of Gooseberries.

Note that the shoots have been cut back previous to mounding the soil about the plants; each shoot is rooting nicely

berries and many ornamentals, a bush is mounded so that each shoot roots, making from five to twenty-five young plants instead of one. After they are well rooted the plant can be divided and each part will be a separate plant. Strawberry runners are natural or voluntary layers. Enough of them can be left to start a new bed to take the place of the old one. Raspberries are propagated by bending down their tips and covering with soil. The tips root, and the resulting new plants may be transplanted.

Tomato stems root nicely when they touch the soil, and Squash stems may be encouraged to root at several places by covering their joints.



Method of layering a woody or half-woody plant, as for instance, a Rhododendron or a Carnation. a, Slit or tongue cut half way through the stem; b, Pebble to keep slit open; c, Peg for holding down the layer; d, A stake to keep the shoot firm

CHAPTER XX

Transplanting

Basic Principles—Transplanting Seedlings—Transplanting to Open Ground—What and What Not to Transplant—Transplanting Shrubs and Small Trees—Frozen Ball Method of Transplanting—Transplanting Fruit Trees—Moving Large Trees—Operations Resembling Transplanting

THE operation of transplanting is, first of all, a means of saving time in gardening. Whether it is the setting out of a Tomato plant started indoors weeks before seed could have been sown outside, or the moving of a 30-foot tree to produce an effect that would otherwise have taken as many years to achieve, the time element is the important factor. Of course there are other reasons for transplanting. One may desire to rearrange his garden plan; it may be necessary to thin out an overcrowded stand of perennials (and incidentally secure a supply of new plants); the object may be to establish specimens raised and obtained elsewhere, as in a nursery, the open fields or a woodlot. Again, as in the case of Celery, evergreens and other materials, transplanting induces a compact, fibrous root system which means both thrifty plants and, in the case of nursery grown stock, easier and safer transplanting when sold. But in every case the most notable result is the saving of weeks, months, or even years that would have been required to produce the same effect by waiting on Nature or from the sowing of seed. And oftentimes, of course, the latter program is impossible for the amateur or small gardener.

Basic Principles

There are certain basic principles common to all the different kinds or classes of transplanting. These may be listed as follows:

1. Keep the roots from drying out.
2. Injure the feeding root system as little as possible.
3. Balance unavoidable root disturbance and reduction of the absorption area by reducing the transpiring (leaf) area of the plant.
4. Prepare the soil thoroughly; firm it securely around the newly set place, and do not let it dry out while the plant is getting established in its new location.

These rules apply, with very slight modifications, to transplanting activities of all kinds. This should be kept in mind as we discuss the detailed methods of handling different classes of plants, even though each rule may not be specifically referred to in each case. On the

other hand, if they are strictly adhered to and conscientiously followed, there is almost no limit to the extent to which successful transplanting can be carried. As an instance, the writer recalls the moving of some shrubs—Lilac, Mock Orange, Spiræa, etc., on the occasion of the purchase of a suburban property in mid-Spring, just when the plants were in bloom. It seemed almost ridiculous to try to transplant them, but the attempt was made. Moreover, as a result of wetting the ground thoroughly before digging the shrubs, keeping the root systems wrapped in wet burlap, rushing the plants to their new location by automobile, having the holes ready and the new soil moist, and keeping the earth from drying out at any time thereafter, the attempt was entirely successful. The plants were established with little if any check; indeed some of them did not show so much as a wilted blossom after twelve hours in their new location. Of course, success of that sort means lots of care and effort, but it is good to know what can be accomplished when the need arises and one is willing to take trouble.

Transplanting Seedlings

The first transplanting of vegetable or flower seedlings started in a pot, pan or flat is termed "pricking out," and should be done as soon as the first pair of true leaves appear. Before this the seedlings are likely to be too delicate to handle; if left much longer in crowded rows they are likely to become spindly and weak.

Several hours before pricking out, wet the soil in the flat and that into which the plants are to go; they are more easily removed from moist soil, more of which will cling to the root hairs. Lift out small bunches of the seedlings with a small stick or trowel—a small, diamond-shaped mason's trowel is excellent—separate them gently with the fingers, holding them by the leaves, and reset them an inch or so apart each way. Make a hole for each plant with a small dibble or skewer, let the seedling stand about as deep as it was before, and press the soil well around the roots with the fingers. When all are planted, the flat or bed may be gently sprinkled until the soil is quite moist, and then slightly shaded if the sun is hot and shines full upon it.

Whenever possible it is desirable to transplant such seedlings a second time before setting them out in their permanent locations. This shift should be done when their leaves begin to overlap and should leave them about four inches apart each way. In the case of Egg Plant, which suffers if its roots are much disturbed, or any plants for which special care is desired, this second shift should be into small pots or old berry boxes. The latter and the various kinds of paper pots can later be set directly in the field or garden without removing the plants which will soon send their roots out through the cracks or through the paper

as it rots away. When pots are not used, this second transplanting usually injures the root system more or less, so it is well to pinch off about half the leaf surface of each seedling as it is set out.

Whenever Cabbage, Tomato, Pepper or other plants that are attacked by cutworms are set outdoors, it is well to wrap a paper collar around the stem of each one. This should extend about an inch above and an inch below the surface of the ground. Another type of cutworm preventer is a disc of tough paper (tarred roofing paper is good) slit to the center and slipped around the stem of the plant close to the ground. An additional precaution that is especially worth while in the case of Lettuce, is to cover each newly set out plant with an old berry box or some kind of commercial plant protector or shade. This will tend to prevent severe wilting and a resulting check; but whatever is used, be sure to provide for ventilation through or under it.

Transplanting to the Open Ground

Whether you have raised your plants from seed or have bought pot grown stock from a nurseryman or plantsman, the details of setting out both vegetables and ornamentals are the same. In the small garden it is usually possible to arrange or wait for conditions that are just about right. A damp, cloudy day is best, especially if there is good chance of a rainstorm before long. Otherwise wait till the cool of the evening so that the plants may have the night in which to get over the shock of being moved—for it is a shock—and then, if the next day is clear and hot, shade them slightly.

In planting Strawberries it is customary to trim the roots off evenly about six inches long, as well as part of the tops. This gives a thick, uniform bunch of fibrous roots that are easily handled and quickly inserted into an opening made in the soil with a thrust of spade. This is good practice with any fibrous-rooted plant that stands transplanting well, but there are many sorts with which the less root disturbance the better. In moving these, prepare the hole, invert the pot, holding the stem of the plant between the first two fingers, tap the rim of the pot against any hard object and place the root ball in the hole with the slightest possible loss of soil; then fill the hole with water and let it soak in before replacing the soil. The final step is to leave a slight depression around the plant so that surface water will run in toward the roots, rather than away from them as it would from a mounded up surface. If the soil is heavy and tends to bake, sprinkle a little loose, dry earth around the plant as a mulch to prevent excessive evaporation.

In this connection a hint in regard to packing growing plants for shipment may not be out of place. If they are to go any distance and

be out of the soil for any considerable time, do not soak the soil or try to keep it wet during the trip. On the contrary, have it only normally moist, wrap the plants (singly or in small bunches) snugly in slightly moistened newspaper, tie each package and pack all together in a paper or burlap lined basket. Later, when you have set them all out, and not till then, give the plants a good drink. This method gives them much less of a shock than the commoner one of soaking them first, then having them often dry out in transit and suffer all the more by contrast.

After setting out plants, as with all growing crops, water copiously *when they need it* and cultivate between times. *Do not* sprinkle lightly every little while, as the plants do not absorb moisture through the leaves, and a shallow wetting of the soil only attracts the roots up toward the surface where the first real drought often kills some of them.

What and What Not to Transplant

There are but few herbaceous plants that cannot be transplanted if taken young enough and handled with sufficient care. Calandrina and annual Poppies are typical exceptions. Among flowers which suffer if allowed to become too large before being moved are Mignonne, Nasturtium, Bartonia, Candytuft, Centaurea, Clarkia, annual Dianthus, California Poppy, Godetia, annual Larkspur, Lupine, Nigella, annual Rudbeckia, Viscaria and, in fact, almost all of the quick-growing annuals. Perennials and plants of the "bedding" sorts may be moved with relative ease and assurance of success.

Practically the same thing holds true with vegetables, but, except for Lettuce, there is rarely need or desire to transplant the quick-growing annuals. Beets, Carrots and even Radishes can be shifted while very small, but it rarely pays to take the trouble. All the cucurbits—Melons, Squash, Cucumbers, etc., are almost sure to be injured by transplanting unless started in berry boxes or pieces of inverted sod which can be set out without disturbing the roots, and Corn and Peas are rarely if ever shifted except upon a very small scale. Tomato, all members of the Cabbage family, Celery and Peppers transplant readily and are generally so handled both commercially and in the home garden.

Transplanting Shrubs and Small Trees

As far as general transplanting methods are concerned, these two classes of plants may be considered together. As with practically all plants other than herbaceous, they are generally moved while dormant although, as noted above, success may result from Spring

or Summer moving if sufficient care is given. For evergreens the former practice of transplanting only in August and early September is still recommended by some, but the dormant system especially that involving the frozen ball of roots, is quite in common use.

The success with which shrubs are moved depends largely upon their root systems; nursery grown stock that has been transplanted at least once has a more bushy, compact root system than wild field grown specimens and is therefore more satisfactorily transplanted. Likewise plants with a shallow, spreading root habit are easier to handle than tap-rooted or fleshy-rooted sorts, such as the Walnuts, Hickories, Magnolias, etc. Taking first the ordinary dormant system, the essential steps are about as follows:

Upon receipt of plants from the nursery leave them wrapped unless a delay of several days must elapse before they are set out; in this case unpack and heel them in, in a somewhat shaded place where the roots will keep moist.

At planting time cut off clean all injured roots and trim back any excessively long ones.

Have the hole big enough to take the root system without crowding. Straighten the roots out as naturally as possible when the plant is placed in the hole.

Let the tree or shrub set about an inch deeper than it set before except in the case of a hedge, when the plants should be set four to six inches deeper in order to develop a thick, much branched base.

Fill in first with the top soil taken from the hole; then add the bottom soil mixed with manure if possible; finish off with more top soil if any is left.

Firm the soil thoroughly, working it in among the small roots. Water the plant well before filling the hole completely.

Cut back the top to balance the root pruning and also to shape the head of the shrub or tree.

When all is finished, mulch with loose soil, coarse manure, or other litter. If severe drought ensues, water well every few days.

In the case of trees taken from the semi-shade of a nursery and set out in early Spring, a wrapping of straw around the trunks for the first season may prevent destructive sunburn and bark cracking as a result of the intense, bright sunlight.

When moved any time except in Winter, broad-leaved evergreens should have a good part of their leaves stripped off to check evaporation, and thus aid the plants in getting settled. This is not necessary if the plants are moved with a frozen ball of earth.

Special Hints Concerning Conifers

A successful specialist in evergreens makes the following valuable suggestions as to the handling of trees of this class that have been dug—as is almost invariably the case—with a ball of earth:

“Where the ball is natural and has not been made artificially, the soil about the roots should be left undisturbed. It is not even necessary to remove the burlap. If, however, the tree has been dug with the roots bare and then dipped in a clay puddle and then a ball has been made in an artificial manner by pressing the soil into ball form and bending and twisting the roots, the soil must certainly be removed at time of planting.

“All small and medium sized conifers we dig with a natural ball and these should be planted without breaking the ball. With trees above five or six feet, we dig around the roots and work in toward the trees with a spading fork. We remove the soil from the entire root system around the side of the ball until we have a reasonable size ball still remaining. The roots are all gathered up and wound around the ball, which is burlapped securely when the tree is ready for shipping. In the case of this style of treatment it is necessary to remove the burlap and set out the roots in their natural position.”

The Frozen Ball Method of Transplanting

Although this method is employed in the case of large trees as well as small ones and shrubs, it is with the latter classes that the private garden owner has to do; when a large tree is to be moved he sends for the professional tree mover—if he is wise. This operation begins the Summer or even the year before it is desired to transplant the tree. At this time a trench is dug around the specimen about the width of a spade, deep enough to cut all the main roots, and far enough from the trunk to insure a good mass of earth around it. If the tree has a tap root this should be cut with a sharp spade or sod cutter thrust in horizontally under the root ball.

The trench should then be filled with loose earth, manure or litter of any sort. When Winter comes and the ground is frozen hard so that the entire root ball can be moved, the trench is again carefully opened up and the mass of roots and soil lifted out and taken to the new location which should have been prepared before the ground froze. The next Spring when it softens up firm the soil well and add enough to fill up the hole about level full.

As a rule no shade or protection is called for by shrubs or small trees. However, evergreens are sometimes covered with damp burlap or heavy paper to check the evaporation that would otherwise occur

under a strong, bright sun. In addition to the trimming given to balance the root injury, now is a good time to cut out any dead branches and clean up the shape and condition of the specimen.

Transplanting Fruit Trees

This operation is practically the same as that described for shrubs except that as fruits are rarely moved when large, the dormant, early Spring or late Fall method is the one most commonly used. It is at these times that fruit trees are shipped from the nurseries. The pruning of newly set fruit trees is generally more severe than that of shrubs or ornamentals as it is usually desirable to determine the form and arrangement of the head at this time. This means cutting back the main stem, removing all the side branches but three or four symmetrically arranged around it so that they will not develop weak crotches, and cut these back to a length of six inches or so. Peaches, according to one system of training, are cut back to a single, branchless stem or "whip" when planted.

Another important point in planting fruit trees is their correct alignment. Of course this is more important in a large orchard than in the home fruit garden, but even here straight, evenly spaced rows make a good appearance; moreover they permit the most economical use of the space. The place where each tree should stand must therefore be accurately located either by sighting through a transit or farm level, or by careful measuring, then the tree must be set right there. One of the best ways to assure this result is to use a planting board. This is a plank about five feet long and a few inches wide with three notches cut into it along one side—one near either end and one in the middle. When the spot for each tree is located and marked with a stake, the board is placed with the center notch against the first stake and two other pins are stuck in the ground where the other notches are. The board and the central peg are then removed and the hole dug without removing the two guide stakes. When it is deep enough the board is placed back against the two pegs, the tree placed in the hole and its trunk placed in the center notch just where the locating peg originally stood. By keeping the tree in this position until the hole is filled it is assured of its exact place.

In some parts of the country transplanted fruit trees have to be protected against the depredations of field mice, rabbits, etc., that gnaw the bark off the trunks. This is best done by encircling each tree with a guard or protector of thin wood veneer, wire netting or stiff building paper, although there are various old recipes for whitewashes and evil-smelling mixtures of mud, manures, carbolic acid, etc., designed to repel attacking rodents.

Moving Large Trees

As already suggested this is really a task for professionals who have the necessary trucks, tackles, and experience. It is necessary only to explain that unless they use the frozen ball method, they usually go about the digging very gradually and systematically, beginning well away from the tree, lifting the roots carefully and picking out the soil from the fibrous masses. They then separate the long main roots, wrap each in burlap and tie them up to the trunk out of the way. When the tree is loose in the hole it is tipped onto and tied to a low-hung wagon or a drag and hauled to its new position where the roots are spread out as naturally as possible.

Of course the soil must be replaced with great care; also the tree must be well braced and guyed until it takes hold and secures itself in its new berth. There is an old belief held to by many that a transplanted tree will not live unless it is set in the same position with reference to the points of the compass as it stood before. Often this can be provided for by noting where the moss or greenish tinge, that is usually present on the north side of a tree trunk, is to be found. We are not prepared to say whether this theory has a proved scientific basis or not.

Fall Planting Opportunities

Many people have a curious notion that the Spring is the only natural planting time. The truth is that experience has shown that this is one of the best seasons for the home maker to set out trees and shrubs. For one thing, work presses less heavily in the Autumn. There are fewer things to do in the flower and vegetable gardens, with the result that more time is left to devote to the care of the trees and shrubbery, without which no suburban or country home is complete. Then, too, the nurserymen themselves are less rushed in the Fall and are able to give more careful attention to the orders which they receive. All things considered, therefore, there is no better time to transplant most ornamental trees and shrubs, as well as Raspberries, Blackberries, Currants, and many of the fruit trees.

There are some exceptions. Most of the trees which have stone fruits, such as both the edible and ornamental Peaches and Cherries, are better left until Spring in the colder section of the country, although they are planted to some extent in the Fall. There are ornamentals, too, with soft, fleshy roots, such as the Magnolias, which it is best not to plant at this season. The average nurseryman will frankly tell which trees are not suitable for Fall setting.

When shrubs and trees are set out in the Fall, they make growth quickly in the Spring and often are much farther along at the end of

the season than when planting is left until the Spring months, particularly if the Spring is a late one, so that planting has to be delayed. One other point in favor of Fall planting might be mentioned, although it applies especially to perennial plants. At this time the garden maker has a lively recollection of the appearance which the different plants have made when in bloom, and is therefore able to choose those which he would like for his own garden much more intelligently than he could four or five months later when his remembrance of the past Summer's experiences will have become dulled.

Some writers have asserted that the Fall is not a good time to set out evergreens, but on the other hand, some of the most expert nurserymen and garden makers declare that the results from Fall setting are fully as good, if not better. In a year of heavy rainfall, the planting of evergreens can be done with perfect safety. In seasons of drought, of course, no plants can be put in with assurance unless a large amount of moisture is available to be applied artificially.

One reason why so much difficulty is found in transplanting evergreens of any kind from the woods or the fields to the garden is because of the damage which is unavoidably done to the root system. Plants growing wild make very long roots which must be broken off in getting them out of the ground. Nursery planted stock, on the other hand, is usually shifted so often that the roots are short and bunched in a solid mass close to the base of the plant. This greatly facilitates transplanting without giving the trees or shrubs a setback, and is the principal reason why nursery grown stock is preferable for transplanting to that which is found growing wild.

Operations Resembling Transplanting

Not greatly different from transplanting is the division method of propagation of herbaceous perennials discussed elsewhere. In this, the clump or crown of Iris, Rhubarb, Phlox, etc., is dug up, cut into several pieces with a sharp spade or knife—being sure that each piece carries an eye—then each piece is replanted in newly enriched and well-prepared soil.

There is also "heeling in," which might be called a transplanting into temporary quarters when it is necessary to delay setting some plants for awhile. To do this dig a wide but shallow trench with one end gently sloping; against this lay a row of the plants. Sprinkle some soil over their roots, then lay another overlapping layer on them shingle fashion. Continue in this way till all have been packed in, compactly but with their roots completely covered with soil. Fruit trees, shrubs, berry bushes, etc., can be kept this way all Winter if

they arrive too late in the Fall to be set out; or for several weeks in the Spring if delivered before satisfactory conditions for planting appear. Of course the soil in and on top of the trench must be kept moist in very dry weather.

Finally, we may consider sodding, which is practically the transplanting of grass. The main object in doing this well is, of course, to get a strip of strong sod of uniform width and thickness. Success will depend largely upon having a good turf underlain with a good clean soil free from stone, to cut from. Strips a foot wide and any desired length are first cut with a grass edger or path trimmer. One man then cuts the strip loose by sliding a spade or regular sodding tool under it, while a second man rolls the strip tightly toward him. As a rule pieces two and a half to three feet long are most convenient to handle. As in all transplanting, the soil should be slightly moist for best results. The ground to be sodded should be carefully prepared and the soil fined and made perfectly smooth and slightly higher than would seem necessary. Next lay the strips of sod, butting them tightly together and adding or removing soil beneath wherever this is necessary to produce a smooth surface. Fill any cracks or breaks with fine soil and when a considerable area is sodded go over it and pound it down firmly with the back of a flat-bladed spade. A heavy tamper may also be used or a lawn roller, provided the latter is not permitted to move or loosen the sod. When thoroughly firmed, water the new grass plot well, soak it in fact, and keep up a program of rolling, watering and cutting as required until it is well established. Bare spots should be treated to a dusting of grass seed.

Here again we find of most importance the fundamental suggestions or precautions back of all transplanting: Disturb the roots as little as possible (that is, cut the sod as deep as you can conveniently handle it). Do not expose the roots to the sun and drying wind a moment longer than absolutely necessary. Firm the soil thoroughly after transplanting (in this case by beating with a spade). Water promptly and abundantly whenever necessary, and refrain from sprinkling in between. Trim back the top growth to balance the unavoidable injury to the feeding root system (by having the grass cut short before cutting the sod and keeping it trimmed after it is in place).

Winter Protection

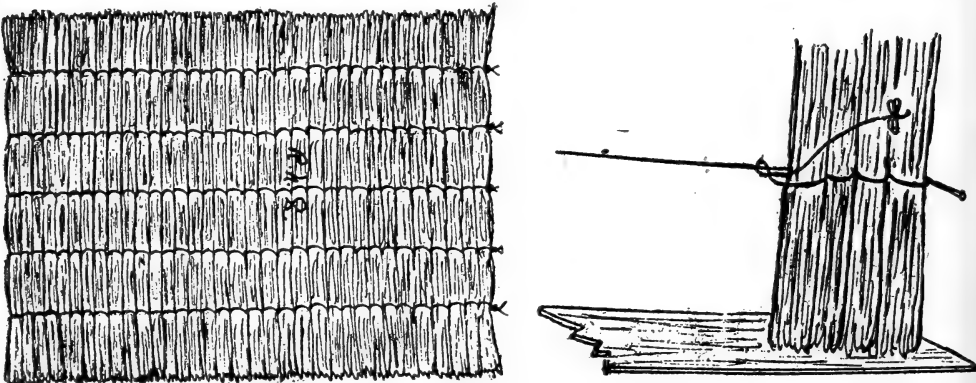
Leaf Coverings—Protecting Lilies and Roses—Windbreaks for Trees and Shrubs—Covering Tender Plants—Facts About Frost

THAT plants or shrubs may withstand the cold, we protect them; but it is mainly to shield them from the Winter sun. Some plants may be heaved from the soil by frosts; when thoroughly protected such heaving does not take place.

Many of the perennials are benefited by a protection in Winter. The sort of protection perennials need is one which will shield them from Winter and earliest Spring suns, which start the plants into growth only to be frozen again when the sun has set. This alternate freezing and thawing is the main cause of Winter injury to shrubs as well as perennials. The proper protection, then, is a light layer of straw or manure or leaves applied after the tops have been killed by frost.

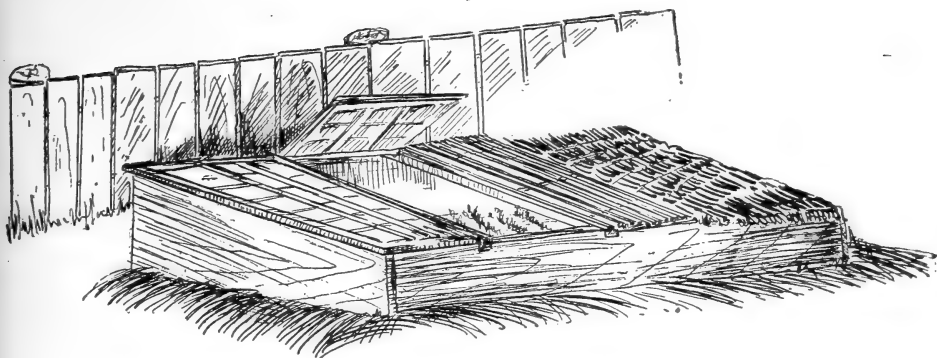
Leaf Coverings

It is usually better to wait until the ground is a little frozen before applying the Winter mulch. It prevents a premature start in Spring, due to a slight heating caused by fermentation. Perennials which retain their leaves through the Winter, as well as biennials and Sweet William, Heuchera and many others, are best covered with straw or leaves, but not manure, which often disfigures the foliage due to its decay. An excellent method, however, is to cover the beds with



Straw or Reed Mats

It is a fairly easy matter to manufacture a good, stout reed mat or straw mat for protective purposes. A ball of stout cord and the necessary material for the mat; a little dexterity in binding these into bundles and in twisting the cord, as shown in the drawing, is all that are necessary. These mats can be put to a dozen good uses. Supplied also by the seedhouses



Another Form of Winter Protection

The ordinary coldframe, especially if covered with mats in hard weather, is sufficient shelter for all that class of plants which are spoken of as "doubtfully hardy." Parsley can be wintered here; Violets can be grown and flowered in deep frames; tender Roses and shrubs for placing out of doors in Summer can find a place

evergreen boughs and then place leaves upon these, in which case the leaves are prevented from matting. Leaves which mat together badly, as Elm, Maple, and other trees which drop their foliage early, are not as valuable as Oak. Coverings which are too thick cause a premature start in Spring, resulting in crippled growth because of the late frosts.

Unless the perennials are diseased the tops may remain during the Winter; breaking or cutting them off often exposes the growing points.

Protecting Lilies and Roses

For protecting Lilies a mound of ashes, placed over the crown, is frequently advised. The Tiger, the Canada, the Coral, the Handsome, the Thunbergian, and the Turk's Cap can be successfully protected in this manner. We have had occasion before to mention the protection of Eremurus, which consists of using a deep box filled with leaves and left over the plants till rather late in the season, otherwise the young shoots will be injured in the Spring.

Then there are the Roses. When rosarians get together they discuss varieties for a time; then the question usually arises: "What do you use for protecting your Roses?" "Well," says one, "I believe that a protection for Roses should be merely a sunshade, not an overcoat, so I just turn a box over the tops of the plants. They always Winter as well that way as any other." "They really need some protection from the cold," says another, "and I think the only way to protect Roses is to mound up all the Teas and Hybrid Teas so that the soil is almost a foot deep all around them." The third gentleman says that the protection afforded by something placed on

their stems, such as rye straw, is best, although paper is an excellent insulator against the cold. Climbers are well protected by laying them down and covering them with evergreens or wrapped in burlap. Any sort of frame packed with leaves is a trifle dangerous, for the leaves are apt to ferment and cause the young shoots to start prematurely. Many persons dig their Teas each Fall and store in coldframes, which usually keeps them perfectly but is rather troublesome.

Windbreaks for Trees and Shrubs

For many trees and shrubs a windbreak will be the proper sort of shelter from the drying winds of Winter. Trees are apt to be injured in Winter by the loss of water by evaporation from the twigs; this cannot be supplied by the frozen roots, and the plant dies. Temporary fences may be erected of boards or Cornstalks which will give the required break to the full sweep of the wind. Such protection is placed on the south side of broad-leaved evergreens to shield them from the Winter sun. The branches of either deciduous or evergreen trees should be tied up when the trees are somewhat columnar and are susceptible to breaking by wind or snow. This is especially necessary with Irish Juniper.

Tender plants and newly set trees, evergreens and others, are successfully protected by tying them together and covering with Hemlock boughs. Other trees and shrubs are covered deeply so that the roots do not freeze, in which case many are encouraged to grow under adverse conditions.

It is the alternate freezing and thawing of the trunk and branches of fruit trees that causes them to crack open on the south side. Low heading is the only precaution.

Facts About Frost

The Weather Bureau recognizes three degrees of frost—*light*, when the tenderest vegetation, such as Peppers, Melons, Egg Plant, Beans, Heliotrope, Coleus, Nasturtium and Salvia, is injured; *heavy*, when the hardier sorts are damaged and the tender ones quite destroyed; and *killing*, when the staple crops of the region are killed.

In the garden the first type is commonly the most disastrous because it comes with the least warning and occurs early in the Fall and late in the Spring when the gardener is off his guard. Moreover, the first Fall frost is usually followed by some weeks of fine, mild weather during which even the tender plants, if they had been protected during the cold snap, might have continued to grow, blossom and ripen fruit.

Notwithstanding the claims of so-called "weather sharks," it is impossible to consistently forecast local frost without systematic knowledge of conditions over a wide area. It is far better to rely on the experienced, scientifically worked out predictions of the Weather Bureau reinforced by a knowledge of the conditions that are favorable to frost occurrence. Then when frost warnings are issued one can judge whether or not precautions are essential in his immediate locality.

Conditions That Suggest Frost

1. Weather comes in "waves," hence an abnormally warm spell during the frost season is liable to be followed by a sudden drop in temperature.

2. A clear sky permits increased radiation and improves the chances of frost.

3. The passing of a storm is usually followed by "clearing and colder," which often means a frost.

4. A still, clear air with a steadily falling temperature in the late afternoon is a good sign of frost.

5. Frosts are more likely to occur in the open country and in small villages than in and near large cities; they occur on lowlands and in "pockets" and valleys sooner than on hillsides; they are less frequent near bodies of water than away from lakes, the ocean, etc.; northern, western, eastern and southern slopes are frosty in decreasing order as given; sandy, well drained, and dark colored soils are less liable to frost than heavy clays and wet, poorly tilled, light colored types.

To Ward Off Frost

Since frosts accompany dry, clear, still air and the radiation of heat from the ground and plants, the following methods of preventing them can be employed in the small garden according to the means at hand: (1) Heating of the air by means of smudge fires, orchard heaters, etc.; (2) the moistening of the air by means of sprays; (3) a combination of (1) and (2), such as the discharge of waste steam into the air; (4) ventilation, or the stirring of the atmosphere, to prevent the settling of layers of cold air on the plants; (5) irrigation by the furrow or flooding system; (6) the covering of tender plants with cloths, paper, a mulch, etc.; (7) the spraying of the plants themselves both to prevent the formation of frost and to help thaw out hardy plants that may have been touched overnight.

Fall Treatment of Plants with Reference to Frost

VEGETABLES.—Perennials, such as Asparagus, Horse Radish, Jerusalem Artichoke and Strawberries are entirely hardy. It is, however, well to mulch them after the ground freezes, partly to prevent alternate thawing and freezing, which tend to heave them out of the ground, and partly to add plant food to be dug in in the Spring.

Annuals may be put into four groups with relation to their ability to withstand frost, as follows:

1. Entirely hardy. Those marked *a* may be sown or planted in late Fall for early Spring use. The rest may be left in the garden to be harvested as needed. For convenience it is well to mulch the root crops to make digging easier: Broccoli, Brussels Sprouts, Corn Salad (*a*), Kale, Leek, Parsnips, Salsify, Witloof Chicory (*a*), Spinach (may be handled both ways).

2. *Hardy*. These will stand a light freeze but should be harvested before the ground freezes solid. In the case of frosted Lettuce, thaw out slowly in ice water and use at once. Carrots, Lettuce, Onions, Peas, Rutabagas.

3. *Hairly hardy*. These will stand a light frost and do their best in cool weather: Beets, Cabbage, Cardoon, Cauliflower, Celery, Celery Cabbage (*Pe-tsai*), Kohl-Rabi, Potatoes, Radishes, Swiss Chard.

4. Practically all other vegetables need warm weather in which to make good growth, and protection from even the lightest frost.

FLOWERS. Perennials are, of course, hardy as to root, even though their tops may be killed down. The following, however, continue to bloom well after the first frost: Chrysanthemum, Gailardia grandiflora, Antirrhinum majus, Coreopsis lanceolata, Lathyrus latifolius.

Annual sorts growing from bulbs that are hardy and that therefore can be planted in the Fall for Spring blooming, include: Lilies, Crown Imperial, Hyacinth, Lily of the Valley, Narcissus, Scilla, Tulips.

Narcissus for best results should be dug after flowering and allowed to ripen before being replanted in the Fall.

Plants with tender bulbs which should be dug after frost has killed or blackened the tops but before the ground freezes, include the following: Begonia (Tuberous), Caladium, Calla, Dahlia, Gladiolus, Tritoma, Tuberose.

Of non-bulbous annuals which are not expected to last more than one season, there are some that continue to bloom even after a mild frost. Among these are Aster, Cosmos, Sweet Alyssum, Clarkia, Marigold, Pansy, Ten-Weeks Stock, etc.

Some Insect Pests of Cultivated Plants

BY W. E. BRITTON

State Entomologist, Agricultural Experiment Station, New Haven, Conn.

The Life of an Insect—Spraying Equipment—Materials Used
to Control Insect Pests—Fumigants—Insect Pests Arranged
by Host Plants

THERE is scarcely a crop grown which is not attacked and injured by insects. It has been estimated that at least one-tenth of all crops in the United States is destroyed each year by insects. This total damage amounts to fully \$1,000,000,000.00 annually.

This article has been prepared so that the amateur may have a simple guide at hand for convenient reference. A part of the material and illustrations have appeared in the Spray Calendar published by the Connecticut Agricultural Experiment Station, and are here printed, by permission, in somewhat different form.

The Life of an Insect

Insects are very abundant and occur everywhere. Though some are called injurious because they attack and injure or destroy plants or plant materials, or infest animals which man has raised for his own use, there are many beneficial insects: some furnish food, like the honey bee, some provide clothing material, like the silkworm, many are parasites upon noxious insects, and many species of bees pollinate the flowers of fruit and garden trees and plants, thus assuring a crop. Most insects have four distinct stages in their cycle of development:

1. Egg
2. Larva (caterpillar, grub, maggot, etc.)
3. Pupa (chrysalis)
4. Adult

In several large groups, including the grasshoppers, true bugs, aphids, scale insects, etc., the insects do not pass through the distinct larval and pupal stages but undergo a gradual development from the time they hatch from the eggs until the adult stage is reached.

Insects may be divided roughly into *biting* or *chewing* (like the Colorado potato beetle) and *sucking* (like the aphids and scale insects). Against the former we can use arsenical poisons, but to kill the latter we must use contact insecticides. Both may be killed with fumigants. The two forms are illustrated on page 308.

Spraying Equipment

Every one who grows plants should be provided with some convenient form of pump for applying sprays and should keep in stock a few of the materials most often used, so as to be available at a moment's notice when needed.

For the small garden, one of the most convenient pumps is the small compressed air outfit holding from three to four gallons. If a knapsack sprayer or bucket outfit be possessed, either can be made to answer the

purpose. For more extensive operations a wheel outfit with tank holding twenty-five gallons is desirable, especially in the vegetable garden. A barrel pump is essential to obtain sufficient power to spray large fruit trees and special power outfits are now being used in large orchards, potato fields, and for spraying shade and woodland trees. Nearly all pump manufacturers make outfits corresponding to those just mentioned. For under leaf spraying, a pipe, bent at a right angle, with a nozzle near the elbow, is essential.

For dusting, the grower may purchase a powder gun or a shaker, according to the amount of work to be done. In the small garden, a shaker may be improvised by punching small holes in a tin can, or by shaking the poison through the meshes of a cheesecloth bag.

Lead Arsenate should be kept on hand, preferably in the dry or powdered form. This may be applied either as a dust or as a spray and keeps in better condition than the paste, which is apt to become frozen, or lumpy from drying, or to corrode the container. The dry form may be kept indefinitely. Some standard *nicotiné preparation* should also be kept in stock for dilution, to be used against sucking insects.

Most of the other materials herein mentioned may be procured as needed from the local seed or hardware store, or from druggists. In large operations home mixing is usually more satisfactory and economical, but the small grower will often prefer to buy ready prepared insecticides, and he should find them satisfactory if put out by reputable manufacturers, and if he follows directions.

Materials Used to Control Insect Pests

STOMACH POISONS—TO KILL CHEWING INSECTS

LEAD ARSENATE	To be used in the proportion of
	3 lbs. paste, or $1\frac{1}{2}$ lbs. dry powder lead arsenate. 50 gallons water. Apply as a spray. The dry powder may also be sifted upon the plants
HELLEBORE	A vegetable powder to be sifted upon the plants or to be mixed with water, 1 ounce in 2 gallons, and applied as a spray. Hellebore loses its value on long standing. Hence fresh stock should always
	be purchased from the wholesale druggist, and it should be kept in a tightly-stoppered container.
POISONED BRAN MASH	Wheat bran.....5 lbs.
	Paris green or white arsenic.....4 oz.
	Lemon or orange.....1 fruit
	Molasses.....1 pint
	Water.....7 pints

Mix bran and poison together, dry. Squeeze juice of lemon into water and then cut pulp and peel into fine pieces and add to water, then add molasses and stir. Add syrup to bran and mix thoroughly. To kill cutworms the mash should be scattered over the field just before dark, preferably a few days before the plants are set. Also effective in killing grasshoppers.

CONTACT INSECTICIDES—TO KILL SUCKING INSECTS

COMMERCIAL LIME-SULPHUR	1 part lime-sulphur } For dormant or Winter spray to kill San
	9 parts water } Jose scale.
NICOTINE SOLUTION	$\frac{1}{2}$ pint (40 per cent. nicotine sulphate)
	50 gallons water or 1 teaspoonful in a gallon.
	2 pounds common soap. May be added to any of the other sprays mentioned herein by omitting the soap.
COMMON SOAP AND WATER	1 pound common laundry soap.
	8 gallons water.

MISCIBLE OIL	1 part miscible oil 15 parts water	} For dormant or Winter spray.
KEROSENE EMULSION	2 gallons kerosene. ½ pound common soap. 1 gallon water.	

Dissolve the soap in hot water, add the kerosene and churn violently together until a creamy mass is formed which thickens upon cooling. Dilute nine times before using.

Fumigants

CARBON DISULPHIDE (Bisulphide). This is an ill-smelling, inflammable liquid which can be purchased in pound bottles. It volatilizes readily at warm room temperatures, and is especially valuable for fumigating stored seeds which are infested by weevils or other insects. The liquid should be placed in a shallow dish on top of the seeds, and the receptacle should be covered tightly and allowed to remain from 24 to 36 hours; two fluid ounces are sufficient for the ordinary flour barrel or its equivalent. In fumigating rooms and buildings, about 10 pounds are required for each 1000 cubic feet of space.

HYDROCYANIC ACID GAS. *Caution: This gas is deadly to all kinds of animal and human life, and should be used with great care.* It may be prepared from the materials and in the proportions given below:

Sodium cyanide	1 oz. (avoirdupois)
Sulphuric acid (commercial)	2 oz. (fluid)
Water	4 oz. (fluid)

This quantity is adequate for each 100 cubic feet of space for use on dormant nursery stock, dry seeds, buildings, etc.

For greenhouses, coldframes, and hotbeds containing growing plants, use one-half ounce of cyanide with proportionate amounts of acid and water for each 1000 cubic feet of space.

The cubic contents of the space to be fumigated should first be computed carefully. The space should then be made as tight as possible, leaving doors, windows, or other openings which can be manipulated from the outside for the purpose of airing.

Stoneware crocks or earthenware jars may be used as generators, and should be so placed as to give the best possible distribution of the gas. The proportionate quantity of acid and water should be measured for each, and the cyanide weighed and placed in paper or cheesecloth bags. The water should be placed in the jar and the acid poured in carefully with constant stirring. When all is ready, quickly drop each bag into its jar, retiring quickly, and lock the door. For greenhouses the exposure should be for 30 minutes, preferably toward night, or when the sun does not shine and when the plants are dry. For dormant nursery stock, 30 minutes. Buildings, granaries, etc., may remain closed over night. Open two or more openings from the outside and wait for 30 minutes before going inside. Then quickly open all sources of ventilation without breathing the gas.

General Recommendations

Where possible, practice rotation, and do not grow the same crops on any piece of ground year after year. Always remove or destroy all tops, rubbish, etc., which may harbor insects. Give the plants clean culture and allow no weeds in the garden.

If pests appear which you cannot identify, write and send specimens to your State Agricultural Experiment Station for information and advice.

Insect Pests—Arranged by Host Plants

APPLE

Leaf-Crumpler: Case Bearers: Bud-Moths: Several kinds pass the Winter as small caterpillars and feed upon the unfolding leaves, occasionally doing considerable damage. Spray with lead arsenate as soon as trees begin to look green; repeat a week later.



Canker Worms

again kept sticky from April 1st to June 1st.

Canker Worms: Small looping caterpillars feed upon the leaves during May, and when disturbed spin down on silken threads. Spray foliage with lead arsenate before blossom buds open, and again soon after the petals fall. In unsprayed orchards sticky bands of tree-tanglefoot should be placed around the trees late in October, and kept sticky until January 1st, and

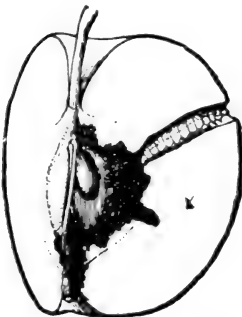


Tent Caterpillar

be removed with a cone-shaped brush.

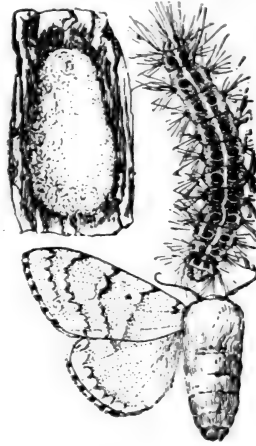
Tent Caterpillar: Forms nests at the forks of the branches during the month of May and the caterpillars devour the leaves. Spray with lead arsenate just before blossoms open and again after they fall. Egg-masses may be clipped off and burned during Winter, and the nests may

Codling Moth or Apple Worm: Larva burrows inside the fruit, particularly around the core. Spray with lead arsenate soon after blossoms fall and repeat three to four weeks later. Both foliage and fruit should be kept well covered with spray until fruit is nearly grown.



Codling Moth or Apple Worm

Lesser Apple Worm: Feeds on the surface of fruit that is nearly mature, often injuring it in storage. Spray as for Codling Moth.



Gipsy Moth

Gipsy Moth: Occurs in the United States only in South-eastern New England. Brownish, hairy caterpillars defoliate the trees in May and June. Spray foliage with lead arsenate, using 5 to 10 pounds of the paste in 50 gallons of water. From August to May, seek for egg clusters and destroy them *in situ* by soaking with creosote. Band trees with tree tanglefoot.

Leaf-roller: Green Fruit Worms: Palmer Worm: Caterpillars feed upon leaves and partly grown fruit, often seriously injuring it. Spray with lead arsenate as for codling moth.

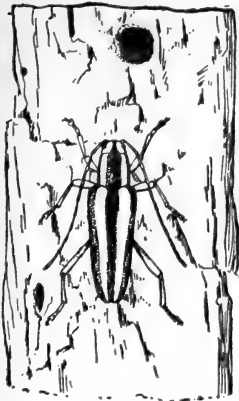
Tussock Moths: Tufted caterpillars of several species feed upon the leaves the latter half of Summer. The white-marked tussock moth and the hickory tussock moth are usually the most abundant and therefore the chief offenders. Spray with lead arsenate as for codling moth.

Red-humped Caterpillar: Yellow-necked Caterpillar: Feed in clusters on ends of branches, often stripping young trees in August and September. Gather by hand and destroy, or spray the foliage with lead arsenate.

Fall Web-worm: Brown-tail Moth: See Pear.

Curculios: Grubs of both Apple and Plum curculios infest the fruit, making it gnarled and ill-shaped. Spray twice after blossoms fall, and remove infested fruit in thinning.

Apple Maggot or Railroad Worm: Small, legless white maggots burrow in the flesh of the ripening fruit of sweet and sub-acid varieties, especially those ripening early in the season. Will greatly injure fruit in storage unless kept at a low temperature. Keep trees sprayed with lead arsenate as for codling moth. Destroy all infested fruit.



Round-headed Borer

Round-headed Borer:
Flat-headed Borer: Grubs tunnel in the trunk near the ground. Dig out the borers wherever saw-dust appears. Apply a mixture of lime-sulphur and lead arsenate to the trunks.

Leaf-blister Mite: See Pear.

Red Spider:
Clover Mite: Injure the

leaves, especially in dry seasons, by feeding on the surface, causing them to turn yellow or rusty in color. Eggs of clover mite are often abundant on tree trunks through the Winter and are orange red in color; they are killed by the lime-sulphur spray in early Spring. For Summer treatment spray leaves with kerosene emulsion or nicotine solution.



Apple Red-Bugs

Apple Red-Bugs: Two species of red leaf-bugs suck the sap, causing the leaves to become distorted, and the fruit to be irregular with depressed spots usually most abundant near blossom end. Spray with nicotine solution (1 pint in 50 gallons water) either separately or in combination with lead arsenate, lime-sulphur or Bordeaux mixture.

Tarnished Plant Bugs: Suck the sap from the fruit, dimples developing from the punctures. Spray with nicotine solution as for Red Bugs.

Leaf Hoppers: Whitish insects sucking sap from the under side of the leaves, causing a whitish spotting or mottling on upper surface. Spray with nicotine solution as for Red Bugs.

Woolly Apple Aphids: A white, woolly or cottony mass on bark represents a colony of this aphid, which sucks the sap, forming swellings or galls on the twigs. It clusters in wounds and prevents healing. It also forms galls on the roots, and often the smaller roots decay. Plant only clean or fumigated stock. Apply tobacco dust liberally and work into the soil around trees.

Spray with kerosene emulsion to kill aphids on twigs.



Rosy and Green Aphids

Rosy and Green Aphids: Rosy aphids attack the fruit clusters which fail to develop, and also the leaves, causing them to curl. The green aphids usually attack only the leaves of terminal shoots and water sprouts, causing them to curl, thus checking the growth. Spray with nicotine solution as for Red Bugs.



Oyster-shell Scale

Oyster-shell Scale:
Scurfy Scale: Both occur on the bark and are elongated or pear-shaped shells, the former about the same color as the bark; the latter, light gray or whitish. The insect under the shell sucks sap from the twigs. Spray with nicotine solution, soap and water, or kerosene emulsion about the second week in June.

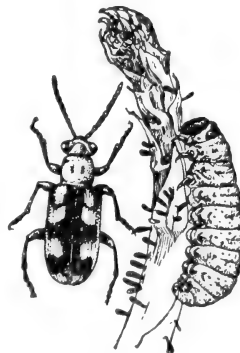
San José Scale: See Peach. Illus.

ASH

Oyster-shell-Scale: See Apple.

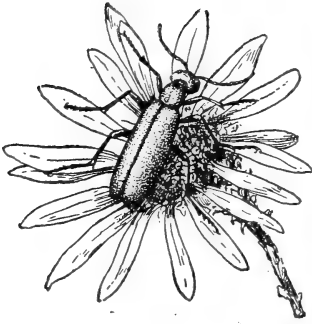
ASPARAGUS

Asparagus Beetles: Both adults and larvae of the common asparagus beetle, and the twelve-spotted asparagus beetle feed upon the leaves, often injuring new plantations. Cut everything clean during the cutting season; later spray with lead arsenate. New plantations should be sprayed when the beetles first appear.



Common Asparagus Beetle

ASTER

*Aster Blister Beetle*

plants with mosquito netting.

BARLEY

Army Worm: See Grass.

BEAN

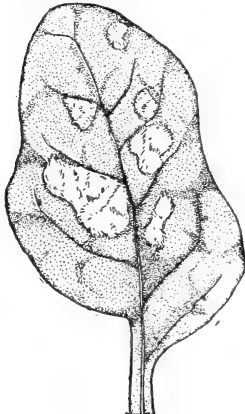
*Bean Weevil*

Weevil: Adults lay eggs in the pods in the field and keep on breeding in the dried seed, finally ruining it for planting or for food. Fumigating for 36 hours with carbon disulphide, using about two fluid ounces in a shallow dish on top of the seed in a tightly-covered barrel will kill the weevils without injuring the beans for food or for planting.

Mixing the beans with an equal weight of air-slaked lime will prevent damage. If to be used for food only, the beans may be heated in the oven to kill weevils, but if the temperature approaches 150° F. the vitality of the seeds is endangered.

Green Clover Worm: Occasionally slender, green, wriggling caterpillars riddle the leaves in July. Dust string beans with a fine powder. Beans to be shelled may be sprayed with lead arsenate.

Aphids: Black aphids on leaves and new shoots sucking the sap. Spray with nicotine solution.

*Leaf-Miner*BEET—
SWISS CHARD

Leaf-Miner: A small fly lays eggs in the leaves and the maggots tunnel or mine between the upper and lower leaf-surfaces. Destroy all infested leaves and practice late fall plowing. Destroy all plants of the weed known as "lambs' quarters" in which this insect breeds.

BIRCH

Tussock Moths: See Apple, Hickory and Horse Chestnut.

Birch Leaf Skeletonizer: Small yellowish larvæ feed on both sides of the leaves in late Summer, often stripping the trees. Spray in July with lead arsenate.

Bronze Birch Borer: The grub makes a spiral tunnel just under the bark of upper main branches, ridges showing on the outside. Often kills trees. Cut and burn infested trees before May 1st.

BLACKBERRY

Blackberry Sawfly: Larvæ feed upon leaves in June and July. Spray with lead arsenate about June 15th.

Blackberry Crown Borer: Grub tunnels in larger roots and at base of stem. No remedy except to dig out and destroy.

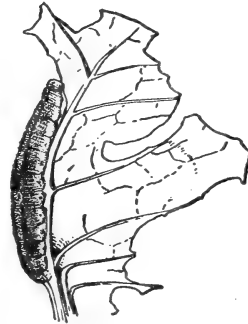
Red-necked Cane Borer: Grub tunnels in stalks, forming galls or swellings often three inches long. Cut and burn all infested canes in Winter or early Spring.

BOX

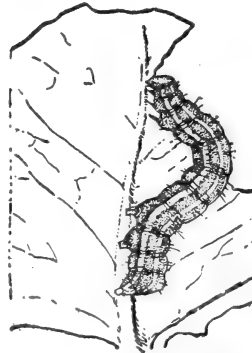
Leaf-miner: A small two-winged fly lays eggs in the leaf and the larvæ tunnel between the upper and lower surfaces. Destroy infested leaves. Fumigate the plants with hydrocyanic acid gas.

Oyster-shell Scale: See Apple.

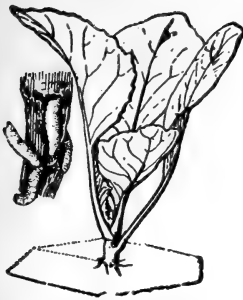
CABBAGE-CAULIFLOWER

*Cabbage Worm*

Cabbage Worm: Velvety green worms feed on leaves throughout the season. Spray unheaded plants with lead arsenate. Use insect powder or hellebore on headed plants.

*Cabbage Looper*

Cabbage Looper: Smooth looping caterpillar feed with preceding in the late Summer and often tunnel into the cabbage head. Spray as for cabbage worm.



Cabbage Maggot

Cabbage Maggot: Tunnels in stem and main root of early set plants, near surface of ground, checking growth and often killing the plants. Place tarred paper discs around stems when plants are set. Practice crop rotation.

Cabbage Aphis: Clustered underneath the leaves, this insect sucks the sap, often causing much injury. Underspray with nicotine or kerosene emulsion.

CARNATION

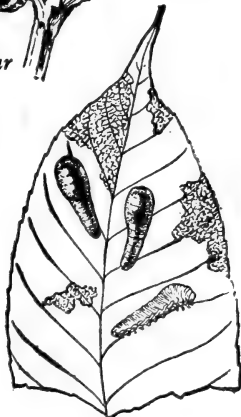
Aphid or Green Fly: Sucks the sap from stems, leaves and buds. Spray with nicotine solution, soap and water, or fumigate with tobacco.



Celery Caterpillar

CELERY

Celery Caterpillar: Devours the leaves of celery, fennel, parsnip, parsley and carrot. Hand picking is usually the best remedy. Parsnip and carrot may be sprayed with lead arsenate.



Cherry or Pear Slug

CHERRY

Cherry or Pear Slug: Eats on upper surface of leaf. Spray with hellebore or lead arsenate.

Canker Worms: See Apple.

Cherry Maggots or Fruit Flies: Larvæ of two species infest ripening fruit. Sprinkle foliage in early June with sweetened lead arsenate to kill the adults.

Cherry Aphids: A brown aphid on under side of leaves, sucking sap and curling the leaves. Spray with nicotine solution, kerosene emulsion or soap and water.

CHESTNUT-CHINQUAPIN

Canker Worms: See Apple.



Weeviled Chestnut

Nut Weevils: Long-nosed snout beetles lay eggs in developing fruit and the grub infest the nuts. Destroy all infested nuts. Fumigate nuts with carbon disulphide as for beans.

Two-lined Chestnut Borer: Slender, flat-headed grubs tunnel under bark of chestnut and oak trees. Badly infested trees should be burned, or the bark removed before insects mature and spread to other trees.

CHRYSANTHEMUM

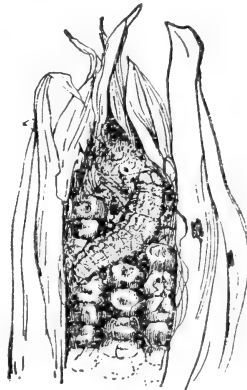
Aphis or Black Fly: Sucks the sap from the tender leaves and flower stems. Spray plants with, or dip them in, nicotine solution or soap and water. Fumigate with tobacco. A steady stream of water from your hose will often prove effective.

CINERARIA

Aphis or Green Fly: Sucks sap from new leaves and stems. Treat as for preceding.

COLUMBINE

Columbine Leaf-miner: A two-winged fly lays eggs on the leaves and the maggots tunnel between the upper and lower surfaces. Destroy the leaves first infested and cultivate the ground around the plants.



Corn Ear Worm

GORN

Cut Worms: See Tomato.

Army Worm: See Grass.

Corn Ear Worm: Eats the immature kernels at tip of ear. Dust with sulphur and powdered lead arsenate, equal parts.

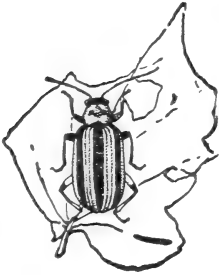
CRANBERRY

Fireworm or Black-headed Cranberry Worm: Small, pale green, black-headed caterpillars web the leaves and new shoots together and feed inside the nest. Spray with lead arsenate to kill the caterpillars. Flood the bog for three days to kill the pupæ.

Yellow-headed Cranberry Worm: Small, green, yellow-headed caterpillars injure plants in same manner as the preceding. Spray with lead arsenate. Keep bogs flooded until about May 20.

Cranberry Fruit-worm: Pale green larvæ infest the berries. Flood the bog for about two weeks as soon as the fruit has been harvested. Destroy all infested berries.

CUCUMBER



Striped Cucumber Beetle

Striped Cucumber Beetle: Eats the leaves of young plants. Larvæ tunnel in main root or stem just under ground, sometimes killing the plant. Dust plants heavily with 1 and plaster or dry lead arsenate. Cover plants with screens.

Melon Aphid: See Melon.

CURRANT



Currant Worm

Currant Worm: Eats leaves in May. Spray with lead arsenate or fresh hellebore. Dampen leaves, then sprinkle with air slaked lime.

Currant Stem Girdler: Adults girdle new tips after laying eggs in them. Clip off and burn these tips at any time of the year.

Currant Borers: Larvæ of two species,—one a moth and the other a beetle—bore in the pith of the stems, causing the leaves to droop and finally killing the canes. Destroy infested canes in May.

Four-lined Leaf-bug: An active bug, striped lengthwise with black and yellow, sucking sap from the terminal leaves. Spray with nicotine solution.

Scurfy Scale: A light gray, pear-shaped scale on bark sucking the sap. Spray second week in June with kerosene emulsion or nicotine solution.

San José Scale: See Peach.

Currant Aphid: Yellowish green aphids sucking sap from the under side of the leaves causing them to curl. Underspray with nicotine solution or kerosene emulsion.

CYCLAMEN

Leaf-Mite: Transparent microscopic mites cause leaves to curl; plants do not blossom. Syringe under leaf surface strongly with water. Spray with, or dip the plants in, nicotine solution (1 part to 400).



Stalk Borer

DAHLIA

Tarnished Plant Bug: Sucks the sap from the stems and developing buds, causing them to drop off. Spray with nicotine solution.

Stalk Borer: Larva burrows up and down inside the main stem, the upper portion usually wilting and dying. Slit the stem lengthwise with care and kill the borer.

DOGWOOD

Sawflies: The larvæ of several kinds feed upon the different kinds of dogwoods. Spray with hellebore or lead arsenate.

EGG-PLANT

Flea-Beetle: See Potato.

Colorado Potato Beetle: See Potato.

ELM

Spiny Elm Caterpillar: Black spiny caterpillars in clusters strip certain branches of elm, willow and poplar. Remove cluster and destroy while caterpillars are small, or spray with lead arsenate.



Elm Leaf Beetle

Elm Leaf Beetle: In May the adults eat holes through the leaves, and in June and July the grubs eat the green tissue from the under surface. Spray under surface of leaves with lead arsenate about June 1st to kill the newly hatched grubs.

Canker Worms: See Apple.

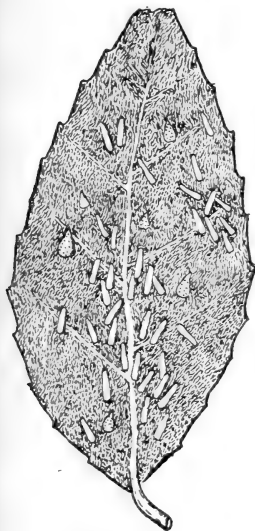
White-marked Tussock Moth: See Horse Chestnut.

Leopard Moth: Larvæ make deep tunnels under the bark, often girdling the branches, which later break off. Small trees may be examined, and the borers killed by injecting carbon disulphide and closing the openings, or by inserting a wire.

Elm Scale: Oval, brown, soft scales, with white marginal fringe, occur in the crevices of the bark of the trunk and larger branches. Spray with kerosene emulsion.

White Elm Scale: A whitish pear-shaped scale on twigs. Spray about June ro, with kerosene emulsion.

Elm Woolly Aphids: Several species curl the leaves, or form in cottony masses on the bark. Spray with kerosene emulsion.



Euonymus Scale

EUONYMUS

Euonymus Scale: Various species of *Euonymus* are injured by this scale, which has narrow white shells in the male, and pear-shaped gray or brown shells in the female. Cut and burn the worst infested twigs. Spray in June with kerosene emulsion to kill the young.

FERN

Woolly Bears: Several light brown hairy caterpillars devour the fronds in late Summer. Spray with lead arsenate.

Hemispherical Scale: Brown, oval, convex scales on fronds of plants under glass. Apply soap and water or nicotine solution as a dip or spray.

GERANIUM

Greenhouse leaf-tyer: Small, green wriggling caterpillars feed upon the leaves of plants under glass. Spray with lead arsenate.

White Fly: See Tomato.

GOOSEBERRY

Currant Worm: Larvæ devour foliage. Apply hellebore or lead arsenate early in May

Yellow Currant Fruit Fly: Small maggots infest the berries, which color prematurely and drop. Destroy infested fruit.

Gooseberry Fruit Worm: Greenish larvæ feed inside the berries. Destroy infested fruit.

GRAPE

Grape Plume Moth: Green spiny caterpillars web together the leaves of new shoots. Crush by pinching the nests.

Grape Vine Flea Beetle: Adults and larvæ devour the leaves. Spray with lead arsenate.

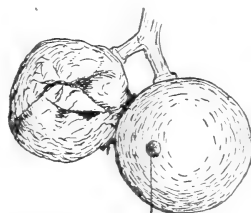


Rose Chafer

Rose Chafer: Long-legged, brown beetles appear about the middle of June and feed upon the leaves, flowers and newly set fruit, often doing great damage. Spray heavily with lead

arsenate just before blossoms open and, if necessary, again after fruit has set.

Grape Root Worm: Adults eat chain-like holes in leaves in July, and grubs eat roots, often causing great injury. Spray foliage with lead arsenate.



Grape Berry Moth

Grape Berry Moth: Larvæ feed inside the berry. Spray with lead arsenate after fruit sets, and repeat twice at intervals of ten days. Place paper bags over the clusters soon after the fruit sets.

Sphinx and other Caterpillars: Several kinds of horn worms, as well as other caterpillars, feed on the

leaves. Spray with lead arsenate or practice hand-picking.

Grape Phylloxera: Sucks sap from leaves and roots, forming galls, causing serious injury to European varieties. Graft on stocks of native species.

Grape Leaf-Hopper: Small yellow and red-marked leaf-hoppers sucking sap from under side of the leaves. Spray with nicotine solution.

GRASS



White Grub

White Grubs: These are the larvæ of June beetles and when nearly mature and abundant in the soil cause much damage, especially in dry seasons, by eating off the roots of grass, corn, potatoes, strawberries, etc. Plow in Fall to expose insects. Harrow very thoroughly before planting.

Army-worm: Occasionally, brown, striped caterpillars are so abundant as to strip the leaves and heads from grass and grain during July; they move like armies from one field to another, sometimes doing great damage. Use poisoned bran mash. Plow deep furrows across the line of march, with steep side barring their progress. Sprinkle worms with kerosene. Spray strips of grass or grain with lead arsenate to protect the fields beyond.

Fall Army-worm: Attacks lawns and millet in September, like preceding, but does not migrate in such large numbers. Same remedies apply. Plow in late Fall.



Army Worm

HICKORY

Walnut Caterpillar: See Walnut.

Fall Web-worm: See Pear.

Hickory Borer: Larvæ tunnel in solid wood of trunk. The burrows may be found by the sawdust ejected. Inject carbon disulphide into the burrow and close the entrance.

Hickory Tussock Moth: White and black hairy caterpillars feed upon the leaves in late Summer. Spray with lead arsenate.

Hickory Bark Beetle: Small black beetles breed under the bark, and the galleries soon girdle the tree. The adults emerge through small round "shot-holes" in the bark. Beetles also feed at base of leaves, causing them to break off and fall in Midsummer. Badly infested trees should be removed before May, and either burned or else the bark removed. Spray healthy trees about June 1st with strong lead arsenate with nicotine solution added.

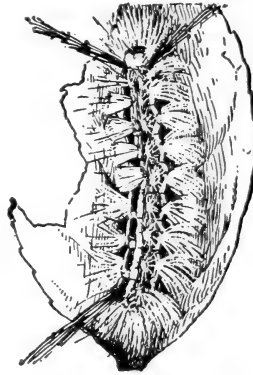
Nut Weevils: Larvæ infest the fruit or nuts. See Chestnut.

Hickory Gall Aphid: Curious galls on the leaf stems often cause the leaves to fall in Midsummer. Galls contain large numbers of aphids. Spray with nicotine solution just as new growth starts in Spring.

HOP

Hop Aphid: Green aphids sucking sap from the under leaf-surface. Spray with kerosene emulsion.

HORSE CHESTNUT



White-marked Tussock Moth

White-marked Tussock Moth: Black and yellow, red-headed hairy caterpillars, each bearing four upright tufts of white hairs, devour the leaves. Spray with lead arsenate.

IRIS

Iris Root Borer: A larva tunnels in the root stocks, injuring many plants. Destroy infested root stocks. Burn over Iris beds in Winter to destroy the eggs.

JUNIPER

Juniper Web-worm: Small brown caterpillars feed upon the leaves which they web together. Spray with lead arsenate.

LARCH

Larch Sawfly: Larvæ defoliate trees in Midsummer. Spray with lead arsenate.

Woolly Aphid: White cottony tufts on bark and at the leaf whorls. Spray with kerosene emulsion.

LETTUCE

Aphid or Green Fly: Sucks sap from the leaves. Spray with soap and water or fumigate beds with tobacco.

LILAC

Lilac Borer: A white larva tunnels in the twigs. Cut and burn infested twigs.

Oyster-shell Scale: See Apple.

San José Scale: See Peach.

LILY

Stalk Borer: See Dahlia.

Aphid: Yellow aphids with red markings suck the sap from under side of leaves. Spray with nicotine solution.

LINDEN

Canker Worm: See Apple.

White-marked Tussock Moth: See Apple and Horse Chestnut.

Linden Borer: White larvæ tunnel in wood at base of tree. Dig out borer or inject carbon disulphide.

LOCUST

Locust Borer: Larvæ tunnel in solid wood of trunk. Inject carbon disulphide into the burrows and close the entrance.

MAPLE



Maple Borer

White-marked Tussock Moth: See Horse Chestnut.

Other Tussock Moths: See Apple.

Canker-worms: See Apple.

Maple Borer: Larvæ make spiral tunnels just under the bark of trunk or larger branches. Examine the trees in September; the burrows may be located by the sawdust thrown out. Inject carbon disulphide and close the entrance.



Woolly Maple Scale

Woolly Maple Leaf Scale: White cottony masses of wax containing females and eggs occur on the under side of the leaves of sugar maples in Midsummer; the insects suck the sap and cause the leaves to fall prematurely. Males and larvæ are found in the crevices of the bark

where the latter pass the Winter in white cases. Spray dormant trees with nicotine solution and soap. Burn infested leaves as they drop.

Cottony Maple Scale: On red and silver maples, large, oval, brown scales pass the Winter on the bark of the branches and in Summer develop conspicuous cotton-like tufts of white wax nearly half an inch in length. Spray with miscible oils.

Terrapin Scale: Small, reddish brown oval scales occur on small twigs of red and silver maples, sometimes killing them. Spray with kerosene emulsion.

Oyster-shell Scale: See Apple.

Maple Aphids: Green aphids are common on under surface of leaves of Norway and Sycamore Maples in June. Spray with nicotine solution or kerosene emulsion.

MARGUERITE

Marguerite Fly or Leaf Miner: A maggot tunnels between upper and lower surface layers of the leaves. Spray with nicotine solution every ten or twelve days.

MELON

Striped Cucumber Beetle: See Cucumber.

Melon Aphid: Sucks the sap from the under side of the leaves, curling them and causing much damage if abundant. Under-spray the leaves with nicotine solution.

MILLET

Fall Army Worm: See Grass.

NASTURTIUM

Aphid: Brown aphids cluster on stems and leaves, sucking the sap. Spray with nicotine solution.

OAK

Canker Worm: See Apple.

Brown-tail Moth: See Pear.

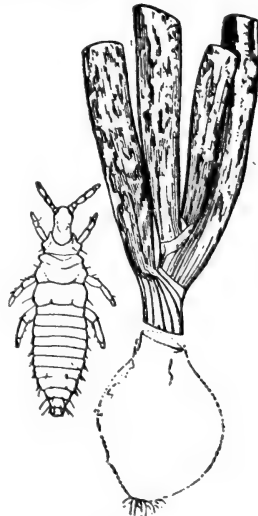
Orange Striped Oak-worm: Black and orange striped caterpillars feed upon the leaves late in the season. Spray with lead arsenate.

OATS

Army Worm: See Grass.

ONION

Maggot: Infests the bulb of the young and growing plant. Practice crop rotation.



Thrips or White Blast

Thrips or White Blast: Very small insects feed upon the surface of the leaves, causing a whitish appearance. Burn all tops and refuse; burn over the grass land around the field to kill over-wintering insects. Spray with nicotine solution.

PÆONY

Rose Chafer: Feeds on blossoms of white varieties. See Grape.

PALM

Scales: Various white and brown scales infest the species of palms found in green-houses. Apply nicotine solution or soap and water as a spray or as a dip.

PEA

Pea Weevil: The adult lays eggs in the pods in the field, and the larvæ develop in the dried seeds and the emerging beetles leave round holes. Fumigate with carbon disulphide or cover with air-slaked lime. See Bean.

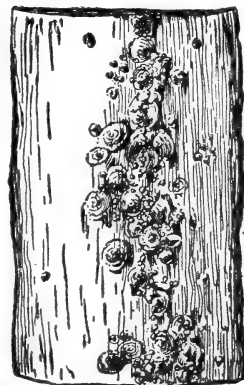
Green Pea Aphid: Sucks the sap from stems and leaves in June, often causing great injury, when abundant. Early varieties may mature a crop before being greatly injured. Spray with nicotine solution and soap.

PEACH



Peach Sawfly

emerging through small "shot holes." Burn infested trees and keep others thrifty.



San José Scale

Peach Sawfly: Larvæ feed upon leaves in June and July. Spray with lead arsenate.

Peach Borer: Larvæ tunnel under bark at base of trunk. Dig them out in May and again in September. Paint trunks with lead arsenate and lime-sulphur from just below the surface to a foot from the ground.

Fruit Bark Beetle or Shot Hole Borer: Small black beetles tunnel just under the bark, girdling the tree, and

Plum Curculio: See Plum.

San José Scale: Small circular shells containing insects which suck the sap from twigs, leaves and fruit. On fruit a red spot surrounds each insect. Spray dormant trees with lime-sulphur.

Black and Green Aphids: Suck sap from leaves and shoots. Spray with nicotine solution.

PEAR

Pear or Cherry Slug: See Cherry.



Brown-Tail Moth

Brown-tail Moth: Occurs only in Eastern New England. Brown, hairy caterpillars hibernate in nests on twigs and feed on leaves in May and June. Cut and burn winter nests. Spray with lead arsenate as soon as blossoms fall, and again in August.

Codling Moth: See Apple.

Fall Web-worm: Brown, hairy caterpillars feed in webs or nests at ends of branches the latter part of Summer. Clip off and burn nests when small. Spray with lead arsenate.

Leaf Blister Mite: Forms galls or blisters on unfolding leaves, causing many leaves to fall in July. Blisters turn red, and later brown. Spray dormant trees in late Fall or early Spring with lime-sulphur.

Leaf Psylla: Jumping plant lice suck sap from leaves and shoots, causing many leaves to fall in July. Spray with lime-sulphur in Spring just before buds open. Spray infested trees with nicotine solution in July to clean up the fruit.

San José Scale: See Peach.

Pear Thrips: A very small insect that feeds upon the fruit buds, destroying them. Spray with nicotine solution just as buds open and again after blossoms fall.

False Tarnished Plant Bug: Punctures the small and developing fruit, causing it to become irregular and knotty. Spray with nicotine solution and soap.

PHLOX

Red Spider: Injures leaves, causing them to turn yellow. Spray with kerosene emulsion or with soap and nicotine solution.

PINE

Sawflies: The larvæ of several native and imported species feed upon the leaves. Spray with lead arsenate.

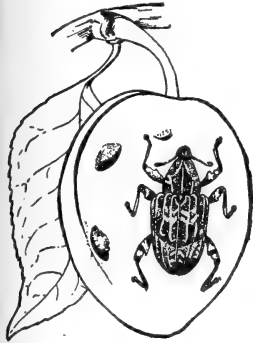
White Pine Weevil: Larvæ tunnel under the bark of the leader, causing it to wilt and die in Midsummer. Ornamental trees may be protected by spraying leaders about May 1st with lead arsenate or lime-sulphur. Jarring the beetles into a net once a week during May will greatly

reduce the damage. Infested leaders should be cut and destroyed before the adults emerge.

Pine Bark Aphid: Aphids with cottony wax secretion form white patches on bark, sucking the sap. Spray with kerosene emulsion.

Pine Leaf Scale: White, pear-shaped shells on leaves contain insects sucking the sap. Occasionally kill small trees. Spray with nicotine solution or kerosene emulsion about the second week in June.

PLUM



Plum curculio

Plum curculio: Grub infests the growing fruit, causing it to fall. Jar the trees once a week, for six weeks after trees bloom; catch the beetles on sheets and destroy them. Also spray during the same period with lead arsenate.

Fruit Bark Beetle or Shot-hole Borer: See Peach.

Plum aphids: Suck sap from under side of leaves. Spray with nicotine solution and soap.

San José Scale: See Peach.

POPLAR

Poplar Tent-maker: Larvæ feed on leaves and fold them together near ends of branches, forming nests. Spray with lead arsenate.

Spiny Elm Caterpillar: See Elm.

Tussock Moths: See Apple, Hickory and Horse Chestnut.

Poplar Borer: Larvæ make large galleries in wood of trunk. Dig out or inject carbon disulphide into the burrow and close the opening.

Poplar and Willow Curculio: Larvæ tunnel in smaller trunk and branches. Destroy badly infested trees. Cut out borers; inject carbon disulphide.

Oyster-shell Scale: See Apple.

POPPY

Aphids: Black aphids suck the sap from stems and leaves. Spray with nicotine solution.

POTATO

NOTE—Potatoes require vigilant watching. Watch your crop for three particular enemies: The flea beetles and adult Colorado beetles may appear soon

after the leaves show above ground and should be given attention. Larvæ of the Colorado beetle do not appear until about the first of June. About July 1st watch for aphids and spray to eradicate the incipient colonies before the aphids spread over the whole field. Unless promptly checked the aphids will ruin your entire crop in a few days.



Colorado Potato Beetle

Flea Beetle: Small, black, jumping beetles eat holes through the leaves. Spray both upper and under surfaces heavily with lead arsenate.

Colorado Potato Beetle: Both adult and larvæ devour the leaves. Spray or dust with lead arsenate.

Three-Lined Potato Beetle: Larvæ feed upon the leaves and carry their black excrement on their backs. Spray with lead arsenate.



Potato Aphid

Potato Aphid: Green aphids appearing in large numbers suck the sap from the shoots and under side of the leaves, causing much damage. Spray with soap and nicotine solution.

PRIVET

Privet or Lilac Borer: Larvæ tunnel in the stems. Remove and destroy infested stems.

QUINCE

Round-headed Borer: See Apple.

Quince Curculio: Adults feed upon, and the grubs feed inside, the growing fruit, causing it to be knotty. Jar the trees as for plum curculio. Spray with lead arsenate.

Aphid: See Apple.

RADISH

Maggot: See Cabbage.

Aphid: See Turnip.

RASPBERRY

Raspberry Sawfly: Larvæ feed upon the leaves. Spray with lead arsenate or hellebore.

Cane Borer: Larvæ tunnel inside the canes. Cut and burn infested canes.

RHODODENDRON

Rhododendron Lace Bug: Sucks the sap from the under surface of the leaves, leaving brown spots of excrement. Spray with nicotine solution or kerosene emulsion.

ROSE

Rose Slug or Sawfly: Eats away the green tissues of the leaves, only the network remaining. Spray with lead arsenate, hellebore, or nicotine solution.

Rose Chafer: See Grape.

Rose Leaf-Hopper: Whitish, jumping and flying insects which suck the sap from the under side of the leaves. Spray with nicotine solution.

Rose Aphid or Green Fly: Sucks the sap from the tender leaves and shoots. Dip the shoots in, or spray with nicotine solution.

Rose Scale: Whitish, circular shells on the stems contain insects which suck the sap. Cut and burn the worst infested stems. Spray with nicotine solution.

RYE

Army Worm: See Grass.

Wheat Midge: See Wheat.

SNAPDRAGON

Leaf-Mite: Causes leaves to curl and plants do not blossom. Spray with nicotine solution.

SNOWBALL

Aphids: Suck sap from the leaves, causing them to curl. Dip in, or spray with nicotine solution.

SPIRÆA

Aphids: Suck the sap from the new shoots. Use nicotine solution as a spray or dip.

SPRUCE

Spruce Bud Moth: Larvæ feed on leaves of terminal shoots of the branches, often causing much damage. Spray with lead arsenate.

Spruce Gall Aphid: Forms galls at the base of the new growth on Norway and other spruces. Spray in late Fall or early Spring with nicotine solution and soap, or with kerosene emulsion.

SQUASH-PUMPKIN

Squash-vine Borer

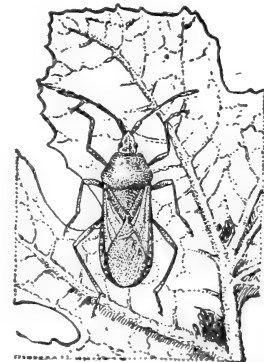
Squash-vine Borer: Larvæ tunnel in the stem near its base, causing decay. Cut slits lengthwise in the stem and kill the borers. Cover the joints of the vine with earth and new roots will be formed to support the plant. Grow a few early plants for traps, and when well infested, destroy them. Plant the main crop rather late.



Squash Lady-Beetle

Squash Lady-Beetle: Adults and larvæ feed upon the leaves. Spray with lead arsenate.

Striped Cucumber Beetle: See Cucumber.



Squash Bug or Stink Bug

Squash Bug or Stink Bug: A brown bug, three-fourths of an inch in length, which sucks the sap from the under side of the leaves, causing them to wilt and die. Underspray with kerosene emulsion to kill the young. The old bugs and the egg clusters may be gathered by hand.

STRAWBERRY

Strawberry Sawfly: Larvæ devour the leaves. Spray with lead arsenate or hellebore.

Strawberry Flea-Beetle: Eats round holes through the leaves. Spray with lead arsenate.

Strawberry Leaf-Roller: Larvæ roll leaf and feed inside. Spray with lead arsenate. In bad infestations burn over fields as soon as crop is harvested.

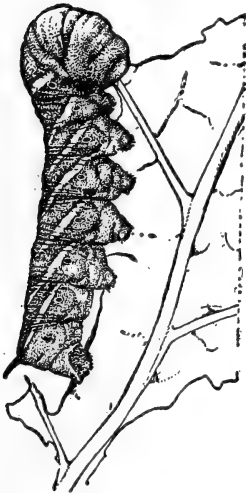
Strawberry Weevil: The females of this small snout beetle cut off the blossom buds of staminate varieties when ovipositing. Plant pistillate varieties in part. Spray with lead arsenate.

Strawberry Crown Borer: Grub feeds in the crown of the plant. Practice crop rotation. Burn over infested field in Fall.

Strawberry White-fly: Sucks sap from the under side of the leaves. Underspray with soap and nicotine solution.

Strawberry Root Aphid: Sucks sap from leaves and roots, killing plants. Spray with nicotine solution. Set clean plants on land not infested.

SWEET POTATO



Tortoise Shell Beetles: Feed upon leaves. Spray with lead arsenate.

TOBACCO

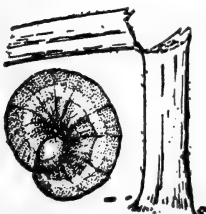
Flea Beetle: Eats holes through the leaves. Spray upper and under leaf-surfaces heavily with lead arsenate.

Cut Worms: See Tomato.

Tobacco or Tomato Horn-Worms: Large green caterpillars with horn on the tail devour the leaves. Practice hand picking. Spray with lead arsenate.

*Horn Worm
Affects both Tomato
and Tobacco*

TOMATO



*The Cut Worm
A general pest*

Cut Worms: Eat off the stems of the plants near the ground; certain species climb the plants and eat the leaves. Scatter poisoned bran mash around the field just at night so that the cut worms may have a chance to get it before it dries.

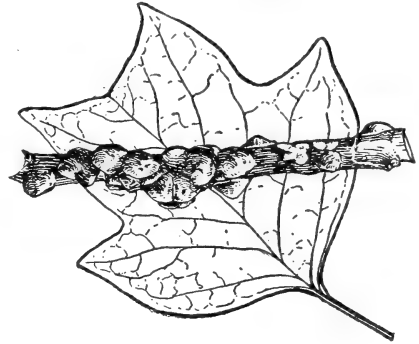
Flea Beetle: See Potato or Tobacco.

Stalk Borer: See Dahlia.

Tomato or Tobacco Horn-worms: See Tobacco.

Greenhouse White-Fly: Immature insects suck the sap from the under sides of the leaves. Underspray with soap and water. Fumigate greenhouses and frames with hydrocyanic acid gas.

TULIP TREE



Tulip Tree Scale

Tulip Tree Scale: Large, brown, hemispherical scales on bark of lower branches, sucking the sap. Spray with lime-sulphur in Fall or Winter.

TURNIP

Cut Worms: See Tomato.

Cabbage Root Maggot: See Cabbage.

Turnip Aphid: Green aphids on under side of leaves sucking the sap. Underspray with soap and water or nicotine solution.

VIOLET

Violet Sawfly: Larvæ devour leaves. Spray with lead arsenate or hellebore.

Eel-worms: Infest the roots, forming galls. Plant in new soil or sterilize old soil by steam. Add plenty of air-slaked lime to the soil.

WALNUT

Walnut Caterpillar: Clusters of black caterpillars covered with whitish hairs strip the branches and finally the tree in August. Spray with lead arsenate. Clip off twigs when caterpillars are small, and kill by crushing.

Walnut Weevil or Curculio: Adults feed at base of leaf stems; larvæ tunnel in new shoots and infest the fruit of Persian and Japanese Walnuts. Spray with lead-arsenate.

WHEAT

Army Worm: See Grass.

Hessian Fly: Maggots burrow in sheath of a leaf at base of stem, causing the stalks to turn yellow and die. Plant rather late, say about September 1st.

Wheat Midge: The fly lays eggs on the chaff and the maggots feed upon the developing kernels, so that the heads ripen early and produce no grain. Burn stubble before plowing. Plow infested fields deeply in the Fall.

Green Bug or Aphid: Green aphids

suck the sap from leaves. Destroy in early Fall all volunteer wheat and oats. Practice crop rotation.

WILLOW

Spiny Elm Caterpillar: See Elm.

Poplar Tent Maker: See Poplar.

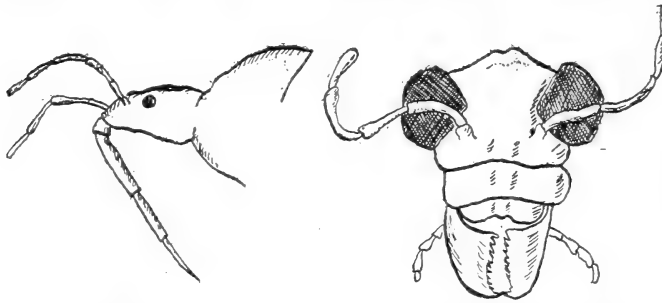
Poplar and Willow Curculio: See Poplar.

Oyster-shell Scale: See Apple.

Aphids: Large reddish aphids congregate on twigs in fall, and suck the sap. Spray with kerosene emulsion or nicotine solution.

We wish to add just a few words in regard to the enemies treated in this and the preceding chapter. The main method for controlling them is to prevent them by the strictest sanitation. All diseased or insect-infested

parts must be burned such stock must never be planted in your clean garden or allowed to remain there if it has already started. Land which is known to be infested with various pests must be avoided.



A sucking insect—note the formidable beak used to pierce plants and extract juices

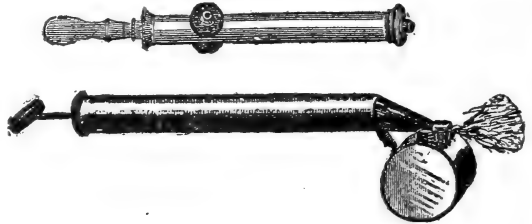
Head of biting insect—note jaws, large compound eyes, and the feelers near jaws and eyes

Keep down weeds which harbor diseases and insects. A method which must

not be scorned is hand picking when possible. Anything which contributes toward the best culture of the plant will be found a control for the enemies as well. If you have questions as to just how to control any of the various maladies, consult your seedsman, florist or nurseryman, but do not lose time—insects and diseases work quickly.

The gardener should become familiar with the ways of the insects, for some are valuable and should be admired. Those who have read Sir John Lubbock, Faber or Maeterlinck realize that the insect world is quite as romantic as our own.

Plants become yellow not only as a result of insect injury or disease, but also when they get too much water or too little or when the soil is too poor or too rich. Be sure of the cause before you try to cure the trouble.



The upper figure shows an ordinary brass garden syringe. Be sure to buy a good article to begin with; it pays. The lower figure shows a brass vaporizing sprayer. This is just what is needed for applying liquid insecticides and fungicides

For a complete work on the subject of this Chapter we recommend *ECONOMIC ENTOMOLOGY*, by Prof. John B. Smith. In this book Prof. Smith, in clear and simple language, has succinctly presented the underlying facts upon which the application of remedial or preventive measures, as regards the combating of injurious insects, is based, and which can be easily understood and followed. 481 pages. Price, \$2.65, postpaid. Secure your copy where you bought your Garden Guide.

Some Common Diseases of Plants and Their Control

BY EDWIN F. HOPKINS, Associate Pathologist, Alabama Agri. Exp. Station, Auburn, Ala.

and

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How Diseases in Plants are Exhibited—The Cause of Disease—Concerning the Control of Diseases—Materials Used to Control Plant Diseases—The More Common Diseases of Garden Crops

INCREASING attention is being given these days to the diseases of plants because of the enormous losses which they annually entail. In addition to the fact that some of these diseases take a certain yearly toll from our crops and thus reduce production per acre, there is the danger that under favorable conditions certain diseases of staple crops may become epidemic and totally wipe out a product, vitally necessary to our welfare. The late blight of Potatoes it is said, contributed chiefly to the suffering caused by the Irish famine in 1845. That year, being a favorable one for the blight, the potato crop throughout Europe was a total failure. Taking some more recent, more local, figures, in New York State alone, it is conservatively estimated that Oat smut caused a loss of over \$2,000,000 in 1915, while the same state that year suffered a loss of nearly 20 millions of dollars from the late blight of Potatoes. Wheat rust is credited with having caused a loss of \$67,000,000; in 1898, Peach leaf curl damaged the 1900 Peach crop in the United States to the extent of \$2,335,000. And while figures are not available, losses from plant diseases in home gardens are without doubt equally appalling in the United States.

One could give many more figures, but these few will serve to illustrate the importance of understanding and controlling plant diseases. We must realize that they are present, that they cause an enormous loss and that every grower and gardener must learn three things regarding the more common of them. These are, first, just how to know them; second, what causes them; and, third, the method of control.

How Diseases in Plants are Exhibited

The presence of a disease is made evident by certain signs or symptoms shown by the diseased plant. These are injurious deviations

from the normal, produced by some agent which interferes with the usual growth or functions of the plant. For example, a certain Cabbage plant wilts while another nearby does not. On pulling up the wilted plant we find that the roots are swollen to many times their normal size. The wilting and the abnormal size of the roots are symptoms of a disease known as clubroot.

The following are some of the symptoms exhibited by diseased plants: *Rot* is the effect produced when a considerable portion, usually of a fleshy plant part, is rapidly killed. We may have soft rots, hard rots, dry rots and wet rots. Rots of stems are called stem rots, rots of roots, root rots, etc. *Blight* is the effect caused by a rapid killing of tissue and usually refers to leaves and shoots. *Spot* is a small area of dead tissue. There are leaf spots, pod spots, fruit spots, etc. *Will* results from injury to the water conducting vessels or from some injury to the water absorbing organs of the root. *Scab* is superficial injury resulting in corky growth and cracking. *Wart* is an irregular outgrowth from a plant organ, leaf, stem or root. *Canker* is a definite dead area in the bark usually on stems or on limbs of trees. *Mildew* is a white fungous growth upon the surface of a plant; there are powdery and downy mildews. *Mosaic* is a peculiar light and dark green mottling of leaves produced in certain diseases. *Knots* are swellings produced by an overgrowth of tissue. *Burn* is a killing of leaves especially at the edges or tips. *Smut* is a black powdery mass, while a *rust* usually consists of reddish to brown powdery pustules. *Leaf curl* is a distortion of leaves due to the presence of a parasite. *Galls* are abnormal swellings. Many other similar descriptive terms are used to designate symptoms, but the above illustrations will suffice to indicate what constitutes symptoms.

The Cause of Disease

We must distinguish between injuries caused by insects and those caused by diseases, although the two may have some points in common. Diseases are usually caused by (1) parasitic slime moulds, (2) bacteria, or, (3) fungi, all of which are low forms of plant life. But there are some diseases which are not due to the presence of a parasite. There are many lower organisms which are not harmful; in fact, many are beneficial; but certain ones have so modified their habits that they are able to live upon the higher plants and use the food prepared by the latter. They are then called parasites and by their manner of living they injure the plants upon which they exist and produce in them a diseased condition.

Slime moulds, though very common, are not well known to most people because of their small size. In their active life phase, they

resemble closely a slime, while at another time they appear mould-like; hence, the name. The dreaded club root disease of Cabbage and allied plants, is caused by a slime mould as is also powdery scab of Potatoes.

Bacteria are perhaps better known because of their connection with disease in man. This has been emphasized so much that there is a general belief that most bacteria are harmful, although actually most of them are beneficial. Bacteria are either rod-shaped, spherical or spiral like. Those which cause diseases in plants belong to the rod-shaped groups. At the present time, there are over 150 plant diseases known to be caused by bacteria, including fire blight, one of the most serious diseases of Pears, Apples, and Quinces.

Fungi make up a large group of lower plants of great diversity of form and life history. The well known mushrooms and puffballs belong to this class as well as countless microscopic forms, like rusts, mildews, etc.; some are parasites while many are not. Probably the largest number of diseases of plants is caused by fungi.

A knowledge of the life history of these organisms is especially important if one is to devise and use methods of preventing the diseases which they cause. We try to determine the point in the life history at which the pathogene (agent that causes disease) is most vulnerable and strike there.

Concerning the Control of Diseases

All methods of controlling plant diseases are based upon one of four principles: exclusion, eradication, protection and immunization. *Exclusion* is a matter of preventing the introduction of disease producing fungi, bacteria and the like into a given country or locality. This is most commonly attempted by legislation, exclusion laws and quarantines. *Eradication* refers to the removal of a pathogene from an area when once it has gained a foothold, and involves many operations, such as sorting out and destroying diseased seed, plants and plant parts, soil sterilization, crop rotation and seed disinfection. This principle may be applied in the control of a large number of diseases. In practicing *protection* methods we work from the standpoint of a plant and place some barrier between it and the parasites which attack it. In the operation of spraying which is a protective measure, we place a layer of poison called a fungicide on the leaves of a plant and when the fungus comes in contact with the poison it is killed. The addition of certain substances to the soil to prevent organisms from attacking the roots of plants, as in the liming of soil to prevent club root of Cabbage, may be classed as a protective measure. *Immunization* involves the selection or breeding of varieties or strains which are

resistant to certain diseases. In some few instances the application of this principle is practical and not a few resistant varieties have been developed in recent years, as, for example, Cabbage immune to yellows and Beans immune to anthracnose.

Materials Used to Control Plant Diseases

Among the fungicides used to protect plants from diseases, by spraying or dusting them upon the foliage or fruit, the most commonly employed are Bordeaux mixture, lime-sulfur solution and sulfur in a finely ground form. For disinfecting seeds and tubers to which the spores of pathogenes become attached, the materials most used are formaldehyde and corrosive sublimate. To kill pathogenes which have gained lodging within the seed, hot water at different temperatures has proven most effective.

Where insects are to be controlled as well as fungi, certain insecticides are often combined with the fungicides. Lead arsenate may be added to Bordeaux mixture or lime-sulfur for chewing insects, and Black Leaf 40, a tobacco extract may be similarly used against sucking insects like plant lice.

Corrosive sublimate, a white powder, may be purchased at the drug store. Dissolve 4 ounces in a small amount of hot water and add cold water. May also be obtained in the form of tablets, one of which dissolved in a pint of water gives the desired strength, a 1 to 1000 solution.

Formaldehyde in the form of a 40 per cent solution called formalin may be purchased at the drug store and diluted to different strengths for different diseases.

Lime-sulfur may conveniently be purchased as the commercial concentrated solution (which should test about 32 Baumé) and diluted as indicated below for the various diseases.

Self-boiled lime-sulfur is prepared by adding a small amount of water to 8 pounds of good stone lime (quick lime) in order to start it slaking. Then 8 pounds of sifted sulfur is added gradually together with small amounts of water to prevent burning. When the slaking is over, make up to 50 gallons with water. This is used chiefly on peaches, but is being largely replaced by sulfur dust applied dry.

Bordeaux mixture is made by adding a weak solution of blue vitriol (copper sulfate) to a weak solution of milk of lime. Five pounds of blue vitriol crystals are put into a burlap bag and lowered into 25 gallons of water just below the surface until all of the blue vitriol is dissolved. While this is dissolving 5 pounds of good stone lime are slaked with a small amount of water and then diluted to 25 gallons. Good hydrated lime may be used in place of stone lime.

Equal parts of the blue vitriol solution and the dilute milk of lime are then mixed together. This mixture is known as 5-5-50 Bordeaux. Other mixtures, as the 4-4-50 and the 3-3-50, are prepared in a similar manner, using proportionately less copper sulfate and lime.

Sulfur, ground fine enough to pass through a 200-mesh to the square inch screen, may be applied with any good dusting apparatus for the control of a number of diseases of plants.

The More Common Diseases of Garden Crops

APPLE

Bitter rot (*Glomerella cingulata*) causes a rot of the fruit, which at first is brown in color; later small pink masses appear on its surface. Finally the whole fruit rots and then shrivels into a mummy, which sometimes clings to the tree. Cankers also form on the limbs. They should be removed in the Winter and burned. Spray with Bordeaux mixture (4-4-50) once before buds open and afterwards according to the weather.

Black rot or New York Apple tree canker (*Phydaspora Cydoniae*). Fruit is rotted and covered with black pimples and shrinks to a mummy; leaves are often spotted and cankers develop upon the limbs. Remove cankers or cankered limbs. Spray foliage with Bordeaux (4-4-50) about the middle of July and again two weeks later.

Blister canker (*Nummerlana discreta*). Cankers are formed on the limbs or body and at first are dull brown in color, later becoming darker. When the canker enlarges the bark blisters and comes off. Finally the small, raised, nailhead fruit bodies of the fungus are formed on the surface of the wood. Cut out small cankers. If large, remove the diseased limb.

Brown rot (*Sclerotinia cinerea*). See Plum.

Fire blight (*Bacillus Amylovorus*). See Pear.

Powdery mildew (*Podosphaera leucotricha*). The leaves become covered with a white or grayish powdery-like mildew which usually affects their growth where infection is severe. Twigs also are attacked. In the latter part of the season minute black bodies may be seen on this whitish overgrowth. Spray with a mixture prepared by adding 3 pounds of copperas (iron sulfate) to 50 gallons of 1-50 lime-sulfur solution. About four sprayings are recommended during the season.

Rust (*Gymnosporangium Juniperi-virginianae*). One stage occurs on the red Cedar as Cedar apples which are brown gall-like growths and produce yellow gelatinous horns in Spring; the other stage occurs on Apple leaves and fruits. The spots on the Apple leaves are at first small

and yellow, but later they become orange colored on the upper side of the leaf; small pimples develop on the spots while on the lower surface minute cuplike structures are formed, the edges of which are split in a starlike manner. Severe infections cause the entire leaf to turn yellow and fall. To control this disease eradicate the Red Cedars within a radius of at least one mile. Spraying is not very effective, but lime-sulfur 1-40 may be used; spray the new leaves as they unfold.

Scab (*Venturia inaequalis*) occurs on the leaves and fruit. It shows first on the under, later on the upper surface of the leaves as circular, olive green, superficial patches which later turn darker. The leaf under the spot may become convex or puffed. When infection is severe the entire leaf may be involved. On the fruit the spot is at first olive green and later has a dark center with a white papery margin. This is one of the most serious of Apple diseases. Spray with lime-sulfur (1-40). (1) When the buds show green; (2) Just before the blossoms open; (3) When the petals fall; (4) Two or three weeks after the petals fall.

Sooty blotch or Fly speck (*Leptothyrium pomi*). Irregular, superficial, sooty blotches which may be rubbed off the apple skin, or minute fly specks thickly crowded in spots over the surface of the fruit. The treatment for Apple scab will easily control this disease.

Stippen, known also as "bitter pit." A disease not due to an organism, but is said to be due to the improper distribution of water to the fruit. It may be recognized by the depressions on the surface of the fruit which are caused by the development of brown, corky areas in the flesh of the apple. Good cultural practices, as proper drainage, cultivation and pruning should be followed. Uniformity in the water supply during the growing season reduces losses from this disease to a minimum.

ASPARAGUS

Rust (*Puccinia asparagi*) attacks the green tops which develop after the shoots have been cut. It may be recognized by the final dying of the tops and the small red or black colored pustules formed on the

stems and needles. In severe infections the tops turn yellow and the needles fall from the stems. Toward the end of the season the black or Winter stage develops. To control this disease, obtain rust-resistant strains.

ASTER

Leaf rust (*Coleosporium Sonchi-arvensis*). May be recognized by the orange-colored pustules or *sori* which develop chiefly on the under side of the leaves. Spray with Bordeaux mixture, before the rust appears.

BEAN

Anthracnose (*Colletotrichum lindemuthianum*), a very serious fungous disease. It is distinguished by the circular and sunken black spots on both the pods and seed which may at certain times contain pink, gelatinous pustules on their surfaces. The leaf veins on the underside of the leaves and the stems also may be affected. The disease is carried over Winter on the seed, hence, use clean seed obtained by selecting pods free from these spots. Spraying with Bordeaux (5-5-50) will also reduce the amount of disease. Resistant strains of some varieties like Red Kidney are now to be obtained.

Blight (*Bacterium phaseoli*). A bacterial disease. Shows at first as large brownish areas on the leaves with yellowish water-soaked margins. Later these spots become darker in color and dry. The pods also develop water-soaked spots which are circular or irregular in shape often with red margins, and not sunken as in the case of anthracnose. As with anthracnose the seed which becomes infected from the pod carries the organism over the Winter. No satisfactory method of control is known except the use of disease-free seed. Resistant varieties have not yet been developed.

BEEF

Leaf spot (*Cercospora beticola*). Very common fungous disease. Appears first as round brownish spots with red to purplish borders. Later, after the spots enlarge, they become ashen and papery in the center, which finally drops out and leaves holes in the leaf. When severe, these spots may coalesce and destroy the entire leaf. Burn the diseased leaves. Spray with Bordeaux mixture (5-5-50) when the plants are about six weeks old. Make later sprayings about 10 days apart.

Root rot (*Phoma betae*). Causes a black dry rot on stored roots. Small, pimple-like structures are formed on the surface of the diseased area. Also large circular spots are produced on the leaves. Spray with Bordeaux mixture and remove all diseased leaves before placing the Beets in storage.

Scab (*Actinomyces chromagenus*). Known by the circular scabs with raised margins and depressed centers which form on the roots. Same as scab on Potatoes, which see. Do not grow Beets if Potato scab is known to be present in the soil, or where Beets

have been previously affected with this disease.

BLACKBERRY

Anthracnose. See Raspberry.

Leaf spot (*Septoria Rubi*). Spots appear on the leaves first as small whitish or brownish areas. When very numerous on a leaf, they may cause it to dry up. Spray with Bordeaux mixture.

Orange rust. See Raspberry.

CABBAGE

Black leg (*Phoma lingam*). Affects the leaves, stems and roots. The leaves are spotted, but not seriously injured. The chief injury is caused by a rotting of the stem and root which turn black; the leaves then wilt and the plant dies. Disinfect the seed as for black rot.

Black rot (*Bacterium campestre*). Affects also Cauliflower, Kale, Rape, Kohl-Rabi, Brussels Sprouts, Radish, Turnip and other members of the Mustard family. The leaves show at the edges large dead areas, in which the veins are black. The entire leaf soon yellows and falls from the plant. The blackening of the veins, easily seen on holding a diseased leaf up to the light, is diagnostic of this disease. On splitting a diseased stalk, a blackening of the sap tubes is apparent. The bacteria live over in the soil and on the seed. Soak the seed 15 minutes in corrosive sublimate solution 4 ounces to 30 gallons of water, then dry in the shade.

Club root (*Plasmodiophora brassicae*). A serious disease caused by a slime mould, which produces enormous swellings of both the main and lateral roots. These swellings or clubs are irregular and unsightly in appearance. In hot, dry weather, wilting of the tops of affected plants frequently occurs. The organism lives in the soil. Practice crop rotation, set healthy plants, apply 2 to 3 tons of lime per acre to infested soil at least one year before planting again to Cabbage.

Yellows (*Fusarium conglutinans*). Its appearance is much the same as that of black rot, but the darkening of the veins begins at the base of the stem and works outward, while in black rot it does just the opposite, starting at the edge of the leaf and working toward the base. Use seed of a resistant variety.

CARNATION

Fusarium Stem rot (*Fusarium sp.*). Affects the stem causing a dry rot near the base. A slow dying of the top takes place. Change the location of plants each year, and in the greenhouse use fresh or sterilized soil. Avoid overwatering.

Leaf spot (*Septoria Dianthi*). Shows small circular grayish spots on the leaves and stem. Spray about once a week with blue vitriol (copper sulfate) 1 pound to 20 gallons of water.

Rhizoctonia Stem rot (*Corticium vagum* var. *Solani*). Rot takes place at or just below the surface of the soil and causes the plant to suddenly wilt. Observe the same precautions as controlling of Fusarium stem rot. Do not set plants too deep.

Rust (*Uromyces Caryophyllinus*). Appears first as a small elongated blister like structure which later ruptures and exposes deep brown powdery masses. Present on both the stems and leaves. Avoid an excess of moisture in the greenhouse and spray with blue vitriol, 1 pound to 20 gallons of water.

CELERY

Early blight (*Cercospora Apii*). Spots appear first as pale yellow areas, irregular and somewhat angular in outline. Later they turn brown and finally the center becomes an ashen gray. May destroy the entire plant. Spray with Bordeaux mixture (5-5-50). Beginning when the plants are first set, make about 6 applications during the season.

CHERRY

Late blight (*Septoria Petroselini* var. *Apii*). Affects flowers, which turn brown and wither, and fruit, which at first is rotted; then small, light brown pustules are produced on its surface. Finally the fruit becomes a hard, wrinkled mummy, which either hangs on the tree or falls to the ground. Spray with lime-sulfur (1-50) or dust with 90 parts of sulfur to 10 parts of arsenate of lead, first when the blossoms show white but before they open, later when the calyx is being shed, and finally about 2 to 3 weeks before fruit begins to ripen.

Leaf curl (*Exoascus Cerasi*). The leaves become crinkled and turn reddish in color. On their lower surface appears a whitish coating. They fall prematurely. The diseased leaves appear only on abnormal outgrowths from affected twigs called witches' brooms. Prune out the diseased twigs.

Leaf spot or Shot hole (*Coccomyces hiemalis*). Spots appear on the leaves which at first mere discolorations, soon become dark red or purple in color; finally the center drops out leaving a "shot-hole," or the leaf turns yellow and falls. Plow under old leaves and spray with lime-sulfur (1-40) or Bordeaux mixture (5-5-50); or dust with sulfur 90 parts and arsenate of lead 10 parts. Make first application when calyx is shedding; repeat 10 days later and again after picking. Do not use Bordeaux on sweet cherries.

Powdery mildew (*Podosphaera Oxycanthae*). Leaves and twigs of young shoots are covered with patches of white mildew which spreads finally over the whole leaf or twig. Small black spherical bodies develop on the surface of this mildew. Dust with sulfur or spray with lime-sulfur (1 to 50).

CRANBERRY

Gall (*Synchytrium Vaccinii*). Small, reddish galls are formed on the young stems, leaves, and sometimes, on the flowers and fruit. They are in color. Burn the bog over in the Autumn and keep it dry during Winter.

Hypertrophy (*Exobasidium Oxycocci*). The buds in the leaf axils grow out into shoots which bear swollen, enlarged leaves of a pinkish color. No remedy is known.

Scald (*Guignardia Vaccinii*). Appears on berries, first as watery areas which enlarge and soften the whole berry which turns brown; several spots may develop on one berry. Finally the affected berries become scalded in appearance. Sometimes black dots appear on them. Spray with Bordeaux mixture (5-5-50) to which a resin fish oil sticker is added.

CUCUMBER, MELON AND SQUASH

Anthraxnose (*Coletotrichum Lagenaarium*) causes circular brownish spots on leaves and elongated light brown spots on stems. The spots on the fruits are sunken and have small pinkish gelatinous masses on their surfaces. Spray frequently with Bordeaux mixture (5-5-50).

Downy Mildew (*Peronosplasmopara cubensis*). At first small yellowish angular spots are produced on the leaves. These enlarge and may involve the entire leaf which finally dies. In moist weather a white downy growth may be seen on the under side of the leaf. Spray the vines every 10 days with Bordeaux mixture (5-5-50).

Wilt (*Bacillus tracheiphilus*). Causes a wilting of a leaf and finally of the entire vine, which dies. Keep vines free of bugs and striped beetles which spread the bacteria. Pull and burn diseased vines.

CURRANT

Leaf spot (*Mycosphaerella Grossulariae*). Appears as small brown spots on the upper and lower sides of the leaf. As these spots, which often run together, enlarge, the centers become whitish and small black pimples arise on their surfaces. Leaves turn yellow and fall prematurely. Spray with lime-sulfur (1-50) or dust with a mixture of ground sulfur 90 parts and powdered lead arsenate 10 parts, as follows: When the first leaves appear and every two weeks following.

Anthraxnose (*Pseudopeziza Ribis*). Appears as numerous small brown circular spots on the upper surface of the leaves, and also on the berries. When severe the leaves turn yellow and fall. On the leaf stems small, slightly sunken spots may be seen. Spray with Bordeaux mixture (5-5-50) or lime-sulfur (1-40) first, when the leaves are unfolding and subsequently at intervals of from 10 days to two weeks. Spray more frequently in moist weather.

EGG PLANT

Leaf spot (*Phomopsis vexans*). Large, irregular patches, gray or brown in color, on which small black pimples subsequently form, are produced upon the leaves. Similarly appearing sunken spots or cankers are produced upon fruit and stalks. Plant only disease-free seed or treat seed with corrosive sublimate (1 to 1,000) for 10 minutes. Wash in running water 15 minutes and plant at once. Do not plant on land which grew diseased Egg plants last season.

GOOSEBERRY

Anthraxnose. See Currant.

Leaf spot. See Currant.

Powdery mildew (*Sphaerotheca Mors-uae*). This disease may be recognized by the powdery white patches occurring on leaves, stems and fruit. These patches finally turn brown as they run together. Sometimes diseased berries are deformed and may crack open. Spray with lime sulfur (1-40) when the buds open and later at intervals of 10 days until four or more sprayings have been made.

GRAPE

Anthraxnose (*Gloeosporium ampelophagum*). Small spots with raised borders and depressed centers are formed on the shoots and tendrils. These enlarge in the long direction of the shoots and later the center becomes more depressed and grayish. On the berries small dark brown spots with red border appear; as they enlarge they become depressed, but remain circular. Cut out and burn diseased wood. Spray dormant vines with lime-sulfur (1-9). Spray the vines with Bordeaux mixture (5-5-50) first, when the shoots are about 12 inches long, second, just before the flower buds open, and third, just after the blossoms fall. Follow with two more sprayings about 10 days apart.

Black rot (*Guignardia Bidwellii*) shows on berries at first as small blanching areas. As the spots increase in size their surfaces become sunken and contain numerous small black pimples. Usually the entire grape is diseased and dries into a hard, shriveled mummy. Reddish brown spots appear on the leaves. Spray with Bordeaux mixture (5-5-50) as for anthracnose; destroy mummies; make applications of spray just before rains.

Downy mildew (*Plasmopara viticola*). Appears first on upper side of leaves as small yellowish spots, indefinite in outline. As these enlarge they turn brown and become dry and brittle. On the lower side of the spot a downy white growth, noticeable especially in moist weather, appears. Other parts of the vines are similarly attacked. Plow under old fallen leaves in the Spring. Make 5 or 6 applications of Bordeaux mixture (5-5-50) beginning just before the blossoms open.

Powdery mildew (*Uncinula necator*). Powdery white patches are produced on both upper and lower surfaces of the leaves. Finally on these white patches small black pimple-like bodies develop. Severe attacks cause dwarfing of the vines. Dust the diseased plants with sulfur from one to six times during the season.

LETTUCE

Drop (*Sclerotinia Libertiana*). Causes wilting of the plants which drop to the ground. White cotton-like growths appear on the under side of the leaves. Later small, hard, black bodies are formed. Remove and burn all diseased plants. Greenhouse beds may be disinfected with formaldehyde. Very difficult to control especially in field-grown lettuce.

Gray mold (*Botrytis sp.*). Seldom serious in the field. The edges of the outer leaves are first wilted, the wilted patches becoming covered with grayish, downy fuzz. The whole leaf may be affected and die, the disease working slowly toward the center of the head. Avoid high temperature, excessive moisture and poor ventilation.

LILAC

Mildew (*Microsphaera Alni*). White powdery patches form on the leaves. Later in the season these become a grayish white and bear minute black spherical bodies. Dust with sulfur.

LILY

Blight (*Botrytis sp.*). Yellowish brown spots appear on the leaves and buds early in the Spring. Later these enlarge and become covered with a light brown dusty mold, which destroys the leaves and blossoms. Remove infected plants and burn.

MELON

See Cucumber.

ONION

Blight or Downy mildew (*Peronospora Schleideniana*). At first patches of fuzzy down cover the affected leaves; these spots are soon blanched and in a short time the leaves are entirely wilted over. Spray with Bordeaux mixture. Not easily controlled.

Neck rot (*Botrytis Allii*). Causes a rotting of the Onion bulb at the neck, accompanied by a grayish fuzz and hard black bodies. The disease occurs in the field but is particularly severe in storage. Remove and destroy diseased plants. Store bulbs in a cool, dry, well ventilated place. Dry thoroughly before storing.

Smut (*Urocystis Cepulae*). Attacks young seedlings but not Onions grown from sets. Shows on the seedling leaves as elongated opaque spots, which finally rupture and expose a black powdery mass. Drill in formalin (1 pint to 16 gallons) with the seed at the rate of 200 gallons per acre.

PEA

Leaf spots (*Ascochyta Pisi*). Small, circular spots with dark borders and lighter centers, bearing small, black pimple-like bodies, form on the leaves. Similar spots are found upon the pods and stems, which also, are attacked. Avoid use of diseased seed.

PEACH

Brown rot (See Cherry). Dust with sulfur and arsenate of lead. Use a 90-10 mixture.

Leaf curl (*Exoascus deformans*). At first the new leaves swell and wrinkle, the leaf-blade puckering along the midrib. At this time the leaf is peculiarly colored with red and yellow tints. Later the upper portions of the affected leaf turn whitish and assume a velvety appearance. Spray in the Fall or the early Spring before the buds swell, with lime-sulfur (1-15). Cover every bud.

Yellows (Cause unknown). May be recognized by the yellowish color of the foliage and the premature development of the fruit. The appearance of an excessive number of slender yellowish shoots occurs in advanced stages of the disease. Destroy affected trees. Do not drag them through the orchard.

Scab (*Cladosporium Carpophilum*). Olivaceous to black, scabby patches on the fruit and twigs. When severe the spots run together. The fruit is often distorted and the skin may crack open. Spray with self boiled lime-sulfur (8-8-50) four to five weeks after the petals fall, and again three weeks later, or better, dust with sulfur and arsenate of lead, as for brown rot.

PEAR

Fire blight (*Bacillus amylovorus*). The blossoms, young fruit and twigs appear as if burned, but affected leaves remain attached to the twigs. Cankers are formed on the larger limbs and in the Spring milky drops filled with bacteria exude from them. Cut out the cankers in the fall and early spring and disinfect the wound with corrosive sublimate (1-1000). Later paint over wounds with coal tar. During the Summer remove diseased spurs and twigs as fast as they appear and disinfect cut surfaces with corrosive sublimate.

Leaf spot (*Mycosphaerella sentina*). Small angular spots with definite dark colored margins and grayish white centers are found on the leaves. Spray with lime-sulfur (1-50) just after the petals fall, two weeks later, and again in another two weeks.

Scab (*Venturia Pyrina*). See Apple scab.

PEONY

Blight (*Botrytis Paeoniae*). Causes a rotting off of young shoots early in Spring. Brownish spots with target board markings

form on the leaves. In moist weather a grayish fuzz may be observed upon these diseased portions. The same disease blasts the buds. Sometimes small black bodies are produced on the rotted stems. Remove and burn the diseased parts. Spray with Bordeaux mixture.

PLUM

Black knot (*Plowrightia morbosa*). Knots from $\frac{1}{2}$ in. to several inches in length are produced on the young twigs. At first olivaceous in color, they later turn to a coal black. Frequently the twigs on which knots form are bent back upon themselves. Remove and burn the knots in the Fall or early Winter.

Brown rot. See Cherry.

Shot hole (*Coccomyces prunophorae*). See Cherry.

POTATO

Blight (*Phytophthora infestans*). Spots, black in the center and with a water-soaked margin, begin to develop, usually at the tip or margin of the leaves. Under moist conditions a white frost-like down encircles the diseased portion. Soon the whole plant dies. At this time an offensive odor is developed. Spray with Bordeaux mixture (5-5-50) when the plants are about 6 in. high. Follow with other sprayings about 10 days apart. Spray just ahead of rain periods if possible.

Rhizoctonia stem rot (*Corticium vagum*). Small, brownish black bodies which may be easily removed from the skin, form on the surface of the tubers. The sprouts often rot before they get through the ground. The stem near the ground is also attacked and often rotted. Plants grown from such seed produce many little potatoes. Treat the seed with corrosive sublimate (4 ounces to 30 gallons) for $1\frac{1}{2}$ hours.

Scab (*Actinomyces scabies*). Rough scabs on the surfaces of the potato. Usually the margin is raised and the center depressed. Avoid the addition of lime or wood ashes to the soil. Treat seed with corrosive sublimate solution, (4 ounces to 30 gallons of water), for $1\frac{1}{2}$ hours.

RASPBERRY

Anthracnose (*Plectodiscella veneta*). Affects principally the canes, which at first show small, purplish elliptical spots. Later these become larger and somewhat sunken and the centers turn a grayish white. Sometimes these spots run together and large areas of the stems become diseased. Remove diseased canes. Set only plants free from the disease. Spray with Bordeaux mixture (4-4-50).

Orange rust (*Gymnoconium interstitialis*). A bright orange colored rust covering the under side of the leaves which become dwarfed and rolled. Dig up and destroy diseased plants.

Leaf spot. See Blackberry.

ROSE

Black spot (*Diplocarpon rosae*). Circular or oval black patches with indefinite margins on the upper side of the leaves. Often whole leaves become covered when these spots run together. Affected leaves turn yellow and fall prematurely. Spray with ammoniacal copper carbonate or dust with sulfur.

Powdery mildew (*Sphaerotheca pan-nosa*). Powdery patches on the leaves and sometimes on the young shoots. Dust with sulfur.

Squash. See Cucumber.

STRAWBERRY

Leaf spot (*Mycosphaerella Fragariae*). Small red to purplish spots which, as they enlarge, become grayish white and papery in the center with a purplish border. Remove the diseased leaves before setting plants and spray with Bordeaux mixture (4-4-50). Mow leaves after fruiting and burn over the patch.

SWEET POTATO

Black rot (*Sphaeronema fimbriatum*). Dark brown to black patches on the surface of the Potatoes indicate rotted portions beneath. The affected parts are dry and black. Avoid diseased sets and plant in soil that is not infested. Practice crop rotation.

Soft rot (*Rhizopus nigricans*). The potatoes become soft and wrinkled and a white, moldy growth develops on their surface. This later takes on a gray to blackish appearance. Store in a cool, dry, well ventilated cellar and from time to time remove all diseased Potatoes.

TOMATO

Blossom end rot. (Cause unknown.) A black, dry rot which occurs at the blossom end. Greatly influenced by the soil moisture. Increase the water holding capacity of the soil by proper cultivation, irrigation and addition of organic matter.

Leaf spot (*Septoria Lycopersici*). Small numerous circular spots with definite margins on the leaves. Small, black, pimple-like structures develop toward their centers. Spray thoroughly with fish oil soap-Bordeaux, especially the lower surfaces. Remove diseased leaves.

TULIP

Blight (*Botrytis parasitica*). On the dormant bulbs as small black bodies about the size of pinheads. Causes a spotting of the leaves and flowers and finally blights them. When the stem is rotted through, the plant falls over. A grayish fuzz may be seen on affected parts in moist weather. Select clean bulbs to set out in the Fall and in the Spring remove and destroy any diseased plants which may appear.

For complete works on the subject of this chapter
we recommend

DISEASES OF CULTIVATED PLANTS AND TREES, by George Massee. A valuable addition to agricultural literature, by the well-known author of "Plant World," "British Fungus Floral," etc. Illustrated. Cloth. 8vo. Price, \$2.90 postpaid.

DISEASES OF ECONOMIC PLANTS, by F. L. Stevens and J. G. Hall. A work designed to meet the needs of those who wish to learn to recognize and treat plant diseases without the burden of long study as to their causes. It indicates the chief characteristics of the most destructive plant diseases of the United States, and gives information regarding the best methods of the prevention and cure of these diseases. Illustrated. Cloth. 12mo. Price \$2.15 postpaid.

FUNGOUS DISEASES OF PLANTS, by Benjamin Minge Duggar. Every known fungus is classified and named, and numerous illustrations render considerable assistance to the unorthodox student in fixing identification. The principles and methods of soil sterilization are also covered. Price \$2.75 postpaid.
Secure your copy where you bought your Garden Guide.

Lawn and Garden Weeds

THE average table of pests—whether insects, weeds or diseases—is arranged alphabetically according to the scientific names of the subjects. This is all right for scientists and librarians who know these names and are interested more in the classification of the troubles than in their cure or prevention. But it is of little value to the practical gardener who doesn't care two straws what the Latin name of a bug or a weed pest may be, but who is deeply concerned in its habits and in the methods by means of which it can be eradicated.

The following table of the most common lawn and garden weeds is therefore made up along new lines. The first column lists the most obvious characters of the weeds, whereby the causal observer may recognize and begin to identify them. The next column suggests their distribution; the third, the season when they are in bloom; the next, their main habits and means of propagation; the next, brief directions as to how to destroy them; and the last two, their common and botanical names (in case the reader desires to look them up in other more exhaustive work). The weeds listed are those which give the greatest trouble in gardens, lawns and around homes, rather than in meadows, pastures, field crops and waste places.

Of course, weed destruction in a small garden or on a lawn where intensive care can be given and hand work done if necessary, is relatively easy. In any case, the principles of weed control are based on (1) preventing the plants from maturing and scattering seed; (2) preventing the introduction of new weeds, either in seed, manure, etc.; and (3) preventing perennial weeds from making any top growth—in other words, starving them out.

Large individual perennials such as Dock, Plantain, etc., and even Dandelion can be dug out with little effort and effectually disposed of. Annual seed bearing weeds are best controlled by thorough cultivation early in the season before the first crop has a chance to reseed. Every weed killed in May means hundreds prevented thereafter.

The biggest problem is encountered in fighting the perennials that spread by means of rootstocks and underground stems. Cultivation simply cuts up, distributes and helps to multiply these. If possible, the best plan is to dig out the entire root system and burn it. Where there is too much land for this, pigs will often clean up the weeds in a season, or they can be smothered out with a heavy crop of Buckwheat or Cabbage. Persistence is essential to success.

Lawn and Garden Weeds

A table listing the most common lawn and garden weeds, with directions for their identification and eradication

Plant Characters	Where it Occurs	Blooming Period Annual (A) Perennial (P) or Biennial (B)	How seed is spread and plant multiplies	Control Measures	Botanical Name	English Name
GRASSES AND SEDGES Leafy, branched roots at joints	Entire U. S. Hoed fields, gardens, lawns	Green flower A spikes June-Oct.	Seed spread in hay and grass seed and by animals	Prevent seed, cultivate thoroughly	Crab Grass	Syntherisma sanguinale
Creeping stem. Hardy	Mc. to Pa. and Minn. Cultivated fields	Green flower P spikes Aug.-Oct.	Seed in grass and grain seed. Root stocks	Repeated hoeing or discing every 10 days from July 1	Quack Grass	Agropyron repens
Resembles Millet	East, except extreme North	July-Sept. A	In hay and grain seeds	Mow often to prevent seeding	Barnyard Grass	Panicum Crus-galli
Triangular stems, nut-like tubers	All humid states moist gardens	Brown flower P spikelets	Wind, hay and other seeds also spreads by tubers	Cultivate clean 2 years then crop heavily	Northern Nut Grass	Cyperus esculentus
Dense, branching	Md. to Mo. South Hoed fields and lawns	Purple flower P spikes	Seeds sparingly Root stocks	Cultivate out thoroughly	Bermuda Grass	Capriola dactylon
VINES AND CREEPERS Resembles Morning Glory	Entire U. S. Fields and gardens	White or pink small P	In grain seed. Also by creeping roots	Cultivate thoroughly. Pull by hand. Apply salt	Bindweed	Convolvulus arvensis
Pink, fleshy radiating stems, small, round leaves	Entire U. S. gardens	Small yellow A flowers June-Oct.	By garden tools. Long, seeding period	Hoe out then destroy (Will re-root if left)	Pusley, purslane	Portulaca oleracea
WITH PROMINENT FLOWERS White; small, arising from whorl of leaves	Entire U. S.	May-Oct. A	Wind blown seed	Cultivate out	Shepherd's Purse	Bursa, Bursa pastoris
Small in cymes	Entire U. S. Waste-places and gardens	July-Sept. A	In hay, grass and Clover seed	Pull up by roots before it seeds	Fleabane, Horse-weed	Leptilon canadense
Small cymes, low, branching	Entire U. S. Lawns and gardens	Apr.-Oct. A	In grass and Clover seed. Animals	Cultivate and rake out	Chickweed	Alsine media

Plant Characters	Where it Occurs	Blooming Period Annual (A) Perennial (P) or Biennial (B)	How seed is spread and plant multiplies	Control Measures	Botanical Name	English Name
Large, flat heads, 1 to 3 ft. tall	Me. to Va. West to Miss. R. fields	All Summer B	In Clover seed. By wind and animals	Dig out. Destroy fleshy root	Wild Carrot (Queen's Lace Handkerchief similar, larger heads)	Daucus carota
Yellow. Flat heads, brilliant leaves on rosettes	Entire U. S. Lawns and fields	Apr.-Oct. P	Wind carries light fluffy seeds. Taproot spreads but little	Dig out. Apply sulphuric acid to cut root	Dandelion	Leontodon Taraxacum
Yellow. Small, later close clinging burs	Northern states gardens, roadsides	July-Oct. A	Seed carried on animal's coats, clothing, etc.	Cut to prevent seeding	Beggar Tick, Shicktight	Bideus frondosa
Purple. Small, thick leaves, heavy stems	Entire U. S. Escaped from gardens	All Summer P	Wind, roots and crowns	Careful, thorough cultivation	Live forever	Sedum telephium
WITH INCONSPICUOUS FLOWERS						
Spiny leaves, milky juice	Central states and far West	Small yellow flowers. June-Oct. A	Wind	Cultivate; prevent from seeding; burn over in early Spring	Wild or Prickly Lettuce	Lactuca verosa.
Finely cut leaves, hairy. Firm green seeds	Entire U. S. Gardens, hoed crops	Small yellow flowers. July-Oct. A	In field seed. Wind blows ripe plants	Mow before seeds ripen	Ragweed	Ambrosia elatior
Erect, mealy plants	Entire U. S. Gardens, hoed crops	Very small, green July-Oct. A	In grain and grass seeds	Prevent seeding. Spray iron sulphate 100 lbs. to barrel	Pigweed, Goose-foot	Chenopodium album
Coarse leaves, large root, winged seeds	Entire U. S. Gardens, lawns	Green, small P	In hay straw and seeds	Dig out or cut off and put carbolic acid on root	Dock	Rumex (several species)
Flat rosette of leaves, erect flower stalk	Entire U. S. Gardens, lawns, etc.	Very small, white; greenish seeds. All season P	In hay, clover seed, etc. Crown spreads slowly	Dig out. Cultivate thoroughly thereafter.	Plantain	Plantago (many species)

Readers will assist themselves to a proper understanding of the information given on these two pages by studying carefully the explanations on page 319. Weeds are disagreeable objects and a knowledge of how to keep them in subjection is a comfort and satisfaction to the land owner.

Greenhouses, Hotbeds and Frames

Advantages of a Greenhouse—What Can be Grown—Greenhouses for the Amateur—Span-Roofed Houses—Attached Conservatories—Heating—Frames and Their Uses—Management of Hotbeds and Coldframes—Useful Little Forcing Structures

IF we but appreciated a greenhouse at its true value, and knew the pleasure as well as the profit that can be derived from the possession of even a small one, there would be many more erected. It is a standing wonder that in a country so wealthy as ours there should be so few greenhouses attached to the residences of suburban and rural homes. A greenhouse of moderate dimensions, 12 ft. long by 8 ft. wide, can be had from a few hundred dollars up, and its upkeep will be nothing like so much as for an automobile.

So confident are we as to the pleasure derivable from the greenhouse, especially in the cold Winter months and in the Spring time before the ground is warm and dry out of doors, that we most heartily urge its consideration on the readers of *THE GARDEN GUIDE*.

Advantages of a Greenhouse

We merely wish to call attention in this place to the advantages of such a house. A succession of flowers can be had during the Winter at small cost, either by lifting the Geraniums from out-of-doors in the Autumn and potting them up, as well as Salvias and some other Summer flowering plants, or by sowing little batches of seeds, or planting bulbs and bringing these on gradually. We all know how difficult it is to make a success of Dutch bulbs in the ordinary dwelling house, owing to the dryness of the atmosphere and the fluctuation of temperatures. In a greenhouse these conditions can be regulated to suit the plants.

What Can Be Grown

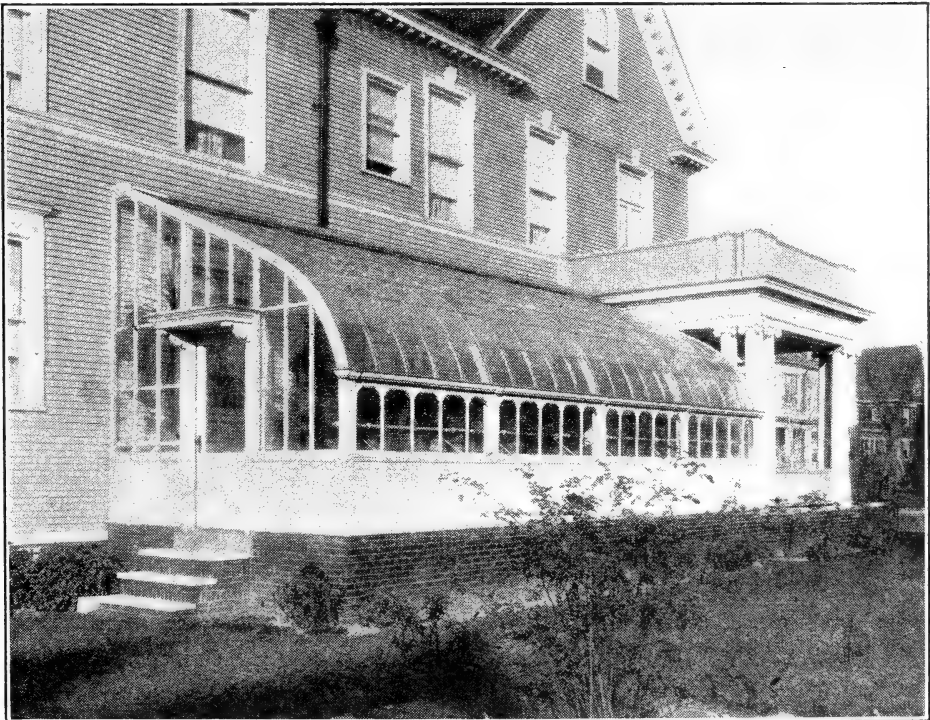
Among other subjects that can be grown are Chrysanthemums, Ferns, Azaleas, Forget-me-nots, Palms, Primroses, Cyclamen, Schizanthus (sometimes called Poor Man's Orchid), Pansies, Sweet Alyssum, and a great variety of other stock. One can frequently obtain a slip or a seedling from a friend, and in this way enrich one's little collection. There are many plants also that can be raised from seed.

Little cultural reminders are published in the seed catalogs, or as a cultural guide Oliver's "Plant Culture" is recommended.

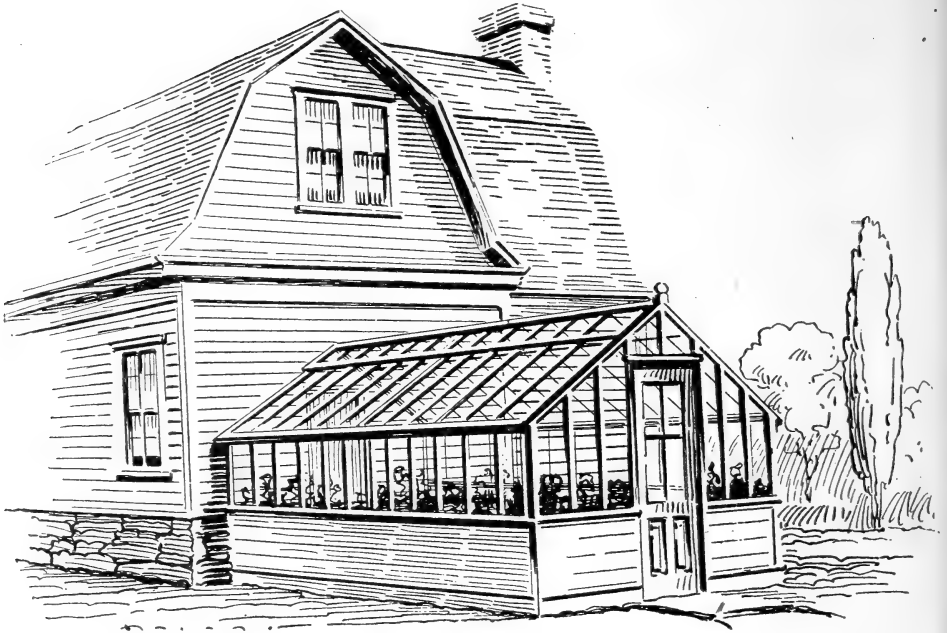
There are many hardy plants that are usually grown in the rock garden that can be placed in what are called flower pans, that is receptacles as wide as a 5-in., 6-in., or 7-in. pot, but only 3-in. or 4-in. deep—and which can be brought into flower in February, March and April in a greenhouse that has no higher temperature than 50 degrees.

Greenhouses for the Amateur

One well-known firm of greenhouse builders, makes a house 12 ft. by 8 ft. in size that is delivered, ready to be screwed together for a minimum sum. This smart little house is made of the best air-dried Cypress, with iron fixtures, bracers, ventilating push rods, galvanized hinges and everything complete, including six heavy iron posts for the support of the house. The glass is of the best double thick A quality, 10-in. wide. The sides are made in two panel sections, each 6 ft. long and 4 ft., 8½ in. high. There are two benches, 11 ft., 8 in. long, by 2 ft., 7 in. wide, allowing for a walk of 2 ft., 4 in. between. Altogether one has an indoor garden of nearly 65 sq. ft., and this includes also the little heating boiler, or in Southern parts of the country where a very little frost is experienced, no heating apparatus may be necessary, and the cost would be reduced by \$75.



A curvilinear roofed, lean-to conservatory by Hitchings & Co., with substantial brick foundation



One of Hitchings' small greenhouses, 10 ft. by 17 ft., suitable for so many moderate-sized suburban places

Of course, more elaborate greenhouses with cement or brick foundation, and of iron framework with curved eaved glass or in other shapes to suit the architecture of the residence, can be erected, but would run to considerably more money.

The greenhouse builders are always willing to give advice, or to estimate for the erection of a greenhouse, and it would be well to consult them whenever a building is contemplated.

Span-Roofed Houses

The best results are usually obtained from span-roofed houses running east and west, although any light position is satisfactory. The site should not be on wet or low ground, nor any very greatly exposed place, and the span-roofed type is generally preferred, although lean-tos or three-quarter span houses with the long slope to the south, are also excellent.

Attached Conservatories

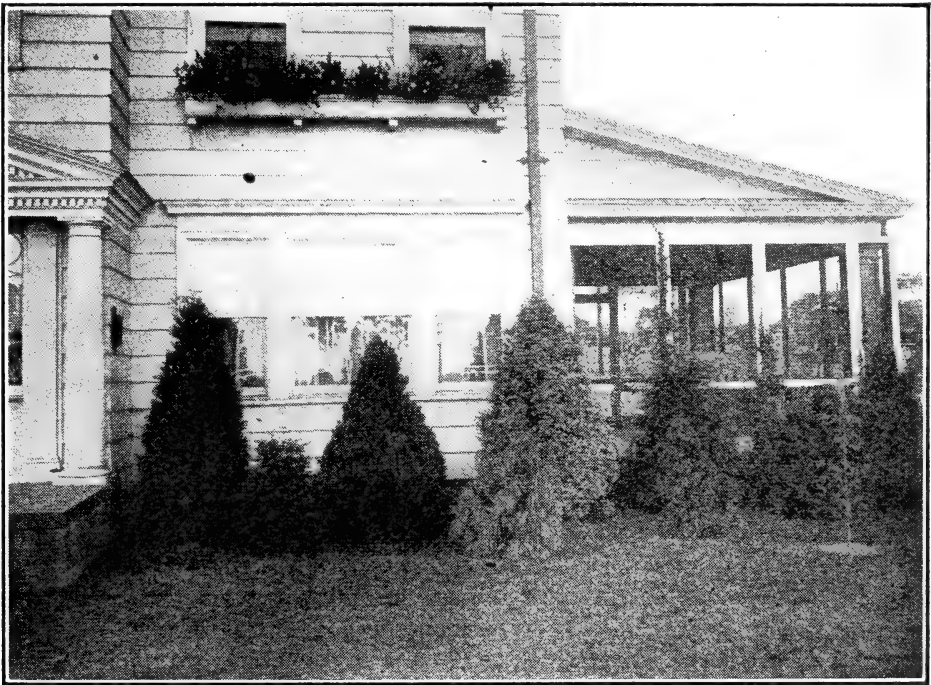
Some of the most beautiful, and we would say comfortable, conservatories we have seen were attached to the drawing room, or led into from the drawing room, thus making a light, beautiful lounge or extra drawing room. A billiard room can be built also in contiguity, and if the conservatory is large enough, aviaries, and aquaria for fancy fish, may be provided.

In other instances we have seen the conservatory set a little way out from the house, and connected with the latter by means of a glass corridor. Very beautiful results can be attained by planting vines and training them under the roof glass.

It should be mentioned that many of these greenhouses can be used for the growing of Tomato or Melon crops, or for the raising of early vegetables in the Spring, if that is thought desirable.

Heating

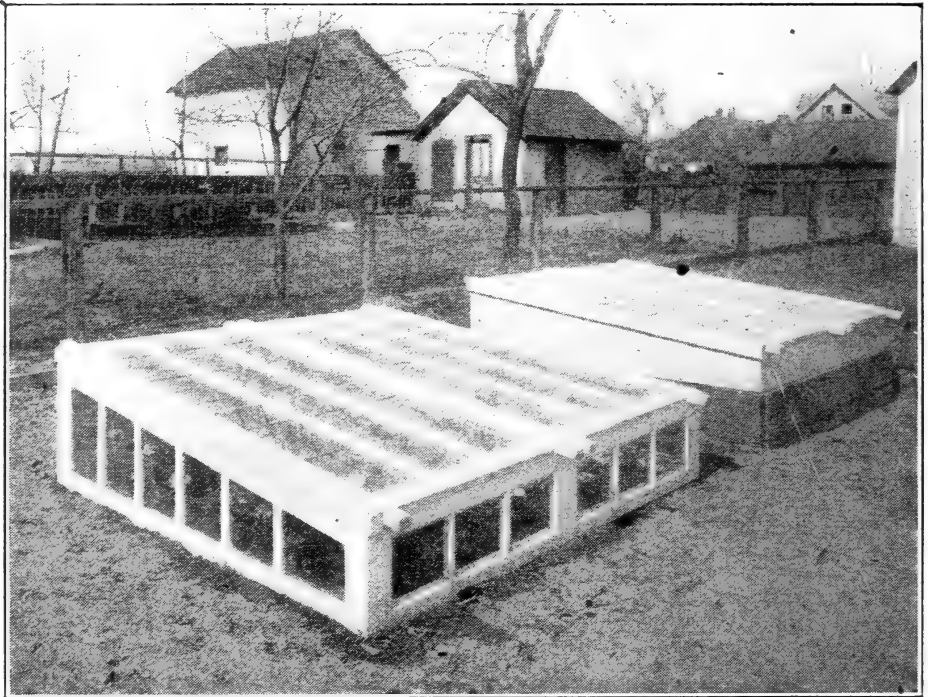
Amateurs' small greenhouses, such as the portable houses, 8 ft. 3 in. wide and 12 ft. to 20 ft. long, are invariably heated by hot water. The boiler is what is known as a Junior, and is usually placed in a



This exemplifies the beauty and value of a few choice, neat growing evergreens close to the house. Dwarf evergreens are also used for filling the window boxes. The sun parlor might well have been converted into a conservatory, or one could have been attached

cellar or put at one end of the house. Coils of 2-in. pipe are placed under each of the side benches, and these coils are connected to the boiler. There is a small open expansion tank at the end of the coils to fill the apparatus with water and take care of the expansion of the water in the system. The amount of radiation in the coils is generally proportioned for a temperature of 60 deg. at night when the mercury outside is at zero. The boiler is a very compact and efficient heater and requires no more attention than an ordinary kitchen stove.

A greenhouse 18 ft. x 25 ft. has usually three benches (two side benches and one center bench) and is heated by coils of pipes placed under the side benches only, leaving the space under center bench free so that bulbs or roots of various kind can be stored there. Hot water is invariably used for heating, as the boiler requires a great deal less attention and a more even temperature can be maintained than if steam is used. The usual temperature is 55 to 60 deg., but the coils are arranged and valved so that the temperature can be controlled.

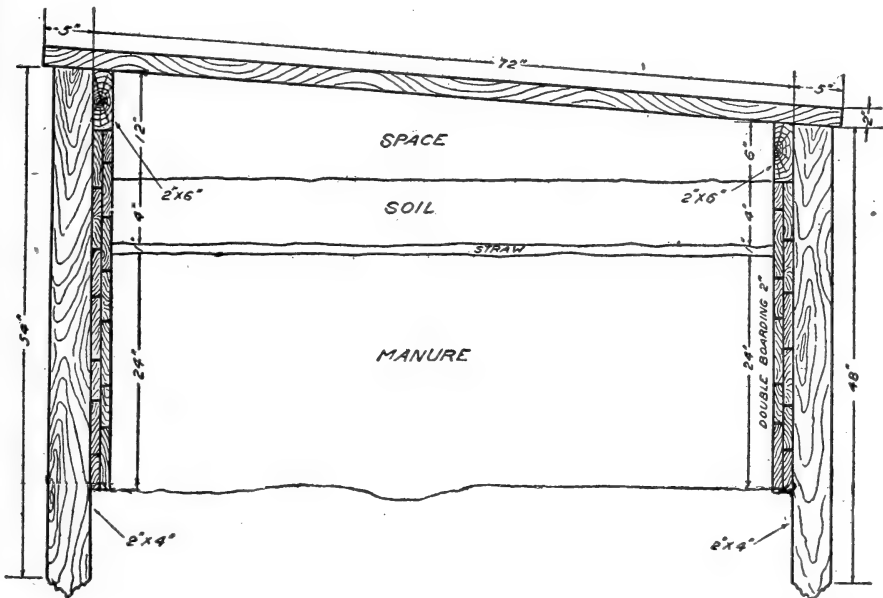


The "King Junior" garden frame made by the King Construction Co., a sort of miniature greenhouse, the top being on hinges. Being glazed on the sides as well as top the plants are afforded every possible bit of sunlight

■ A small, round, hot-water boiler is used for heating the coils. The boiler is arranged with a shaking and dumping grate. When the heating apparatus is filled with water and the fire started, the water circulates through the pipes and maintains the required temperature. The entire heating apparatus is simplicity itself; a child could take care of it.

When the greenhouse is 18 ft. wide and 50 ft. long, a partition can be placed in the center, making two compartments, and different temperatures can be maintained in each if desired. The compartment nearest to the boiler is usually heated to a higher temperature. If

Roses are to be grown in the warmest compartment, it is customary to place heating pipes under both side and center benches for bottom heat, and to dry out the benches. The heating pipes are so arranged and valved in both compartments that the temperature can be controlled as desired. For heating a greenhouse 18 ft. x 50 ft., a small square sectional water boiler is used. There are no steam gauges or complicated fixtures required on a hot-water heating apparatus.



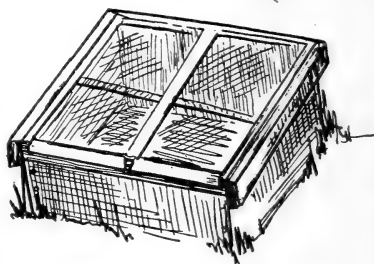
Section of a hotbed frame with details of measurements. Reproduced from a Cornell bulletin

Frames and Their Uses

The garden without its quota of frames is like an automobile without tires; you may run it, but it is hard and slow work to get anywhere with it. Frames, properly managed, will accelerate and supplement the garden throughout the year. The frames (which you can build yourself with little trouble if you do not care to buy them) and the sash are not expensive. With reasonable care and if kept well painted they will last indefinitely. The writer has a sash which has been in continuous use for over twenty-two years. Concrete frames are growing in popularity, as they can be built at little additional expense and will last practically forever. They are tighter and warmer than wooden frames, and they do not warp or settle, so that the sash always fits them tightly, a very important point.

Standard size sash covers a space 3 by 6 ft., and the frames to support it are made to correspond. In building of wood it is better to use 2-in. planks, although inch boards are often employed. In building a wooden frame, after ascertaining the correct size to fit the particular sash you are buying, put in posts of 3 by 4 in. stuff with the inside corner planed down for an inch or so, to avoid a sharp edge. There should be a drop of about from 3 to 4 in. from the back to the front. If you can get boards or planks 6 and 9 in. wide, and 6 or 12 ft. in length, practically no cutting will have to be done in building the frame. Let the sides come down well below the ground as the soil inside should be a few inches below the general ground level. After it is finished, a layer of gravel or roofing slate on the outside, or banking up with soil, nearly to the top, will greatly increase its efficiency in keeping out cold. Concrete frames should be made 4 to 6 in. thick and sunk well below the ground level so that the frost cannot get under the mason work.

At least part of your sash should be of the double-glazed type. Two layers of glass instead of one are used, with the result that the thin air space left between them forms a cushion of dead air which is as effective as a blanket of wool or canvas in keeping out the cold, while it admits the light and sunshine as readily as a single layer of glass. With a good tight frame and double glass sash, crops may be grown well into the Winter, and started very early in the Spring, without any other protection.



Small forcing frame

With single glass sash, wooden shutters or burlap mats are used as an extra covering in cold weather. If these are employed in addition to double glass sash, half hardy crops, such as Lettuce, can be carried through very severe weather without any artificial heat at all, and the frames will be ready for use in the Spring as early as they may be wanted, without having to wait for them to thaw out.

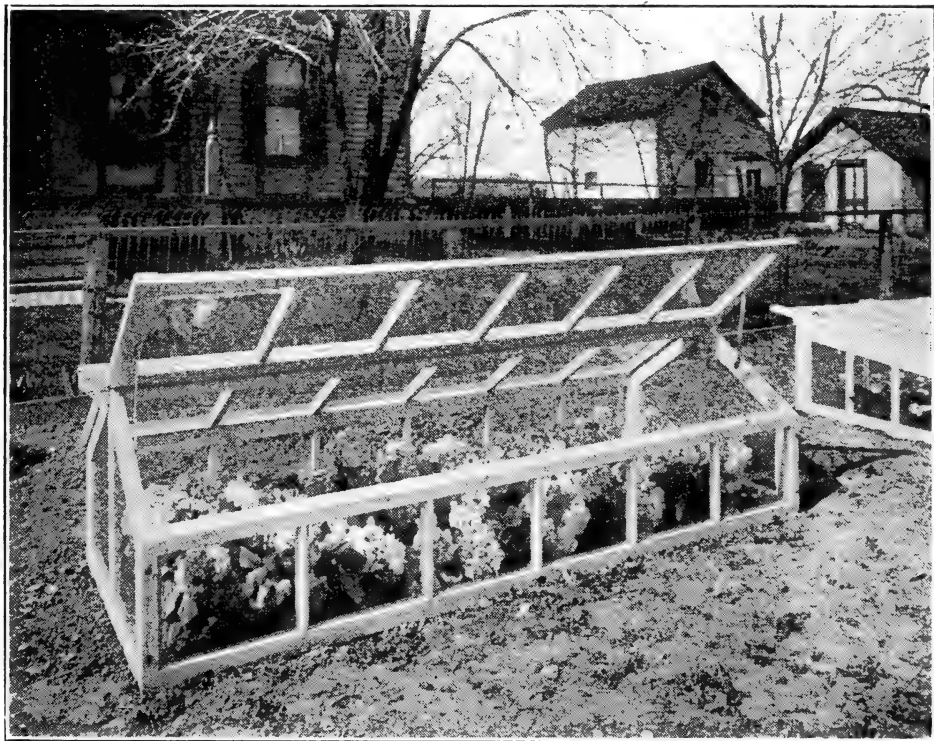
Hotbeds are made one to two feet deeper than for coldframes, to allow for the layer of manure put in to furnish the heat.

Location

Generally it is best to locate with southern exposure and with a protection of trees or fence at north (see p. 330). Three feet should be allowed back of frame to the fence to allow for working facilities. Do not put the frame where the Spring rains may drain into it. Good drainage is especially important in Winter as well as in Spring.

Preparation of Bed

During Winter deep the snow out by a covering of boards. In the middle of March, or six or eight weeks before plants can be safely put out of doors, if the bed has been constructed as directed, two feet of fresh manure is placed in the frames. Nothing but fresh manure will suffice, horse manure being best, which has been piled and turned several times to bring to a uniform temperature. As placed in frames, the manure should gradually be stamped rather firmly. To insure more uniform heating a layer of straw is used to cover the manure. Soil which has been stored in basement is then spread over to a depth



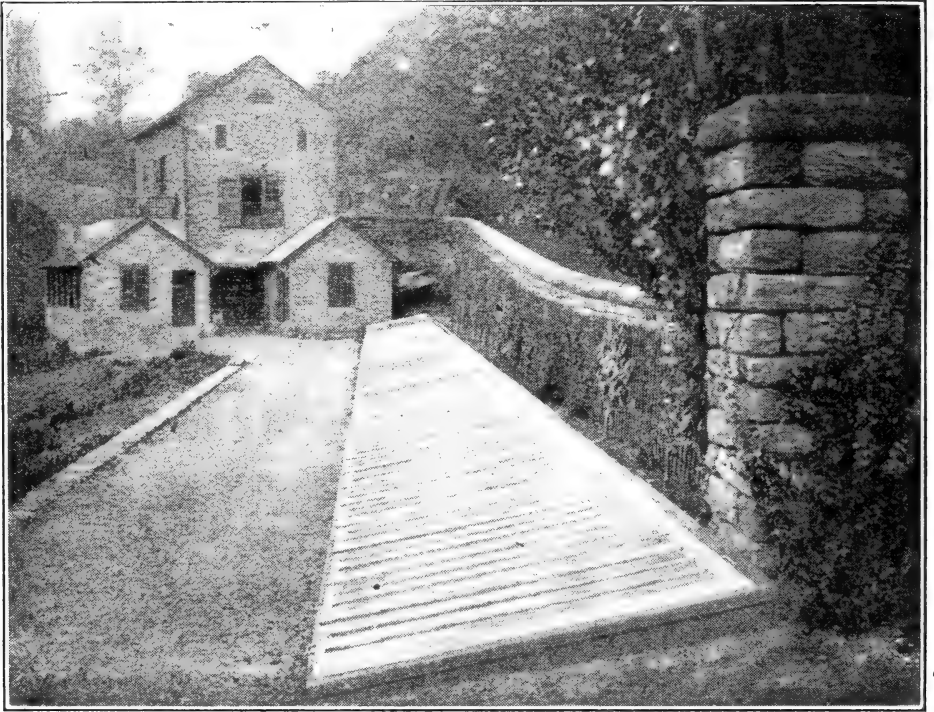
One of the King Construction Co.'s double-glazed frames, a very valuable type

of four inches. The soil should be rather sandy and should consist of good loam, leaf mold, sand and some well decayed manure. Put on the sashes and, as Mrs. Rion, in "Let's Make a Flower Garden," says: "Let her bile." It will steam tremendously for four or five days, then it gets down to regular business of more or less even heat. There are nice thermometers to be had to take the bed's temperature; find out when its fever has dropped below ninety degrees; then you know it is t me to go ahead and plant.

Another sort of hotbed may be constructed by placing a coldframe upon a heap of manure which in the colder regions should be a foot and a half thick when packed rather firmly. Hotbeds can be easily heated by running a pipe from the heating plant of the house into the frame which can be located near the house.

Management of Hotbeds and Coldframes

Radish, Lettuce, Cabbage, Tomato, Cauliflower, Aster, Pansy, Scarlet Sage, Verbena, and such seeds, are planted in rows, several inches apart. The ventilation of the frame must be carefully attended



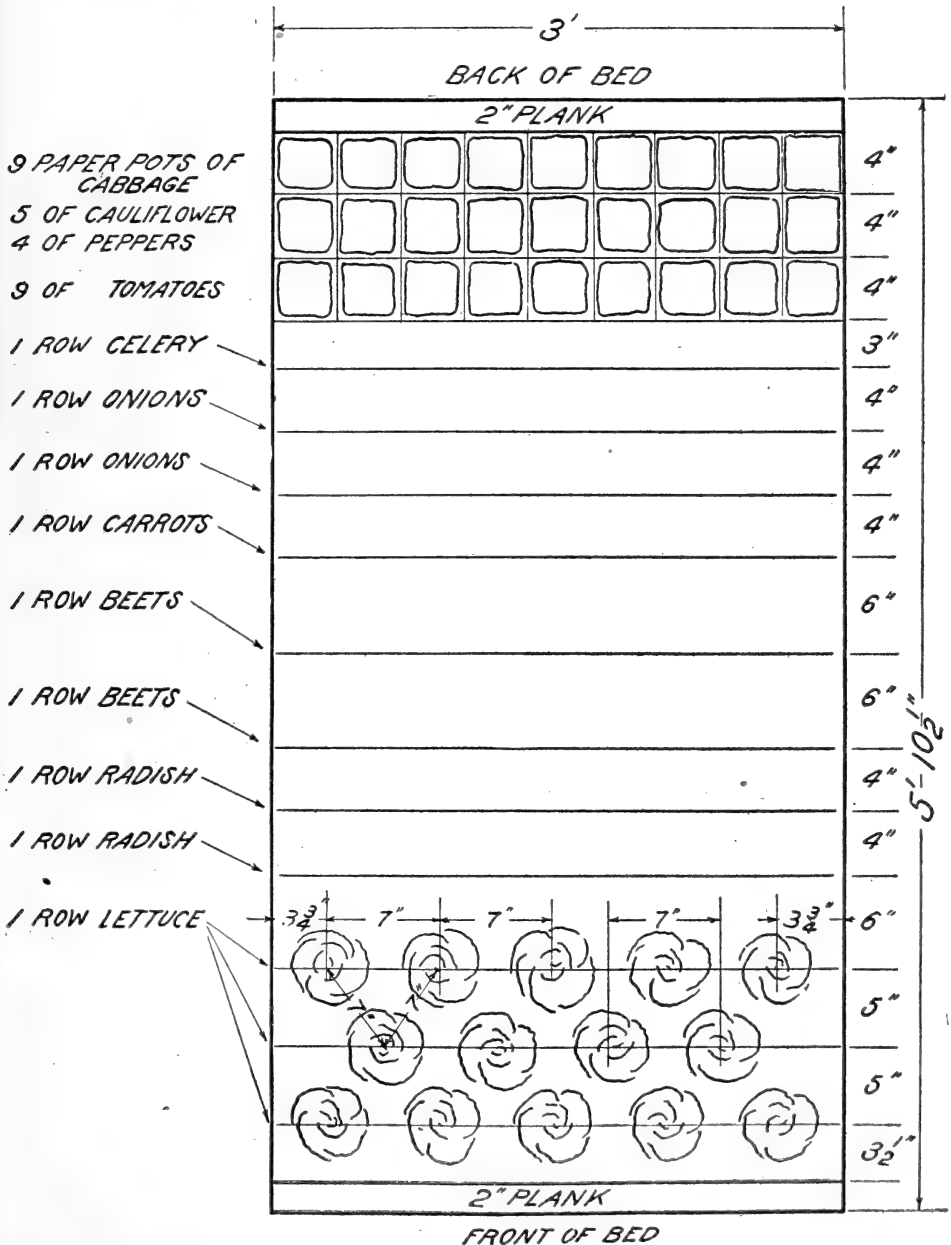
A well-sheltered line of coldframes facing due south. How invaluable they are

to and if moisture condenses on the glass the sash should be lifted a trifle on the side away from the prevailing wind. Sashes should be capable of being raised at any angle. Much damage can be done by leaving the frame closed tightly on sunny days, for the crops are easily burned.

The watering should be done on sunny mornings. When the plants have produced their third leaf they should be transplanted, according to their various needs. Lettuce will, perhaps, be matured in the frames and will need to stand eight inches apart, while Tomatoes

may be set out three inches apart and transplanted again. On real cold nights the hotbeds should be covered with some sort of mat, either of straw or padded cloth.

Prof. Wilkinson of Cornell University gives the following discussion of vegetable combinations that can be grown in a hotbed:



Plan for the planting of a hotbed. The frame is 3 ft. wide by 5 ft. 10 1/2 in. long

“Radishes, Lettuce, Beets and Carrots seem well adapted for growing together, while Tomatoes, Egg Plants and Peppers, although they can be raised with the others, will grow better if given a higher temperature than, and conditions slightly different from, those required by the first four plants named. Through experience the various requirements of different plants will become known to the grower.

“A good plan for planting a hotbed for the home garden is shown on page 331. The Cabbage, Cauliflower, Tomatoes and Lettuce that are transplanted to this bed can be first raised in a small flat, which is a wooden box twelve inches wide, eighteen inches long outside and two and one-half inches deep, filled with dirt, either earlier in this bed, in another bed, or in the house at a sunny window or behind the stove. Other plants, such as Radishes, Beets and Carrots are sown for maturing in this bed. For the best results they will require thinning, the Beet thinnings being used as greens. The seed of Celery and of Onions is sown and the seedlings are transplanted later.

“After the Lettuce plants have been disposed of, one row of Cucumber seeds may be planted, the plants being thinned later to six inches apart. Cucumbers may be planted also after the pots at the back of the bed are removed. The Cucumber plants are then allowed to spread at will and to mature a crop of Cucumbers for slicing or for other uses as required.

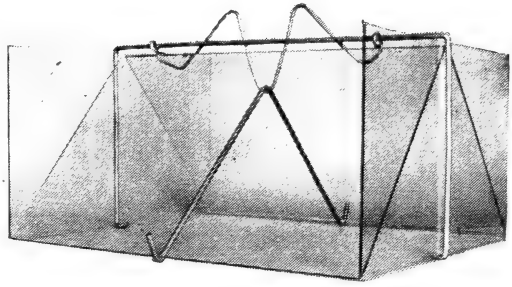
“After one crop is taken out another can follow, the soil in the bed being forked over and raked level between crops, and after the manure is spent the bed can be used for the development of vegetables throughout the Summer. In the Fall the soil and the spent manure is taken out of the hotbed pits, the sash is stored away, and the board covering is replaced for Winter protection. Fresh manure is used every Spring, also fresh soil, the process of making and managing the hotbed changing only as the operator becomes more experienced in successful hotbed work.”

The same treatment should be given coldframes, except that they can not be started so early.

Useful Little Forcing Structures

The gardner's inventive genius will devise a hundred ways of growing the earliest possible plants out of doors. He will use boxes with glass lids and butter bell-jars. Finally, he will see the advantage of a small individual coldframe and will have small coldframes one or two feet square constructed, in which he can cultivate Cantaloupes, Cucumbers, early Peppers, Squash, Lima Beans.

The Cloche Co. has devised a very ingenious plant forcer made of glass held together by wires. They are sun catchers and should be a great factor for early results. It is a handy and useful method of growing vegetables under what it calls "cloches."



The "Gro Quick" Forcer. A miniature greenhouse, complete in itself

There is a system of forcing under bell-jars called "French gardening." It takes a great deal of labor and a very perfect condition of soil, but enormous crops are grown on small areas. Those who are interested in vegetable growing should read about this French system of gardening.

A new type of frame, which is practically a miniature greenhouse, can now be bought. (See illustration page 326.) Double glazed sash are also used, and a miniature heating plant can be operated in cold weather in a little enclosure at one end of the frame. This does away with the inconvenience and the trouble of procuring and handling manure to furnish artificial heat.

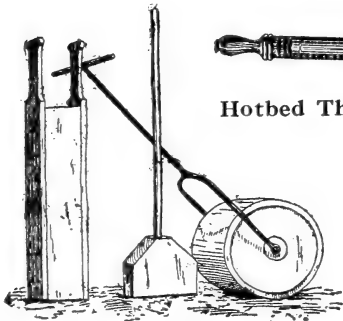
The satisfaction that you will get from your frames will depend upon your carefulness in planning their use. Look ahead and have one crop growing and ready to occupy frame space as fast as another is removed. Thus, in the Fall, you should start Lettuce in August or early September to be large enough to set in the frames as soon as frosty weather arrives. Radishes can be planted and half-grown before it is necessary to put on the glass. Lettuce started in January or February in the hotbed or in the house will be ready to set out in the frames in February or March. Cucumbers or Melons started in paper pots can be set into frames after the Spring grown plants are removed, weeks earlier than they can be put out of doors. Plan always for a succession of crops in your frames, just as you do in your garden.

*For a complete work on the subject of this
Chapter we recommend*

GREENHOUSES; THEIR CONSTRUCTION AND EQUIPMENT
by W. J. Wright. Opens with a chapter on the construction of sash beds, and continuing with much valuable information concerning the location, adaptation, general construction and equipment of greenhouses as will enable the reader to decide upon the type of house best adapted to his needs. The endeavor has been to make the volume of service to the present owner of a greenhouse and to those who may contemplate building, whether it be a small private house or a large commercial range. There are sixteen chapters devoted to structural material, methods of erecting the framework, glazing and painting, ventilation, machinery, heating, boilers, fuels, concrete construction, water supply, plans and estimates. 268 pages, cloth. Price, \$1.90 postpaid. Secure your copy where you bought your Garden Guide

Garden Tools

THE presence of a garden always carries with it the need for some tools. The first tools needed, perhaps, are a spade, fork, rake, trowel for transplanting, hoe, sickle for trimming grass, and a watering can. In all of these tools nothing is more important than their strength. Strong unions of the steel to the wood are important, for it is here that the tool breaks most quickly. All the tools that are meant to be sharp should be kept so, or else their work cannot be done



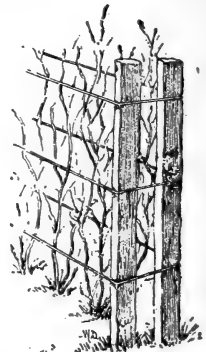
Two lawn beaters or levelers and a garden roller



Hotbed Thermometer



Light ladder used for gathering fruit

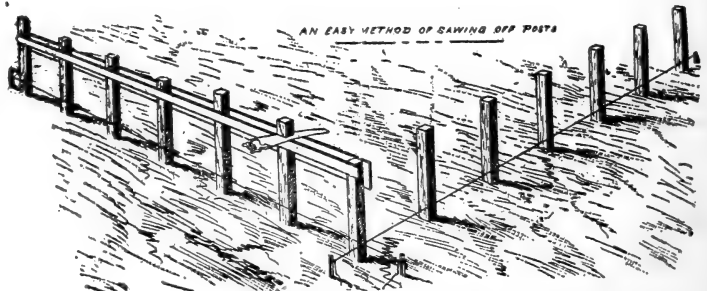


End posts and wires or strings used for Pea or Bean supports

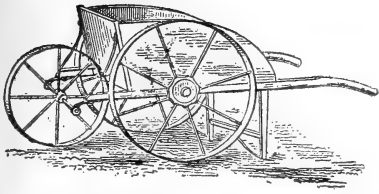
efficiently. The spading fork is especially useful in digging up borders and about trees, as it does not cut off roots. If a half-moon turf cutter is not available, the spade is indispensable for edging beds. Large and small hoes are both useful, the large one for general use, and the small one for working about in small places. The Dutch or English scuffle hoe is most useful for loosening the surface of the soil and cutting



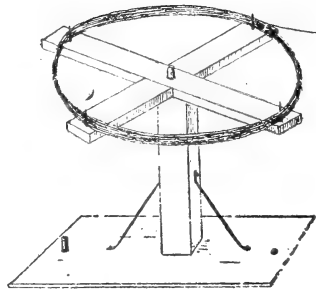
Hand Spading Fork—Buy a good one



An easy method of sawing posts off level



A broad-wheeled barrow



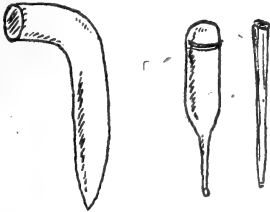
Device for winding cord or wire. A modification of this can be used for winding hose-pipe



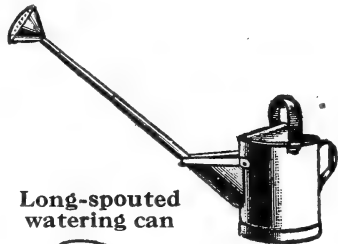
A sickle, sometimes used instead of shears



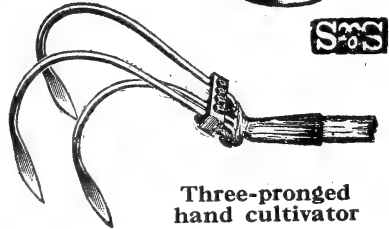
Garden steps



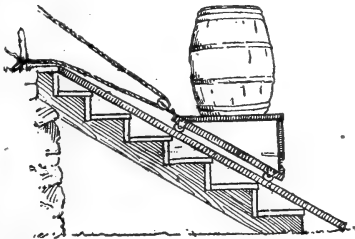
Dibbles. The small ones are safest unless the soil is loose and spongy



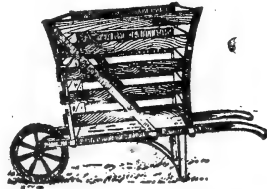
Long-spouted watering can



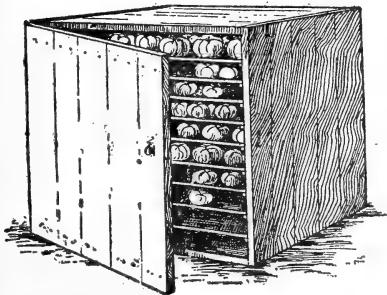
Three-pronged hand cultivator



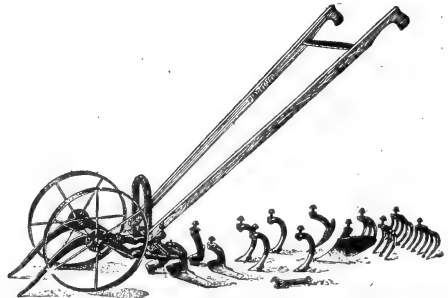
Shows a device for hoisting a barrel up steps or incline



frame barrow for leaves, grass or similar material



Shelves and temporary storage box for fruit

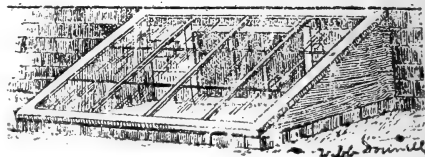


Planet Jr. No. 11 Double Wheel Hoe complete with accessories

off weeds. A small hand cultivator is now on the market having prongs which are easily removed or of which the cutting angle may be changed.

Many will feel that a wheel hoe is a very useful accessory tool; it will certainly come in handy, and can be used for hoeing, cultivating,

furrowing, hilling up or raking. Combination seed drills and wheel hoes are also very serviceable. For the larger vegetable garden the seed drill is most useful. With a seed drill the furrow can be opened, the seed sown, covered, the soil compacted over the row and the next row marked.



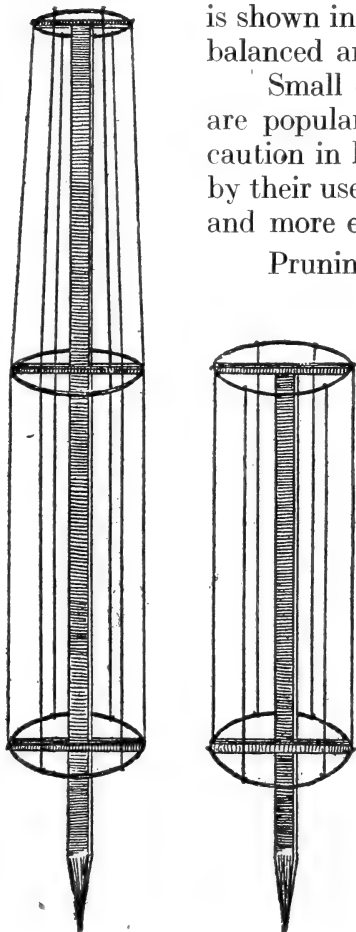
A little frame against a basement window

A wheelbarrow will surely be wanted; a good type is shown in the sketch. Some wheelbarrows are poorly balanced and are difficult to handle in the garden.

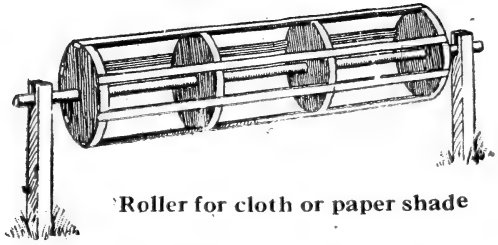
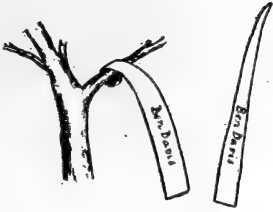
Small dibbles of different sizes for making holes are popular with many but they should be used with caution in heavy soils that are likely to be compacted by their use. Often a narrow bladed trowel is a safer and more efficient tool.

Pruning shears which are procured at ridiculously low prices are never worth anything. They are not sharp and injure the plants because in attempting to cut a branch, it is pinched and crushed. Good steel shears should be chosen fitted with strong springs which will cause them to open after cutting. The larger hedge and grass shears should also have these springs, otherwise they are a nuisance.

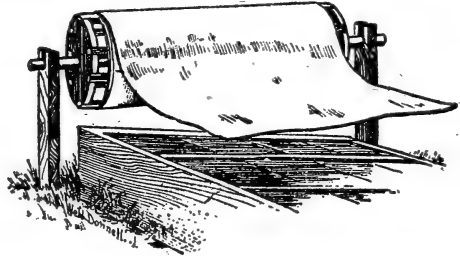
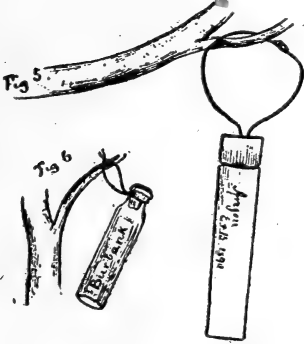
For the lawn we need as well as the standard ball-bearing lawn mower, a narrower one for trimming the edges; if you have much lawn you will appreciate the value of this machine for trimming to the very edge. A wooden leaf rake or one of those with bent wire teeth will enable you to keep the lawn neat without tearing the turf as usually occurs when the ordinary steel rake is used.



Tall and short supports for Beans
other climbing plants



Roller for cloth or paper shade



Showing how simply a shade or protecting cover can be unrolled

LABELS FOR FRUIT TREES

The top two are of thin strips of copper or tin; the largest one is of wood, while a third is shown in a sealed bottle



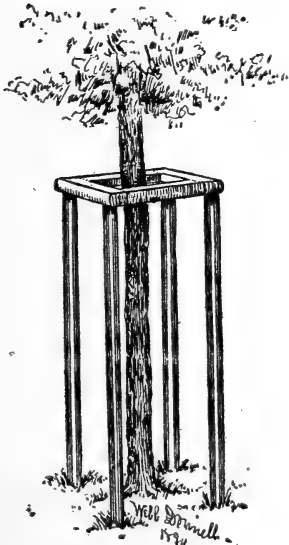
Two pairs are really necessary—one for light and one for heavy work



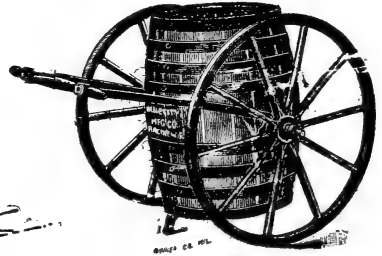
Approved form of Asparagus Knife



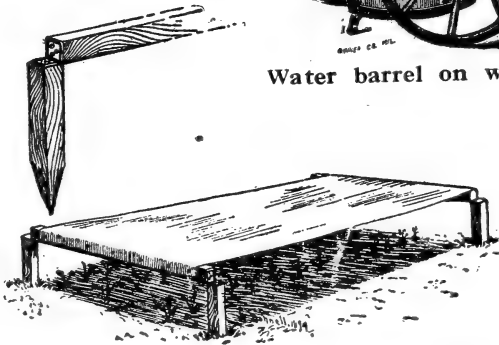
Hand Trowel—The best obtainable is none too good



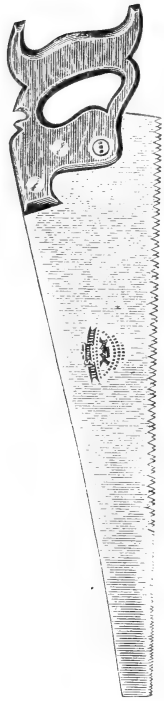
A tree guard



Water barrel on wheels



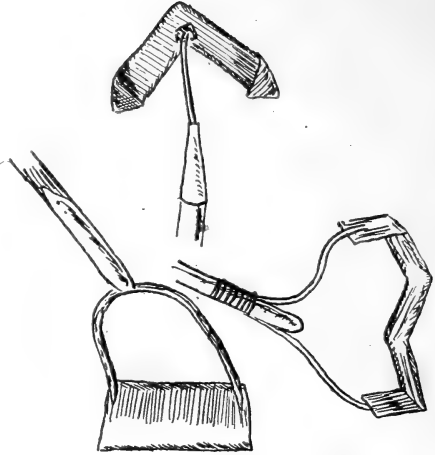
Shade for young plants and seedlings



Pruning
Saw

To keep the rows straight in the vegetable garden, a good stout garden line is necessary.

For cutting glass to be used in the hotbeds a glass cutter should be at hand. Very cheap steel ones can be bought, as well as better ones with diamond points. It is a rather simple matter to cut glass if a flat surface is available. The main object is to get a deep, even cut entirely across the glass.



Scuffle hoes of different patterns

Gloves are needed when pruning Roses and other thorny plants. Perhaps old discarded ones are as good as anything bought for the purpose. In this connection, too, keep a stout pair of heavy, loosefitting boots handy to be slipped on whenever there is garden

work to be done. Low shoes, sneakers, etc., may seem more suitable for hot weather, but avoid them. They are continually filling up with pebbles and gravel and in wet weather, in the early morning, or when you are using the hose they are no protection whatever. When you garden dress for it; it pays.

Here is a suggestive list of some really necessary tools:

Garden Requisites

Bellows, Powder	Hoe, Ordinary and Scuffle	Shovel, Square Pointed
Dibber	Hose	Spade
Forks, Hand Weeding and	Lawn Mower	Sprayers, Hand and Auto-
Spading	Lawn Roller, Water Ballast	matic
Garden Line	Lawn Sprinkler	Thermometer, for Hotbed
Glass Cutter	Lawn Trimmer and Edger	Torch, Asbestos (for burn-
Glazing Points	Rake	ing out insect nests)
Gloves	Saw, Pruning	Trowel, Transplanting
Grafting Tool	Combination Seeder, Wheel	Watering Pot
Grass Hook (Sickle)	Hoe, Cultivator, etc.	Weeder, Hand
Grass Edging Knife	Shears, Pruning	Wheelbarrow

Nearly every seed store handles these supplies and lists them, so before making purchases readers should look over their seedsman's catalog, and in the case of the beginner it will pay to consult the seedsman personally as to the best tools for his primary needs.

Additional Requirements. A wire cutter will quite frequently be found of service. A measuring rod can be manufactured at home for marking the distance between rows and the distance between the larger plants. A supply of raffia or soft twine, for tying up plants to stakes, etc., is an essential. No gardener with a plot over 25 x 40 ft. should be without that greatest of labor saving devices, the Combination Seeder, Wheel Hoe, Cultivator, etc. Have your seedsman show you the many excellent models of this really wonderful implement, which can be bought in all combinations and at varying prices.

Calendar of Garden Operations

THE [suggestions for the work for the various months must always of course be merely approximate. Seasons govern land operations; latitude and altitude have also a wonderful influence on the climatology of a given place.

Prof. J. W. Lloyd, of the University of Illinois, in his book on Vegetable Growing, makes three sections, the Central, Northern and Southern, but says that no absolute boundaries can be ascribed, one merging into another in a general way. For example, the territory lying between the 37 and 42 degrees parallels of latitude may be considered as essentially Central, while the area north of the 42 degree may be considered Northern, and that South of the 37 parallel Southern. These boundaries refer only to relatively low elevations, and do not apply in the high altitudes of mountainous regions.

Calendar for Northern and Middle States

JANUARY

This is the month for planning ahead; think over the alterations you are going to make in the garden, the purchase of new plants and stock. It is also the month for the ordering of early seeds, and for looking over catalogs. The pruning of some outdoor shrubs may be done (see Pruning, p. 259) as well as of fruit trees, if the weather allows. Keep snow from specimen evergreens.

Give air to coldframes whenever the temperature is well above the freezing point. Take Asparagus and Rhubarb to greenhouse for forcing, and place them under the stages. Sow Lettuce, Cauliflower, Cabbage, Onion and Leek under glass.

FEBRUARY

Sweet Peas may be sown in pots in the greenhouse or in frames if they are intended for exhibition. Keep Violet plants clean, and begin taking runners for the supply of new plants for next year. Stakes and labels may be got ready for Spring and Summer. Collect hotbed material. Spray fruit trees against San José scale.

MARCH

Pruning may be done on Catalpas, Hibiscus, Vines. By the end of the month protective material may be taken away from most of the shrubs. Lawns should be swept, rolled, re-seeded and top dressed. Pansies, Daisies, dwarf Phlox may be planted at the end of the month. About the 17th make a hotbed. Sow seeds of annuals and perennials, especially Asters, Begonias, *Cobæa scandens*, Coleus, Gypsophila, Nicotiana, Petunia, Phlox, Ricinus, Salvia, Verbena, Zinnia, in the greenhouse or in frames. Sow in the greenhouse or hotbed, Peppers, Egg Plant, Tomato, Cucumber and Melon.

APRIL

Set out plants of Cabbage, Cauliflower, Celery, Kohl-Rabi, Leek, Lettuce from frames.

Set out plants of Alyssum, English Daisy, Dianthus, Myosotis, Pansy. Also sow in frames seeds of above and Asters, Candytuft, Celosia, Centaurea, Dianthus, *Dimorphotheca*, *Eschscholtzia*, Hollyhocks, Marigold, Morning Glory, Nasturtium, Poppies, Pyrethrum, Sweet Peas, Sweet William. Seedlings sown in March need transplanting. Make cuttings of all house plants that will stand it, such as Geraniums, Coleus, Begonias. Give them an indoor start. Sow outside Beets, Carrots, Corn (extra early), Kohl-Rabi, Leek, Lettuce, Onions, Parsley, Parsnips, Peas, Potatoes, Radish, Salsify, Spinach, Swiss Chard, Turnips.

Divide perennials and plant others received from nurseryman. Plant shrubs and evergreens. Plant Apples, Pears, Peaches, Plum trees, Currants, Gooseberries, Strawberries. Plant Beans, Corn and Cucumbers, Melons, Pumpkins, when Apples bloom. Give the Rhubarb some manure and nitrate and cover with box to keep it tender.

Asparagus: Dig in the mulch and give nitrate and other fertilizer. Leave a few stalks for beetle traps. Prune hedges.

MAY

Frames need attention to watering and ventilation. Sow seeds for late crops of Cabbage and Cauliflower. Nothing is gained by setting out Egg Plants and Peppers too soon. Wait until it is really warm before removing from coldframes. You can keep the soil between the Onion and Carrot rows stirred if you have planted Radishes between and can see where the rows are.

Spray fruit. Plant *Gladiolus* till late in June. Plant about four inches deep. Dahlias may be planted for later blooming.

When planting be sure to divide Cannas.

In the region of Central New York it is hardly safe to set out any bedding stock before May 30. A frost usually comes quite near this date. Roses bought from nurserymen can be set out.

Spray Currants with arsenate of lead wash, against caterpillars.

Plant Gladiolus, tuberous-rooted Begonias, Caladiums, Cannas, Tuberose, Madeira vine. Start Asparagus seed to keep up your stock. Put up window boxes, porch boxes, hanging baskets.

Make another sowing of all crops already sown. Sow early Corn, Cucumber, Melon and Squash. Thin crops to prevent overcrowding. Examine Peach trees for borers. Spray for codlin moth as soon as Apple blossoms have fallen. Dust with hellebore powder for caterpillars on Gooseberries.

JUNE

Dahlias may be planted up to the middle of the month. Tender or half hardy annuals can be sown out-of-doors. Plant out tender Water Lilies. Spray against Rose bugs and aphid. Tie climbing Roses and vines. Keep all land well cultivated. See that recently planted trees are kept watered. Evergreens may require to be sprayed with clear water to prevent wilting. Lawns also may require watering. German Iris can be divided and replanted at the end of the month. Make successional sowings of desired vegetables. Sow Sweet Corn for September; also start Cabbage and Brussels Sprouts for Autumn use. Store away temporary frames and sashes.

JULY

Some pruning can be done to certain shrubs (see Pruning chapter) that have flowered, but this should mostly be done merely to thin the growths and allow room for the development of new ones, as in the case of the Flowering Currant, climbing Roses, *Spiraea Thunbergii* and *Vanhouttei*, *Calycanthus florida*. Give herbaceous borders and flower beds constant cultivation. Staking must be done wherever plants require it. Trim lawns and hedges. Divide Japanese Iris. Remove seed pods from Rhododendrons. Keep everything well watered. Cultivate thoroughly. Plant Sweet Corn and Beans for use in late September. Plant out late Tomatoes, Celery, Cabbage and Brussels Sprouts. Sow Endive for use in Fall.

AUGUST

Evergreens may be moved now. Transplant Iris, Peonies, Oriental Poppies and Madonna Lilies. Spray Box plants for red spider. Dust the lawn with bonemeal after a rain, or after watering it thoroughly.

Last planting of Beans can be sown, Carrots and Beets also. Sow late varieties of Peas. Sow Spinach. Look over the Cabbage before it heads, for Cabbage worm and hand pick. Onions are gathered near the last of the month. Order bulbs. (Read chapter on Bulbs.) Keep runners of Strawberries cut. Early in month sow perennials in some sort of frame. Cut flowers to prolong the season of blooming.

SEPTEMBER

New lawns may be made. Shrubs or trees may be transplanted at the end of the month. Cuttings can be taken of Geraniums, and some other bedding plants, and seeds of perennials and biennials sown. Plant early Dutch bulbs. Begin to blanch late Celery with soil or brown paper. Dig late Potatoes and harvest the Onions that were grown from seed.

OCTOBER

Dutch bulbs can be planted this month; the sooner they are planted the longer period they have for rooting before Winter starts and the better the results. Seedlings of hardy plants may be transplanted, and hardy borders can be re-made. This is also a good month for the thinning out of the branches of fruit trees before the leaves fall. Collect leaves for the making of leaf mold, or for protection purposes. Collect Corn stalks. Roses can be planted. Prepare compost pile for hotbed or greenhouse for Winter and Spring and take under cover. Place Parsley plants in frames for Winter use. Blanch Endive.

NOVEMBER

Leaves can still be collected. Plant bulbs, trees and shrubs, as well as hardy plants. By the end of the month protective material should be placed around the Rhododendrons, Hydrangeas and other shrubs. Dig up Cannas and Dahlias and store them. Take in Bay trees and Cacti to shelter. Store Potatoes and all root crops. Clean up generally. Dig some Rhubarb before ground freezes hard.

DECEMBER

Tie up evergreens. Knock snow off branches of large trees. Protection may be given to shrubs or plants that are reputedly not altogether hardy. Ventilate frames on every good day. Protect Celery and such other crops as may be in the open ground. Look over and clean and oil all tools. Roots, fruits and stock in storage may be looked over occasionally during winter. This is the period when we look back, next month we look forward!



Fresh Vegetables Every Day Throughout the Year

On the two following pages we give a "Vegetable Planting Table" for the South. Readers please note—In Tennessee, mountain districts and other territories of relatively high altitude, planting should be made ten days later in Spring and ten days earlier in Fall.

VEGETABLE PLANTING TABLE

Quantity of seed and number of plants required for 100 feet of row and for one acre, with the proper depths of planting and distances apart for rows and plants.

Kind of Vegetables	Required for 100 ft. of row	Distance Apart		Depth for sowing seed	Required for one acre	Plants	SPRING PLANTINGS and when to make them				FALL PLANTINGS and when to make them				Time until ready for use
		Horse	Hand				Lower South	Middle South	Upper South	Lower South	Middle and Upper South				
Artichoke: Globe Jerusalem	1 oz. 4 qts.	3 ft.	2 1/2 ft. 1 1/2 ft.	1 in. 3 in.	1 lb. seed 2 to 3 bu. tubers	60 to 80	Mar. 15 to Apr. 1 Apr. 1 to 15 Mar. 15 to Apr. 1	Apr. 1 to 15 Mar. 15 to Apr. 1	Apr. 15 to May 15 Apr. 1 to 15	Not advisable Will not mature.	Not advisable Will not mature.	Not advisable Will not mature.	Second Spring 6 to 8 months.		
Asparagus	1 oz.	3 to 4 ft.	2 ft.	1 in.	6 to 8 lbs. seed	60 to 80	Feb. 15 to Mar. 1	Mar. 1 to 15	Mar. 15 to Apr. 15	Oct. 15	Oct. 1	Second Spring.			
Beans: Bush Lima Pole Lima Snap	1/2 to 1 pt. 1 pt. 1 pt.	3 ft.	2 1/2 ft. 3 ft. 2 ft.	1 1/2 to 2 in. 1 1/2 to 2 in. 1 1/2 to 2 in.	3/4 bu. 3 to 12 qts.	60 to 80	Mar. 15 to Apr. 1 Apr. 1 to 15 Mar. 15 to Apr. 1	Apr. 1 to 15 Mar. 15 to Apr. 1	Apr. 15 to May 15 Apr. 1 to 15	Not advisable Will not mature.	Not advisable Will not mature.	Second Spring 6 to 8 months.			
Beet	2 oz.	2 to 2 1/2 ft.	1 to 1 1/2 ft.	3/4 in.	6 to 8 lbs.	60 to 80	Feb. 15 to Mar. 1	Mar. 1 to 15	Mar. 15 to Apr. 15	Oct. 15	Oct. 1	Second Spring.			
Brussels Sprouts	1 oz.	2 1/2 ft.	2 1/2 ft.	1/2 in.	1/2 lb.	60 to 80	Feb. 15 to Mar. 1	Mar. 1 to 15	Mar. 15 to Apr. 15	Oct. 1	Sept. 15	2 1/2 to 3 mo.			
Cabbage	1 oz.	2 1/2 to 3 ft.	2 to 2 1/2 ft.	1/2 in.	1/2 lb.	60 to 80	Jan. 15 to Feb. 15	Feb. 15 to Mar. 1	Mar. 1 to 15	Sept. 1	Aug. 15	4 to 5 mo.			
Carrot	1 oz.	2 to 2 1/2 ft.	1 1/2 ft.	1/2 in.	1/2 lb.	60 to 80	Jan. 1 to 15	Jan. 15 to Feb. 1	Feb. 1 to 15	Sept. 1	Aug. 15	2 1/2 to 3 mo.			
Cauliflower	3 oz.	2 1/2 to 3 ft.	2 to 2 1/2 ft.	1/2 in.	1/2 lb.	60 to 80	Feb. 15 to Mar. 1	Mar. 1 to 15	Mar. 15 to Apr. 15	Sept. 1	Aug. 15	3 to 4 months.			
Celery	3 oz.	3 to 4 ft.	1 1/2 to 2 ft.	1/3 in.	1/2 lb.	200 to 250	Feb. 15 to Mar. 1	Mar. 1 to 15	Mar. 15 to Apr. 15	Oct. 1	Sept. 1	2 to 2 1/2 mo.			
Chard	2 oz.	2 to 2 1/2 ft.	1 1/2 ft.	3/4 in.	6 to 8 lbs.	60 to 80	Feb. 15 to Mar. 1	Mar. 1 to 15	Mar. 15 to Apr. 15	Sept. 15	Sept. 1	2 1/2 to 3 mo.			
Collard	1/2 oz.	2 to 2 1/2 ft.	1 1/2 to 2 ft.	3/4 in.	1/2 lb.	60 to 80	Feb. 1 to 15	Feb. 15 to Mar. 1	Mar. 1 to 15	Aug. 1	July 15	2 months.			
Corn, Sweet	1/2 pt.	3 to 3 1/2 ft.	2 1/2 to 3 ft.	2 in.	6 to 10 qts.	60 to 80	Mar. 1 to 15	Mar. 15 to Apr. 1	Apr. 1 to 15	Aug. 15	Aug. 1	2 to 4 months.			
Cucumber	1/2 oz.	4 to 5 ft.	4 to 5 ft.	1 to 1 1/2 in.	2 to 10 lbs.	60 to 80	Mar. 15 to Apr. 1	Apr. 1 to 15	Apr. 15 to May 1	Aug. 15	Aug. 1	2 to 3 months.			
Eggplant	1/2 oz.	3 ft.	2 to 2 1/2 ft.	3/4 in.	6 oz.	60 to 80	Mar. 15 to Apr. 1	Apr. 1 to 15	Apr. 15 to May 1	July 15	July 1	3 to 4 months.			
Endive	1 oz.	1 1/2 ft.	1 ft.	3/4 in.	1 lb.	60 to 80	Mar. 1 to 15	Mar. 15 to Apr. 1	Apr. 1 to 15	Sept. 1	Aug. 15	3 to 4 months.			
Garlic	2 to 3 lbs.	1 1/2 ft.	1 ft.	1 in.	300 to 500 lbs. sets.	60 to 80	Feb. 1 to 15	Feb. 15 to Mar. 1	Mar. 1 to 15	July 15	July 1	4 to 6 months.			
Cherkin	1/2 oz.	4 to 5 ft.	4 to 5 ft.	1 to 1 1/2 in.	2 to 10 lbs.	60 to 80	Mar. 15 to Apr. 1	Apr. 1 to 15	Apr. 15 to May 1	Aug. 15	Aug. 1	2 to 3 months.			
Kale	1/2 oz.	2 1/2 to 3 ft.	1 1/2 to 3 ft.	1/2 in.	1 1/2 lbs.	60 to 80	Feb. 1 to 15	Feb. 15 to Mar. 1	Mar. 1 to 15	Nov. 1	Oct. 1	2 to 3 months.			
Kohlrabi	1 oz.	1 1/2 ft.	1 1/2 ft.	3/4 in.	1 1/2 lbs.	60 to 80	Feb. 15 to Mar. 1	Mar. 1 to 15	Mar. 15 to Apr. 1	Sept. 1	Aug. 15	2 to 3 months.			
Lettuce: Head Leaf	1 oz. 1 oz.	1 1/2 ft. 1 1/2 ft.	1 ft. 1 ft.	1/2 in. 1/2 in.	1/2 lb. 1/2 lb.	60 to 80	Feb. 15 to Mar. 1	Mar. 1 to 15	Mar. 15 to Apr. 1	Sept. 15	Sept. 1	2 to 3 months.			

Vegetable	Quantity	Depth	Distance	Time	Height	Planting	Harvesting	Duration	Remarks
Leek	1 oz.	4 to 6 lbs.	½ in.	1½ ft.	1½ ft.	Feb. 15 to Mar. 1	June 15.	Mar. 1 to 15.	June 1. - 16 to 8 months.
Beet	1 oz.	1½ to 3 lbs.	1 to 1½ in.	5 to 6 ft.	Drills 1½ ft. Hills 5 ft.	Apr. 1 to 15.	June 15.	Apr. 1 to 15.	June 1. 2½ to 4 months.
Watermelon	1 oz.	2 to 3 lbs.	1 to 2 in.	8 to 10 ft.	Drills 8 ft.	Apr. 1.	July 15.	Apr. 1 to 15.	July 1. 3½ to 6 mo.
Mustard	1 oz.	1½ lbs.	½ in.	1½ ft.	1/3 to ½ in.	Feb. 15 to Apr. 1.	Sept. 15.	Mar. 1 to 15.	Sept. 1. 2 to 2½ mo.
Okra	2 oz.	6 to 8 lbs.	1 to 2 in.	4 ft.	2 ft.	Feb. 15 to Mar. 1.	July 15.	Apr. 15 to May 1.	July 1. 2½ to 4 mo.
Onion:	1 oz.	4 to 6 lbs.	½ to 1 in.	1½ ft.	½ to 1/3 in.	Mar. 1 to 15.	June 15.	Mar. 15 to Apr. 1.	June 1. 4 to 6 months.
Red	1 oz.	6 to 10 bu.	1 to 2 in.	2 ft.	¼ to 1/3 in.	Feb. 15 to Mar. 1.	July 15.	Mar. 1 to 15.	July 1. 3 to 6 months.
White	1 oz.	3 to 5 lbs.	½ in.	2 ft.	¾ to 1/3 in.	Mar. 1 to 15.	Nov. 1.	Mar. 15 to Apr. 1.	Oct. 1. 3 to 4 months.
Parsley	¼ oz.	4 to 6 lbs.	¾ to 1 in.	2 to 2½ ft.	1 to 3 in.	Feb. 15 to Mar. 1.	Sept. 15.	Mar. 15 to Apr. 1.	Sept. 1. 3 to 4 mo.
Parsnip	½ oz.	4 to 6 lbs.	2 to 3 in.	2 to 3 ft.	2 to 3 ft.	Feb. 15 to Mar. 1.	Sept. 15 to Oct. 1.	Mar. 1 to 15.	Sept. 1. 2½ to 3 mo.
Pea:	1 qt.	1 to 2 bu.	1 in.	2 to 3 ft.	¾ to 1½ in.	Mar. 1 to 15.	Sept. 15 to Oct. 1.	Apr. 1 to 15.	Sept. 1. 2½ to 3 mo.
Smooth	1 qt.	1 to 2 bu.	1 in.	2 to 3 ft.	¾ to 1½ in.	Mar. 1 to 15.	Sept. 15 to Oct. 1.	Apr. 1 to 15.	Sept. 1. 2½ to 3 mo.
Wrinkled	1 qt.	1 to 2 bu.	1 in.	2 to 3 ft.	¾ to 1½ in.	Mar. 1 to 15.	Sept. 15 to Oct. 1.	Apr. 1 to 15.	Sept. 1. 2½ to 3 mo.
Pepper	1 oz.	6 oz.	4 to 6 in.	3 ft.	1 to 1½ ft.	Apr. 1.	July 15.	Apr. 15 to May 1.	July 1. 3 to 4 months.
Potato:	3 to 6 lbs	4 to 5 bbls.	4 in.	2½ to 3 ft.	1 to 1½ ft.	Feb. 15 to Mar. 1.	Aug. 15.	Mar. 1 to 15.	Aug. 1. 4 to 6 months.
Irish	3 lbs.	10,000 plants.	2 to 3 in.	2½ to 3 ft.	1-1/3 to 1½ ft.	Mar. 15 to Apr. 1.	Aug. 1.	Apr. 15 to May 1.	July 15. 3 to 4 months.
Sweet	1 oz. for 25 hills	2 to 3 lbs.	½ in.	8 to 10 ft.	8 to 10 ft.	Apr. 1.	June 15.	Apr. 15 to May 1.	June 1. 3 to 4 months.
Pumpkin	1 oz.	3 to 30 lbs.	½ to 2 in.	2 ft.	1 to 1½ ft.	Feb. 15 to Mar. 1.	Oct. 15.	Mar. 1 to 15.	Oct. 1. 1 to 2 months.
Radish	1 oz.	1½ to 3 lbs.	¾ to ½ in.	2 ft.	1½ to 2½ ft.	Feb. 1 to 15.	Oct. 1.	Mar. 1 to 15.	Oct. 1. 3 to 4 months.
Rutabaga	¼ oz.	8 to 10 lbs.	2 to 3 in.	4 ft.	4 ft.	Mar. 1 to 15.	Nov. 15.	Mar. 15 to Apr. 15.	Nov. 1. 2 to 2 years
Pie Plant or Rhubarb:	1 oz. 25 roots.	6 to 8 lbs.	½ in.	1½ ft.	3 to 4 in.	Mar. 1.	Nov. 1.	Apr. 15.	Nov. 1. 3 to 3 months
Roots	2 oz.	3 to 30 lbs.	1 to 2 in.	2 ft.	1 to 2 i	Feb. 15 to Mar. 1.	Oct. 15.	Apr. 15 to Apr. 1.	June 1. 3 to 4 months.
Salsify	2 oz.	3 to 30 lbs.	1 to 2 in.	2 ft.	Drills 1-1/3 Hills 4 ft.	Apr. 1.	Aug. 15.	Apr. 15 to May 1.	Aug. 1. 2 to 2½ mo
Spinach	½ oz.	1 to 3 lbs.	1 to 2 in.	7 to 10 ft.	Drills 2 to 3 ft. Hills 8 ft.	Apr. 1 to 15.	July 15.	Mar. 1 to 15.	July 1. 2½ to 3 mo.
Squash:	½ oz.	4 oz.	½ to 1 in.	3 to 4 ft.	2 to 3 ft.	Apr. 15 to May 1.	Aug. 15.	Mar. 15 to Apr. 1.	July 15. 3 to 4 months.
Bush	½ oz.	1½ to 3 lbs.	1 to 2 in.	2 ft.	1½ to 4½ ft.	Feb. 1 to 15.	Oct. 15.	Mar. 1 to 15.	Oct. 1. 2 to 4 months.
Vine	½ oz.	1½ to 3 lbs.	1 to 2 in.	2 ft.	1/6 to ½ ft.	Feb. 1 to 15.	Oct. 15.	Mar. 1 to 15.	Oct. 1. 2 to 4 months.
Tomato	¼ oz.	35 to 50	¾ to 1 in.	3 to 4 ft.	3 to 4 ft.	Apr. 1.	Aug. 15.	Apr. 15 to May 1.	Aug. 1. 2 to 2½ mo
Turnip	½ oz.	1½ to 3 lbs.	½ to ½ in.	2 ft.	1½ to 2 ft.	Apr. 1.	Oct. 15.	Mar. 1 to 15.	Oct. 1. 2 to 4 months.

Animal Life in the Garden

Poultry Possibilities—Pigeons—Bees—Rabbits—Larger Animals

TOO many gardeners have the idea that all animals are abominations and that it is impossible for any home plot to include vegetable and flower gardens and harbor animals or poultry at the same time without disastrous results. Of course, a flock of hungry chickens unrestrained and a newly planted seedbed are a bad combination; likewise a frolicsome puppy can do inestimable damage to an herbaceous border. But handled rightly, a moderate number of the right sort of creatures can actually increase the productivity of a garden and prove a valuable asset of a suburban or country home that cannot afford to be overlooked in these days of the high cost of living by purchase.

Poultry Possibilities: Comfortable, weather-tight quarters and adequate, securely enclosed yardage or range are essential features of modern, successful poultry keeping, no matter on what scale. The waste from the garden and the cooked vegetable refuse from the house supplement such conditions with food material that is essential to perfect health and maximum production, for which the flock pays in eggs and in fertilizer, poultry manure being a very rich, easily handled plant food. Moreover, early in the Spring and late in the Fall, when the garden is being spaded or plowed or the crops harvested, the fowls can safely be permitted to run over the newly turned ground where they will do a tremendous service in devouring injurious insects. In this respect ducks, too, are of considerable value, especially in destroying Asparagus and Potato beetles.

Pigeons cannot be accused of injuring the garden in any way, but on the contrary they, too, are a source of valuable manure, bird guano being one of the old standbys in agricultural practice, especially as a source of nitrogen. Since they can be kept in the loft of a barn or shed, they need not even reduce the space available for gardening activities.

Bees: If you or your family or your friends are fond of honey—the real, pure thing; if you enjoy the peaceful, happy sight and sound of humming visitors among the flowers; if you want to be sure of maximum crops of tree fruits, Melons, Tomatoes and all other products of which the flowers depend entirely or largely upon insect

pollenation, and if you are interested in the possibility of netting a comfortable sum each year at the cost of an occasional hour or two of pleasant, not difficult or heavy work—then plan to add to your garden features some colonies of bees. The initial expense is not heavy. Twenty-five dollars will provide you with a full equipment of tools, a colony of bees including a queen, a completely fitted hive and two more hives to keep in reserve for future swarms. It is not unusual for a colony to double, that is, to produce another by swarming each year, in addition to yielding from 25 to 50 or more pounds of honey a season, depending upon the weather, etc. The bees get their food from flowers over a range of several miles so you are not required to feed them except in emergencies, when a little sugar sirup or surplus honey may be given them. As suggested they pollenate the blossoms of fruits and vegetables and insure heavy sets that could not be duplicated even by extensive, costly hand pollenizing. And contrary to many opinions, they are quiet, peaceable if not tormented, easily managed by one who knows what he is doing and how to do it, and altogether offer an appropriate and highly desirable feature to be included in the home orchard or even the small home garden. More home gardens should have their apiaries for the sake of both the pleasure and the profit they offer.

Rabbits: While it is probably true that many exaggerated and unfounded claims have been made as to the money making possibilities of rabbit culture, at the same time a few hares, like a small flock of poultry, can be kept on the small place at small expense and little trouble, with benefit to the owner in several ways. Rabbit meat is a real delicacy and under home garden culture conditions can be produced very reasonably; rabbits will consume much of the waste green matter from the garden, save the trouble of getting rid of it, and turn it into delicious meat; a rabbit hutch and pens take up but little room; the care of rabbits is an interesting task for the boys and girls in the family; and surplus stock can easily be sold, either in the market or as breeding stock to others who want to take up the work. Like chickens, rabbits running wild can soon damage garden crops to a discouraging extent. But such results can easily be prevented by foresight and attention.

Larger Animals: As consumers of waste products and as a source of valuable manure, pigs are almost invariably to be found on commercial truck farms or vegetable growing establishments. Whether conditions (including local statutes) make it possible for you to keep a porker or two on your home grounds to serve these same ends, you must decide for yourself. However, it is well to remember that

rightly cared for a pig is neither as dirty, odorous or otherwise offensive as you might think; that garden truck and kitchen garbage provide a good ration which need be reinforced only by occasional grain mashes, ear corn, etc.; that at the end of the Summer it can be sold or butchered to supply a good part of the Winter's pork, ham and bacon; and that with barnyard manure selling—when obtainable—at \$5 or more per load, the cleanings of the pig pen will add many dollars to the value of the compost heap to be spread on next season's garden.

Another farm animal that can be brought within the confines of a small place is the milk goat. This, too, will consume all the Beet tops, Pea and Bean vines, waste Cabbage leaves, etc., and all the clean, vegetable refuse from the table. Also it provides from one to four or five quarts of rich, delicious milk per day for anywhere from six or eight to ten or even more months at a stretch. The milk goat is also a quaint, docile, companionable animal, not difficult to care for, and requiring, not a wide pasture, but only a patch of roadside or scrubby ground where it can be tethered to browse. In view of the newly proven facts as to the essential nature of milk and milk products in our diet, it would seem advisable for more gardeners to think about the addition of a little "goat dairying" to their agricultural activities.

*For books treating fully on subjects mentioned in this chapter,
we recommend:*

THE HOME POULTRY BOOK, by E. I. Farrington. *Here is just the book for the person who wants to keep a few hens to supply fresh eggs for the table. No elaborate systems or expensive fixtures are advocated, but the author gives specific information concerning every phase of poultry keeping. Illustrated. 184 pages, bound in cloth. 32 full page illustrations. 12mo. Price, \$1.35, postpaid.*

PIGEON RAISING, by Alice MacLeod. *This is a book for both fancier and market breeder. Full descriptions are given of the construction of houses, the care of birds, preparation for market and shipment and of the various breeds with their markings and characteristics. Price, \$1.35, postpaid.*

QUIMBY'S NEW BEE-KEEPING, by L. C. Root. *The mysteries of bee-keeping explained. Combining the result of 50 years' experience with the latest discoveries and inventions and presenting the most approved methods, forming a complete work. Illustrated. 271 pages. 5x7 in. Cloth, Price, \$1.65, postpaid.*
Secure your copies where you bought your Garden Guide.

Birds in the Garden

Best Type of Bird Houses—Feeding the Birds—Berry-bearing Shrubs



The Bluebird

“Typical of all that is pleasing in bird life generally”

Courtesy U. S. Farmers' Bulletin No. 755

Mr. Chas. Livingston Bull, than whom no one is better acquainted with the birds and their habits, furnishes us excellent directions for making them tenable homes, as follows:

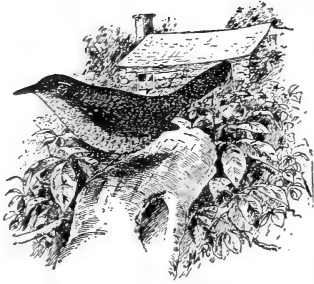
The bluebird and wren are the easiest to satisfy as to the outward appearance of the house; probably nine out of ten native birds living in artificial nesting sites are bluebirds. Almost any box, if only it has a space at least four and one-half inches high by the same width, and a length of seven inches or more, with a hole about one and one-half inches in diameter, preferably round, at the end and not

too low down in that end, with some sort of perch just below it, will please the bluebird. As to outside finish, the more it looks like some natural object the more sure it will be to attract the little bluecoats.

The most successful bluebird box of which I have knowledge was a section of a hollow limb, in which a woodpecker had cut a little round hole into the cavity. This limb, about seven inches in diameter, had been sawed from the tree and a section about two feet long containing the cavity, had been cut out and wired to the branch of an old Pear tree. This was used every year by a pair of bluebirds, and most years two broods were raised. Think of the thousands of fruit worms and curculios and other insects that went to feed the broods in that nest year after year!

I have duplicated that nest a number of times simply by cutting a section of a branch or small trunk, seven or eight inches thick and a foot long, boring a hole with an inch and a half bit half way through, near one end, then hollowing out a chamber, either by sawing a slab off one side, which is tacked or wired on again after the chamber (about 5x5x8) is hollowed out, or by sawing a section for a cap two inches thick from the end farthest from the entrance hole and then drilling or turning out the hollow and closing the end with the cap, carefully tacked on. This house should be hung horizontally.

If a box is to be used as the foundation of a bluebird house, cover it with bark or make it of slabs with the bark on, or at the very least,



The House Wren

"Whose bubbling song is such a joy all through the Spring and Summer"

Courtesy U. S. Farmers' Bulletin, No. 755

stain it a dark grayish brown, and if the proportions are right, the birds will do their part.

Bluebirds like to nest rather low. The house should be placed either on a pole in the garden, about seven or eight feet above the ground, or on a tree branch, perhaps a little higher. The pole or branch should be so slender that a cat would not venture to climb it, that is, not more than one and one-half inches thick; and if a pole, preferably some smooth, hard wood like a rake handle or the thick end of a bamboo fish pole.

The wren, whose bubbling song is such a joy all through the Spring and Summer, does not get here so early as the bluebird and might easily find all the nesting sites occupied, were it not for one thing. His tiny body will squeeze in where no sparrow or starling or bluebird could obtrude, and while he might try the bluebird box, the first pair of bluebirds or sparrows to come along would surely oust him.

An entrance hole one inch in diameter is the solution, and if the interior is no more than three and one-half or four inches square by six inches long, the larger bird will not even look in more than once.

Wrens have been known to nest in many curious places, such as the sleeve of an old coat, an old boot, a bomb shell, a pump, an empty tomato can, and perhaps the most curious of all, a human skull.

The great majority of wrens, however, nest in a hollow limb or tree trunk, and naturally the bird house which most resembles such a location will be the most likely to attract these tireless little bug hunterst. The ideal box would be the one which most nearly resembles a big kno. on the side of the tree trunk.

A bluebird does not seem to care how exposed the house may be to the sun, in fact, he rather likes an open situation, but I have yet to see a wren's nest where the entrance was not well shaded, so, to guard against the gardener, who might not know this peculiarity of the cunning little brown fellow, the bird house man should provide a good overhang to the roof of the wren house, also a little perch just below that entrance hole and be sure once more that same entrance hole is round and no more than an inch in diameter. A



The Robin

"How cheery his song at the first peep of day"
 Courtesy Nat'l Ass'n of Audubon Societies

couple of designs for bird houses which have been successful are shown on this and following pages.

Writing of the robin, Mr. Bull continues:

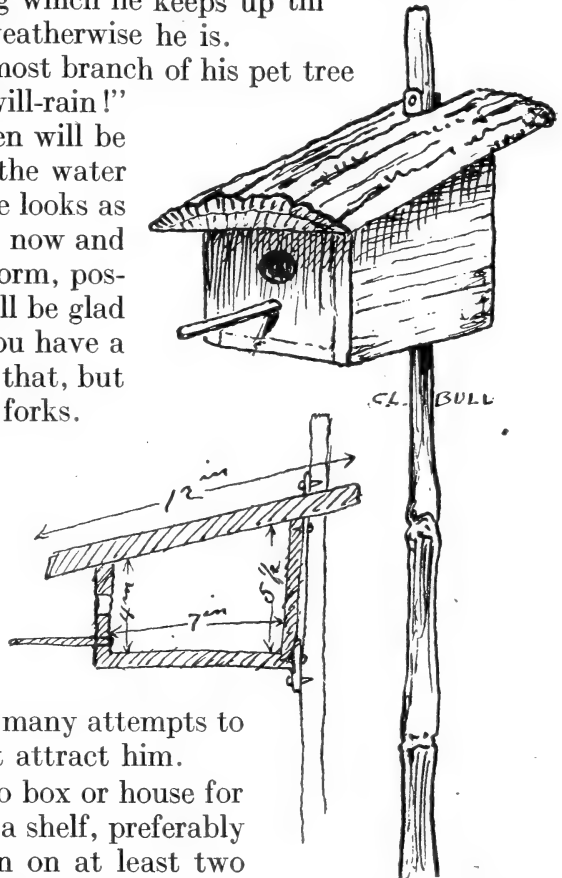
How cheery is his morning song just at the first peep of day. And how sweet his long evening song which he keeps up till long after sunset. And how weatherwise he is.

When he flies up to the topmost branch of his pet tree and calls his "twill-rain!" "twill-rain!" you may be very sure the garden will be sprinkled without overworking the water meter. How fat and cheerful he looks as he hops over the lawn; stopping now and again to yank out a great fat worm, possibly as long as himself. He will be glad to nest in your garden and if you have a large tree he will usually nest in that, but so many trees have no suitable forks.

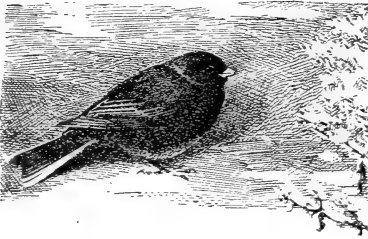
He would be most pleased to nest on a shelf under the eaves of your house, but so many houses have no shelf there. Or under the porch roof, if he could find a good place. But most houses are so built that there is no suitable location for him, and so there have been many attempts to construct locations which might attract him.

He will not enter a hole. No box or house for him! It must be in the form of a shelf, preferably with a cover. It must be open on at least two sides and should have a low, raised rim around the edge to keep the nest from being blown or washed off. It should have a roof, too, for while the great majority of robin nests are in trees, and in rather open situations at that, when they can find a good situation on a house it will nearly always be under some sort of overhang.

The shelf might be hung right on the side of the house, preferably on the east or west side, not on the south unless the location is partially shaded. It should hang so rigidly that no severe wind will swing it too hard, preferably by two screw eyes. The roof should have enough pitch and overhang so as to shed most of the rain and yet not too much.



A serviceable bluebird house. Make box as shown in sketch, preferably of slab wood, especially top. If impossible to secure wood with bark attached, stain dark grayish brown. Box is fastened to pole by strip of sheet iron screwed on back of box and screwed to pole



The Junco, or Snowbird

"Leaden skies above; snow below"
 Courtesy U. S. Farmers' Bulletin,
 No. 506

I have never seen a robin's nest less than 8 feet above the ground and usually they are much higher; so hang it fairly high, beside or under a second-story window would be a good place; and, if there are vines, so much the better. If it must be in the garden, then put it on a tree 10 feet from the ground or on a pole among the twigs and leaves of some shrub or bush 10 feet high. The most successful robin shelves are those 7 inches square with a rim 1 inch high and $\frac{1}{2}$ inch wide around the open sides, making an inside measurement of 6 inches square. The back and one side closed; the whole stained brownish gray or to match the side of the house where it is to hang. The roof is preferably a piece of wood with the bark on and should be 4 inches above the platform at the lowest point and should have an overhang of about 2 inches.

The same thing is right for the cat-bird, but the location should be entirely different. Cat-birds always nest close to the ground (from 2 feet to 6 feet) and in the heart of the densest brush they can find. The center of your biggest Rambler Rose is your best location, or deep in a close growing evergreen: Cedar, Retinispora, clipped Spruce or Hemlock or some similar growth. I found a big thorny Barberry bush in a clump of other shrubs a good place, when I tied five or six branches together above the little platform to hide it thoroughly.

One of the most valuable birds we can have about our homes is the phoebe. He belongs to the family of flycatchers, and well justifies the name for he spends the entire day watching from a twig and flying out and snapping up every fly, mosquito or moth that passes, and will pick off every little leaf or fruit worm that his keen eyes may note.

His note "phoebe, phoebe," is not as musical as the elaborate and varied assortment the cat-bird will regale one with; but it is cheery and alert, and, when one thinks of the vast number of insect pests, he is destroying hourly, it is a most welcome note indeed.

The phoebe is not as common as we might wish, but if your garden is fairly large and the houses are not too close together, a pair will doubtless look you over this Spring, and if you have the right sort of place ready, may stay with you.

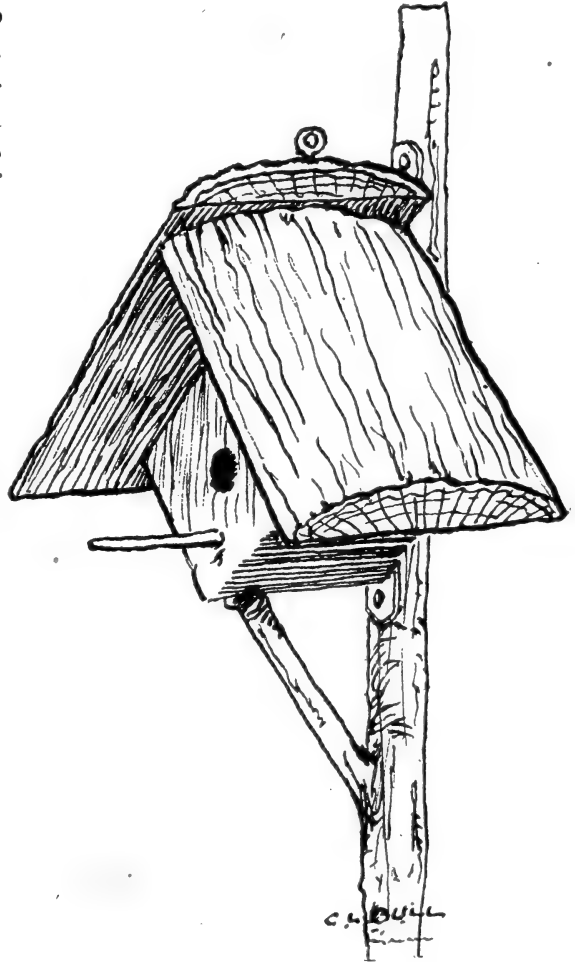
The favorite location for the phoebe is under a bridge or on a shelf of rock under a ledge, or a beam under an open shed, or similar location; preferably near water, though not necessarily so. They like plenty of room, and a good cover. The shelf should be 6 inches wide and at least 12 inches long, open at ends and with roof 5 in. above

at the front and 6 inches or 7 inches at the back and an overhang of at least 3 inches. A perch is not necessary.

They are rather particular little fellows; for example, it is of little use to hang such a shelf on a house painted a light or bright color for they will not be interested. They will have nothing to do with anything on a pole. There must be the suggestion of the big wall of rock and the protected ledge, so if you can, hang the shelf under the eaves or under an open porch, not more than one story from the ground. No high places for them, but it should be 7 feet or 8 feet from the porch floor or ground, at least. If you are so fortunate as to have a pair of phœbes nest on your house, you will be well repaid for the trouble of putting up the little shelf and be sure that it is some dark color, brownish or grayish, or you will have your trouble for nothing.

To make the birds perfectly at home we must provide a bird bath or drinking basin. For this purpose any low bowl can be used in which the water is not too deep, for it would appear that some birds fear too deep water. If the bowl is deep, fill in with clean pebbles or cement, or very attractive baths may be procured from some of the seed and florist firms. These pedestals and bowls furnish an excellent ornament to the garden as well.

A suggestion for making the bath more attractive is to plant an umbrella plant in a small pot and place it at the side. A small quantity



Wren House—Simply a square box (5 in.), all dimensions inside measurement, with slab covering, flat on back, but 3 in. overhang in front and 1 in. at sides. One inch hole at center of front; 3 in. perch. We have shown this box on pole but it could be hung from screw eye.

of Colomba and Parrot's Feather (*Myriophyllum*) might also be included and so placed that the pot will be entirely hidden.

I have divided the birds into four distinctive groups, as follows:



Song Sparrow

"One of the most admirable and delightful of American songsters,"
Courtesy U. S. Farmers' Bulletin, No. 630

No. 1.—SUET GROUP:

Chickadee
Tufted Titmouse
White-breasted nuthatch
Red-breasted nuthatch
Downy woodpecker
Hairy woodpecker
Red-bellied woodpecker
Flicker
Blue jay
Oregon jay
Whiskey jack
Crow
Clarks crow
Brown creeper
Myrtle warbler
Rose-breasted grosbeak
Hermit thrush
Winter wren
House wren
Starling
Screech owl

These birds also eat
Sunflower seed
Squash seed
Meat
Fat pork
Crumbs
Dog biscuit
Walnuts
Butternuts
Unroasted peanuts
Other oily nuts
A few of these birds will also eat cracked corn and oats.

No. 2.—SEED GROUP:

Junco
Tree sparrow. Song Sparrow
White-throated sparrow
White crowned sparrow
Foxsparrow. Cardinal goldfinch
Redpoll. Snow bunting
Evening grosbeak
Pine-grosbeak. Purple finch
Gray-crowned rosy finch
Other finches and sparrows

These birds also eat almost any kind of small seeds or cracked grains, such as bird seed, millet, etc., crumbs, bread, crackers, dog biscuit, etc.

A few of this group will also eat a little suet, or will pick at a bone with a little meat or fat adhering, but their normal food is vegetable.

No. 3.—GRAIN GROUP:

Ruffed grouse
Quail
Partridge
Pheasant
Lapland longspur
Shore lark

Any kind of grain as:

Oats
Wheat
Rye
Barley
Buckwheat
Cracked corn

No. 4.—FRUIT:

Robin
Mocking bird
Catbird and most other thrushes

This is a Southern group. Will eat oranges, figs, grapes and almost any other fresh fruit, also, sometimes, bread and milk.

BERRY-BEARING SHRUBS, VINES AND TREES FOR THE BIRDS.

Another way, and a very effective one of attracting birds, is to plant berry-bearing shrubs, trees and vines. The robins, starlings, thrushes, cedar birds, mocking birds, in fact most so-called soft billed birds, will eat berries, and some of the finches and sparrows will pick them open to get at the seeds.

Many of the migrating birds will stay about a place, where there is an abundance of berry-bearers and an allowance of suet and seeds, much later than they ordinarily would stay.

For example here in Northern Jersey as I write this in the last of October, there are great flocks of robins and thrushes hurrying to cull the very last of my Mountain Ash and Dogwood berries, before they go away South.

Last year one robin stayed with us all Winter eating the Japanese Barberries. There is also a pair of chewinks still here, while back in the woods they have been gone for at least three weeks. I should head the list of berry-bearers with such trees as the Mountain Ash, Dogwood, various wild Cherries and Cedars, Junipers, and other berry-bearing evergreens. These are especially beloved by the birds. A list of shrubs should include the shrubby Dogwoods, such as the Cornelian Cherry, Red Oiser, etc.; many of the Viburnums, and Ilexes, all the Vacciniums (that is, Blueberries, Cranberries and Deerberries) some of the Loniceras and Cratægus or Hawthorns, Aronias, Calli-carpa, Enkianthus, Ribes, Rubus, Sambucus, Phillyrea, Amelanchier and Symphoricarpus, and be sure and save a shady nook for a clump of Mahonia and Cotoneaster. Last but not least we put the Barberries, for the reason that the birds will eat everything else first. Then when all the rest of the berries are gone they will settle down to the sour, bitter berries of *Berberis Thunbergii*. *Berberis vulgaris* is also very good, but the birds will eat its fruit earlier for the clear, sour flavor (which our grandmothers found so good in jam making) is pleasant to the robins' palate, so, let me repeat, be sure to have a clump or hedge of *Thunbergii*, for the cold January and February days when all the other sweeter fruits are gone and the Cedar birds will stay with you till the hosts appear from the South in March, April and May.

There are also a few vines which will repay planting for the birds. Notably *Actinidias*, *Lyceum* and the berry-bearing *Loniceras*.

All these trees, shrubs and vines are not only useful as bird food but have decorative value as well. Not nearly enough people realize the great beauty of berry-bearers in Winter. The warm oranges, reds,



Black-capped Chickadee
 "Any side up, without
 care, is the label he bears"
 Courtesy U. S. Farmers'
 Bulletin, No. 630

bright blues and clear blacks of the different fruits are most attractive and especially if there are evergreens with which to contrast them, their decorative value has only to be seen to be appreciated.

The birds will find the evergreens, especially the dense, close growing Cedars, Arbor Vitæ and Retinisporas extremely welcome as roosting places on long, cold Winter nights, as I have repeatedly observed, every one of my cedars having its cozy feathered tenants.

I will never forget the night I saw, just at dusk, a Pine-grosbeak creep into one of my Junipers, the only one of that species I have ever seen. Or that other February afternoon when in a little flock of cedar birds eating Barberries, I suddenly realized that one was twice as large as any of the rest and had two white bars on each wing and I knew I was watching a Bohemian waxwing, that rare wanderer over the face of the world. I am sure he found a sufficient supper, rather bitter to be sure, but warming, and a dense Arbor Vitæ hedge kept him warm and safe for one night at least.

Readers interested in the study of birds can obtain descriptive leaflets, including colored plates and an outline, concerning over a hundred birds, from the National Association of Audubon Societies, 1974 Broadway, New York City, for the nominal sum of three cents each (no order for less than fifteen cents); also useful bird study books, etc.

*For a complete work on the subject of this
 chapter we recommend*

BIRD NEIGHBORS, by Nettie Blanchan. Excellent plates of birds in natural colors make possible the identification of many birds even by the unpracticed eye. 234 pages. Price, \$3.65 postpaid. Secure your copies where you bought your Garden Guide.

Always consult Index to Contents. Familiarize yourself with it. There are hundreds of good things in this book that will escape your attention if you do not use the Index freely.

Fruits and Vegetables for Winter

Canning Fruits and Vegetables—Methods of Canning—Scalding, Blanching and Cold-Dipping—Sterilization—Equipment—Jars, Tin Cans and Rubbers—Sirups—Flat Sour—Treatment After Canning—Preservative Powder—Short Instructions for Canning Vegetables and Fruit—Recipes—Time Table for Scalding, Blanching and Sterilizing Vegetables and Fruits

THE products of our own garden always taste better than fruit which has been prepared in the commercial establishments. We have grown the material; it is ours and we like it.

Canning Fruits and Vegetables

Science always tells us why we do a thing, and it is only by a knowledge of why we do things that we get so that we can apply the art of doing one thing to the art of doing another. As early as the seventeenth century, persons began to know that it was very minute plants and animals which caused the spoiling of fruits. These organisms induce fermentation and putrefaction, and are of immense importance. They are of three groups: First, molds, which appear as a white, green or black furry growth; they are often present on the vegetables at the time we can them. Secondly, we have the yeasts, which are familiar to every housewife who makes bread. These little "plants" are invisible to the naked eye and seem to like to get into all substances which contain sugar. They are not usually there very long before they cause the substances to become sour, the next stage being the production of alcohol. The air is full of yeast, and it is almost always found on ripe fruit. The third class consists of bacteria. When we realize that sometimes fifteen thousand of these pesky little things can be placed end to end in an inch, we wonder how they can do so much damage, but they are the hardest foes of canning we have to fight.

Every utensil which the housekeeper uses, and every vegetable and all the sugar and the water, contain some form of mold, yeast or bacteria. Our problem then is to take all possible care that each of our three enemies is conquered.

For absolute cleanliness the soil must be carefully washed from the fruit; over-ripe fruit should never be used; bruised and cracked fruit should be avoided, for it is in the bruises and cracks that the yeast and molds are very prevalent. All jars and containers must be thoroughly scalded with boiling water.

The discussion of canning procedure set forth in these pages relates almost entirely to the one-period so-called cold-pack method and, together with the recipes, is based largely upon descriptions and directions contained in *Farmers' Bulletin* 839 and Form NR-24 of the *Co-operative Extension Work in Agriculture and Home Economics* (O. H. Benson, U. S. Department of Agriculture, Washington, D. C.), and the *Cornell Reading Course for the Farm Home* (Cornell University, Ithaca, N. Y.) By the one-period

method adopted for use in the home canning-club work of the U. S. Department of Agriculture in the Northern and Western States it has been found a relatively simple matter to can practically any food product in the home with ordinary kitchen equipment and with the expenditure of comparatively little labor.

Methods of Canning

An important factor in the development of home canning work has been the great success of the Department of Agriculture in its experiments with the one-period method, by which the uncooked or partly cooked fruit or vegetable is packed in a jar or can and covered with water, sirup or juice, both jar and its contents being then sterilized by hot water or steam. This is now the most popular method in use by housekeepers, because of its simplicity, rapidity and certainty. The product thus preserved retains much of its natural beauty and flavor.

By the open-kettle method the food to be canned is completely cooked in a kettle and then poured into the jar and sealed. The jars, rubbers and all utensils must be sterilized by boiling for 20 minutes before the jars are filled, otherwise there is danger that the food will be reinfected and spoil after the sealing. By many this method is preferred for canning Strawberries and Tomatoes; it is also recommended for Beets, because the skins can be easily removed after the cooking and less color is lost.

Scalding, Blanching and Cold-Dipping

Scalding means placing the product in a cheese cloth bag or dipping basket and merely dipping it into boiling water, the object being chiefly to remove skins of certain fruits and vegetables, as in the cases of Peaches, Tomatoes or Carrots.

Blanching carries with it the meaning of allowing the product to remain a much longer period (1 to 15 minutes, according to kind) in the hot water, which serves to remove dirt and organisms, to insure a close pack by reducing the bulk of greens and increasing the flexibility of such vegetables as String Beans and Asparagus, to eliminate objectionable acids and acrid flavors and, in conjunction with the cold-dip, to set the color. Greens and green vegetables are most satisfactorily blanched in steam.

The cold-dip means the quick chilling of the outside of the blanched vegetable or fruit. Take it sharply from the hot water or live steam, plunge it into cold, clean water, and immediately remove and drain it for a few seconds. This permits the removal of the skin without injury to the pulp, coagulates and preserves the coloring matter and facilitates the handling of the product in packing.

Sterilization

Complete sterilization of the food and can is one of the most important requirements in connection with the successful preservation of food by canning, as it means the eliminating of all the live molds, yeasts and bacteria. When blanching and cold-dipping are followed by a single or continuous period of sterilization, it is claimed by experts that the success of canning most vegetables is just as sure as though the intermittent method—three periods for three successive days—were used. By this one-period method the risk of overcooking the product is obviated and, besides, it is more natural in color, flavor and texture.

The cooking of canned foods for a given time on each of three successive days is called the intermittent process, and some canners advocate

its use for certain non-acid vegetables, but equally satisfactory results are accomplished by the one-period method, which has the additional advantage that it saves labor and expense.

Equipment

The housewife can do home canning successfully by using only such equipment as may be already on hand. When canning is done by the cold-pack method the first and most essential requisite is a hot-water bath, in which the cans of food may be boiled or sterilized. An ordinary wash boiler can be easily converted into an efficient home canner by fitting it with a false bottom made of slats, with lifting handles. Then there will also be needed a suitable table, paring and coring knives, a thermometer, a few yards of cheesecloth, a wire dipping basket, wiping cloths, an abundance of clean hot and cold water, a duplex fork for lifting hot jars, a watch or clock to check schedule times, and a good stove or other heating device. Other types of canners now on the market are steam cookers, water-seal outfits, and steam-pressure outfits, but the home made hot-water receptacle described above will meet the necessities of most individual housekeepers.

Jars, Tin Cans and Rubbers

Large-mouthed glass jars should be used for canning. Of many kinds on the market, the types that seem to be most generally favored are those with glass covers clamped on with some metal device, those with screw metal tops and those with suction seal tops. All jars should be carefully tested, washed and placed in a pan of cool water on a stove to heat, keeping them there until needed for packing. Testing may be performed by partly filling the jar with boiling water, adjusting the rubber and the cover, and sealing and inverting the jar. If there is a leakage, determine the cause, and if the defect cannot be remedied reserve the jar for some other purpose.

Crockery jars with rubber top and clamp spring adjustment for sealing hermetically are also used for canning. Packs in crockery jars of more than one quart size need an increased period of sterilization of 10 to 20 per cent. over glass jars of the same size.

Plain tin cans may be successfully used for packing most foodstuffs, but greens, Beets, Strawberries, Cherries, Pumpkin and Squash should be put up in enameled cans, as the enamel prevents chemical action of the products on the tin coating of the container.

Care should be given to the selection of good elastic rubber rings. New rubbers are required each year, as they seldom stand using a second season.

Sirups

In canning fruits the thickness of the sirup employed depends upon the kind of fruit and the sweetness desired. For ordinary use sugar and water may be combined by boiling until the sugar is dissolved in the following proportions:

Thin sirup (20 to 30 per cent. density): 8 cupfuls of water and 3½ cupfuls of sugar. Used for Apples, Pears, Raspberries and other sweet berries.

Medium sirup (30 to 40 per cent. density): 8 cupfuls of water and 5½ cupfuls of sugar. Used for such fruits as Currants, Blackberries, Dewberries, Raspberries, Sweet Plums and Sweet Cherries.

Thick sirup (50 to 55 per cent. density): 8 cupfuls of water and 10 cupfuls of sugar. Used for Cherries, Pineapples, Apricots and Peaches.

Flat Sour

There should be no delay at any stage of the canning process, otherwise what is known by canners as "flat sour" is liable to develop, especially in canned Peas, Corn, Beans and Asparagus. This is a condition in which the taste and the odor are so disagreeable as to necessitate the destroying of the product. The danger may be minimized by using product which has not been gathered more than five or six hours, blanching, cold-dipping and packing one jar at a time and placing each jar in the canner as it is packed. If a steam-pressure canner is used, do not clamp down the covers until the retort is filled.

Treatment after Canning

Before storing canned food set it aside for two or three days and then test as follows: Loosen the clamp and grasp the jar by the edges of the glass top. If the can leaks, or if decomposition has set in, the top will come off. If the top stays on, tighten the clamp again and the food is ready for storage. If the top comes off, reject that can. Red fruits and vegetables should be stored in a dark place, as light destroys the color.

Preservative Powder

Preservative powder should not be used. Small doses are not immediately harmful to the healthy adult, but for children and invalids, or in larger doses, the effects are dangerous and, for these reasons, although these powders prevent spoiling, they should not be employed.

Short Instructions for Canning Vegetables

Select vegetables that are young, sound and clean, and use as soon as possible after they have been gathered. Peas, Beans, Corn and Asparagus, which lose their flavor rapidly, should be canned within five or six hours after picking.

Grade the vegetables and make the contents of each jar as nearly uniform in size as possible.

Do not attempt to handle too large a quantity of vegetables at once, especially in hot weather.

Blanch or scald the vegetables by plunging into boiling water, allowing them to remain long enough to make the vegetables sufficiently flexible to pack easily, or to loosen the skins so that they can be readily peeled or scraped off.

As soon as taken from the boiling water dip the product into cold, clean water and immediately remove and drain. The vegetables should not be cooled thoroughly by this cold immersion.

Pack the vegetables firmly into tested hot jars to within one-half inch of the top and fill with boiling water to within one-quarter inch of the top. Add salt for seasoning. The addition of a small amount of sugar improves some vegetables. The new rubbers are put into place and the heated covers adjusted and partly sealed.

Place the containers in the hot-water bath and sterilize for the required length of time (see time table). The boiling water should cover the tops of the jars to the depth of about one inch. Keep the water boiling during the sterilizing process. Begin to time the sterilizing when the water boils over the jars.

Immediately after the sterilizing period is ended, remove the jars, seal them promptly, place them on a tray upside down to cool, and carefully examine for leaks.

The canning being now completed, wash the jars, label and store them.

Instructions for Canning Fruit

With very few exceptions, the directions for canning fruit by the one-period method are similar to those given above for canning vegetables. Well-grown, firm and not overripe fruit should be chosen and all blemishes or decayed parts removed. Cherries, berries and Plums do not need blanching. Fill the jars with the boiling sirup to within one-quarter inch of the top. To prevent loss of color, store red fruits in a dark place. When there is not enough product to fill the last jar, fill it up with liquid and treat it in the same way as those which are fully packed. The fruit will keep just as well.

Recipes. One-Period Method

A time table for scalding, blanching and sterilizing vegetables and fruits appears on page 364.

VEGETABLES

Tomatoes.—Scald $1\frac{1}{2}$ minutes or until skins loosen. Cold-dip. Remove stems and cores. Pack directly into cans or hot jars. Press down with tablespoon (add no water). Add level teaspoonful salt per quart, and sugar if desired. Put rubbers and caps of jars into position, partially seal, but not tight. Seal tin cans completely. Sterilize in hot water bath, 22 minutes; water-seal outfit, 18 min.; 5 lbs. steam pressure, 15 min.; 10 lbs steam pressure, 10 min.

If the open-kettle system is used, sterilize the jars and the covers by boiling them for 20 minutes. Immerse the rubbers in boiling water for about 5 min. Add salt (and sugar if desired) to the Tomatoes as in the cold-pack method. The Tomatoes will make their own juice as they become heated; therefore add no water. Boil for from 6 to 10 min.; the longer period may be required for large Tomatoes, which should be turned during the cooking. Fix the rubbers and with sterilized spoons ladle the boiling Tomatoes into the jars, filling them to overflowing with the boiling juice. Adjust the sterilized tops immediately and seal the jars. Invert the jars to cool, avoiding a draft on them.

Sweet Corn.—Can the same day as picked. Remove husks and silk. Blanch on the cob in boiling hot water 5 to 15 min. Plunge quickly in cold water. Cut the corn from the cob with a thin, sharp-bladed knife. Pack corn in jar tightly until full. Add one level teaspoonful of salt to each quart and sufficient hot water to fill. Place rubber and top in position; seal partially but not tight. (Cap and tip tin cans.) Sterilize in hot water bath, 180 min.; water-seal, 120 min.; 5 lbs. steam pressure, 90 min.; 10 to 15 lbs. steam pressure, 60 min. Remove the jars. Tighten covers, invert to cool and test joints.

When canning Sweet Corn on the cob, follow same directions but pack whole ears in jars instead of cut-off corn.

Sweet Peppers.—Use sweet green Peppers. Place the peppers in the oven and bake them until the skins separate from the meat. Remove the skins. Pack them solid in hot glass jars or tin cans. Add water. Add one level teaspoonful of salt per quart. Put the rubbers and caps of jars in position, not tight. Cap and tip tin cans. Sterilize in hot-water bath, 90 minutes; water-seal, 75 min.; 5 lbs. steam pressure, 60 min.; 10 lbs. steam pressure 40 min. Remove the jars; tighten the covers; invert the jars to cool, and test the joints. Wrap the jars to prevent bleaching.

Pumpkin, Squash, Hominy and Sauerkraut.—Prepare and cut into convenient sections. Blanch 3 minutes. Cold-dip; pack closely in hot jars or cans. Fill with boiling water. Add level teaspoonful salt per quart. Put rubbers and caps of jars into position, not tight. Seal tin cans completely. Sterilize in hot-water bath, 120 minutes; water seal, 90 min.; 5 lbs. steam pressure, 60 min.; 10 lbs. steam pressure, 40 min.

Roots and Tuber Vegetables.—These include such vegetables as Carrots, Parsnips, Salsify, Beets, Turnips and Sweet Potatoes. Grade for size, color and degree of ripeness. Wash and clean thoroughly. Scald or blanch in hot water sufficiently to loosen the skin. Dip quickly into cold water. Pare or scrape to remove skin. Pack whole vegetables, slices or cross-section pieces in hot glass jars or tin cans. Add boiling water until full. Add level teaspoonful salt to quart. Place rubbers and tops of jars in position. Partially seal, but not tight. Cap and tip tin cans completely. Sterilize in hot-water bath, 90 minutes; water seal.

1 min.; 5 lbs. steam pressure, 60 min.; 10 lbs. steam pressure, 40 min. Remove jars from canner. Tighten covers. Invert to cool and test joints. Wrap in paper and store.

Small Beets that run about 40 to the quart are the most suitable for good packs. To prevent fading of the color, leave on 1 in. of the stem and all of the tail while blanching. Blanch not more than 5 min., and cold-dip. The skin should be scraped off, not peeled. Pack Beets whole, if possible.

Vegetable Greens—These include Swiss Chard, Kale, French Endive, Chinese Cabbage leaves, Cabbage Sprouts, New Zealand Spinach, Asparagus, Spinach, Beet tops, cultivated Dandelion and Collards. Can greens the day they are picked. Wash clean, sort thoroughly, allowing no foreign weeds or other vegetable matter to remain. Rid the greens of all sand, dirt, dry and decayed or diseased leaves. Place the greens in a crate or cheese cloth and blanch in a vessel with a little water under false bottom or in a regular steamer, 15 to 20 minutes. Remove. Plunge quickly into cold water. Cut in convenient lengths. Pack tight in jar or container and season to taste; add a little chipped beef, olive oil, etc. Add hot water to fill crevices, and a level teaspoonful of salt to each quart. If using glass jars place rubber and top in position, partially seal; if using tin cans, cap and tip completely. Sterilize in hot-water bath, 120 minutes; water seal, 90 min.; 5 lbs. steam pressure, 60 min.; 10 lbs. steam pressure, 40 min. Remove from canner. Tighten covers of jars. Invert to cool and test the joints. Wrap in paper to prevent bleaching, and store.

Vegetables. Including Wax Beans, Stringless Beans, Okra, Green Peppers, Cabbage and Brussels Sprouts—String or hull. Blanch in live steam for 5 to 10 minutes. Remove and dip quickly in cold water. Pack in hot jars or tin cans and add boiling water until jars or tin cans are full. Add one level teaspoonful of salt to each quart. Put rubbers and caps of jars in position, not tight. Seal tin cans completely. Sterilize in hot-water bath, 120 minutes; water seal, 90 min.; 5 lbs. steam pressure, 60 min.; 10 lbs. steam pressure, 40 min.

Lima Beans and Peas.—Blanch in live steam for 5 to 10 minutes. Dip quickly in cold water. Pack immediately in hot glass jars or tin cans. Add boiling water to fill container. Add level teaspoonful salt per quart. Place rubbers and caps of jars in position, not tight. Seal tin cans completely. Sterilize in hot-water bath, 180 minutes; water seal, 120 min.; 5 lbs. steam pressure, 60 min.; 10 to 15 lbs. steam pressure, 40 min. Remove from container. Tighten cover. Invert to cool, and test the joints. Wrap in paper to prevent breakage, and store.

Cauliflower.—Use the flowered portion. Separate head into small pieces. Plunge it

into cold brine (one-half pound salt to 12 quarts of water). Allow the Cauliflower to remain in this brine for one hour. Blanch it 3 min. and dip quickly into cold water. Pack it in hot glass jars or tin cans. Fill with boiling water and add a level teaspoonful of salt per quart. Put rubbers and caps of jars in position, not tight. Cap and tip cans. Sterilize in hot-water bath, 60 minutes; water seal, 40 min.; 5 lbs. steam pressure, 30 min.; 15 lbs. steam pressure, 20 min. Remove the jars. Tighten covers. Invert jars to cool, and test the joints. Wrap the jars with paper to prevent bleaching.

FRUITS

Soft Fruits and Berries.—These include, Apricots, Blackberries, Blueberries, Cherries, Currants, Dewberries, Figs, Gooseberries, Grapes, Huckleberries, Peaches, Plums, Raspberries, and Strawberries. After hulling, seeding, stemming, or skinning the fruit, place fruit in a strainer and rinse by pouring cold water over it. Pack from strainer into hot jars or cans without crushing, using big spoon or ladle. Hot sirup previously prepared should be poured over the fruit at once. Before packing a second jar, place rubbers and caps in position, not tight. If using tin cans, seal completely. Enameled tin cans should be used for all highly acid berries. Sterilize in hot-water bath, 16 minutes; water seal, 12 min.; 5 lbs. steam pressure, 10 min.; 10 lbs. steam pressure, 5 min. Remove from canner; tighten covers; invert to cool, and test joints. Wrap in paper to prevent bleaching, and store.

Hard Fruits.—Apples, Pears, and Quinces.—Remove skin and core. Cut into convenient slices or sections and drop into slightly salted cold water to keep from tarnishing. Blanch 1½ minutes. Cold-dip. Pack closely in hot jars or tin cans. Fill with hot sirup. Put rubbers and caps of jars into position, not tight. Seal tin cans completely. Sterilize in hot-water bath, 20 minutes; water seal, 12 min.; 5 lbs. steam pressure, 8 min.; 10 to 15 lbs. steam pressure, 6 min. Remove from canner; tighten covers; invert to cool, and test joints. Wrap in paper to prevent bleaching, and store.

DRYING FRUITS AND VEGETABLES

The old art of drying fruits and vegetables is again revived. It is the simplest method of preserving many of our crops.

Simple frames may be made, using a low tray with a wire bottom; the mesh must be rather fine, otherwise the portions of fruit will pass through the holes, for it is remarkable how much the crops will shrink when water is lost. This frame may be hung outside in the sun, or may be hung over the gas or coal range. The use of an electric fan is also advised, for the drying depends upon heat and interchange of air.

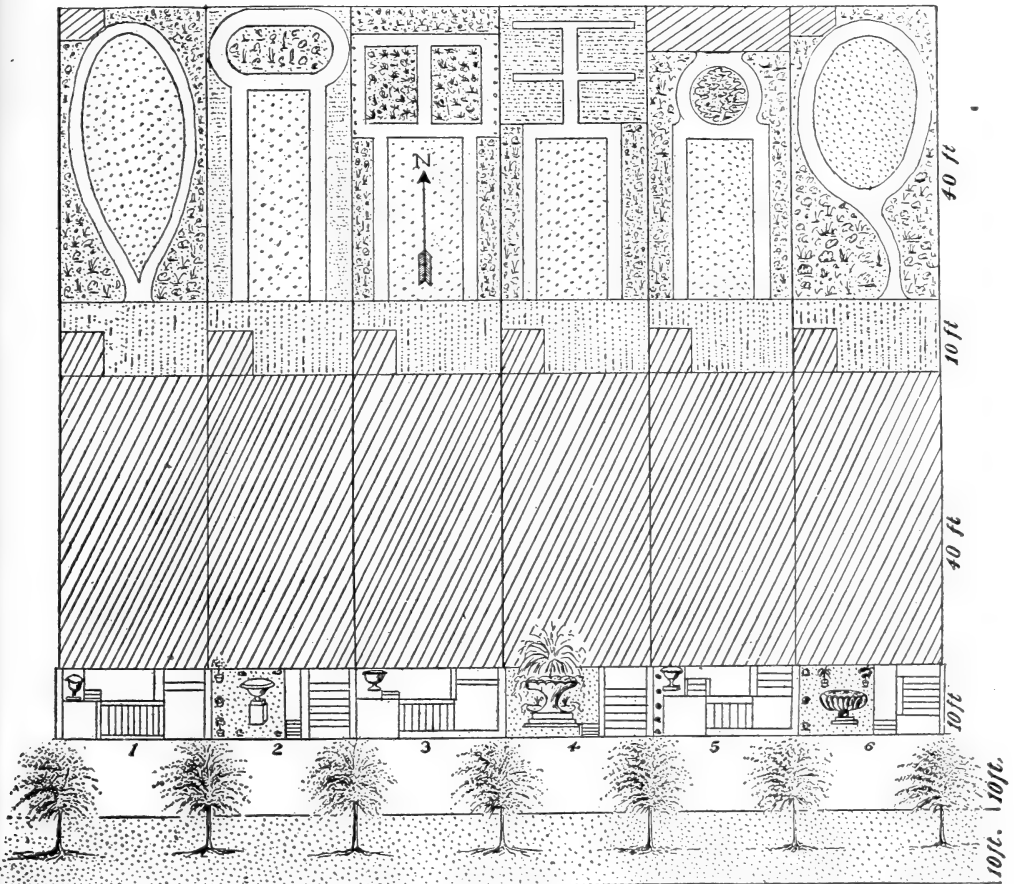
Vegetables and fruits should be pared and cut into thin slices. With certain juicy sorts placing them in the oven to start drying will be found advisable; the heat must not be strong, otherwise the material will bake or burn, not dry.

Most vegetables are blanched; this consists merely of placing them in a wire strainer and plunging in boiling water. The blanching is followed by the cold-dip; this merely means that they are dipped in cold

water, which will retain their color and make them firm. The blanching process removes strong odors and flavors and softens the fiber, besides thoroughly cleansing the product.

Full directions for drying fruits and vegetables in the home, with recipes for cooking, are contained in *Farmers' Bulletin 841*, copies of which may be obtained free from the Division of Publications, U. S. Department of Agriculture, Washington, D. C.

For a complete work on the subject of this chapter we recommend CANNING AND PRESERVING, by Mrs. S. T. Rorer. This book is the result of careful practice in teaching beginners how to can and preserve fruits and vegetables; also the best methods of making marmalades, fruit butter and jellies, drying fruits, and making sirups and catsups, pickling, flavored vinegars, drying herbs, etc. Price, \$1.10. postpaid. Secure your copies where you bought your Garden Guide.



City Houses and their Rear Yards

Some of these yards are purely ornamental; others, notably the two in the middle, have vegetable spaces. The dotted parts of the yards represent grass, the shaded parts arbors and rest house, the remainder being beds and borders. Some most delightful landscape effects can be produced in these limited areas of 20 ft. wide by 40 ft. deep

TIME TABLE FOR SCALDING, BLANCHING AND STERILIZING VEGETABLES, AND FRUITS

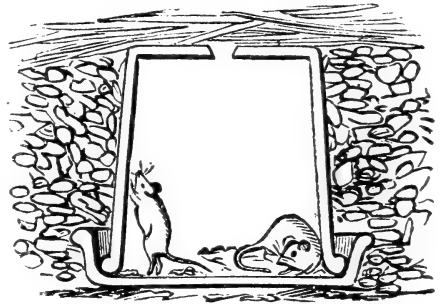
(From Farmers' Bulletin 839)

Products by groups.	Scald or blanch.	Hot- water- bath outfits at 212°.	Water- seal outfits, 214°.	Steam pressure 5 to 10 pounds.	Pressure cooker, 10 to 15 pounds.
SPECIAL VEGETABLES.					
Tomatoes.....	1½	22	18	15	10
Pumpkin.....	3	120	90	60	40
Squash.....	3	120	90	60	40
Hominy.....	3	120	90	60	40
Sauerkraut.....	3	120	90	60	40
Corn, sweet.....	5	180	120	90	60
Sweet peppers.....	5	90	75	60	40
POD VEGETABLES AND OTHER GREEN PRODUCTS.					
Beans, wax.....	5-10	120	90	60	40
Beans, stringless.....	5-10	120	90	60	40
Okra.....	5-10	120	90	60	40
Peppers, green or ripe.....	5-10	120	90	60	40
Cabbage.....	5-10	120	90	60	40
Brussels sprouts.....	5-10	120	90	60	40
Cauliflower.....	3	60	40	30	20
ROOT AND TUBER VEGETABLES.					
Carrots.....	5	90	80	60	40
Parsnips.....	5	90	80	60	40
Salsify.....	5	90	80	60	40
Beets.....	5	90	80	60	40
Turnips.....	5	90	80	60	40
Sweet potatoes.....	5	90	80	60	40
Other roots and tubers.....	5	90	80	60	40
SOUP VEGETABLES.					
Lima beans.....	5-10	180	120	60	40
Peas.....	5-10	180	120	60	40
GREENS, DOMESTIC OR WILD.					
Swiss chard.....	15	120	90	60	40
Kale.....	15	120	90	60	40
Chinese cabbage leaves.....	15	120	90	60	40
French endive.....	15	120	90	60	40
Cabbage sprouts.....	15	120	90	60	40
Spinach, New Zealand.....	15	120	90	60	40
Asparagus.....	15	120	90	60	40
Spinach.....	15	120	90	60	40
Beet tops.....	15	120	90	60	40
Dandelion, cultivated.....	15	120	90	60	40
Collards.....	15	120	90	60	40
SOFT FRUITS AND BERRIES.					
Apricots.....	1-2	16	12	10	5
Blackberries.....	16	12	10	5	5
Blueberries.....	16	12	10	5	5
Cherries.....	16	12	10	5	5
Currants.....	16	12	10	5	5
Dewberries.....	16	12	10	5	5
Figs.....	1-2	16	12	10	5
Gooseberries.....	1-2	16	12	10	5
Grapes.....	16	12	10	5	5
Huckleberries.....	16	12	10	5	5
Peaches.....	1-2	16	12	10	5
Plums.....	16	12	10	5	5
Raspberries.....	16	12	10	5	5
Strawberries.....	16	12	10	5	5
HARD FRUITS.					
Apples.....	1½	20	12	8	6
Pears.....	1½	20	12	8	6
Quinces.....	1½	20	12	8	6

Miscellaneous

Mice and Rabbits

Pine mice and cottontail rabbits occur throughout the eastern portion of the United States and do much harm to fruit and ornamental trees and shrubs as well as to garden produce and other farm crops. Both can be thinned out or cleared out by poisoning. For the Pine mice use Sweet Potatoes cut into pieces about the size of large Grapes. Moisten four quarts of these and drain off excess moisture. Slowly sift over them one-eighth ounce of powdered strychnine (alkaloid), using a pepper box or salt shaker for the purpose, and stir constantly to distribute the poison evenly. One or two pieces of the poisoned Sweet Potatoes should be dropped into the tunnels through the natural openings, or through openings made with a stick. A systematic use of this poison invariably results in an almost complete extermination of Pine mice.



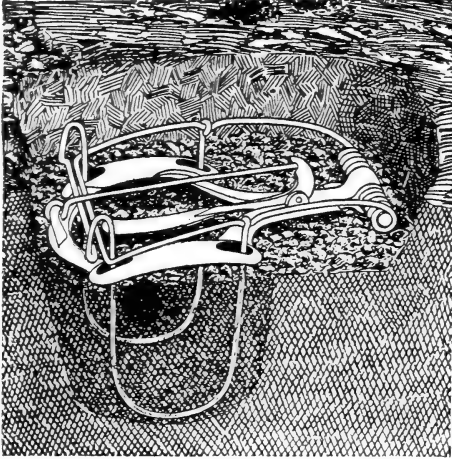
A Simple Mouse Trap

These pests are also easily trapped, but owing to the extra time and labor required, this method does not compare favorably with poisoning. Rabbits can be exterminated by the use of powdered strychnine, but game laws should be first consulted.

Eradicating Moles

One of the worst and most persistent pests in gardens, nurseries, lawns and sometimes in greenhouses, is the mole. There are several ways of trying to eradicate moles. First, and doubtless best, is the use of traps, either wooden or iron, which are in several patterns, those best known being the Out o' Sight, costing 75c. each; the Reddick, at \$1; the Olmstead, \$1.50; and the Nash mole trap, \$1. The latter is used and recommended by the United States Agricultural Department. It is a light wire arrangement, and is highly spoken of. It acts upon the well-known principle of the Choker wire traps used for mice. These and other traps may be had from seedsmen. It requires considerable skill to set a trap to the best advantage, and is an art not always readily acquired. In gardens or nurseries it is well to set the trap at the edge of the grounds or lawn, as it is there that the moles

usually enter. Poisoned fresh Corn, placed in their runs, is also recommended, a strychnine solution being used. Lastly, carbon bisulphide, which is a deadly poisonous volatile liquid, may be poured into their runs at places, covering the opening over again with the soil. The fumes permeate the soil and kill the moles. One can frequently catch or kill the moles as they work, by noticing the move-



Choker Loop Trap for Moles

From "Trapping Moles," Farmers' Bull. 832



**Scissors-jaw or Gripping-jaw
Trap for Moles**

ment of the soil. The utmost caution has to be exercised, as they hear the slightest noise. A spade or digging fork may be used to scoop in behind them at about 6 inches from where they are working, and not in front, as they always run backward.

How to Destroy Rats

The chief means of keeping rats from one's place is to have rat-proof buildings, and for preventing the increase or presence of rats have perfect cleanliness everywhere, no waste food or shelter places for them. Dogs, cats, ferrets, hawks, owls, skunks, coyotes, weasels and minks are among their natural enemies and should be encouraged. Trapping, poisoning, fumigating, and the use of micro-organisms (bacteria) are other means adopted for their eradication. Full particulars as to the destruction of rats are given in Farmers' Bulletin 369, published Sept. 3, 1909, by the U. S. Dept. of Agriculture. There are several forms of rat traps, possibly the best being one or other of the guillotine type. The mouse trap shown p. 365 could be attempted. Sometimes a barrel trap is used, the cover being so poised and balanced that when the rat places its weight on it that side immediately tips

and throws the rat into the water. Of course, a bait has to be placed on the top. Among the poisons used are: barium carbonate, strychnine, arsenic and phosphorus. The barium may be fed in the form of a dough, composed of four parts of meal or flour and one part of the mineral. Another plan is to spread the barium carbonate upon fish, toasted bread or ordinary bread and butter. The prepared bait should be placed in rat runs, about a teaspoonful at a place. Strychnine may be used by inserting the dry crystals in small pieces of raw meat, sausage or toasted cheese; or oatmeal may be moistened with strychnine sirup, and small quantities laid about. The sirup is made as follows: dissolve one-half ounce of strychnia sulphate in a pint of boiling water, add a pint of thick sugar sirup and stir thoroughly. For an arsenic bait, take a pound of oatmeal, a pound of coarse brown sugar and a spoonful of arsenic; mix well together and put the composition into an earthen jar.

Bulbs, Corms, Tubers, Rhizomes, and Rootstocks

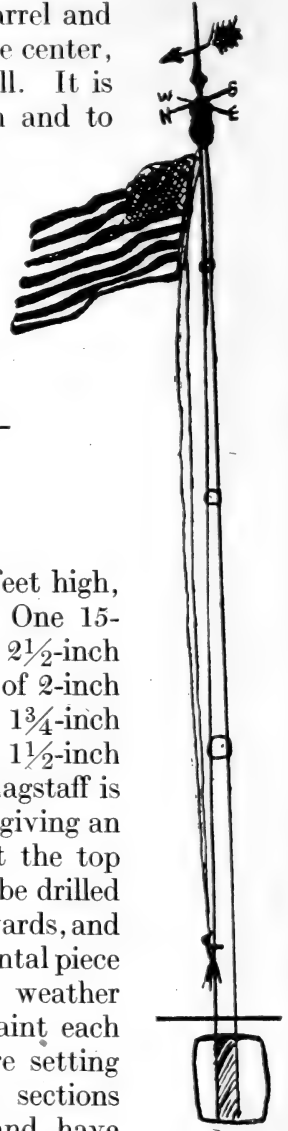
A *bulb* is composed of fleshy scales packed together, forming an ovoid, oval, round, or flattened ball, from the under surface and edges of which roots are produced during growth. Examples: Hyacinth, Liliun, Daffodil, Onion. A *corm* may be superficially like a bulb but is solid. Examples: Gladiolus, Crocus, Cyclamen. A *tuber* is best represented in a Potato, being "a short thickened shoot furnished with 'eyes' or buds"; other examples are Caladium, Calla or Arum Lily, Dahlia, tuberous Begonia. A *rhizome* (rhizomatous plant) is a shoot or stem that grows more or less horizontally on or in the soil producing buds and stem growth. Examples: German Iris, Lily of the Valley, Solomon's Seal. A *rootstock* is the thickened fleshy mass that hardy herbaceous perennial plants as a rule, form, and in which their store of nourishment is carried over in Winter. Examples: Peony, Rhubarb, Phlox, Delphinium.

Ants, Destroying

Some good ways of destroying ants are to get some old meaty bones—from the stock pot will do—and place them near the nest; these will attract them in large numbers, and they can then be dropped into boiling water. Another way, where there are no valuable plants near, is to sprinkle the nest and runs with a mixture of six parts water to one part kerosene. Forceful syringing with warm water will clean pot plants of ants; and stirring the soil around their nests repeatedly will also tend to clear them out. As a soil fumigant Vaporite is an excellent remedy. It is safe and easy to use, being already prepared. Bisulphide of carbon is likewise sure.

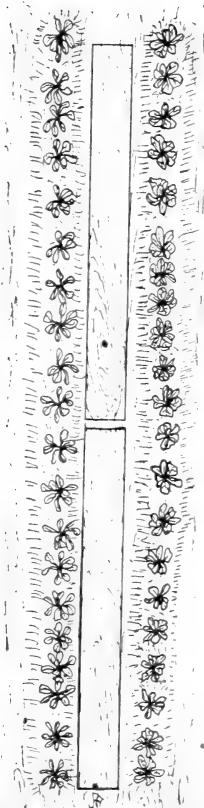
A Dandy Flagstaff for the Lawn

One who has a flagstaff writes: "We got a barrel and put in a heavy 2-inch iron pipe, keeping this in the center, around which we filled concrete, ramming it well. It is necessary to place a small block at the bottom and to cover the concrete with some small boards at the top in order to hold the iron pipe steady while the concrete is being filled in. This work must be done near to the place where the pole is to be erected. When the concrete has set solidly, the barrel may be slid into the hole prepared for it in the way shown in the illus-



Prepared trench in which to slide barrel

tration. The flagpole is 38 feet high, made of sections as follows: One 15-foot length of extra heavy 2½-inch iron pipe; one 10-foot length of 2-inch pipe; one 8-foot length of 1¾-inch pipe; one 5-foot length of 1½-inch pipe. Total, 38 feet. The flagstaff is set 4 feet below the surface, giving an actual height of 34 feet. At the top of the last section a hole can be drilled through the pipe for the halyards, and surmounting this an ornamental piece can be set on, including weather vane. It is important to paint each section three times, before setting into position, and all the sections must be well threaded and have good sockets."



Garden Boards and Their Uses

When in early Spring we have spaded our garden, made the soil fine and mellow, and leveled it by use of the garden rake, we greatly disliked to walk on the plot to plant the seeds, the hopes of our season's

crops. It always seems that in trampling down the soil which we have brought into such a mellow condition, we partly undo the work which we have done with spade and rake. Later, when the seeds have germinated, and the plants need attention, again we feel reluctant to walk between the rows for the purpose of thinning out, cultivating or transplanting. We know that the soil, especially if moist, is compacted by the pressure of our feet so that, in drying, it is left in hard lumps.

We have learned in our many years of amateur gardening a simple method whereby to avoid trampling down and compacting the garden soil. We do not claim to have originated the device, it may have been used, for aught we know, ever since Adam and Eve left Eden. The point is that it works. Last season our garden plot was 36 feet wide and 48 feet long. Through it, lengthwise, ran a path 3 feet wide, which left on each side a plot in which the rows of vegetables were 16 feet long. Some of these rows were 14 inches and some 16 inches apart. In view of these dimensions we obtained two pine boards, planed both sides, each 1 inch thick, 10 inches wide and 8 feet long.

Standing in the path we would place one of these boards end toward the path and across the end of the plot which we were going to plant; then walking along it we would place the near end of the second board against the far end of the first board, so that it reached the rest of the way across the plot. Walking on these boards we would set our garden line along one side, make a drill and plant seeds or set plants. Next we would move the garden line over to the other side of the boards, make a second drill, and plant a second row of seeds or plants. Then we would lift to the other side of the line, first the board farthest from the path, and second, the one nearest the path, and proceed to plant a third row, and so on till the whole plot was planted. It should be noted that at the first placing of the boards we planted two rows before moving the boards, but after that we move the boards as we plant each row. Where the rows in the garden plot are not more than 6 feet to 10 feet long a single board may, of course, be used.

In thinning out and weeding rows we invariably use the boards in this way. And often in gathering the vegetables, especially if the soil is wet, we use our garden boards and thus avoid compacting the soil at a time when moisture conservation helps to insure big crops. In view of our past experience we would not want to be without our garden boards, and do not intend to if we can help it.

Paint

The most economical and satisfactory black paint we have ever used for ironwork was made by mixing about two quarts of coal tar with a pint or a pint and a half of benzole, which was laid on with a paint brush. This makes an excellent varnish for rough work. It could not be recommended, however, as a fine varnish for any inside work. Paint made of coal tar and benzole will be found excellent for smearing the ironwork of farm implements. As benzole is somewhat volatile, no more paint should be prepared at one time than would be used immediately. Another composition to blacken walls is made as follows: Boil well together one gallon of coal tar to 2 pounds of pitch, add 5 pounds of sifted hot lime. Apply it hot with brushes. Other cheap and durable paints for woodwork are these: For wood underground: Take boiled linseed oil, stir in pulverized charcoal to the consistency of paint. Put a coat of this over the timber, and the exclusion of damp will be perfect. Limewood posts have been taken up after having been set seven years that were as sound when taken up as when first put into the ground. Time and weather seemed to have no effect upon them. The posts should be well seasoned before the oil and charcoal are applied, and the paint should be thoroughly dry before they are put into the ground. For outdoor woodwork, the best priming is simply whiting mixed in pure raw linseed oil; let it stand until it is thoroughly mixed; then reduce with oil, and add the drier sufficient to dry it. This makes a good, hard, durable paint for the first coat. Reduce it to an ordinary thickness for priming and apply with an ordinary brush. It must be thoroughly beaten together, so as to work out all the lumps of whiting. If color is desired, or the woodwork is very much stained by age, take about one-half common whiting, one-half white lead, throw in a small portion of red lead and chrome yellow to overcome the blackness of the wood, or add umber for a drab color. Fresh paint is always best. Small portions of Venetian red and lamp-black will do for a dark color. Yet another wood preservative paint is made thus: Boil together one gallon of coal tar and $2\frac{1}{2}$ pounds of sulphate of zinc (white copperas), and paint it on the woodwork while hot.—The Horticultural Directory.

Drainage

There are few places where some amount of drainage is not necessary. It may be merely the drainage around barns and other houses to keep them dry and to prevent rot, or it may be the improvement in land. The most difficult land to drain is a perfectly level stretch. About the only thing one can do is to cut a wide, deep

ditch at the most convenient side, or where the ground is seemingly lowest, and drain into this; an outlet, of course, is imperative. All land that holds water for a day or so after heavy rain requires drainage. The benefits derivable are the sweetening of the soil, making it accessible to roots to a much greater depth, freeing it of stagnant water, and allowing healthy action to take place. Hard baked cylindrical tiles of 2½-inch diameter, set from 2½ feet to 3½ feet deep, according to the stiffness or sogginess of the soil, is recommended. In the larger areas these should be 30 feet apart. Two and a half inch pipe will drain from 400 feet to 500 feet of ground. A good system is to have a large central drain with oblique lateral feeders. There should be a steady fall and good outlet. The tiles are laid on a flat foundation, tightly butted end to end, and are covered over with sod, grass side downward, or brush, or straw, or even paper, and the soil then filled in on top. Where much drainage on cleared land has to be done, lines can be cut to a considerable depth by ditching plows or subsoil plows, the rest of the work being done by hand labor.

Flies in Houses

The common house fly is now generally known to be a very dangerous insect, carrying disease germs far and wide. It lays its eggs upon horse manure, and a great variety of decaying vegetable and animal material. An individual fly may lay 120 eggs at one time, and two to four batches may be laid. The eggs usually hatch in less than 24 hours, and the period of emergence of the adult fly is 8 to 12 days. In a few days the young female is ready to deposit eggs. There may be 10 to 12 generations every Summer, so that the number of flies that it is possible to mature will thus readily be estimated. The best preventive of all, of course, is *absolute cleanliness*, especially in regard to decaying material; sticky fly papers are also used, fly traps, which are obtainable in various patterns, fumigants, and the burning of fresh pyrethrum powder. Another way is to expose in shallow dishes a mixture of formalin and milk or water, sweetened with a little sugar; one teaspoonful of commercial formalin to one teacupful of water or milk. Above all, however, cleanliness pays.

Poison Ivy

Poison Ivy (*Rhus toxicodendron*), which possesses an irritant poison, and is usually found on trees, walls and fences, somewhat resembles the Virginia Creeper. The plants, however, are easily distinguished by comparison of the leaves, the Poison Ivy having three leaflets while the innocuous "Creeper" has five. The cheapest and most effective method of eliminating Poison Ivy is the simple one of

rooting up the plants and destroying them. The safest time for handling the Ivy is in the Fall, after the plant has stopped growing and the sap is out of it. Overalls and gauntleted gloves should be worn. As a further precaution, grease the hands with lard and wash off with strongly alkaline soap on the conclusion of the work. In burning Poison Ivy keep away from the smoke. Thorough and repeated washing with warm water and alkaline soap as soon as possible after contact with the Ivy is advisable, and it should be borne in mind that the poison may be transferred indirectly from clothing, gloves and implements, also from towels used by those who have touched the plant.

It is a curious fact that some individuals experience no ill effects from contact with Poison Ivy, while others are affected even without actual touch. The poison produces acute inflammation, accompanied by intense burning and itching. Application of mildly astringent and sedative lotions will allay the irritation; boric acid, hyposulphite of sodium, sugar of lead, and zinc are regarded as effective remedies. In severe cases a physician should be consulted.



Why not a perennial border like this between neighboring lawns, instead of a formal fence?

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In this Index to Contents no attempt has been made to index all the species and varietal names mentioned in this book, except when these have special paragraphs given to them; otherwise, for instance, in the chapter on Annuals and Biennials, will be found listed all the more worthy varieties; in the chapter on Ferns, all the best Ferns; in the chapter on Pruning is given a full list of nearly every plant which calls for pruning treatment, and so on throughout all the chapters. Every species or family is treated in its own particular chapter; hence, it was deemed unwise to string out a list of hundreds of names which might serve but to confuse.

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The Home Fruit Grower

By PROF. M. G. KAINS



A CLEAR, simple, practical and comprehensive volume for the amateur who seeks to grow high quality fruits for home needs, whether to eat out of hand as dessert, or put up in some culinary way.

The author is particularly well fitted to write this book, having been reared in just such a fruit plantation, and in a village where for more than half a century the leading hobby has been high quality fruit growing for family use. With this standard of excellence he has united the best modern methods of securing choice specimens—methods little practised, or even unknown, in his boyhood days—tillage, spraying, thinning, fertilizing, cover cropping, preventing frost injuries, low heading, rational pruning—each simple in itself and each conducive to the production of an abundance of the best fruit.

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Choosing Varieties
Buying Nursery Stock
Season to Plant
Preparation, Fertilization
and Management of
the Soil

Cover Cropping
Pruning
Thinning
Spraying
Harvesting
Storing

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Apple
Pear
Quince
Peach
Nectarine
Plum
Cherry

Apricot
Strawberry
Raspberry
Dewberry
Blackberry
Grape
Loquat

Fig
Juneberry
Pawpaw
Persimmon
Kaki
Pomegranate
Wineberry

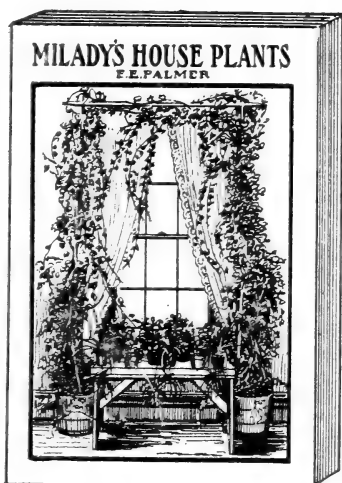
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Milady's House Plants

The Care of Plants in the Home made simple and success assured to all who follow the practical directions of the veteran grower who, after much urging, at last consented to give the public the benefit of his lifelong observations and experience



HERE is guidance for the woman who loves the companionship of plants in the home. Written by F. E. Palmer, a recognized authority in the United States on the subject on which he has so conclusively written. Mr. Palmer has spent twenty-five years engaged in the business of selling plants to women, arranging for their home decorations, etc., and so knows just what problems present themselves to the woman taking care of plants in her own home. He tells fully and conscientiously of the plants which any woman can successfully grow indoors, and of all the details necessary to insure this success.

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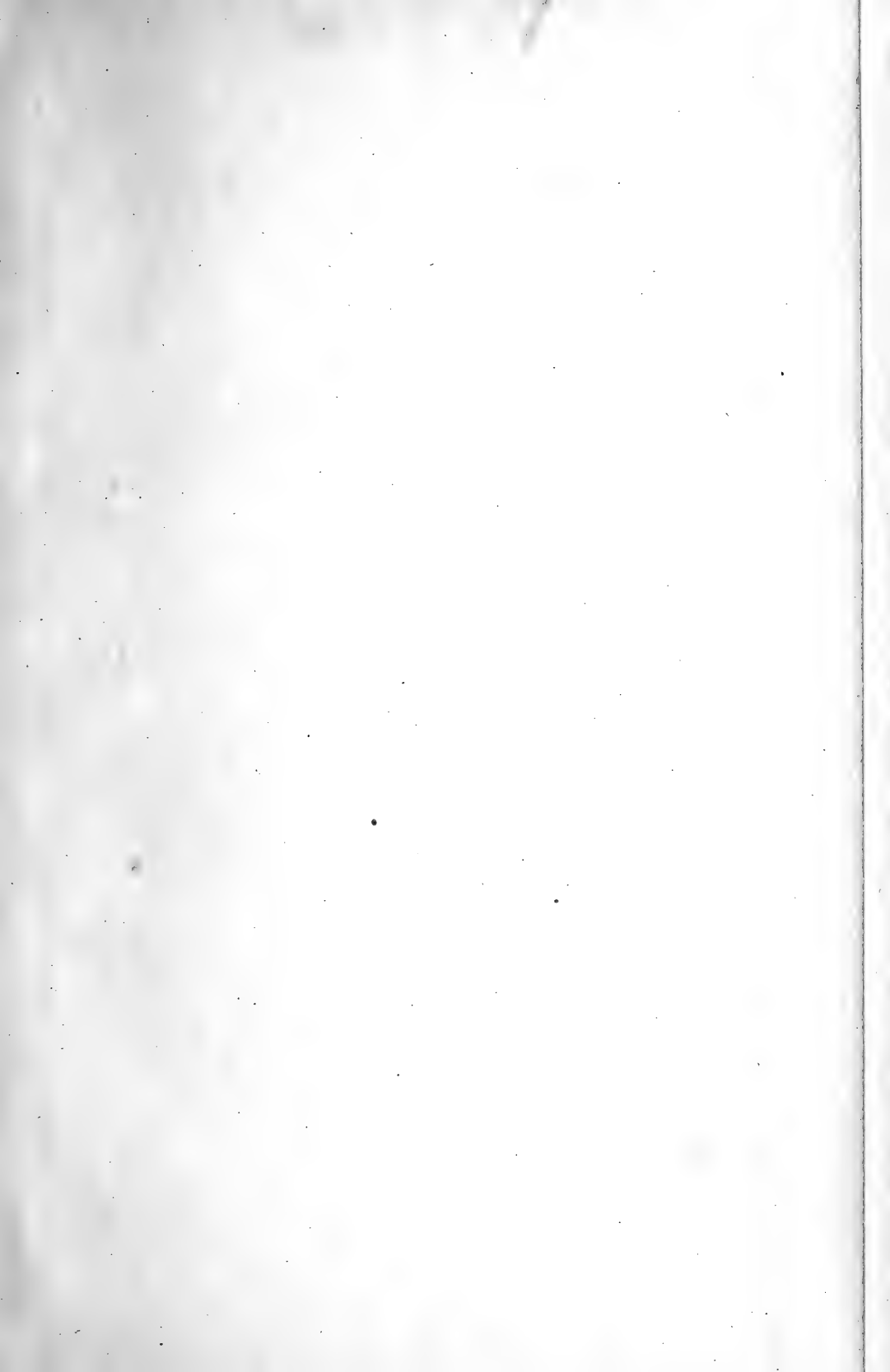
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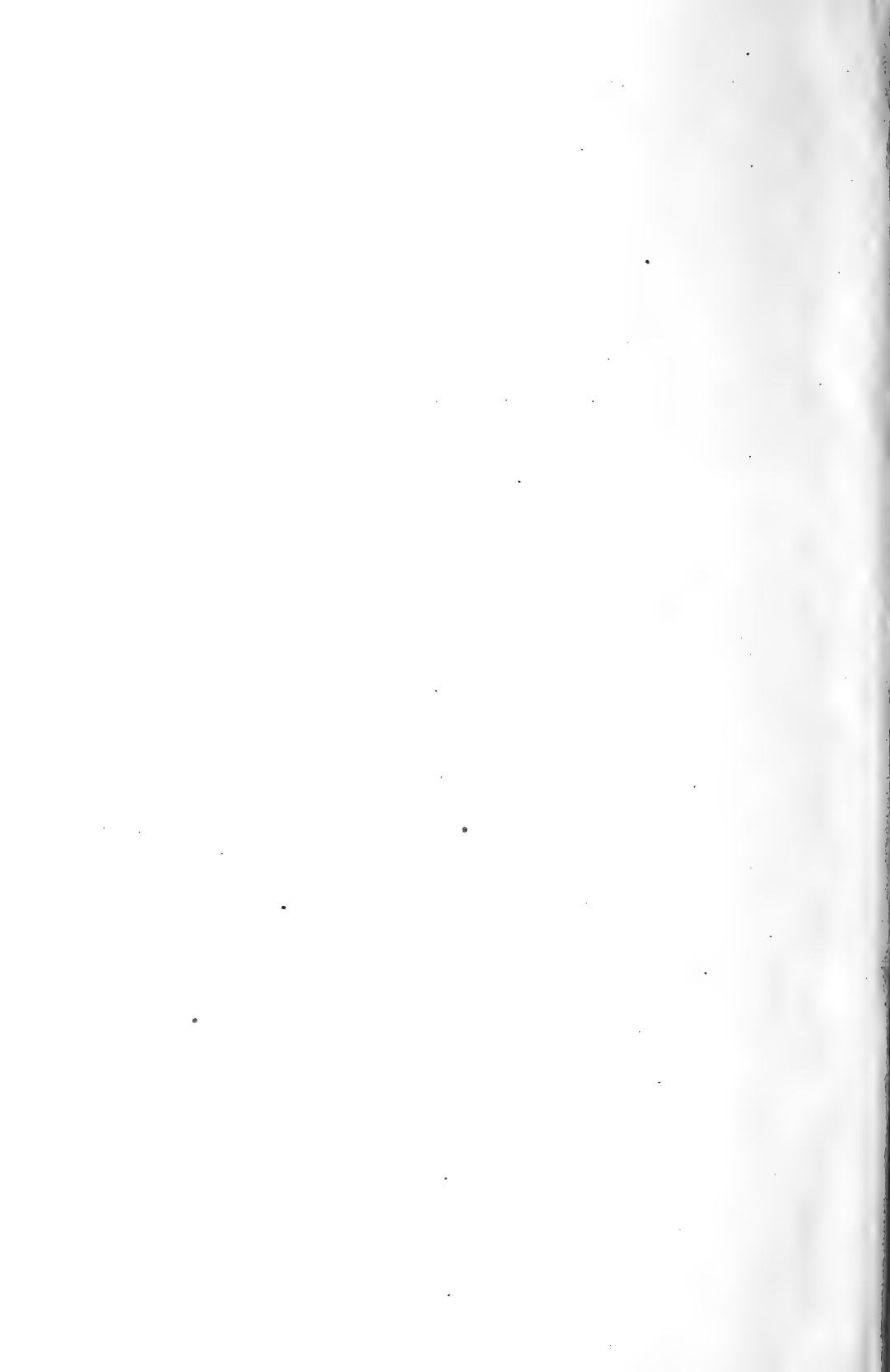
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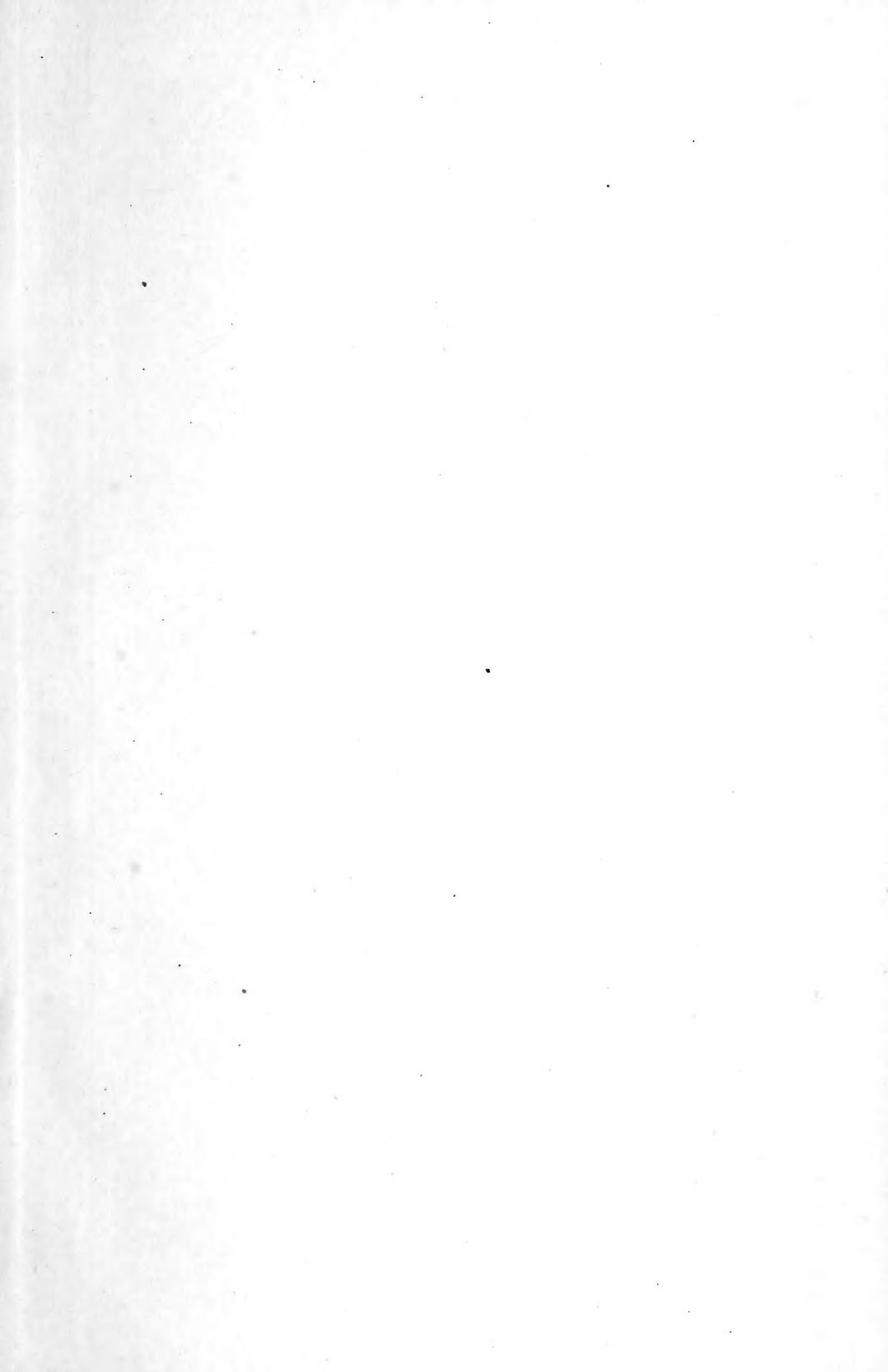
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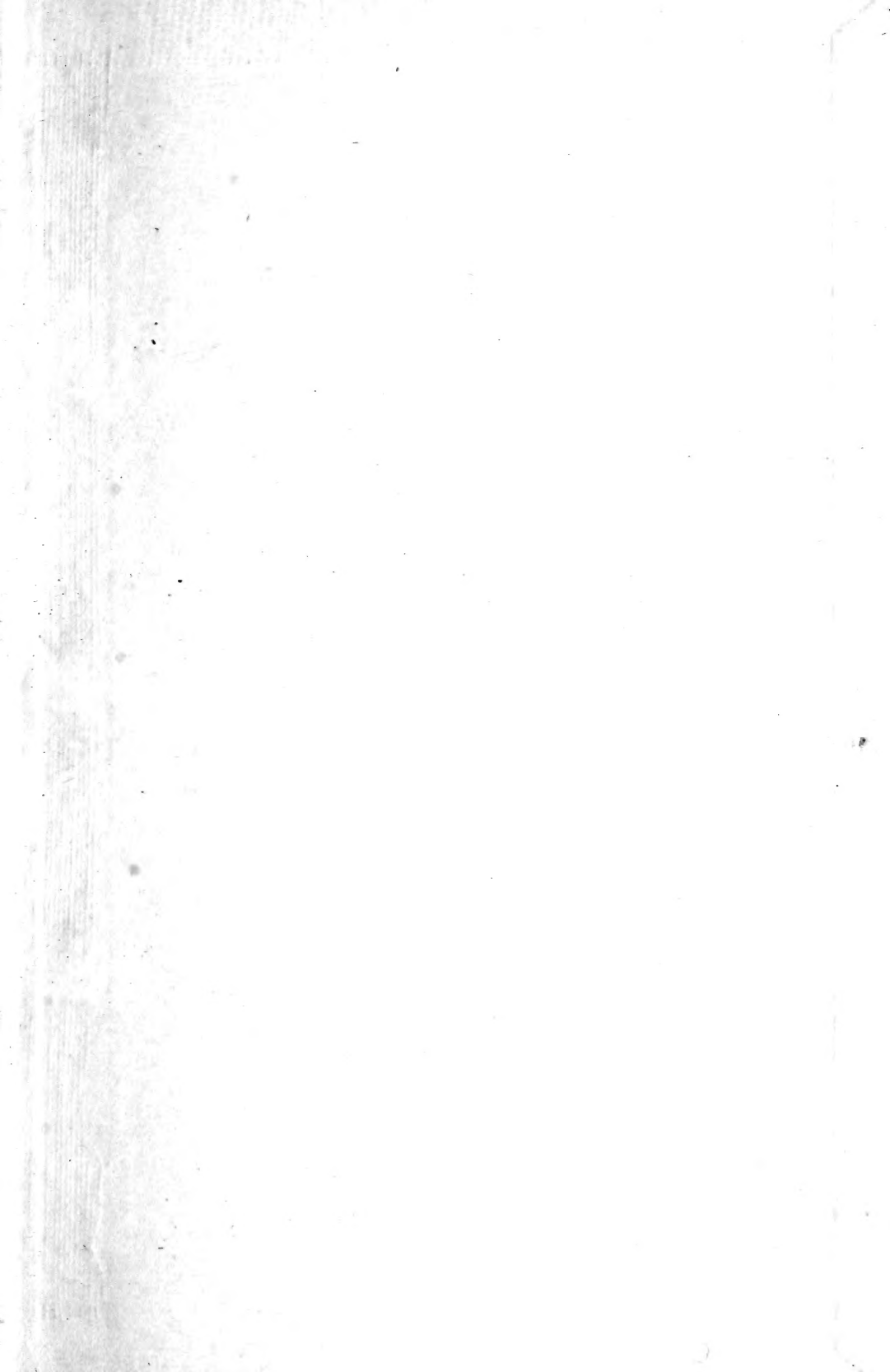
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