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PACIFIC

RURAL HANDBOOK;

CONTAINING

A SERIES OF BRIEF AND PRACTICAL ESSAYS AND NOTES
ON THE CULTURE OF TREES, VEGETABLES AND
FLOWERS, ADAPTED TO THE PACIFIC
COAST. ALSO, HINTS ON HOME
AND FARM IMPROVEMENTS.

14
9/27/11
BY CHAS. H. SHINN.

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S. F.

Preface.

AT the request of my kind friends, the publishers of the "Pacific Rural Press," I have written the following brief chapters on horticultural, and similar topics. It has been my endeavor to realize our climatic conditions, and to avoid merely compiled information.

The task I assumed was to write a book which should treat, in an unpretending way, of rural homes, and their improvement, of gardens and orchards, of house-plants, lawns, and woodlands—all with distinct reference to the needs of this coast, and the experience of our farmers, orchardists, gardeners, florists, and nurserymen.

This little volume is a venture into a field which the writers of this coast have hitherto carefully avoided. It is a hope and a prophecy of the future when all our rural interests are to be treated of in pamphlets and books by our own writers. We have had poems, political essays, and theological discussions, but not, so far as I know of, anything of the character of "Rural Essays." Yet this is a land for vines, and fruits, and flowers. It is a land whose glowing future nerves us to renewed labors as we plant our vacant hill-sides, and reclaim our miles of tide-lands. My thoughts go out towards California as a region of many homes, and of boundless hopes. Wherever there are strong toilers who love shade-trees and fruitful orchards; wherever busy women or fair children know the fragrance of lilies and heliotropes; wherever city dwellers long for the country freedom and the happy days of youth—there may this little book wander, as a friend and a guide, not infallible, but speaking audibly of what we have ourselves seen, and have ourselves loved.

C. H. S.

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CALIFORNIA ORANGES.

CHAPTER I.

LAYING OUT THE GROUNDS.

Innate Love of Rural Life.—The Pleasantness of Founding a Home.—We can Read Men's Character in their Homes.—Value of Originality.—Importance of a well Considered Plan.—Hints on General Effects and Results.

WHOEVER, in this fair State of ours, has become the fortunate owner of a little nook of land which, by patient and well directed toil, may be changed from a waste to a garden, must feel in some degree as if he were the master of a new and glorious world. There lie the fresh and smoking furrows, smiling to think of the countless secrets they hide—the fruit and leaves and flowers, the shaded walks and the sloping lawns; there the new master plans in faith and patience for the golden years of a long and useful life. The founding of a home is one of the purest joys left to fallen man; it is the blessing which came softly out of Paradise with Adam, and has followed his wandering children ever since.

In this desire for rural homes the perennial freshness of humanity is revealed. As every successive generation of children love to pull corn-silk, and tumble in the hay-fields, so every generation of busy, over-worked men—lawyers, politicians, merchants, editors—love to unfasten the chafing harness at times, and choose some happy spot, by the rippling streams, where they may be new Adams received again into Paradise—new dwellers in Arcadia. Our modern

intense life draws men, in early manhood, to the centres of activity, where fortunes and reputations are to be won; but their hearts, as they grow older, turn back to the grassy fields, the blooming gardens, the quiet heath, the country freedom, and they remember, with deeper affection, the old farm-house of their boyhood, the fragrant garden, and the fruitful orchard. Then that saving, long dormant love of the brown, friendly earth asserts itself; and so, in due time there is a home planted, and grounds, large or small, to be laid out.

And first, it is on the whole a pleasant task to make plans for a new home, to lay out the grounds and to plant trees, shrubs, and flowers. Although little plans sometimes fail, and workmen cannot be trusted with everything, and years may be required for complete success, yet it is usually much better to take a vacant lot, or a rather neglected farm, and improve to suit yourself, than to pay fancy prices for orchards and gardens, which grow so fast in our climate. A farmer may, on account of nearness to water, or commanding position, be compelled to build his own house nearly where the old one was; but no minor question should ever prevent the choice of the absolutely best point attainable. The essentials of a comfortable home are good soil, good water, and beautiful location. Beautiful scenery, varied surfaces, and, if possible, a glimpse of the ocean, or a river, add much to the value of a location; nearness to market, and social advantages, are very important; but every hope of success depends primarily upon the character of the soil, and on the rainfall, or facilities for irrigation.

Men have a curious habit of stamping their personality on the clothes they wear, the team they drive, the house they live in, and all their property, real or personal. In a most complete sense the grounds a man lays out, takes care of, and enjoys, become like himself, or rather, in a very precise way, give us glimpses of his nature, and hints of his possibilities. Indeed I love to notice the constant changes and little improvements in every village through which I pass, and make wondering guesses concerning the owners of each suc-

cessive cottage. Altheas, lilacs, a damask rose, groups of pansies, and clambering wealth of sweet peas, with perhaps a sugar maple, evidently cherished—it is in some way a suggestion of a New England family. An Irish yew tree by the gate, a row of black currants along the fence, Shropshire damsons and Kentish cherries in the orchard, box borders, and Covent Garden stocks,—this is staid, portly old England, surely. Bottle gourds over the well, balsams and crape myrtle by the door, melons and gumbo in the vegetable garden—here is a picture from the sunny South. Dill, saffron, yellow marigolds, sunflowers, and horse-beans, in straight rows in front of a door painted red, yellow and blue—this can only be a Portuguese family from the Azores. It is the charm of California in the eyes of her children that so many variations are possible here, so many widely different types of gardening succeed, and blend harmoniously in our landscapes.

Secondly, therefore, I would impress originality, alike upon the young householder planning his first home, and on the busy farmer, who has probably sold out, and bought again, a dozen times during his life. The best and happiest plan to be found elsewhere ought to have some modification to suit the place, or the owner. Indeed there is little hope for you without a lively discontent with other men's plans. If you have in your nature the capacity of founding a beautiful home, you shall search volumes of landscape gardening, and find nothing fit to accept without change. A few great principles must always guide you, and suggestions from numberless sources must unite in your mind before you realize the difficulties of the work and the happiness of a successful result. You will not ever be able to say that your work is well done in the sense in which an artist speaks of a picture as finished when it leaves the easel, for you will always be haunted by growing and boundless possibilities; but when your ideas are broadly planned, and fulfilled to the earliest fruit and shade, we may safely speak of results.

The most important question to be settled at first, is, how much of the land surrounding the house is to be devoted to

ornamentals, how much to fruit, and how much to out-buildings? Or, to put this in another form, what proportion shall the shrubs, flowers, and trees, bear to the whole space available? The answer to this question will depend somewhat on the state of a man's purse, but more on his feelings in the matter, since, by choosing fruit and nut-bearing trees, the poorest man may afford to surround his house with shade and beauty. Some styles of architecture, as the Italian villa, seem to require more foliage around them than others, so that this proportion ought really to be settled with some reference to the plan of the house.

More than a few good people have a theory that it is only necessary to begin work, and a successful plan will evolve itself—the buildings, paths, and beds, will assume the best positions by a series of fortunate accidents; thus, it is also believed, an air of simplicity and naturalness will be secured. But this plausible theory is a delusion. No place will ever be satisfactory if the plan is allowed to drift helplessly according to circumstances; for paths will take undirected curves, scattered beds will fail to have unity of effect, choice trees will be crowded in, without any view to the future, continual change will be needed, and a wreck on the rocks of confusion will probably end the unguided endeavor. It is best, therefore, to fully understand what you propose to do. The general plan must be well considered, and, on all important matters, settled, before a tree is planted. Haste here will prove to have been sowing a large crop of future repentance. Of course minor changes are admissible; but a definite, vital, and organized plan will need few alterations.

The next step is to find out all you can about your soil and climate, and, taking the best works obtainable, to make lists of suitable trees, shrubs, and plants. Make it much longer than you expect to use at first. Go and see fine plants at the leading nurseries, and on private grounds. If you want anything which you cannot procure from your own nurserymen, tell them so, and they will probably procure it the next season. Try to realize how each tree you think of using will look when it is fully grown. Beautiful grounds

are only to be obtained by knowing beforehand nearly what effect will be produced, so that, whilst others are surprised, the quiet owner is only justified in his own thoughts by the fulfilled, but long foreshadowed, landscape.

This art of graceful combinations is the hardest, yet loveliest, of garden problems. The trees and plants of any country harmonize perfectly with each other when in their native woods, but our eagerness for new things, and our thirst for variety, often leads us to mingle the plants of every region on one poor half acre. The possibilities of artistic landscape-gardening which our climate affords, are wonderful, but the dangers also are great. Our native lilies, shrubs, and spicy vines, are perfectly at home near a drooping redwood, or mountain pine, but they have little sympathy with a Eucalyptus, other than the mere vegetable kinship. Plants, in themselves beautiful, may be, and often are, a positive injury to a garden, because they introduce an inharmonious idea in outline, style, or color. No man should ever buy a plant merely because of a vague impression that it is cheap, or pretty, or can be utilized somewhere; but he ought to know beforehand exactly where to put it, and exactly what he expects it to do in the way of harmonious effect. Neither should any man expect to buy all the different species which are for sale at the nurseries, any more than he desires to wear all the new styles of cravat on one occasion.

It is always desirable to grade the ground before any trees are planted, so that there are no little depressions where water will stand after a long rain. Do not try to produce a dead level, but uniform slopes, preserving the salient features of the location. This grading process is essential if much irrigation is proposed. By studying the surface carefully after a heavy rain the work can be done reasonably well without expensive surveying.

In arranging for the general plan it is best to avoid a carriage-road passing in a circle around the house, for the privilege of possessing your back-door in privacy is not one to be lightly cast away. Those straight roads which pass from the main gate, and go inflexibly to the stable, are only allowable

on the plea of saving ground. Straight walks and rows of trees increase the sense of length, whilst curving walks and masses of shrubbery tend to diminish it. Tall trees appear best near the middle of grounds, or forming a background for buildings. Trees with feathery, graceful leaves ought to stand where their outlines are revealed against the sky. Dark and massive trees give force and stability to the landscape. The weeping trees add the sad minor key. Columnar trees should rise from masses of enveloping shrubbery. Trees with red winter-berries, as the mountain ash, and holly, show well among deciduous trees. Each tree should have room to develop its true character, and must not be tortured, by too much pruning, into a stiff and ungainly satire upon itself. Numerous hints of this kind may be given, but we can sum them all up in two precepts: "So plan your grounds that they will form one harmonious whole." "Give your grounds a positive character, suitable in general to the age we live in, and the climate we enjoy, and, in particular, to the house you have built, and your own individual tastes." Full directions for planting trees, shrubs, etc., with lists of leading kinds, will be found in subsequent chapters.

The man who chooses his nook of earth, and founds a home there, is justly entitled to that too often bestowed title of "public benefactor." The tired travellers, plodding wearily along the dusty summer road, look gladly on the waving spires of green, the soft, bright grass, the cool fountains, the flashes of color from the well-kept beds, the bending and fruitful boughs, and they are made more hopeful by all this beauty and repose. It is, for the owner, a daily blessing, and the hallowed memories of home cluster thickly, as the years increase.

The voices of happy children, some of them no longer on earth, and thus eternally young, yet seem to echo beneath the arching trees, which his own hands planted long before. The blue-bells, and the violets, the fragrant lilies, and the passion-hearted roses—these carry his dreams back to his boyhood, and move his soul to tears. The impulse which led him to found a home is justified.

CHAPTER II.

IMPROVING THE SOIL.

Whatever is Taken from the Soil must be Restored.

—We may even Increase the Fertility of Soil.—

Otherwise Farming would be a Sad Affair.—

Thorough Cultivation.—Rotation of Crops.—

Wasteful Methods of many California Farmers.

—Commercial Manures.—Barnyard Manures.—

Composting.—Alkali Soils.—Adobe Soils.—

Sandy Soils.

NO SOIL that I know of in California, or have heard of anywhere else, is perfect enough to warrant our using it without in some way restoring the elements lost. A man can no more take materials, which make plants grow, from his soil, without impoverishing it, than he can take money continually from a lessening purse. So much plant-food, nature, through the lapse of ages, concentrated in our fertile valleys; so much, to some definite appreciable amount, each one of our crops requires; and when it is marketed the chemical resources of our soil are by so much the poorer. Nature's system, in which plants withered where they grew, wasted nothing; but now her sceptre is given to men, who have too often used it foolishly. The system which breaks up virgin soil, rich with the sediment of nameless rivers, and the wash

of pre-historic mountains, to destroy its fertility by a continued course of wholesale robbery, is only to be classed with the operations of savages, not of civilized men. On the contrary, a true and enlightened system of restorative agriculture lies at the root of all progress, and is the very life of a nation.

The experience of thoughtful tillers of the soil, and the results of scientific investigation, alike tell us that it is possible to keep soil for generations in its pristine fertility, and even to add to its capacity for high culture. If it were otherwise, the outlook of our race would be sad in the extreme, as our harvests waned, our cities perished, our arts disappeared; but, as it is, we may toil in the full knowledge that, with proper treatment, land once fertile is always so. The fairest valleys of earth shall lose none of their beauty as the years roll by. No roof-tree, hung with long and sweet memories, need ever fall because the ancestral acres are worn out. Even the classic lands, and those earlier cradle-homes of the race, shall, it may be, renew their youth in some later system of agriculture, and men see once more the vines of Judea, the olives of Greece, the palms of Mesopotamia.

It is a good thing for men that they can accomplish so many valuable results in farming without altogether understanding the processes they have set in motion. The soil we cultivate is a chemical laboratory, which does wonderful things for us if we will only follow the beginnings, and give it half a chance; the seeds we sow are little bundles of cells, and fibres, and forces which no man has yet measured,—but they grow by force of nature, and make no fuss about it. Because a farmer is face to face with so many questions, and so near to some of the secrets of life, he ought to be modest, deliberate, and full of the Divine patience; one who can and will keep his soil fertile for his great, great grandchildren, and who is willing to plant oaks to cradle the breezes of a thousand years.

Thorough cultivation is the first means of preserving the fertility of land, for air and sunlight modify the harsher elements of the soil, and make it fitter for the use of plants.

We all know how unfit for use the earth from a well, or a heavy subsoil appears, until changed by the action of wind, sun, and rain. In this State, with our long, dry summers, the value of thorough cultivation cannot be over-estimated. It is our sheet-anchor for the cereals, fruits, vegetables, and flowers. Ground must be kept mellow, and free from weeds, which last, if they drive a lazy man to his cultivator, have a clear right to exist.

A system of rotating crops will always be necessary to good farming. I notice with much pleasure that farmers who rent their lands require it more and more. In the Pajaro valley, leases are often given for three years, requiring the renter to put in not less than one-third in green crops, each year. The smaller a piece of ground is the more religiously should its crops be rotated. In the vegetable garden, peas, beans, and melons, after root-crops; in the orchard, if an old apple tree dies, try to put a peach, cherry, or almond in its place, unless, indeed, the whole orchard, being moss-grown and fruitless, is rooted out, the place seeded to wheat, and a new orchard planted elsewhere.

For restoring and improving the soil, fertilizers of some sort must be used; and this question opens up a vast subject, discussed in many large and costly volumes. It is not my intention to cite formulas and chemical analyses, but a few principles ought to be expressed. Nitrogen, potash, and phosphoric acid, are the essential plant-elements which we must aim to supply, and these are all found in barnyard manure, which, if produced on the farm, is doubtless the most economical. The commercial manures—South Carolina phosphates, Stockbridge compound, blood-and-bone fertilizer, and others, when obtained under the manufacturer's warranty, are profitable, if applied understandingly. Still, for some years to come, the great need of California farming and California gardening is to utilize all our own coarser and native manurial substances, whose loss, if it is not stopped, will eventually impoverish us. I have seen farmers haul loads of manure into the dry bed of the Salinas river, so that the winter floods might sweep it away, and I have known

men to move their sheds rather than haul off the manure; but the most unedifying waste often occurs on hill-side farms, where the entire drainage from the barnyard is lost, for lack of a ditch and small reservoir. Indeed I speak within bounds when I say that not over a dozen farmers of my acquaintance scrupulously utilize all the fertilizers within their reach.

Barnyard manure, well kept and well handled, ought to contain from three to six per cent. of nitrogen, from four to six and a half per cent. of potash, and from two to three per cent. of phosphoric acid. In our climate manure ought to be in the field before the first rains. Every gardener ought also to have a pile on which he puts refuse vegetables, roots, trimmings of plants, weeds, leaves, defunct animals, and all decayable substances. The pile, once begun, grows so fast, that no man, though he farm his hundreds of acres, can afford to neglect it. It should be turned over and wet completely now and then, to assist decay. No better manure can be made for garden plants.

The class of phosphate-manures are represented by bones. In some parts of California, a farmer could collect quite a pile, and prepare his own phosphates. A ton of bones is worth at least \$20 to any man who expects to use them, in the form of phosphates, applied to his crops. Any farmer can dissolve ground or broken bones by the use of sulphuric acid, which he must not get on his clothes; or bones can be broken in a common mortar, or Mexican arastra, and used in that state, though it will be much longer before they are available. There is, however, a form of composting which possesses many advantages. If the bones are broken up, and mixed with a pile of fresh stable manure, wet down, and the whole covered with a thin coating of earth, to retain the ammonia, the bones will decompose in from three to six months. Hair, leather, wool, and horn-scrap, need the same treatment. If wood-ashes are added to the compost, the process will be hastened, and potash will be added to the manure.

If we will take a lump of dry, hard clay, and burn and pulverize it, we shall see a wonderful change in color, con-

sistency, and adaptability to plant-life. Fire has subdued the harsher elements, and made others more available. Now the florist likes to take this burnt earth, for he knows its value. He also takes loam, sand, decayed leaves—all these, mingled in the best proportions to make rich, friable soil. On a large scale that is what a man is doing with his farm—trying to modify, enrich, and complete. Small garden patches of stiff soil are ameliorated by a coating of sand, and by burning over the surface occasionally, with a coating of straw.

Our alkali soils, cold and unproductive, have been a hard problem. In many cases the use of gypsum has proved a complete remedy. Our State University published a Bulletin on the subject, last year. Many experiments and investigations yet remain to be made before the subject is fully understood, but it is much to know that we can, at a moderate expense, neutralize the alkalies of some soils, at least.

To return again to the subject of fertilizers. The profits of farming consist in changing our waste matters and crude phosphates and nitrogens into golden wheat, and ruddy winter apples, or, to still more condense our products, into beef and butter. Some farmers want to dishonorably kick a crop out of their long-suffering land; but now and then we find a man who coaxes his farm, and pays all he honestly owes it, and the broad acres never fail him. An old horse turned out to die; an old farm, weedy, and exhausted; a blear-eyed drunkard by the roadside—these are mournful things, with a certain subtle relationship of sorrow, forlorn and hopeless.

California may well become the world's granary; but even our young wheat-fields falter, and their yield decreases. Are we, indeed, by special enactment, made exempt from the law of the Universe, and freed from its mighty penalties? Shall conversion of Force, and conservation of Energy, be solemn facts for all other peoples, and for us only myths?

CHAPTER III.

IRRIGATION.

The Object one of Great Importance.—Need of Better Legislation.—Water, the Property of the People.—Examples of Successful Irrigation.—Value of our Mining Experience.—Sources from which Water is Obtained.—Methods of Lifting Water.—Artesian Wells.—How to Use Water, when Obtained.—Winter Irrigation. —Examples of its Use.—Irrigation in Lombardy, and elsewhere.—A Governmental System needed here also.

FOR many years to come the subject of irrigation will be of the greatest importance to the people of this coast. If unscrupulous monopolies are not allowed to make private property of that which the State only should possess, we shall, in the course of time, perfect a vast and accurate system of retaining the surplus of our mountain streams, of distributing it during dry seasons, and of restoring and increasing the fertility of our soils. The kind of irrigation which is going to benefit our State most, will be the work of thousands of earnest and patient men who will utilize a little water here, and a little there, doing all their work cheaply, under their own supervision, and under general irrigation laws at once comprehensive and practical. There are many places in the coast range, and in the Sierras, where small streams or springs can be used, and cheap reservoirs made to guard against the evils of a dry season. On the utilizing of all these sources, small separately, but large in the aggregate, depends in a great measure our future prosperity.

The artificial application of water to growing crops is a practice which comes from a dateless antiquity. Running water, so full of minute particles of vegetable and animal

matter, held in suspension, and fit for plant-food, has always been considered the most important of fertilizing agents. This applies with peculiar force to the warmer regions of the earth, where water—running water—is, of itself, when used wisely, sufficient to preserve fertility unimpaired, and even increased, for generations. The banks of the Nile, twice overflowed; and the fertile plains of Lombardy, watered from reservoirs kept full by the melting snows and mountain streams, are full of instruction for California. The engineering difficulties met and conquered by our hydraulic miners, as they carried large bodies of water over deep ravines, through tunnels, and along the face of precipices, will be of priceless value in the coming era of irrigation. We have old miners—many of them—who know water, practically speaking, and can do almost anything with it. These men, and the lessons of the mines, will repay our careful study.

If any reader has ever felt the need of more water on orchard, vegetables, grass, alfalfa, or any crop whatever—and who has not at some time felt such a need?—let him bestir himself and carefully cast about for a remedy, more or less efficient. The means available will be either running streams, ponds or lagoons, springs, wells, either artesian or surface, or catchment reservoirs, which merely store up the rainfall.

Water from running streams is far better for irrigation than that from wells; and, in the mountains, it is not usually difficult to get fall enough to carry the water to the desired spot. To have water deliver itself by its own gravity is the perfection of irrigating; but where this cannot be done, and some way of lifting must be found, the question of expense is to be considered carefully. With a large, flowing stream, where the distance is not excessive, enough water for a garden may be lifted by means of a water-wheel and buckets, such as are often used in the mines, to drain a portion of a river channel. Where it is desired to raise water quite a distance, the hydraulic ram is worth study. It is only effective where there is some fall, and it lifts only a small part of the whole stream; still, as it works night and day with

intermittent pulsations, a tank will soon be filled. I have seen several hydraulic rams, and the cheapness and simplicity of the contrivance recommends it where the conditions are favorable.

But in most cases water must be pumped from rivers, ponds, or wells, and it takes the most careful reckoning to find the cheapest way. Wind-power, horse-power, steam-power—one of these three we must use. Where there is enough wind the cheapness of a home made wind-mill, and its slight running expense, give it a great advantage. Along our windy coast, and on our breezy slopes, the lesson of Holland—land of wind-mills—will never be outgrown. Where there is no certainty about winds, steam is the cheapest agent.

At present the public attention is strongly turned towards artesian wells. When we consider the structure of our mountain chains, and strata of rock, and notice the altitude of these mountains, we cannot doubt that artesian wells will succeed in many places hitherto untried. A flowing artesian well is of great value, everywhere, and brings the cost of water down to the mere interest on the expense of boring the well. It is to be hoped that many will be successfully dug, and that we shall become as famous for our artesian wells as for our orange-groves and orchards. In a neighborhood where the conditions appear favorable it would seem best for the farmers to unite and bore one in common, the person on whose land it is, agreeing to pay a larger share if it succeeds.

If water, more or less, can be obtained, the way to numberless difficulties is only just opened. If the stream of water you have in control be too small it will trickle and creep from point to point, or lose itself in crevices and holes, until you seem to make no advance whatever. If the stream is large, and capable, it will, at some unexpected moment, cut or undermine a bank, or go where it is not wanted. Only some experience, and a careful study of your soil, so as to know how much water it needs, can make irrigation a complete success and pleasure.

There are, however, a few leading and precious principles respecting the use of water for irrigation, and the first of

these is: When you water, whether in field or garden, do it thoroughly,—not a mere perfunctory surface work, but a complete soaking; second, loosen the surface when it begins to look dry; third, do not water any more till there is an absolute need for it. In alluvial soils, either strike a deep furrow, and run the water in that, let it soak well, and in a few days fill up the furrow, or else level the land in squares, and flood one at a time. Our red lands seem to be much more porous, and the water goes down fast enough. It takes a great deal of water to wet a piece of land thoroughly. Any one who has cut hay, in any ordinary season, plowed the land, and, after wetting, put in corn or beans, will remember how much work it was. But the possibilities of water lie in just that direction. Two crops a year, as compared with one, may sometimes mean the difference between a bare living and a comfortable competence. But two crops a year is an urgent call for the use of manures, and this must not be neglected. Vegetables are seldom over-watered. With most kinds, as lettuce, turnips, &c., a rapid, succulent growth is much to be desired. When the garden is watered often, the little channels may be left from time to time, and when they become dry, water again, instead of loosening the surface. The stream of water should be carried close to the roots of what-over needs wetting, and not in the middle of the row, unless it is a very narrow space.

In our State, winter irrigation is of the greatest value, and often insures a large and profitable yield. The stored-up surplus of a wet winter will bridge the farmer over the following season, should it prove to be dry. In order to secure a full yield, we need a rainfall of about twenty inches; and if this can be had, a crop is reasonably secure. But if in a wet season we have thirty-five or forty inches of rainfall, and the surplus can be retained against future need, it will so supplement a light rainfall of eight or ten inches, the next year, as to secure an average crop.

Now this storing up of supplies would appear to be a troublesome business; but, all over our farming counties, there are creeks which descend from the mountains, carrying

torrents of water during the winter, and lying grim, silent, full of a forlorn desolation, through the long summer months. The expenditure of a comparatively small sum will carry this water upon the level lands, or along the cultivated slopes, enriching the soil, and thoroughly moistening it. Time and time again our farmers have proved the value of this winter use of water, as a safeguard against dry seasons.

In Stanislaus Co., the Messrs. Crow, near the Orestimba creek, flood several thousand acres of their best lands every winter. The stream is a large mountain torrent, flowing from the coast range, dry through the summer, but in winter full to overflowing. These gentlemen have, for several years, acted upon the theory that farming lands cannot be made too wet in winter, and they have been most abundantly repaid for their labor. In the winter of 1874 these gentlemen flooded lands which, the following dry season, yielded thirty bushels of wheat to the acre, whilst unirrigated lands of a similar character failed to give any crop whatever.

In Washington Township, Alameda Co., the irrigation ditch from Niles, across the valley, towards Centreville and Alvarado, and now managed entirely by John L. Beard, is a marked success for winter use, of some considerable value for use in spring, and of little importance, as summer advances, and the water supply fails. Mr. Lowrie, and Mr. Brier, have always used water from this ditch, largely, for winter irrigation of orchard and grain land. The yield, and consequent profit, have been largely increased by this method.

Pages might easily be filled with examples of similar success attending winter irrigation. The past volumes of the "Rural Press" are full of notes, correspondence, and items on the subject, all of interest, but too numerous to be quoted here.

For us, in California, the examples of northern Italy, southern France, and India, are of incalculable importance, and unmeasurable in value. No success was ever yet, in any branch of human labor, obtained without a full knowledge of other men's efforts. The fundamental need of dry land having been, in all ages, water as a fertilizer, men of earlier

racess have made endless experiments, and won success, and the ultimate support of large populations, from arid plains and mountainous regions.

In northern Italy, the extensive system now in use, was first organized in very early times, probably about the era of the early Norman kings, and whilst the greater part of Europe was in a state which verged upon barbarism. Along the lower slopes of the Alps there are numerous small lakes, which serve as reservoirs, receiving the waters of many little rivers and mountain springs.

A single canal, protected by levees planted with willows, receives the waters of each lake, and distributes it, through a multitude of lesser, and still lesser channels, to each neighborhood, village, farm, and little field, within reach. Sluice-gates control the water wherever needed, and the surplus passes off, by other channels, until it finally reaches the Po river, which drains central Lombardy. The larger canals, and the main system, supervision, and authority, are governmental; but some of the smallest side-ditches often belong to individual owners. The system of works begun more than six hundred years ago, and since continued with all the zeal, industry, and good faith of people directly interested, is now so nearly perfect that the cost of repairs and supervision is comparatively light, and has never been a burdensome tax. Through all social, political, and religious changes, this most admirable system has continued unmolested, and has made northern Italy one of the world's most fruitful regions. Writers upon the method of farming used, with this abundant supply of water, say that lands are used as rich pastures for a number of years, usually about fifteen. By proper use of water, the grass is cut at least four times in the year, and fed to cattle kept in stalls. At the end of this term of fifteen years the grass becomes coarse and innutritious. The sod is then plowed up, and wheat, barley, oats, maize, hemp, flax, beans, potatoes, and similar crops, follow in a rotation for five years, after which the land is again seeded down to grass.

In California we have all the advantages of Lombardy,

except the system of natural lakes. In the place, therefore, of these lakes, we must use artificial reservoirs, to hem in and retain the surplus waters. Southern France, and India, have been in a measure without such lakes, and they have solved the problem by earthen walls across the mouth of ravines, excavations in level places, and, as in Ceylon, stone walled "tanks," or artificial reservoirs, of great extent. Mr. George Davidson, of this coast, has made a most exhaustive Report on the Governmental Irrigation Works of India, and elsewhere. The trained engineers who planned and executed the stupendous works of India, have successfully met many problems, which we of California, will also have to settle. Their failures also, for failures there sometimes were, will be of even greater value to us.

In the near future we can with safety predict that the irrigation question will be in a very distinct way the leading question before our legislatures and officials. Over our waters, and mountain water-sheds, the State must assert and maintain its complete control and ownership. It may even be necessary to purchase back water-rights already private, and make them again a part of the property of the people as a body. Without a most complete ownership, we can in no wise inaugurate or carry to a successful termination any abiding or comprehensive system of irrigation. We have much faith that this will, notwithstanding all difficulties, become an accomplished fact, within the lifetime of our young men. If California, land of budding powers, and of enormous possibilities, shall succeed in utilizing her waste waters, in avoiding the ruin of farming lands consequent on uncontrolled waste of mining debris, and will thus reclaim millions of arid acres, sage-brush lands, slopes of chapparal, and seeming desert—if California, and the men of '49, will do this, it will be a fact pregnant with hope and interest to the world; it will bring us thousands of men, and millions of capital; it will found cities, and dot the wide Pacific with the sails and smoke-stacks of our commerce. So let us have hope, let us add fact to fact, and success to success; let us do work which shall last ten times six hundred years.

CHAPTER IV.

WIND-BREAKS AND HEDGES.

Benefits to be Derived from a Use of Wind-breaks.

—Kinds most Popular.—Other Valuable Varieties.—The Best Way to Procure Trees in Large Quantities.—Hedge Plants for Fences.—The Plants Adapted to our Climate.—The Value of Low Boundaries, for Ornamental Purposes.—Shrubs which may be Used.

OUR whole coast, with perhaps the exception of a few sheltered valleys, is subject to occasional violent winds, and often to long continued gales, most severely felt in the great central valley of our State, and in those coast valleys which open northward. On the Salinas and San Joaquin plains, and along many treeless points of the coast, from Humboldt to San Diego, are localities almost uninhabitable, by reason of the constant winds, which make gardens and orchards an impossible luxury.

The judicious planting of tall and well foliated trees has always been productive of good, and cannot be too strongly insisted upon. A shelter of trees around the house breaks the winds, ameliorates the climate, saves fuel, and adds beauty to the landscape of summer and winter. Trees around the stables, make them warmer, and so indirectly save a percentage of food. Trees around the orchard and garden enable a man to raise more, better, and earlier fruits and vegetables. I have noticed the beneficial effects of wind-belts near Santa Cruz, Soquel, Aptos, Monterey, Cayucos, San Luis Obispo, Lompoc, and numerous other points along

the coast, where much has been done by enterprising planters; but hardly a beginning has been made in the wind-swept portions of the Salinas valley, along the San Joaquin, and on the plains of the Northern Sacramento. Notwithstanding our leagues of sugar-pine, fir, and redwood, we shall need to grow trees for protection, for timber, and for ornament; and the interest shown in the subject is truly encouraging.

In this State, so far, the favorite tree has been the *Eucalyptus Globulus*, or blue gum, whose adaptability to our climate, rapid growth, and evergreen foliage, have given it a leading place. There are signs that its supremacy will be closely contested by *E. Collossea*, *E. Marginata* (Jarrah), and others of later introduction. The place of second favorite appears to be held by the Monterey cypress, a large conifer, which bears close pruning, and thrives on a great variety of soils. Third in popularity comes the Monterey pine, by some preferred to the cypress, and beyond doubt the easiest to transplant of all our modern evergreens. Some of the coarser *Acacias* are used near Morro, but they answer poorly, being quite too brittle to withstand the wind. If we turn to deciduous trees, I have noticed settlers using cottonwoods and sycamores from the bottoms, and often the Lombardy poplar, with its tower of formal green; still the cork-bark elm, which luxuriates here, and the American black walnut, are much better.

It is a grave mistake on the part of our planters that they confine themselves so exclusively to a few leading and common varieties. Any evergreen tree which grows well in your neighborhood, and forms a compact head, is of value in itself, and also increases the natural beauty of the vicinity far more than the common trees, because that delightful element of variety, is introduced. Some monotonous people, whom we have all known, would like to plane down all the mountains, divide the soil into regular squares of 160 acres, surround each square with the same number of the same kind of trees, and put a square house, with a railing on top, exactly in the middle of each farm. But some of us would not like to live in that kind of an artificial world. We love

wild places, where the mossy trees bend over the child-like waters, and the sunlight trembles through the swaying leaves to kiss the rosy Trilliums; we believe in bits of woodland, and belts of forest, and wind-breaks that wind along the horizon.

Those who desire a change from the path of safe monotony, might plant the tufted *Abies Douglassi*, the drooping *Cupressus Lawsoni*, the rapidly growing *Picea Amabilis*, our native *Thuja Gigantea*, the spicy redwood, or the dark mountain laurel. They might vary *E. Globulus* by *E. Rostrata*, *E. Viminalis*, or *E. Marginata*. On hills of drifting sand along the ocean—where nothing else thrives—the *Pinus Pinaster* will succeed, binding the sand more firmly, sheltering the inland farms, and finally yielding a fair amount of firewood. This variety has been planted by the million along the shores of France and England, and wherever tried here grows rapidly, moves well, stands drought, and is reasonably good-looking. For a wind-break of medium height, our native holly, known in some sections as the wild cherry, is valuable, but the seed must be sown where the trees are to stand, for they are hard to move.

A finer effect may be produced by planting different kinds together in harmonizing groups, and winding belts, than by using any single variety. Small trees, and even shrubs, are then used to fill in between the trunks of the larger trees, and give the desired shelter; every variety of blossom and foliage is eagerly sought; the effect of outlines is carefully studied, and if the belt is several rods in width, it adds a great charm to the landscape.

In our climate the deciduous trees do best when planted early, so as to get all the rain. January, and February, are the best months for evergreens. Small trees, not over two feet high, are preferable. Monterey cypress and blue gum are most available when about a foot high, and may be planted from six to eight feet apart. They are usually grown in boxes, and may be blocked out with a trowel, or large knife, and planted like so many cabbages. Walnuts, beeches, maples, and similar trees, may well be five or six feet high,

when moved. The oaks must all be taken when small. Trees desired in large numbers are best procured by making an arrangement with some responsible nurseryman, one or more years in advance, and letting him grow them by contract. By giving previous notice the trees can be grown at much lower rates, and better satisfaction is usually given. Indeed many trees cannot be procured in quantity by any other course. For instance, if any-one wished to plant a few thousands of the cedar of Lebanon, or of the Deodar cedar, both beautiful and historic trees, well adapted to our climate, he would find that our nurserymen only grow a limited number, to supply a rather uncertain demand; but they would be very glad to grow any number to order.

HEDGE PLANTS.

There is a propriety of putting my remarks on hedge plants of every description into the same chapter with my remarks on wind-breaks, for a hedge is only a sort of diminutive and refined barrier, where shrubs take the place of trees, and the predominant idea is no longer shelter, as in the wind-break, but defence, or possible ornament. The primary use of a hedge appears to have been that of a defensive and impassable barrier, not beautiful, but very ferocious; and of this type the Nopal, or prickly pear, which we have all seen around the old Missions, may be taken as an example. The savage idea of mere defence gave way to a desire of uniting all possible beauty in the leafy barrier; and the Osage orange, hawthorns, Cherokee rose, and similar plants, came into use. Finally, and this not until modern times, the idea of beauty became predominant, and the hedge, still further reduced in size, and having almost entirely lost its defensive character, was used to bound carriage-ways, and make low divisions, wherever we fancied them. Still another modification of the hedge is in the low box dwarf pink, Iris, or Cerasium, used to surround a garden-bed, or edge a walk.

A hedge which takes the place of a fence must of course be substantial, and decidedly armed. The general opinion

being that thorns are unpleasant, a well grown, compact hedge is more of a protection to an orchard than a dozen fences, picket or otherwise. Osage orange grows pretty large, needs much care, and is subject to gophers. Still, if well splashed—that is, each stem cut half way through, and laid over in the row, in the same direction, so as to sprout up thickly—it is a valuable hedge plant. Use one-year old plants, and set them two feet apart. The honey locust is thorny enough, but it has not succeeded well in many parts of the State.

The most defensive deciduous shrub we know of, and one which appears well adapted to our climate, is the purple-leaved barberry, here a much more rapid grower than in the East. With us it forms an impassable barrier in a few years, is highly ornamental, and the fruit makes a very pleasant preserve. It will also last longer than most other hedge-plants. The barberry is propagated both by seeds and by cuttings. If cuttings are used, take them early in December, cut them 18 inches long, with sloping ends, and plant them in long rows, packing the earth tightly, at the base of the cutting.

The English furze is a well known and well defended plant, which grows rapidly on almost any soil, even where alkali abounds. Its chief beauty is during the winter months, when it is fairly loaded with masses of large, golden-yellow, pea-shaped blossoms, set in the axis of the narrow, dark green leaves. It cannot be handled with any particular delight even then; but for months no plant is more handsome.

Evergreen hedges are preferred by many, and the most popular conifer for this purpose is undoubtedly the Monterey cypress (*C. Macrocarpa*). A few years ago, only large plants were used; but now trees of from 8 to 15 inches are preferred, as being safer to plant, and much cheaper. Cypress, if used for a hedge, must be well trimmed several times in the year, or it will never thicken up, and the lower branches will in due time die, and fall off, leaving a ragged stem. Cypress may be kept at the height of an ordinary fence, and

made a compact, woven floor of green, or it may be trimmed up into a wall of 20 feet height, if desired.

If we allow the idea of ornament to overshadow that of defence, but yet desire hedges around spacious pleasure grounds, or to line broad carriage-ways, we shall find it hard to surpass the pomegranate, with its pure, dark foliage, flaming blossoms, waxen fruit, and compact growth. The shrubby lime and lemon are much used in the southern half of our State. The recently introduced Jujube plum gives promise of value for this kind of work. It must be remembered that by using fruit-bearing shrubs for hedges we may expect some crop, although not as large as if the shrubs were set further apart.

Leaving the taller hedge plants, to consider those which more properly belong to the lawn and pleasure garden, we observe that every well kept place calls for interior division lines, and neat boundaries, to its different parts. Along the side of a flower-plot; hiding the vegetable garden; separating the croquet ground,—very often a low hedge is the salvation of the landscape gardener. Nor must it be always straight, but following gentle curves, and melting slowly into the heavier boundary lines.

The rare possibilities of many shrubs in this direction are strangely neglected. Cypress, trimmed close, looks well; but some other things look better. *Cestrum Aurantiacum*, with clean foliage, and drooping, fragrant corymbs of yellow flowers; the silver, or the golden-leaved *Euonymus*; shrubby roses, all of one color, or mingled; the brilliant dwarf Japan quince; double-flowering peach, and almond; *Spireas*, *Wigelias*, *Deutzias*—any of these might be used with pleasing effect. For a very low division line, or around a child's garden, the charming little Bourbon or Button rose, is perfectly adapted. The *Laurestinus* is our finest winter blooming shrub. The Japan privet is a fine evergreen, with fragrant white flowers, and large, glossy leaves, but it needs close trimming.

The builder of a home, the new Adam in his Eden-work, must in this, as in many other things, venture to have the

courage of his own choice, and the sturdy patience to search long for that which is truly fit and truly beautiful. For instance, the *Diosma Alba* (or "breath of heaven"), would make a wonderfully nice, low hedge; but who, of all who know and love its delicate spicy leaves, and its abundant, starry blossoms, has ever tried it in that capacity? And what could be better, if in a somewhat shaded place, than a row of the choice fuchsias, trained to a hidden trellis, and trailing downward as fountains of grace and color?

Then, lastly, there may be vine-hedges, for backgrounds to beds of annuals, or for boundaries. Sweet peas, morning glories, or the handsome fringed *Tropoelum Lobbi*, may be trained on lattice, for this purely ornamental work of the flower-garden. It seems a long step from the wind-breaks, with which we began, but there is, through all, a thread of relationship.

CHAPTER V.

FRUIT TREES AND SMALL FRUITS.

California's Leading Industry.—Orchards: where to Plant them.—Treatment, Pruning, &c.—A List of Fifty Trees, for a Family Orchard.—Leading Market, Drying, and Canning Varieties.—Small Fruits.—Their Culture, and Best Kinds Known.

WITHIN the limits of our State, every fruit of the temperate zone, and some of the tropics, will ripen in perfection. We have soil of every character, climate of every possibility, resources undeveloped everywhere, industries yet to be fostered, hopes to be realized, a future which we, who live in its midst, can hardly as yet comprehend. This is not only a land of mile-wide wheat-fields, of ships loaded with one man's crop, of principalities owned by an individual; but it is also a land of homes, of fruitful orchards, and vineyards ruddy with wine, of quiet villages, and sunny gardens, and acres of scarlet berries. It is a fair and a growing land, with no problem too hard for us to solve, no danger so great that we need despair. The great industries of our future, if we would use our advantages of soil and climate, are to be fruit raising, and kindred employments. Some varieties we shall doubtless over-produce, and we shall not at once gain control of foreign markets. But in the end we shall push the production and preservation of fruit to an extent never before known.

It is surprising, even now, after so many years of tree-planting, to observe how many localities are apparently without orchards, and how many farmers buy their fruit from the peddlers. Year by year, however, small orchards are planted; and everywhere with success. It was not long since that the Salinas valley was considered unfit for the culture of fruit and berries—but the thrifty young orchards now tell a different story—and some-day we shall expect to see extensive orchards of apricots, peaches, prunes, pears, and apples, with large canneries and dry-houses, in that thriving valley.

The first step towards subduing a new land is to break up the virgin sod, and make vast wheat and corn-fields; the next step is to work towards orchard, rotation of crops, forage plants, blooded stock, the best of everything, and only a portion of wheat. This step we are now taking, as our successive State and county fairs very plainly show. Californians were always in earnest about whatever they wanted; gold we sought with volcanic energy; now costly plants, fine stock, and thrifty orchards, are pursued with the same zeal.

People who have never planted an orchard—and there are many such—desire to know all about the soil needed, the exposure and location to choose, the kinds to plant, and the after treatment to give. Now, volumes have been written on these subjects, and it would be sublime folly for anyone to try to condense them in a short chapter. It is only possible to give a few leading points, adapted, so far as may be, to our diversified climate.

An orchard needs good soil, but rarely the wettest on the farm. The mistake of many of our earlier tree-planters was in putting them near springs, close to streams, or in natural pastures, green the year round. In every case unhealthy and short-lived trees have been the result. Lowlands must be well drained; uplands which are fit to grow wheat on, will also raise apples, almonds, and peaches, by means of good cultivation. There are many points in our mountains where no irrigation is needed, to insure large crops. Along the northern Sierras, and through the coast range, south to Monterey, small orchards require little care.

A south-eastern slope seems usually the best, but fruit will ripen later on a northern slope. It is best to plow and cross-plow before the rains begin, and also to lay off the ground; and dig holes where the trees are to stand. Thoroughly prepare the soil, for, otherwise, transplanted trees cannot make much growth, and a larger proportion will die. When the trees come from the nursery, unpack the bundles at once, and heel the trees in; or, if the bark seems shriveled, cover them entirely, root and top, for a few days, with moist earth.

When the soil is in the right condition to plant, make a clean cut on the ends of all broken roots, and shorten all the branches fully one half. If the weather is dry, we would recommend "puddling" the roots, that is, dipping them in a thin mud of rich soil; but care must be taken that the fine fibres are not plastered together by this process. Plant the tree a very little deeper than the line at which it stood in the nursery; let one man hold the tree, shaking it slightly, whilst the other sifts moist surface earth under and around the roots. Press the soil carefully, and, if dry weather follows, water must be applied.

MULCHING is very valuable in our climate, and consists in covering the ground near the tree with straw, coarse manure, leaves, tan-bark, or some similar substance. This must not be neglected, especially where the summers are hot and dry.

PRUNING should begin when the trees are planted. By constant and careful attention a fine head may be formed, even of varieties naturally of poor growth. Our main pruning must be done in the early winter; but what is called SUMMER PRUNING, or the pinching-in of soft-wood shoots, may be practiced with very good effect. By rubbing off a shoot which starts in the wrong place we may easily save sawing off quite a limb in the winter.

KINDS.

A great many men are planting out small orchards for family use, and desire a good assortment, but have not room

for many trees. To suit such, the following list of 50 trees was prepared. They are all family and market sorts, well adapted to our climate, and forming a succession throughout the season. They will cover a little less than half an acre of land, and the space between may be planted with strawberries, raspberries, and currants:

LIST OF FIFTY FRUIT TREES, FOR FAMILY USE.

APPLES.

No.	No.
Early Harvest	Rhode Island Greening.....
Red Astracan.....	Vandevere
Gravenstein	Wagoner.....
American Summer Pearmain.....	White Winter Pearmain.....
Skinner's Seedling.....	Yellow Newtown Pippin.....
Hayes (Wine Apple).....	Large Red Siberian Crab.....
Ben Davis	
Yellow Bellflower.....	Total.....
Smith's Cider.....	18

PEARS.

No.	No.
Madeleine.....	Glout Moreceau.....
Bloodgood	Easter Beaurre.....
Bartlett	Winter Nelis
Seckle.....	
Fall Butter.....	Total.....
	9

PEACHES.

No.	No.
Brigg's May.....	White Imperial.....
Shinn's Rareripec.....	Salway.....
Crawford's Early.....	Old Mixon Cling.....
Richmond.....	
Smock's Late Free.....	Total.....
	8

PLUMS AND PRUNES.

No.	No.
Cherry Plum.....	Coe's Golden Drop.....
Columbia.....	Ickworth Imperatrice.....
Washington	
Felenberg Prune.....	Total
	6

CHERRIES.

No.
Early Purple Guigne.....
Elton.....
Black Tartarian.....
Royal Ann.....
English Morello.....
Total.....
5

LIST OF FIFTY FRUIT TREES—(Continued.)

APRICOTS.

	No.
Large Early.....	1
Hemskirke.....	1
Moorpark.....	1
Total.....	3

PERSIMMON.

	No.
Japanese.....	1

A good family orchard should also include at least 6 Mission grape, 6 Muscatel, 5 Muscat of Alexandria, 6 Black Ham-burgh, 6 Black Morocco, and 6 Flame Tokay.

It is difficult to select a list for market purposes, because the popular demand varies from season to season. Color and size are the first considerations, whilst flavor has been of secondary importance. A firm texture, which will bear carriage well, is desirable. There has never been any sale for sweet apples in the San Francisco market. Probably the best market apples have been: Red Astracan, which, though ripening irregularly, is of high color; Gravenstein, Hays, Skinner's Seedling, and Washington Strawberry, for Fall apples; and Bellflower, Jonathan, King, Nickajack, Smith's Cider, Vandevere, Wagoner, White Winter Pearmain, and Yellow Newtown Pippin, for winter apples.

The market pears are few in number. Clapp's Favorite, Bartlett, Beurre Clairgeau, Seckle, Beurre Hardy, Doyenne D'Alencon, Easter Beurre, and Winter Nelis, are among the best. Bartlett and Winter Nelis are at present preferred for shipping East. The canning establishments use Bartlett and Flemish Beauty, both of which also dry well.

The plums, for drying, are: Columbia, Felenberg prune, Petite Prune D'Agen (French prune), and Washington. The canners at present use Coe's Golden Drop, and Yellow Egg, besides prunes and gages.

The very early peaches, such as Brigg's May, have been profitable in good locations. Foster, Crawford's Early, Richmond, Crawford's Late, Smock's Late Free, and Salway,

make a succession of yellow peaches for market; and Alexander, Early Tillotson, Shinn's Rareripe, Stump the World, White Imperial, and Silver Medal, are good white varieties. Clingstones are more in demand for canning purposes, and will now probably pay to plant. Old Mixon Cling, and the Orange Cling, are preferred.

Apricots, of the larger kinds, such as Hemskirke, Large Early, and Moorpark, are in great demand for drying and for canning. Nectarines are also sometimes canned.

Among cherries, the Black Tartarian still keeps the lead for market, although Monstrous Mezel, and Royal Ann, rank high. It is not probable that there will be an over production of this beautiful fruit, for many years to come.

The new Japan Persimmon is already widely distributed. Doubtless those who succeed in fruiting it will find a large profit; but experience alone can determine its final value as a market fruit.

SMALL FRUITS.

The strawberry is the most universally grown, either for market or for home use. Amongst the hundreds of native and foreign varieties now on this coast, every soil and situation can be suited. All that need be said about culture and treatment is, to plant healthy, well rooted young plants, as early as possible, on deeply dug and pulverized soil, which, if poor, must be manured. Plant two rows, a foot apart, leave a space of three feet; plant two more rows; and so on. Irrigate through the summer. In this section (Alameda Co.) Longworth's Prolific, and Peabody's Seedling, have been good market varieties. Monarch of the West, Jucunda, Seth Boyden, and Black Defiance, promise well. That old variety, the Triomphe de Gand, still stands in the front rank for heavy soils.

Raspberries may be planted in rows, four feet apart, and two feet in the row. The favorite red raspberries at present are Herstine, Brandywine, and the old Red Antwerp. The Mammoth Cluster and the Doolittle have proved the

best black-caps. The Philadelphia, a red variety, is largely grown.

The only gooseberries considered entirely reliable are the Downing, and Houghton's Seedling.

The most valuable currant for market is the Cherry.

The Kittatinny blackberry is the best for home use, although the Lawton is still extensively grown.

The small fruits require water, and a good deal of care in manuring, weeding, and careful culture. The farmer who will not give them this had better not try to grow them. But he who does will find that in no other way will a small piece of ground bring more satisfactory returns, either in pleasure or profit. Anyone who lives near a large town, or where there are mines or mills, had better investigate the subject of supplying the local market. In many cases a prosperous business can readily be established, for few of our towns are well supplied with small fruits, and the business is not likely to be over-done. The one heavy expense of small fruits is the gathering; and if the boys and girls of the neighborhood could be hired for this, a mutual benefit would be conferred. When the crop is heavy, and prices low, small fruit-growers have made their surplus into wines, extracts and jellies, which command a fair price.

CHAPTER VI.

SHADE TREES.

Universal Love of Shade Trees.—Their Measureless Beauty.—My Friend who Uses too many Evergreens.—The proper Use of Conifers, and the most Desirable Kinds.—How to Transplant Evergreens.—Deciduous Trees.—Their Great Variety, and Place in Landscape Gardening.—Leading Varieties.—Nut-bearing Shade Trees.—Trees with Tropical Foliage. —The Weeping Trees.—Ancestral Oaks.

IT is a sign and a proof of the good in humanity that men have, from the earliest ages, surrounded their homes, palaces, and sacred places, with groves of trees which produced no edible fruit, but were simply rare and beautiful. Worthy of remembrance were the classic times, with their groves of oak, ilex, and olive, clustered around the temples of white marble, above the azure sea; the garden of Solomon—first recorded Arboretum—where all plants grew, from the cedar of Lebanon, to the hyssop on the wall; the fair terraces which the king of Babylon reared for his home-sick, mountain queen; the shade and coolness of Haroun Al Raschid's wandering paths, where song and fragrance forever mingled; the deep stillness and terror of the Druid's sacrificial groves; the grassy hollows, and untrameled ways of Merry Sherwood. In modern times, botanic gardens, and collections of choice trees, are found in every country; those ornamental species

—which it formerly required the revenue of a king to purchase—are brought within the reach of every man who possesses a rod of soil; we live, gladly be it said, in a planting age, and an infinite variety of effects is possible. The utilitarian would plant nothing but Bartletts and Pippins, Gages and Crawfords, in straight-rowed monotony, surrounded by walls of poplar, with their unendurable stiffness; but there are those who realize that the best gift of a tree is intangible and measureless, won only by thoughtful grouping, and much study of its nature. To the lovers of deep, song-haunted woods, so full of gray-haired wisdom, so young with budding leaves, a tree is at once a temple and a laboratory; it is beautiful beyond expression; and it is full of active life and of wonderful processes, varying with every species, and indeed most worthy of study in those kinds which have not been modified by the meddling tendencies of man—the gardening animal.

I hope no one who plants trees for shade near his house will follow the plan of my friend Williston, whose abiding passion is for evergreens of every description. His little place fronts the south, and you drive in from the main road, under a continuous arch of Monterey cypress, and circle about a vast green island of pine and cedar, to the shaded porch, protected by four sentinel-like Italian cypresses. East and west of the house are masses of holly, juniper, and yew, single specimens of magnolia, and hedges of privet. The deciduous trees that his wife desired, remembering New England's maples, oaks, and beeches, have been contemptuously dismissed to the north side of the house, and scattered around the rambling barn and the mossy corrals. The natural consequences have followed, and a more unhealthy place for winter residence cannot be found in Alameda county. The shaded walks are never dry; the shaded house drips and stains; the shaded people look pale and bloodless. The whole place is a victim to misapplied affection for the evergreens; and the family physician prospers, judging from his frequent visits. Had the same trees been massed in clumps, relieved by trees of a different type and growth, and kept far

enough from the house to allow it to stand in clear relief against deeper masses behind, the effect would have been artistic and vigorous.

With us, the conifers must be used with a sparing hand, except for hedges and wind-breaks; we do not feel the need of them, as do our Eastern friends, with their long winters. Small plants do not thrive well near them, and they are expensive to keep in order. On small grounds only the dwarf varieties are allowable. Still we must admit the rare power of combination which the conifers possess when properly controlled. They give strength to the landscape; they are embodied silence; we love their defiance of the season's changes.

Among our most desirable conifers are the *Cupressus Lawsonia*, with its dark and drooping grace; the *Picea Amabilis*, or Lovely Silver fir; the dwarf *Arbor Vitæ*, both green and golden; the delicate *Cryptomerias*, from Japan; the *Cupressus Gouveniana*, of dwarf growth, and showy when in flower; the Bermuda Juniper; and the *Libocedrus Decurrens*, or native *Arbor Vitæ*. The dwarf upright and the weeping Junipers, are beautiful for small places, whilst the trailing varieties should be put on rockwork, or on little knolls. The *Torreya Californica*, or Nutmeg tree, is in many respects the finest of our native trees. It grows slowly, but always has a character of its own, and, when fully grown, as I have seen it on the summits of the coast range, possesses a grandeur and strength undescribable. The cedar of Lebanon, and the Deodar, or Himalayan cedar, have historic interest, in addition to their rare beauty. The *Pinus Pinaster*, or Cluster pine, a native of southern Europe, is a beautiful tree, and deserves extensive planting, especially by the ocean, where something is needed to bind the sand, or to form a wind-break. For pure ornament, in sheltered places, the *Araucaria Cookii*, *A. Bidwellii*, and *A. Imbricata*, are always admired. The Hemlock spruce, and the deciduous cypress of our southern States, do well in wet places, and often on uplands.

Evergreens are a little hard to transplant, and should be moved when small. The tendency is more and more to pur-

chase Monterey cypress, and pine, when not over 18 inches high; and when other varieties are wanted in large quantity, this is the safest size. The small, fibrous roots must not be allowed to get dry, and the trees must be sacked with a ball of earth in all cases, unless shipped in boxes, as grown. If it is late in the season, trim heavily, to restore the balance between top and roots. If a tree looks badly, shade, and sprinkle the leaves, which will often bring it around.

But if we would add beauty to our grounds, the deciduous trees are our main dependence; so we must leave the interesting group of conifers. Deciduous trees give a daily variety to every feature of the home. Some bud, whilst others are in full blossom, and some are loaded with the ripened seed. Some, as the *Paulonia Imperialis*, or blue trumpet tree, blossom on leafless stems; others, as the mountain ash (*Pyrus Quercifolia*), are chiefly ornamental when covered with clustered berries. They vary, too, in growth, for some pierce the very heavens, some are compact and low, and some are of pendulous growth. They differ, also, in the shape and color of the limbs, which may be round, compressed, or nearly square, as the South Carolina poplar; or they may be green, brown, golden, black, purple, bronze, or beautifully speckled and mottled. The spotted trunks of sycamore add a peculiar charm to our summer landscapes. The greatest variety, however, is observable in the form, grouping, and color of the leaves, which may be simple, compound, serrate, lobed, palmate, feather-veined, or of colors ranging from an olive green to a reddish purple. By virtue of this unlimited variety, the deciduous trees take the highest rank in landscape gardening.

Deciduous trees should have a straight, smooth, and healthy trunk, crowned by a symmetrical mass of well developed foliage. The peculiar charm of an evergreen is in having its branches extend nearly to the ground, so that the shape of the tree is pyramidal; but the glory of our ashes, maples, elms, and beeches, is in their slender trunks and wide-reaching arms, their moving leaves, and the sun and shadow on the grass beneath them. Deciduous tree planting

in this State is yet in its infancy, and many desirable kinds are not yet found in our nurserymen's catalogues.

Among the ashes, *Fraxinus Europa*, and *F. Salicifolia*, have succeeded best. They need heavy pruning, and a stout stake, for a few years. The beech is a slow grower with us, yet it is too noble a tree to be neglected. The American beech, and the purple-leaved, are among the most desirable. The maples comprise many varieties, but the Eastern kinds rarely grow well here. The Oregon maple, and our mountain species, are beautiful, rapidly growing kinds, and nearly perfect for planting by the roadside. The seeds should be sown as soon as ripe.

The large class of nut-trees can be used for ornament, thus answering a double purpose. I often see men who have only a few acres of ground, planting pepper trees, or poplars, along the fence, when the hickory, chestnut, pecan, butter-nut, and black walnut, would be much better. There are often little angles left about the out-buildings, where one or two trees can easily be planted; or neglected fence corners, broken slopes which are hard to plow, and borders of streams, may be filled with nut-bearing trees. The English walnut is more of a nut-bearing tree, but single specimens are very fine. The Italian chestnut is the most reliable here.

One or two of the *Alianthus* give a sub-tropical appearance to the grounds, but the subterranean suckering is a ground of complaint, so that we had better depend on palms, dræcenas, and acacias. The elm, the linden, and the catalpa, are suitable for avenues and roadsides. The ginko (*Salisburia Adiantum*) has tri-lobed leaves on long petioles, which give the tree a peculiar appearance, that harmonizes well buildings and rocky heights. This is often called the maiden-hair tree, and there is a sub-variety with variegated leaves. The mesquite tree, and the carob, of Spain, known as St. John's Bread, are in every way adapted to our soil, and possess an economic value.

The weeping trees form a very lovely class. Everyone immediately thinks of the weeping willow, first introduced into England by Pope, who planted some little twigs in his

garden at Twickenham. But the weeping ash, the cut-leaved weeping birch, the dwarf weeping cherry, and the Camperdown weeping elm, are all equally beautiful. The weeping mountain ash can be grafted on the common kind. The weeping *Sophora Japonica* is a lovely tree. All weeping trees are apt to bring sad memories. They are, in landscapes, the sweetly pathetic chord, the minor key. They should cluster around old ruins, and follow the winding streams, and ripple modest lakes with their graceful branches. Most of all, in the quiet cities of the dead, they should bend as kind mourners among the gleaming piles.

Thus much have I written in vain if no one is moved to plant a tree. Whoever places a seed, or tree, in the kindly earth, is king over unreckoned forces. By virtue of his act the buds swell, the leaves unfold, the fibres strengthen, and over his gray hairs the wind shall tremble through the branches, and sing him softly to sleep. The children who played under "grandpa's tree," will go out into the world, armed with home's love and home's training; the tree will reach its broad and blessing arms over their hopes and victories. It may not be a "talking oak," yet perhaps a wavering elm, a singing maple. Then, when its life fades, for even trees die, its knots and fibres shall live again in the shape of a costly table, or polished bracket, or the trinket-box of some fair, coquettish maid, or the wooden cross of some poor sailor, pressed to his dying lips whilst drifting on the naked sea, and praying for the glimpse of an approaching sail.

CHAPTER VII.

SHRUBS.

The Value of Shrubs.—Their Easy Culture, and Clustered Memories.—Shrubs for each Season. Deciduous, and Broad-leaved Shrubs.—Diseases, Treatment, and Method of Training.

THE garden which has no shrubs anywhere is sorrowfully deficient. They are a connecting link between soft-wooded plants and trees, from a horticultural standpoint; they are like trees in miniature, with an added grace of leaf and blossom; they are statelier and more enduring than the soft-wooded, frost-bitten denizens of our gardens. In time of blooming they girdle the round year with brightness; there are shrubs for each season, and for each month. Where a tree is vast, imposing, a shadower of much ground, the shrub is graceful, friendly, home-like, adapting itself to our little nooks and corners, with lovable versatility. The twisted branches of an oak may be gnarled, rugged, full of power, and knotted, sinewy strength; the twisted limbs of a *Pyrus Japonica* are merely quaint, picturesque, or fantastic withal. Shrubs need comparatively little care, and the best of them flourish without irrigation. Hours, and weeks, of labor must be spent over beds of annuals, and soft-wooded plants, all beautiful in their way, essential to the complete garden, and more charming in color, or fragrance, than any of the shrubs. But, on the other hand, shrubs need no care, after they are once planted, except an early manuring and pruning. They become, in the course of time, a permanent part of the landscape, and memories cluster around

them even more thickly than about the trees of childhood. What middle-aged person does not hold in fond affection the snowball by the gate, or mother's lilac, so carefully watched in spring, when its fragrant spires began to appear, or the scarlet-flowered pomegranate, or the white sprays of Spirea, drooping sadly over some playmate's grassy mound, forgotten, treasured, and forever holy? Or else, in childhood, when each day

" Was one continuous song,
Linked sweetly with all other days,"

who has not found a *Kalmia* in the woods, or Emerson's *Rhodora*; or in the South, the *Stuartia*, flower of a kingly line; or in our Sierras, the lilac *Ceanothus*; or along the coast ranges, our native *Rhododendron*? Whoever has, will remember the thrill of joy, the beauty of the newly discovered world, the clustering delights of that moment. Whoever has not, whatever I may hereafter say, for them I am not now writing. I have a profound, and I trust an eternal pity for the man or woman who has no memory of olden flowers.

The founder of a home will be wise to plan for many shrubs, at intervals along the walks, in masses and groups on the lawn, hiding unsightly objects, winding by the margins of streams, crowning rocky knolls, and clustering in shady valleys. For blooming in winter, here, we can depend on the *Kerria Japonica*, with rose-like, double, yellow blossoms; the Japan quince, either scarlet, pink, or white, and a brilliant object on the lawn; the Catalonian jasmine, a shrubby vine, most effective when trained to a pillar, and allowed to trail over, as a fountain; the shrubby honeysuckles; and, over a large part of our State, the camellia, so perfect in shape and color of blossom.

For spring blooming we can have *Spireas*, white, rose-colored, single or double; lilacs, white or purple; *Wigelias*, of different shades; *Deutzias*; hardy white azaleas; *Laurestinus* (also a winter bloomer); our native *Cercis*, or Judas tree, with its charming, rosy-purple clusters; dogwood (*Cornus*), of a dozen species; *Calycanthus*, lover of we

places, and full of spicy fragrance; *Ceanothus*, both upright and trailing; sometimes, in favorable localities, the pink-tinted, urn-like blossoms of our mountain manzanita.

All summer we may depend upon roses. There will be *Altheas*, *Kennedias*, crape myrtles, oleanders, and a long list of other shrubs, also, which will carry us imperceptibly through the autumn to the Japan quince, again.

The proper theory on which to be a shrub-fancier would be, it appears, to first have a series which, as a whole, would supply the year with flowers. Secondly, to have a single species on which to lavish your deepest affection. The rhododendrons, camellias, and azaleas, have, more often than any others, received the attention of amateurs, and there are already some extensive collections on this coast. Azaleas are hard to keep, and difficult to manage, seemingly not well adapted to the climate, although we have two very handsome native species, found in the coast range. With scarcely any exceptions, the shrubs of Japan and Australia do well here, and also the shrubs of our southern States.

Deciduous shrubs are best used in early winter, and bear transplanting well, with a good pruning to balance the loss of roots. After the buds have started it is late for safe planting, although if the atmosphere is damp, most shrubs will take hold, even if the young wood is half an inch long. In such cases more pruning is required, and little blooming allowed, the first year.

Broad-leaved evergreens, as the camellia, are much more difficult, and should be moved with a ball of earth attached to the roots, at a season when they are not in bloom. Too much water must not be applied to the roots. Sprinkling the leaves with water, several times a day, will often save plants from withering.

The Hydrangeas, as their very name implies, need an abundance of water, and make an effective lawn shrub. The ungainly and rather useless, *Melaleucas* (bottle brush), are less popular than formerly. The great objection to the double peach, almond, plum, cherry, &c., is their short season of bloom. The black or brownish scale (*Coccus*),

found often on oleanders, has led to a crusade against that plant; but a strong suds of whale-oil soap, and free potash, applied often, is a complete remedy both here, and on the orange, or other plants.

The body of a shrub is liable to become covered with moss, and to crack, and become unsightly. Soap-suds or lye, applied as a wash, will remedy this. Some few shrubs are liable here to the attack of a species of borer, similar to that found on apple trees; and, where the marks of their work are noticed, they must be killed, with a pointed wire.

Shrubs are susceptible of a number of different methods of training. A snowball, for instance, may be allowed to send up a large number of stems from the surface of the ground, thus insuring a constant supply of new wood; or it may be trimmed to a single trunk, which is more handsome, and gives better blooms. We may have the form of a globe; or, by cutting out the central stems, that of a cup. Shrubs with drooping flowers look well trained in the shape of a fan. Shrubs, as the *Clianthus*, of rather trailing growth, should be forced to make a single, upright stem, to a height of three or four feet, and then allowed to droop evenly on all sides.

Shrubs are seldom propagated from seeds. Most of our shrubs will grow best from cuttings taken off, in this climate, in the fall, and planted in the open ground, or in boxes of sand, as directed in the chapter on cuttings.

CHAPTER VIII.

THE VEGETABLE GARDEN.

Farmers ought to Raise more Vegetables.—
Different Ways of Laying out a Garden.—The
Combination System.—General Culture and
Treatment.—The Tools Needed.—Notes on the
best Vegetables.—Birds in the Garden.

IT is a lamentable fact that not one farmer in ten raises his own vegetables. He prefers to buy from one of the yearly increasing band of Portuguese or Chinese peddlers, who have learned how to make every rod count, and are steadily advancing their fortunes by the neglect of the mass of farmers. Even if the peddler's celery is green, his turnips and parsnips woody, his cauliflower wilted, his onions strong, yet the average farmer will buy from him rather than to start a garden of his own, where everything is sure to be fresh, and at hand when wanted. This last is an important item. Housekeeping is full of so many unexpected emergencies in the way of sudden visitors and numberless accidents, that a flourishing little garden will bridge over many a difficulty. If we also consider the cheapness and healthfulness of home-grown vegetables, it would seem as if the peddler's occupation should be gone.

But the average farmer does not fully understand how to produce good vegetables cheaply, and how to have a constant succession throughout the season. He plants corn of the White Flint variety, for roasting ears, without much attention to the far better sweet corn; he has a late patch of com-

mon field peas, but neglects the delicious marrowfats; he does not believe in celery, salsify, parsnips, lima beans, for succotash, or black-wax, for snaps; his tomatoes are sour, wrinkled, and watery, because he does not grow the Trophy, and Acme. In these matters there might and ought to be a great change for the better. If a spot for a vegetable garden was deliberately chosen, and for all time set apart, and highly fertilized; if a little study were put upon books of gardening, and catalogues; and if the best varieties only were planted—we cannot doubt that the average farmer would soon take a vast pride in his vegetable garden.

The ground for a good vegetable garden needs to be deeply plowed, and well covered with completely rotted manure. Plow again, and harrow until in good condition, and ready for planting. We will suppose that the ground is prepared in early spring, and will briefly sketch a plan of procedure.

There are two leading methods of raising vegetables: one in beds, or small squares, and one in long rows. Each method has its admirers, and its advantages; so we shall present both. In the bed system, the whole plot is first laid off in large squares, and again into narrow beds, from six to ten feet wide, and of any length desired. Narrow paths are left between the beds, and these may, in a well arranged garden, be bordered with thyme, sage, sweet basil, majoram, or some other herb. Fragrant or medicinal herbs are the only plants proper for an edging in the vegetable garden. When vegetables are sown in beds a great deal of hand-work is necessary; but some kinds thrive better with this constant care; and in no other way can the garden be made to look so well.

According to the row system, we plant in long rows, and cultivate with a horse. There are no paths laid out, and it is in reality only a field system adapted to the wants of the vegetable garden. No one who has not tried it can realize the success attainable by this simple method. Peas, beans, parsnips, carrots, salsify, carrots, onions, &c., may be grown to great advantage, and indeed better and more cheaply, than

if in beds. The rows may be made straight with a marker, after the ground has been thoroughly well prepared, and sown with any of the above seeds. When the second leaf is well developed these may be thinned out. Cultivate often, and keep clear from weeds. In no other way can a busy farmer find time to attend to a vegetable garden, than by having it planted mainly on the row system.

Since each system has its advantages, we ought to combine them. In a garden planned on the bed system there ought also to be long rows of peas, sweet corn, and other field vegetables; in a garden planned on the row system there ought also to be a series of small beds, at one side, containing radishes, lettuce, cabbage, and cauliflower plants, for future transplanting, turnips, and similar vegetables. Here, also, may be a small frame for tomato plants, or a hot-bed, for planting sweet potatoes.

The question of proportion is hard to settle in a vegetable garden; and, since the tastes of individuals and families vary, no definite rule can be laid down. Most farmers, however, will need a constant succession of peas, sweet corn, cabbages, cauliflower, onions, parsnips and turnips. By far the larger part of the garden may well be dedicated to these vegetables, and, by successive sowings of two weeks apart, a constant supply can be secured. Other vegetables, as celery, salsify, snap-beans, okra, &c., may in some cases be favorites. Nor must asparagus, that most delicate and healthful vegetable, be neglected in any garden, however small. Of all these, and many others, long rows, mulched a little in dry weather, and given ordinary field treatment, will insure a full supply.

In any part of California where snow does not fall, we may sow the following vegetables at any time during the fall or winter: beets, carrots, celery, cabbage, cauliflower, endive, lettuce, parsley, parsnip, onions, peas, radish, turnips, and spinach. Until danger of frost is past, we must not sow beans, sweet corn, cucumbers, watermelons, squash, and tomatoes. Seeds sown in winter must be lightly covered, and the soil pressed only a little above them; but seeds sown in summer require a deeper covering, and a close pressing of

the soil, to prevent the hot dry air from destroying the germs of life, or wilting the growing plants. If beet seed is soaked for twenty-four hours, it germinates better. Carrot seed should only be sown on the cleanest land obtainable, for it grows slowly, and the weeds are apt to take possession.

The tools required in the vegetable garden, will consist of a spade, of the best make, a large steel rake, an 8-inch garden trowel, a cultivator hoe, which combines many points of excellence, a prong hoe, which is very useful to loosen soil, after irrigation, and a garden reel and line, for marking rows. A small hand-weeder, with prongs like extended fingers, will be found useful here, and also in the flower garden. A wheelbarrow for moving manure, earth, mulching, and refuse, will be necessary; and a watering pot, or piece of garden hose, attached to a hydrant, is needed to sprinkle newly sown beds in dry weather.

The best seed catalogues give complete lists of the seeds required to keep up a succession, and contain much information about culture and time of ripening. To give in this chapter merely borrowed information, is far from our plan, and we refer readers to the catalogues of Bliss, Thorburn, Henderson, Hovey, Dreer, Landreth, and others, for principles of a general nature. But experience has taught us that some vegetables do not succeed well here, whilst others are superior. Notes of this character are in the line of our work.

The black-wax, snap-bean, and the Lima pole-bean, are our best garden beans, for productiveness and quality. The Egyptian turnip beet is superior to the common early turnip. Kale is scarcely grown at all, away from San Francisco, and sea-kale, not anywhere. Brussels sprouts, and kohlrabi, do not seem to do well. Turnips cannot be grown as a field crop with any certainty. Carrots, large white Belgian, and long orange, are grown for stock, and do admirably on the tule lands. Of the newer cabbages, Henderson's early summer does extremely well; the Jersey Wakefield is hard to head in the warmer parts of our State. Celeriac, or turnip-rooted celery, is of easy culture, and worth trying. The early

Minnesota sweet corn, and Stowell's late evergreen, have been the most satisfactory of a dozen kinds tried. It is easy to have green corn until the frost kills the stalks, by successive plantings. The white and green Cos lettuce thrive better than the other varieties, and do not run up to seed so soon. Among the onions, the new Italian varieties, giant Rocca, white Tripoli, &c., are well adapted to our climate, and popular.

Peas merit a separate paragraph. They are grown so largely for market that some seasons they hardly pay for picking. The varieties used for market are not often the best. No early pea is fit to eat, after the marrowfats and wrinkled varieties come in. We can get nothing better, for a first crop, than the Philadelphia Extra Early. McLean's Little Gem, is one of the best early wrinkled marrows. The Champion of England is still a favorite kind for the general crop.

Summer squash ought to be in every garden, but they do not seem to be grown to any great extent. Spinach thrives wonderfully, but is extremely apt to be covered with insects so minute that they are hardly noticed at first. Our wild mustard, mixed with beet tops, makes good greens. Tomatoes should be started in a hot-bed. The Trophy is the best we have ever grown.

The vegetable garden, properly managed, is an adjunct to the farm, which few men can well spare. We have shown how it can be arranged and managed with economy of space and labor. Plant vegetables, diversify your agriculture, and load your table with fresh and healthy products of your own garden. There is no way for the man who owns a small farm to become independent except by producing, as far as possible, everything he needs.

There is room for experiments with good California grown seed. Our seedsmen mainly send East, and many of our market-gardeners do the same. But it has been proved that, with proper care, we can grow seed of the best quality; and it is to be hoped that the current of seed buyers will be checked, and turned towards home-grown seeds. When we

give sufficient attention to the subject, I doubt not that we shall, in this climate, produce new varieties of superior excellence. The subject of improved vegetables, fruits, and flowers, is deeply interesting; but there are hardly a dozen men on the coast who have made efforts in that direction. All honor to our pioneer experimenters, and may others follow in their footsteps.

CHAPTER IX.

FLOWER GARDEN AND LAWN.

Lord Bacon's Remark.—The Universality of Gardens.—Their Infinite Variety.—The Time when our Gardening Calendar properly Begins.—Autumn Work.—Our Californian Winter, and the Happy Awakening of the Flowers.—Gardens must be Permanent, kept Clean, and full of Fragrance and Gifts.—How to Lay Out a Garden.—Plans, Walks, advisable Flowers, and Edgings.—Roses.—Garden Statuary.—Concerning Rock-work.—Aquatic Gardens.—Lawns.—Beds Cut in the Lawn.—The Enemies of the Garden and Lawn.

MEN come to build stately, sooner than to garden finely; as if gardening were the greater perfection," says Lord Bacon, in one of his essays. In no more fitting way might this chapter begin, than by thus expressing the thought that beautiful gardens and grassy lawns are hopeful signs of a nation's progress. Wealth which has been gained by the delights of honest toil is a lover of conservatories and costly gardens, and arboretums gathered from many lands. It is only unhealthy, speculative wealth which gambles in stocks, or fast horses, and lives in a round of excitement.

One comfort in having a garden, be it ever so small, arises from the universality of gardens. They dot the earth with blossoming pulses. In every town in this State there are flowers, full of color and fragrance. There might well be more—but some there already are. Where Art has done least, and there are few roses and gardens, there Nature plants her

wild flower gardens, full of infinite suggestiveness and rarest grace, so that the children may find wild flowers, and learn their lesson of simplicity.

I have heard of a lover of music who wandered, on foot, over the world, that he might hear the songs of the people, and the sounds of Nature, in their infinite change and pathos. He stood at palace gates, and by the dwellings of poverty. He walked crowded cities at noon-day, and weird forests at midnight. He heard the mother, hushing her sick child; the sailor boy, singing on the open sea; the prima donna, weaving her swift enchantment; the winds moaning in the forest; the bees, murmuring in clustered grass; the river's laughter on gray ledges of rock; the ocean, with its low trembles and stormy wrath. So, by listening to the voices of men, and of Nature, he grew to understand the hearts of both.

Now, I have thought that in like manner one might journey the world over to study the gardens of the children of men. Here, he might pace the stately walks of a king's arboretum, full of rare trees, and linked with history; there, he might linger over a child's pet corner of pinks, marigolds, and fragrant brown wallflowers. He might see aristocratic bedding-plants of salvias and begonias, set on slopes of green turf; or he might notice a sweet pea, trained by the hands of some crippled child. There might be gardens where Art had supplemented Nature with rare and costly grace. There might also be neglected and broken-hearted gardens, whose sagging gates led into a wilderness,—but even here Nature would somewhat rejoice—some wildling rose would bloom above the weeds—some graceful grass would cover the long untrodden steps. Our wandering student of gardens would find that everywhere the hopes, sorrows, and histories of men are written on the friendly earth. Our gardens become revelations of ourselves.

The gardening calendar of California begins, properly, with the cool days of autumn, and the earliest rains. In our climate the earlier part of winter is outwardly a period of rest for all plants. Each plant, however, begins, in all prob-

ability, to realize that a new growing season, with its cares, duties, and pleasures of blossoming, is near at hand; the cells begin to arrange for their sudden development of a few months later; the buds are sending telegraphic communications to the most distant rootlets, bidding them be ready for the rush and quiver of spring. Much of the future blossoming power of our shrubs and herbaceous perennials will depend on the rest they have before the rains come.

As soon as the leaves fall, the trimming of shrubs, roses, &c., is in order. First, cut out all the unhealthy looking wood, and clear the suckers away. Then stand off, and look at your subject, and cut no branch without a reason—a symmetrical, open head, open enough to give each blossom a chance to see, and to be seen—is what we want. I observe that, in nine-tenths of the pruning done in gardens, by far too many large limbs are cut from the shrubs, and there is seldom enough thinning out of the little twigs. Pruning, usually the first matter to be intrusted to an ignorant laborer, is properly, as a question of ethics and common sense, the last. Let a common laborer, if you will, dig up your oxalis, walk over your pansies, cut in twain your dahlias, break your newest fuchsias, mix the labels of your seedling roses, and eat your early radishes and turnips—but keep from his bungling hand the pruning shears—fateful arbiter of the fortunes of shrubs.

The garden loves the rain better than our artificial waterings; the warm drops soak into the ground, and ask the little rootlets to adopt them, and change them into leaf and blossom, or, best of all, into final fruit, and seeds of new generations. The tiny roots, away down in their still home, telegraph back to the leaf-buds overhead, “Is it time?” and the brown, scaly buds answer in sweet iteration, “O yes, it is! yes, it is!” Then, as Nature’s example of the division of labor, the rootlets gather food for the brown buds, the brown buds grow and blossom for the rootlets, and each is a happy part of the perfect plant.

The charms of our Californian winter, so suddenly full of growth, waves of green, tints of rose and purple in countless

buds, beginnings of song from the thickets where robins and thrushes gather—all these derive their exquisite surprises from the long months of autumn which made every root and bud impatient for the swift, coaxing rain. In this, our winter, which is but a rainy Eastern June, the Gillias, Bee Larkspurs, Escholtzias, Limnanthus, and Dodecatheons, by some called American cowslips, are covering all the slopes with their mottled and pointed beaks; in shady places the columbine's dark leaves mingle with the wild parsley, and with the delicate volutes of uncoiling ferns; the new grass clothes the naked places and the fissures of the weather-beaten rocks. And, in our mountain regions, the miles of manzanita, wake, and bud, and blossom, by deserted mines, and on windy heights, shaking their royal and tinted cups in lavish grace upon the ground, till all the slopes are white as with drifts of fragrant snow.

But long before this happy awakening time we ought to plan for the little portion of earth we possess; we ought to lay out the garden, with needed improvements and changes, manuring the surfaces of old beds, and preparing new ones, if desired. Any garden, which is worthy of the name, must be permanently located. The sweetest and brightest flowers grow best in the same places year after year. The choicest plants we have are not of a nomadic race. Not until we are sure that our garden beds are laid out for years of uninterrupted peace and growth, can we venture to indulge in the costlier beauties which, once planted, must not be disturbed, under penalty of losing a year's bloom. A herbaceous perennial, or a handsome shrub, is like money at interest, constantly increasing in value, if left alone sufficiently. In the truly delightful gardens, masses of bulbs cluster in every available nook, so that it is fairly dangerous to dig anywhere, and the sweetness of the air is a constant revelation.

Then, also, a garden ought to be small enough to be kept clean. A weedy garden is an abomination, hated by the gods, and not loved even by careless men. Nature alone can mix weeds and flowers in one grand display on her free hills and in her forest glades, and deep, silent ravines; but our leveled

and fenced-in places cannot endure these uncultured and saucy plants.

Three good qualities a garden should possess,—it ought to be good to look at, and good to smell of, and full of a doral benevolence and liberality. Somewhere it must have the beauty of masses of intense color, as scarlet verbenas, lobelias, portulaccas, anemones; it must have fragrant corners, and indeed a pleasant breath, and a hint of odorous things all over—the love-enchanted heliotrope, roses of mirth and song, slender and maidenly carnations; it must be of that generous and universal nature which furnishes flowers for every event of our passing lives.

The beginnings of a garden are of the greatest interest. Whoever plans, through our swift autumn months, for laying out a new garden, has a pleasant and grateful task. The time spent in winter, will come back with tenfold compounded returns; and about the first plant which blooms in a new garden there is a charm and glory, as if the flower itself were conscious of its messengership.

The first thing to do in laying out a new garden is to make a suitable plan. Almost anyone can draw sufficiently well to sketch different outlines until a satisfactory one is found. It is safe to say that there must be small oval, or round, beds, for massing such flowers as petunias, stocks, phlox, scarlet flax, our native annuals, and most low-growing, bright-flowered plants. There must be larger beds for a mixed style of gardening, not so showy as the preceding, but far more practicable in small gardens. The outlines of large and small beds must blend harmoniously, and the paths should seldom be straight, but gently curving, and not too narrow. A tyro in the art of gardening usually fails to allow space enough for the walks. It is not desirable to compel your friends to follow in meek Indian file when they come to look at the garden.

The material used on the walks is of much importance. In this direction we note three essentials: it must be smooth, and easy to walk on, hard, or impossible for weeds to grow in, and the color must not be glaring, but of rather a subdued

tint. Well packed gravel or broken rock, makes a good walk. Bricks, plank, or asphaltum, are only good for small city gardens. Broken shells are too bright, unless mixed with something of a more neutral tint.

After the whole garden has been laid out, leveled, the paths defined, and the beds dug, the very important question of edgings will come up. The small gardens along a street present a curious variety of materials, and some laughable effects are produced. Black whiskey bottles, for instance, buried so that only a few inches of the bottoms project, are not seriously commended! Edgings may be either natural or artificial. The best artificial edging, although somewhat expensive, is made of small edging-tiles, either plain, beaded, or rounded. They are of good color, neat, and indestructible. Natural edgings of low plants require great attention in this climate. Dozens of things have been tried with little success. The golden dwarf fever-few, kept trimmed, is effective, as also the deep blue lobelia. These two, alternated and kept at the same height, are better than either alone. One of the most compact edgings is of dwarf pinks, one variety of which forms a close, dark edging, never too large, and lasting for several years, when it will of course need re-setting. Spring blooming dwarf iris, oxalis, grape hyacinth, and crocus, are suitable to edge beds of bulbs. *Ixias* and *sparaxis*, left permanently in the ground, do very well for large mixed borders. Box, in some localities, is desirable, but, under our hot suns, often dies out in spots.

The soil which most flowers prefer is a sandy loam, or a vegetable mold, although we have seen fine flowers grown on heavier soils. In a small garden, harsh soil may be ameliorated, light soil strengthened, and any soil whatever greatly improved, by the use of fertilizers, mulching, sand on the surface, and other agents. Manure must not be used until well rotted. Spread a thin coating on the surface before the rains. Do this also to the lawn, if thrifty trees is desired.

Flowering plants may be started in boxes and removed to the garden, or a little corner may be set apart for raising seedlings, and starting cuttings. This corner must be well

protected from birds; but on this coast the hardy and half hardy annuals thrive better out of doors than if started in a greenhouse. When seedlings are transplanted a cool and cloudy day must be chosen, or else they should be shaded until established. Of course if the ground seems dry they must also be watered. Our best month for sowing most hardy and half hardy seeds, is December; and March or April for tender seeds.

In considering the garden as a whole the question arises, "What shall we plant?"—to which the retaliatory question would be: "Well, what do you want the garden for?" If it is for effective show, and nothing else, if you want people to look over your fence and exclaim with admiration; if you give away few flowers—then plant dahlias, verbenas, geraniums, petunias, &c., and mass everything. If your garden is for friendship and delight, gift-blossoms and constancy, be sure that, although you may mass flowers on the lawn, the garden has beds for cutting, and groups, and a great variety of flowers.

The following list does not nearly embrace all the flowers suitable for our climate, but they are those which have been well tested. It will be understood that our early blooming bulbs are taken up as soon as the tops wither, and put away until the next season—something else then filling the vacant bed:

Crocus, followed by pansies, for late blooming; anemone, followed by double portulacca; verbenas, of different colors; *Nemophila*, in variety; *Collinsia*, *Leptosiphon*, and *Gillia tri-color*, three native annuals; ten-week stock; lilies, of our native species, or from Japan; hyacinths, followed by asters; *Ranunculus*, followed with balsams; *Salpiglossis*, edged with *browalia*, both fine for cut flowers; *gladiolus*; carnations; everlastings and grasses for winter bouquets; *Campanula medium*; *Delphinium Formosum*; *Penstemon*; *Antirrhinum*; *Whitlavia*; *Digitalis*; *Schizanthus*; phlox; candytuft; *lobelia*; dwarf morning-glory; scarlet flax, and *Anagallis*; succulents, for the sunniest part of the garden, or for rock-work. Three or four sowings must be made of

pansies, sweet-peas, and morning-glory. All these must be started early. We must not omit a shady bed of violets: the double blue, double white, and the improved singles, are indispensable. *Ageratum* is good for bouquets. Train heliotrope and *clianthus* against the fence. Don't forget to plant a little Bourbon, or button-hole bouquet rose.

A bed devoted to herbaceous perennials will, in due season, become the garden's chiefest attractions. The *Astible Japonica*, with its white spikes, the well known *Dicentra Spectabilis*, or bleeding heart, of which we have several relatives among our native flowers, the *Aquilegias*, lovers of shade, *Lychnis*, *Polyanthus*, and dozens of others, are simply invaluable.

Of roses, no garden ever has too many. Group them on the lawn, and by gateways; plant them along the widest paths. If you have any to spare set them even by the roadside, as a gift to the public. Never buy any roses if you can help it, except those grown on their own roots. The Marshal Niel is so difficult to start that budded roses of this kind may be taken. Trim roses up to a head, with a straight stem, unless you wish to layer a few. The following roses are among the choicest known: Duchess of Edinburg, a new crimson tea rose; Aline Sisley, rosy purple; Bella, a pure white; Bon Silene, purple carmine; Isabella Sprunt, canary yellow; Safrano, orange; Hermosa, pink; Agrippina, bright crimson; Climbers; white Lady Banks; yellow Lady Banks, and James Sprunt, a crimson rose. The deep pink Scotch Moss rose is the best of all, as the whites seldom do well. Of course there are dozens of other good roses, as Homer, Madam St. Joseph, Gen. Jacquiminot, Black Prince, and others; but those named will form a good list. Scrapings from the chicken-yard make the best manure for roses. Every year a bucket-full should be dug in around the roots, and the flowers will be of better color and substance.

All summer long there will be something to do in the garden. Plants will need trimming, staking, or watering; where some die, or stop blooming, others must be ready to take their place; cuttings will need attention; there will be

seeds to save,—in short, gardening is a continual occupation, not to be followed by lazy people. After a while some things will grow nearer your heart of hearts than others, and certain flowers will begin to predominate. It may be pansies, in which case you will buy German seed, Scotch seed, prize English, and American seed, planting at all seasons until your garden is full of bewitching flower-faces, dainty and winsome. Or yours may be the counterpart of Chriemchild's Rose Garden, that enchanted place of legend. Or it may become a hot-weather garden of *Caladiums*, Bananas, Cacti, *Coleus*, *Echeverias*, *Sedums*, and other succulents—a warm, tropical region of gorgeous color and magnificent foliage. There is an almost infinite variety possible in our gardens.

Concerning the garden statuary, ornate fountains, and other decorations often seen, there is much to be said. We are not prepared to deny that in some styles of gardening these expensive affairs may well harmonize. If anywhere, they belong to the Italian style, or to the stately Elizabethan gardens, and cannot, by any manœuvering, become a part of our daily lives. Earthenware, or bronze satyrs, fauns, fountain-pouring nymphs, and bleary-eyed watch-dogs, are a part of the elder, not of the younger, art of gardening. We are glad there are ancient gardens, with moss-grown statues, and fountains wonderful even in their ruin. But in this new and hopeful land, we shall not copy the dead forms, though once so dear to the hearts of men. Here there shall be spacious groves, wide lawns, and numberless gardens wherein the flowering plants of each broad continent, and of every wave-girdled isle, shall give us their varied blooms. Here, if indeed we use statues in our gardens, there shall be no servile imitations, but our young sculptors shall again embody the breathing shapes of sky, and sea, and wood.

Concerning rock-work, which, if illy done, is an abomination and a terror, this: To pile freshly splintered fragments from a quarry, in the middle of a lawn, and, at rare intervals, to put a sickly plant, whose abortive efforts to cover the glaring roots are weak and pitiful—this is a crime against beauty and fitness. A pile of naked and shapeless stones to which

no paths lead by natural gradations, and which has not visible support and excuse in its surroundings, is not "rock-work"—but rather a cobble-stone mockery. And are we to have no rock-work? Of a verity, so only it is well done. On the slopes of all our hills there are moss-covered, element-worn, grotesque fragments of rock. Limestone, sandstone, slate, quartz, and conglomerate, of a great range of colors, and an infinite variety of shapes, may be found. These are the natural material for rock-work. Built up irregularly, in the corner of the garden, at the head of a ravine, or in the midst of winding paths, a beautiful effect may be produced in time. The mossy and wave-beaten sides of rock must appear. The crevices must run downwards and towards the centre. Vines, succulents, cacti, agaves, yuccas, and similar plants must be used, in such abundance as to nearly cover the rock-work. A concealed fountain is a very pretty adjunct to a piece of rock-work. The so-called Alpine plants may be used effectively. On our hills, in our ravines, clinging to our own rocks, are plants worth our closest attention. A few dozen bulbs of either the white or yellow *Calochortus*, *Brodiaea Coccinea*, or *B. Grandiflorum*, or any of our hill-side bulbs, if scattered in the crevices of rock-work, will bloom every spring, and give us much pleasure. Our native *Frittelaria*, the *Dodecatheon*, or shooting star, our spicy *Yerba Buena* vine, and, in shady nooks, our native ferns, all flourish on well built rock-works.

Sometimes a person might have a stream in the garden, or in some way, a surplus of water, so that a success might be made with aquatic plants. No more fascinating division of gardening exists. There is a wide range, from the flags and reeds of our marshes, to the *Victoria Regina* water-lily, and no one on this coast has yet fairly attempted it. A quiet pond of water, with a collection of all the water-lilies known, would be worth seeing. The white pond-lily (*Nymphaea Odorata*) is often grown in tubs. The newly discovered yellow lily of Florida has bloomed this year, in San Jose. The blue African water-lily has not yet been introduced. Our native scarlet *Mimulus* is a gorgeous bit of color in the

edge of a stream. The curious horned water-nut of the Chinese (*Trapa Bicornis*) may be dropped into a tub of water half filled with earth, and it will grow, blossom, and ripen its curious seeds, called of old "Pythagoras beans." Water-grasses are numerous, the *Cyperus* being prominent.

Grass for lawns is hard to manage under our hot suns, and through our long dry summers. Kentucky blue grass fills the bill as well as anything else. Bermuda grass, and a creeping Sandwich Island variety, come as visitors, and remain abidingly. The perfect lawn grass is, so far as our knowledge goes, a thing yet to be found. A good and complete preparation of the soil is essential to success. Break the ground up deeply, pulverize it thoroughly, manure well, let the weeds sprout and destroy them, level the ground, or give it a uniform slope. Sow the grass seed evenly, and roll heavily. Close pressure of the surface, is the only way to insure a stand. If there are bare places, afterwards, scatter seed there and mulch with boughs or weeds. Grass must be kept growing, and often cut. Spread well rotted manure on, every fall. Grub out every weed, and keep the edges trimmed.

Beds for flowers or shrubs, cut in the lawn, have a fine effect. Tri-color geraniums, chrysanthemums, fuchsias, roses, petunias, tuberous rooted begonias, dahlias, and carnations, are admirable for this purpose. Trees, on a lawn, will bear closer trimming, and a more formal treatment, than if in mixed shrubberies. Rustic seats have an air of hospitality and solid comfort withal.

The enemies of both flower garden and lawn are numerous, and, sad to say, increasing. The time was when we could read with entire serenity of the insects which prey upon vegetable life. But that time is long past. The Codling moth is in our apples, the borer in our fruit trees, the grub in our strawberries, the woolly Aphis, scale-bug and other enemies everywhere, whilst slugs hold High Jinks, and Bohemianize in our gardens through the winter and spring months. These slugs exist in many unsuspected nooks, and quietly increase until the garden is alive with them. The

sharpest of unslacked lime, sprinkled over the ground at nightfall, kills all the slugs it touches. Sometimes the lime is put in a coarse sack, and beat so as to scatter a fine dust. Coal-tar, diluted to the color of weak tea, is highly recommended. Hand picking is a necessary adjunct. The Coccus, or scale-bug, infests oranges, oleanders, myrtles, and most hard-wooded plants. It is easily destroyed by an application of whale-oil soap, made into strong suds. It should be attacked when first observed, and not allowed to increase. The small, green Aphis, and also a yellow variety, gather on plants and vines—notably on the *Physianthus Alba*: Remedy, repetitions of whale-oil soap. Antirrhinums, and some other plants, are often covered with clusters of caterpillars. Cut these clusters off and burn them at once, unless trouble is desired. Sometimes there is a sudden raid of yellow squash-bugs. Paris green, sprinkled over the plant in the morning, before they can fly, makes them very quiet and harmless—kills them in fact. Keep a can of prepared wheat poison for the benefit of wandering gophers, and a small trap to set in the run-way of moles. Patience and industry will circumvent the garden's worst enemies.

CHAPTER X.

SEEDS, AND SEED PLANTING.

The Way Plants Grow.—Some of the Curious Things about Seeds.—Sowing of Flower Seeds.—Preparation of Soil.—Planting, and Covering.—Tree and Shrub Seeds.—The Critical Periods: Subsequent Treatment.—The Three Enemies.—The Delight of Success.

THE beginning and the end of plant life are in the seed. Nothing else is so nearly a miracle as this endless round of Nature, from the planted seed of Spring, through the leaf, stem, blossom, and forming germ, to the ripened seed of Autumn—the hope of another generation.

In our mild climate, and fertile soil, there is a wonderful swiftness about the growth of seeds. Noiselessly, when the first rains of our winter come, all the brown slopes thrill and quiver with bursting seeds. Noiselessly, too, over our new plowed, smoking acres, the promise of the harvest awakes, the seeds of old-fashioned flowers, in quaint gardens, begin to found their leafy palaces, and rear their tinted spires where banners of bloom shall wave hereafter. By our low marshes, where tulle and *Mimulus* grow; along our rivers, and shores, bright with lupines and gillias; in our deep gulches, fit home of *Trilliums* and *Aristolochias*, of *Calycanthus*, *Azaleas*, and modest ferns; on our long hillsides, and rocky heights, rich with clumps of *Ceanothus*, sown with blue *Nemophilas*, and planted with countless bulbs—everywhere the glad germs waken, and the world laughs into leaf and blossom.

This miracle of germination we have learned to produce

at our own will, by imitating Nature's conditions of heat, moisture, and darkness. So, mainly by seeds, which retain their life for a considerable, though varying period, and can be easily transported, we are enabled to possess the plants and flowers of every land,—some of them to brighten our conservatories, some to give an added grace to the garden, and some to become field products, and so increase the wealth of individuals and the prosperity of the State. The history of the introduction of many seeds, now common, reads like a romance—the romance of horticulture. Ardent collectors have risked their lives to gather and preserve seeds; the strangest accidents have scattered them; they have been carried in unknown ways, and have suddenly appeared in new places; kings have made treaties for them, and have planted them with their own hands.

But, after we have thought of the wonderful things connected with plant-life, we must proceed to put a practical point to this chapter of ours. Given the seed—this brown mystery—and how shall we set it at work; how shall we rouse its downward energies; what are the laws of germination?

In starting seeds, warmth and moisture are the most important. These must be applied evenly, steadily, and with patience, for they are as necessary to sprouting seeds as pork and beans, beans and pork, were to our miners of '49.

Flower seeds are best sown in boxes two and one half inches deep, and one foot in length and breadth. Cut small holes in the bottom for drainage, and fill the boxes with prepared soil. Just here the amateur begins to be puzzled, if he has consulted a series of authorities. Peat, loam, silver-sand, compost, sods, leaf-mold, variously compounded—these look mysterious enough, to be sure! But there is, in practice, a simpler way. Take any garden soil as a basis, and add sand to it, and also the light mold from under a rotted straw-pile, or from the hollows on the hillsides, where leaves drift and decay. Mix well, until you have a light, rich, and friable soil. No definite rule respecting the proportions can be given, except that the prepared soil should hold moisture

well, should not become hard, and should never crack, even if in the sun.

Fill the boxes carefully with moist, but not very wet earth, and with a small board press the soil evenly and closely, so that it will retain moisture better. The board must be planed on the under-side, or the soil will adhere; and it may be convenient to nail on a handle. Sow the seed broadcast, if the soil is not weedy, and if you will know the plants when they come up; but, in general, it is best to sow in marked rows, scattering the seed evenly.

Now take a sieve, made by tacking a square piece of one-eighth inch mesh wire-netting, to a light frame, and sift light soil over the box till the seeds are just covered. Take the little board again, and press carefully. If any seeds are in sight, sift on a little more earth, and press again. Small seeds must never be covered more than their own thickness; the surface must be level and firm; keep it damp, but not dripping, and success is certain. Very fine seed must be sown on carefully sifted earth, which has been sprinkled before the sowing. The box may then be covered with a pane of glass, and occasionally sprayed by a brush dipped in water, and drawn lightly across the edge of a stick. Whenever a pane of glass is used, over fine seeds, the under-side must be wiped every week, or too much moisture will drip back and rot the seeds.

The seed-boxes must be set level, for otherwise the constant tendency is to wash the seeds to the lower side, and to destroy many whilst sprouting. The soil must be equally pressed all over, or else watering will cause some portions to sink, and form little puddles. The watering must be done with a fine rose, held so that the soil does not wash away—for this also is a fruitful source of failure. The proper time for watering is in the evening or early morning. If the boxes at any time look dry, they must, however, be watered, and shaded from the direct rays of the sun.

Tree, and shrub seed, are most conveniently sown in boxes two or three feet square, and four inches deep. The soil only needs to be rapidly mixed, and pulverized, with a

shovel; thrown into the boxes, pressed, so that no settling can occur, and sown broadcast, the seeds being covered with finer soil. The seeds of conifers, such as juniper, cypress, pine, and fir, sprout slowly, and require moisture, light covering, and a moist atmosphere. Our best plan is to sow conifer seed as early as the 1st of December, covering it with fine sand, and sheltering with lath. Conifers need protection from the direct sun.

When the young plants are just coming through the ground, affairs begin to approach a dangerous and troublesome period, which lasts from the time they sprout to the appearance of the second leaves. If sowed too thickly, they come up in bunches, and lift the soil, thus exposing the roots. Hardy plants will survive this soil, with proper thinning out. Tender plants require also a sprinkling of sand, to fill the crevices. Sand is also good, if the soil gets too wet, and covered with green moss, to dry the surface. If young seedlings have too much heat they wither; if too much damp, they decay, and suddenly perish; if too much shaded, or thickly crowded, they spindle, or become, as gardeners express it, "drawn," that is, they increase in height without a corresponding strength, the cellular tissue being merely lengthened without a gain in width. Light, warmth, and only moderate moisture, are the watchwords for plants at this period.

Seedlings of every description ought to stay in the seed-boxes until the second leaves appear; and it is usually best to leave them until the third or fourth pair of leaves are seen, and the stem has become somewhat hard. Plants that flower the first season ought then to be spaced in other boxes, giving them rather more room than they had before. Tree and shrub seedlings may, for the most part, be safely left in the seed-boxes for the first year, and then planted in rows in the open ground. The palms and Dræcenas must be potted off early, or the roots grow too long to be handled. The blue gum, and most other varieties of Eucalyptus, if sown in August, in boxes, or, better still, in sheltered beds in the open ground, and spaced once, are fit for planting in the

field by spring. The garden flowers, such as carnations, asters, balsams, and petunias, will become stocky and fibrous-rooted, if several times transplanted. They can be put in the garden, in masses, little groups, or as single specimens, as preferred. For handling small plants, use a knife-blade, or a small trowel, not larger than a teaspoon; for moving larger plants, and for garden-work generally, a seven-inch steel blade garden-trowel is needed.

Seeds, though carefully watched, are subject to many living enemies. First among the pests may be mentioned mice, which are excessively fond of some kinds of seeds, notably of blue gum. If they find boxes of this, they will scratch up the surface and eat every seed, leaving only the fragmentary hulls, as a bitter gibe. Pine-seed is another mouse delicacy. A green-house should be made safe against mice; and if one sneaks in occasionally, he can be circumvented by trap, or poison. Where seed-boxes are, however, set on a porch, or in a shady place out of doors, the mice often commit depredations. The boxes can be covered with glass, or surrounded by strips of tin.

The small red and black ants are also among the enemies of horticulture in general, and of seed-sprouting in particular. We fervently advise every novice in the ancient art of gardening to study the ways of these restless and impudent rascals. If the flavor of any kind of seed suits their fastidious palates, they will form in sedate military lines, and carry off every seed in the box before you really discover the trick. I believe that ants are responsible for at least a few of the failures usually attributed to poor seed. If the seeds to which they take a fancy are too large for one to shoulder, a number will unite, or else they will dig into each one separately, and carry off the kernel piece-meal. I have watched several minute red ants thus dissecting a Canna seed, and displaying as much zeal as if they were scientific men trying to discover the secret of life. Now and then they stop to consult, or to announce progress, thrusting their antennæ close together--then, with renewed energy, pushing the work of excavation till all the kernel was removed. Against ants, therefore, we

must declare relentless war. To save the boxes attacked, make a heavy mark, with chalk or tar, on the edge of each box; trace the marauders to their nests, and soak them out with boiling water. Move your boxes and pots occasionally, and, if they have started new colonies, make matters unpleasant for them. It is not cruel to the ants, because they ought to move out-doors and study Nature. Besides—and here is the gist of the matter—we want the flowers.

Another great danger, which threatens seeds planted in the open ground, and more especially coniferous seeds, arises from the presence of so many small birds through the winter, in our mild climate. Salpiglossis, Nemophila, ten-week stock, lobelia, and many other flowers, will be eaten off as soon as they appear. Vegetables will often suffer. Pines and cypress, whilst small and tender, will be completely destroyed. If it were otherwise, field culture would be the cheapest way of growing our hardy evergreens; but the little birds snap them off as soon as they appear, and skip saucily on the bushes when the excited owner comes along, to astonish him with a flood of twitters and a multitude of vibrant, melodious calls. The only effectual method of protecting conifers is to have a lath-house, or else to use lath frames to put over the seed-beds.

To sum up all in a paragraph, the growth of plants from the seed requires the utmost patience, and endless vigilance. It is the straight-forward, natural way of propagation; but it is beset with minor difficulties. No one can start seeds except by accident, who does not think of their welfare, and examine them daily, and several times a day, until they are up and fit to be transplanted. By-and-by you, the young seed lover, will learn how long it takes this and that kind of seed to germinate; you will know just how they look as they shake the soil from their brown garments, and unfold their new apparel of green. You will discover that, from their very first appearance, no two plants are precisely alike; and you will study each successive change with deepening interest. So seed-planting will become the delight of delights, and seed-growth the mystery of mysteries.

CHAPTER XI.

CUTTINGS.

Nature Provides for many Ways of Increase.—

Plants may be Grown from Cuttings, Slips, or Pipings.—Nurseryman, Florist, and Gardener, depend on this System.—The ease with which some People Start Cuttings.—The Difficulties of Others.—The Practical Divisions of Soft-wood, Hard-wood, Leaf, and Root Cuttings.—Each one, considered Separately.—Closing Hints.—Layers, and the Probable First Suggestions of Layering.

NATURE'S principal way of propagating plants is, as we have previously seen, by the use of seeds. But, in addition to this universal method of growth and preservation, Nature has given many plants a great and curious power of repairing worn tissues, and of making roots where portions are broken or separated from the parent stem. An almost miraculous power of recuperative separate existence is possessed by some plants. Sometimes a leaf, a joint of the stem, a bud, or scale, laid on moist sand, will first form a callus, and then will send forth roots. Sometimes we will find two plants of a closely allied species, one of which grows easily from cuttings, whilst the other fails entirely. Sometimes cuttings from the same plant vary much in their power of rooting. The atmosphere and climatic influences have much to do with this.

In all cases where cuttings can be used, they will be found a great advantage to propagators. Plants grown from cuttings usually bloom earlier and more abundantly than those grown from seeds. There is also, by the use of cuttings, a certainty that the same plant is obtained, as plants from seed often vary; but plants grown from cuttings never do, except in those extremely rare phenomena, known as "bud variation."

That system of propagation which consists in rooting a piece of a plant, making it to all intents and purposes an exact copy of its ancestor, naturally divides itself into a number of branches, such as the rooting of the soft ends of new shoots, which may be called "slips;" the rooting of little side-shoots, such as those pulled from a carnation bush, and called "pipings;" and the use of pieces of old wood, or, technically speaking, cuttings. In addition to these divisions, the system of "layering," or rooting first, without entirely severing the limb, belongs to the same class of propagating.

Fortunately plants which do not seed easily will often grow with the greatest ease from cuttings, and so this has become the leading method in the treatment of whole classes of plants. It is of great value to the commercial florists who spread their green-houses over acres of ground, and devote miles of glass to roses, fuchsias, smilax, carnations, verbenas, bouvardias, begonias, geraniums, and other popular bedding and house plants. The enterprising nurseryman, also, propagates all he can by means of cuttings, and fills field after field with currants, gooseberries, deciduous shrubs, and many shade trees, which, under favorable conditions will, in many cases root from cuttings. In the piecemeal work of even the tiniest city flower-garden, and in the painstaking operations of every amateur florist, the secret and the art of growing plants from cuttings ought to be acquired at the earliest moment.

It is a good rule to try to root cuttings of everything you want, whether the authorities encourage you or not. Thus cometh experience, and, at times, an unexpected and wonder-

fully sweet triumph, when something which every-one said would not grow from cuttings, did, in some inexplicable manner, strike roots and become a thrifty plant. We have known mild-mannered and quaintly old-fashioned old ladies, to whom the mysteries of plant-life were as an open book: under all seemingly impossible conditions they coaxed and persuaded growth out of cuttings which had travelled for long distances; their resources and patience were inexhaustible; and so, in the lapse of due alternate seasons of rain and sun, their gardens became, at little expense, full of rare and beautiful plants, each one interwoven with its own remembrance. There was one lady, in the days of childhood, whose garden was a wilderness of delight. She had roses, pinks, shrubs, and flowering trees, in almost endless variety; and yet, as she afterwards told us, she had never bought a plant, but had grown everything from cuttings and slips, found in bouquets or given to her by friends, and rooted in little saucers of sand set on the kitchen window.

On the other hand there are people in the world, plenty of them—and good people, too—who never seem to have any success with cuttings, or any particular reason to give for their failures. Every successive spring they visit their flower-loving neighbours, and, after loudly expressed admiration and surprise, beset them for gifts of cuttings, which they “will take care of so carefully!” The successful gardeners are somewhat afraid of the results, but good nature usually wins, and their visitors wander homewards with arms-ful of trimmings and cuttings, and with ears ringing with sound horticultural advice. The anxious inquirers plant their prizes in hap-hazard fashion, in corners here and there, or in boxes and pots, and care for them with a faint-heartedness not conducive to final victory. Occasionally a few of the cuttings bud, leaf out, and conclude to grow; but usually all hope departs utterly as summer advances, and the luckless amateur sighs with mournful intonation, “Alas! I never did have any luck with cuttings!”

For such people, of many attempts and failures, and yet with earnest horticultural desires, and a most abiding love for plants, flowers, gardens, lawns, and such beautiful things,

these lines, paragraphs and chapters, were written. There is a world of hope for those who study the sources of their failures, and the reason of other people's successes. Day by day they will win a completer knowledge of the underlying principles. Year by year their gardens will grow and bloom gorgeously, nor yet without secret places of fragrance. Is not all this a consummation worth the earlier struggle?

Besides the division, given in a few paragraphs before, into cuttings proper, slips, pipings, and layers, or semi-cuttings, gardeners have another, and certainly more logical classification. It is usual to say that cuttings are of three kinds—leaf-cuttings, root-cuttings, and stem or branch-cuttings. Here, then, we have a natural arrangement founded primarily on the part of the plant used for propagating. Pieces of woody fibre taken from above the surface, are stem-cuttings; pieces of woody fibre taken from beneath the surface, are root-cuttings; and pieces of leaves, or leaf-stems, are leaf cuttings. Stem-cuttings, which embrace by far the largest and most universally used class, will admit of a still further division into soft-wood and hard-wood cuttings. For bedding-plants, such as geraniums, heliotropes, nasturtiums, &c., only the use of soft-wood cuttings can be advised, as likely to succeed. Hard-wood cuttings are used for deciduous shrubs, such as lilacs, syringas, roses; for some evergreen shrubs, as laurestinus, euonymus, myrtle; and for some well known trees, as poplar, cork-bark elm, and weeping willow.

Let us return to a consideration of soft-wood cuttings. Whenever the young wood of a shoot is in a brittle, growing condition, and will snap evenly across if bent in the hand, it is fit for a cutting. If it is allowed to become further advanced, and somewhat woody, it is more difficult to root; and if in the blooming stage, almost impossible, as a rule, although the double geraniums, which are apt to rot off, do well, if a flowering-tip is taken. It will, usually, however, be found that a short piece of a tender shoot is far preferable. Cuttings snapped off in this way will not, probably, be over two and a half inches long, and often not over half an inch. Pinch off the larger leaves, retaining only one pair of small ones at the tip. Take sharp, clean sand; put it in a box, pot,

or saucer; plant the cutting down about one-third of its length; pack the sand nicely around, pressing it firmly, so as to touch everywhere, but not so hard as to bruise the bark of the tender shoot; then water, and keep the sand so moist that the cuttings do not wilt. Florists like to have a bottom heat of 65°, and an atmosphere heat of 50°; but a large number of plants may be grown, by any careful person, with the most ordinary means, and without any bottom heat whatever.

Cuttings like company, to a most surprising extent; it is therefore best to crowd them closely in a box or pot, and fewer proportionately will fail than if they were wide apart. Perhaps this idea of mine is a superstition unworthy the pages of a prosaic Manual, but it has commended itself strongly in frequent experiments with soft-wood cuttings. We might add that when soft-wood cuttings appear to mould, drop their leaves, and rot, the air is too cold, and the soil too wet. Sometimes, if done at once, it saves a cutting to take it out, dry it a little while, make a fresh cut at the lower end, and try it again in a warmer place.

We give a partial list of house plants, which can be propagated without bottom heat, from soft-wood cuttings. The best seasons on this coast are either in April or May, before hot weather, or in early fall, although young and thrifty shoots are good at any season:

PLANTS EASILY GROWN FROM SOFT-WOOD CUTTINGS.

Amaranthus (tri-color),	Hydrangeas,
Ageratums,	Libonia Floribunda (sometimes called "Yellow Fuchsia"),
Begonias (tuberous rooted),	Myosotis (Forget-me-not),
Browallia,	Maurandya,
Coleus,	Pansies,
Cobea,	Petunias,
Cupheas,	Plumbago,
Eupatorium,	Salvias,
Geraniums, Zonale, Lilliputian,	Tradescantias,
Ivy-leaf (double, and tri-colors)	Tropæolums,
Hoya Carnosa, or Wax Plant,	Verbenas.
Habrothamnus,	
Heliotropes,	

Hard-wood cuttings are to be taken in the fall, and planted in the open ground, or in boxes. They should be from six inches to a foot in length, laid sloping, with two or three buds exposed, and packed closely. The earlier this is done the better will be the prospect of success. As soon as the leaves of deciduous shrubs have fallen the ground may be prepared, and cuttings planted. The use of a pair of shears, which pinch and mangle the wood at the lower end of the cutting, is greatly to be depreciated. Only a sharp knife ought to be used, and the cuttings ought never to be allowed to get dry for a moment. The soil for cuttings of this character ought to be a light, sandy loam. When the buds start, care must be taken not to rub them off; but when the plant is of good size all the branches but one may be cut off, and that one trained up to form a good head. We recommend great patience with hard-wood cuttings. Even though the top appears dead, do not despair, but think of all the plucky events of literature. We have known olive cuttings to remain in the ground, without a sign of life, for three years, at the end of which period they started into action, and astonished the beholders. Roses are grown in deep boxes of light soil, in pots, or in the open ground. Some kinds are very difficult to grow from cuttings, but most of them can be so grown. The oleander, and the well known lemon verberna, seem to require (like the olive) a very great quantity of water; in fact, a regular foot-bath, daily. A mulching of straw around the cuttings is in many cases of much service.

Another idea of value to people who wish to keep their gardens always renewed and full of shrubs, is to take hard-wood cuttings of any favorite shrub in fall or early winter, and plant them in little groups of half a dozen, where you want bushes to grow. Nothing imaginable can be much easier than to do this, and worry no further on the subject. But if, as spring advances, you find that several have grown, all except one can be removed or destroyed. Thus, in a rapid, lazy, and inexpensive way, you will be able to replace old, moss-grown and insect-covered shrubs with young and healthy ones; and anything of value once procured can be kept in the garden. *Ceanothus*, *Cestrum*, *Wigelia*, and

many other species, can easily be propagated by this grouping system.

Root-cuttings are almost the only method with some species. The efficacy of this kind of cutting is owing to the presence of small, dormant buds, along the roots, which, under favorable conditions will become sprouts, or "suckers." It is rather a dangerous tendency in a plant, if carried to an excess. Many of our most vicious and unendurable weeds are mainly troublesome on account of their root propagation. But some plants, by no means weeds, are best increased by this system. Of this class are the Bouvardias, whose clusters of waxen white, rose, crimson, or intense scarlet flowers, are so valuable for decoration; the chocolate-red flowered Calycanthus, or spice-wood; the winter-blooming dwarf and showy Japan quince; the large-flowered Anemone Japonica; some of the trees, as Paulonia Imperialis, and others. The roots may be sown on the surface of a box of sand, covered lightly, and kept moist and warm. It is customary to cut them into short pieces. After they have sprouted there will probably be a chance to make still further divisions, and obtain a plant from nearly every joint. Root-cuttings, when at all successful, are a wonderfully rapid method of procedure.

Leaf-cuttings, though of a narrow application, must ever awaken a strong sense of curiosity and interest. It is strange to reflect on that unity of parts in a plant whose leaf can root, form a stem, and so in time become competent to run its own establishment. Then, too, the multifarious ways in which different leaves do this deserves careful study. For instance, Bryophyllum Calycinum, a succulent and rapidly growing plant, has leaves which will root at the edge, and form numberless small plants. Some of the begonias have thick leaves which will form a root, and send a stem from the base of the old leaf-stem; the leaf then dies, and the new stem soon becomes a large plant. A cactus leaf buds from the end and becomes a part of the new plant. If space permitted, many curious examples of leaf propagation might be given.

Leaf-cuttings require much more attention, to prevent

“damping off,” than stem-cuttings do. Begonia leaves must be cut with half an inch of the stalk: sink this in pure sand, letting the leaf lie on the top, but slanting it a little, so that water will run off, and not rot the leaf. If leaves are scarce, the leading mid-rib may be cut in several places, when it is likely that a plant may be formed at each joint. Succulents, such as the Echeverias, Cacti, &c., should be well wilted in the sun for several days before they are put in the cutting box. Otherwise they will ignominiously decay.

With reference to cuttings of every kind, a few hints may be useful. An even temperature is very desirable; sudden changes are ruinous. The sand should be a little dry on top, but moist underneath. The leaves should not wilt, or the stems curl up. When a callus is formed on the end of the cutting the first step of the process is over; but wait until roots of half an inch in length are formed, and then pot the young plant off in a light sandy loam, shifting it as soon as it fills the pot, or planting it in the open ground.

Layers are a method of aiding Nature in the formation of a new plant, by bending down the lower limbs of a tree or shrub, and fastening in a little trench, cutting the limb nearly through, so that roots may more readily start. A piece of copper wire twisted around the limb is quite as useful in stopping the flow of sap, and aiding roots. We may suppose that the first savage gardener, in pre-historic times, were led to practice the art of layering by observing how often a sudden freshet along a river bank bends over some limb of a tree, twists and mangles it, piles silt and decayed leaves over it, and then retires, leaving the branch to root itself and grow vigorously, soon rivaling even its parent tree. To observations of this character, made in the wide field of Nature, it is probable that we owe the guiding principles of the art of gardening.

CHAPTER XII.

WINDOW PLANTS, HANG- ING BASKETS, AND FERNERIES.

Conservatory Gardens: The Highest Type.—A Love of Flowers in the Homes of the Poor.—How to Make Window-boxes.—What Plants to Use, and how to Take Care of them.—House Plants, for Winter and Summer.—Hanging Baskets, how to Make, and how to Keep in Order.—The Best Plants for Baskets.—Ferneries and Jardinieres: Treatment, and Suitable Plants.

PLANTS IN THE HOUSE.

IN our climate, all those fortunate people who have ground for an out-door garden, may well get along without the trouble and expense of a window-garden, which is at best only a substitute for the real thing. But many who live in cities have no garden room whatever, and so must cherish a few plants in window or conservatory.

In the conservatory, gardening becomes a romance, and is far removed from the common earth; plants are taken away when they fade, and others brought in; a fountain perhaps sings forever, in delicious iteration; gold fish swim in their crystal globe, under the shadow of lily leaves; birds twitter in satisfied content; bronze-winged butterflies pause on the changeful green of a broad banana—a contrast of color fit for

a watching artist: such is the highest type of house gardening. But still there may be more pathos about the stunted plants, in some wretched, sunless alley, cared for by a pale and dying child, or by a sad-faced and hopeless woman, to whom all her childhood's memories of woods and flowers must speak through the leaf of one geranium—the flower of one daisy.

Window gardening is one of the divine arts, and must have been invented for the sake of city dwellers, that they might in some degree learn to love Nature's grace and quiet delights. It is best to use a window with a southern or southeastern exposure, if possible, for only a limited range of plants succeed in the northern windows. A strong wooden box may be fastened securely to the window-sill outside, and filled with good rich earth, which may be had by mixing the sifted street sweepings, or the dust of a road, with half its weight of sand. The box will last much longer if it is lined with tin, making holes for drainage. The outside may be covered with rustic work, or with oilcloth, but the vines will soon hide it. Costly and beautiful window-boxes of earthenware, iron, and stained wood, may be bought, if desired.

Now, what shall we plant in our mute and empty box, so that it shall speak to us of cool woods and fragrance, of rest and patience? Well, first, is the box in the sun daily?—then we can have flowers, and brilliant markings on the leaves. If it is mainly in the shade we must have fewer flowers, and soberer colors. Second: is the box to be kept pretty dry, or reasonably moist, or very wet?—because in each separate case it will require an altogether different set of plants. In a shady place, the ferns, daisies, double violets, pansies, primulas, and *Tradescantias*, do well. The *Echeverias*, *Sedums*, and other succulents, prefer a dry, sunny place; and an *Agave* or *Yucca* may be used as a centre-piece. An investment of five cents in *Single Portulacca* seed, or, better yet, of fifteen cents in double seed, would fill a window-box with beauty and color all summer. In a reasonably moist box belong *Coleus* (if warm enough), *Zonale geraniums*, blue *lobelia edgings*, a *smilax*, to run on strings, and

net the window with its graceful loops. And, if we use Calla lilies, we shall find that they need quantities of water.

House plants may be kept in pots or boxes, placed on a shelf or table near the window, in a well aired room. The surface of the pots must be kept stirred, and free from weeds and moss. Give the plants a thorough watering, and then leave them until the surface looks dry again. Pick off the dead or decaying leaves, and the faded flowers; if mould appears, the place is too cold and damp; if the leaves curl and fall, it is too hot and dry. Pinch back the shoots of fuchsias, geraniums, coleus, &c., so as to keep them compact. Florists have a bad trick of running them up tall and slender so as to save room in the greenhouse; when you buy plants get stocky ones, with short joints, and dark leaves. Set the pots in saucers, and a little apart, so as to allow a free circulation of air. Turn the plants half way around every few days, or they will grow one-sided. Keep a saucer of wet sand on the window-sill, and start slips of your choicest plants.

If plants seem to do poorly, try the effect of warm water, night and morning. Wash the leaves occasionally with warm soap-suds. Little white scales often appear, as a result of ill health, and must be washed off with whale-oil soap. A quart of lime in eight or ten gallons of water will destroy the common angle worm, often so annoying in pots.

There are so many plants well adapted to house culture that it is hard to select the best. Two at least of the Abutilons, the *Boule de Nieve*, pure white, and *Mesopotamicum*, yellow and red, small leaves, are valuable. Most of the flowering begonias do well. *B. Fuchsoides* is perhaps the best to begin with. The *Begonia Rex* are grown chiefly for their foliage. *Crassula Cordata* is a good small succulent, which has white flowers in spikes. The *Epiphyllums*, or lobster-leaved cacti, are constant favorites. They require light soil, and a period of rest. The *Euonymus* will succeed at a north window, and the fuchsias only need a little sun, but easily become pot-bound. Among the best fuchsias will be found *Aurora*, *Beacon*, *Arabella Improved*, *Dictator*, *Gem*, *Princess Alice*, *Elm City*, *Double White*, *Tower of London*,

Roderick Dhu, Tribune, Maximum, and Vainquer De Puebla.

When we begin to consider the geraniums, they appear too numerous to mention; and hardly anyone really pretends to grow them all. Jean Sisley and Master Christine are two of the best Zonales. The doubles do well in boxes almost anywhere. The ivy-geraniums are unsurpassed for house culture, being valuable both for leaf and flower. Fairy Bells, with violet and white flowers; Diadem, deep crimson; Innocence, pure white; and L'Elegante, with dark leaves bordered with white—these are the best known. The Primulas, or Chinese primroses, do admirably in the house, and stay in bloom for months. Cinnerarias, taken from the greenhouse when just opening, are very satisfactory. The Smilax, and the *Lygodium Scandens*, or climbing fern, are of easy culture, and form graceful festoons. The wax plant (*Hoya Carnosa*), and the variegated English ivies, are good climbers for the house. The hybrid *Tropaeolums* have a rare brilliancy, and a heliotrope is never out of place.

HANGING BASKETS.

Not only the gardenless dwellers in cities, but also all flower lovers, everywhere, admit the expressiveness of a well arranged hanging basket. Indeed it is often the villagers and the country people with plenty of room for an out-door's garden, the busy farmers' wives, and the coquettish country maidens, who know how to improvise a basket and fill it with the most available plants, quite as well as their city relations. The wire of an old hoop-skirt, bent into a rude basket, lined with moss and planted with "Wandering Jew;" the rude box, covered with cones and bits of twisted root, half hidden by the leaves of German ivy; the log-cabin affair built up of sticks nailed together in rustic fashion, and filled with bright lobelia; even the scooped-out crown of a carrot, inverted, by the window, and kept full of water—these, although cheap and common, are none the less real forms of beauty, and lead

to better things. Whoever loves a flower has a daily teacher, persistent and kind.

The best baskets for general use are those made of wire, in rather close loops, and lined with moss. If you put the plants in yourself, arrange them first, grouping them over and over, until you are sure they will look well in the basket. Then take moss, in as large pieces as possible, dampen it, and press it firmly in the basket, leaving a hollow for the soil centre. The moss must not be over half an inch thick. Take rich earth, and press it in quite firmly, so that it will not wash out. Get the plants in with the earth, and leave the surface level. Cover it with moss, and soak the basket. Soak it whenever it seems dry, and sprinkle the moss often. In the earthenware and rustic pots you must see that there is enough drainage, which they often lack. In arranging a basket, do not fill it too full, but allow for the growth of the plants. Let them mingle and cluster as they will, only pinching off too vigorous shoots, now and then. Watch for weeds, which are often in the moss, and pull them up at once; but if you get bits of fern, which the mountain-moss often has, let them alone, and rejoice. The best time to start hanging baskets is with the first rains, hanging them out-doors, but bringing in when a frost is threatened.

The plants used in a basket must harmonize perfectly in form, proportion, leaf, stem, growth and blossom. Plants which look well enough side by side in the garden will not endure the closer companionship of the vase or basket. Every little weakness and coarse feature of a plant are revealed, and, it is fair to add, its latent possibilities of good, also. The variegated *Solanum*, and the *Tradescantias*, have much more brilliant leaves when used as trailers for a rather dry basket, than in any other position. We do not need uniformity in a basket, but a nice relative balance and harmony. One color in flowers is enough; or, if two are used, one of them must be white. In respect to leaves, beauty of form is better than beauty of color, though we may often combine both. If the central plant, which must be the largest, has branches of a drooping habit, as the *Begonia Fuchsoides*,

the same fountain-like plan may be carried out to the edge of the basket, with fine effect. When a plant with upright leaves is placed in the centre, the change from that to the trailers at the edge must not be too sudden, and plants of a half-drooping habit may make the transition.

A basket of eight inches in diameter may contain: *Begonia Fuchsoidea* Alba; pink *Primula*; *Eranthemum Argentea*, a handsome plant, with white on the leaves; and a vine of *Smilax*, of which three stems can be trained up the wires, and the rest brought around the edge of the basket, and allowed to trail over. Another combination will embrace *Coleus*, Ivy geranium (holly wreath), and a little *Saxifrage*. One *Yucca*, or *Dracena*, surrounded by variegated Ice Plant, interminged with blue *Lobelia*, makes a good basket for a sunny place. The *Yuccas*, *Agaves*, *Cacti*, *Echeverias*, *Sempervivums*, and in general, the plants known popularly as "succulents," are natives of dry and rocky regions—hence they are extremely useful for vases on the lawn, baskets on the porch, rockwork, and sloping beds. In places of comparative shade, the ferns, *mimulus*, pansies, violets, *Fragaria Indica* (a species of strawberry), and most of the Alpine plants, may be used.

Among the new plants, for baskets, the *Begonia Glauco-phyla Scandens*, a bright leaved trailer with panicles of salmon flowers, must take high rank. *Nertera Depressa*, a creeping plant with dark leaves and red berries, and also *Torrenia Asiatica*, having brilliant blue flowers, should be widely used. *Æschynanthus Zebrinus* grows about one foot high, has flowers of bright scarlet, and leaves of light green striped with dark, above, and crimson beneath. It requires light soil, and also grows on old stumps or roots. *Campsidium Filicifolium* is a new climber, with pale leaves, like the fronds of a fern.

WARDIAN CASES.

Wardian cases, jardinières, and ferneries, add much to the beauty of a parlor, or sitting-room, are more easily cared for

than plants in pots, or hanging baskets, and enable us to succeed with the denizens of the deep woods, and the tropic islands. Any receptacle to hold earth, covered with a closely fitting glass case, gives the essential warmth and moisture. The Wardian cases are shaped like a box, having glass top and sides and a wooden tray, lined with zinc. Any good carpenter can make one. The glass must be set in the frame without the use of putty. The jardinières have a circular base covered with a bell glass. Either form may be used for a fernery. Use light soil composed of sand mixed with leaf-mold; water when the plants are put in; close the glass, and only lift it when moisture accumulates on the inside. Watering need not be repeated oftener than once a month. Here, in your little glass case, you will have an epitome of the atmospheric changes going on about us: moisture rising, condensing, falling back in miniature rain; and so repeating the process forever.

The best plants we can find will be those which love moist and shady places. Dwellers in the forest or mountains need only take a trip along the nearest ravine to find little black-stemmed ferns, *Mimulus*, *Oxalis*, *Saxifrage*, our native *Anagallis*, and other inexpensive yet priceless plants. If we purchase cultivated plants, the *Begonia Rex*, with its numerous varieties of ornamental leaves, will deserve attention. The *Fittonias* are low plants with curious veined leaves, nutted with red, pink, or white. *Aspidistra Curida* has bright green leaves, and the odd habit of producing its flowers underground. The *Peperomias* have clusters of striped leaves. The *Lycopodiums* are charming in form and color. Ferns, also—teachers of beauty in form, possessors of grace untold, cherished darlings of nature and of poetry—are the chief dependence of our moist Wardian cases. *Adiatum Cuneatum*; *A. Pubescens*, and *A. Pedatum*; *Pteris Macrophylla*, and *P. Serrulata*; the *Lastreas* and the *Gymnogrammas*, are all desirable. These are pretty hard names; but fortunately names are the only hard thing about ferns, which only need shade and moisture to grow delightfully. The *Adiatums* are called, popularly, “Maiden Hair Ferns,” and there are many species,

and some natives, worth cultivating. Search the ravines in spring; wander along the water-courses; go and see what ferns grow by the margin of the spring. If you cannot afford to buy costly exotic ferns, depend entirely on our wild species. Even if you have the greenhouse and window-garden varieties, do not neglect the mountains, or the mountain ferns. Whoever searches for ferns finds out the secrets of Nature, and acquires the peacefulness of pleasant places, where there is never any fret or jar, and where the tired wayfarer may gather new strength for earth's many toils.

CHAPTER XIII.

A SMALL GREENHOUSE.

The Comfort of having a little Greenhouse.—Early Enthusiasm.—Changeableness of many Greenhouse Owners.—Their Frequent Failures.—The Mournful Tale of a Friend.—The First Rule is not to Grow too many Kinds.—The Second Rule is to give Constant Attention.—Liquid Manure.—Potting Plants.—Watering.—Hanging Baskets.—Autumn Work.—A Digression concerning Mangoes.—Begonias.—Other Greenhouse Plants.

IN our climate, where no artificial heat is needed in winter, a small greenhouse or conservatory might be made an adjunct to all lovers of flowers, furnishing a constant variety of leaf and blossom. Many things which we cannot safely leave out of doors all winter, can be potted and brought in. We may grow Camellias, Azaleas, Primulas, Cyclamens, Cinnerarias; vines innumerable; the tuberous Begonias; Coleuses; even, as we feel on firmer footing, and begin to know plants better, the grand spotted Caladiums, the Gloxinias, and the Calceolarias. We may start all our seeds in safety and comfort, stock our garden, and supply our neighbors occasionally.

The ardent lover of flowers, who has, after months of contriving, built his own conservatory, and is beginning to stock it, wanders about, on rare plants intent, visiting his amateur

neighbors and the nearest nurseries, questioning and taking copious notes with a new and laudable enthusiasm. A greenhouse in the New England States means a much greater expense, and probably yields a much greater pleasure than here. Still the latent possibilities of a greenhouse, even here, are wonderful. The owner thereof may luxuriate in tropic fruits, and grapes out of due season, or he may revel in masses of bloom, vines of the sunny islands, orchids of equatorial forests, gorgeous exotics whose radiant colors seem to flash and move as the living hues of some unresting bird of Paradise; or he may, in some quieter mood, despise the sensuous attractions of color, and hide his fancies in wildernesses of ferns, beneath leaves drooping and fronded, leaves of untold variety and endless beauty.

Some of the happy owners of a few square feet of glass, are, under the varied attractions of many classes of plants, everything by turns, and nothing long. With each revolving year their small greenhouses suffer marvelous changes. At one time this hobby of theirs is called "cacti"—a hobby of wrinkles and innumerable thorns, spines, and bristles; of long months of silence and quiescence, then of sudden, irrepressible brilliancy and warm, scentless color. At another time, the dynasty of the cacti having been dethroned, azaleas, and their neighbors among the hard-wooded shrubs, become dominant in our imaginary greenhouse. Instead of growing larger, the azaleas, after one or two seasons, begin to lessen materially; hopes of rivaling the grand specimens of English conservatories slowly perish; there are dead azaleas somewhere, and a new king begins to reign. Now all this is well enough so long as people fancy it. To buy unsuitable plants, or plants whose treatment you do not understand, is a profitable affair for the nurseryman, and an interesting process for the owner, whose greenhouse, unless he is careful, will soon assume the proportions of a surprisingly portly elephant on his hands.

Said a brisk friend of mine, lately, surveying his scantily filled greenhouse of eight by fourteen feet dimensions:

"That is a pretty, a very pretty glass house. But I can't

keep anything alive very long. Some things kick once, and then go; others stagger along under their many infirmities until a kind Providence ends the struggle."

"What have you bought and tried here?" I asked, as I surveyed the dusty benches, the moss-covered pots, the fallen leaves, the air of helpless innocency expressed.

"Everything," said my friend, with an inimitable mixture of sigh, look, shrug, and intonation. "Everything to be bought, begged or stolen. I've ravaged the florist establishments, the nurserymen know my steps—and I know their bills. I don't blame them. I seemed to have good plants. But, as I once heard an old fellow remark, 'Pears like I doan't hev no kind o' luck in this here transaction.'"

So we looked into matters. We found that my friend was trying to raise too many kinds of plants in one greenhouse; for, as a matter of course, plants which must have different degrees of heat cannot possibly be well grown in the same room. Just here is the primary need of successful greenhouse work. Everything cannot be grown in one house, though a great many widely differing plants may be kept a short time in the same greenhouse. Florists give the different classes of plants a different treatment, and, when possible, a separate house. Amateurs must take a leaf from their book, and try to grow plants according to divisions made, not botanically, but on the basis of the degree of heat required for healthy growth. Some one plant must be taken as the standard in each small greenhouse, and the conditions studied until that plant grows well; then other plants of similar habits may one by one be added until the benches are full of healthy plants.

Then, when one class of plants is decided upon, it is folly to change the type too often. If there is to the rightly balanced mind any pure delight, it is to slowly but surely obtain those lasting plants which, when once obtained, will improve for a term of years, and which everybody does not have. If fuchsias are chosen (and fuchsias possess many charms for a small greenhouse), there is much pleasure in obtaining all the new varieties, in treating them so as to have

a succession of bloom, and in experimenting with seedlings, and other novelties. If Caladiums, Crotons, and stove plants form the basis, a more tropical display will be possible, and much closer attention will be needed. If orchidaceous plants are predominant, few others will thrive; and if the evergreen shrubs form the type they will need a distinct treatment.

The "secret of secrets," is constant attention. Twenty times a day the florist is in and out of his greenhouse, watching the condition of his plants, changing the temperature, moving pots, shading seeds, and studying the laws of germination and growth. It is this continual presence of some one which has much to do with the care of plants; and this explains the success of many ladies. We have known garden-loving ladies in whose hands were magic—for whom Coleuses came true, seeds always germinated, and healthy plants, laden with abundant bloom, crowned their efforts. The owner of a small greenhouse should visit it daily, at least; five minutes twice a day is far better than five hours weekly. There will be some plant to train or trim, water, or re-pot. A greenhouse gives endless occupation.

Liquid manure is good for plants in pots, if it is properly diluted. Palms, and most tropical plants, can hardly have too much. When the surface of a pot becomes covered with a green moss it has had too much water, and must be stirred up, and allowed to dry some. Frequent stirring of the soil in pots is of great benefit. The question of how much water a plant will stand is a very critical one. When the soil looks white on the top, and feels dry, soak that pot. The first rule is—don't water too often. The second rule is—don't even sprinkle merely, but wet thoroughly. On these two precepts hang theory and practice. In the course of time a person becomes able to tell from the color of a plant's leaves whether its water supply is properly regulated. Some plants, as the Hydrangeas, can stand almost an unlimited amount.

When the roots grow through it is well to turn the plant out, and, if the pot is full of roots, it will need re-potting, in a pot only one size larger. It is quite an enterprise to get suitable potting-earth. Ordinary soil will not do without

adding other substances. A good sandy loam is a satisfactory basis; to this add leaf-mold, or well decayed straw, or rotted sods, and mix them thoroughly. Burnt earth from a fire, or an old kiln, is of much value for potting. If the soil is stiff, sand must be added. A pile of clean, sharp sand is an essential adjunct of every greenhouse. In potting, as in other horticultural work, it will often happen that seemingly small causes greatly vary the results. Very much often depends on the amount of pressure given to the soil. Some things require tight potting, laugh at and enjoy it. Others are impatient of more than a tap on the bench to settle the earth around the roots. The *Pelargoniums* like close work; the ferns, *Mimulus*, &c., should be potted loosely. This is one of the things "no fellow can find out," without experience. In re-potting, never wait till the roots are hard and woody. Let them be well matted, but soft, or the knife will have to be used, to start a healthy growth. Watch fuchsias, and re-pot them frequently, or they will not bloom freely. In potting, the soil needs to be pressed closely to the roots of the plant. Some plants will move or re-pot with much greater ease than others. A stiff and spiny cactus, for instance, is a ferocious and often tearful thing to handle. Then the largest pot seems inadequate, and the spiciest language weak.

The plants should be as close as possible to the glass, and occasionally turned about, to keep them growing straight. In a conservatory, a new grouping, almost daily, is possible. To have a plant in a pot is to have a movable piece of outdoors; and consequently few combinations are possible. This is true, to a peculiar degree, of the arrangement of hanging baskets. The variety of possible effects is truly wonderful. Your basket may be simple or profuse, modest or gorgeous, subdued or overwhelming. It is a good plan to select the plants needed, take them to the potting-bench, and then group them until the desired effect is produced. It is unpleasant, or mildly absurd, to have too many colors or styles of foliage mingled in the same basket. We should choose some one thing to give the needed impression, and let the

rest become subordinate. Now and then we may find a basket in which the art is hidden. It is a bit of Nature, full of simplicity. A hand's breadth will cover it, and yet there seem to be cool depths where fancies wander with idleness and sweet content; where it is as a fragment of the deepest ravines, cool, and full of quietness. Such a basket was planned by some one in a mood of happiness, and willing Nature seconded his thought.

In the autumn months the owner of a small greenhouse must sow seeds of annuals for winter-blooming. Without proper forethought there will come a most dismal and blossomless time—later. A great many seeds, particularly of the perennials, seem to do much better if sown in the autumn days, or in late summer. The conservatory is a place where very entrancing experiments with seeds and plant-growth may be made. To obtain seeds from some unpronounceable province of earth; to study their peculiarities of germination, and to watch their progress, are all extremely pleasant things. Yet unpleasant recollections will occasionally cling to some of a person's first seed experiments.

Not long ago I noticed that the earth in a certain pot was cracking, and a pair of dark green stems were mounting towards the light. And this is the story thereof:

From boyhood my dreams have clung about the tropics, with their mellow skies, placid seas, and coral isles; their gorgeous birds, deadly reptiles, savage animals, quivering volcanic mountains; but, most of all, their strange spotted orchids, fruits of unknown but doubtless delicious flavor, and forests wierd, tangled, full of voices continually. My earlier two-bit pieces of childhood were spent in making surreptitious purchases of supposedly choice tropical fruits. A stale pine-apple, a spoilt cocoanut, and a speckled banana, are grewsome remembrances, and shook my faith in desert-island romances. Only last summer a smooth-faced Italian dealer sat behind a box of yellow, bean-shaped fruit, which he volubly explained to the passers by—were genuine Isthmus mangoes. Now, mangoes and mangroves were rather confused in my earlier fancies; I had a dim idea that oysters

clung to the twisted roots, and fruit of Sybaritic flavor grew among the glossy leaves. So I yielded to the voice of the charmer; I bought—I am ashamed to say how many; I walked down the street with an air of superiority to the common herd, none of whom had genuine mangoes; I went on the ferry-boat, and sought a secluded corner. It is quite impossible to speak of what followed. The taste and smell of turpentine and other vicious drugs are concentrated in the mango. It is not an advisable article of food. I have since learned that it should be peeled, and dropped into fresh water, to remove these flavors; but on this occasion I dropped them into salt water immediately, reserving only two for planting. They came up soon, have grown thriftily, and are so ornamental, that I have forgiven them. Thus endeth this lengthy digression, the moral of which is that it is well to own a small greenhouse, or a wee conservatory corner—for otherwise this mango speculation would have been a total loss.

A greenhouse might be made very beautiful by calling it a “*Begoniarum*,” and proceeding to collect each and every species and hybrid obtainable. Begonias are the most refined of plants, and vary greatly in leaf and flower. No other one class of soft-wooded plants presents greater attractions. We mention *Begonia Weltoniensis*, a summer bloomer; *B. Palmata*; *B. Picta*; *B. Glaucophylla Scandens*, a fine trailer; *B. Fuchsoides*, an old favorite; *B. Semperflorens*, excellent for baskets; *B. Odorata*, with large, white flowers; the foliage, or *Rex Begonias*, and the large-flowered, tuberous-rooted section embracing many shades and colors.

Among hard-wooded shrubs we would mention *Daphne Odorata*, and *D. Rubra*; *Dracæna Ferrea*, *Tri-color*, and *Indivisa*; the *Ericas*, or *Heaths*; the *Bouvardias*—white, pink, rose-colored, and scarlet. Soft-wooded plants, of value, are—*Cinnerarias*; *Cupheas*; *Justicias*; *Primula Sinensis*, both single and double; winter-blooming carnations; *Cereus Grandiflorum*; *Echino-cacti*; *Epiphyllums*; *Sempervivums*; *Crassulas*, and other succulents. A few hyacinths, *Amaryllises*, *Cyclamens*, *Tropæum*, *Tri-colorum*, and *T.*

Pentaphragm bulbs, may easily be grown. Ferns may fill up the shady corners; vines of Passifloras, Hoya Carnosa, Maurandias, &c., may cover each pillar and wall; Lycopodiums may carpet the ground. After all, much variety is possible, with due care and attention to details, and personal interest in the work.

CHAPTER XIV.

OUR HORTICULTURAL FUTURE.

Enthusiasm in some Degree Pardonable.—Our Latent Resources.—We need not Despond.—The Wide Meaning of Horticulture.—The Impression which a Florist's Establishment would make on a Savage.—Horticultural Development of the last Half Century.—Its Refining Influence.—This is an Age of Homes.—The Work of Botanist and Nurseryman.—New Plants to be Discovered.—The Gradual Increase of Horticultural Sentiments.—What America may Become.—The New Eden.—What is Possible here in California.

ENTHUSIASM is the birthright of youth, and of young communities. Hopefulness is its own best reason. It may be that Californians have too much self-confidence, and too precise an acquaintanceship with the mouthpieces of metaphorical trumpets; but yet none of all our visitors have ever pictured in too glowing colors the vast undeveloped resources of these Pacific States. It is true that many have written too hastily, or are influenced by personal considerations; but on the whole the record of our visitors is a good one, and the lapse of time will doubtless fulfil every prognostication. If it is, on the one hand, true that the greater portion of the surface of our State is mountainous, and much of it forever unfit for the plow, it is also, on the other hand, equally true that our arable lands are surpassed in fertility by none

others in the world. This, taken in connection with our mines of precious metals and other minerals, our miles of durable pastures, our yet untouched forests, and, more than all, our immense water privileges, and possibilities of irrigation, must encourage every toiler to lay broad and deep foundations for the days that are most assuredly coming—the days of a vast and thriving population. Our cities shall be manufacturing and commercial centres, yet not overgrown, but fed and sustained by lesser towns, villages, farms, and countless other industries.

Too many people amuse themselves, in these days, by gloomy prognostications of our political and industrial future; we have too many prophets of evil and voices of despair; it is time for a brighter gospel, a more hopeful vision. Whilst we recognize the fact that this age, like all that have preceded it, has its own mighty problems to solve, its own path to hew, let us gladly meet them with faith and courage. The mission of the Anglo-Saxon race is not yet accomplished; hardly is it fully begun. If there be any such thing as “The genius of the American people,” a phrase which public speakers delight to apply on all possible occasions, it is chiefly manifested in our capacity for developing a new country. We hate to see lands uncultivated—mines unworked. We praise the man who plants orchards, vineyards, shade-trees, shrubberies, lawns, gardens, hedges, and small fruits. And here in California, we perceive, though as yet dimly, that in these directions, and not in unparalleled wheat-fields, must hereafter lie our greatest prosperity.

Horticulture is a very comprehensive term. It has to do with trees for use, and for ornament; with the study and cultivation of every plant that grows; with the work of nurseryman, orchardist, farmer; it desires a knowledge of plant-diseases, and of their remedies; it is commercial and practical; it is also loved for its own sake alone; it is the delight of children, and the comfort of many a man's declining years.

If one of Stanley's African kings were to be taken through one of our large cities, from one point to another of interest, he would find few things so utterly incomprehensible from

his standpoint, as a large commercial nursery, with its green-houses, flowering plants, seeds, bulbs, and long rows of carefully labeled trees. We may believe that he would soon begin to understand that brick blocks were for business, and costly palaces for shelter and pleasure; that railroads and steamboats were for travel; that booming cannon and long lines of soldiery meant defence; that smoky manufactories, and the clang of hammers in countless foundries were an essential part of the complex life around him. But he would almost certainly fail to comprehend the reason and utility of growing thousands of plants of no visible value for food, clothing or fuel. It might indeed be possible that the sudden sight of a radiant *Azalea Van Houttii*, in full bloom, or of a snowy *Espiritu Santo* flower, with its wonderful hidden bird, might move him to realize, by a sudden thrill of nature, that the love of these things showed greater advancement and gave a purer delight to the possessors than did the miles of marble palaces and glittering shop-windows. But if ever our imaginary visitor from savage Africa grew to appreciate beauty of form, of fragrance, of growth, of singularity, of simplicity, of color—which abide more or less in each royal flower, he would be very far advanced towards the complete comprehension of our complex fabric of civilization, and might be shown our works of art and precious memorials of the past.

Indeed I know of nothing else, unless it be the modern newspaper, which has been so much the creation of the past fifty years as has this wonderful horticultural development. A few centuries ago ambassadors from countries whose doors were locked against plain merchants and untitled travelers, took gifts of their native plants, and laid them before proud and selfish kings, who planted them in royal gardens, where proud nobles and worthless courtiers might wander; but the middle and lower classes were shut out ruthlessly by walls, and uniformed guards. Through war and revolution, political change and industrial growth, the love of gardens, trees, and flowers broadened slowly until it was a heritage of no single class, but of the whole people. The pleasure

gardens of royalty became popular resorts of merchants and tradesmen; the love of horticulture extended from the palace to the cottage; men drew nearer to the heart of Nature, and that ever faithful breast revived them.

It has become the peculiar glory of our age that a man's home is safer than ever before: loving it more, he beautifies it more, and that beauty re-acts upon his mind, giving him purity, happiness, simplicity of feeling, and delight in the secrets of growth and growing things. Thus the tendency of every successive age of peace is towards a fuller development of horticulture, which is, of all human pursuits, endless in its hopes and swift in its progress. Where, half a century ago, there were but a few botanists exploring the new floras of China, South America, and Mexico, there are now educated men in every region of the earth whose lives are devoted to the discovery and dissemination of new plants; there are even nurseries which send out private collectors, for the commercial value of a new plant is often considerable. The rarer orchids of the tropics, the tuberous-rooted begonias, the lilies and foliage plants of Japan,—these, and many others, have paid their discoverers and propagators large sums.

Now, this process of discovery is to continue until every plant is found, classified, tested, and made use of for food, shelter, timber, ornament, or medicine. Emerson says a weed is only a plant whose virtues are not yet known. We may hope eventually to find a reason for the existence of every plant. Nor will this be a light or simple task. Even in our State the labor of local and foreign botanists has by no means exhausted the field, and we may look for many more discoveries. When we consider the vastness of the new field of Central Africa, where whole unrecorded families, and certainly new species, may be expected, and also add the slightly explored regions of Asia and South America, we shall begin in some degree to appreciate the task of mere discovery. There are also continent-like islands, such as Borneo, and New Guinea, whose flora lies almost unrevealed. There may well be new fruits of richest flavor. plants of undescribed

peculiarities, flowers of strange and wonderful hues and fragrance, to reward the daring explorer, and the anxious nurseryman. Then, when these plants are found and classified, the work of the microscopist and vegetable physiologist begins, the chemist brings his agencies to bear, and perhaps a new dye, which saves thousands of dollars—or a new drug, which saves thousands of lives—is discovered, and the wild flower becomes an ally of civilization.

Long before this, however, will begin the commercial task of scattering newly discovered flowers all over the land. If once a sufficient demand is awakened, our rarest and costliest plants, as the Camellias, Rhododendrons, &c., will in time be brought within the reach of every purse; a new flower found at the Antipodes will flash, the next season, in thousands of gardens. The growth of the larger nurseries in England and the United States is a constant marvel. Sales that less than fifty years ago were counted by the hundreds, now are reckoned by the ten thousands. Communities where no trees were planted then, now support half a dozen nurseries. The printing, engraving, and colored plates used by seedsmen and plant dealers, the tons of catalogues sent out, the use of express and mail facilities—all these mark the growth of a vast business as yet comparatively in its infancy. When Downing began his "Horticulturist," it had a slow, long fight, to win support; now we have several monthly and weekly horticultural journals, whilst the religious and literary and political press of the land finds it advantageous to devote a portion of their space to a weekly department of agriculture and horticulture. There is yet much to do, but beyond a doubt public interest is awakened in these directions. To cultivate flowers is no longer a merely feminine pursuit; not to love them is a sad weakness and loss, instead of being something manly. We begin to realize, some of us at least, that life is short, failures common, success too often embittered, public life full of hidden stings; but that to improve a single acre of naked earth, covering it with bloom and foliage, is something tangible, is more enduring than marble, is a blessing for children's children.

Our aim is to make America what England has become by her steady, peaceful years of horticultural pursuits, and the kindred arts of civilization. We do not propose to have a servile imitation of her yew-groves, and hedges of hawthorn; we will use our native plants and trees, and only those foreigners which prove themselves adapted to our climate. New England shall be New England still—land of trailing Arbutus, ferns, water-lilies, lilacs; the opulent Middle States, the empire-like West, the sunny, awakening South, our own varied slopes of coast range and sierras—each and all shall, we hope, be individual, and therefore artistic. It is the refinement which comes from a national love of flowers, the simplicity which is fostered in rural homes, the comfort and quietude of horticultural pursuits—that restless America needs, most of all regions under the sun. Art, Science, and Literature, shall build up a strong, patient, and benign race, if only we sufficiently love the friendly earth, and follow the pursuits of the soil, living close to Nature, as out-door loving men and women. The little children shall have gardens, to them mysterious treasure-houses; the earliest work of our schools shall be the study of plant-growth and botany; tired people shall, let us hope, learn to ramble, every year, in ravine and forest, and find renewed health in the presence of the wonderful mountains.

The poets' Golden Age is lost from sight in the mists of Fable, and hid by centuries of war and crime; but the Age of Ages, the Song of Songs lies before us, brought nearer by each changeful year. The world, which began with a Garden of Eden, shall complete the cycle, and come once more to a garden as fair as that lost, angel-guarded beauty. Nations, it may be, shall yet unite their wealth and energy to reclaim the historic deserts of Asia, to re-plant the treeless wastes, to revive the dead rivers and re-build the fallen cities of the East.

Here, in California, we too have deserts to plant with palms, and naked mountains to plant with cypress and pine. There are swamps and malarial regions to be reclaimed with Eucalyptus, and red lands to be covered with orchards and

vineyards. There is room for many more homes, and industries in drying, canning, or preserving fruits. Our most fertile valleys must sustain a much greater proportion, and in the course of time become beautiful beyond expression, with the rarest fruits, flowers, and shrubs of every land; with oranges and magnolias, Japanese foliage plants, South African succulents, begonias from the Andes, cacti from Mexico. Tea experiments, coffee trials, persimmon investments, and similar efforts, are to go on until each locality knows its best crop. Wheat-culture will in a measure pass to newer States and virgin soil, and the sceptre of grain will leave our hands. Our large ranches will be divided up, and we shall enter upon a period of unclouded prosperity, founded on diversified interests, and the highest development of horticulture in all its branches. We shall perfect a State system of irrigation, reclaim our tule lands, and utilize many of our mountain slopes. Strangers will come to visit us, and gladly stay to assist our development.

To this future, then, we look; and southern Europe is in many respects our type and example. Whatever Greece, Italy, and Spain, were in their noblest days, that we also hope to become, except that, as our facilities are greater, so our mingling of the beauties of a world may be greater. A cosmopolitan people, not narrow nor prejudiced; strong, earnest, truthful, original; state-builders, home-lovers, believers in education, full of Nature's naturalness: this is that end to which we of a ruder, more foolish age must toil, setting our faces towards the morning. Our State is not a tent of the Saxon race, pitched hastily by this western ocean, but a temple rising in the sight of all men. It is not yet finished; but the pioneers of '49 hewed monolithic stones, fit for a new Temple of the Sun. And here the great of after days shall worship, when, ages hence, the story we are now beginning shall be continued in the deeds of our children; when our ancestral oaks, now only just planted, shall become hoary monarchs tottering to their fall; when the new walls of our young University shall be as gray and venerable as classic Oxford. Let us patiently do the work of to-day, so that our

rude beginnings shall not be useless, but linked with past and future. If only we do our part, these rivers and lakes, the beautiful bay of San Francisco, the lonely cliffs, and the pallid snow-peaks, shall one and all become classic ground. It is man's labor, and the heroic deeds of men, which put a new and more divine seal to Nature's fairest scenes. Mount Shasta, in its translucent majesty, shall out-rival Mont Blanc; our Sierras shall awaken more noble poems than Alps or Appenines. So these western shores shall become the lands of cultured groves and dreaming gardens and horticultural triumphs, linked closely with Art, Literature, and the outdoor pursuits of a powerful, yet refined race.

“O fair young land, the proudest far
Of which the western world can boast;
Whose guardian planet, evening's silver star,
Illumes her golden coast.”

CHAPTER XV.

HOMES, AND HOME LIFE.

The Central Thought of this Book.—For the Sake of our Children we should have Beautiful Homes.—The Barrenness of too many Farm-houses.—The First Necessity of a Home.—Woman's Work in the Garden.—Books: their Value.—How to Buy Books.—Books of Reference.—Books for a Family Library.—Newspapers.—Pictures, and Picture Frames.—The Expense of Home Adornment Considered.—A Plea in its Behalf.

IF there be in this unpretentious volume, which I have written during the intervals of farm-work, any connecting link which runs from chapter to chapter, any central thought found everywhere as a bond of union, any strong motive which gives these rambling essays the effect and meaning of a homogeneous whole, it can be none other than this—to honor the home and its surroundings, and to teach people how to improve them. These rural essays are successive sermons on the pleasures inherent in tree-shelter, flower-fragrance, vines, hedges, masses of color, Alpine gardens, and the other arts which pertain to the adornment of home. No subject should be nearer than this to the hearts of the people; the homes we make decide in a large measure the destinies of our children; if we crown them with love, and bower them in beauty, the next generation will be manly, womanly, pure, and healthful. The hopes, fears, and labors

of each generation are largely bound up in the next. Parents worthy of the name will plan, toil, save every dollar, and deny themselves needed comforts, for the sake of their children's future advancement.

But parents commit a sad and almost remediless error when they, as so often, bring up their children in bookless, pictureless homes. A forlorn looking house, with dusty grain-fields sweeping to the very door, no orchard or garden anywhere, no picturesque porches or balconies, is not apt to be very dear to the memories of after years. It does not take much money to brighten home, but it does take patience and forethought. A few books of permanent value—the masterpieces of English literature; a few engravings of pure outline and refined beauty which shall daily refine the children's faces; a few papers of good morals and practical ability; a bit of color here, a home-made bracket there, an air of neatness everywhere—are these costly requirements? In this age of toil, ambition, and wealth-getting, we cannot too strongly emphasise the fact that it is not sufficient for a man to feed, clothe, and technically educate his family. He must in some way have links to bind their hearts to the paternal acres, and to the family calling; gardens, shrubberies, clinging vines, pictures, low voices of loving parents—these shall far outbid the attractions of saloons, billiard-tables, races, and licentiousness. Your sons, under home influences, shall become truth-loving, sinewy men; your daughters shall be fair and stately women; unsullied names shall be theirs, and lives of sweetness and rare simplicity.

Only those who have travelled over the length and breadth of California know how far from this ideal picture is the average farm-house. It is true we have often been happily surprised at the refinement, and knowledge of Art and Literature, manifested by dwellers in lonely mining cabins above the roaring Trinity, or on the upper Sacramento. Still, in numberless instances, we have seen where Nature had done all she could for the surroundings, and careless men had done absolutely nothing. It is within the power of every man to brighten his home, no matter how poor or rude are the surroundings.

The first necessity, whether a house is perched on some lonely peak, or hid in a deep canyon, or set on a wide, treeless, dusty plain, is to fence in a little space around it, so that the cattle-yard shall not extend quite to the door-step. In too many cases owners of large ranches will have cattle, sheep, and hogs lying at the very door. This is defended as a convenience, whereas it is the costliest of nuisances. A little orchard, a vegetable garden, a few hardy shrubs, a rose climbing over a porch, some grape-vines, a patch of strawberries—all solid and tangible comforts, might so easily be secured, if only the little fence were built. Even in localities called barren, much may be done by continually stirring the surface. We have seen vegetables of the finest quality, which were grown on uplands, without irrigation. Fruit trees, well planted and mulched, need little further care. And as for flowers, just give the ladies of the family a dollar or so to send for flower-seeds, and they will inevitably have a garden. If women ever do get the upper hand in this world, I fancy it will be a good time for flower-planting, and the chances are that they will quite usurp the occupations of florist and seedsman. In these days our girls mostly think they must, in order to remain respectable, teach school, or teach music, or write poetry, or read proof, or get a place in the Mint, or sell silks, or set type; but we wish they could believe that gardening, and flower-growing, fruit-gathering, and green-house work, were quite as fitting, more healthful, and pleasanter. Shall ever our autumnal vintages be gathered, not by alien hands, but by our own cheerful youths and laughing maidens? For women, as for men, the out-door life is a constant blessing; this climate of ours, so benignant in its gifts, would make us new children of the summer; our hills are the hills of Palestine, our valleys are the vales of Thessaly.

If a man would have his home-life profitable he must have some books. A well selected small library is a safeguard against evil, and a constant refining influence; its practical value in showing how to economize or make money, is undoubted; and no other single element so enforces and

justifies parental teachings. In selecting books for a library, the books sold by travelling agents should always be viewed with caution. They are, as a rule, expensive works, written by second-class men, large print, poor paper, wide margins, and in all respects far below the books which can be obtained at the same price from a reliable book-store. We do not question that some well written books, and some of rare value, have occasionally been published on the subscription plan; but the exceptions prove the rule. It is well, therefore, to buy subscription books with great caution; no respectable working library can be made up of them alone; nor one of them, unless it be Stanley's "Across the Dark Continent," has ever reached the dignity of a classic. The best way to procure books is to write to any book-seller or publisher in San Francisco, or any other large city, enclosing a stamp, and asking for a catalogue of books. When received, make your selection, and the books will be sent by mail, or C. O. D. Persons spending twenty-five or fifty dollars at a time will get quite a desirable discount from any reliable firm.

Let us see what we most require. The model library must have some weight; it must be an authority in the home. We must not have dull books, written by men who did not die soon enough, nor works of mock-sentimentalists, nor controversial books, nor systems of theology; but those works, of a practical order, in which the latest and best information is to be found. Briefly, the first needs of a library are a Webster's Unabridged Dictionary, a Cyclopædia, either Johnson's or Appleton's, and a large Atlas. These are somewhat expensive, but they may be purchased by monthly installments, and are of themselves a library, whilst no assemblage of books without them is entitled to that name. Next, there might well be an illustrated work on botany, one on geology, some of the Science primers, Tyndall's "Forms of Water," Faraday's "Chemistry of a Candle," "Orton's Zoology," "Newcomb's Astronomy," and similar books.

This model library, however, is not only to be a reference and authority, but also a sweet, refining influence. It must

contain what a recent writer calls "the might and mirth of literature." It must hold the highest thoughts of men, and their utmost expression. If to those children whose horizons are as yet narrow, and whose futures are as yet problematic, some of that broader intellectual light which is the age's dower can be given—it may be that the revelation will last, and brighten their lives, making them better wives and husbands, better women and men. Herein is the true joy and worth of books; that they speak, deny, rejoice, awaken, sympathize with our moods, change the currents of lives—are engines mightiest of all that men have contrived. This library of ours must be heedfully chosen, with books for every age. For the youngest of the family there are the "Seven little Sisters," the Prudy books, the Ainslee stories, The Bodleys on Wheels, the bound volumes of the Nursery, and, for young and old alike, the volumes of St. Nicholas. The older boys and girls may have Paul and Virginia, Undine, The Ancient Mariner, Plutarch's Lives, Tom Brown at Rugby, Little Women, Hale's "Ten Times One is Ten," and Kingsley's "Westward Ho," the noblest of his works. History is of great importance. Green's "Shorter History of the English People, is the best family history for the period of which it treats. The small volumes of the "Epochs of History" series may be depended upon. Gibbon, Macaulay, Prescott's Mexico and Peru, Motley's "Rise of the Dutch Republic," Buckle's History of Civilization, and Freeman's Norman Conquest, are works of fascinating interest. American history is told in the pages of Bancroft, Parkman, Draper, and Greeley. Among standard and collected works it is well to at first select only the best examples of each author's style. Bacon's Essays, Dickens' David Copperfield, Irving's Knickerbocker, a volume of Emerson's, of Hawthorne's, of Macdonald's, of De Quincey's, Shakespeare, Tennyson, Longfellow, Whittier,—in some such way the choice should be made. A library thus chosen, and faithfully used as a part of the home-life of every farmer, will educate his children to be men and women full of power, dignity, freedom and expression, conversant with the leading events of history,

lovers of pure literature, and, above all, honest, independent thinkers.

The newspapers and monthlies which come into the family circle are of almost as much importance as the books in the library. No man is in any wise excusable for a lack of knowledge of the events and thoughts of the living present. No person who does not read the daily newspaper is fit for self-government. A school-teacher, going into a new district, can, within three hours, pick out the children whose parents read newspapers, and read them in the family. Such children are brighter, less liable to be puzzled, have more general information, and study better than those from homes where no dailies or weeklies are taken. It is true, however, that newspapers are only a supplement of hard study. The knowledge they give is necessarily fragmentary. The daily paper must be read with dictionary, atlas, and cyclopædia, close at hand. I am persuaded that the average farmer can afford to take one daily paper, his local weekly, a weekly or monthly devoted to agriculture and horticulture, and one good literary monthly, like Scribner's or Harper's—these four, at least; and at the end of each year, his monthly should be neatly bound and put in his library.

Pictures enliven the rudest cabin, and cheer the lowliest home. If only every child could live, from the days of infancy, in the presence of noble pictures! Pictures of very great educational value can be procured at a slight expense—the mere pictures, without frames, I mean. There are engravings, “Night,” and “Morning,” “The Huguenot Lovers,” faces of Elaine and Evangeline landscapes, engraved from the greatest of artists, animals of Landseer and Rosa Bonheur. There are chromos of Prang's, and there are cheap chromos, of which the less said the better. A good engraving is infinitely the best. Then, as regards the framing, let the boys have a good bracket-saw, and some cheap moulding; let them try rustic frames, and carved ones; it will not be long before every picture is framed with a skill which is nearly professional.

DRIED FLOWERS, AND GRASSES, FOR DECORATION.

But we may decorate our parlors, sitting-rooms, and halls, with Nature's own gifts. Books we must have, and pictures we must have; there are also IMMORTELLES and GRASSES for HOUSE-DECORATION; and although it will make this chapter rather long, still I have been recently asked, by many persons, for some paragraphs on this subject.

Although dried flowers and grasses are so useful as ornaments on our mantel-pieces, brackets, and centre-tables, they are as yet chiefly imported from the East and from Europe. Now there is every reason in favor of, and none against, our own growth of these things. It is well known that our plumes of pampas grass are shipped to the Eastern States by the thousands, and quite control the market. I am convinced that we can grow much finer immortelles, also, and our native grasses, used in conjunction with imported kinds, will give us an unsurpassed variety.

The most popular foreign flowers and grasses are dyed, and bring high prices. Now, we ought to grow all these in California. Our boys and girls ought to have little gardens, and build up some trade in this direction. It will be a long time before we can equal the French in preparing them; but doubtless there are many men in San Francisco who understand how to dye them. The culture and home-treatment are what I would now discuss.

The *Helichrysum* ranks high among the immortelles. It is of easy growth, showy in the garden, blooms all summer and autumn, and has large, bright, double flowers. The seeds of ten varieties of *Helichrysum* may be purchased for seventy-five cents, or a paper of mixed seeds for ten cents. Sow in the open ground, or in a box, and transplant, one foot apart each way. Gather the flowers before they are quite open, and use some small buds. The *Acroclinium* is a delicate little everlasting, with pink and white flowers. *Ammobium* has small, white flowers. The Globe Amaranth (*Gomphrena*) is of harder culture than the others named, but should be in

every collection. *Helipterum Sanfordi* is highly recommended, but has not been much of a success with us. *Rhodanthe*, *Waitzia*, *Xeranthemum*, and others, add to the winter bouquet; and some flowers will be found to retain their color when dried.

The rule for drying immortelles is to dry them in the shade—and so hung and tied that they will dry reasonably straight. Then they may be packed away in a large box or trunk, until wanted for floral decoration, mottoes, &c. Single blossoms of the larger everlastings may be woven through evergreen decorations with good effect.

Let us not think that here, in California, we do not need them. Beautiful in themselves, and interesting from their permanence, they also bring many of us memories of Eastern homes, of merry winters, and old-fashioned parlors, grandly decorated. Whether we may or may not find that it pays to grow immortelles, let us fill our homes with them, for the color they give. Fresh and living flowers shall always be dearest, but shall we not treasure these winter-flowers also, and find new uses for them? In the smallest garden, let them have a corner; it will not be without value.

The ornamental grasses may next claim our attention. They may be sown in small beds, early in the season, and given no further attention, except an occasional watering, and some thinning out, if needed. Out of the long lists, which might be given, we select those we have seen tried here, and know to be desirable: *Agrostis Nebulosa*; *Avena Sterilis* (animated oats); *Briza Maxima* (shaking grass); *Hordeum Jubatum*; *Setaria Macrocheta*—these are annuals. Some of the best perennial grasses are *Gynerium Latifolia* (pampas grass); *Stipa Pennata* (feather grass); *Bromus Brizæformis*; and *Erianthus Ravennæ*. Pampas plumes are to be bleached in the sun, to obtain that silvery whiteness so much admired. Cut them when just out of the sheaths.

But although dried flowers are cheap, books and pictures cost money; and if a further suggestion is made of one of Rogers' statuettes, to stand in the parlor, perhaps there will

be a murmur of disapproval. Well, then, let us consider. It will be admitted that more knowledge is required to succeed in life now, than heretofore. This tendency will doubtless increase. Our children must know more than we do, or they cannot maintain their places in the same social circles. The public school can never entirely take the place of home instruction. An expense which early awakens the intellect, and strengthens it for after usefulness, cannot be termed useless. Every cent which aids in adorning home, or purchases books, or hangs pictures on the walls, is to be considered a good investment, with first-class collateral securities.

A child once well educated is a profitable investment for his family and for the State, even from a material sense only. He may revolutionize the world of science with a discovery the germs of which trace back to a book of his childhood. He may paint pictures which shall hereafter be heirlooms in noble families; or write poems of such rare force and delicate finish and spiritual insight, that the hearts of toiling people shall be glad because of his gift; he may become one of those leaders whose silence is the hope of a land, whose speech is its salvation whose right arm guides to victory, not only, or merely, on battle-fields, but where great moral principles contend, and the blind passions of the masses are to be controlled. Men of these types are hard to find, although they are the desire of every age. For lack of home-training and home-education the world is too often compelled to take narrow, one-sided, selfish leaders, instead of strong, gentle, and patient heroes.

A child who is foolishly trained, or poorly educated, or left to "grow up" under countless evil influences, in an unrefined, hopeless sort of a home, affords but sorry material for a citizen. In endless ways of ignorance and fraud he becomes an expense to the State, a bar to hopeful human progress. Under our system of government uneducated citizens are expensive luxuries which need the sort of watching given to a powder magazine. Let us have faith in the work of the public schools, but let us never forget that the privacy and gentle lessons of home are the crowning result of men's work

on this planet, and that the purest influences and noblest citizens must come from the quietest homes.

Whoever desires to have the affection of his children, and memories reaching pleasantly from year to year, must be sure that his home is not merely a costly shelter, but is instead a living embodied spirit of comfort, peace, patience, restfulness, freedom, and affection. If you make your homes all they should be your children rise up and call you blessed. Your sons are counselors in the gates, your daughters are prudent and virtuous. Broad acres, and a heavy banking account are desirable; but do not let too eager pursuit of wealth overshadow the lives of your children, or deprive them of books, pictures, flowers, and school privileges.

TABLES OF DESIRABLE PLANTS.

TABLE I.

DESIRABLE DECIDUOUS SHRUBS,

(In most cases rooting from cuttings taken in early winter.)

Name.	Description.	Treatment, &c.
Almond, double white, and double pink.	Showy flowers, not long in bloom.	Bud on common peach or almond.
Althea, or Rose of Sharon	Many colors ; double white is the best ; constant summer bloomer.	Cuttings, in autumn, or grafts on seedling stock.
Achania Malvavisca.....	Scarlet, bell-shaped flowers ; brilliant bedder.	Needs close trimming ; grow from cuttings or seed.
Abutilon, or China Bell-flower.	Boule de Neige, Thompsoni, Vexillarium Var., and Darwini, are the best.	Trim, and keep in good growth ; liable to scale-bug, or coccus.
Aloysia Citrodora, or Lemon Verbena.	Well known, but always desirable.	Cuttings need to be kept wet all summer.
Cestrum Aurantiacum...	Spikes of yellow flowers ; very ornamental.	Needs close trimming, to keep in shape.
Crape Myrtle (Lagerstrœmeria Indica).	Masses of bloom, all summer, and universally admired ; valuable on the lawn.	Should have a warm, sheltered location.
Clerodendron Fragrans, and Speciosa.	Large purplish clusters of striking appearance.	Does well with ordinary treatment.
Calycanthus Florida, or Spice Wood.	Large, double fragrant, dull red flowers. We have a native species of stronger growth.	Naturally grows in moist places ; propagates by suckers and root-cuttings
Cornus Alternifolia.....	Species of dogwood ; seldom seen ; desirable.	Grown from seeds.
Deutzia Scabra, and D. Crenata.	White-fringed flowers ; single or double ; neat growth.	Easy culture, and rapidly propagated from cuttings
Hydrangea Hortensis, and other varieties.	The pure white, Stellata, and the climbing, are the most desirable. Immense heads of bloom ; well known.	As the family name denotes, lovers of water ; grows readily from the new wood.
Habrothamnus Elegans..	Tubular red flowers, in drooping clusters ; blooms in winter and spring.	A large grower ; needs close trimming ; easy of propagation.
Lantanas	Coarse, but showy shrubs, with verbena-like flowers.	Killed by severe frosts ; liable to grow from seed, and become a weed here.
Lilac.....	Indispensable for spring blooming ; the white blossoms shyly.	Keep the head open, and cut off the suckers.

TABLE I.
DESIRABLE DECIDUOUS SHRUBS.—(Continued.)

Name.	Description.	Treatment, &c.
<i>Pyrus Japonica</i> , or Japan quince.	Blooms in winter; colors, pink, white, and scarlet.	Grow from suckers, or root cuttings.
<i>Rhus Cotinus</i> , or Smoke Tree.	A large shrub, with peculiarly graceful and airy flowers.	Grows well on rocky and arid points.
<i>Ribes Sanguinea</i> (flowering currant).	This, and our native, rose-colored species, are very desirable.	Enjoys a cool and shady location.
<i>Syringa</i> , or Mock orange.	These three well known shrubs should be in every collection, however small. <i>Spirea Prunifolia</i> is one of the best.	Treatment easy; prune in the Fall; cut off suckers; propagate from hardwood cuttings.
<i>Spirea</i> , or Bridal Wreath.		
<i>Viburnum Opulus</i> , or Snowball.		
<i>Tamarix Gallica</i>	A fine-leaved shrub, with rose-colored, spring flowers.	Can be trained over a gateway.
<i>Wigelia</i>	Flowers white, and of various shades of pink; compact growth and luxuriant bloom.	Any good soil; healthy, and easy of culture.

TABLE II.
DESIRABLE EVERGREEN SHRUBS.

Name.	Description.	Treatment, &c.
<i>Aucuba Japonica</i> , or "Gold Dust Tree."	Leaves of great substance, spotted with yellow.	Liable to scale-bug; grown from new wood.
<i>Buddleia Lindeyana</i>	Handsome blue flowers....	Of easy culture.
<i>Buxus Variegata</i> , or "Tree Box."	The fine leaves and rich color of this well known tree render it desirable.	A shady and somewhat moist place is best.
<i>Cerasus Illicifolium</i> , or "Wild cherry."	This is a native shrub, similar to the holly.	Cannot be easily transplanted; grows from seeds; hedge plant.
<i>Camellia Japonica</i>	Although in great variety of color, the white is universally preferred.	Too much sun scorches the leaves; avoid too much water.
<i>Daphne Odorata</i>	Fragrant, white, star-like blossoms.	A shady, sheltered place on the lawn.
<i>Diosma Alba</i> , or "Breath of Heaven."	A charming little shrub, of slow growth, and always in bloom.	Needs water; difficult to propagate from cuttings.
<i>Escallonia, Alba</i> and <i>Rubra</i> .	Hardy little shrub of upright growth, and long in bloom.	Succeeds well anywhere.

TABLE II.

DESIRABLE EVERGREEN SHRUBS.—(Continued.)

Name.	Description.	Treatment, &c.
Gardenia Florida, or Cape Jasmine.	Fragrant white flowers, and of handsome growth.	Warm and sheltered location.
Guava, apple and strawberry varieties.	Bearing delicious fruit in winter.	Will not endure frost.
Holly, Ilex Crenata.....	The classic red-berried English holly.	Use as a single specimen on the lawn.
Kalmia Latifolia, or "Calico Bush."	A shrub of the Alleghanies, with large rose-colored flowers.	Prefers a shady place, and may be grown from seeds
Kennedya alba.....	Racemes of white and fragrant flowers.	Perfectly adapted to our gardens.
Laurestinus.....	Our best winter blooming shrub.	Valuable for an ornamental hedge.
Ligustrum Japonica, or "Japan privet."	White clusters; summer bloomer.	Also used for hedges; grown from cuttings.
Mahonia Japonica, or Ash-berry.	Holly-like leaves and racemes of yellow flowers.	Choice, as a single specimen; grown from seeds.
Myrtus Communis	Spicy leaves; small flowers; bright berries.	Liable to scale-bug.
Oleander.....	One of our most popular shrubs.	Much affected by the scale-bug; cuttings root slowly
Polygala Dalmaisin.....	A nearly perpetual bloomer; purple flowers.	Succeeds everywhere; of slow growth.
Pomegranate, dwarf, double.	There is a white, besides the well known scarlet.	An admirable lawn plant; keep trimmed well.
Veronica.....	Winter bloomers; spikes of purple, white, or rose colored flowers.	Of easy culture; grown from seeds, layers, or cuttings.
Yuccas.....	A family of shrubby plants; natives of hot and dry regions.	They may be used on rock-work, or lawns; grown from seed.

TABLE III.

CLIMBING PLANTS OF VALUE.

Name.	Description.	Treatment, &c.
Akebia Quinata.....	An evergreen vine of great beauty, delicate leaves, good habit, and unique flowers appearing in spring, and fragrant; one of the best vines in the whole list.	It rarely forms seed, and is difficult to propagate; plants must be bought.

TABLE III.
CLIMBING PLANTS OF VALUE.—(Continued.)

Name.	Description.	Treatment, &c.
<i>Ampelopsis Virginica</i> , or Virginia Creeper.	A deciduous vine, with brilliantly colored autumnal foliage; clings with curious disks at the ends of the tendrils; of very rapid growth.	Of the easiest culture; grown from seeds, or layered, or from cuttings
<i>Abutilon Vexillarium</i>	Small, fluted, malvaceous flowers; may be trained against a fence, or trellis, or trimmed closely, to form a bush.	Always grown from cuttings.
<i>Aristolochia Sipho</i> , and other varieties (Dutchman's pipe).	Brown-colored flowers, bent like a tobacco pipe; large, heart-shaped leaves grow rapidly.	Propagated from seeds and layers; there are several <i>Aristolochias</i> natives of the Pacific slope.
<i>Bignonia Radicans</i> , and <i>Grandiflora</i> (Scarlet Trumpet Creeper). <i>B. Tweediana</i> has golden yellow flowers.	This deciduous vine, a native of our southern States, ranks with the <i>Wisteria</i> for striking effects. No vine is better suited to our climate.	Broken cliffs of rock, old trees or buildings, may be covered; it clings by air-roots at the joints; we have seen it staked, and trimmed to a bush-like head.
<i>Clematis</i> (Virgin's Bower)	The new hybrid varieties of this old flower are of value for rock-work and bedding.	The best kinds are grafted on seedlings, or on our wild species.
<i>Clianthus Puniceus</i> , or "Parrot's-bill Flower."	This is a shrubby climber, unsurpassed for color.	A native of Australia; grown from seeds, and, in rare cases, from cuttings.
<i>Cobea Scandens</i>	Large purple, bell-shaped flower; coarse, but showy; marvelously rapid grower, and will soon cover unsightly objects.	Seeds, planted edgewise, in light, warm soil; soft-wood cuttings rooted in sand at any season.
<i>Cissus Quinquifolia</i>	This is a fine and hardy vine, with variegated leaves.	Cuttings, with bottom heat
Everlasting Pea.....	A perennial pea, with many admirable points; the flowers are white, pink, or crimson.	Cut back to the ground, after blooming; grow it from seeds, or divisions of the roots.
<i>Hardenbergia</i>	A shrub of climbing habit; pea-shaped flowers of white, and other colors.	In this climate, hardy; grown chiefly from seeds.
Honeysuckle.....	The coral, the evergreen fragrant, and the golden-leaved, are the best.	Of the easiest culture; grown readily from cuttings.
<i>Hedera</i> , or Ivy.....	Those who study ivy leaves will find an extensive variety of both plain and colored. The choice ivies should be planted more often.	Parts of our State are very trying to ivy; a cool and northern locality is preferable; seeds; cuttings; layers.

TABLE III.
CLIMBING PLANTS OF VALUE.—(Continued.)

Name.	Description.	Treatment, &c.
Jasmine—White, Yellow, and Catalonian, or Grandiflorum.	The jasmines are unapproachable for beauty, when trained to a pillar and allowed to trail over. The Catalonian jasmine is much the largest, and blooms in winter.	Jasmines, if kept too warm and close, are apt to get scale; use a handful of free potash, stirred in a quart of whale-oil soap; grown from cuttings.
Maurandya Barclayana.	A delicate leaved vine, with purple, trumpet-like flowers; rapid growth; healthy; a constant bloomer; also rose-colored, and white.	Prefers a warm and sunny place; grown best from cuttings of new wood.
Passiflora Cœrulea; P. Alata; P. Edulis.	Well grown evergreen vines with gorgeous purple or scarlet flowers. P. edulis has fruit of good quality.	They prefer a sunny location, and are easily grown from cuttings.
Plumbago Capensis (light blue); Larpentæ (dark blue), and Alba (white)	The plumbago is a shrubby vine of great value for walls, arbors, and pillars.	It grows readily from cuttings taken in fall.
Physianthus Alba.....	Fragrant clusters of flowers curious large seed pods, full of silvery down; an evergreen vine.	This vine, in many respects desirable, will make a thick cover for arbor, &c.; it is attacked by the yellow aphid.
Rhyncospermum Jasminoides.	Fragrant and white flowers.	A hardy vine.
Smilax	A delicate vine, unsurpassed for small trellises; used for decoration.	If planted in the open ground, prefers a somewhat shady location; grows from seeds.
Senecio Macroglossis (dark leaved German Ivy).	An evergreen vine of strong growth; dark, lustrous leaves; much better than the old sort.	Used to cover mounds, or on a fence or trellis; grown from cuttings.
Solanum Jasminoides; also S. Variegata.	Evergreen vines of rapid growth, and great bloomers; clusters of blue-colored, potato-like flowers.	Fasten to a wall; contrast with some bright color, as a clump of gladioli; grow from cuttings.
Thunbergia Alata.....	The sulphur-yellow and dark center of this flower are unique.	Does well in the summer-garden, on a trellis, or pegged down; increased from seeds.
Tecoma Jasminoides (Trumpet Flower).	An evergreen vine always much admired; good habit, and beautiful flowers.	Should be in a sheltered place.
Vinca (Periwinkle).....	Small vine; blue and white; liable to spread.	Use on rock-work, old stumps, &c.; grows well in the shade.
Wisteria Sinensis; blue, rose-colored, and white	This deciduous vine is of rapid growth, soon covering a porch or wall; brilliant racemes of pea-shaped flowers.	Needs a good support, and fastening; when once established, will need heavy pruning; increased by cuttings; also by seeds.

TABLE IV.
AQUATIC PLANTS.

Name.	Description.	Treatment, &c.
<i>Alocasia Esculenta</i>	Very large, shield-like leaves; tropical appearance.	Bulbous-rooted; will also grow in garden soil.
<i>Arundo Donax</i>	A variegated grass of tall growth.	Increased by root divisions
<i>Brasenia Peltata</i> (Water-shield).	An aquatic plant of the Eastern States.	Desirable for ponds.
<i>Bambusa Japonica</i>	Of these there are many varieties, both dwarf and tall; wide, and narrow-leaved, dark green, light green, and variegated colors; the black stemmed variety is very striking.	By using in clumps, fine effects are obtained; increased by root division
<i>Calla Ethiopica</i> ,.....	The favorite white <i>Calla</i> lily.	Will flourish in garden soil, if not too dry.
<i>Calla Palustris</i> (Marsh <i>Calla</i>),	White and green flowers...	Related to the <i>Papyrus</i> of the Nile; often beautifully variegated.
<i>Cyperus Alternifolios</i>	A grass-like plant, with stems crowned by whorls of horizontal leaves.	Also used for baskets or vases; of easy culture.
<i>Lysimachia</i> (Moneywort)	A small plant for aquariums, &c.; yellow flowers	An allied species grows in this State.
<i>Myosotis Palustris</i> (Blue Forget-me-not).	Another aquarium plant; spikes of delicate, starry flowers.	Prefers shade; grown from seed, or new wood cuttings.
<i>Mimulus</i> , in variety.....	The small hybrid <i>Mimulus</i> , also the tall growing wild scarlet, and our native yellow species, are indispensable.	Seed scattered in moist places grows readily; the wild may be moved in spring.
<i>Nymphaea Flava</i>	This is the yellow water lily of Florida, figured by Audbon, and re-discovered by Mrs. Treat, in 1876.	Probably the best water lily for tubs or aquaria; tuberous roots.
<i>Nymphaea Odorata</i>	The white water-lily; large, fragrant flowers; orbicular leaves, cleft from the base.	The root should be buried in the mud and covered with at least a foot of water.
<i>Paenocratium Coronarium</i>	White flowering lily-like bulb; native of the south; blooms from July to November.	Should be planted by the side of a stream or lake.
<i>Reineckea Carneae</i>	A small plant with narrow leaves and purple flowers	Also good for baskets.
<i>Saxifraga Peltata</i>	Shield-like leaves; hairy stem.	For small aquaria.
<i>Trapa Bicornis</i> , or "Bean of Pythagoras,"	A water-plant, bearing a curious, black, horned seed, used for food by the people of China and India.	Grown from the seeds, or nuts, and peculiar in bloom and growth.

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