

# RUSTIC ADORNMENTS

FOR HOMES  
OF TASTE.

—  
SHIRLEY HIGGERS.















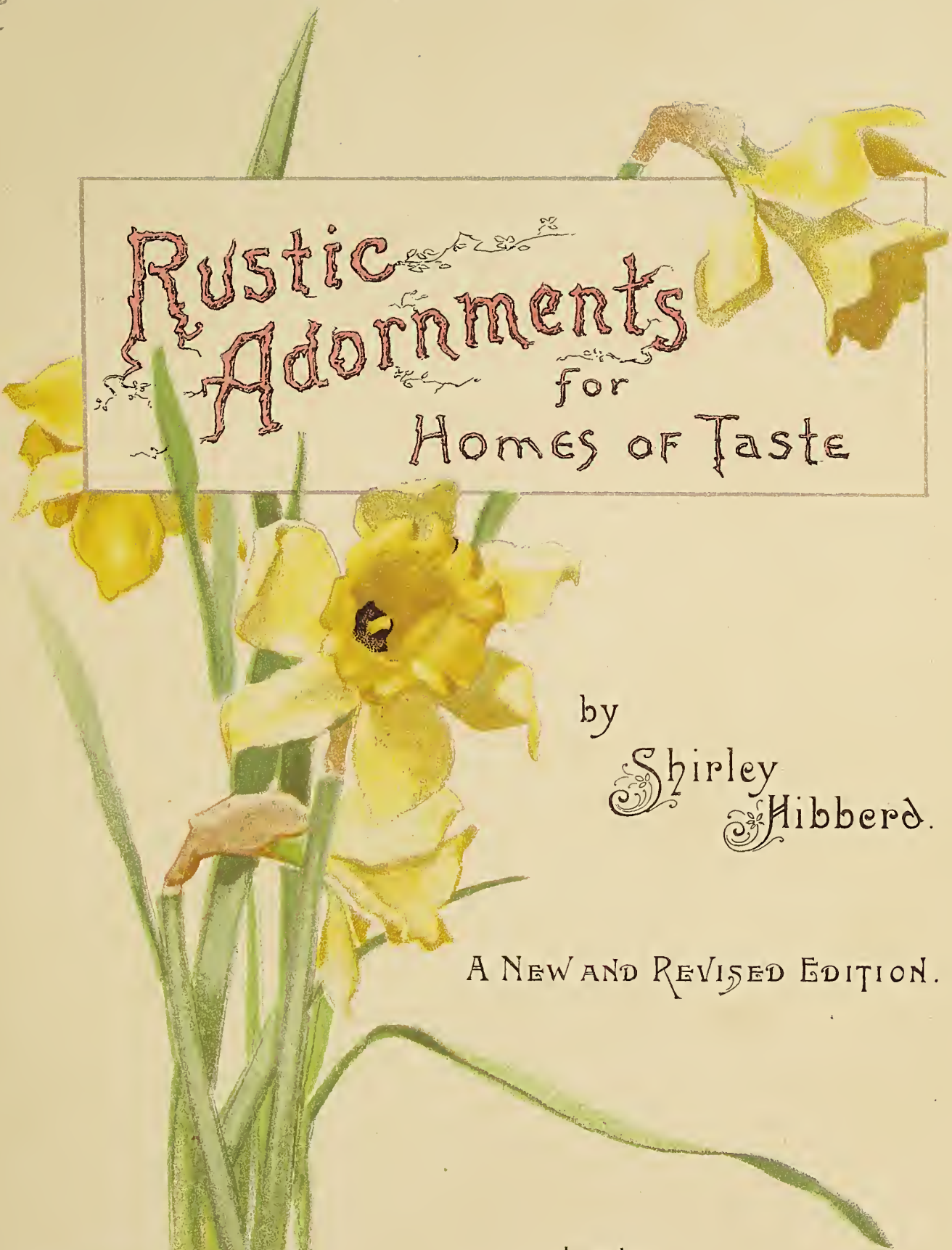








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Rustic  
Adornments  
for  
Homes of Taste

by  
Shirley  
Hibberd.

A NEW AND REVISED EDITION.

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A decorative border of green leaves and small flowers surrounds the text. The border is composed of several strands of vines with leaves and small, five-petaled flowers. The top strand is a simple vine with leaves. The left and right strands are more ornate, featuring a spiderweb in the middle section. The bottom strand is a dense, low-lying vine with many small flowers.

## PREFACE.

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**I**T is now many years since the late Mr. Shirley Hibberd issued the first edition of *Rustic Adornments*, with a view to disseminating some useful suggestions for the embellishment of the home and its surroundings. Several editions have appeared since, and each has been modified somewhat to keep the work abreast with the ever-changing fashion of the day. But this notwithstanding, and in consequence of some years having elapsed since the publication of the last edition, it has been necessary, in preparing the present one, to thoroughly revise the original matter, and bring many of the chapters up to date. New chapters have been introduced, in which floral decorations for interiors, table decorations, plant propagation for amateurs, and the Alpine garden are severally dealt with.

In carrying out the revision, we have been careful to preserve as much as possible of Mr. Hibberd's charming style, and also such of his views as were applicable to home and garden embellishment of to-day. New illustrations have been freely added, and every pains taken to render the work as complete as possible, and thus make it adapted to the requirements of the home and the garden in both town and country.

T. W. S.

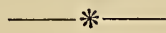








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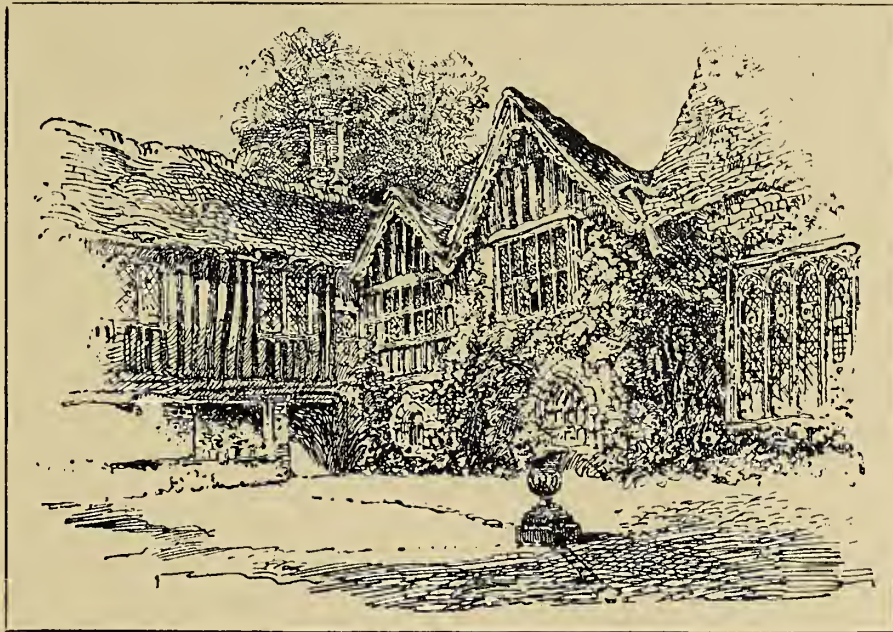
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## RUSTIC ADORNMENTS FOR HOMES OF TASTE.



### THE HOME OF TASTE.

Home! in that word how many hopes are hidden,  
How many hours of joy serene and fair,  
How many golden visions rise unbidden,  
And blend their hues into a rainbow there!  
Round home what images of beauty cluster,  
Links which unite the living with the dead;  
Glimpses of scenes of most surpassing lustre,  
Echoes of melody whose voice is fled.

J. W. FLETCHER.

**A**MONG the emblems of our nationality, not one is more strongly cherished by us than OUR HOME. We pride ourselves on the strength and healthiness of our domestic life, and we challenge the world to produce an example of a people more fondly attached to their native soil, or in whom the fireside affections have a broader development, or a higher aim. We



cherish the chimney corner where we first were blest by parental kisses, and through the "aisles of memory" its ruddy glow shines on our grey hairs, and warms our hearts as we hurry to the grave. At any period of life there is, with the majority of us, no dearer object of recollection than remembered scenes of the Home wherein we first lisped "Our Father," and no more hopeful subject of speculation and conjecture than the Home we have, or, by the help of God and a noble purpose, are building up, in which to teach that same simple prayer to children of our own.

It is because we are truly a domestic people, dearly attached to our land of green pastures, and shrubby hedgerows, and grey old woods, that we remain calm amid the strife that besets the states around us, proud of our ancient liberties, our progressing intelligence, and our ever-expanding material resources. Those resources daily multiply the means of exalting our social life, and invention keeps pace with the demands of an improving civilization ; so that while

" The thoughts of men are widened by  
The progress of the suns,"

the facilities for calm and healthful enjoyment increase with the growth of more elevated desires. The "Home of Taste" is one of the latest fruits of the high tone to which social life has attained in this country of late years, and its complete development may not be so far off, but that the present generation may witness the union of Nature and Art in happy ministration to human sympathies within doors.

We know already that the luxuries of refinement are no longer monopolized by the wealthy, that the merchant is not rendered sordid by commerce, but that he can delight in the strength of Angelo and the grace of Raphael ; the ledger does not dwarf the trader's soul below the appreciation of Titian's lights or Rembrandt's shadows ; and the persevering plodder, who from four to six does battle with armies of statistics, can retire to his suburban villa to rejoice as a happy soul in the midst of his family, or fondle his tame birds with the affection of a child. The aboriginal nature can never be drummed out of us, let visionaries say what they may ; through all the varying circumstances of life, let the whirl of excitement be never so rapid, or the stupor of despondency never so profound, that which minister to our perceptions and enjoyments of beauty, grace, and truth, serves at once as rest, and solace, and refreshment. Therefore we build up Homes of Taste



wherein to find epitomes of the natural world, and where, secure from the commotion and dust that prevail without, we may cherish the affections that lie deepest in our nature, and from which spring the noblest and most enduring results in the exaltation of our intellectual and spiritual faculties.

A Home of Taste is a tasteful home, wherein everything is a reflection of refined thoughts and chaste desires. It is a school of the heart, in which human sympathies teach profounder lessons than are found in books, and the ornaments of walls and windows suggest a thousand modes of being cheaply happy. In such a home Beauty presides over the education of the sentiments, and while the intellect is ripened by the many means which exist for the acquisition of knowledge, the moral nature is refined by those silent appeals of Nature and of Art, which are the foundation of Taste. If Taste is an application to nature of the same faculty which in morals enables us to distinguish between right and wrong, then the Beautiful is the highest form, or rather the embodiment of the purest ethics; and to be in constant communication with it, drawing our inspirations from its most palpable phenomena, is to place our spiritual natures under the guidance of a goddess who cannot lead them wrong. No matter in what form the cultivation of Taste may manifest itself, in paintings and sculptures; in the analysis of scenery; in the grouping of flowers; in the embellishment of the window or the table; in the cultivation of criticism, and the appreciation of what is true and good in Art generally; refinement of manners, sensitiveness of personal honour, kindness of feelings, and a deeper devotion of religion will be its sure attendants. We cannot come into the presence of any work of high-class art without at the instant experiencing emotions that increase our happiness, nor can we take interest in the simplest pursuit of a leisure hour, if that pursuit be pure and pleasing, without at once passing into an atmosphere of higher moral purity than we breathe at other times, amid

“The weariness, the fever, and the fret,”

that, without such an antidote, harden the heart by degrees, restrain the aspirations of the inner life, and arrest the development of our spiritual capabilities. Such “enchantments are medicinal, they sober and heal us. They are plain pleasures, kindly and native to us.”

But the Home of Taste is not necessarily the result of a lavish expenditure—the most humble may command it. Though the several Rustic Adornments treated of in this work admit of extension, commensurate with the



most liberal outlay, there is not one but is in some measure attainable by those who have but little leisure and most narrow means, and some indeed may be, and have been, cultivated most successfully by those who could not aspire even to the ordinary luxuries of middle life. If the poor man cannot have his picture gallery, he can still gratify his love of art by embellishing his walls with copies of works of great masters, brought within his reach by the multiplying skill of the copyist and the engraver; if he cannot have a library, paneled with palm branches, and containing a collection of Aldines on vellum, and Caxtons worth twelve thousand guineas, he can still command elegant editions of the greatest historians, philosophers, and poets, to whom God ever gave the gift of expression. If he cannot afford pictures, he may have a "garden of delights;" and if palms and orchids are forbidden fruit, he may every day experience a subdued but healthy pleasure amidst ferns and flowers; the rose will shake into his heart her perfume, and the lily recall to him the teachings of the Lord. In the adornment of the home it does not require a princely fortune to set up a vase of flowers, or an aquarium, or a stand of bees that shall sing to their master all day long and entrap every spare moment of leisure he may be able to afford to "shepherd them." He who lays out his garden in accordance with correct principles of taste, may find in it as much amusement, and as genuine a solace from the cark and care of life, as if it were a domain of thousands of acres—perhaps more so, for it is his own work, it represents his own idea, it is a part of himself, and hence redolent of heart-ease.

It is an error common to writers to believe that the special subject on which the pen is engaged is of pre-eminent importance, and perhaps I may be yielding to this common weakness when I suggest that the embellishments of the household embrace the highest of its attractions apart from the love which lights the walls within. The prose of life is good—food, clothing, safety must be first secured; but the poetry is better, for though the body must be fed, it is chiefly because of the soul it shelters that it must be kept sound and clean. The pleasures of the garden, the tending and taming of household pets, the culture of choice plants in the greenhouse and the window, seem to me much more remunerative, both intellectually and morally, than even the study of the higher departments of art, because of their suitability to all taste, and means, and their directly educative power, for they keep us near to nature and compel us to be students of the out-door world, whence many noble inspirations and humanizing teachings and devotional impulses are drawn.



“It seems as if the day was not wholly profane, in which we have given heed to some natural object.”

It would be an anomaly to find a student of nature addicted to the vices that cast so many dark shadows on our social life, nor as a matter of fact can we readily recall an instance of a naturalist or philosopher who has been known as a bad man ; but of such as have been revered and loved for goodness the names are so numerous that we might liken them in plenitude as well as their nature to the stars in heaven. But to avoid any severe test, is it not true that the most genial natures are of the homely sort, attached to the fireside ; cultivators of rural tastes in some form or other ; given to simple hobbies that keep the attention fixed on things that breathe purity, and quiet, and peace, answering to their own aspirations ? They are healthy folks, healthy in mind as well as in body, and to clear perceptions add the impulses of generous hearts. We must receive the kingdom of heaven as little children, and shape our lives in childish ways to be worthy of it.

In a certain sense the Home is the outside of a man ; it is an external vesture, and more or less, but always in some degree, a visible embodiment of his mental character. The man of intellect and taste will impress on everything about him an air of usefulness or elegance, and will make the best of the roughest materials that fate may cast in his path. Architecture—the highest of the domestic arts—spring out of the desire of the mind to dwell in a fair exterior, and to be surrounded by harmonious forms. In this, as in other of the useful arts, elegance, comfort, and convenience usually go hand in hand ; and while deformity is invariably more expensive in every sense than grace, so the well-built and tastefully-adorned mansion more readily meets our domestic requirements, and in accordance with our station, affords proper scope for embellishment within and without. Sir Henry Wotton says, “Architecture can want no commendation where there are noble men and noble minds ;” and it is not to be doubted that if ordinary residences were constructed in accordance with correct principles of taste, the dwellers in them would attain a higher status in mind and morals, for the character is powerfully impressed for good or evil by what surrounds it permanently. Why should the eye be compelled to gaze on ugly lines and awkward angles, false proportions, and incongruities intended as ornaments, when symmetry is at all times cheap, and accuracy of form the most useful and convenient ? If builders were equal to their work we should read art-lessons in the streets, instead of perpetually deploring the violation, in bricks and mortar, of every



law which should control domestic architecture, save and except the one primary law that a house must have a foundation. However, in this matter we witness the beginning of a revival ; true taste has ceased to be esoteric, and in all our cities evidences abound, to testify that our people are not satisfied with bread alone, but crave the heavenly teaching of beauty as a reflex of the divine nature. Art is religious or it is nothing, every touch of grace in outward form is a rebuke to sinfulness, every work of art is a minister of morals to those who can understand.

Lord Bacon says, "Every man's proper mansion, house, and home, being the theatre of his hospitality, the seat of his self-fruit, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kind of private principedom ; nay to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

Wealth is certainly a blessing when it is made the instrument of increasing human happiness, and in the gratification of a love of elegance money is certainly a powerful instrument. Still the Home of Taste is within the reach of all, it is the mind more than the money that must make it. Spiritual life will give radiance to a cottage, pure pleasures will sweeten the humblest lot, while the noblest productions of genius may even contribute to the gloom of the mansion, where moral and religious worth are unknown. Whatsoever we look upon reflects our own mood, we see ourselves perpetually, as if all nature and art were but repetitions of a mirror.

" Our sleeping visions, waking dreams,  
Receive their shape and hue from what  
Surrounds our life."

Where the counsels of wisdom preside over parental love, where those "whom God has united" remain in unity under the bonds of a beautiful affection, than which

" All other pleasures are not worth its pains ;"

where woman appears in her true gentleness, and the children grow up in the love of parents and the fear of God, there is a Home of Taste, a Home of Virtue, of Mental Discipline, of Moral Worth, Domestic Affection, and Religious Aspiration. "Round it all the Muses sing ;" everything within takes the semblance of the souls that preside over it ; the simplest things acquire grace and meaning ; vulgarity, meanness, and vice dare not cross the



threshold—ennui cannot find its way there, petulance is smiled out of countenance, and temper is rebuked by the placidity and suggestiveness of the surroundings. “If the Lord build not the house, they labour in vain that build it.”

The mind, like a sensitive plate in a camera, receives impressions which become permanent pictures in the memory, and these pictures refresh or depress us according to their tone and tinting. In meditative moments we turn them over as the leaves of a book, and our hearts leap with joy as the pictures of happy times and generous deeds are revealed. But they sink despondent under a weight of regrets as the great blanks that represent wasted opportunities, or the more demonstrative mementoes of vice and folly, break into the field and pass drearily in review. Hours well spent, like fruits well grown upon the bough, give gladness for the present and afford enjoyment for the future as memory recalls them, and that inward gratulation follows which only the satisfied conscience can allow. Memory rides above the will, and to forget is a pleasant or a painful impossibility according to the complexion of the reminiscence that flashes upon the inward eye. So for the sake of the future when the calm days approach, and remembrances hold us more strongly than the events of the passing hour, it is well that we should shape our pleasures, in common with our more serious occupations, in accordance with the demands of reason and virtue. The perfection of dulness and indifference may be surest attained by devotion to sordid pursuits and selfish aims: it is the outgoing of the affections in honest sympathies and kindly acts that will most certainly tend to a spirit of joyfulness. True mirth is of a quieter aspect than the world allows; and there is an inward cheerfulness that makes no noise and appears not to sense, that will ever be welcomed as a foretaste of the blissful condition of the happy dead to the heart that faith has sanctified. For the sake of all around us, who may be blessed or banned by our example and works, no less than for our own sakes, that happy pictures may be painted on the memory to beautify the sunset of our lives, we must shape our course in all things so that “Hope may never lose her youth,” and that every individual endeavour shall be as seed sown in the field of the heart to bring forth “the peaceable fruits of righteousness.”

“ Thrice blessed whose lives are faithful prayers,  
Whose loves in higher love endure ;  
What souls possess themselves so pure,  
Or is there blessedness like theirs ? ”



In the Home of Taste we find abundant resources of recreation, and many an antidote to care and folly. Its best embellishments fill the mind with a sense of the exhaustlessness of form and colour in this orderly universe ; there are household pets that daily teach us we may rule by love and not by fear ; there are gatherings of all kinds from the world of art and the world of nature that demand attention, and the exercise of skill, every one of which represents an idea, and persuades us to reflection ; while every labour they require brings its high reward in mental activities and the gratification of ennobling desires. But above all there is the ripe domestic life which forms the true centre of this circle of adornments, heightened by them in its ever-growing appreciation of what is good in man and beautiful in nature, and in both representative of the Wisdom, Power, and Goodness of the Almighty.

“ Domestic happiness, thou only bliss  
Of Paradise, that hast survived the fall !  
\* \* \* \* \*  
Thou art the nurse of virtue, in thine arms  
She smiles, appearing, as in truth she is,  
Heaven-born, and destined to the skies again.  
Thou art not known where pleasure is adored,  
That reeling goddess, with the zoneless waist  
And wandering eyes, still leaning on the arm  
Of novelty, her fickle, frail support ;  
For thou art meek and constant, hating change,  
And finding in the calm of truth-tied love  
Joys, that her stormy raptures never yield.”

COWPER.







“Bring flowers, young flowers, for the festal board,  
To wreath the cup ere the wine be poured.  
Bring flowers! They are springing in wood and vale,  
Their breath floats out on the southern gale,  
And the touch of the sunbeam hath waked the rose,  
To deck the hall where the bright wine flows.”

MRS. HEMANS.

## CHAPTER I.

### FLORAL DECORATIONS.

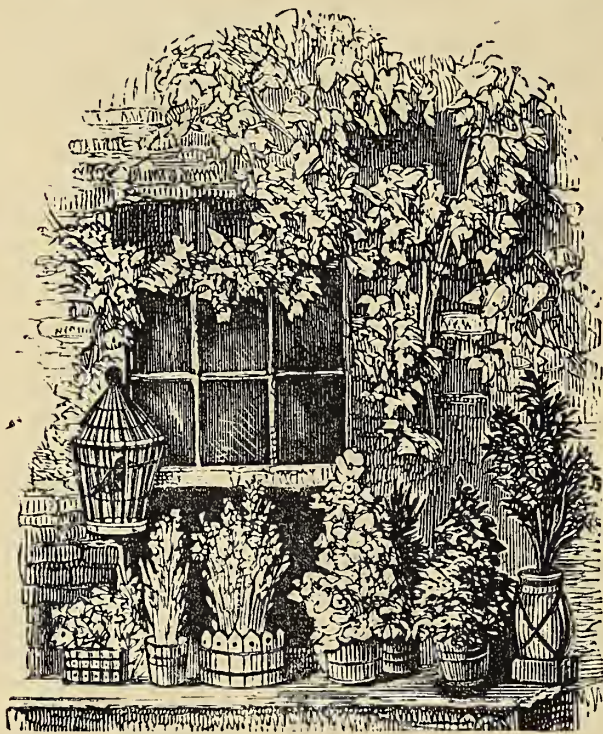
SO many are the social qualities of flowers that it would be a difficult task to enumerate them. We always feel welcome when, on entering a room, we find a display of flowers on the table. Where there are flowers about, the hostess appears glad, the children pleased, the very dog and cat grateful for our arrival, the whole scene and all the personages seem more hearty, homely, and beautiful, because of those bewitching roses, and orchids; and lilies, and mignonette! Assuredly, of all simple domestic ornaments flowers must have the first place.

“Better hang a wild rose over the toilette than nothing,” says Leigh Hunt; “the eye that looks in the glass will see there something besides itself, and acquire something of a religious right to respect itself, in thinking by how many objects in the creation the bloom of beauty is shared.”

Speaking of breakfast in summer, the same prince of essayists says, “Set flowers on your table, a whole nosegay, if you can get it, or but two or three,



or a single flower ;—a rose, a pink, nay, a daisy. Bring a few daisies and buttercups from your last field walk, and keep them alive in water ; and preserve but a bunch of clover, or a handful of flowering grass—one of the most elegant as well as cheap of nature's productions—and you have something on your table that reminds you of the beauty of God's creation, and gives you a link with the poets and sages that have done it most honour. Put but a rose, or a lily, or a violet on your table, and *you and Lord Bacon* have a custom in common ; for that great and wise man was in the habit of having the flowers in season set upon his table—morning, and, we believe,



A HUMBLE FLORAL DISPLAY.

noon, and night ; that is to say, at all his meals ; for dinner, in his time, was taken at noon ; and why should he not have flowers at all his meals, seeing that they were growing all day ? Now, here is a fashion that shall last you for ever, if you please ; never changing with silks and velvets, nor dependent upon the caprice of some fine gentleman or lady. The fashion of the garments of heaven and earth endures for ever, and you may adorn your table with specimens of their drapery—with flowers out of the fields, and golden beams out of the blue ether."

It would be folly to assume that our readers need any persuasion to adopt the practice of adorning the inside of the house with flowers ; for who does not rejoice in a bright bouquet, or a vase of newly-gathered roses, or a window screened with fresh foliage and pyramids of bloom ? Children delight to make posies for mamma, lovers tremblingly present blushing roses to blushing maids, and dimpled cheeks outshine the flowers because the flowers have foolishly competed with them. The serious master of the house bethinks him of the home demands as he hurries about the city, and the consequence is that flower-stands come home in the carrier's cart, and all are impatient to see them filled with their glorious burden. And the good old soul who gets ready that same carrier's breakfast, ere he sallies out into the hot dusty road,



has her box of mignonette and ornamental pots of balsams, fuchsias and musk, and her jug filled with wallflowers, and the smoked mantel in her little kitchen is smothered with dry grasses, with a sprig of asparagus berries in the midst, while the window of her parlour is artlessly draped with the bright green foliage and the yellow blossoms of the canary creeper.

You who have gardens may multiply your enjoyments of them a hundred-fold by keeping in mind the genial suggestion of Leigh Hunt. Make the most of every ray of light that falls out of heaven to bless you at the window; there you may woo beauty, and have it nod to you in a hundred forms: with a pair of scissors you may, every morning, cull a posy for the breakfast-table; you may make the tables, and the mantel-pieces, and the quiet recesses of your rooms gay at all times, and the whole atmosphere of the house as odorous of flowers, as we will hope it is already morally sweet with the interchange of love's language and the expressions of high emotions of the heart.

There are many ways in which cut flowers may be preserved, both with and without suitable appliances. In spring time you may delight yourself by culling a few violets, and place them in a glass dish, in which there is a little wet silver-sand. The short stems stuck into the sand obtain sufficient moisture, and a glass over the whole confines the fragrance, so that whenever you are inclined to inhale a full breath of unadulterated violet perfume, you have but to lift off the glass, and enjoy it to your heart's content. In the



SABOT OF GRASSES AND BULRUSHES.



same simple way any short-jointed flowers may be preserved for a considerable time ; the partial shade and the confinement of moisture secured to them by the glass, preserve their beauty and fragrance, sometimes even for a fortnight, but the most fragile will in this way continue fresh and beautiful for at least a week.

But we must not ignore the vase and basket of flowers, and so for a moment let us consider how best to deal with them. Directions for filling vases might be multiplied beyond all possibility of usefulness, and perhaps we should be brief rather than prolix on the subject, for just this reason, that people must fill them with what they can get, and frequently the hand of taste is paralyzed by the scarcity of subjects for its exercise. The common fault of flowers in vases is that they are "bunched" like greens: too much is thought of colour and too little of form: too much is thought of flowers and too little of leaves. As to the flowers, much positive colour is not desirable; intense yellow is a dangerous element, a soft mixture will usually gratify an educated eye far more than a dashing display of primary colours unrelieved by secondaries or by green leaves. Strong colours are not objectionable, for in truth we need them to light up the whole and give it character; but you will soon see that the line must be drawn somewhere by filling a vessel with the brightest scarlet geraniums only, without a single leaf to tone down the glare. It is very important to make proper distinction between flowers that retain their character, or at least look pleasing by artificial light, for some of the best daylight flowers are but poor things when daylight has fled, and the flame of gas or oil has become the substitute. Nearly all flowers in which there is a notable proportion of blue are unattractive when seen under artificial light. Hence purple and lilac flowers do not usually look well at night, though there are exceptions owing to the intensity of the red in some purples, which comes out well at night and causes them to appear as crimsons. Yellows invariably lose brilliancy, and pale yellows become bad whites under gaslight, but reds and crimsons, all shades of pink and white retain their beauty, and, as a rule, green leaves are pleasing under any light; the introduction of electric light, however, obviates this difficulty; for, where this is used, everything keeps almost its natural hue.

As to the leaves, it scarcely matters what they are while they simply supply the filling up or foundation—green showing to advantage, even if obscurely, under the chaste lacing of many coloured flowers. But wherever a leaf appears as a leaf, we must have grace as well as greenness, and happily the poorest garden will supply abundant material, especially in the form of fern



fronds, for the purpose. Suppose we take first a few orchids, or some of the lovely *Eucharis Amazonica*, and finish the whole with the biggest cabbage leaf the garden can supply! It will be evident thereupon that the forms of leaves that accompany flowers are fully as important as their colours, for assuredly we may find amongst the cabbages some very refreshing tones of verdure. Now it is really true that many bouquets, and vases, and homely jugs, filled with flowers, that are admirable up to a certain point, are ruined at last by the introduction of leaves that are as fustian jackets on bonny belles sitting at a tournament. Take away the cabbage leaf, and insert a few tufts of that very cheap and common striped grass of the cottage garden, the variegated *Phalaris arundinacea*. What a change! But you may have finished your bouquet with leaves of *Begonia rex*, or similarly large multi-coloured leaves, and have made it quite as hideous thereby as by the employment of a cabbage leaf. Take them away, and put in a bit of maiden-hair fern, or a few small portions of the fronds of the common brake (if it happens to be summer-time), or any other of similarly elegant, bright, fragile-textured things, and the flowers will instantly acquire ten times, a hundred times, their former beauty.

Large flowers are, generally speaking, not adapted for small bouquets or vases; such coarse things as pæonies are utterly unsuitable, and even roses are more acceptable if only half expanded, or fairly showing colour in the bud, than when full out and becoming loose with age and expansion. Severity of outline, too, is as objectionable as the employment of coarse subjects. A bouquet or a bunch should alike be elegantly negligent in configuration, a general contour distinctly suggested but not defined, the tendency to harshness of outline which flowers regularly packed are sure to produce, broken by the uprising of green sprays of grass and fern, not obtrusively, as if the flowers were there simply to show *them* off, but modestly, and to afford a passing relief. To say that a geometric arrangement is never to be tolerated may appear superfluous, but really we have seen in many competitions at provincial exhibitions, flowers grouped in accordance with such a system,—a ring of yellow, a ring of scarlet, a ring of blue, and a central dot of white. Oh, horror, horror, to think that flowers should grow in the gardens of folks who can use them in this way!

The management of cut flowers will justify a few words of advice. In the first place, the flowers should be *cut*, not torn or pinched from the plants, for bruised or crushed stalks cannot take up nourishment from water properly,



but those sharply and cleanly cut can. Flowers gathered by means of the thumb nail will not live so long as those cut with a sharp knife or scissors; and so to begin with, there is a science of obtaining as well as of grouping them. As it is not well to make a toil of pleasure, cold water, hard or soft, may be used for flowers of all kinds during the summer. If changed every three days, and the ends of all the stems are cut clean off at the same time, the flowers will last a reasonable length of time and do their duty perfectly. So far we consent to the rough and ready method that the world allows. But those who love flowers will not be content with rough and ready methods always. A few nodules of charcoal in the water will in great part prevent putrescence when flowers have to be left some time in water without a change. A pinch of common salt is a cheap and handy preservative, and actually benefits the flowers as a stimulant. A small quantity of permanganate of potash added to the water will keep it quite sweet for days, and camphor is a similarly valuable preservative. In winter it is best never to employ cold, but tepid water, for filling vases, and to place them in a room warmed by a fire, but always avoiding the exposure of the flowers to a high temperature if possible. A hot dry air will kill them sooner than cold and moisture, but both extremes are bad. Flowers that have been long gathered and neglected, or that have been conveyed a long distance by carrier, or post, may be quickly revived by plunging them in *hot water*, say  $100^{\circ}$  to  $140^{\circ}$ , the last figure to be the maximum by Fahrenheit's scale. Almost any plant will bear immersion in water heated to  $150^{\circ}$ , but it is safer to regard  $140^{\circ}$  as the maximum, because forced flowers are delicate, and a few very soft-textured hardy kinds are not to be parboiled with impunity. Another essential point must not be overlooked, and that is adopting some means of preventing the petals of single-flowered azaleas and zonal pelargoniums falling off prematurely. The usual, and perhaps the best, plan is to drop some specially prepared floral gum into the centre of each bloom directly the flowers are gathered. A very small quantity of the gum (which is sold in a liquid state in bottles by florists) will suffice to firmly cement the petals, and hence the blooms will retain their freshness for a much longer period than if not gummed. Scarcely less important than the foregoing considerations is the one to be named last in the list. We have shown that flowers should not be exposed to cold unduly; it now remains to be said they must not be strangled. When tightly-tied bouquets are purchased, the ties should be loosened, if possible, but that may necessitate making them up again, and the task may



be too great. It is quite an easy matter to make up a bouquet sufficiently firm that it will endure a considerable amount of shaking without harm, and yet to leave it loose enough for every stalk to act as nature intended it, as the purveyor of nutriment to the leaves and flowers. There is, indeed, no necessity to tie flowers at all for home use, and only when necessity really requires it should any kind of ligature be employed.

FLOWERS SUITABLE FOR DISPLAY UNDER GAS OR ELECTRIC LIGHT.

The various shades of mauve, purple, and yellow do not come out well by gas-light. We have avoided them, and in the undermentioned selection have named those only which have a peculiarly bright and effective appearance when seen under the influence of this form of artificial light.

The best of those requiring a stove temperature are the following, namely :

*Achimenes coccinea.*

*Æchmea fulgens.* *Æschynanthus splendidus.*

*Amaryllis* or *Hippeastrums*, all the scarlet varieties.

*Anthurium Scherzerianum.* *Aphelandra auriantica*, *A. Roezli.*

*Begonias* (tuberous), scarlet and white varieties.

*Clerodendron Balfouri.*

*Crinums*, in variety.

*Dipladenia Bolivensis*, *D. amabilis*, *D. Brearleyana.*

*Epiphyllum truncatum*, *E. truncatum aurantiacum*, *E. truncatum violaceum.*

*Eucharis amazonica*, *E. candida*, *E. Mastersii.*

*Euphorbia jacquiniflora.*

*Eurycles australasica.*

*Gesnera Blassi*, *G. exoniensis*, *G. refulgens*, *G. zebrina splendens.*

*Gardenia citriodora*, *G. florida.*

*Gloxinias*, white and scarlet varieties.

*Hoya Bella.*

*Impatiens Sultanii.*

*Ixoras*, in variety.

*Justicia coccinea.* *J. speciosa.*

*Orchids*, white or rose-coloured.

*Pancratiums fragrans.*

*Poinsettia pulcherrima.*

*Plumbago coccinea superba.*

*Thyrsacanthus rutilans.*



Amongst the inhabitants of the greenhouse the following are first-rate, namely :—

*Azalea indica*, in variety.

*Bouvardias*.

*Camellias*.

*Calla Lily* (*Richardia Æthiopica*).

*Carnations*, Tree, of sorts.

*Choisya ternatea*.

*Cyclamen Persicum*, white and rose varieties.

*Epacris*, in variety.

*Eupatorium odoratum*.

*Francoa ramosa*.

*Hydrangeas*.

*Kalosanthes coccinea*.

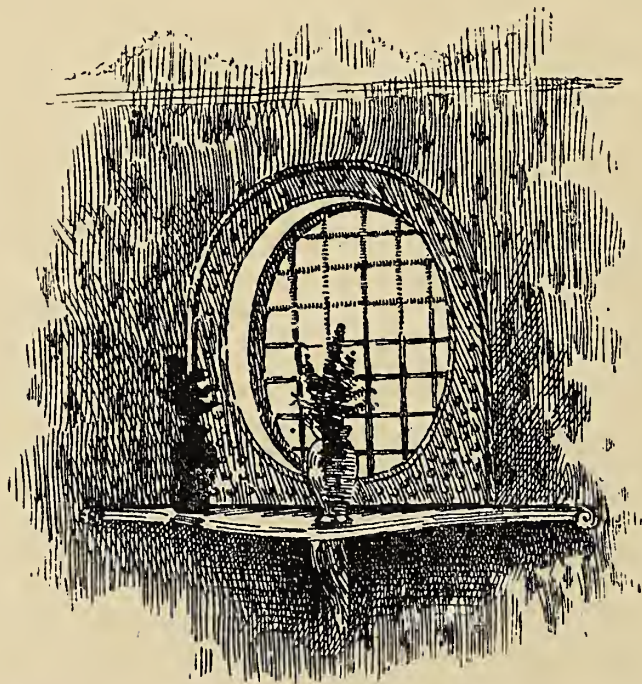
*Lilium speciosum*.

*Lily of the Valley*.

*Primula*, Chinese, double and single.

*Zonal Pelargoniums*, scarlet and white.

Berry-bearing plants with scarlet berries are very showy by gaslight, especially *Ardisa crenulata*, *Rivinia humilis*, *Solanum hybridum*, *Crategus pyracantha*, *Aucuba fœmina* (true, green leaf), and the scarlet and yellow-berried Hollies.







A CHRISTMAS DINNER-TABLE.

## CHAPTER II.

### DINNER-TABLE DECORATIONS.

When summer comes, the little children play  
 In the churchyard of our cathedral gray,  
 Busy as morning bees, and gathering flowers,  
 In the brief sunshine ; they, of coming hours  
 Reck not, intent upon their play, though time  
 Speed like a spectre by them, and their prime  
 Bear on to sorrow—" Angel, cry aloud !"  
 Tell them of life's long evening—of the shroud :  
 No ! let them play ; for age alone, and care,  
 Too soon will frown to teach them what they are.  
 Then let them play : but come, with aspect bland,  
 Come, Charity, and lead them by the hand ;  
 Come, Faith, and point amidst life's saddest gloom,  
 A light from Heaven, that shines beyond the tomb.  
 When they look up, and in the clouds admire  
 The lessening shaft of that ærial spire,  
 So be their thoughts uplifted from the sod,  
 Where time's brief flowers they gather— to their God.

BOWLES.

**T**O go over old ground is one of the necessities of this book, but now we have a new subject ; for since "Rustic Adornments" first appeared, a quite new order of things has arisen in connection with the embellishment of the dinner-table. The improvement made upon the old "épergne," heavy with precious metal or an imitation of it, is so decisive and delightful, that we



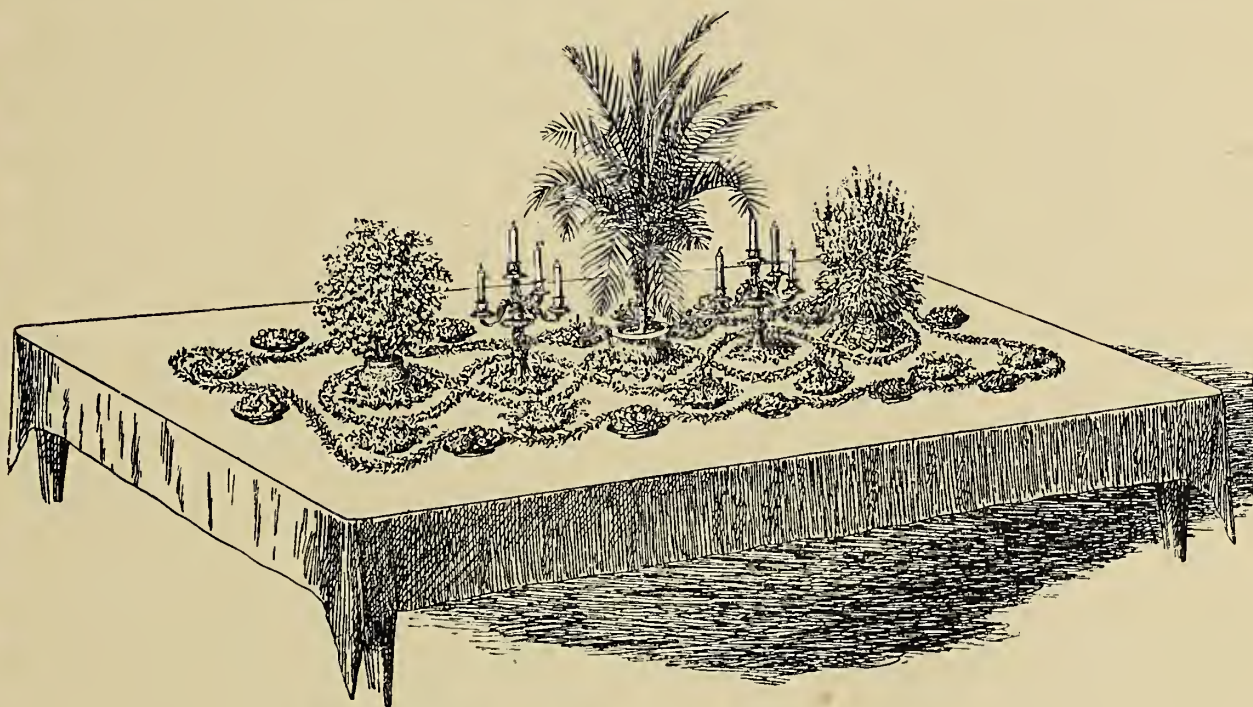
are much more desirous of advancing the good points of the new system than of pointing out its possible defects. Horticultural exhibitions have in our time accomplished one most useful purpose, in the promotion of good taste in dinner-table decorations, by means of the numerous competitions that have been instituted for the purpose throughout the length and breadth of the land.

The exhibitions resulting from the invitations given have had a marked effect on the taste displayed at home in the employment of flowers as embellishments, and, to a certain extent, as necessary adjuncts to festivities and family gatherings. Much talent hitherto latent, or but rarely called into exercise, has been quickened into activity, and many who could appreciate good teaching in matters of taste have benefited by the lessons offered. In our visits to exhibitions, we have been deeply interested in watching the development of the art of decorating in this particular department of the economy of the Home of Taste, and it is with delightful satisfaction we have observed the steady improvement from year to year by which these exhibitions have been marked. When they were first instituted, many clumsy contrivances for the reception of fruit and flowers, and many ill-judged combinations of colours, were displayed; there was, indeed, for a time a sort of indefinable want felt by many of some type or standard of perfection, which was in part supplied when the Misses March made their *debut*, and attained the highest honours at South Kensington, by means of what were immediately designated the "Marchian épergnes." In a typical group, there was a central vase of three tiers, and two smaller vases of two tiers each, all of colourless glass, and of a simple and elegant design; and many variations of the "Marchian" glasses followed, with cornucopias, and hanging baskets, all in clear glass. Great as was this improvement on the older forms of dinner-table decoration, these glasses had several weak points, one of the most troublesome being the difficulty with which the flowers were induced to stay in the flat saucer-shaped trays; one or two heavy blossoms often causing the whole to fall out, just as they were complete in arrangement. Another difficulty arose, when flowers became scarce in winter; for a large number of various kinds of bloom was necessary for a "Marchian" vase, and few horticulturists cared to cut so many flowers during the cold season. The monotony, too, of having constantly the same form in the centre of our dinner-tables, before long began to pall on the senses, and the idea of a carefully thought-out scheme of colour in one or two tints only (which could



be constantly varied with the season), took the place of these tall glass vases, filled with many colours.

At the present time, table decoration has assumed the dignity of a fine art ; and it is difficult to conceive anything more beautiful than the appearance of a really well-decorated dinner-table. China, glass, drapery, vases, and flowers are all made to contribute their share to a thoroughly harmonious whole ; with rich yet subdued colouring, sweet (but not oppressively luscious) scents, with plenty of the soft lace-like greenery of maiden-hair fern, *Asparagus*



A MODIFICATION OF THE INDIA TABLE DECORATION.

*plumosus*, selaginella, and flowering grasses to set off and harmonise the rich tints employed.

Four distinct styles of decorating a dinner-table may here be mentioned, *i.e.*, the plan of draping the centre of the table with soft silk, of a suitable colour to harmonise with the china and glass, flowers being added to complete the harmony ; secondly, the use of the new art tablecloths, in delicate tints of old gold, crushed strawberry, olive green, and heliotrope, which are superseding the drapery, and when used with suitable flowers, have a charming effect. The third system is that which is so well carried out by the native servants in India, either on white or coloured tablecloths ; which does away with the necessity of glasses for the flowers ; wreaths of exquisite beauty being



constructed on the cloth itself. The central decoration should be in each case a handsome feathery palm, or a well-grown specimen of *Thyrsacanthus rutilans*, *Azalea indica*, fern, *Spiraea japonica*, Begonia, or any other flowering plant, which may give the necessary light and graceful outline, with sufficient height to form a suitable centre, without obstructing the view of the guests—a great mistake in arrangement, which must be carefully avoided. The fourth plan

consists of the use of coloured leaves, berries, grasses, etc., and is more adapted for autumn and winter use.

To make the above different schemes of decoration for the dinner-table more easily understood, it may be well to give the details of each plan separately. Taking the "draped" table first, we must have, besides the white cloth, an oblong piece of "Liberty" silk (or soft sateen), about one-and-a-half yards in breadth, and two-and-a-half in length, or larger in proportion to the length of the oblong table to be draped. Having laid this flat in the centre of the table, a silver or china bowl, containing the central specimen plant (say a fern, *Cyrtomium falcatum*), is placed upon it (or the pot, being large, may be draped with the same tint). The silk is now waved



CENTRE PLANT DRAPED IN SILK.

with the finger until it looks like a soft sea of drapery, little pushes with the forefinger giving it bends and crinkles innumerable.

Again, it is extended somewhat at the four corners, and on each of these is placed a frosted specimen glass containing a fresh rose-bud, with a frond or two of maidenhair fern or a spray of *Asparagus plumosus*; the edges of the silk are deftly turned in, and the drapery is caught up at the sides, so to speak, by fern fronds, or tinted foliage (such as blackberry, virginia creeper, or carrot), in autumn; or even by sprays of the crimson tacsonia, or any richly coloured plant which harmonises with the roses employed. Specimen glasses containing similar rose-buds to those on the drapery may be used at intervals,



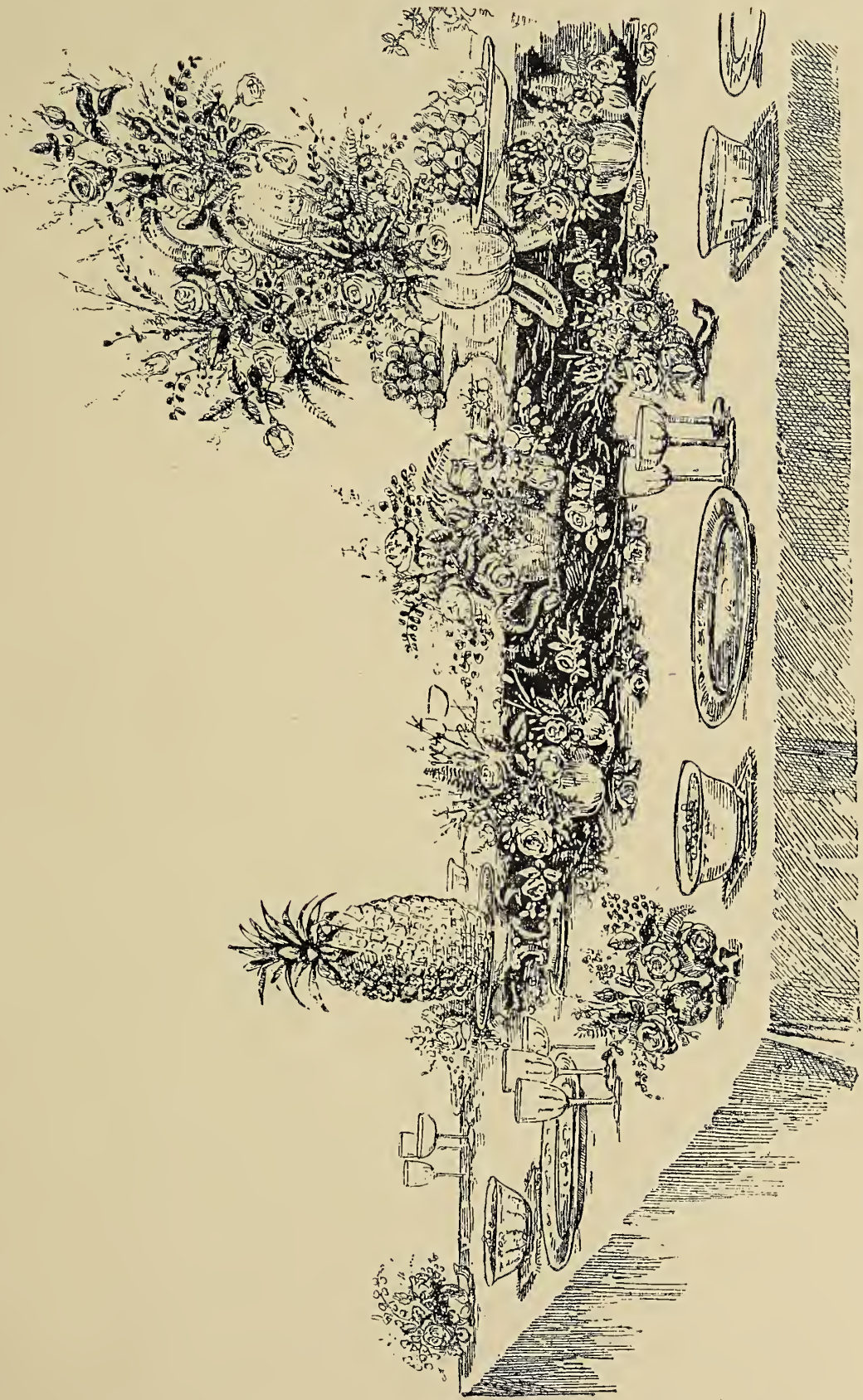


TABLE DECORATIONS WITH ROSES AND YELLOW CHINA. (See page 22.)



and tiny bowls of silvered glass (or china) may be filled with small pots of maidenhair fern for the corners, or to alternate with the crystal vases. Small shaded lamps, too—much used on the dinner-table—add greatly to the general effect of soft light and colour.

When roses are scarce, pelargoniums, freesias, Shirley poppies, and many other flowers, will be suitable for these specimen glasses (which should be about six inches high), always avoiding brilliant yellows with old gold drapery, and subduing the whole effect with plenty of fern or flowering grasses. With silk of a soft tint of green, almost any flowers may be used, and china of various colours; but with old gold drapery, turquoise, or marone and white, are the most suitable tints for the china, with clear or frosted glass.

A slight modification of the above plan is illustrated on p. 21. In this design the centre of the table may be covered with crimson plush, and yellow china vases, filled with white lilies, roses, and ferns, arranged in a free and graceful manner. The plush should be laid in a *negligé* style, and have rose blooms dropped here and there on it or at the sides. Small vases filled with flowers should be dotted about near the corners and sides, and sprays of maidenhair fern placed in the finger bowls.

For the second plan of decoration, the softly-tinted new tablecloths are used in preference to the draped silk; white damask slips being placed under the plates, and removed at dessert time.

On a "crushed strawberry" cloth, all pinks except those in perfect accord with the cloth must be avoided; here creamy marguerites, arranged lightly, two or three in an iridescent glass, with fern, grasses, and perhaps a spray or two of *Myosotis dissitiflora* (forget-me-not) will be perfect in effect, with white and gold china and iridescent glass. A tall elegant palm will be the centre-piece, no decided colours being needed; or *Spiræa japonica*, with crimson shaded lamps, will carry out the scheme of "*strawberries and cream.*"

On these lovely cloths it is not difficult to carry out the Anglo-Indian plan to perfection. For instance: on a tablecloth in soft shades of heliotrope may be placed a central plant of feathery fern, with a wreath of selaginella, fern, or other delicate foliage surrounding it, in a star, or spiral design. Violas (which are now brought to such a pitch of perfection) or purple pansies may be used to enrich these stars, which will surround every soft shaded-lamp and every dish of fruit on the table. The rich apricot buds of the William Allen Richardson rose, or buff marguerites, with fairy-like sprays of *Asparagus plumosus* or fern, may be used as occasional groups; and the china, which must not



be of an obtrusive colour, should complete the harmony of purple and soft yellow.

With reference to the fourth plan, represented at the head of this chapter, a charming effect can be produced by the use of berries and winter foliage for table decorations. There will be seen a centre-piece filled with small branches of the Scarlet-fruited Barberry (*B. vulgaris*), the rich, glaucous purple fruit of the Holly-leaved Barberry (*Mahonia aquifolia*), the brilliant orange-red capsules of the Winter Cherry (*Physalis Alkekengi*), and the fairy-like silvery placentas of the pods of the Honesty (*Lunaria biennis*), with a sprig or two of the yellow winter jasmine and a few blooms of the Christmas rose interspersed between them. From the centre-piece to the four candelabra hang festoons of ivy, and under these are two ornaments filled with Christmas roses, small sprigs of ivy berries, and barberry fruit. Around all is a border of rich, bronzy-tinted ivy, and a tall glass in each corner filled with sprays of solanum and barberry berries, and flowers of winter jasmine and Christmas rose. At each corner and in the middle of each side, just outside the ivy edging, a few sprays of mahonia leaves, barberry and solanum berries, and blooms of Christmas rose are tastefully arranged. The warm, glowing colours of the berries and the rich bronzy tints of the foliage combined, render such an arrangement exceedingly effective when the room is lighted up in the evening. There are plenty of such materials to be obtained. In addition to those mentioned, there are holly berries, also berries of the Evergreen Firethorn (*Crataegus pyracantha*), and Sea Buckthorn (*Hippophae rhamnoides*). These, with everlasting flowers and dried grasses, may with little taste be utilized with good effect for the decoration of the Christmas dinner-table.

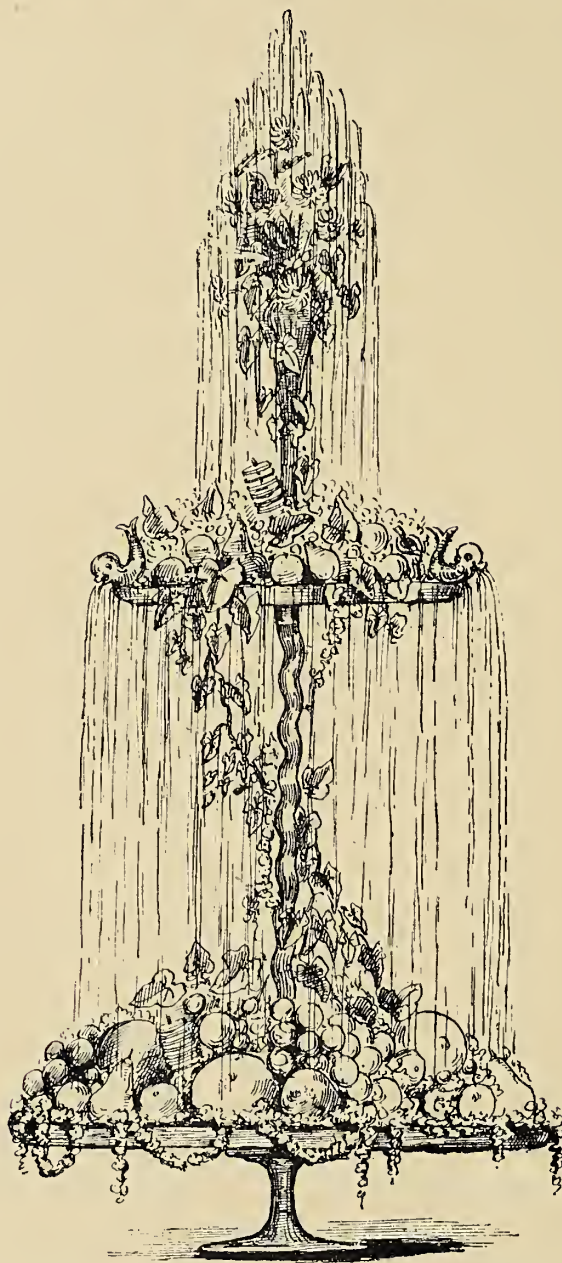
The foregoing explanatory specimens of table decoration may, of course, be modified and varied endlessly; but it will always be found the best plan to use only two, or at the most three, kinds of blossom at the same time, with ample greenery.

Those who live in the country will find a delightful task in supplying the table with exquisite flowering grasses, tinted oak, maple, and other leaves, sprays of delicious creamy meadow-sweet, and all manner of lovely wild flowers; while, fortunately for town dwellers, the craving for country delights has induced the flower-shops to lay in regular supplies of grasses and decorative items of many kinds from our lanes and hedges, which a few years ago would have been unsaleable commodities.

Assuming that grasses, foliage, and cut flowers are not readily come-at-able



in winter, a very pretty decoration may be ensured as follows: Procure an old-fashioned double-tiered épergne; fill it with crystalised fruit, oranges, and grapes, drop popped corn into all the little spaces, and let festoons of the



FROZEN FOUNTAIN ÉPERGNE.

same fall here and there over the edges, and then get some stiff wire, rolled first in green and afterwards in talc, and arrange this as shown in the accompanying illustration. You will then have a capital imitation of a frozen fountain.



A dinner-table is intended chiefly for the enjoyment of those who sit at it, and should never be made an occasion for ostentatious display of plate or cumbrous ornaments. One of the charms of a good dinner is agreeable conversation; we cannot enjoy a meal that is eaten in dead silence. Now, the more heavily weighted the table is with plate or with massive ornaments, the more are the guests oppressed by grandeur and awed into silence. For every necessary purpose of the feast there can be nothing too good. The precious metals are better than crockery for the reception of the viands, and china is better than pewter or wood. But there is a point at which to cease in the employment of costly furniture, and we certainly reach it when we begin to enrich the scene with fruits and flowers. These claim admiration on their own account, and require only to be placed in elegant receptacles in an elegant manner, so as to be seen from all points, and to offer no obstruction to the interchange of words and glances across the table, and so as not to overweigh or oppress the social light that belongs to the scene, and which is so easily crushed by excess of grandeur, or much more display of any kind than is appropriate to the place and the persons assembled. At a grand dinner we expect to see grand decorations, such as at a humbler table would be extravagant or perhaps absurd; but the comfort of the guests is the matter of primary importance, and the embellishments of the table are to be adapted to that end; the guests are not to be adapted to the decorations. When two friends happen to be placed on opposite sides of a table, with a large urn stuffed full of artificial flowers in the form of a gigantic cauliflower, and they have painfully to bob their heads right and left to catch the merest glimpses of the extreme outside edges of each other's physiognomies, they are apt to decry the gay cauliflower and its sumptuous receptacle, instead of giving God thanks for their happy meeting and their well-spread table; or will certainly entertain undesirable notions as to the ideas of their host in matters of taste and propriety. *The chief adornments of a dinner-table are the guests assembled.* Let that be remembered for ever and ever. The wealth of Cræsus might as well be flung into the sea for the distraction of the fishes as be employed in overloading the table whereat his guests have assembled, not so much to be convinced of his wealth and grandeur as to see each other, and to do justice to his hospitality by enjoying it. For the present, this perhaps will be enough on the general requirements of dinner-table decorations.

In furnishing vases, plateaux, and other contrivances, a certain richness of



effect should be aimed at, but with the softening aid of a certain happy ease and negligence. Let us again take up the story of the requirements. As we are to sit for some time at the table, and may frequently look at the decorations, perhaps even talk about them, the more choice and beautiful the flowers and fruits the better. A good effect in the whole grouping is undoubtedly the matter of highest importance. Weeds tastefully grouped are to be preferred to orchids clumsily heaped up, and as it were thrust upon us. But given a couple of vases equally tasteful as to arrangement, one filled with the commonest flowers of the field or garden, the other with rare and costly flowers, the last must have our preference certainly. We require in the first place a good general effect; for these decorations constitute a part of the *visible welcome* which a table spread for dinner should offer in every one of its several features. But when we have been seated long enough at table to take notice of the sorts of flowers and fruits that are there grouped, the more individual beauty and interest we find amongst them the better. As to suitable subjects, to enumerate them is impossible; their name is Legion. But almost anything and everything that the garden or the field will furnish may be employed, provided the decorator has the taste and judgment requisite for the task. We have seen such things as hollyhocks and dahlias, which, in truth, are "lumpy" flowers for this sort of work, employed with the best effect; and we have seen delicate grasses and fuchsias which are pre-eminently adapted to the purpose, so badly set up as to have no grace at all, but rather as if to hint to us that an angel when its wings are crumpled is but a chubby child after all—perhaps a clumsy one of his sort. We must, as a rule, be content with what the season and our resources place at our command; but in selecting from our stores, whether they be great or small, a few more of the requirements of the case must be kept in view. Let us once more return to first principles.

In the majority of cases the table is arranged by daylight, but is to be seen by artificial light, whether of electric light, gas, or of candles. The particular light under which they are to be displayed is a consideration of the first importance. Usually delicate shades of lilac, such as we have in the Chinese primula, have the appearance of dirty white by artificial light; some shades of blue, such as we have in *Plumbago capensis*, change to a washed-out slate; and all yellows, from deepest orange to the palest primrose, undergo considerable change, rarely for the better. White and most shades of red are least influenced by the quality of the light, and if duly proportioned with





DECORATION WITH GLASS, AND LILIES AND ROSES.



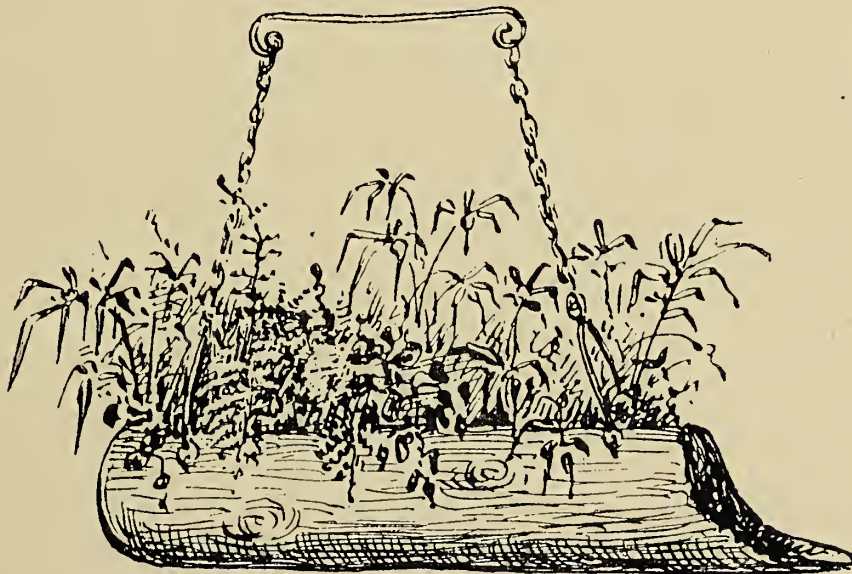
shades of green, the grouping may be rendered at once rich, varied, fresh, and pleasing. The experienced artist will at times use almost anything, and all will be right in the end; for the worst colours may be improved by skilful association, as the best may be made obnoxious by excess or injudicious combinations. Suppose it is winter time, and we cannot have fuchsias for the effect required. We can have the crimson tube of *Thyracanthus rutilans* instead, and in all nature we can scarcely find a better subject as a central object with pendant flowers of the best possible colour for artificial light. All roses of every kind look well at night. Pelargoniums of every kind are equally fortunate, for they do not offer us any blue or yellow tints that suffer change by artificial light. Speaking generally, orchids of all kinds are suitable; sprigs of heath and epacris are admirable. Strange to say, the lovely mauve flowers of *Justicia speciosa* change to a rich bright crimson under gaslight, and some cinerarias of a mauve cast, especially if edged with white, come out well. As a rule, beware of blues and yellows of every shade, and of the colours into which they enter largely, as orange and purple, or your best daylight work may be poor indeed when placed beneath the treacherous gaslight.

There is yet another matter of some importance. It is that the flowers are required to last some time; if they fall to pieces before the feast is over, it is matter for regret, and may be evidence of defective work in the first instance. The subjects should so far as possible be selected, not only for their fitness as to form and colour, but as to capabilities of endurance. The lovely and delicate *Spiræa Japonica*, which looks too frail for enduring the heat of a dining-room for an hour, will wear out the longest night and still look fresh. The stoutest leaves of caladium that can be found will begin to look flaccid, perhaps will actually shrivel, in an hour or two in a dry atmosphere. Perhaps as much depends upon the mode of setting up the flowers as upon their relative texture and powers of endurance. Those that have been carefully cut with a knife will last longer than those the stems of which have been mangled by rude finger-nails, or even with scissors; for crushed vessels cannot take up moisture so effectually as those that have been cleanly severed. Something may be done, however, to assist the fragile candidates. Take a frond of maiden-hair fern; dip it in water, gently shake it, so that it appears dry, and, whether placed with its stem in water or not, it will last out twice as long in a hot room as a frond from the very same plant that was not so dipped. There is no mystery in the matter. There is a certain amount of



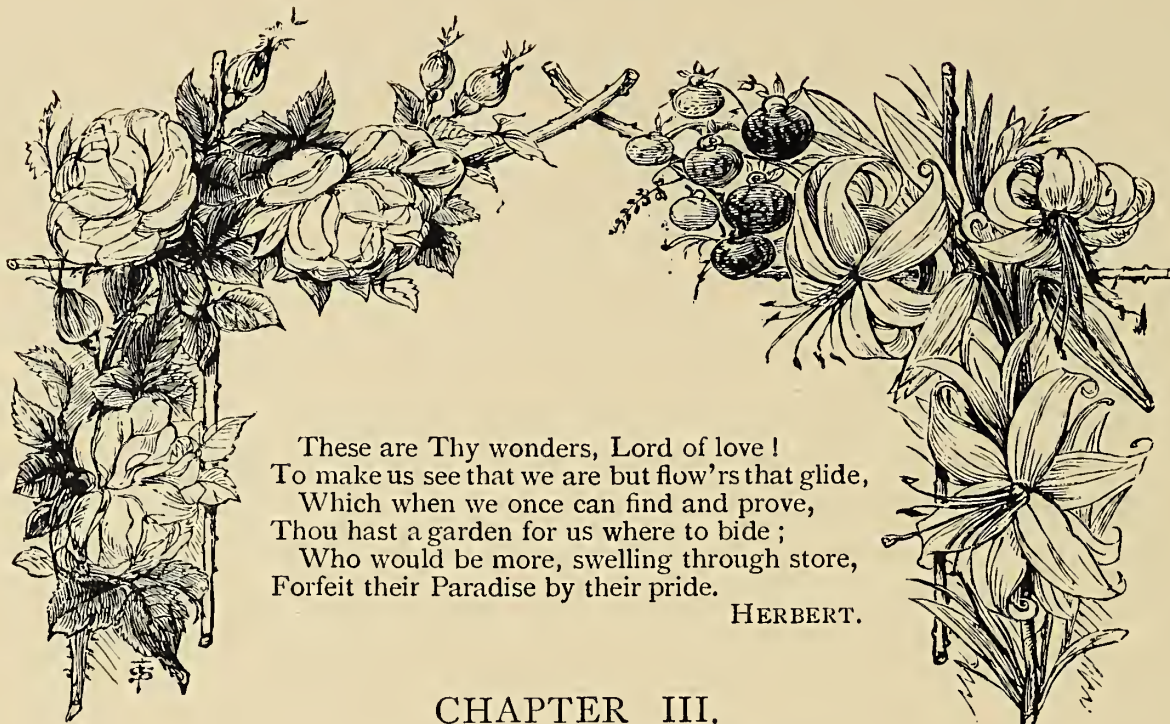
moisture, the result of the dipping, entangled in the texture, especially about the margins of the pinnules, which assists to preserve its freshness; in this we have the explanation of the fact. Generally speaking, dipping is not necessary, but it is well to bear in mind that, when our work is likely to be severely tried, we have this resource to aid it.

There are many more points that might be dwelt upon, but we must be content to mention only one, and that is, that flowers which emit agreeable odours or that are quite destitute of fragrance are to be preferred to such as offend the nostrils. Some odours are agreeable to many persons and obnoxious to others. The chrysanthemum is a fair example of the debateable flower, which we must use with caution, because to some it is agreeable and to others otherwise. Recurring to the subject of colour, and remembering that in November, when chrysanthemums are at their best, other flowers are scarce, the temptation to use them at that season is great, because, as a rule, they look well by gaslight. But it is possible for some one placed near a group of these most useful flowers to be very unhappy by reason of their peculiar odour.



BARK BASKET OF FERNS.





These are Thy wonders, Lord of love !  
To make us see that we are but flow'rs that glide,  
Which when we once can find and prove,  
Thou hast a garden for us where to bide ;  
Who would be more, swelling through store,  
Forfeit their Paradise by their pride.

HERBERT.

### CHAPTER III.

#### DECORATIONS FOR THE HOME.



ALTHOUGH the seasons must determine by their productions the nature of the materials to be employed, certain principles of action apply to all the various methods of embellishment adopted for different parts of the house. We may take lessons at flower shows to advantage, but we must modify our tactics to suit the domestic scene, for the formality of a display resulting from a settled competition is the very thing we do not want. But let us take one lesson on a point of art. We enter an exhibition, and find the plants on high stages of rough wood, and we see the pots in which the plants are grown far more perfectly than the plants themselves. This is a quite common mistake. In another instance, we find the plants staged on a low bed, the ground-work being a clean grass turf, the pots hidden, perhaps, by means of baize or grass mowings, or at least overshadowed by the plants themselves, so as to be no longer



obtrusive and therefore objectionable features. Here is a good practical lesson, the angle of vision must determine the primary features of the arrangements, or suggest the devices necessary to obviate the results of inconvenient positions. Now, let us find another lesson. We may see in an exhibition of the grandest character features scarcely less objectionable, though perhaps unavoidable in the association of many plants in large groups, the result being a monotony of glaring colours. The continental exhibitions far surpass our own in this respect; artistic grouping is usually attempted, and not without a pleasing degree of success. Suppose we gather up a lot of pelargoniums all aglow with flowers, and put them all together as a group. They will scarcely please a true artist, however filled with delight the florist may be by their perfections. We will therefore separate them and mix them up with ferns, palms, eulalias, the elegant *Cyperus alternifolius*, and the very characteristic *Yucca aloifolia variegata*. The difference is so great, that if decorating is to be a matter of principle at all, we have it plainly proved that elegance of form is of as much importance in the selection of plants, possibly of more importance than richness of colour. Of necessity we must have both, and the most lumpy subjects that afford abundant flowers will prove of the utmost value if relieved judiciously by means of plants that have bold, distinctive, and elegant outlines. Therefore those who grow plants for home use, should be careful to have a sufficiency of subjects adapted to give the relief desired—flowers are rarely wanting, and too often are too profusely employed; but it is of great utility to understand the general principles on which they should be used. We will therefore now pay a visit to the home of a lover of flowers, and describe, in a few words, the summer plants which decorate it.

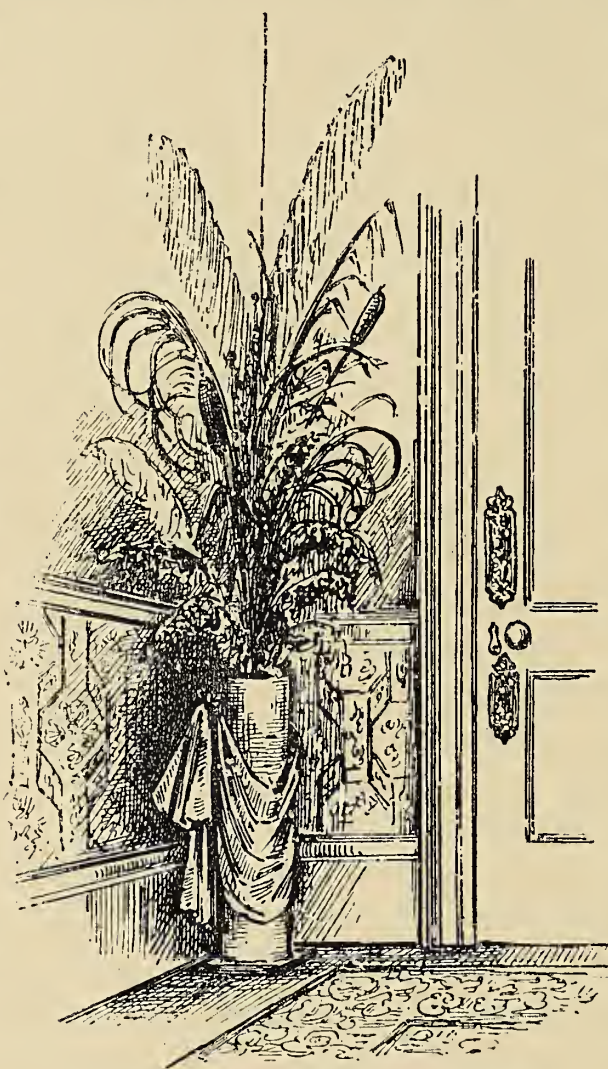
On reaching the entrance, guarded by high pillars (wreathed with *Wistaria sinensis*, and the creamy stars of *Clematis montana*), we meet with a group of white hydrangea (Thomas Hogg), backed by the broad bronze leaves of *Ricinus Gibsonii*, in front of which, and grouped with them, most brilliant blossoms of pure scarlet pelargoniums give a mass of warm colour. These are all old plants, saved from the borders of last season, and carefully potted on to become the specimens they are. In front of these, and hiding their pots, stand alternate plants of pale blue lobelias, Harrison's musk, the delicate green-leaved *Selaginella Kraussiana*, and the elegant rush-leaved *Isolepis gracilis*. These will impart a finished look to the group, and altogether make an effective display.



The doors stand open (for we are within gates at some distance from the road), and through them, as we enter, streams a welcoming perfume of many flowers. A magnolia bud and blossom, displayed only with its own foliage in an old china bowl on the hall table, partly accounts for this delicious fragrance; but there is also a delicate whiff of burnt almonds, which must come from vase, of pure and standing eighteen ground, which bouquet of (*Spiræa ulmaria*), fronds of Lady *felix-fœmina*), and sprays of wild giving an effect gance to the Single palms and are also used ferns are only corners (for the where the draught them; and we are English ferns, varieties now in- of our leading

Entering the walls and drapery a grey-green tint, a floral bower. hidden by rich

and in front of these a group of foliage plants and ferns surround the tall stems of *Lilium speciosum var. Kretzeri*, with their lovely silver blooms and the soft clear pink, crimson-flecked blossoms of *Lilium speciosum* and its varieties. A royal group it is, a feast of perfect form; and from the mantel-board above these hangs a delicate spray of white passion flower (*Constance Elliot*) on one side, while the other is occupied by a basket of roses, fresh from the garden. A simpler, but probably quite as effective,



A CORNER ORNAMENT OF GRASSES.

the tall majolica simple shape, inches from the holds a glorious meadowsweet surrounded by fern (*Athyrium* surmounted by oats and grasses, of lace-like elefoamy mass. specimen ferns here, but the in the further hall is broad), does not hurt observe that they of the improved troduced by some fern-growers.

drawing-room, the of which are of we are, indeed, in The fire-place is marone curtains,



an arrangement for a fireplace, is depicted in the accompanying illustration. Instead of the lilies and foliage plants, a tall vase tastefully filled with flowers, foliage, and grasses occupies the central position, while on one side is a graceful fern, *Pteris hastata*, and on the other a golden marguerite, both in ornamental vases. Above, on the mantelboard, is a plant of *Cyperus alternifolius*, with

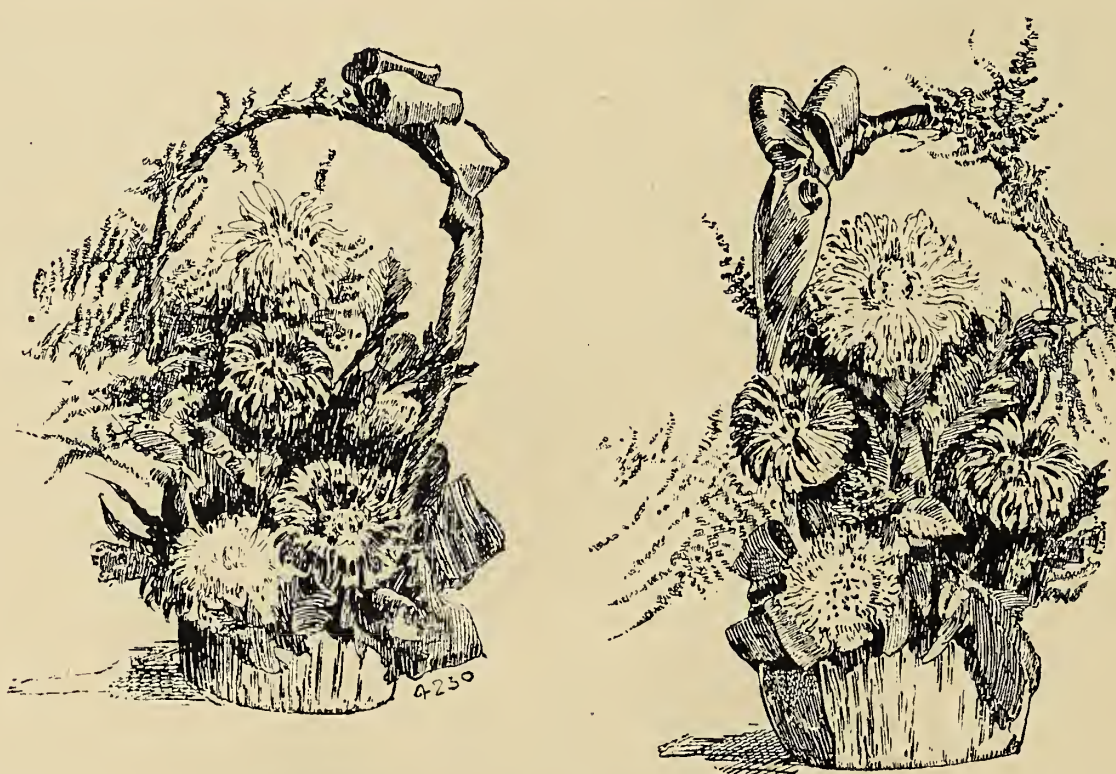


A SIMPLE FIREPLACE DECORATION.

small glasses or bowls filled with cut flowers. At various points are displayed specimen plants of tuberous begonias. "Leah," with her fine dark foliage, and clear yellow flowers, lights up a side-table, standing against some soft green drapery. "Mauvette," a most floriferous double begonia, of the deepest shaded marone, gives point (in a pale turquoise bowl) to another corner; while the darkest place of all is illuminated by the pure white stars of *Nicotiana affinis grandiflora*,



which shine all day if kept from the direct light of the sun, although they hang their heads in the conservatory. Quaint glasses, in many directions, contain bouquets of Shirley poppies, cornflowers, and marguerites, carnations and mignonette, or a half-open rosebud with a spray of its own foliage, and a frond of maiden-hair fern ; and on an Indian cloth of gold embroidery stands a small group of magnificent pansy-blooms. These are deftly arranged in fresh green moss, with sprays of tiny ferns and selaginella ; and from the saucer-shaped vase of majolica arises a small central tazza, which contains a



PRETTY BASKETS OF CHRYSANTHEMUMS.

few sprays of viola foliage, *Asparagus plumosus* ; and ferns, between which some of the finest pansy blossoms show their gorgeous velvet to the greatest advantage, with others, contrasting, placed in the surrounding moss and fernery.

We thus perceive that the true principle in arranging flowers is to supply their own foliage, with plenty of light grasses and ferns ; so that the rich and delicate tints of the flowers are set off by the fullest natural surrounding of greenery ; not mixed and confused with other tints too closely placed. At the same time two varieties, or even three, of blossom may occasionally be



used in small quantities in the same bouquet ; for instance, buff marguerites, with the purple stars of *Clematis Fackmanii*, are a delightful combination ; and the living turquoise gems of *Myosotis dissitiflora* may well be added to any bouquet of creamy white, with a touch of carmine or a spray of pelargonium of the "show" kinds, or the ivy-leaved varieties. But some of these last incline to a magenta tint, and of this we must beware ; for magenta is a



HAMMOCK OF DAFFODILS, FERNS, AND SMILAX.

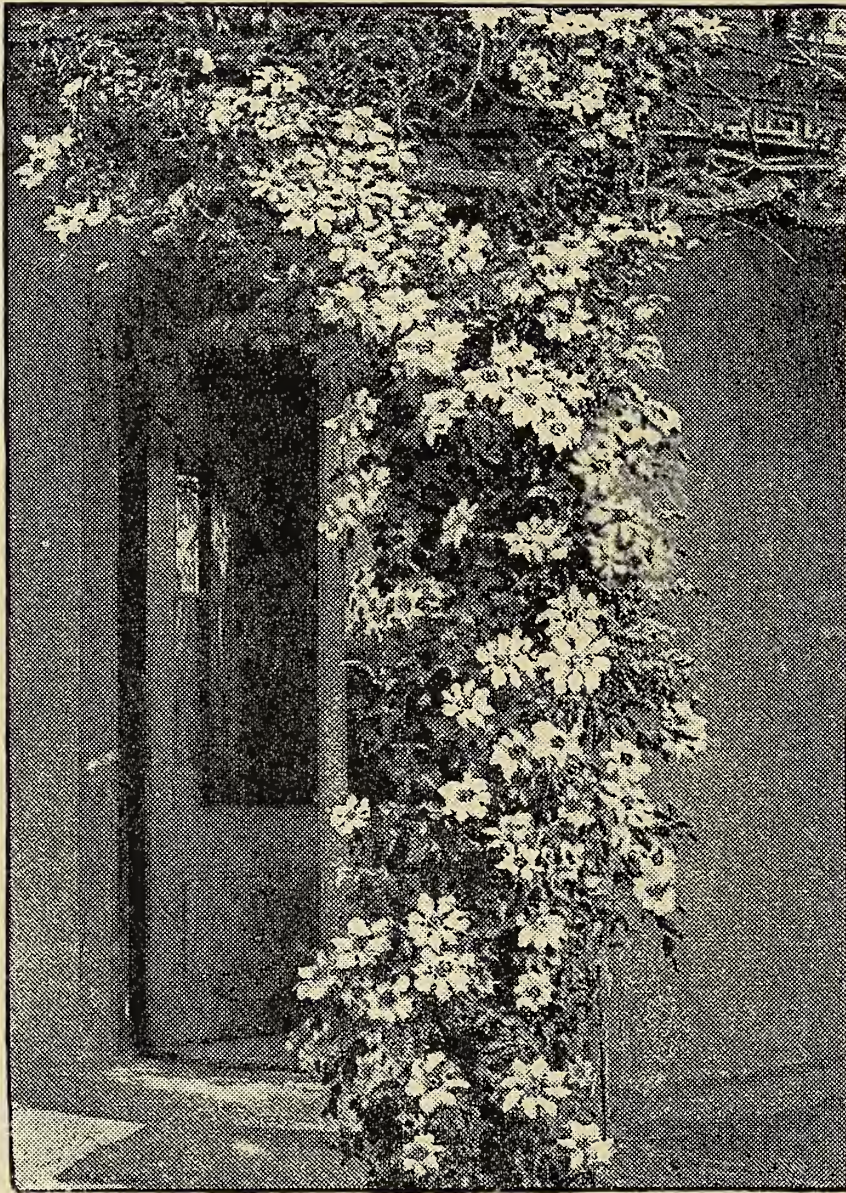
quarrelsome colour, which agrees with few of its neighbours, and positively kills many of them.

But enough of the drawing-room ; the day is fine, and a broad verandah outside the open French window, with a broad and well-planted lawn behind it, looks really tempting. At the invitation of our friend, we step through the open glass door, and find outside fresh groups of floral treasures.

In the central alcove stands a magnificent group of fuchsias, rising to the height of five feet, backed by foliage plants and the elegant green waterfall of



*Zea Japonica variegata* (Japanese maize); cannas, with fine dark foliage and brilliant carmine spikes of bloom, make a lovely group with the warm spikes of tuberoses; and yet another successful combination is that of the



CLEMATIS ON A VERANDAH.

various exquisite shades of Kelway's and Lemoine's gladioli, grown in pots and well-arranged with ferns and foliage.

Stepping out upon the lawn, a view of the whole garden-front of the house is attainable, and this may be well described as a home of flowers. Roses, clematis, jasmine, and virginian creeper wreath the light iron supports of the



verandah ; each of the windows has a setting-of *Tropeolum Canariensis* in full bloom, with a box of ivy-leaved pelargonium, blue lobelia, and delicate white fuchsias on the sill ; and the charming groups of flowering plants on all sides of the verandah complete the floral effect. Yet, on inquiry, we find that no hot-house has been necessary for any of the flowers mentioned, only the ordinary moderate heat of a conservatory, which is the home of the more delicate plants used for decoration (to which they are removed at night, and which now contains a fine show of tuberous begonias of great beauty), with a vinery as a cool house, and frames for early spring work. But the house contains a lover of flowers, and the arrangement and care of these pets is not left entirely to the hired gardener, useful and indefatigable as he is.

The refined taste of a highly cultivated mind brought to bear more especially on the grouping and arrangement of flowers, should surely bring about more tasteful arrangements than are commonly to be seen where to the gardener is left both the choice and the grouping of the plants, often resulting in a stiff row of similar pots, each containing a handsome plant, truly, but so like its neighbour, and so wanting in foliage to set off its beauty, that the eye turns from it in search of more satisfying charms.

Another common error in arranging flowers may here be noticed, *i.e.*, the great display of stakes and matting which so often destroys the natural symmetry of the plant. On entering a chrysanthemum show, for instance, who can really admire the form of an unfortunate plant which has every shoot tightly tied to a stake, at the end of which appears an enormous bloom, certainly, but a bloom deprived of all the grace which it was endowed with by Nature, looking now more like a well-made pincushion on a stick than the central flower of what should be an exquisite spray ? Foolish rivalry as to the number of the inches of the poor thing's diameter has robbed it of its gracious beauty, and it is only fit to be cut and placed as one more rosette amongst a dozen in the terrible little tin arrangements in which blooms are condemned to exist at flower shows, minus all greenery, and often in juxtaposition to the most conflicting shades. When shall we learn that Nature, well supported, knows best, and cease to contravene her laws ? In the meantime, a practical piece of advice may be given, namely, to use as few stakes as possible, and these of a dark-green colour. Soak the raffia used for a short time in a little green dye, so that it may not be noticeable amongst the foliage, and keep each plant as far as possible to its natural form,



avoiding any formal and angular arrangement, for these are unknown in the natural world.

Returning once more to the subject of winter flowers, we will dispose of snowdrops, crocuses, hyacinths, and tulips in very few words, but those words shall be such as are not to be found in nurserymen's catalogues. All these bulbs (and a few more that are really not worth mention) may be grown in water or moss on the sideboard and in the window, and in almost any kind



POT OF SNOWDROPS LIFTED FROM OPEN GROUND.

of receptacle. The old-fashioned hyacinth glass is nearly extinguished, and we now see beautiful Etruscan vases, porcelain baskets, rustic boxes, and urns employed in this department of domestic gardening. All things considered, Tye's hyacinth vases are the best, both in respect of usefulness and elegance, of any among many contrivances that have competed for popularity. If it were as easy to grow the flowers in dwelling-rooms as it is to buy suitable receptacles for them, we should have little to say upon the subject here; but the ten thousand "directions" circulated by traders in bulbs bring forth little fruit; for, as a rule, the examples commonly met with are such as can only give pain to those who know what good cultivation means, both

as to requirements and results. Bulb-growing in glasses and other elegant vessels may be considered a failure always, and the one prevailing cause of the failure is *insufficiency of light*.

We will not dwell upon the subject, for fear we should dispirit some who find in this branch of parlour gardening an agreeable recreation, attended with remunerative results. But we will make one remark on our own practice, for we do employ bulbs largely in domestic decorations, as well as in the



embellishment of public fêtes and soirées in the winter season. All the bulbs intended for this work are planted in pots of rich soil, and have the usual greenhouse or stove culture that would be required for plants intended for exhibition. In other words, they are really cultivated, and their flowers have their true colours, and are borne on stems capable of supporting them. It is a very small task, indeed, to shake them out, wash off all the soil from their roots, and insert them in the ornamental vases; and then they are ready for decorative purposes, and will maintain their good looks and fragrance for a fortnight if required, if only treated with a little care. Snowdrops, and for the matter of that, crocus and scillas, may be lifted from the open ground, in bunches, with a little soil attached to their roots, and placed in small pots, bowls, or other bric-a-bac, just when they begin to show their flowers. Given a moderate amount of water, they will flower quite as long as those grown entirely in pots, and the blooms be much finer. By this method of procedure a grand display is secured; but we lose the recreation of growing the flowers by the fireside, which may be too great a price to pay for it.

The last subject demanding notice in this section is that of Everlasting Flowers, and these are far more deserving of eulogy than many will suppose who know them only as they appear in the London shops. The very last idea of those who provide these flowers for sale is to allow nature to speak in or by them. They are *dyled*, and thereby we lose their natural colours. They are mixed with grasses and mosses, also dyed, and they are gathered up in ugly bunches, as if intended for brushing crumbs or cobwebs—not at all as if intended to serve as ornaments, and to take their place as flowers.

The only way to employ these beautiful flowers with good taste is to preserve their natural colours, and mount them all on wires, for their stems do not maintain their original rigidity sufficiently; and, moreover, in the manipulations to which they must be subjected, they are likely, if not wired, to separate from their stems and become suddenly useless. A few words on the subject will close this chapter appropriately; we beg that it may have attention, for, though short, it contains much, and is thoroughly practical.

First, as to cultivation. All the annual sorts, both of everlasting flowers and grasses, are best grown by sowing the seeds in light rich soil in March or April, and treating the plants in just the same way as asters; that is, in brief, getting them strong by the middle of May, and then planting them out. But if this is not convenient, they may all be sown on a rich light sunny border, in the



early part of April. Every patch should be tallied, and a bit of seed of every sort kept in reserve. About the middle of May sow again any that have not by that time come up. By this plan you will be likely to secure all the sorts on which you speculate.

Next, as to gathering the flowers. Take them in all possible stages ; but by far the largest proportion should be young and scarcely expanded, as they are sure to expand in the process of drying. To dry them, lay them on papers in an airy warm place, *safe from dust*, and store them when dry in dry closets or drawers where dust is as nearly as possible unknown. The grasses may be dried by simply laying them between folds of blotting-paper, or placing them between the pages of large heavy books. Remember, "practice makes perfect" ; the beginner is sure to spoil a few ; never mind, there will be many good ones to make amends.

As to mounting, the grasses must be used in their natural state ; but it is best to mount the flowers on wires. This is a nice proceeding ; but ladies generally acquire the art in haste. The finest steel wire is the best adapted to the purpose, and it is attached to the flower at the base by merely thrusting it into the centre ; but the wire should have a few twists to make a sort of base to catch the flower, or rather, for the base of the flower to rest on. As to modes of grouping, that must be a matter of taste and practice. The illustration represents a wreath formed of helichrysums and grasses, and filled in with green moss, the solid foundation, or ring of the wreath, being formed of the wires on which the flowers are placed, twisted and twisted into a sort of rope, with the moss thickly entangled between them.

The best everlasting flowers for this purpose are the following :—

*Helichrysums* of all kinds ; more especially *H. atrosanguineum nanum* and *H. Borossorum rex*. All are half-hardy annuals, to be raised on gentle heat and planted out in May, or sown in the open ground in April. As they are so useful, it would be well to try all the sorts the seedsmen can supply. *Acroclinium roseum* should be sown in pots and pans in April, and placed in a cold frame, or sown in the open border at the end of April

*Rhodanthe Manglesi*, *R. atrosanguineum*, *R. maculata* and *R. Major* are half-hardy annuals requiring similar treatment to acrocliniums. *Helipterum Sandfordi* and *H. corymbiferum* require careful culture. Sow, if possible, in a temperature of 65 deg., in February, and treat like lobelia. These are the least likely to succeed if sown in the open border in this country. They are so beautiful that they well repay a little extra care. *Polycolymnia Stuarti*



is a hardy annual, but none the worse for being pushed forward under glass. *Ammobium alatum* is a perennial, but should be treated as a half-



A WREATH OF EVERLASTING FLOWERS.

hardy annual, as it is sure to be killed by a sharp frost. *Waitzia corymbosa* and *W. grandiflora* are fine half-hardy annuals ; but of no use to beginners



for winter wreaths. They must be started early to make sure of a good bloom. *Xeranthemum annuum*, *X. album*, and *X. purpurea* are fine hardy annuals, all of which may be sown in the open ground in April. They are not the most desirable, as their colours are apt to fade when dried; but this may be in some part prevented by drying them *quickly in the dark*, and in a very dry warm atmosphere. Try them in an oven when the fire is nearly out. As for *Aphelexis*, *Phœnocomas*, and *Statice*, all the varieties known are good.

The following is a list of flowering grasses suitable to grow in the garden, and the inflorescence of which may be used in a fresh or dried state. All of them require to be treated as annuals, *i.e.*, sown in patches in ordinary soil in a sunny position early in April, where required to grow. Only just cover the seed with soil. Gather the inflorescence directly it is fully expanded, and dry it by spreading it out thinly on sheets of paper in a cool, dry place. *Agrostis dulcis*, *A. elegans*, *A. nebulosa* (Cloud grass); *Anthoxanthum gracile* (Vernal grass); *Avena sterilis* (Animated oat); *Briza major* (Quaking grass); *B. gracilis*, *Brizopyrum siculum* (Spike grass); *Bromus brizæformis* (Brome grass); *Ceratachloa pendula* (Horn grass); *Chlora barbata* (Windmill grass); *Chrysurus aureus* (Golden-spiked grass); *Coix lachryma* (Job's Tears); *Eleusine coracana* (Wire grass); *Elymus Caput-medusæ* (Lyme grass); *Eragrostis elegans* (Love grass); *Hordeum jubatum* (Squirrel-tail grass); *Lagurus ovatus* (Hare's-tail grass); *Lasiagrostis splendens*, *Leptochloa gracilis*, *Panicum capillare* (Old Witch grass); *Paspalum elegans* (Millet grass); *Pennisetum longistylum*, *Piptatherum Thomasii*, *Stipa pennata* (Feather grass); *Tricholœna rosea*, *Uniola latifolia* (Sea Oats).

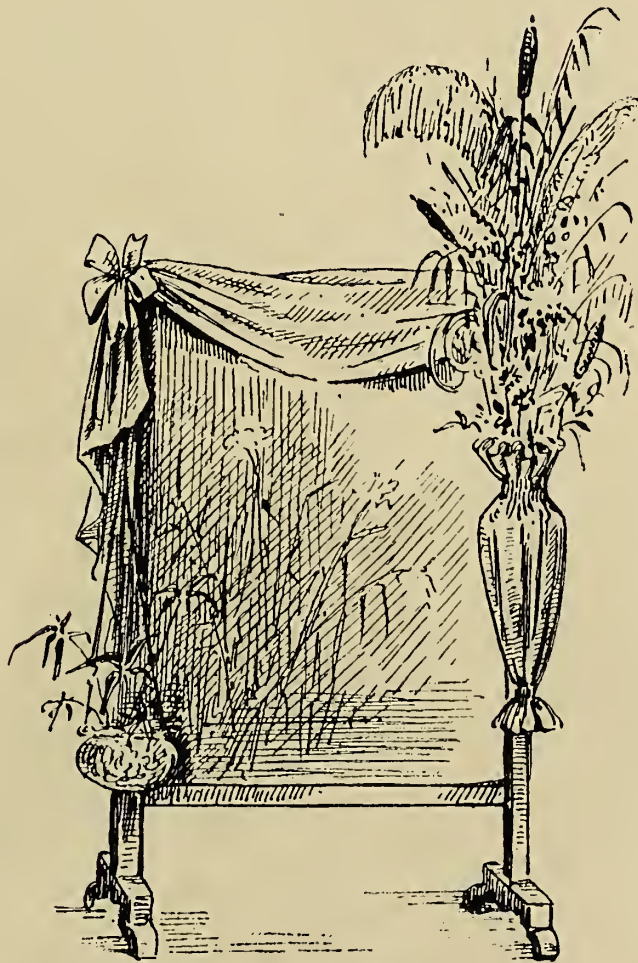
Of strictly hardy perennial grasses the following are exceedingly useful:—*Andropogon giganteus* (Giant Beard grass); *Arundo conspicua* (Silvery Reed grass); *Chloropsis Blanchardiana*, *Eriantha Ravenneæ* (Woolly Beard grass); *Gymnothrix latifolia*, *Gynerium argenteum* (Pampas grass); *Tripsacum dactyloides*. Plant strong tufts of these in April.

Subjoined is a list of wild grasses, with situation where they are most likely to be found and time for gathering:—*Apera Spica-venti* (Bent grass), sandy fields, July and August; *Aira cœspitosa* (Tufted Hair grass), pastures, August; *Arrhenatherum avenaceum* (False Oat grass), waysides, June; *Avena flavescens* (Yellow Oat grass), chalky pastures, June; *Bromus sterilis* (Barren Brome grass), fields, August; *Briza media* and *B. minor* (Quaking grass),



hilly pastures, June ; *Glyceria fluitans* (Floating Manna-croup), ditches August ; *Melica uniflora* (Wood Melick grass), shady woods, May ; *Milium effusum* (Millet grass), shady woods, June.

Here are a few wild rushes and reeds :—*Carex remota*, shady places, July ; *Juncus lampocarpus* (shining-fringed rush), bogs, July ; *Typha latifolia* (Reed Mace), ponds, August.



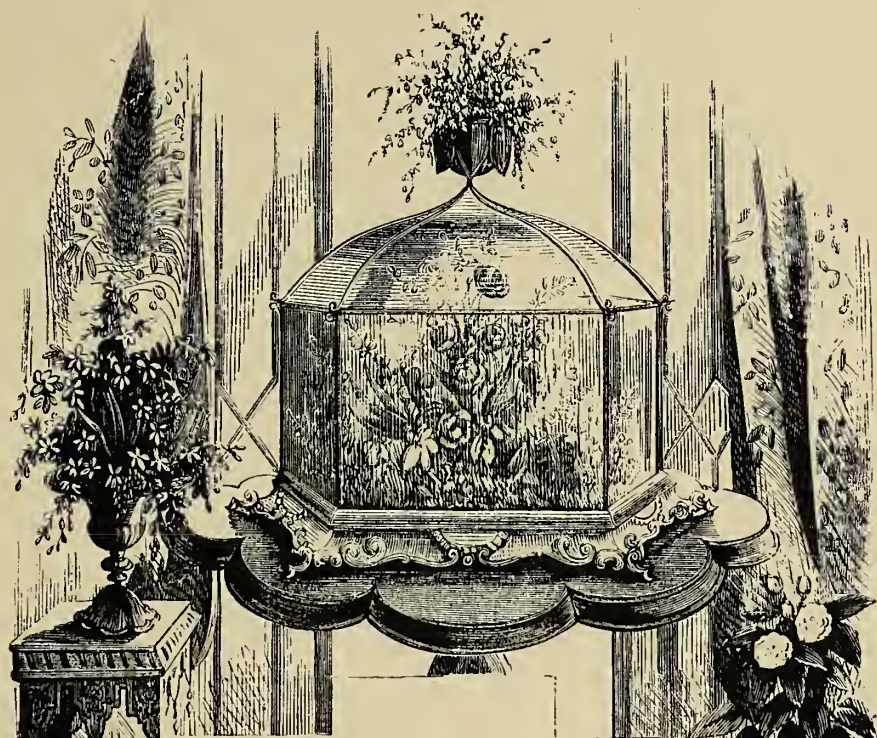
DRAPED SCREEN, WITH GRASSES AND FERNS.





BLECHNUM SPICANT PLUMOSUM.





## THE FERN CASE.

In princely halls, and courts of kings,  
Its lustrous ray the diamond flings,  
Yet few of those who see its beams,  
Amid the torchlight's dazzling gleams,  
As bright as though a meteor shone,  
Can call the costly prize their own ;  
But gems of every form and hue  
Are glittering here in morning dew ;  
Jewels that all alike may share  
As freely as the common air.

### CHAPTER I.

#### FIRST PRINCIPLES CONSIDERED.

**F**ERNS induct us pleasantly into one of the quietest regions of vegetable life, a region in which flowers are unknown, and yet where those who love flowers most will least of anywhere miss them. The estimation in which ferns are held may be considered a measure of individual culture, and a reflex of the refinements of domestic life. They make no appeal to a superficial taste ; they demand for the appreciation of their beauty a delicate discernment of their



distinctive forms, having but few attractions in respect of colour to engage the attention, much less win the admiration, of the unobservant or the careless, who might be struck with surprise at the splendour of a display of flowers or fireworks. They have never held a higher place than now in the circle of household adornments; indeed, their adoption as domestic pets is of the most recent date, and to recall the circumstances of their introduction to the fireside has at least one pleasing accessory in the necessary association of the fact with the memory of a good man, who was amongst us when "Rustic Adornments" first bid for public approbation, but has since gone to his rest. It may be claimed for ferns, in an especial manner, that they have conferred benefits on their votaries without becoming thereby associated with any such folly or extravagance as we are compelled to record with regret when we trace the history of many other subjects which have been conspicuously numbered amongst domestic recreations. If there ever was a "fern mania" it was a harmless one. If compared with the "tulip mania" it stands apart as bright and pure as the ferns themselves; and its incidents will justify us in saying, that the quiet that belongs to ferns in their own natural world is to be found also in the taste which finds gratification in collecting and cultivating them.

The fern-case, whether it be a grand or a humble example of its class, is the best reminder of the existence and plentifulness of beauty in the out-door world that we can have for all seasons close beside us in our homes. When the woods are leafless, and the fields and gardens destitute of attractions, the little fireside garden still shines in emerald green, and russet brown, and gold and silver leafage, safe from frost, suggesting that the time is not far off when the woods will be robed again, and ten thousand flowers will spring forth to welcome the renewal of the season of song. The exquisite beauty of a good collection of case ferns skilfully managed may well account for the popularity of this class of plants amongst residents in towns, who by means of a fern-case can secure a garden in the closest and smokiest localities, where, if exposed to the influences of the poisonous atmosphere, scarcely any kind of vegetation long survives. Especially valuable to the invalid is a fern-case; it affords amusement without exertion; a subject for study unattended with fatigue; an innocent, remunerative relaxation from cares, and a perpetual antidote to weariness and ennui. It is in the city, without doubt, that the indoor fern garden is most precious. The citizen may refresh himself with the sight of a meadow by travelling to it, he may even here and there see in



the centre of the town a few old trees peering above the black roofs, and which, from their forms rather than their colours, are distinguishable from chimneys, and he may, with great care, preserve a gaiety in his narrow garden in the midst of darkness and smoke; but to have real verdure in the freshness of its original strength and life, there is but one method, and that is by the culture of it in Wardian Cases. Not only may many ornamental plants be thus preserved in their full beauty in the midst of surrounding dust and the fumes of factories, but the rarest forms of vegetation readily submit to domestication, and attain their highest development of beauty in these cases, if the requirements of their constitution are severally fulfilled.

It was in the year 1829 that the late Mr. Ward placed the chrysalis of a sphinx in some mould in a glass bottle covered with a lid, in order to obtain a perfect specimen of the insect. "After a time, a speck or two of vegetation appeared on the surface of the mould, and to his surprise turned out to be a fern and a grass. His interest was awakened: he placed the bottle in a favourable situation, and found that the plants continued to grow, and maintain a healthy appearance. On questioning himself about the matter, the answers readily presented themselves, inasmuch as air, light, moisture, and other requirements of the plants were contained within the bottle."

This was the first Wardian Case. Mr. Ward extended the experiment, and arrived at the conclusion that certain kinds of vegetation readily adapt themselves to an unchanged atmosphere in a *close* structure of glass, and to account for such an apparent departure from the recognised laws of vegetable growth, certain explanations as to the absorption of carbon and the evolution of oxygen were offered, and quite an elaborate theory of vegetable physiology was the consequence. It was admitted, reasonably enough, that it is impossible to make a Wardian Case on such a plan as wholly to exclude the outer air, but at the same time it came to be generally accepted that, for all practical purposes, such a case might be sealed hermetically, change of air, in the ordinary acceptance of the term, being quite at variance with the theory of vegetation as applied to these cases. Mr. Ward himself industriously taught that a plant-case is a self-supporting structure. Once set going, the exhaling moisture trickles down the glass, refreshes the herbage, and rises again to be again condensed, while the air in the case is alternately charged with excess of carbon or oxygen, the plants being always occupied in restoring it to a normal tone, spite of their tendency to vitiate it; that, in fact, they create an atmosphere of their own, and thrive without external aid and independent of



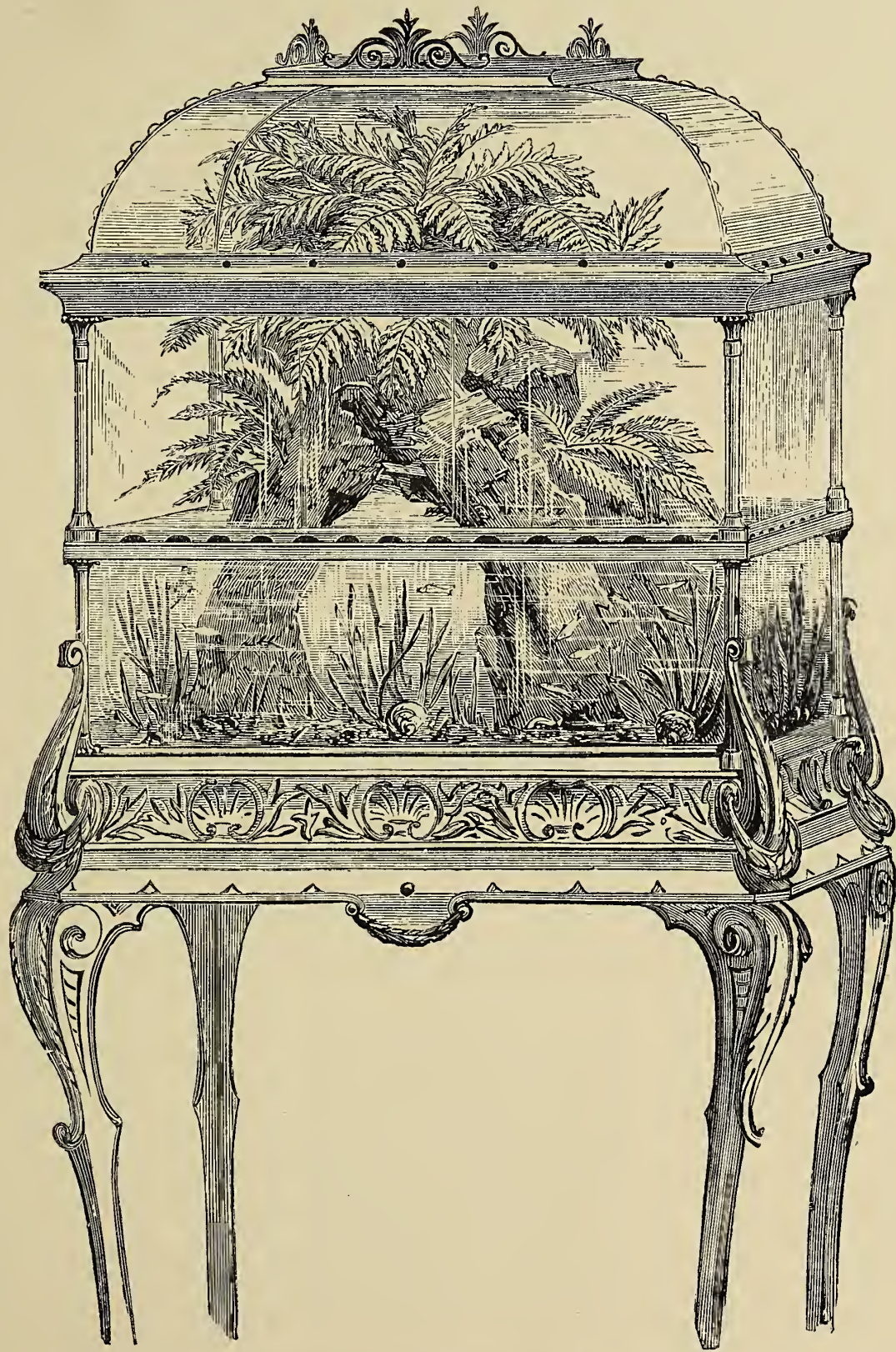
external agencies. It does not detract from the merits of the inventor that we disregard his theory, and abandon entirely the doctrine that the closer a case is kept the better for the plants within it. Nor is our obligation lessened if we abandon also many of the inventor's proposals as to the kinds of plants that may be grown in cases, and restrict the selection to far fewer families than he considered suitable. It is not because a plant will simply live for a time with less light and air than it obtains in its natural habitat, that we should consign it to a case; our rule should be to give preference to such as will really thrive in close confinement, and though they are by no means scarce, they are less numerous than Mr. Ward supposed when he published an account of his experiments, and the conclusions he deduced from them in his interesting pamphlet "On the Cultivation of Plants in Closed Cases."

A few leading principles must be kept in view in the construction and management of these contrivances. These we will endeavour to state briefly, but explicitly.

The form and the dimensions of a fern-case are to be determined by individual tastes and requirements. As a rule, the larger the construction the better, an abundance of light and a large body of air are favourable conditions for the plants. But usually it is necessary the contrivances should be portable, and that must be borne in mind. The lighter the construction, consistent with sufficiency of strength the better, for not only must the ferns have as much light as possible, but we must have, as far as may be, an uninterrupted view of them. Heavy woodwork and cumbrous designs are offensive to good taste, injurious to the plants by robbing them of light, and, it may be, calculated to render an apartment dull and unwholesome which otherwise would be cheerful and healthy. It is a great advantage in the management of the collection if the several parts of the construction can be readily separated. This is not possible in every instance, but a near approach may be made to it by providing more than one door, so that the ferns may be reached without difficulty from two or three sides. Provision must be made for the free escape of water from below, and the admission of air above. In no particular has the theory of Mr. Ward been more completely overthrown than by the common experience of cultivators in respect of air-giving: ferns kept as nearly as possible hermetically sealed, become weak, attenuated, pale, sickly; but regular ventilation and abundance of light promote a robust growth, and the healthy plant is always the most beautiful.

Given the properly constructed case, we have next to consider the aspect in





AQUARIUM AND FERNERY COMBINED.



which to place it, the plants suitable to furnish it, and the soil in which the plants are to be grown. The first point is easily disposed of. *Any* aspect will suit a fern-case. If peculiarly exposed to sunshine it may not be so well for ferns, but it very rarely happens that in any apartment the sunshine is too strong even for these shade-loving plants, provided they have plenty of air; if kept very close, strong sunshine tries them in a painful manner, but if kept in vigorous health, a moderate amount of sunshine will increase their health, and cause a free production of fully-developed fronds, and also of crowns and rhizomes for the extension of the specimens. There are just two considerations that may detain us for a moment in connection with the sunny aspect. First, as the sunny windows are usually wanted for flowers, or for the sunshine only, and as ferns will thrive with plenty of light in a north aspect, it is not usual to give them a south exposure; and as they do not absolutely need it, there is no necessity to place the fern-case in the most sunny position. Second, if it suits to furnish a south window with a little fern garden, excess of sunshine may be easily screened out by means of a blind or a sheet of paper, which should be used only for an hour or two at mid-day when the light is strongest.

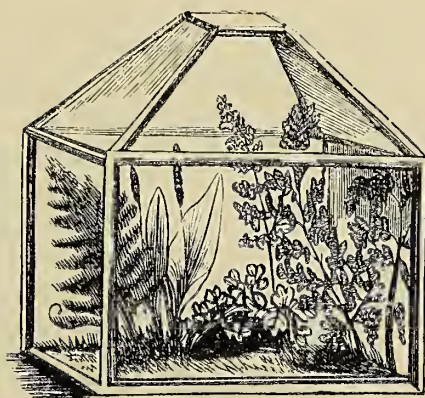
Next, as to the plants; make experiments to any extent you please, and chronicle all your successes, and such of your failures as are likely to be instructive; but in the first instance, adopt only such plants as are known to be adapted to this kind of treatment: they are plentiful enough, but far fewer than good Mr. Ward supposed. He even proposed to grow salads in close cases, but it is a question if he ever put upon his table a salad produced in any room of his residence in Finsbury Circus. Ferns, selaginellas, and mosses, comprise the inmates that are most likely to enjoy life in such artificial conditions, as "to the manner born." A few orchids, palms, and succulent plants may be grown to a fair degree of perfection in cases, but they are not adapted for beginners. The common ivy (*Hedera helix*) succeeds astonishingly well in a fern-case, and may be turned to good account where a screen of glossy-green leaves is needed to shut out an unsightly view, and the amount of light and air available for vegetation are too limited for bold experiments in gardening. We may mention the beautiful sheet of ivy filling a window garden, years ago, at the residence of Dr. Conquest, in Finsbury Square.

The soil for a fern-case is a most important matter. Common earth taken from a garden is no better than paste or putty; not one of your plants will



live long in it. The very best leaf-mould, such as a skilful gardener would employ for potting purposes, will answer very well, if a fourth part of its bulk of silver sand be added. But the staple soil should be friable peat of a dry fibrous texture, with sufficient sand added to give it a decidedly gritty character. To say how much sand should be allowed to any given measure of peat is impossible, for the best kinds of peat contain so much silicious grit that there is no occasion to add sand at all. Other kinds of peat are silky and mellow, and evidently deficient of silica ; in this case it must be broken up small, and a large proportion of sand thoroughly intermixed with it. A peat or bog earth, of a black, greasy texture, is to be avoided as unsuitable ; on the other hand, a soil on which the common brake, the ling, and any other of our native fens and heaths grow plentifully, is sure to suit for the fern-case, if a liberal proportion of sand be added.

It is easy, some will say, to prescribe the soil, but in some districts far removed from heaths, it is difficult to obtain it. Granted : but then recourse must not be had to the soil of the garden or the hedgerow even, unless the practitioner has some actual experience in the matter. Wanted, then, a patent preparation. Happily, we can provide one that can be obtained anywhere through the aid of railway or the post as a shop article. Mix together equal quantities of cocoa-nut-fibre refuse, pounded charcoal, good loam and silver sand. This is a capital mixture, and as for the loam, whatever is known in the district as a "loam" will answer the purpose. Yet, another : chopped moss, flower-pots pounded almost to dust, common loam, silver sand, equal quantities, thoroughly blended together. It remains now to describe a few applications of these principles, and the rule will be followed of illustrating the several features of the subject by examples of our own.



SMALL CASE FOR FILMY FERNS.





## CHAPTER II.

### DESCRIPTION OF FERN-CASES.

“ Mighty Flora, goddesse of fresh flowres, which clothed hath the soyle in lusty green  
Made buds to springe, with her sweet showers, by influence of the sunne shine ;  
To doe pleasance of intent full cleane, unto the states which now sit here,  
Hath Ver downe sent her own daughter deare ”

LYDGATE



**M**HAT is the simplest form of fern-case? A flower-pot, with a bell glass to fit close down upon the soil within the rim of the pot, in which one fern alone is planted. And a very pretty ornament such a simple fern-case may be, with a fine plant of the erect variety of *Asplenium marinum*, or one of the tasseled kinds of *Scolopendrium vulgare*, to occupy it. Next to this is the “Fern Shade,” a contrivance consisting of a circular pan about a foot in diameter and six inches deep, and having a narrow groove inside the rim for the reception of a glass shade. The exterior of the pan is generally adorned with rustic figures, and covered with a brown glaze. The glass shade, of course, is movable, thus affording easy access to the plants and permitting the necessary watering and airing to be carried out without much difficulty. Drainage,





ORNAMENTAL STAND FOR HALL.



in the shape of broken pots, crushed bricks, or small wood charcoal, has to be provided to a depth of two inches, so that superfluous water may readily find its way to the small outlet hole at the bottom of the pan. On this put a thin layer of dry moss or fibrous peat, from which the finer particles have been removed; and then fill the remainder of the space with the following compost:—equal parts peat, leaf-mould, loam, silver sand, and pounded charcoal. Having done this, the next thing to see about is furnishing the pan with suitable ferns. Now with regard to this phase of the subject, we may as well say at the outset, that it is practically useless planting very choice kinds of ferns in cases similar to that under consideration. The hardy or more robust sorts are infinitely preferable, because they will withstand with greater impunity the vicissitudes of temperature prevailing in dwelling-rooms and irregularities in airing and watering. Then we have also to consider the fact that the area available for planting is limited, therefore it is desirable that the kinds selected should, whilst possessing vigour, be yet sufficiently moderate in growth so as not to unduly crowd the shade with foliage. The Sea-spleenwort (*Asplenium Marinum*); Maidenhair-spleenwort (*Asplenium trichomanes*); Hart's Tongue (*Scolopendrium vulgare*); and the Black-spleenwort (*Asplenium adiantum-nigrum*) are suitable British species for planting in the centres of the pans. Of exotic species, equally well adapted for similar positions, the Spider or Ribbon Fern (*Pteris serrulata*); Black Rock Fern (*Asplenium fontanum*); British Maidenhair (*Adiantum capellis-veneris*); Hairy Maidenhair (*Adiantum hispidulum*), and the Rue-leaved Spleenwort (*Asplenium rutæfolium*) are particularly suitable. Round the central plant three or four of the following smaller species may be grouped:—Alpine Hare's-foot (*Davallia alpinia*); Alpine Deer Fern (*Lomaria alpinia*); *Doodia caudata*; Kidney-leaved Maidenhair (*Adiantum reniforme*). To render the furnishing complete, one or two plants of the creeping moss, *Selaginella kraussiana*, and its golden variety *aurea*; also its silvery one, *argentea*, are necessary. These mosses may be planted singly or together; in either case they will soon spread and cover the soil with a carpeting of pleasing green or variegated foliage. When planting the ferns and mosses, put, if possible, a piece of sandstone or tufa rock here and there to break up the surface and impart a faint idea of a miniature rockery.

There are other forms of fern shades or stands, of much the same size, but differing in shape. Some are pentagonal; others sexagonal and octagonal, and all are interesting in their way, and quite as suitable for fern culture as



the one just described. It is, perhaps, hardly worth while describing these in detail, as the demands of fashion frequently bring forth new styles, and hence what may be the most popular among them at the present time may, in a few years, be superseded by something more elegant and serviceable altogether. We therefore counsel those who are desirous of purchasing fern shades or stands, to pay a visit to some of the leading dealers in horticultural sundries, where they will generally find a good and varied selection to choose from.

From fern-shades we pass to what we may call boxes, as the next stage of ascent in the degrees of excellence. If the cultivation of ferns in the highest degree of perfection possible in a case of any kind is the object in view, then the rectangular cases which Miss Maling recommended so ably and perseveringly are undoubtedly the best. At page 60 of the "Fern Garden"\* is figured the first case of this kind which we furnished, and at page 52 of the same work the improved stand which we afterwards adopted for these cases. They are extremely simple in construction, but might be improved nevertheless, especially as to material, for the zinc trough in which the soil is placed soon rots away, and then affairs go wrong. However, if we take them as we find them, they are worthy of regard, for with reasonable care they last a good many years, and there is nothing obtainable in the ordinary way to equal them, if the health of the ferns and the display of their beauties are the principal objects we have in view. The lower part of this case consists of a two-fold trough, the under part of which is periodically filled with hot water, and the part immediately over is permanently filled with soil and planted with ferns. The upper part consists of five sheets of glass fitted into wooden frames; these are not fixed together to form an unalterable box, but come together as so many cards in a pack, and when placed in proper relative positions to form the glass box are so maintained by means of screws. Our plan of managing them is to remove the screws and have hooks and eyes fitted by a carpenter; this renders it an easier matter to get at any part of the case readily, by taking out the top or one of the sides. As a matter of course, the owner of one of these constructions is not bound to supply it with hot water, whether by means of a lamp or by periodically changing the contents of the water trough. It is a great convenience, in respect of fern culture, thus to have command of stove heat for the tender kinds in a fernery

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\* "The Fern Garden: How to Make, Keep, and Enjoy it; or, Fern Culture made Easy."  
(W. H. and L. Collingridge, 148 & 149, Aldersgate Street, London, E.C.)

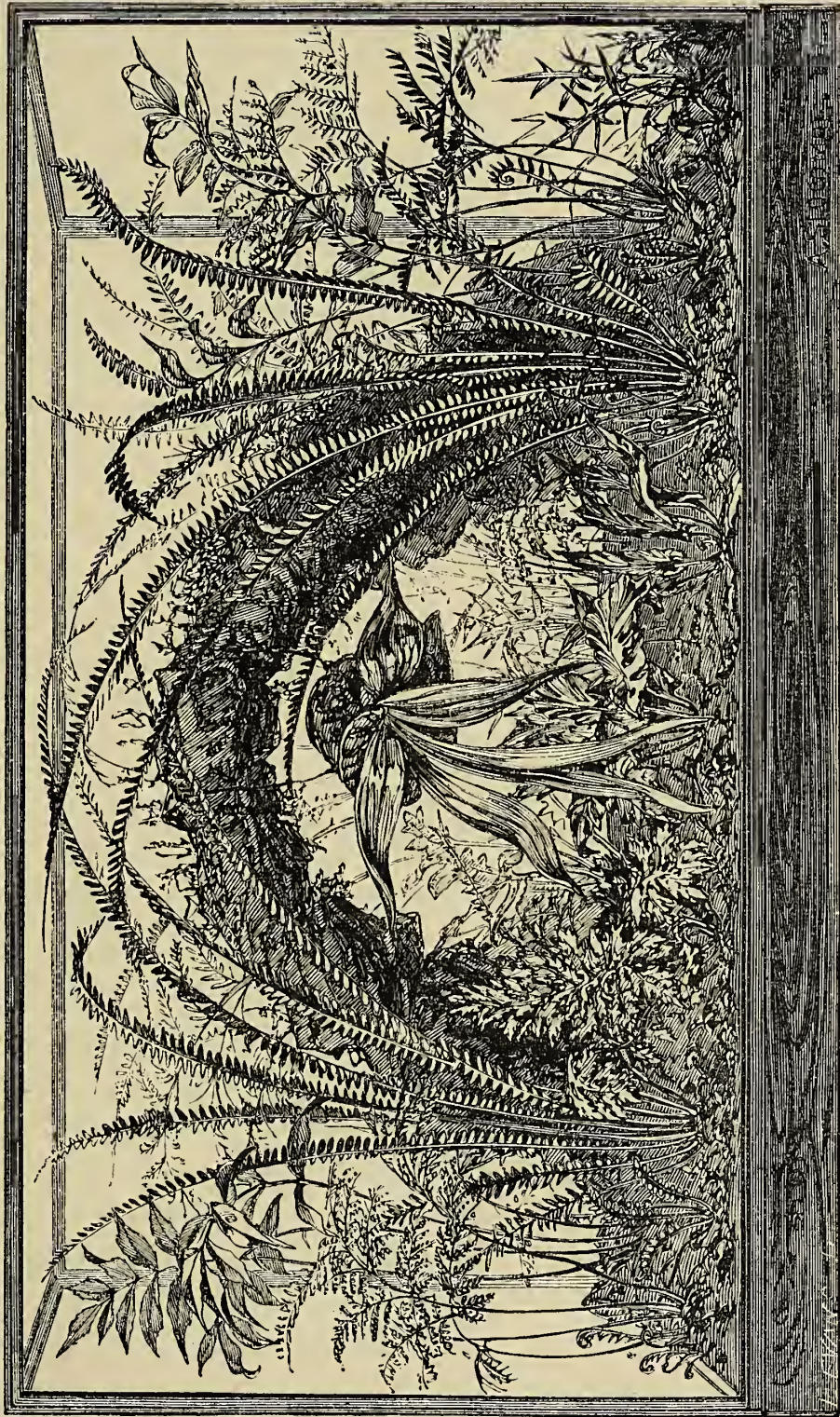


of such small dimensions, but it is a great inconvenience (at least, so we have found it) to keep up the hot water system in its integrity, and so for some years past we have given up that part of the business, and keep all our cases on what we may call the cool system. Having a heated fernery, of sufficient dimensions to constitute a "fern-garden" for tropical ferns, renders it the less necessary for us to maintain artificial heat in these cases. But we have long since agreed that those who have no heated fernery beyond the dwelling-house in which to grow tropical ferns, would do well to be content with managing their cases on the cool system, for the hot water system occasions considerable trouble, and if once commenced must be continued, or the risk to the ferns will be considerable.

There are a great variety of styles of fern-cases in the market. In some the stand or base consists of wood, plain or ornamented, on which rest glass sides, ends, and top, connected by zinc or copper bars. The top or one of the sides is constructed so as to open and give access to the interior. Others consist entirely of zinc and glass, or have their bases of rusticated rock, earthenware, or bronzed metal. They vary considerably in shape, too. Some are rectangular and plain; others oblong, with stands decorated with Minton tiles, and having gabled or curvilinear roofs; in fact, there is an infinite variety of styles, enough to suit all tastes.

We have several rectangular cases in operation, but will describe only two; and these two with sufficient fulness both to explain them as they stand for ornamental purposes, and also to illustrate in some measure the principles of furnishing and management. One of them measures four feet in length by two feet in breadth and height, and is fitted as represented in the sketch which accompanies this. The other is of less dimensions, and is fitted in the ordinary way, the surface being varied with bits of rock and miniature mounds, so as to display to the best advantage the various characters of the plants. What is of more importance is this, that the small case is filled with cocoa-nut-fibre refuse and charcoal alone, with a substratum of potsherds; the large case is filled with fibry peat, torn to shreds, and admixed with silver sand, with special preparation in some instances for particular plants. The behaviour of the ferns is very different in one case to what it is in the other. In both their growth is more than satisfactory, yet there is a decided difference. This is a very interesting fact, discoverable only by keeping two or more distinct collections in the two distinct kinds of soil for some time, and noting the difference, if any. In the cocoa-nut refuse the growth is surprisingly





RECTANGULAR FERN-CASE, WITH ROCKERY AND FERNS.



luxuriant and rapid. As an example, a plant of *Adiantum cuneatum*, turned out of a four-inch pot, and put in the case containing cocoa-nut fibre refuse extended itself in six months so as to cover a breadth of fifteen inches each way; it became, in fact, too large for its domicile, and several small-growing ferns had to be removed to save their lives, for the adiantum threatened to suffocate them. The following spring the adiantum threw up its new fronds with such vigour as almost to lift up the top glass, and the next thing needful was to take it out, reconstruct the rockery, and plant again so as to allow more head-room. A very small plant of *Pteris cretica albo-lineata*, put in late in the summer, threw up its fertile fronds so vigorously the next year that it became needful to peg them down, and the ensuing spring it was transferred to the centre of a very large case, principally to give it head-room, which it must have when it attains to its full characteristic growth. So much for the bright side of cocoa-nut refuse, or shall we add that it holds moisture tenaciously, never exhibits the slightest trace of any kind of mildew, and has a most pleasing appearance in the fern-case, its nice brown tint showing up the green of the ferns delightfully. On the other side, it must be said against the cocoa-nut refuse that the ferns grown in it are somewhat like those plants in our Lord's parable of "the Sower," which sprang up from seeds sown on the rock and among the thorns, and which therefore had no power of durance. We will illustrate this by an experiment. Let us remove the top glass from each case until the sun shines on them, and in an hour's time see what effect a little fresh air has upon the ferns. The hour has elapsed: those in the cocoa-nut dust are, in some instances, half dead, and their fronds have fallen like so many rags; others look slightly flagging, and will evidently be the better for a dewing and immediate shutting up. In the other case, the plants that are rooted in fibry peat and loamy mixture, are scarcely any the worse for the breath of air that has blown upon them, there is not one in a collapsed condition, and all are evidently of more robust constitution than those that have suffered so severely. But to make the balance as nearly as possible equal, the peaty soil does not produce so luxuriant and rapid a growth. The ferns come to perfection in it, but at a slower pace, and, in case of any accident, as of a square of glass being broken, or of neglect in watering, the ferns in the peat will suffer less than those in the cocoa-nut dust. It follows, from this, that the cocoa-nut dust is invaluable for the growth of seedling ferns and to help on young plants till they are of a size to be transferred to a more substantial soil; but that when a case is planted in such a way that there is



no reasonable prospect of it undergoing any alteration for a year or two, a peaty mixture will be preferable to cocoa-nut in every case, if it can be obtained. Having used the cocoa-nut fibre in ways almost innumerable, we recommend to fern-growers a mixture of one part good yellow loam with two parts cocoa-nut refuse, with one part silver sand, the whole thoroughly mixed and almost powdered together. In this mixture any and every fern will grow luxuriantly, and yet with sufficient substance to endure a few vicissitudes without harm.

The case here represented was planted with two objects in view—first, to create as picturesque an effect as possible; and secondly, to prove the fitness of certain ferns for a certain routine of treatment. It fell to my lot, as one skilful in such things, to construct the mimic archway, and fill it with “pockets” for the reception of small ferns. For that purpose I took two square seed-pans, and placed them bottom upwards on the zinc floor of the case as the abutments, which, of course, when the case was filled with soil, were hidden from view. From the flat foundations of burnt clay thus provided, I began to build, using small pieces of coke dipped in a batter of Portland, and spending a few hours every day for four days in succession upon the work ere it was completed. In the pockets were inserted specimens of *Cystopteris regia*, *Camptosorus rhizophyllus*, *Asplenium flabellifolium*, *Scolopendrium vulgare var. ramosum*, *S. vulgare polyschides*, and *S. vulgare ramo-marginatum*, *Adiantum hispidulum*, and a few *Selaginellas*; the latter soon grew so as to smother the whole fabric, forming a rich belt of various tints of blue and green, with the ferns pushing through them. On the right hand side of the arch was planted *Nephrolepis exaltata*, one of the most superb of Wardian-case ferns, and remarkably distinct with its graceful arching polypodium-like fronds. On the left hand *Nephrolepis pectinata*, which is of the same habit of growth, and a very beautiful and interesting fern; nevertheless, less beautiful than the other, as it is also less vigorous. A small plant of *Platycerium grande*, the “Elk’s horn” fern, was then planted in the husk of a cocoa-nut, and suspended by copper wire to the crown of the arch, and in twelve months its new growth was so vigorous that it had to be removed, and is now flourishing in the greenhouse. Two more notable ferns were introduced, namely,—*Pteris flabellata var. crispa*, a very erect and characteristic fern of large growth, quite cheap and common, and one of the best for glass cases of at least two feet in height within. The other was our fine old hardy friend *Cyrtomium falcatum*, which is worth a place anywhere



among ferns, and fortunately it will grow anywhere, and is always noble. As for the rest, they consisted of various small and comparatively choice subjects, which I shall name as they occur to me—*Pteris scaberula*, very beautiful in the lace-like divisions and light green hue of its fronds, but has a habit of running about by means of its extending rhizomes, just as if the case belonged to it, and not to you. It is really a gem, and always grows well in peat, cocoa-nut refuse, or any soil of a light spongy texture. *Doodia lunulata* and *D. caudata* are of small growth, and serve well with *Lomaria lanceolata* and *L. spicant*, to fill up with green tufts between ferns of very distinct and striking appearance. In the centre of the case, but on the side opposite to the view here given, and hence hidden by the platycerium, a plant of *Phlebodium sporodocarpum* made a fine effect; it is one of the most distinct and beautiful and easily managed of all Wardian-case ferns, but it does not like cocoa-nut fibre, and must always have a nice peaty mixture. *Polypodium phegopteris* and *P. rugulosum*, *Campyloneurum phyllitidis*, *Adiantum formosum*, *A. pedatum*, and *A. tenellum* have all done well in this case. The varieties of *Scolopendrium vulgare* enjoy a position like this, the damp, shade, and coolness of the case seem to be exactly the proper conditions for their perfect development.

One very important point in determining the success of these, is that they should be constructed so as to move about easily, which allows occasionally turning them quite round and giving those previously farthest from the light a larger share of it for a season. Those made for us have been very unsatisfactorily mounted, and we have had them fitted by a skilful carpenter with a deep skirting frame all round, and stout legs with large brass castors. The consequence is that they move about at a touch, so that a lady engaged in fern-growing may wheel them about with as much ease as Atlas and Hercules used in classic times to play at marbles with the planets. It is no small matter to be compelled to let a case stand as a fixture when a small shift to vary the light upon it may make all the difference between the life and death of some precious pet, or have the alternative of bringing the whole affair to the ground with a crash.







### CHAPTER III.

#### MANAGEMENT OF FERN-CASES.

O, blessed things !  
At sight of this your perfect innocence,  
The sterner thoughts of manhood melt away  
Into a mood as mild as woman's dreams.  
The strife of working intellect, the stir  
Of hope's ambitions ; the disturbing sound  
Of fame, and all that worshipped pageantry  
That ardent spirits burn for in their pride,  
Fly like departing clouds, and leave the soul  
Pure, and serene as the blue depths of heaven.

WILSON.



THE leading points in the management of fern-cases have been in some part stated in the former portion of this section, and it only remains to gather up here the several threads into an orderly skein. The cases may be considered under two heads, those that are unassisted with artificial heat, and those that have that advantage. They may also be considered under two heads as to furnishing, for they may either be planted with subjects intended to remain and attain their fullest possible development *in situ*, or be kept furnished with plants in pots. The easiest to manage are the unheated cases ; indeed it is but proper here to warn the reader that a heated case—no matter by what method the heat is supplied,—entails a larger amount of trouble in our opinion than it is worth, except to such as can devote



abundance of time to it, and who count trouble as nothing when engaged heartily in an elegant recreation. The unheated case will in great part take care of itself as to temperature, but some skill and care will be required to guard against possible injury by extreme temperatures. Any aspect except due south will suit, except in winter time, and then a south aspect is decidedly desirable, for the occasional glimmerings of sunshine in the dull season will benefit the inmates of the case. It may happen that exposure to sunshine in spring and summer cannot be avoided; in that case, draw down the blind from about 11 to 2 on sunny days, or if that be not practicable, lay a newspaper over the case, taking care to remove it when the day has somewhat advanced. Bear in mind that ferns will bear without harm a considerable amount of sunshine, if they are freely ventilated, and at all times inured to full daylight. In the winter another course must be pursued in order to prevent injury by frost. Slight frosts of short duration will do no harm, and we must suppose the room to have the benefit of a fire. But severe and long-continued frost will prove injurious if the ferns are left to their fate in the window. It is a good plan during severe winter weather to draw the case away from the window into the middle of the room; this will probably make a difference of ten degrees of temperature in its favour. The manner in which our cases are mounted on well-built frames with powerful brass castors renders this an easy matter; but it may happen that the case is immovable, in which case some kind of woollen garments must be provided. Pieces of old carpet, cloth table-covers, and other such protecting materials are usually available, and must be adopted in time, with the view of preventing a single frond at any time from being frozen.

The methods of heating cases vary, but they are nearly the same in principle. There is a vessel below the trough in which the ferns are planted, and this is either supplied with hot water from time to time, the cold water being at the same time removed, or the water is kept hot by means of a flame of gas or oil lamp. Whatever be the plan of heating, a good thermometer should be kept within the case, and of course the smaller it is the better, so long as it can be depended on. Throughout the winter the thermometer should be kept as nearly as possible at an average of 50°. It may rise to 60° as spring advances, in order to assist the new growth which will then be pushing, and at the end of April or very soon after (as the weather may determine), heating should be discontinued until about the middle of September, when heating must be again resorted to. An endeavour should be



made to keep the temperature down to 45° during November and the first half of December, to afford a season of rest, after which it may rise gradually to encourage the new growth.

Ventilation has been remarked upon already as necessary to the health of the plants. The cultivator's chief care should be to avoid extremes. A few choice ferns, such as those of the genera *Trichomanes*, *Hymenophyllum*, and *Todea*, do not need ventilation at all, and therefore it is advisable to grow them in groups, apart from a mixed collection. But, as a rule, ferns will bear, and be benefited by much more air than is commonly allowed them, but a smart breeze blowing through a case from an open window will be sure to cause havoc, and perhaps occasion injury that it will require months of extra care to repair. Those who attend to their ferns constantly will discover the happy medium, and attain to complete success; those who are fitful and intermittent, will perhaps stifle their pets for a month at a time, and then suffer them to be blown away, in consequence of a sudden fit for extravagant ventilation.

The giving of water is the most important matter of all. Although the different species vary immensely in their requirements in respect of the most perfect development, yet in practice the same treatment as to water-giving will very nearly suit all alike. The soil should never be quite dry, and never be saturated with moisture. In spring and summer more water should be given than in autumn and winter. The supplies should be regularly increased as summer advances, up to about the middle of July, and then be regularly diminished. Our cases are commonly left without water, either over the fronds or at the roots, for three or four weeks at a time in winter, with evident benefit, but as soon as growth commences freely in the spring, we give water frequently, and then begin to use the syringe. Now, it is well known that frequent sprinkling of the fronds of ferns is beneficial; it not only aids the growth directly, but it causes the diffusion of watery vapour in the atmosphere of the case, and, as a rule, ferns only attain to perfection in an atmosphere more humid than flowering plants require. There are, however, a few species which are scarcely benefitted by periodical showers overhead, and the adiantums are notable examples, for oftentimes the fronds of maiden-hair ferns are seriously injured by excess of moisture. Here, again we come to a point which the cultivator must settle by observation and experience. In cold weather the syringe should not be used at all. In a case containing adiantums only, it should never be used, but in mixed collections, the



adiantums and others that are susceptible of injury through the application of water overhead must take their chance. A very small shower goes a great way, and therefore the cultivator will soon learn to be cautious and moderate.

One more remark on this subject must be made. Cold water, that is, river and rain water, as it comes to hand, may be used from May to August, but from September to April the water should be tepid. This is a matter of great importance, as will be seen by those who take a real and constant interest in fireside fern-culture.

Under the best of management accidents will happen. One of the most likely, and one from which the most experienced cannot be entirely secured, is an accumulation of an excess of water in the soil. It is a common defect of fern-cases, that they allow no escape for the excess of moisture, but there ought in every instance to be some provision to render it impossible for the soil to become water-logged. But how will you know when the dreadful event has occurred? The ferns will tell you in unmistakeable language, for fronds that should be green will become yellow; there will be patches of decay and some of the more-delicate-habited species will cease to throw up fronds, and if examined will be found to be decaying in the centre. The safest remedy is to take the whole affair to pieces, remove the sour soil, and begin afresh. Lay down a good bed of broken flower-pots, or large cinders, or broken charcoal; then put on a thin layer of moss, or the coarsest cocoa-nut fibre refuse, and finish with a bed of the proper soil, piling it up as much as may be consistent with good taste, but to increase the depth for the plants, and to raise them as much as possible above the drainage.

Insects rarely prey on ferns, but they will appear occasionally. In spring, the tender rising fronds may be beset with green aphis, and in summer the more injurious thrips will perhaps appear. Judicious ventilation and watering are the best preventives, but onced lodged, the eradication of these insects is not an easy matter. To fill the case with tobacco smoke until not a leaf can be seen, and keep it closely shut and every crevice covered with a damp cloth for several hours, will certainly make an end of the vermin, but then it is the very thing that in the majority of instances cannot be done. The next best nostrum is the vapour of turpentine. Place a little spirits of turpentine in an open vessel which can be kept warm for an hour or two, and shut it up in the case for six hours. A simple mode of creating a turpentine vapour is to fix



a small empty flower-pot in the centre of the case ; then to make a flat-iron hot, and stand it on the flower-pot, and occasionally paint the iron with the turpentine by means of a brush. Better still, perhaps, is a solution of fir-tree or lemon oil, applied in the form of a fine dewy spray, by means of an apparatus called a spray diffuser, such as is used by hair-dressers. If fir-tree oil is not readily obtainable, a good substitute for it may be prepared by soaking cigar ends or tobacco in water for a few days, then straining off the liquid, putting it in a bottle and keeping it corked closely until required for use. In either case make it a rule to spray or syringe the foliage with clear tepid water an hour or so afterwards. With patience and perseverance, however, mechanical methods will be found sufficient. The insects can be removed by means of a camel's-hair pencil, and the fronds that are most disfigured may be cut off and burned. The beginner will no doubt have to deal with insects, but the adept will rarely see them, for good cultivation will keep them at a distance.

Cases that are kept furnished by means of plants in pots will of course demand the aid of pits and greenhouses, if a frequent change and a rich effect is at all times desired. It is only by this method that any variety of flowers can be displayed in a plant-case, yet it will often happen that a hall or boudoir may be by the adoption of this system kept delightfully gay, and all kinds of flowering plants will endure the confinement for two or three weeks while at their best without harm, if reasonably cared for. A bed of green moss or of quite new cocoa-nut fibre refuse will suffice for the groundwork, and to hide the pots. When the cocoa-nut fibre has been some time in use, it must be changed, because its fine brown colour, which affords a charming relief to green leaves and flowers, will disappear. The moss will keep green a great length of time, and indeed will grow, and soon after every disturbance produce a fresh green surface.

As explained in the preceding chapter, it is more satisfactory in the end not to attempt heating fern-cases ; but still, if it is desired to do so, the simplest method of heating is that known as the "Louise" Heater. This bijou apparatus, for such it is, consists of a small boiler, of about the size of an ordinary wall lamp, and a flow and return pipe. The piping is arranged in such a way that it traverses the sides and ends of the case, and thus distributes the heat equally to all parts of it. The water may be heated by oil or gas. Of the two, however, gas is preferable, because more cleanly and needing less attention than oil. The boiler may



be fixed to the side of the case or to an adjacent wall, and if the fumes arising from combustion are made to pass through a charcoal purifier no unpleasant smells will arise in the room.

A SELECTION OF FIFTY FERNS FOR CASES THAT ARE NOT HEATED.

The following selection includes such kinds only as can be grown in cases without heat; but as a few of those named will be injured by frost, it will be well to protect the case with a woollen cover during the night in frosty weather.

BRITISH FERNS.—The true Maiden-hair fern, *Adiantum capillus-veneris*, is compact in growth, very beautiful, and in every way suitable for closed cases. *Asplenium adiantum-nigrum* and *A. trichomanes* are both very dwarf, and prefer a dry position; therefore, they should be planted upon the most prominent points of the rockery. The Sea Spleenwort, *A. marinum*, though hardy, never presents such a beautiful appearance as when grown under glass. We pass over the beautiful varieties of the male and female ferns, because of their deciduous character and want of beauty during the winter months. The Welsh Polypody, *Polypodium vulgare Cambricum*, and the Irish Polypody, *P. vulgare semilacerum*, are both first-rate in every respect, but the good old English Polypody, *P. vulgare*, is not to be despised. *Polystichum angulare cristatum*, *P. a. grandiceps*, *P. a. perserratum*, *P. a. plumosum*, and *P. a. proliferum Wollastoni*, are all elegant in habit, and have the desirable qualification of a hardy constitution. - The strap-like leaves of the Scolopendriums contrast well with the light-feathery fronds of the preceding, and must not be passed over. Of these select *S. vulgare crispum*, *S. v. laceratum*, *S. v. marginatum*, *S. v. ramosum*, *S. v. ramo-cristatum*, *S. v. ramo-marginatum*.

EXOTIC FERNS.—*Adiantum Æthiopicum*, *A. affine*, *A. assimile*, *A. capillus veneris*, *A. cuneatum*, *A. formosum*, *A. hispidulum*, *A. pedatum*, are all beautiful, but they must not be wetted overhead more than can be helped. *Asplenium bulbiferum*, *A. fœniculaceum*, *A. palmatum*, *A. alatum*, *frugrans*, *Colensoi*,—these are all of free growth and remarkably beautiful. *Cyrtomium falcatum* is rather coarse in comparison with those previously named, but it is so bold and distinct in character that it cannot be omitted. *Blechnum gracile* is a graceful fern of the tree type, and suitable for a central plant in large cases. *Davallia Canariensis*, *D. bullata*, *D. hemiptera*, *D. Novæ-Zelandiæ*, and *B. tenuifolia* are suitable for either planting with the others or for suspending in small



ornamental baskets from the roof. *Doodia aspera*, *D. caudata*, *D. rupestris* are all of humble growth and very beautiful. *Lastrea opaca*, and *L. Standishi* are good. *Todea superba* is one of the most beautiful ferns in existence, and especially good for growing in dark positions ; it should have a case to itself



SCOLOPENDRIUM VULGARE ON AN OLD WALL.

which must be kept closed, and the fronds frequently sprinkled with soft water. *Lomaria blechnoides*, *Lygodium palmatum*, *L. scandens*, *Nephrodium molle corymbiferum*, *Nephrolepis exaltata*, *Onoclea sensibilis*, *Onychium japonicum*, *Platycerium alcornu*, *Polypodium plumosum*, *P. pulvinatum*, *P. adnascens*, *P. Billardierii*, *P. olystichum acrostichoides*, *P. setosum*, *Pteris cretica albo-lineata*



*P. scaberula*, *P. serrulata*, *P. s. cristata* : all possess the desirable qualities of an elegant and graceful habit, and grow freely with ordinary management. The two best Selaginellas for carpeting the case are *S. Kraussiana* (erroneously called *denticulata*) and *S. involvens*. *S. apoda* grows freely in a case, but is liable to mildew and decay in a confined atmosphere during the winter. Of the tall or erect growing selaginellas *S. grandis*, *S. umbrosa*, and *S. Victoriae* are to be specially commended as suitable for cases.

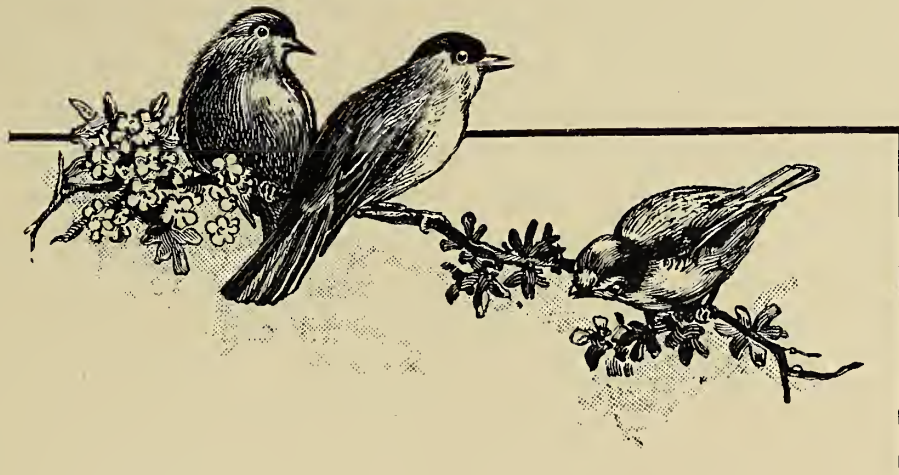
A SELECTION OF ORCHIDS FOR CASES THAT ARE NOT HEATED.

The most suitable orchids for unheated cases are *Barkeria Skinneri*, *Cattleya citrina* (this should be secured to a block of wood—cork is the most suitable—and suspended with the foliage downwards), *C. Skinneri*, *Cypripedium insigne*, *C. venustum*, *Epidendrum vitellinum*, *Lælia albida*, *Lycaste Skinneri*, *Odontoglossum*, *O. Alexandræ grande*, *O. pulchellum*, *O. Rossi majus*, *Oncidium bifolium*, *O. ornithorhynchum*, *Pleione humile*, *P. lagenaria*, *Sophranitis grandiflora*, *Stanhopea oculata*, *S. tigrina*, and *Zygopetalum Mackayi*.

The plants should be potted in a mixture of sphagnum and peat, the pots being half filled with crocks. Place the case in a window facing as much towards the south as possible, and throw some thin material over the case when the sun is shining brightly, to prevent its burning the foliage. The shading must be thin to admit the warmth from the sun, especially during the early part of the summer, when the plants are making fresh growth. After the middle of August, expose freely to the light, to ensure the young growth being well matured, otherwise the plants will not flower freely. A rather liberal supply of water will be necessary during the summer, when the plants are growing vigorously ; but when at rest through the winter, only sufficient must be supplied to prevent the leaves flagging. The case must be sufficiently ventilated to maintain a pure atmosphere ; but the air must be admitted carefully, and mild weather should be selected for air-giving.



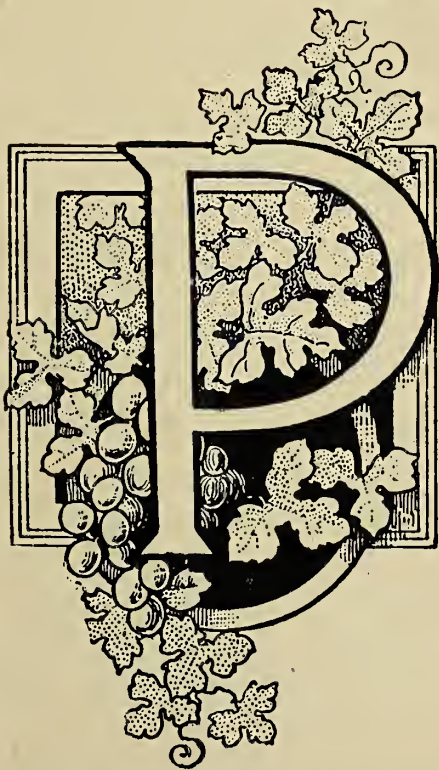




## THE AMATEUR PROPAGATOR.

No works indeed  
That ask robust, tough sinews, bred to toil  
Servile employ ; but such as may amuse,  
Not tire, demanding rather skill than force.

COWPER.



PLANTS of all kinds are to be obtained at such absurdly low prices now-a-days, that it is questionable whether it is hardly worth while for the amateur to take the trouble to propagate them himself. But, as one of the chief charms of gardening lies in raising plants from seed or cuttings, and tending them in their various stages of growth upward, until they produce lovely blossom, richly coloured or handsome foliage, or luscious fruits, the amateur gardener ought to know something of the wonderful art of propagation, if he is to derive the greatest amount of pleasure in the exercise of his favourite pursuit. He should, at any rate, have some knowledge of the manner of raising plants from seeds, also of the several methods of propagating them by cuttings, division, layering,



and budding, so that, if necessary, he can increase the commoner kinds of plants that are requisite to adorn the house, the conservatory and the garden at the present day. We might have gone further and included grafting as an indispensable mode of propagation, but as the scope of this work scarcely embraces the section of horticulture to which this art is peculiarly applicable, we pass it by. The various methods that we purpose to describe will be amply sufficient to meet all ordinary requirements, and we hope to set forth the details in such clear and terse language as will convey to the inexperienced a lucid idea of the manner in which they should be carried out.

**AIDS TO PROPAGATION.**—Our first business, before we go into the question of the various modes of increasing plants, is to describe the appliances and apparatus necessary for the purpose. First and foremost among these

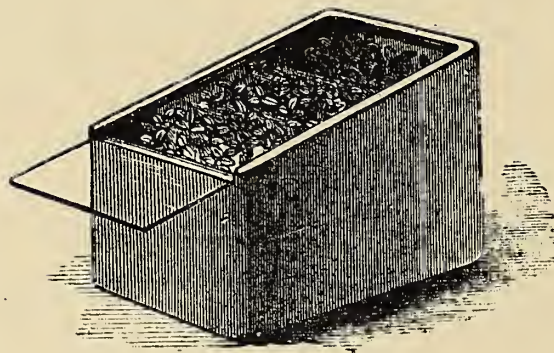


Fig. 1.

come pots, pans, and boxes. For seed-sowing, the most suitable sizes are those 3 in., 4½ in., and 6 in. in diameter; the smallest being adapted for large seeds, such as cucumber and castor oil, the others for smaller seeds. Thimble-pots (2 in. in diameter) are specially suited for small single cuttings; and thumbs (2½ in.) for single cuttings of a larger size. Where several cuttings may be conveniently inserted together, 3 in., 4½ in., and 6 in. sizes may be used. Larger sizes than these are unsuitable for seed or cuttings. Pans are largely used for both purposes; they are circular, square, and oblong in shape, and three to six inches in depth. The bottoms are usually perforated to permit the escape of superfluous water, and allow the heat to have free access to the soil. If not perforated, holes should be made in them before they are used. There is another kind of pan (Fig 1), made slightly deeper at the back than the front, and furnished with a groove inside the rim for receiving a pane of glass, which can be moved up and down at will.



This pan is useful for many purposes. Boxes are largely employed for raising plants, and they answer quite as well for common use. Fig, chocolate, and sweet boxes, generally averaging one to three inches in depth, and of various sizes, are the most suitable. For raising annuals and "striking" cuttings of bedding plants they are better than pots or pans, because a larger number can be accommodated in a limited space.



Fig. 2.

Other indispensable appliances are a quantity of clean potsherds, or cinders free from dust, and some common moss, dry tree leaves, and rough fibry stuff, such as has been removed from the soil when sifting it. These materials are necessary for draining the pots and pans. The next thing required is a stout piece of board, six inches square, with a short handle attached to one of its sides, called a "presser." This is required for pressing the soil level and firmly in the boxes and square pans; a circular one is also useful. Then a small piece of wood of the thickness of a cedar pencil, and pointed at one end, as shown at Fig 2, is needed for inserting cuttings. At least three sieves are also requisite, one of which should be of a very fine mesh, so as to pass sand or soil in minute particles for covering fine seeds, the others having meshes of one-eighth and one-sixteenth of an inch respectively. Some squares of glass, and one or more cloches or bell-glasses, a keen-bladed

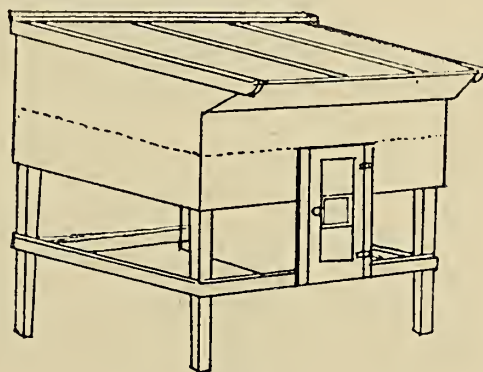


Fig. 3.

budding knife, a fine-rosed water-can, and a few sheets of brown or white paper, complete the list of minor appliances.

Last of all, but certainly not the least important, of the needful propagating appliances, are the various contrivances essential for raising plants from seed or cuttings—namely, propagators and frames. Of the former there are severa



kinds : some are portable, as shown at Figs. 3 and 5 ; others a fixture, as at Fig. 12 ; whilst another type (Figs. 13 and 14) is also portable, but of different construction to that represented by Figs. 3 or 5. The first type of portable propagator is a popular one, its handy form enabling it to be used in the dwelling-room, greenhouse, or in the open air. There are many kinds manufactured and sold by firms who make a speciality of their construction, their cost varying from one to three pounds, according to size, etc. But as it is not a difficult matter to make a serviceable one, we give below a few particulars as a guide to those who care to undertake the construction of one for themselves. Fig. 3 represents a simple kind, which anyone able to handle carpenters' tools with a fair amount of skill may make at a cost of 8s. 6d., according to the following estimate :—

	s.	d.
Wood ... ..	2	0
Glass ... ..	2	3
Wire netting ...	1	0
Cocoanut mat ...	1	6
Cocoanut fibre...	1	0
Lamp ... ..	0	6½
Copper Tacks ...	0	3
	<hr/>	
	8	6½

The top is divided into three compartments, to take three sheets of glass. Size over all, four feet by two feet, four inches. The front top board is



Fig. 4.

sloped to avoid any shadow. From the top of back to the bottom of the cocoa-nut fibre refuse is fifteen inches, and the depth of fibre about eight inches. Below the latter is a common cocoanut-fibre mat, laid on a platform of three-eighths of an inch galvanized wire-netting.



On this netting, immediately over the lamp, is laid a roofing slate (A, Fig. 4) to take the heat. Below the netting is the air chamber, nine inches deep, and next this the lamp chamber, so made that the top of the lamp chimney is level with the bottom of the air chamber. The receiver of the lamp is dropped through a hole cut in the bottom of the lamp chamber, otherwise it becomes dangerously heated. It is also necessary to bore three or four half-inch centre-bit holes in the bottom of the latter, also one or two in the air chamber, to admit air. The entire frame, with the exception of the lamp chamber, is lined with carpet. As will be seen, there

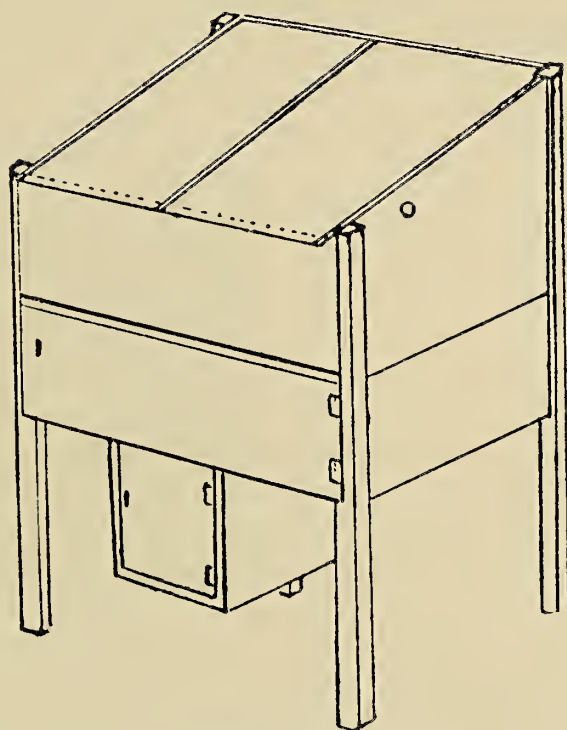


Fig. 5.

is no water tank, the needful moisture being supplied by keeping the cocoa nut-fibre refuse damp. If the lamp is kept properly trimmed no unpleasant fumes will be emitted, and an average temperature of 65 to 70 degrees may be maintained at a cost of 6d. per week for oil. This propagator can be used indoors or out.

Another and more substantial form of propagator is represented by Fig. 5. This, too, may be made as easily as the preceding form; but the cost will be about double. This has a great advantage over the other kind in having a water tank, by means of which a more steady and uniform heat can be



maintained than with the aid of the cocoanut-fibre refuse alone. Besides, there is less risk of the air becoming too dry when hot water is employed. The material required to construct this propagator will be twenty-five feet of seven by one-inch matchboarding, two feet of sash bar similar to Fig. 6, and fifteen feet of one by one-inch deal. In proceeding to construct the propagator, first cut off four eighteen-inch and four twenty-inch lengths of the matchboarding, and join two of each size together to make a bottomless box (Fig. 7), the inside measurement of which will be eighteen by eighteen inches, and put some of the one by one inch wood in the corners, in order to strengthen it. All the tongues of the wood must be kept the same way up. Now take the eighteen by eighteen-inch case with the tongue side upwards

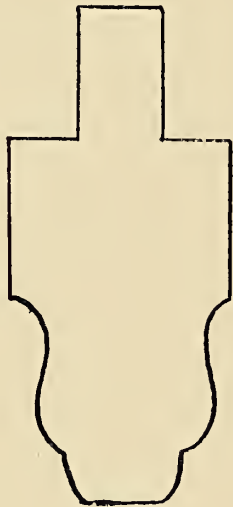


Fig. 6.

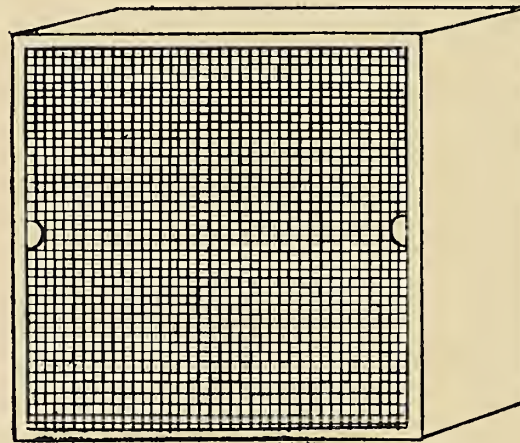


Fig. 7.

and cut the tongues off with a spokeshave or plane. Next get a piece of finely perforated zinc, and nail it tightly across the bottom of the case, on the groove side of the match boards (as shown in Fig. 7), great care being observed that the zinc does not overlap the groove in the least degree, otherwise the tongues of the under case will not fit in properly. A small hole must be made on each side of the zinc, before fixing it, to admit the steam pipes, of which we shall speak presently. Next make an under case, the same as the top one, except that it must have three sides only, and the one by one-inch wood must not be put down the angles.

A galvanized iron tray,  $17\frac{1}{2}$  by  $17\frac{1}{2}$  by  $2\frac{1}{2}$ , will be necessary, and two pieces of iron, 18 inches long, as shown in Fig. 8, will be required also, the latter



to be fixed into the top of the under-case, so as to prevent the perforated zinc bending under the weight of the soil which will be placed on it. Some of the one by one-inch stuff must next be nailed to the sides of the lower case, three inches from the top, to form a rest for the iron tray, and the bottom boarded up, leaving an open space in the middle, about eight inches square, to admit the lamp chamber. The latter should be of the same material as the cases, and about ten inches high. It may be fixed into the case by nailing a piece of the one by one-inch wood across the top, back and front, and fixing these to the bottom of the case (see Fig. 9). When the lamp chamber is well and firmly fixed, the whole concern (Fig. 5) may be set upon its legs, which are made similar to Fig. 10, so as to hold the two cases firmly together.

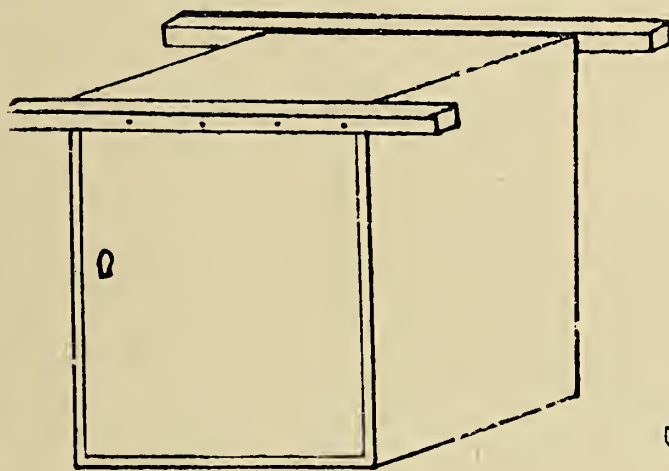


Fig. 9.

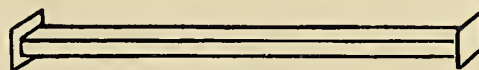


Fig. 8.

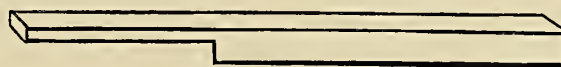


Fig. 10.

Screws must be used to fasten the legs on. So far, however, we must bear in mind that the lower case and the lamp chamber have each one side open, and these must now be put on by means of hinges. The sash-bar (Fig. 6) should be cut to the proper length and nailed across the top, as shown at A, Fig. 7. Some slides made of the one by one-inch stuff must be nailed along each side of the case for the glass to rest on. The aid of a plumber must be called in to fix the steam waste-pipes (Fig. 10), which are brought up through the perforated zinc (3, Fig. 11), and taken through the side of the case just below the glass (5, Fig. 11), so that all superfluous steam is thrown off outside the propagator. Leaden gas-tubing does very well for this purpose, but it must not measure less than three-quarters of an inch externally. If this method of disposing of the moisture does not carry off enough, a good thick layer of hemp should be



placed on top of the perforated zinc ; or better still, another piece of perforated zinc may be obtained one inch larger than the internal measurement of the propagator each way. This should be bent up all round, and nailed in about one inch above the other, the intervening space having been previously filled with asbestos fibre. Any lamp with a one-inch wick, provided that it will hold sufficient oil to burn through the night, will be suitable to heat the above apparatus. It is best to get a tin chimney made for the lamp at first starting,

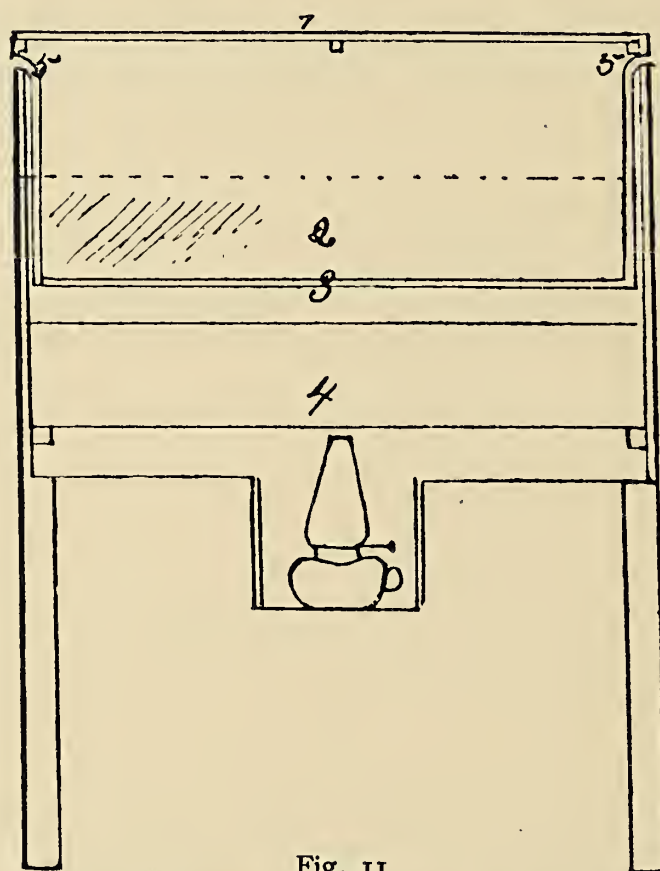


Fig. 11.

References to Fig. 11—1, Glass ; 2, Soil ; 3, Zinc ; 4, Iron Tray ; 5, Steam Pipe.

as glass is so apt to break, that it is a continual expense. To ensure perfect safety, it is well to nail pieces of tin or zinc over the inside of the lamp chamber and the bottom of the under case. This applies more especially to those who have their propagators indoors, or who use open lamps.

The second or permanent class of propagator is represented by Fig. 12. A contrivance of this kind can only be utilised in greenhouses heated with hot-water pipes. It should always be fixed over the pipes nearest to the boiler, so that the greatest amount of heat may be obtained. Get some inch-and-a-



quarter red deal boards, and fix these in front of the pipes at the same distance from the latter as they are from the wall. Build the side up level with the bottom of the front sash, and arrange the length according to space or requirements. The further end must be closed up with boards so cut as to encircle the pipes. If this is a difficult matter the space can be filled with asbestos fibre. In the bottom of the frame place sufficient broken bricks or other rough material to fill up to the base of the lowermost hot-water pipe ; this is to serve as drainage. On the brick rubbish put some coarse cocoa-nut fibre refuse to fill the remainder of the space to within six inches of the top. The fibre is for plunging the pots in to the rim, and for holding the moist heat

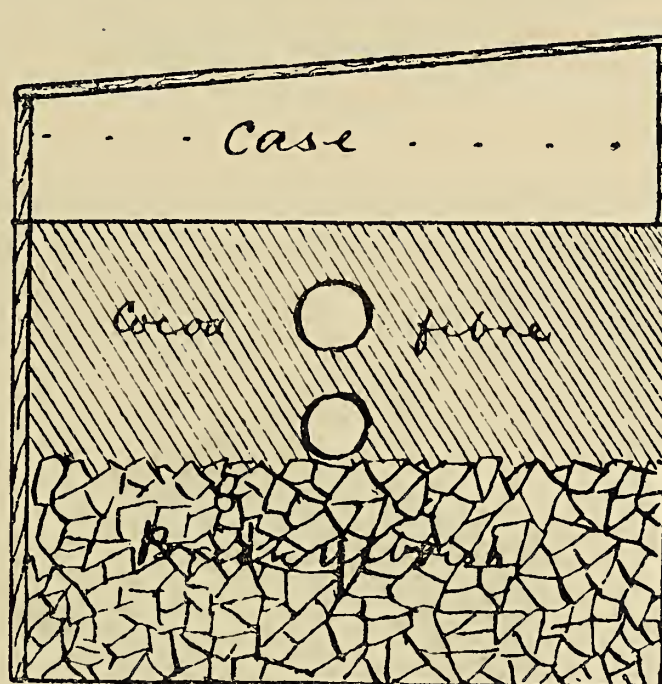


Fig. 12.

given off from the pipes in the centre. On the opposite side of the frame a piece of board must be fixed, on which to hang a glazed sash by means of hinges. This sash must be fixed so as to give a gentle slope, and thus prevent the possibility of condensed moisture dripping on the cuttings. The dotted lines in Fig. 12 show the height to which the tops of the pots of cuttings and seedlings should be allowed to attain. If you cannot afford a sash, panes of 21 oz. glass, sliding in a rabbet at top and bottom would do. The fibre must be kept moist by frequent watering, as the pipes soon exhaust the moisture. A propagator of this kind can be utilized for forcing bulbs as well as raising plants from seeds or cuttings, and the fact of its being placed on the hot-water



pipes dispenses with the cost of having to provide special heating apparatus ; and, moreover, it is always available for use whilst the pipes are heated.

The third and smaller portable class of propagators are simple contrivances for placing on hot-water pipes. They are very convenient for owners of small

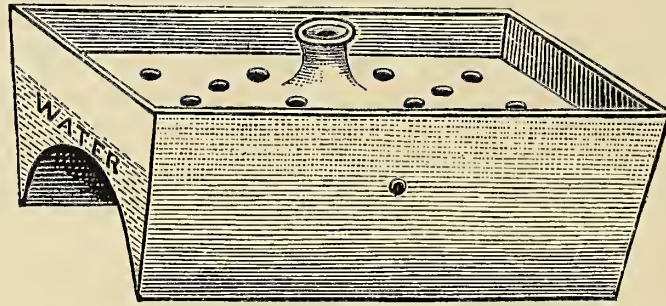


Fig. 13.

greenhouses who have hot-water piping, and only need to propagate a few plants occasionally. There are two kinds, and both are patented articles. One (Fig. 13) is an earthenware pan, measuring fourteen inches long, six and half inches wide, and six inches deep. Inside the pan is a perforated movable

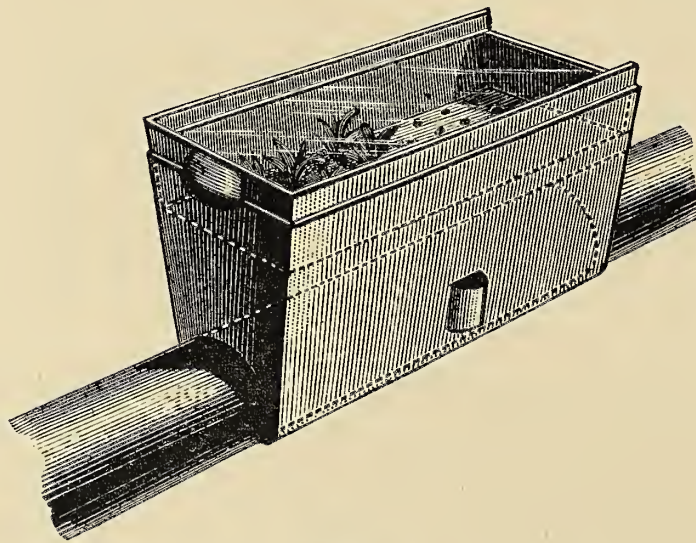


Fig. 14.

false bottom with a projecting tube in the centre, the bottom resting on supports fixed half way up the depth of the pan. The bottom part is of concave shape, and is so formed that it fits on the top of a four-inch hot-water pipe. The lower half of the pan is filled with water, and in the upper half



the soil intended for the cuttings or seed is placed. The pipe-like projection in the centre serves the double purpose of a handle for lifting the body of soil and cuttings out for potting, and providing the means of replenishing the water, which, of course, soon becomes exhausted through evaporation. When the cuttings are first inserted a large pane of glass can be put over the top, and the rooting process greatly accelerated in consequence. This is the invention of Messrs. Pascall & Son, Norwood. Another similar contrivance (Fig. 14) consists of a zinc trough, fifteen inches long, six inches wide, and six inches deep, with a perforated bottom, to drain off surplus water, and a concave bottom made so as to fit a four-inch hot-water pipe. A dish or pan six inches in depth, with a perforated bottom, is made to fit inside the trough,

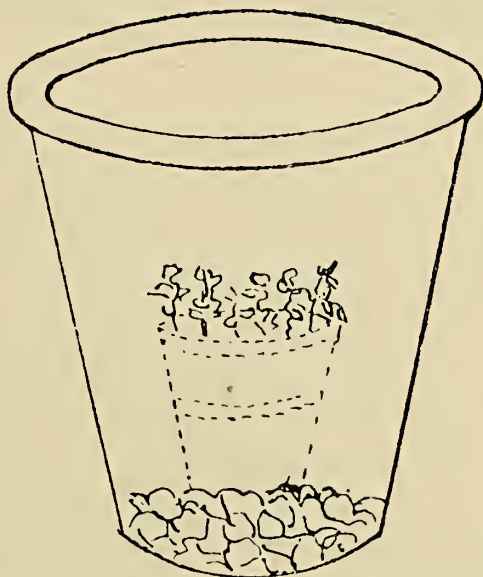


Fig. 15.

for the purpose of holding soil on which to sow seeds and to insert cuttings, the top of the dish being furnished with a rabbet to receive a sliding pane of glass, and a handle at each end to enable the dish to be lifted out readily when required. The outside of the trough and dish is enamelled. In this case the space between the bottom of the trough and dish is occupied by an inch layer of indestructible asbestos fibre instead of the water. The asbestos absorbs five times its own weight of moisture, consequently it is only needful occasionally to sprinkle it with water to maintain a pure, sweet, moist, and mild heat. Messrs. Toope and Son, Stepney, are the patentees of this contrivance.



So much for special appliances. There are, however, a few others of a make-shift character that ought not to be passed by. Fig. 15 represents a very simple, but at the same time, effectual contrivance for striking cuttings. It consists simply of a six-inch pot, with a few potsherds in the bottom. Inside this the small pot containing the cuttings is placed, the space

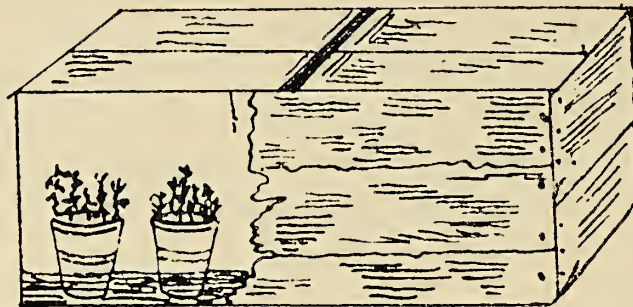


Fig. 16.

between the sides of this and the larger pot being occupied by cocoa-nut fibre refuse as far as the rim of the small pot. A pane of glass is next placed over the large pot, and thus the cuttings are kept moist and cool. This contrivance answers well for striking cuttings in windows or greenhouses. Another equally simple propagator may be made out of a champagne case, as

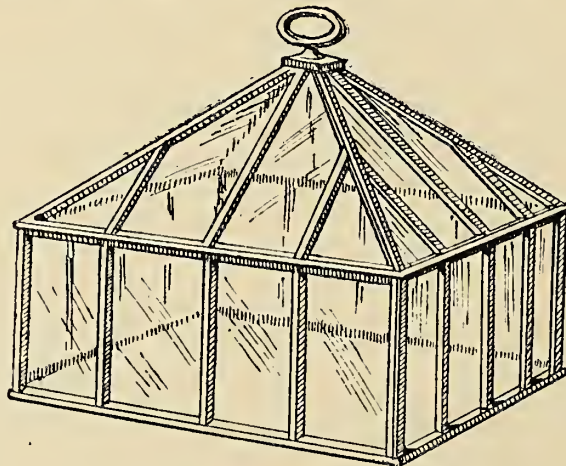


Fig. 17.

shown at Fig. 16. A small flat piece of wood should be fixed across the centre, its upper surface being level with the sides. On this put two or four panes of glass, and you have a useful propagator ready, at a small cost. It must, of course, be placed in a warm greenhouse, or where warmth can reach it externally.



Handlights (Fig. 17) are useful, too, for striking hardy plants—calceolarias, and so forth. They may be obtained ready-made of all seedsmen. The light frames, made of wood and portable, like Fig. 18, are exceedingly useful

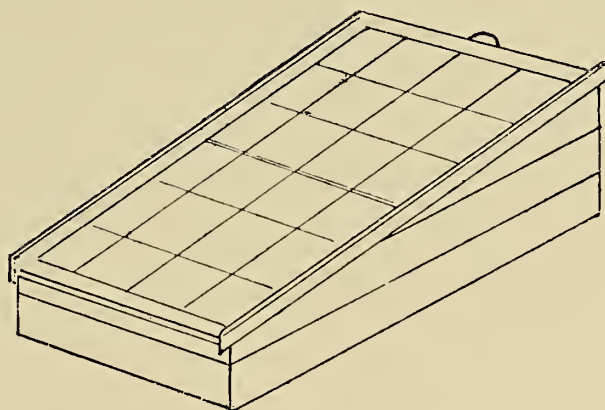


Fig. 18.

for propagating all kinds of hardy and half-hardy plants, and for “hardening-off” plants raised in heat. Equally as useful are the three-quarter span-frames, represented by Fig. 19, or the span-roof kinds.

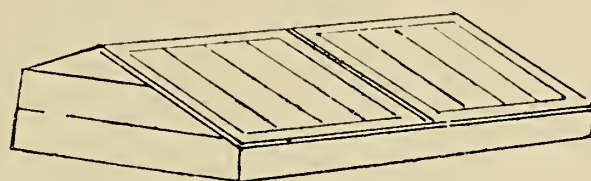


Fig. 19.

SOILS.—For ordinary purposes, any light soil containing a fair porportion of sand will suffice. All soils, however, used for raising seeds should, as far as possible, be free from weed seeds; and to ensure this, it should be slightly baked over a fire before using. For raising choice plants good sandy loam, fine sandy peat, some well-decayed leaf mould—not manure—coarse and fine silver sand, wood, charcoal, and cocoanut-fibre refuse, are indispensable propagating requisites. Common sand, or such as is of a reddish hue, is unsuitable for striking the cuttings of many plants. If silver sand is not obtainable, the red sand must be well washed in water to remove the oxide of iron. Sea sand answers well for striking most cuttings.

PROPAGATION BY SEED.—Now we come to the most important part of this chapter, namely, the description of the various methods of propagation.



The first to be dealt with is the propagation of plants by seeds. All pots must be well-drained by filling at least a third of their depth with broken potsherds. Next to the drainage, put a thin layer of moss or rough fibre to prevent fine soil penetrating the former, and on the moss sufficient finely sifted soil, sandy in texture, to fill the pot to within half-an-inch of its rim. Press the soil moderately firm by the aid of the bottom of another pot. Where fine seeds, such as begonias and gloxinias, have to be sown, the upper half-inch of soil should be put through a very fine mesh sieve. Before sowing the seeds, water the soil gently but thoroughly in the pots by the aid of a fine rosed can, then, after half-an-hour's interval, they will be ready for the reception of the seeds. Or, better still, grasp the pot or pan by the two hands, and hold it in a vessel of tepid water sufficiently deep to immerse it nearly to the rim. Hold it thus until the water percolates through the drainage and finds its way to the surface of the soil. On no account allow the water to run over the top of the pot, or it will wash the seeds into a heap on one side and do more harm than good. This is really the best way to water all pots or pans containing, or about to be sown with, seeds; it ensures the whole of the soil being equally moistened, and the non-displacement of seeds. In preparing boxes or pans, from one to two inches of potsherds are needful for draining the latter, whilst as to the former, a layer of rough soil siftings is ample. Fill both as advised for pots, treating them alike as to pressing the soil and watering. Too much care cannot be bestowed on the draining of the pots. If badly drained, the soil will trickle into the drainage and fill the cavities through which heat would otherwise pass to the soil. Again, if the latter is not firmly pressed, water will render it stagnant, sour, and wholly unfit for the germination of seeds.

Very great care is necessary in sowing seeds. Those who have had little or no experience invariably fall into the common error of sowing the seeds too deep—that is, covering them with too great a thickness of soil. There is a wide difference in the size of seeds. Some—those of the tuberous begonia and gloxinia for example—are exceedingly minute; hence, to cover these with the same thickness of soil as would be essential for *Phlox Drummondii*, would destroy them. A safe and general rule to observe in sowing seeds of flowers, is simply to sow those half the size of an ordinary pin's head thinly on the perfectly even surface of fine soil, prepared and watered as indicated above. When the seed is sown, do not cover it with any soil whatever, but simply apply, by means of a fine-roshed can, a little tepid



water, which will have the effect of washing it partially into the soil. In the application of water, some degree of care is absolutely necessary to prevent its washing the seeds over the top of the pot; therefore, avoid giving more than is needful to just cover the surface. Seeds of the size of a pin's head require to be barely covered with fine soil, whilst those a size larger need to be quite covered; but in no instance ought the larger seeds to be buried deeper than an eighth of an inch. Palm, castor-oil, or canna seeds are an exception; these should be placed at least an inch below the surface. Primula seeds, again, require different treatment. It is not advisable to cover these with soil, although a little fine cocoa-nut fibre refuse may be beneficially sprinkled among them to assist in keeping their surroundings in a moist condition.

The next step to take after sowing is that of giving the seed such after treatment as will induce them to germinate satisfactorily. Heat, air, and moisture are important factors in this part of the business. Heat is necessary to arouse the dormant vital forces or protoplasm of the seed into activity; moisture to soften the outer part or integument of the seed, so that air may pass in the form of oxygen to combine with the carbon of the albumen, and thus enable the chemical changes to be carried out which nature demands.

Seeds in general will not germinate in a lower temperature than 32 deg., or a higher one than 100 deg. Those of hardy plants should be sown when the temperature is not likely to fall lower than 40 deg.; half-hardy plants 55 to 65 deg.; and all others 75 to 85 deg. In the latter category are included palm and stove plants, seeds which, as a rule, fail to germinate in less heat than we have stated above. Half-hardy plants embrace all those tender subjects grown for flowering in greenhouses, and for summer bedding. These can be raised in the portable propagators (Figs. 5 and 7), such apparatus being capable of being heated to a temperature of 55 to 65 deg. with very little trouble, the plunging material being, perhaps, five to ten degrees higher.

Moisture is most essential, and must be supplied in such a way that the seeds can have all they require without running the risk of receiving too much, and thus destroying their vitality. Seed pots, pans, or boxes should therefore be plunged to their full depth in cocoa-nut fibre refuse or sawdust, whether they be in a portable propagator, or in the greenhouse, frame, or window. Treated thus, dry air cannot penetrate the sides and extract the



moisture from the soil. In windows the difficulty can be got over by placing the pot or box inside a larger one, as shown in Figs. 15 and 16, and filling the vacant space between with damp moss, cocoa-nut fibre refuse, or sawdust. Then, again, it is most essential to protect delicate seeds from the dry air of the atmosphere, even though they be inside a glazed propagator. The general and simplest method is to cover each pot or pan with a pane of glass, this admitting light and conserving moisture. If both these matters are attended to directly the seed is sown it will rarely happen that any more water will be required until it has germinated. This is a most important point, as, until germination takes place, there are no agencies at work to remove superfluous moisture, which, if lying in the soil for days will cause stagnation and sourness, thereby rendering it unfit to support the growth of the seedlings. If by any chance the surface of the soil in which seed is sown becomes dry, immediately immerse the pot or pan nearly to the top of the rim in a vessel of tepid water, and leave it thus until the latter has percolated from the bottom to the top of the soil. By this means a thorough moistening of the soil will be ensured without displacing any of the seeds. Sprinkling the surface of the soil in or on which seeds are sown is a bad practice; therefore avoid it. The plunging material should be kept continually moist; then with artificial heat beneath, a nice genial moist atmosphere will be obtained—just what is needed for successful germination.

Air is of vital importance, but it must not be supplied indiscriminately. In the propagator, until the seeds begin to germinate, there is no need to lift the glasses from the pots, as sufficient air will creep in between the two; but at least once a day—generally about seven to eight a.m.—the sash should be tilted a few inches for an hour, to expel foul and admit fresh air to the interior. Similarly, seeds under bell-glasses should have air admitted to them, but in this case the glass should not be tilted for more than ten minutes.

Shade from the direct rays of the sun is essential. There need be little difficulty about this, because seeds invariably germinate better in darkness than in the full light; indeed, some cultivators go so far as to assert that darkness is really necessary. Scientific experiments, however, have long since proved that seeds will germinate as well in light as in the dark; but as in the latter case there is no danger of the sun unduly drying the soil and injuring them, it is wise to protect them from the light until they germinate. The necessary darkness and shade combined may be obtained by painting the squares of glass with whitening and size, or placing sheets of brown paper over



them during the middle of the day. Directly the sun is off, however, remove the paper, replacing it again the following morning.

Every day examine the seed-pots, and where the seeds are seen to be sprouting, slightly tilt the glass to admit air. When it is apparent that all the seeds have sprouted, remove the plants out of the plunging material nearer the sash of the frame, and a day later to a shady position out of the frame. Continue to supply moisture by immersing the pot in water, as advised above, and the second day after removal from the frame, take off the glass altogether. If any seedlings begin to show signs of damping—that is decaying, carefully pick them out and put a pinch of powdered charcoal and sulphur on the spot. Except for an hour or two in the middle of the day the seedlings must not be shaded, but occupy a light position on a shelf near the glass, to prevent their becoming drawn and weak.

When the first rough leaf is formed, transplant the seedlings into pots, pans, or boxes, prepared in a similar way to those advised for seeds, then put them in the shade for a few days to establish themselves in new soil, after which a sunny shelf and a moderate amount of air will ensure their being dwarf and bushy.

All half-hardy plants raised from seed in heat require to be gradually inured to a lower temperature by a process called “hardening off.” Thus, when the seedlings have been once transplanted from the seed-pot or pan, they should, as soon as established - that is, as soon as they hold themselves erect—be transferred from the propagator to a cold greenhouse or frame. Whichever structure they are put in, carefully exclude the cold air from them for the first few days, and also shade from sun. Commence to admit air about the third day, opening the lights a little between 11 a.m. and 2 p.m. Each day afterwards increase the ventilation according to the weather, then the plants will be hardened sufficiently to plant out-doors. Where neither a greenhouse nor frame is available, use the propagator for “hardening off,” by reducing the heat and gradually tilting the sash.

In regard to seed-sowing out-doors, two methods are generally followed. One is to sow, as in the case of hardy annuals, where the plants are to grow; and the other in nursery beds, as in perennials, for instance, afterwards transplanting the seedlings. In carrying out the first plan, sow the seed in patches or drills. Very fine seeds should be sown on the surface and covered with mould; moderate sized ones, about one-eighth of an inch deep, and the larger sizes, a quarter to half an inch deep. Those sown in reserve beds should, if



small, be sown on the surface and covered with fine mould ; all others in drills, half an inch to one inch deep. Water thoroughly when first sown, and, in the case of reserve beds, cover with a mat until the seeds sprout, then expose to the air.

CUTTINGS.—Next to seed, cuttings form the most general mode of increasing plants. There are several types of cuttings ; the commonest is the point of a shoot prepared as shown in Fig. 20. Geraniums, fuchsias, chrysanthemums,



Fig. 20.



Fig. 21.

verbenas, and similar plants, are propagated thus. The next type is illustrated by Fig. 21, which is a cutting of an epacris, a plant with hard shoots. Camellias, azaleas, and acacias, belong to this class, and are propagated by cuttings prepared in a somewhat similar manner. Nearly all hardy shrub cuttings require to be prepared thus. Both types of cuttings require to be from one to three inches long, and, in the case of Fig. 20, to have its lower pair of leaves removed, and its base cut level close to a joint. Fig. 21 must be prepared from a firm shoot, and have its leaves removed from its



lower part, and its base cut level close to a joint. The dotted line shows the depth for inserting it in the soil. Insert Fig. 20 as far as the base of the leaves.

We now come to another class of cuttings, namely, those represented by Figs. 22, 23, and 24. The first of these is called a "bud cutting." It consists of a bud in the axil of a leaf, and is removed with a portion of the stem in the shape of a shield, which portion is inserted as shown in the soil, the point of the bud appearing above the surface. It is used chiefly for propagating uses. Fig. 23 shows a "stem cutting." The stem of a plant is cut into short lengths, each having a leaf attached. The short stem is half buried horizontally in the soil, and the leaf secured to a stick. This is the mode of

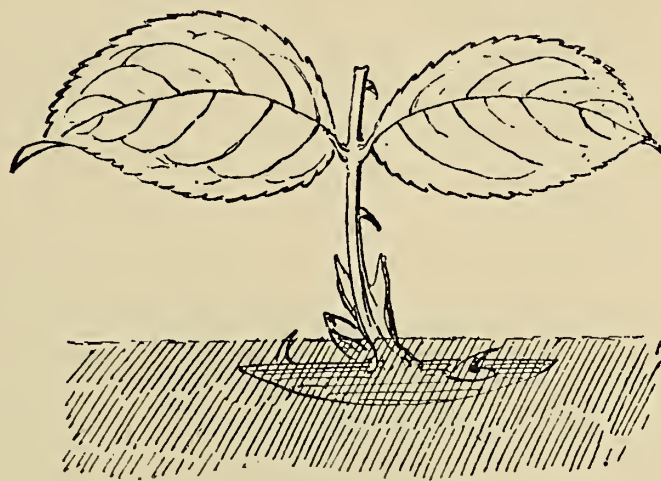


Fig. 22.

propagating the india-rubber plant. Last of all, we have the leaf-cutting (Fig. 24.) A full-grown leaf of begonia or gloxinia has its mid-ribs severed where they join, and is then laid on the surface of the soil, and secured there by pegs. In due course, roots form at the incisions, and eventually shoots issue, and a number of plants are thereby obtained. There are a few other forms of cuttings, but they are beyond the scope of this work.

The pots, pans, or boxes, alluded to elsewhere, must next be prepared for the cuttings. If two or three-inch pots are used, put a few small potsherds in each; if larger sized are to be used, one-third of their depth should consist of potsherds. In each case cover the latter with a layer of moss, dead tree leaves, or rough fibre; then add a layer of coarse soil, and finish off with a



layer of soil passed through a one-sixteenth of an inch mesh sieve. Fill the pots thus to the rims, then press the soil down firmly with the bottom of another pot or a "presser," so that the level of the soil is about a quarter of an inch from the rim. Sprinkle some silver sand on the surface, water with a fine-rosed can, and shortly after insert the cuttings. Remember, the chief points are to use clean pots or pans, provide ample drainage, cover the potsherds with moss or fibre to prevent the soil washing into them, and to press the soil firm.

The cuttings should be inserted by means of a dibber (Fig. 27). Make the hole for each cutting as deep as it is to be inserted, and no more. When inserting the cuttings, see that their base touches the bottom of the hole, and then press the soil firmly round them. Always commence to insert the cuttings near the edge of the pot or pan first, and finish off into the centre. After insertion, give

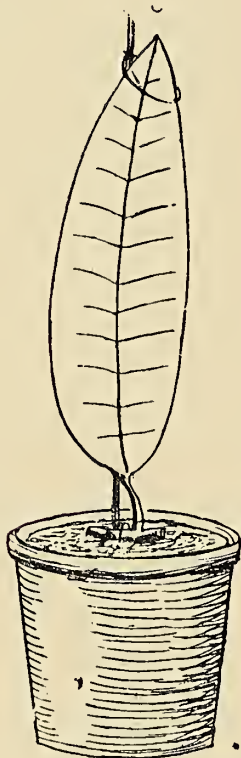


Fig. 23.

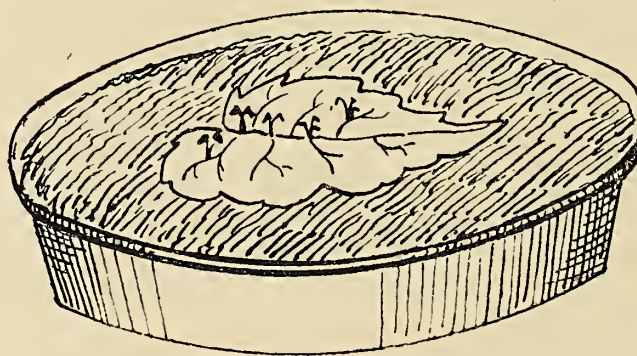


Fig. 24.

the soil and cuttings a good watering, and remove them to the propagators, where they should be plunged to the rim in cocoa-nut fibre refuse. If a propagator is not available, put the pots inside a larger pot, as shown at Fig. 15, or in a box, as illustrated by Fig. 16. Failing these conveniences, cover the pot or pan with a bell-glass, as shown at Fig. 25, and place it in a window or greenhouse. Whilst in the propagator, attend to shading from sun by placing sheets of paper over the glass by day. Every morning, tilt the light for fifteen minutes to dissipate foul air, then close again. Remove dead or dying leaves, and early every morning, and late in the after-



noon, dew the foliage with tepid water. Do not give water to the soil unless really necessary. Examine the cuttings occasionally by carefully turning the ball out of its pot, and as soon as roots are seen, remove the cuttings from the propagator to a shady position in the window or greenhouse. See that the cocoa-nut fibre in the bed of the propagator is kept moist. The temperature of the fibre should be 75 to 85 degrees, and the air about 65 to 75 degrees. Cuttings in contrivances like Figs. 15 and 16 must have air admitted to them

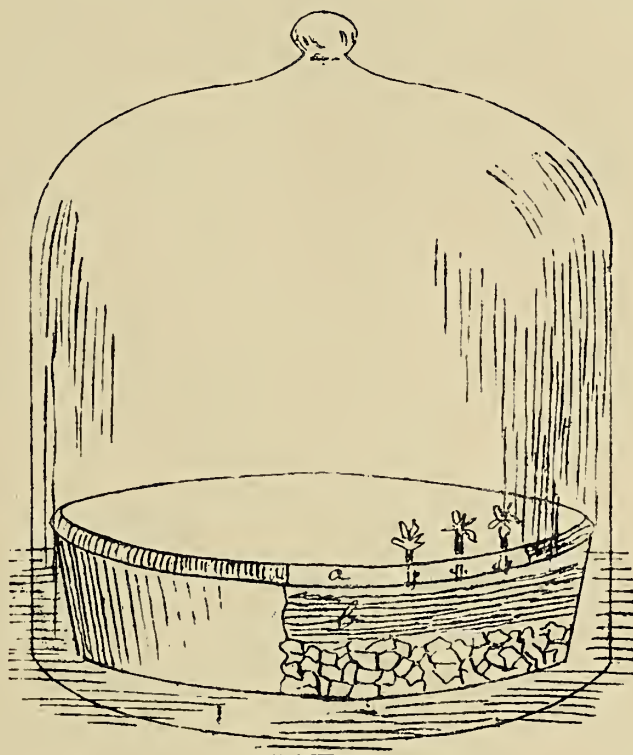


Fig. 25.

for a few minutes every morning. Before closing, wipe the glass clean, and also remove any dead foliage. Shade from sun, too. Here, also, the chief points to observe are not to water the soil too freely; to sprinkle the foliage twice a day; to shade from sunshine; remove dead leaves; and to admit air every morning for a few moments.

Cuttings of oleanders, myrtles, aucubas, and many plants and shrubs, may be inserted in soda-water bottles, filled with water and suspended, as per illustration (Fig. 26), in a window or greenhouse. When plenty of roots have formed, withdraw the cuttings carefully from the bottle and pot in warm, light soil; then it will make as good a plant as if struck in the ordinary way.



Cuttings of fruit trees, honeysuckles, roses, ivy, and deciduous shrubs, should be prepared from shoots of the current year's growth ; be about eight inches long, and have both ends cut off level with a bud. All buds, except the three uppermost, should be removed, and the cuttings inserted half their depth in firm ordinary soil, in a shady position, in October or November.

Evergreen shrubs should be propagated by firm shoots, three to six inches long, with their base cut level close to a joint, and the lower leaves removed. Insert them in sandy soil, under a hand light, in a cold frame, or in a sheltered corner. August to November is the proper time to do it.

Cacti and fleshy-leaved plants require different treatment from the preceding. The cuttings of these should be inserted singly in two or three-inch pots, half filled with small potsherds, and the remainder with a mixture of sand, old mortar, brick dust and loam. Give no water for the first ten days, and after that once a week will be sufficient. The pots should not be placed in a propagator, but on a shelf in the greenhouse, or in a window.



Fig. 26.

of a knife, trowel, or spade. October to March is the proper time to do this.

**LAYERING.**—This is another simple mode of propagating clematis, carnations, honeysuckles, sweet williams, pinks, roses, and many other shrubs and plants. Following is the method of layering carnations. Select short firm growths at the outside of the plant, break up the soil on the surface round



the base of the plant, level it, and then place on about a couple of inches of sandy soil to receive the layers. In preparing the latter, strip the under leaves



Fig. 27.

clean off, as shown at Fig. 27 ; then at the bud *a*, about four inches from the top of the shoot, make an incision half-way through the stem, and an



upward slit through the centre of the shoot as far as *b*. When this is done, get some wooden pegs similar to *d*, and then, having formed a slight basin in the sandy soil, bend the shoot down so that the slit part or "tongue" *c* is in the centre. Tie the peg *d* at *a*, and then get another peg *e*, and place this in a slanting position in the manner shown in the illustration. The object of this is to keep the shoot in a firm perpendicular position, and, to ensure this being fully accomplished, a piece of bast or some other soft material should be used to tie round the shoot and peg. Many do not use the peg *e*, but it is undoubtedly better to do so, since it enables the "tongue" *c* to be opened widely, and causes the wounded parts to callus, and produce roots quickly. It is also a practice with some to draw the leaves up closely together with the hand, and then cut off the tips, but we do not believe in its efficacy. After the layer is fixed, water the soil thoroughly, then place some of the sandy soil over the layered parts to keep in the moisture, and encourage the prompt production of roots. The same mode of procedure should be followed in all cases. Carnations require to be layered in August; the others in October or April.

**BUDDING.**—This is the process of detaching a "bud" or eye from one plant and transferring it to another. It is very essential that a suitable time be chosen for this operation, as unless the bud be sufficiently matured, and the shoot from which it is to be detached has enough sap in action to allow of its easy removal, the delicate organs of the bud are injured. The stock, also, that is to be converted into a rose tree must have its sap in sufficient action to allow of the bark being lifted easily and smoothly.

Fig. 28 shows a portion of a rose shoot containing three buds or eyes. The one marked *a* is too forward in growth, and would have the root or seat of the bud too high up for our purpose. The upper bud, marked *b*, is in the right stage. A good guide as to whether the buds are sufficiently ripe and ready to lift out freely, is when the prickles of the shoot break off close to the wood in a brittle manner when touched. If these hang on toughly, the bark or rind will also cling too tightly. This is a good general guide, but not absolutely correct. Trim off the leaf of the upper bud *b* at the dotted line, and then cut it out with a sharp knife (Fig. 28, *c*). Do not allow the knife to pass quite all of the way out again, but tear the bottom part of the bark away from the shoot. You will then have a bud like the one marked *d* in Fig. 28. Take this between the thumb and finger of the left hand, bend back the bottom portion of the bark until you can take hold of the small piece of



wood with the thumb of the right hand and point of the knife ; having gained a hold of this, with a slight jerk or snatch remove the small portion of wood entirely. This will come out very easily if the bud is in a proper state. Now cut off the lower part of the bark—see the dotted line in *d*—and your bud will represent Fig. 29, *a*. If the bud is fit for further operations, it will have



Fig. 28.

Fig. 29.

the root or seat of the eye left in it. A properly prepared bud should have this seat as prominent as *b* in Fig. 29, and should be low enough to rest upon the wood of the stock when the bark is fitted into the slit prepared for it. In treating the bud marked *a* in Fig. 29 to this process, it will be found that the seat of the bud is so far up that it would be impossible for it to lie on the wood as described.



Fig. 30 shows the method of inserting the bud. Make a couple of cuts in the back, like those marked *b*, taking care not to cut deeper than is necessary for the easy lifting of the rind. With the back of the handle of the budding-knife, lift up the bark of the stock as gently as possible, raising it away from the wood the whole length of the cut. This is best accomplished by slipping or sliding the bone handle downwards, after it is well inserted under the rind. Any smooth piece of bone or hard wood will do equally as well as a budding-knife. Having raised or loosened the bark, slip the bud under it; starting from the cross cut marked *c*. Slide the bud well home; the closer to the stock in this case, and the nearer to the roots in the case of dwarfs, the better it will be. The bud will now be in its proper position (*d*), and it only remains to tie it in securely, so that when all is finished it represents *e* in Fig. 30. In about a month, or sometimes less, the bud will either be well set to the stock, or it will be dead; in the latter case, there will be plenty of time to try again. The following

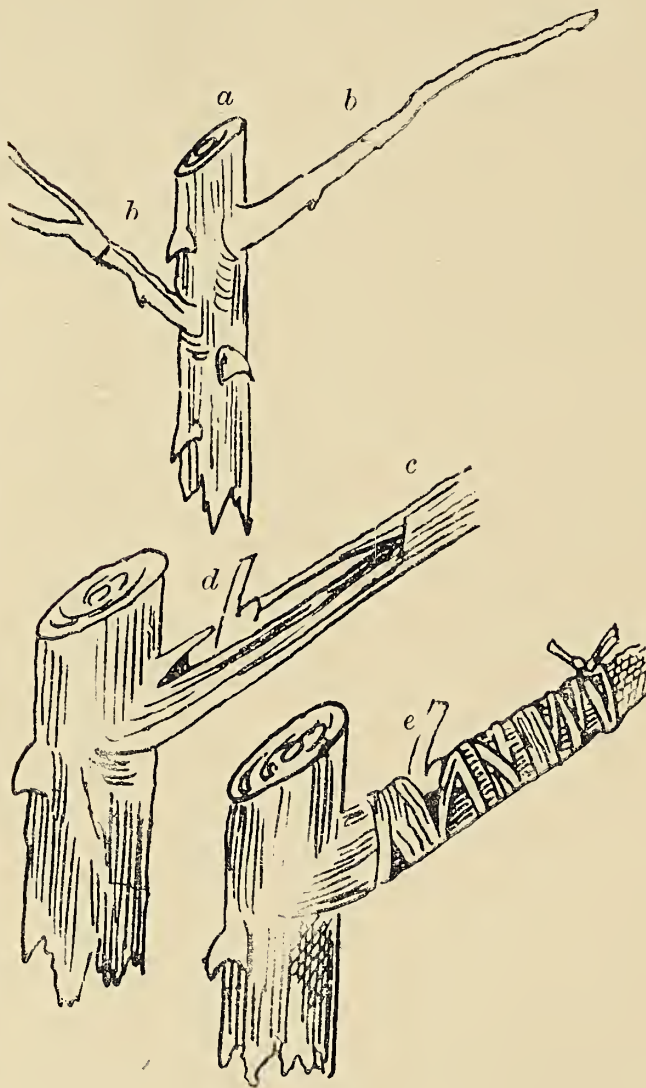
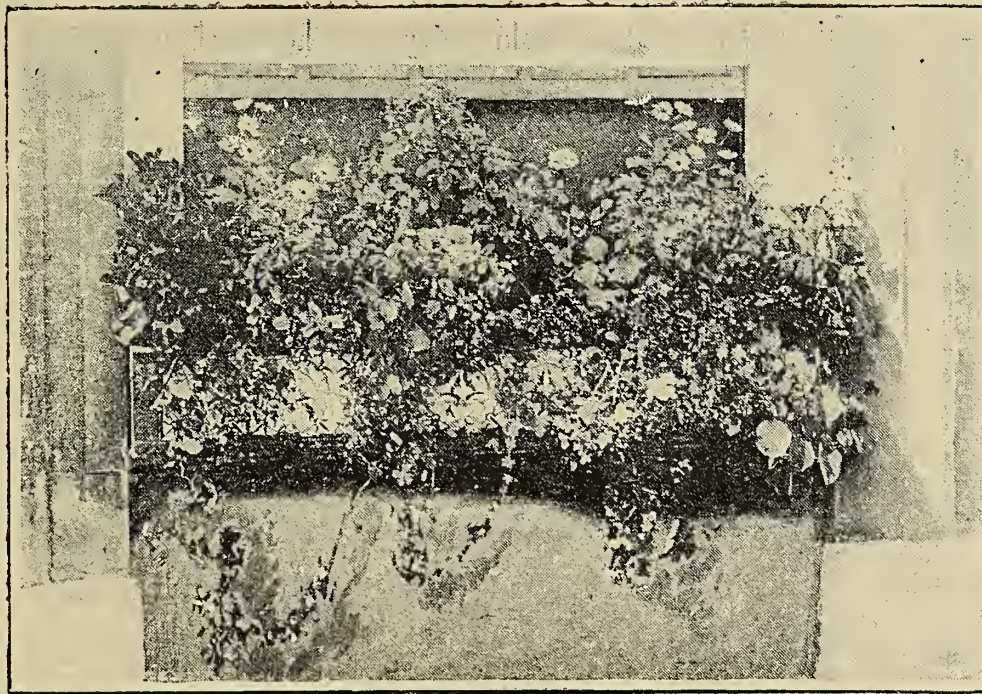


Fig. 30.

season cut the shoot back to within a couple of inches of the bud, then in due course you will be rewarded with a fine shoot of growth. Some few growers advocate shortening the shoulders containing the bud during the first season. The majority of them, however, agree in leaving them intact until pruning time during the following season.





A SUMMER WINDOW-BOX.

## THE BALCONY AND WINDOW GARDEN.

See, light darts down from heaven,  
And enters where it may ;  
The eyes of all the people  
Are cheered with one bright day.  
And let the mind's true sunshine  
Be spread o'er earth as free,  
And fill the souls of men  
As the waters fill the sea.

FROM THE GERMAN.

### CHAPTER I.

#### TOWN BALCONIES.

**H**OMELY recreations, in common with all other pleasures, are capable of abuse, and it may be well, now we are to consider about the embellishment of windows, to offer a kindly warning to all who read this book. The cultivation of the aquarium, the fern-case, and the formation of a window garden, may jointly and severally operate to the ruin of a household by excluding from it the light of heaven and the common atmosphere



A defect of daylight is as likely to tell, slowly perhaps, but surely, upon the health of the inhabitants of a house as a poisonous atmosphere or insufficiency of food. The obstruction of the daylight, therefore, is in itself an evil, and every instance in which it is contemplated to occupy any considerable portion of a window with an object that will exclude the light from the room should be considered with reference to the health of the family first, as of the utmost importance. Generally speaking, exclusion of light necessitates also exclusion of air; the window that is blocked up ceases to be a ventilator, and the chamber it should illuminate and sweeten becomes altogether unfit for occupation by human beings. The value of fresh air is perhaps sufficiently understood, but it is otherwise as regards the value of light. Photography compels us daily to observe the effects of the subtle powers of light in rapidly changing the colours of certain chemical preparations, yet we are slow to learn that the blanched cheek and trembling hand oftentimes represent debility induced by dwelling in darkness. The ruddy hue of health was never known to warm the cheeks of habitual dwellers in-doors, or of those shut up to sedentary employments, or such as breathe constantly a vitiated air. It is next to impossible to have abundance of light without having plenty of air also as a corollary, and both are primary essentials of health and cheerfulness, more especially to such as are much within doors. We have known instances of injury through undue indulgence in the tastes of which this work is intended to be the exponent, and we cannot proceed further without offering this brief word of caution against riding this particular class of hobbies too fast and too far.

Window gardens of all kinds belong to the town much more than to the country. Even an invalid shut up in one room in a country house can scarcely need a window garden; for the bleakest prospect will have its changes and its cheerful seasons, and our rural scenery is usually fresh and bright, and permanently interesting. Let each determine the particular case, while we deal with the subject broadly, and with a view to many practical suggestions.

In dealing with the various methods of decorating balconies with plants, aspect and position must be fully considered. It is useless recommending a general list of plants or describing a single example of decoration, as balconies occur in all aspects, and therefore what would be suitable in one instance would be totally unfit in the other. To meet these difficulties and render our remarks, as they should be, really useful and adapted to all cases, we



must deal with the various aspects separately. We must not only do this, but also take into account the position of balconies. For instance, a balcony may occupy a south or western aspect, and yet, owing to the contiguity of lofty buildings, be so shaded as not to get any sun whatever. In a case of this kind it would be useless to employ sun-loving plants, especially flowering kinds, as absence of the solar rays would encourage leaf growth at the expense of the flowers. Thus it is manifest that at least two positions—sunny and shady—must be considered with the four primary aspects.

Having decided the foregoing important points, our next business is to describe the most suitable plants for each purpose. Taking the sunny position first, as being the most important of the two, we have practically but three aspects to deal with, namely, south, west, and east; the north getting so little of the sun's rays as not to warrant its inclusion in this section of our remarks. Of course, it is needless to say that the first of these aspects is the best for ensuring a really good display. The number of plants available is practically unlimited. Of climbing plants there are *Clematis montana*, *C. flammula*, *C. Jackmanii*, and the hybrids of *C. lanuginosa*, *C. patens*, and *C. florida*; green and variegated ivies, Blue Passion flower (*Passiflora cœrulea*), Dutchman's pipe (*Aristolochia siphon*), *Ampelopsis Veitchii*, Common Jasmine (*Jasminum officinale*), yellow Nepaul jasmine (*Jasminum revolutum*), and the white Noisette rose (*Aimée Vibert*). These are all permanent climbers. Stout boxes or tubs not less than eighteen inches deep and a foot wide are necessary for growing the foregoing plants. In the bottom of each place about three or four inches of broken bricks, and on this some rough fibrous material, filling the remainder of the space with a compost of two parts turfy loam, one part decayed manure and silver sand. Plant the climbers any time between October and April. The aristolochia, Nepaul jasmine, *Clematis flammula* and *montana*, and the passion flower are the best adapted for twining among the balcony railings; the others may be trained in a *négligé* manner up the pillars, sides of the windows, or up a lattice-work trellis secured to the wall. Honeysuckles, especially the Goat-leaf Woodbine (*Lonicera caprifolium*), and the Golden-leaved Japanese Honeysuckle (*Lonicera brachypoda aurea-reticulata*), the former a spring flowering, and the latter an ornamental foliage kind, may also be grown as balcony plants, except in very smoky districts. For balconies near the sea, the Nepaul jasmine and the blue passion flower are the most suitable. Then among annual climbers we have the Common Nasturtium (*Tropæolum majus*), Lobb's nasturtium



(*T. Lobbianum*), morning glory (*Convolvulus major*) canary creeper (*Tropæolum canariense*), and the Japanese hop (*Humulus japonicus*), all of which may be raised from seed sown in ordinary soil in April, in the boxes or pots they are intended to grow in.

We have by no means exhausted the list of climbers. There remains yet to be mentioned the Chilian Glory Flower (*Eccremocarpus scaber*), the Cup and Saucer Flower (*Cobæa scandens*), and two other pretty, though somewhat tender kinds (*Thunbergia alata* and *Lophospermum scandens*). These must



THUNBERGIA ALATA.

be raised from seed, or increased by cuttings in a heated greenhouse, or, failing this, be purchased in June from a florist's. The cobæa has handsome foliage and purplish flowers, and the eccremocarpus finely-cut foliage and orange-red flowers. Both are charming plants, adapted for balcony railings, or for pillars or trellises.

Now we come to the question of plants for hanging baskets. Variegated ivies make the best permanent plants, and next to these the Periwinkle (*Vinca major*) and the Creeping Jenny (*Lysimachia Nummularia*). There is a golden



variety of the latter which is most effective. Of tenderer kinds, adapted for summer decoration only, we have ivy-leaved pelargoniums, which are unsurpassed for the purpose, petunias, fuchsias, trailing tropæolums, *Maurandya Barclayana*, and the lophospermum and thunbergia already mentioned. All these may be planted in the baskets in April, and grown in a greenhouse until June, then hung outside, or planted and placed outdoors then. Any of the last-mentioned plants may be planted in boxes, and their shoots allowed to ramble through the railing, and thus drape the base of the balcony in a most pleasing and effective manner.

Boxes, too, may be sown with mignonette, and placed in such a position that its fragrance may be wafted into the rooms. Pots containing sweet-scented Tobacco (*Nicotiana affinis*), heliotrope, and ten-week stocks may be stood about here and there during the summer, in order to afford a greater amount of fragrance if desired, and yellow and white marguerites, zonal geraniums, fuchsias, calceolarias, and lobelias pressed into service for yielding a bright display of colour.

If fine foliage plants are in request for summer decoration, the India-rubber Plant (*Ficus elastica*), Fan Palm (*Chamærops excelsa*); Silky Oak (*Grevillea robusta*); Parlour Palm (*Aspidistra lurida variegata*), and the Blue Gum Tree (*Eucalyptus globulus*), will be found suitable.

In autumn, early flowering chrysanthemums in pots will be useful for taking the place of the faded summer plants. When October arrives, clear away the summer plants, and plant daffodils, crocus, scillas, tulips, hyacinths, and snowdrops in the boxes, just forking the old soil over, no fresh mould being necessary. Then, in the place of the palms, have some small conifers, such as *Cupressus Lawsoniana*, *Retinospora plumosa*, *Taxus baccata elegantissima*, *Thuopsis dolobrata*, and *Juniperus tamariscifolia*. A few other ornamental shrubs, as *Aucuba Japonica*, euonymus in variety, variegated and common box, variegated hollies, and *Mahonia aquilifolia*. These will brighten up the balcony wonderfully in winter. If space permits, a few flowering shrubs, as rhododendrons, *Kalmia latifolia*, and laurestinus may be added. Berry-bearing shrubs, such as *Skimmia japonica* and *Pernettya mucronata*, ought to be found room for, too. On the approach of spring, wild primroses and the cultivated kinds, together with polyanthus, might be planted between the bulbs in the boxes, and thus an endeavour be made to render the balcony a source of interest all the year.



So much for the south aspect. With regard to the western one, nearly the whole of the plants, and the remarks concerning them, mentioned in connection with the former aspect applies to this. The exceptions are, in the case of the permanent climbers, the Nepaul jasmine and the aristolochia. These two climbers really require more sun than can be obtained in a west aspect. Then, as to balconies with eastern aspects, the list of plants adapted for these must be curtailed somewhat. Such permanent climbers, for instance, as Nepaul jasmine, aristolochia, passion-flower, and the choicer kinds of clematis, are quite unsuitable. *Clematis Jackmanii*, *C. montana*, and *C. flammula*, the common jasmine, the Noisette rose (*Aimée Vibert*), and all the ivies, will succeed there, however. Among the annuals, the common nasturtium, canary creeper, and the Japanese hop, are the only kinds available.

Similarly, among basket plants, only nasturtiums, fuchsias, creeping jenny, and *Vinca major* are suitable. Of other plants, marguerites, calceolarias, lobelia, Harrison's musk, and sweet-scented tobacco, are the chief tender kinds. All the bulbs and the shrubs described may be safely employed. The palms and foliage plants may also be used during June, July, and August; after that the position will be too cold for them.

Now we have to say a few words on balconies in shady positions. There, of course, it is assumed, that no matter what the aspect may be, the balconies fail to get any sun whatever, and therefore are much in the same position as is afforded in the case of an ordinary north aspect. In all such instances flowering plants are almost unsuitable. The yellow and brown calceolaria, most fuchsias, and the yellow or red flowered musks, are the only plants that any reliance can be placed upon for summer decoration. In autumn, chrysanthemums grown elsewhere and brought in a flowering state into a shady balcony will flower well enough. In spring, too, crocus, snowdrops, and daffodils will flower freely. For basket culture, the creeping jenny, *Vinca major*, and variegated ivies, are suitable permanent plants; and Harrison's musk and fuchsias similarly adapted for summer. In the way of permanent climbers, the Irish ivy, virginian creeper, *Clematis flammula* and *Jackmanii*, are the only ones that can be conscientiously recommended for shady positions. The common nasturtium and the Japanese hop do uncommonly well in the shade. If not too bleak and cold, the canary creeper may be counted upon as a reliable plant. The best of all plants for boxes in a shady position are hardy ferns. All the varieties of the male (*Lastrea*) and the lady



(*Athyrium*) ferns are eminently suited for it. Other robust kinds are the Buckler Fern (*Lastrea dilatata*), Hay-scented Fern (*Lastrea æmula*), Royal Fern (*Osmunda regalis*), Shield Ferns (*Polystichum angulare* and *P. aculeatum*). Dwarf and equally suitable are the Parsley Fern (*Allosorus crispus*), Hart's-tongue (*Scolopendium vulgare*) and its varieties, the Polypodies (*Polypodium calcareum*, *dryopteris*, *phegopteris*, and *vulgare*), Hard Fern (*Blechnum spicant*), Scale Fern (*Ceterach officinarium*), and the Maidenhair-spleenwort (*Asplenium adiantum-nigrum*). These should be planted in well-drained ornamental pots or boxes, in a compost of equal parts peat loam and leaf mould, in October or March. They are British species, and may be collected in a wild state by those who care to take the trouble to find out their haunts. Here we would offer a word of caution. Never purchase ferns from hawkers. These individuals invariably collect the ferns they offer for sale in a haphazard way, minus their roots, to save the trouble of digging them up. Such ferns, if planted, only live a short time, and have to be replenished by a fresh lot. It is better to go to a fern nursery and pay a trifle more, and get really good plants that will grow and flourish for years.

In cases where the owner of a balcony wishes to make the utmost of it in the delightful pursuit of plant-collecting, a rockwork may be added with advantage. We have hundreds of fine subjects amongst the Alpine and succulent-leaved plants that are admirably adapted for the balcony garden, as a large section can be grown in little space, and with a minimum amount of skill or trouble. All that we shall name will thrive in either a shady or sunny position, and, excepting in the hottest part of the year, require no water, and even then once or twice a week will be quite sufficient under ordinary circumstances. A small rockery upon which to grow succulent plants may be erected on each side of the window, or at each end of the balcony, and, as it is useless to attempt an imitation of Alpine scenery in the limited space at disposal, a simple undulating surface only should be aimed at. Place a layer of brickbats or rough clinkers on the floor to drain off the water quickly, then a layer of light sandy soil about a foot in thickness over these, and a few large burrs along the front to keep it in its place. When the work has progressed thus far, take a few rustic-looking pieces of burr or stone, stand them on the surface, and fill in the interstices with soil, so as to leave the points of the material used visible. It is a very common mistake to call in the bricklayer and erect an elaborate rockery, with little or no provision for placing the soil in which the plants are to be grown; but



with the simple arrangement here advised, the body of soil will be sufficiently ample for all purposes. When everything is in readiness, insert the plants between the crevices; and if any are taken out of pots, reduce the ball of soil, and carefully separate the roots; and in planting, whether from pots or not, see that a little soil is placed between the roots and the rock work. Very little attention will be necessary after the planting is completed, but from the end of May until the end of August the soil should not be allowed to become quite dry, although the plants will not take much harm if they suffer neglect occasionally.

Having pointed out the best and most simple way of constructing the rockery, it will be a very easy matter to name a few plants suitable for growing upon it. The most prominent points should be taken advantage of for planting the several members of the houseleek family, and of these the most beautiful and distinct are *Sempervivum arachnoideum*, *S. Californicum*, *S. ciliatum*, *S. globiferum*, *S. hirtum*, *S. montanum*, *S. pyramidalis*, *S. soboliferum*, and *S. tectorum*. For planting between these, nothing can surpass the thymes, stonecrops, and saxifragas. The former soon form huge tufts of vegetation, and must be kept in subjection by an occasional cutting back. *Thymus corsicus*, *T. lanuginosus*, and *T. serpyllum album* are the most distinct in character. The saxifragas are remarkable for the dense tufts of moss-like verdure they so quickly form in positions the most unsuitable to vegetable life. *S. aizoon*, *S. androsacea*, *S. cæspitosa*, *S. cochlearia*, *S. hirta*, *S. hypnoides*, *S. incurviflora*, *S. longiflora*, *S. pedata*, *S. pygmea*, and *S. pyramidilis*, are all good. The best stonecrops for carpeting the surface are *Sedum acre aureum*, *S. azoideum*, *S. glaucum*, *S. Hispanicum*, and *S. sempervivoides*. A few stronger kinds may be added, such as *S. atro-purpureum*, *S. fabarium*, *S. Japonicum*, *S. purpureum*, and *S. Sieboldi*. These are more suitable for planting in the lower parts of the rockery, where they will have the advantage of a greater body of soil than they would have in more prominent positions.

In the management of a balcony garden, one of the chief anxieties of the possessor should be to afford the plants sufficient nourishment. Every reasonable opportunity should be embraced of introducing fresh soil, but not to the great disturbance or injury of the roots of permanent occupants. In every case sound loam should be employed if possible, and means should be provided for the ready escape of surplus water, and also for the regular supply of water in dry weather. As renewal of the soil of a balcony garden is usually





THE PYRAMIDAL SAXIFRAGE (*Saxifraga Pyramidalis*).



inconvenient, and in regard to carpeted stairs and the keeping of the house objectionable, recourse may be had to the use of the prepared fertilizing compounds sold by seedsmen and florists. We cannot afford space to discuss the merits or properties of these preparations, but it may be useful to remark that they may all be used with perfect safety if used *sparingly* and *frequently*. A thin sprinkling of the material on the surface of the soil may be made at three separate intervals during the growing season, say in April, May, and June. Thenceforward until April again it would be wise to abstain from any further application, except it be to assist plants that flower in autumn, such as chrysanthemums, which, by the way, are admirably adapted for the balcony garden, provided they can be grown elsewhere during the summer, and have places in the balcony when the geraniums and fuchsias begin to fail. The chrysanthemums should have a pinch once a month from April to October, and no more. Another mode of employing these refreshers is to dissolve them in the water which is supplied to the roots of the plants. Although they differ in strength, they may all be used with safety and benefit in the proportion of half an ounce to a gallon of water; and as they are comparatively inoffensive, there can scarcely arise any objection to the practice. Let there be provided for balcony uses a vessel large enough for one day's supply, and in this prepare, in the early part of the day, the water which is to be used the same evening. The vessel should stand in the full sun in the open air, and if the water becomes warm in consequence, so much the better for the plants which, so fed, will glisten with health, and grow with delightful vigour. Whenever possible, use rain water in preference to hard water obtained from the tap. Hard water frequently contains a large percentage of lime, besides being considerably lower in temperature than rain water, and is more or less injurious to plant life. If rain water cannot be readily obtained, dissolve a quarter of a pound of common washing soda in hot water, and add the solution to thirty-six gallons of hard water. The soda thus added will soften the water, however hard it may be, in twenty-four hours, and render it equal to rain water.

Yet one more remark on management. It would be a grand thing for the plants if they were treated to a shower of pure, soft, almost tepid water every evening all the summer long. Water holding in solution any kind of manure should not be used for this purpose, though accidental splashing of the leaves with *very weak* liquid manure will never do harm. But it rarely



happens that it is possible to play an engine over the plants in a balcony garden,—it may be that windows on one side, and pedestrians on the other, are to be considered as rendering the practice inadvisable. Well, every case must be determined on its merits. Something may be done, perhaps, by means of a hand syringe, and if only a slight dewing by means of a fine shower can be given daily, the results will repay the trouble a hundredfold. In very hot weather, water should be given twice a day, if possible. If that is not possible, once a day must suffice, and will be more beneficial in the evening than in the morning. To give water while the sun shines fiercely will be to risk the safety of the whole affair.







## CHAPTER II.

### ENCLOSED WINDOW GARDENS.

Mild-breathing Zephyr, father of the spring,  
Who in the verdant meads doth reign sole king,  
Who, sheltered here, shrunk from the wintry day,  
And careless sleep the stormy hours away,  
Hath roused himself, and shook his feathers, wet  
With purple-swelling odours, and hath let  
The sweet and fruitful dew fall on this ground,  
To force out all the flowers that might be found.

BEN JONSON.



**T**O adapt the fern-case and the aquarium to the window is by no means a difficult matter, and may oftentimes be most desirable; for though windows are useful usually to permit of a view and afford ingress for light and air, occasions occur in which light and air may be partly spared, and the view must be blotted out by something better. As speech may be employed to conceal as well as to publish thoughts, so windows may be sometimes increased in value when occupied with objects that render them

useless for their ordinary purposes.

Where a house stands amidst its own grounds, there may not be much need



of a floral display at the windows ; but in suburban villas the views are not always of the finest, and besides the opportunity the window offers for flower culture, it is sometimes advisable to shut out the glances of too curious eyes, and screen ourselves from the glare of the sun, the driving dust, the keen wind in spring, when the blue sky and inviting greenness tempt us to throw up the sash in spite of the lingering north-east ; in fact, a bowery window is often desirable for strict utility, as well as for ornament ; and nothing is easier than to break the angular outlines with plants, and create a choice garden within and without, such at least as may give a lady full employment, and add vastly to the grace and pleasure of the home.

The shape, dimensions, and aspect of a window will, of course, pretty much determine what is to be done with it. Supposing that you decide to have a small ornamental case constructed, somewhat after the manner of the accompanying illustration, outside a south or west window, you may turn this to account from May to September for growing small palms, *Dracæna indivisa*, *Aspidistra luridâ variegata*, *Anthericum variegatum*, *Isolepis gracilis*, and flowering plants in season, as marguerites, zonal pelargoniums, musk, heliotrope, lobelias, and petunias. In September these may be replaced with small ornamental shrubs, as *Pernettya mucronata*, *Euonymus radicans*, *E. japonica* and *Eulalia japonica*, with the addition in spring of hardy bulbs in flower, and a charming effect secured throughout the year. If the aspect be an easterly or northern one, then recourse must be had to such ferns as *Pteris tremula*, *Pteris cretica*, *Cyrtomium falcatum*, and *Pteris serrulata*, with *Begonia rex*, *Grevillea robusta*, and musk for summer ; and similar shrubs, &c., to those recommended for the south aspect for winter and spring.

Then another mode of decoration might be carried out as follows : To begin inside, you may, if there is sufficient space, and particularly where a large bay window offers the opportunity, place at each side a neat box lined with lead, and of a depth proportionate to the height of the window-sill. Twenty inches may be considered a good depth ; and each box should occupy not more than a third of the window, so as to leave the central space open for the view and the transmission of unbroken light. Then in each box fix a trellis of wood or wire—and wire is *always best*—to ascend nearly to the top of the glass, and then arch over and meet in the centre. Indeed, the centre-piece should be made separately, so as to admit of removal in winter, if desirable, and it may be attached to the two side portions by a little simple carpentering. Most of the climbers require to





OUTSIDE WINDOW CASE, FURNISHED WITH PALMS AND DRACÆNAS



be shortened in autumn, and the few rods left must be well ripened by the plentiful admission of light and air ; and when this is accomplished, the upper portion forming the arch of the trellis may be removed, to give full access to the winter light, which is, heaven knows, scanty enough in our climate. These boxes, if fully exposed to the daylight, may be stocked with choice half-hardy plants, which, having the shelter of the room in cold weather, will do as well there as in a greenhouse. Against the trellis may be planted a few tender climbers, such as you cannot well grow outside, and which are of quick growth and light in leafage. In Paris, the common ivy is often grown in this way, and is well adapted to the purpose ; so also is the Japanese honeysuckle, the leaves of which are most beautifully reticulated. We have eaten many a fine bunch of grapes grown in this way, but the root was usually outside, and the rods brought in and trellised over the window, greenhouse fashion ; and a lovely spectacle it makes as we catch the daylight through the emerald green of its noble leaves. Indeed, plants seen thus *against* the light have the most charming appearance possible ; every vein and pore is visible as the light streams through them, and on the room the light falls beautifully tinted with a soft green, and chequered with a thousand interlacing shadows.

A grand development of the foregoing simple plans is accomplished by the construction of a miniature conservatory opening from a large window or a pair of glass doors, these being made so as to allow of their removal during the summer, when the lintels can be dressed with drapery to give an artistic finish to the whole affair. The aspect must determine the selection of plants for the purpose. If shady, ferns will thrive if carefully tended. If the aspect is due south and the sun plays for many hours with full force upon the glass, a number of most noble plants become instantly available, such as agaves, aloes, yuccas, bonapartias, the Tree Houseleek (*Sempervivum arboreum*), dracænas, crotons, a number of small succulent plants, of which we may take the curious *Pachiphyton bracteatum* as an example. Flowering plants of many kinds may of course be used abundantly, but generally speaking it is unwise to attempt to keep them in these small structures ; they should be brought in when at their best, and be taken back to the frame or greenhouse when beginning to wane. To add a fountain is an easy matter, if there is a sufficient supply of water from a higher level ; and if there is not, a supply sufficient for playing the fountain occasionally may be obtained for comparatively little expense. A small cistern in one of the upper rooms or outside the house should be fixed where it can be conveniently filled as required. A





A MOVABLE WINDOW GARDEN.

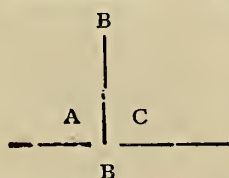


lead pipe of small bore will convey the water to the fountain, and there a little skilful engineering will accomplish the rest. As the splashing of water in such a place might be objectionable, the fountain may be enclosed in a glass shade, and its appearance rendered none the less elegant thereby.

Where there is no opportunity of fixing cases inside or out for growing plants in windows, the following plan, enabling a pretty effect to be produced inside may be adopted. Have a stout oak box, coated with pitch inside, made to fit the window; then four zinc shells to fit inside the box. The shells are to be filled with plants and kept in the greenhouse until required, bringing them in one at a time, and removing them when the plants begin to look shabby. By this means a constant succession of plants in good health can be maintained. The example figured shows a wire arch covered with the German Ivy (*Senecio mikanioides*), and caladiums, arum lilies, dracænas, coleus, &c., grouped underneath, and finished off with an edging of moss (*Selaginella Kraussiana*). The box may be filled with cocoanut-fibre refuse and the pots plunged in this, or with soil and the plants planted in it.

Another development of the enclosed window garden is that particular form which, some years ago, we designated the *hortus fenestralis*, the window garden *par excellence*, and the *multum in parvo* of its kind. It is an elegance peculiarly adapted for the window that commands an unpleasant look-out, or where inquisitive eyes impose a limit on privacy, or perhaps tongues that defy propriety make unseemly noises without. It is powerful to exclude noise, dust, and excess of light; and may be made a gratification to passers-by, as well as to those within the house, as may be desired.

An essential feature of the *hortus fenestralis* is, that it is in the fashion of a closed case fitted to the window, extending to half its height or more; it may indeed be of the same height as the window, and projecting outwards to the full extent of the sill or beyond it. If the reader will turn to any one of the windows of the apartments occupied, during the perusal of this, it will be seen that there is a space both within and without the glass sashes that may be appropriated for the cultivation of plants, as the annexed diagram will illustrate. Let A represent the inner sill, B the existing glass sashes, and C



the outer sill. The whole width of A and C may be appropriated to plants by providing a glass case to fit it: and as most windows consist of two sashes, the lower sash may be removed and its place be taken by the case; or if that is objectionable, the space C may be appropriated to the case, which may be



allowed to project a little beyond the actual width of C in order to gain a sufficient depth for a good effect. Where the windows are large, and there is no objection to a considerable projection, two feet depth may be considered liberal for the *hortus fenestralis*; its width and height will be determined by the window. The next business is to fit it. It is well if the base be made of one stout slab of slate or stone, the joints may be iron, and the lower sash of the window may be made to serve as its inner side, and the means of access to it. Any skilled worker in glass and metals could fit up a case if furnished with such a design as the employer would approve of, and we will

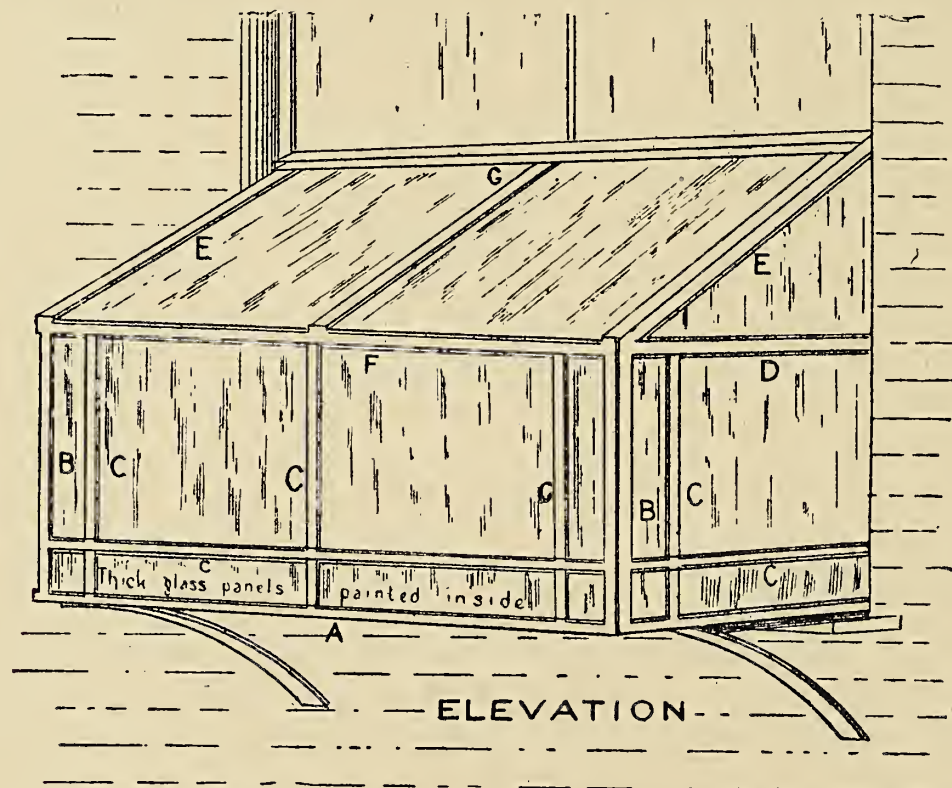


Fig. 1. Elevation of Window Case. The letters used are repeated on details (Figs. 4, 5, 6, 7, 8, 9, 10) to show the respective shapes of the rails, standards, rafters, and bars. Scale:  $\frac{1}{2}$  inch to the foot.

only remark that every part of the workmanship must be good, and there ought to be about the whole affair an elegance of finish consistent with its purpose.

Assuming that the reader desires to have a case specially made for an outside window, here is a good design, accompanied by detailed drawings:— The case is, perhaps, not quite so genteel in appearance as the previous ones, but it has the merit of being quite as serviceable, at all events. It can be



easily made by any skilled workman, or by any amateur carpenter, for the matter of that.

The section, Fig. 2, is made to a half-inch scale, and the details, Figs. 3, 4, 5, 6, 7, 8, 9, 10, are half full size. The bottom (*a* Fig. 3), should be formed of board  $1\frac{1}{4}$  inch or  $1\frac{1}{2}$  inch thick, with three pieces of 1 inch by  $\frac{1}{4}$  inch iron screwed across on the under side, to keep it from warping, and should be rounded on the outer edge, and also have a drip groove round the under side. There should also be a groove in the top side to receive the glass panels. The narrow glass panels, *c c*, round the bottom part of the case may be any kind of thick glass—rolled plate for instance—which may be painted inside of any desired colour; this will prevent pots or earth being seen through the glass. It is, however, a good plan, as tending to durability, to have a galvanized iron tray (as shown in section, Fig. 2) to set inside, with pipes through the bottom for drainage. The upper panels (*f d*, Fig. 1), and roof (*e*) may be glazed with 21 oz. sheet glass, and the wood be any hard kind, or good red deal. In the latter case it should have three coats of paint, and in the former one coat of boiled oil, and then a coat of varnish. Care should be taken that it is well supported, so as to bear not only its own weight, but also that of any plants that may be put into it. To this end good strong iron brackets, as shown at Fig. 3, should be used, and a fixing obtained on each side near the

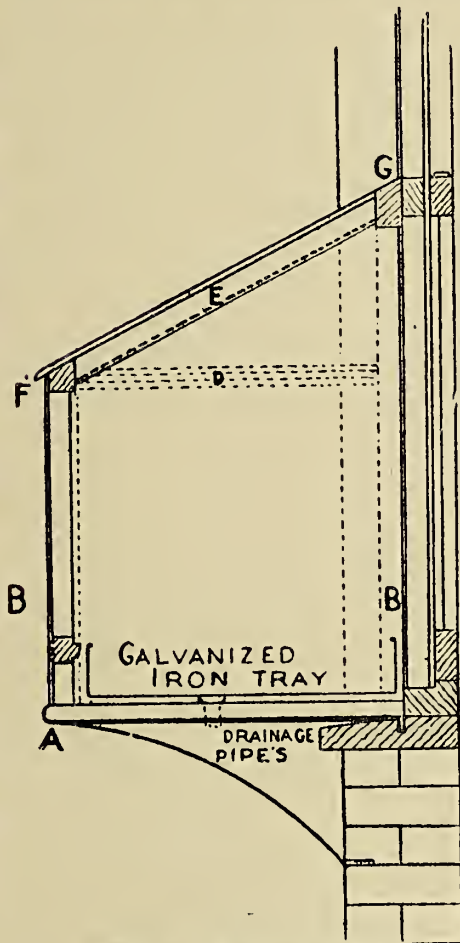


Fig. 2. Section of Case.

top of the case into the window frame. We recommend the sprigging in of the glass with small brads before puttying, and if the amateur workman should not be very clever at tenons and mortice, on a small scale, he may find it advisable to screw on some neat brass or malleable iron L angles at the corners where the timbers are joined together. Some red and white lead mixed with boiled oil, to the consistency of joiners' glue, should be put into all the joints. In this case it is intended that the top



rail (g. Fig. 1), should reach to the meeting rail of the window against which it is to be placed, so that when the lower sash is lifted up, access can be

had to the case; and at the same time air will be circulated in it. The tray should be filled with cocoa-nut fibre refuse, in which the pots of the various flowering and foliage plants brought into the case from time to time should be plunged—partially for the purpose of concealing the pots from view, and more particularly for protecting the roots within from drought. If preferred, a layer of rough cinders might be placed in the tray, and on this a compost of equal parts loam, cocoa-nut fibre refuse, and sand. Some pieces of sandstone

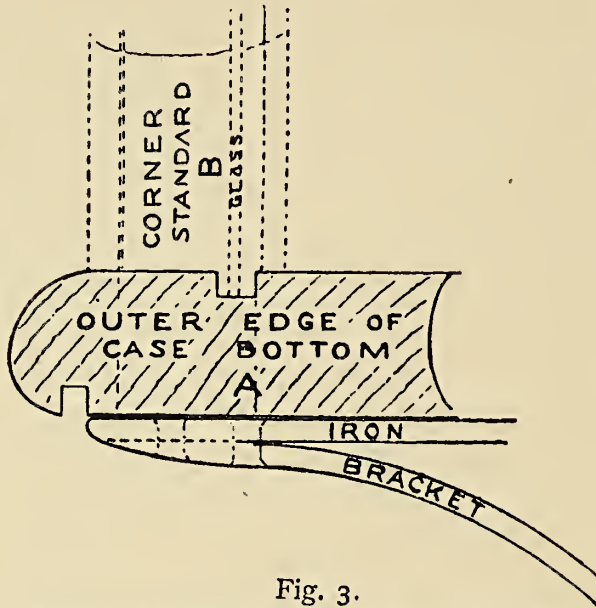


Fig. 3.  
Section of bottom of case and iron bracket.

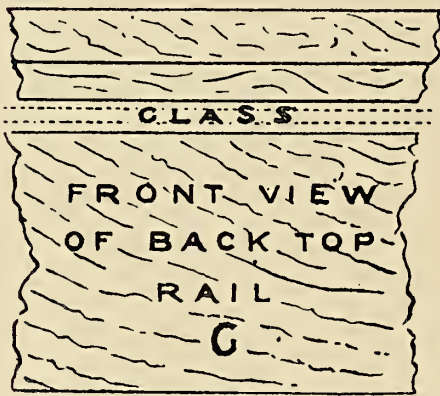


Fig. 4.

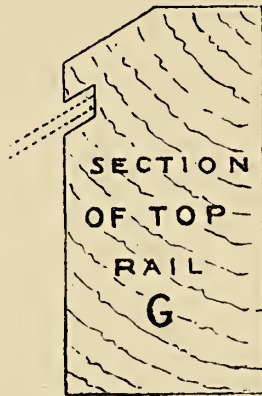


Fig. 5.

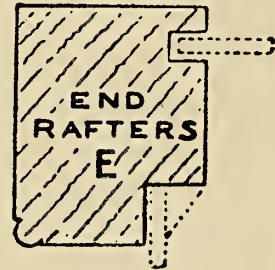


Fig. 6.

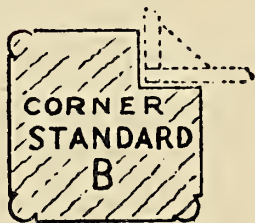


Fig. 7.



Fig. 8.



Fig. 9.

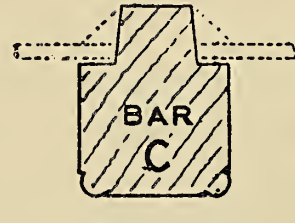


Fig. 10.

EXPLANATION.—Sections of rails shown at positions marked by corresponding letters in elevation (Fig. 1), and drawn to half their full size.



or tufa might also be introduced here and there in the soil, to give the surface an undulated appearance, suggestive of a miniature rockery; ferns of various kinds might then be planted thereon, leaving spaces for adding a few plants in flower from time to time, or if desired, planting the whole with ferns and foliage plants.

As a rule, there are no plants to equal ferns for these cases, and as they will afford more space for them to grow than ordinary fern-cases, some species of large size may be introduced. It will be understood, however, that a sunny south window is not the place for ferns; there, indeed, another course must be pursued. These window gardens or cases may, if desired, be heated in a similar manner to that described for fern cases. But when not so aided, the hardier kinds of ferns should alone be planted in them. Ferns that are adapted for cool houses and cool cases are just such as are required here.

One form of case combines an aquarium with a fernery. Here the lower half or a third of the window space should be blocked with a slate slab, which forms the back of the tank, the glass front being within the room. It has been shown in the chapters on the aquarium that it is not generally advisable to allow the light to stream through a tank, and therefore an opaque back is preferable to glass. In furnishing a case of this description, the common English ivy, *Hedera helix*, in the normal condition in which we usually find it in hedgerows, would be most valuable, as it thrives in closed cases and can be trained up to form a most elegant green tracery. Those beautiful climbing ferns, *Lygodium scandens*, and *Lygodium Japonica*, are also well adapted for the same purpose, and must have copper wires fitted to train them to. But here is a golden opportunity for growing the lovely filmy ferns, such as *Trichomanes radicans* and *Hymenophyllum Tunbridgense*, with other moisture-loving kinds, such as *Asplenium fontanum*, and many of the larger varieties of mosses met with in bogs and the neighbourhood of fountains. As to the aquarium, it is advisable to introduce small fishes only, and those should be varieties of carp, the gold carp being the most generally useful. To every two gallons capacity of the tank one small carp may be allowed, and no more. The water should never be changed unless some accident renders it necessary to clean out the tank, and cleanse it thoroughly. All snails, and in fact all the small animals commonly used as "scavengers," are best dispensed with; they are simply a nuisance. It is also a fallacy to introduce water-plants, but *Vallisneria spiralis* is an exception, as it generally thrives if planted in a bed



of pebbles, and left undisturbed. In every part of the rock, and the sides of the aquarium, confervæ should be allowed to grow, but the front glass, through which the view is obtained, must be kept quite clean by the occasional use of a sponge firmly fixed to a stick. As a matter of course, the front glass of the upper part should open as a door, and there should be permanent ventilation provided above.

Of course, where the cases previously described occupy a sunny position, ferns are scarcely suitable plants to grow, as there is a danger of their fronds getting disfigured by the sun. In such cases the foliage plants described at the end of this chapter should be substituted for the ferns, with the addition of flowering plants in season. In both cases plunge the pots to their rims in cocoa-nut fibre refuse. In shady positions give the preference to ferns. Flowering plants may be grown, too; but, as a rule, it will be necessary to change the plants frequently, as the flowers lose their freshness and beauty sooner in the shade than in the sun.

As we have kept in mind the importance of light and air, we must not here forget that conservatories that are approached through dwelling-rooms are apt to communicate to those rooms more atmospheric moisture than desirable. Therefore, protection against damp must be thought of in time. One great safeguard is to establish an intermediate apartment, through which the conservatory can be seen as well as approached. This, however, is only possible in certain peculiar instances. But a coating of Portland cement on all the walls of the dwelling that abut on the conservatory will most effectually prevent transmission of moisture through the walls, and a careful use of water amongst the plants will keep evaporation at a minimum. Succulent plants need so little water at the root, and thrive so well in a dry atmosphere, and, moreover, are so much benefited by free ventilation in summer time, that they are the very best of subjects for growing in window cases. Palms will bear privations better than is commonly believed; and a number of flowering plants may be kept in health for a short time on small allowances of water, provided they are never allowed to become quite dry. Another help towards counteracting humidity is to have the plants staged on an open trellis, and beneath this a zinc tray, continued all round, and communicating with an outlet for the quick conveyance of every drop of water that runs through the pots in watering.



A SELECTION OF PLANTS ADAPTED FOR ENCLOSED WINDOW GARDENS.

ORNAMENTAL FOLIAGE.

*Agave Americana*, *A. Americana fol. var.*, *A. applanata*, *A. cœrulescens*,  
*A. filifera*, *A. Schidigera*, *A. dasyliriodes*, *A. Verschaffelti*.

*Aloe plicatilis*, *A. serrulata*, *A. variegata*.

*Anthericum variegatum*.

*Aralia leptophylla*, *A. palmata*, *A. papyrifera*, *A. quinquefolia*, *A. reticulata*.

*Araucaria Bidwilli*, *A. Cooki*, *A. Cunninghamsi*, *A. excelsa*.

*Arundo donax variegata*.

*Aspidistra lurida variegata*.

*Bambusa Fortunei variegata*.

*Beaucarnea recurvata*.

*Cordyline indivisa*.

*Dasylirion brevifolium*.

*Dracœna Australis*, *D. Veitchi*, *congesta*, *gracilis*, *lineata*, *terminalis*.

*Echeveria metallica*.

*Eulalia japonica variegata*.

*Farfugium grande*.

*Ficus elasticus*, *F. Chauvieri*, *F. Porteana*.

*Grevillea Drummondii*, *G. elegans*, *G. robusta*.

*Hydrangea Japonica variegata*.

*Isolepis gracilis*.

*Lomatia elegantissima*, *L. ferruginea*.

*Ophiopogon jaburan variegatum*.

*Osmanthus ilicifolius aureus variegatus*.

*Phormium tenax*, *P. tenax variegatum*.

*Rhopala Australis*, *R. corcovadensis*, *R. Porteana*.

*Veronica Andersoni variegata*.

*Yucca aloifolia variegata*, *Y. filamentosa variegata*, *Y. quadricolor*.

PALMS.

In addition to the foregoing plants, the following Palms succeed well in window-cases, if protected from frost in winter :—

*Areca Baueri*, *A. lutescens*, *A. sapida*.

*Chamœrops excelsa*, *C. Fortunei*, *C. humilis*, *C. palmetto*, *C. sinensis*



*Cocos Australis*, *C. Bonnetti*, *C. Chiliensis*, *C. Widdelliana*.

*Corypha Australis*.

*Kentia Belmoreana*.

*Latania Borbonica*.

*Phœnix dactylifera*, *P. humilis*, *P. sylvestris*.

*Rhapis flabelliformis*, *R. flabelliformis variegatus*.

*Seaforthia elegans*.

*Thrinax parviflora*.

#### DROOPING PLANTS.

*Campanula garganica*.

*Chlorophytum Sternbergianum*.

*Linaria cymbalaria*.

*Othonna crassifolia*.

*Saxifraga sarmentosa*.

*Sedum Sieboldi variegatum*.

Flowering plants of many kinds may be introduced from time to time, to light up the collection and afford agreeable charges.

#### FLOWERING PLANTS FOR EACH MONTH IN THE YEAR.

JANUARY.—*Acacia platyptera*, *Coronilla glauca*, *Jasminum nudiflorum*, crocuses, chinese primroses, *Primula obconica*, snowdrops, Roman hyacinths, violets, mignonette, *Erica hyemalis*, epacris in variety, Christmas roses, winter aconites.

FEBRUARY.—*Azalea amæna* and *A. indica* in variety; camellias of sorts; epacris of various kinds; *Cyclamen persicum*, Dutch hyacinths, early tulips, paper-white narcissus, Chinese sacred lily, *Iris reticulata*, and most of the plants described for the preceding month.

MARCH.—Azaleas and camellias; *Acacia armata* and *grandis*, lily of the valley, tulips and hyacinths, cinerarias; *Erica gracilis* and *Wilmoreana*; double zonal pelargoniums; hippeastrums; arum lily (*Richardia æthiopica*); *Spiræa japonica*; *Dielytra spectabilis*; *Boronia megastigma*; *Polygala oppositifolia*.

APRIL.—*Deutzia gracilis*, *Cytisus racemosus*, *Alyssum saxatile*, primroses and polyanthus; *Lilium Harrissi*; *Lachenalia tricolor*; azaleas and camellias; daffodils, lilacs, amaryllis, hydrangeas, and roses.

MAY.—*Weigela rosea*, *Cytisus Everestiana*, *Lachenalia tricolor*, *Acacia*



pubescens, *Iberis correæfolia*, epacris, azaleas, hydrangeas, and show and fancy pelargoniums ; petunias, heliotropes, *Primula obconica*.

JUNE.—Fuchsias, single and double ; zonal pelargoniums, ivy-leaved pelargoniums, heliotropes, petunias, tea roses, golden and white marguerites.

JULY.—Same as for June, with the addition of balsams, celosias, cockscombs, rhodanthes, mignonette, sweet-scented tobacco (*Nicotiana affinis*), carnations, violas, pansies, mimulus, *Lilium auratum*, *Lobelia erinus speciosa*.

AUGUST.—*Lilium speciosum* and varieties, zonal pelargoniums, *Vallota purpurea*, tuberous begonias, and any of the plants named for the two preceding months.

SEPTEMBER.—*Sedum Sieboldi*, *Plumbago capensis*, *Agapanthus umbellatus*, oleander, *Veronica Andersonia*, zonal pelargoniums, early-flowering chrysanthemums.

OCTOBER.—*Veronica salicifolia*, belladonna and Guernsey lilies, *Salvia splendens*, *Eucomis punctata*, *Scilla autumnalis*, *Colchicum autumnale*, *Anemone japonica*, rosea, and alba ; early-flowering chrysanthemums.

NOVEMBER.—Tree carnations, bouvardias, *Primula obconica*, chrysanthemums, *Amaryllis reticulata*, Chinese sacred lily, double zonal pelargoniums, *Cyclamen persicum*.

DECEMBER.—*Chimonanthus fragrans*, *Erica gracilis autumnalis*, Neapolitan violets, Chinese primulas, epacrises, Christmas rose, Roman hyacinths, paper-white narcissus.







### CHAPTER III.

#### THE WINDOW-SILL AND THE AREA.

I would not for a world of gold,  
That nature's lovely face should tire :  
Fountains of blessings yet untold,  
Pure source of intellectual fire :  
Fancy's pure buds, the germs of song,  
Unquickened 'midst the world's rude strife,  
Shall sweet retirement render strong  
And morning silence bring to life.

BLOOMFIELD.

LET us not despise the day or small things. A window-sill garden is better than no garden, and the dark area, where cats quarrel and damp makes patches of unsightly mould, may be made bright with healthy vegetation that shall be worth a little care, and very much love. One advantage of abstaining from the adoption of a glass enclosure is that we may have flowers at the windows without losing a ray of light, and with additional temptations to open the window that the healthy breeze may wander round the room, and bless the inmates with waftings of odours from our own flowers.

It is a very simple matter to obtain a sufficient number of handsome plants in pots, and place them on a window-sill, and thus produce a fringe of fragrant flowers that shall contribute materially to the comfortable aspect of



the house, whether as seen from within or without. But it too often happens that the effect is ephemeral. The plants are, perhaps, not suitable, though attractive. It may be early spring time, and a bleak east wind blowing. A hawker appears with a gay basket of pelargoniums, cinerarias, and cyclamens, all of which have been rapidly forced into flower in a hothouse, where they have not only been kept very warm, but have been bathed in atmospheric humidity. A purchase is made, and the plants make a bonny show to-day, to-morrow, and perhaps for one day more, and it is all over with them; the cold has killed them. Or it may be high summer, and the hawker appears again; and as there is no cold now to fear, another purchase is made. Once more a bonny show, in the blazing sunshine, where the pots become so hot that a tender hand dare not touch them, and in a few days they cease to be, for the heat has killed them. A little judgment is certainly needed to begin well in window gardening, but more needful than judgment is constant care, for where care is exercised the necessities of the plants will be discovered, for they almost speak for themselves, though only those who really take an interest in their welfare will ever discover what they mean by their varying aspects as their fortune changes. Pot plants answer admirably on windows, as everybody knows who has made a few commonplace observations, and it may be well to offer a few words upon the conditions that are essential to success. First, we must have a good selection of subjects. Forced flowers are not desirable, and, therefore, in the early months of the year, hardy plants alone should be employed. We may have during winter, and far into spring, neat, bushy, evergreen shrubs, such as *Arbor vitæ*, laurestinus, box, holly, aucuba, ivy, and euonymus; of all these, except the first two, there are several varieties with variegated leaves, which, if intermixed with the dark-green kinds, have a beautiful appearance. The sort of window-sill on which a group of these would have the best appearance is one with a broad slab, with heavy ornamental ironwork in front to hide the pots, and prevent them being blown over. The sort of plants best adapted for it are short, compact, roundish bushes; and the best way to place them is to pack them close in three or four rows, the tallest in the centre, and the shorter plants on either side, thus forming a sort of bank, as seen both from within and without. For spring a few potted wallflowers, primroses, cytissus, hyacinths, tulips, and crocuses, may be brought forward; and they will look better if a few of the greenest of the evergreens are associated with them than the brightest lot of flowers without any such relief. For summer the zonal pelargoniums



(geraniums so-called) will take the lead, both for their brilliancy and their long endurance ; but any free-flowering plants will then be available, and will always have the best effect if care is taken to ensure in the mixture a due proportion of green. The autumn will bring asters to make a change, and pom-pone chrysanthemums to wind up the season of flowers ; after which the ever-greens will take their place again.

The endeavour must be made to keep all the plants in perfect health as long as possible. To begin with the ever-greens : they must have regular supplies of water, even in rainy weather, for very little rain will ever find its way to their roots. They should never be exposed



A SUNNY WINDOW.

to severe frost, but a slight freezing of the top crust of soil will do them no harm. During really damp weather they should all be removed, and



put aside in any *dry*, cool place, safe from frost ; even if they are in the dark for a week will not much matter, but light is good for them always. A dry, hot room is not the place for them at all—better a dark cellar or the roughest shed ; and if the place they are taken to is one where long-protracted frost will be sure to find its way, lay them on their sides upon the ground, and put about six inches of dry hay over the pots lightly—no frost will hurt them then.

Equal care must be taken to protect the roots of the plants from injury by excessive heat. It is a good plan with such plants as calceolarias, verbenas, lobelias, and pelargoniums, when placed in the full sun, to drop them into empty pots a trifle larger than the pots they are in, and fill the space between with moss or sawdust : this affords sufficient protection. Of course, ornamental pots may be employed for this purpose, and this is always the best way to use them, for it is a bad practice to grow plants in ornamental pots ; they should be used merely as receptacles, or they will not last long ; and moreover, it is but seldom plants of any kind will grow so well as in the common garden pots that are in use everywhere.

As to watering, an occasional deluge is almost as objectionable as perpetual insufficiency. Give water moderately and regularly ; let it be soft, and if not warm, at least not decidedly cold. Large plants in small pots will not continue long in health unless most carefully tended as to watering, and it will usually help them if a mere pinch of some fertilizing substance, such as half-ounce of guano, is dissolved in every gallon of water which is intended for them. Remove all seeds or seed pods as fast as they appear, for the bloom soon ceases if seeds are allowed to ripen. Dead leaves must be removed, of course.

A well-filled flower-stand may prove an agreeable window ornament, provided it is kept always well furnished with plants in the best of health ; but we see some dingy examples at times that are fitting “adornments” only of a house where slovens hold the rule. Lightness and elegance of outline are to be studied in choosing them, and no little care must be exercised to keep them gay at all seasons. It is a folly to suffer plants to pass all their days in such receptacles ; their proper use is to exhibit fine specimens of blooming plants ; and of these, greenhouse exotics are most suitable. Where a greenhouse is well managed, there will be no difficulty in furnishing the stand with a succession of fairy roses, zonal pelargoniums, fuchsias, heaths, genistas, azaleas, camellias, calceolarias, etc. ; and it should be the aim of the possessor





WINDOW WITH A SHADY ASPECT.



to preserve the brightness of the scene all through the year. The moment a plant goes out of bloom it should be removed and its place supplied with another ; for as to rearing plants in such situations as many do, it is wasting one of the best opportunities which art affords us for a display of successional pictures. As well might the actors dress and rehearse before the audience, as a collection of plants be allowed to present themselves in all their preparatory stages to the eye of either visitor or host.

A flower-stand should always be bright, clean, and gay ; and since it is a purely artificial arrangement, it should *in itself* be ornamental in design, material, and colouring. Designs and patterns might here be multiplied without end were they needed, but they are not. A visit to any of the established makers of iron and wire ornaments will enable any one to choose better than a whole sheet of engravings. Strict *appropriateness* is all that need be thought of (except price) by any purchaser of such a floral necessity. The size, the form, and the general arrangement must be such as to adapt it to the place it is to occupy ; and if any special form deserves special notice, it is that which admits of the grouping of other ornaments, such as vases and fern shades with it ; and this is easily accomplished—with a stand of an arched form, which admits of additional objects being placed beneath it.

Window flower-boxes are now made in a variety of materials and styles, from the humble trough of deal wood painted stone-colour or dressed with rustic work in the shape of hazel-rods and pine cones, to the richly coloured encaustic tiles, and the equally beautiful and cheap imitations of them. These not only make an end of the ugliness and inconvenience of flower-pots, but in them the plants grow far more satisfactorily, and require considerably less attention. It is quite common now—and let us rejoice that it is common—to see windows most tastefully embellished with these constructions. In one of our regular “constitutional” walks we pass a handsome mansion built of white brick, all the noble windows of which are furnished with boxes of a costly kind, in the colouring of which blue predominates. They are always dashingly kept in flowering plants, and the rich colours of the boxes do not in any way kill out the colours of the plants. And we frequently pass a quiet tradesman’s cottage, the windows of which have plain stone-coloured wooden boxes, which are equally satisfactory, because appropriate and well kept. Thus, the purse does not confer on its possessor a monopoly of pleasure any more than it serves him in place of judgment and taste ; and both these instances



may be, and we hope they are, outward exponents of the content and peace that prevail within. Hear what Spenser says :—

It is the mind that maketh good or ill,  
 That maketh wretched, happy, rich, or poor ;  
 For some that hath abundance at his will,  
 Hath not enough, but wants in greater store ;  
 And other, that hath little, asks no more,  
 But in that little is both rich and wise ;  
 For wisdom is most riches ; fools therefore  
 They are which fortune do by vows devise,  
 Sith each unto himself his life may fortunize.

In the management of window-boxes the directions given above for pot plants apply with very few exceptions ; they must be prepared with care, in the first instance : a layer of broken flower-pots must be put in to ensure perfect drainage, and then a bed of light rich soil, such as would be employed for growing potted fuchsias, for example. Having had a set of boxes to keep furnished at our own windows for many years past, we have found that though an annual renewal of the soil is desirable, it is not imperatively necessary. We kept our boxes in fine condition for four years in succession without changing the whole of the soil, but every time they were replanted we removed a little of the top crust, and after planting, filled up with good hot-bed manure rotted to powder. A succession of plants must be provided, for the boxes should be always occupied. Let us sketch out a course in brief. For winter, small bright evergreen shrubs, packed close. When they are planted pot, in the smallest pots possible, a lot of snowdrops, crocuses, hyacinths, and early tulips, but have nothing to do with the narciss, ixia, and other bulbs commonly grown in the greenhouse and garden. About the end of February take out the evergreens with care and plant them in the garden, or pot them and put them in a frame. Then carefully turn the bulbs out of their pots and plant them very close together in the boxes, arranging them as to their future heights and colours, according to your knowledge of their habits ; as a rule, placing the hyacinths and tulips along the centre, and the crocuses and snowdrops along the front and back. There will be a long succession of flowers, for as the snowdrops and crocuses go out of bloom, their leaves will rise and form a green groundwork which will enhance the beauty of the hyacinths and tulips that follow. By the middle of May all these will be over. If you can afford to throw them away, do so, as it is best to plant fresh bulbs purchased



from the seedsman every year. If that sacrifice alarms you, place them aslant upon a shady border, and cover with earth until their leaves have quite perished, and then store them away. Then plant summer flowering plants, such as pelargoniums, calceolarias, lobelias, fuchsias, and other compact-growing subjects that are gaily coloured; but avoid, as a rule, the golden and silver-leaved plants that are used for edging flower-beds, for they rarely look well in window boxes. When these begin to fail in autumn, take them out, and again, if you can afford to throw them away, do, and save all the trouble of keeping them through the winter. Now you may fill the boxes with asters of all colours mixed; or with pomponé chrysanthemums, which, however, are usually too tall to make a pretty display. Then the evergreens come on the scene again, and it may be agreeable to vary the furniture by means of plants which bear red berries, such as skimmias, and until frost actually kill them (as it will), the large-berried varieties of *Solanum pseudo-capsicum*. Potted plants may be plunged in these boxes, and as there may be in your possession suitable plants which it would not be worth while to turn out of pots, plunge them and wait for the next turn of fortune's wheel. An inexpensive and very pretty arrangement may be ensured by the use of hardy annuals alone. Prepare the box in the ordinary way, filling it with good mould, the best you can obtain; then sow a few seeds of the common nasturtium, canary creeper, sweet peas, or convolvulus major at each end, and seeds of the following annuals along the remainder of the surface:—eschscholtzias, candytuft, mignonette, virginian stock, kaulfussias, nemophilas, dwarf nasturtiums, godetias, and saponaria calabrica. These may be sown together or singly, but according to our experience by far the prettiest effect is to be obtained by adopting the former plan. The climbers and sweet peas, when they appear above the surface, can be trained up strands of twine or wire up each side of the windows. Boxes sown with canary creeper and common nasturtium mixed make a charming arrangement, the brilliant yellow and scarlet blossoms nestling on the thick bed of green foliage which drapes the box and sill being exceedingly showy. Mignonette, too, may be grown by itself in boxes. Grown thus it is specially suitable for bedroom windows, owing to its pleasing fragrance. Some sifted old mortar or a little builder's lime should be mixed with the soil before sowing the seeds. All the foregoing seeds to be sown in April or May.

Enough of prose so far; now let a poet, Jacques de Lille, suggest the rule of action:—



You then, to whom their lovely pomp is giv'n,  
 Display with art these charming gifts of Heav'n ;  
 Let every season have their brilliant bloom,  
 Their laughing colours, and their rich perfume :  
 Let each in turn the well-wrought chaplet wear,  
 Thus ne'er shall fade the garland of the year ;  
 But new-born joys shall every season bring,  
 Each month a bower, and ev'ry bower a spring.

For a moment only we will now descend to the lower regions. In perambulating the great city we obtain occasionally a glimpse of a great area which the owner has rescued from the cats and made into a pretty fernery ; why should there not be many such subterranean gardens ? They are to be preferred to dirty bricks and damp stone, and the scatterings of the scullery, which oftentimes find their way there. It is easy enough if there is a will to give the impulse ; yet it may be attempted and prove a failure, and so a few words of advice may profitably occupy a page or so here. In the first place, to guard against damp, the walls should be dressed with a surfacing of cement as high at least as rockwork is to be built, or water splashed. Against the walls rear banks of burrs and sandy peat, and plant thickly with the commonest hardy ferns, such as *Lastrea filix-mas*, *L. dilatatum*, *Scolopendrium vulgare*, *Polypodium vulgare*, *Cyrtomium falcatum*, *Polystichum aculeatum*, and *Athyrium filix-femina*. You may be told, perhaps, by some horticultural Solon that ferns will not live in such a position ; but never mind that, try it, and success will be certain, unless there is a great blunder at first, and utter neglect afterwards. Regular watering both winter and summer must be given, but never a drop while the soil is really moist in winter, nor during frost. From the end of April to the end of September give them a daily shower from a syringe, but never use the syringe in the remaining months of the twelve. Many other plants will grow in such a position with the same treatment. For example, plant in the dampest and shadiest part of the area garden the common "mother of thousands," *Saxifraga sarmantosa*, and it will grow so luxuriantly that those who only know it as a pot plant will be surprised at its beauty. The next step is to cover in the area with glass, which will suit the ferns very well, but may utterly ruin the breakfast-parlour or kitchen that commands the view. Do not take this step, therefore, without serious consideration of the possible consequences.

Once more, and most briefly. You may wish to grow a few plants or even to make a gay garden on a roof or some other hot, dry spot, where



ferns would soon perish, and greenhouse plants scarcely live. For such a spot there is a host of subjects available, and chief amongst them certain succulents, such as *Sempervivums*, *Sedums*, *Yuccas*, *Agaves*, and the curious *Pachiphyton*. Make the drainage secure, provide a bed of good loam, with plenty of sand and broken bricks intermingled, give plenty of water while the plants are growing, and none at all, or very little indeed, during the season of rest.

Where shall we find a spot in which not any plant in the whole world can live? It will be a hard task to find a spot where vegetation is impossible, but if it be found, human life would be endangered by inhabiting it, and so we may take plants of some sort with us wherever we go, and make them the quiet companions of our daily life.

SELECTIONS OF PLANTS FOR WINDOW BOXES.

SPRING.

BULBS. - Hyacinths, tulips, daffodils, crocus, snowdrops, scillas.

PLANTS.—Wallflowers, common yellow and coloured primroses, daisies, *Veronica saxatilis*, *Iberis sempervirens*, *Arabis albida*, *Aubretia purpurea*, *Alyssum montana*, *Phlox amæna*, and *Nelsoni*.

SUMMER.

FLOWERING PLANTS.—Zonal pelargoniums, petunias, heliotropes, fuchsias, golden and white marguerites, lobelias, balsams, tuberous begonias *ageratum*s.

FOLIAGE PLANTS.—*Coleus*, *Cineraria maritima*, *Centaurea ragusina compacta*, *Iresine Herbstii* and *I. Lindeni*, *Pyrethrum aureum*.

CLIMBERS.—*Tropæolum Lobbianum*, *Cobæa scandens*, *Lophospermum scandens*, *Eccremocarpus scabra*, *Thunbergia alata*.

DROOPING PLANTS.—Ivy-leaved pelargoniums, *Thunbergia alata*, *Lophospermum scandens*, petunias, and *Tropæolum Lobbianum*.

CLIMBING ANNUALS.—*Tropæolum majus*, *T. canariense*, *Convolvulus major*, sweet peas.

DWARF ANNUALS.—*Godetias*, candytuft, Virginian stock, *Nemophila insignis*, *Kaulfussia amelloides*, *Eschscholtzia crocea*, mignonette, sweet alyssum, night-scented stocks, china asters.



## AUTUMN.

FLOWERING PLANTS.—Early-flowering chrysanthemums, *Salvia splendens*, *Anemone japonica*.

FOLIAGE PLANTS.—*Euonymus japonica*, *Aucuba japonica*, common box-tree, and trailing ivies.

## WINTER.

ORNAMENTAL-LEAVED SHRUBS.—*Aucuba japonica*, *Cupressus Lawsoniana*, *Euonymus radicans variegata*, *Hedera arborea*, *Mahonia aquifolia*, *Retinospera plumosa*, *Taxus baccata elegantissima*, *Thujopsis dolabrata*, *Juniperus tamariscifolia*, golden and silver-leaved hollies.

FLOWERING SHRUBS.—*Laurestinus*, *Andromeda floribunda*, *Erica herbacea carnea*, *Kalmia latifolia*.

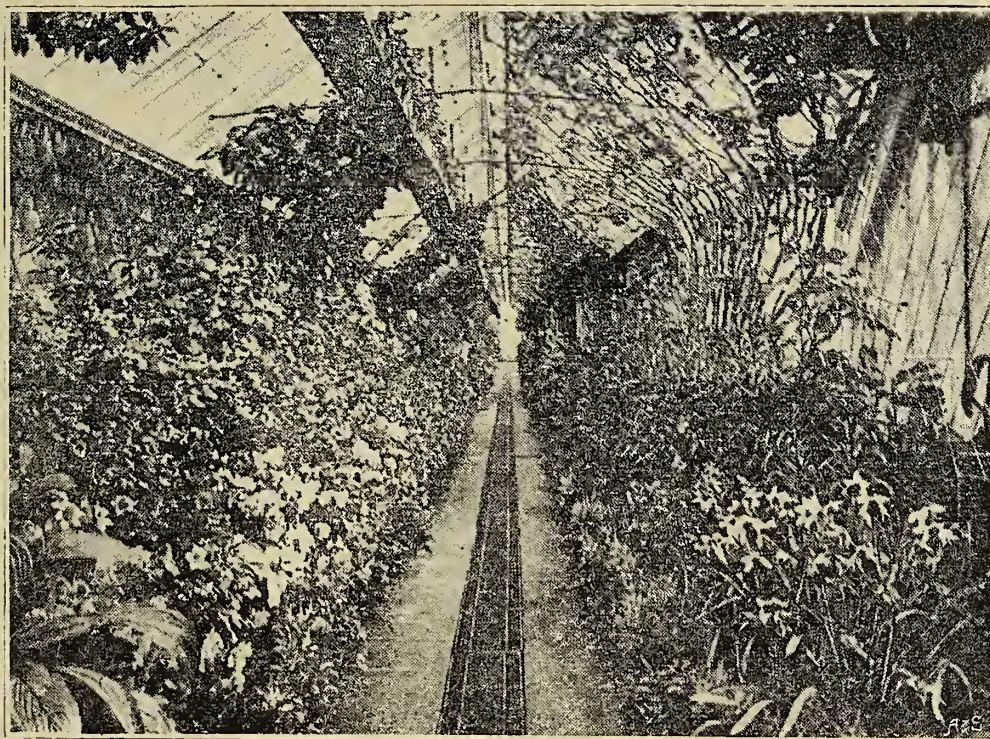
BERRY-BEARING SHRUBS.—*Skimmia japonica*, *Cotoneaster microphylla*, tree ivies, *Pernettya mucronata*.

TRAILING PLANTS.—Golden, silver, and green ivies, *Vinca major elegantissima*.



ANEMONE JAPONICA.





A CORRIDOR CONSERVATORY.

## THE CONSERVATORY.

Who loves a garden, loves a greenhouse too.  
Unconscious of a less propitious clime,  
There blooms exotic beauty, warm and snug,  
While the winds whistle and the snows descend.

COWPER.

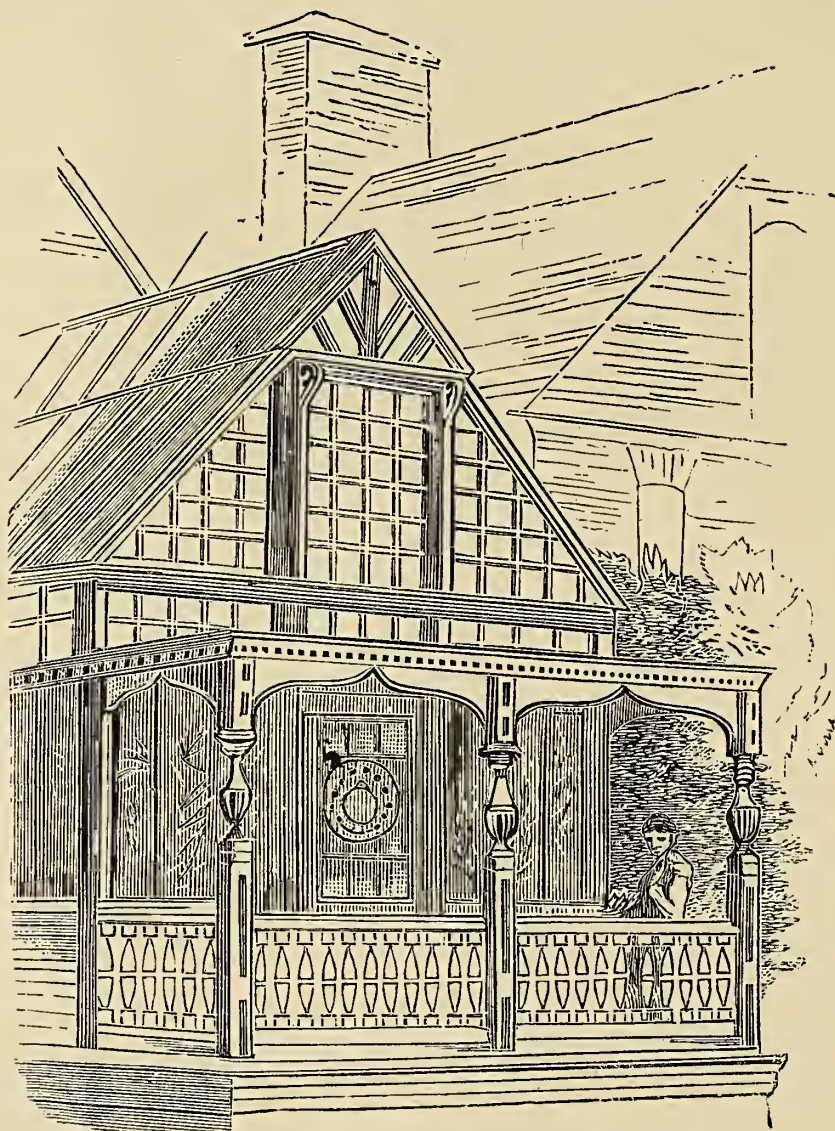


CONSERVATORY is to be considered an absolute necessity in connection with the "Home of Taste." It needs no vindication, for none will question its value, or doubt that wherever circumstances permit—we will not say favour—the establishment of such a luxury, there indeed it should be found. The subject is a tempting one, and we shall have to practise a stern self-denial in order to avoid prolixity and keep to the rule observed hitherto of touching the more salient points, and preferring to leave much unsaid that would properly have place in a systematic treatise. We have yet to find room, within the limits fixed for this work, for many essays on separate subjects, and so we beg permission to commence business at once



without further preface, begging the reader to imagine all the many agreeable things that might be said on the pleasures the conservatory and greenhouse afford by the beauty they cherish for us, and the flowery paths they open into the boundless fields of knowledge.

Conservatories are of many kinds. All the world has heard of a great one



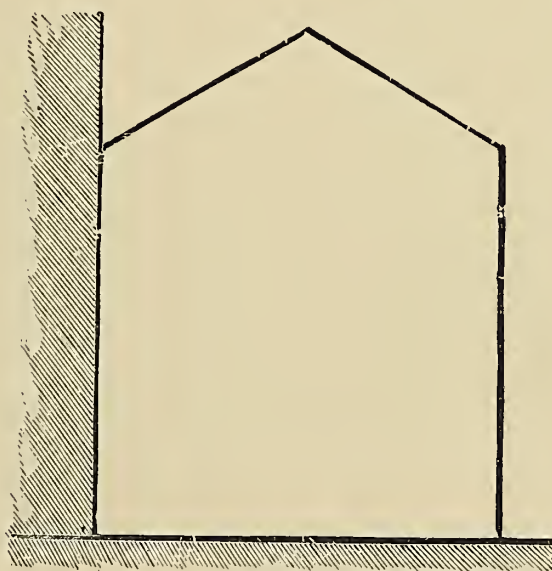
VERANDAH ENTRANCE TO CONSERVATORY.

at Chatsworth, of a noble one at South Kensington, and of an ugly one in the Royal Botanic Gardens, Regent's Park. The Crystal Palace is a conservatory, and so is the little glass box of ten or twelve feet square, which hangs like a meat-safe on the rear wall of many a small suburban villa. The little conservatories we have disposed of in the chapters on fern-cases, having considered them in connection with the house rather than the garden. We are free, therefore, to speak of the conservatory proper, and shall first remark upon it, that

when connected with the house it is of an immensely greater value than when separated from it, no matter by how short a distance. Better go round about by ways not usually considered proper, as through a kitchen, a storeroom, or even a scullery to reach the conservatory, than have no other way of access than by a walk in the open air. But we do not advocate



attaching conservatories to back entrances ; all we mean is, that as it is not always possible to place the structure where it should be for the most agreeable mode of access, it is well to consider before plans are drawn, if it be possible even at the sacrifice of a few proprieties, to secure a way to it in the worst weather without encountering the damp and cold with which in this country we are too painfully familiar. We will suppose a lady to be interested in plants, and the happy possessor of a well-furnished conservatory. If it is far removed from the dwelling-house, what a deprivation of accustomed amusement will a week of snow and frost, or of fog, rain, or blustering wind occasion ! Or, on the other hand, what risk of health must be encountered by braving the storm, if enthusiasm should supersede prudence ! Such an one would rather go round about, say through a kitchen or the gardener's shed, to get amongst her floral pets than not see them at all ; and the grand way across the garden by which visitors are taken will be none the less grand because of the additional convenience in view of bad weather and quiet times. We often see conservatories of the very best type as to construction and contents removed just far enough to afford no advantage by distance from the house, though enough to render them useless so far as to amusement in bad weather, or a dangerous temptation to persons of delicate health who take a constant interest in plants. A covered way, or glass corridor, is the best ordinary mode of establishing communications with the conservatory when it does not happen to be too far removed. If a sufficient space for this be granted, it becomes an addition to the conservatory itself, and may be made to answer admirably for camellias, orange trees, and other nearly hardy subjects, or it may be made a museum of curiosities. As a rule, the best way to deal with a glass corridor is to form a border *outside*, and in that border to plant vines or other hardy plants suitable to be brought in and be trained over the roof. These give shade in summer, and offer no obstruction to light in winter, and if the place is not heated they suffer nothing.



A PLAIN CONSERVATORY AGAINST  
DWELLING-HOUSE.



Whatever the dimensions of a conservatory, or the particular taste of the owner, it should be so constructed that plants will not only live but thrive in it. Architects and builders have a fine talent for raising imposing glass edifices in which nothing will live that is worth the having. Ye who happen to be "in the hands" of any of these useful functionaries, beware! None but a grower of plants can fairly forecast in architectural lines all that plants require. The architect will, perhaps, design a temple with massive pillars and pediment, or a mosque with glass domes, and call it a conservatory. But if never a plant of any kind, except it may be of the kind known as "mildew," will thrive in it, what is the gain, or rather, what is the loss? Architects' conservatories are frequently met with, and almost without exception they are such as no plant-grower could ever attempt to grow a plant in, except under the compulsion of obedience to an employer, and that obedience strongly tintured with an honourable desire to please. We could name many examples in illustration of the general unfitness of architects and builders to construct conservatories, but we forbear for reasons that will be understood.

As a rule, the larger the conservatory the better. This rule, however, must be seasoned with several grains of salt. A great cold place poorly furnished would not afford the gratification of a smaller structure well kept and showing abundance of

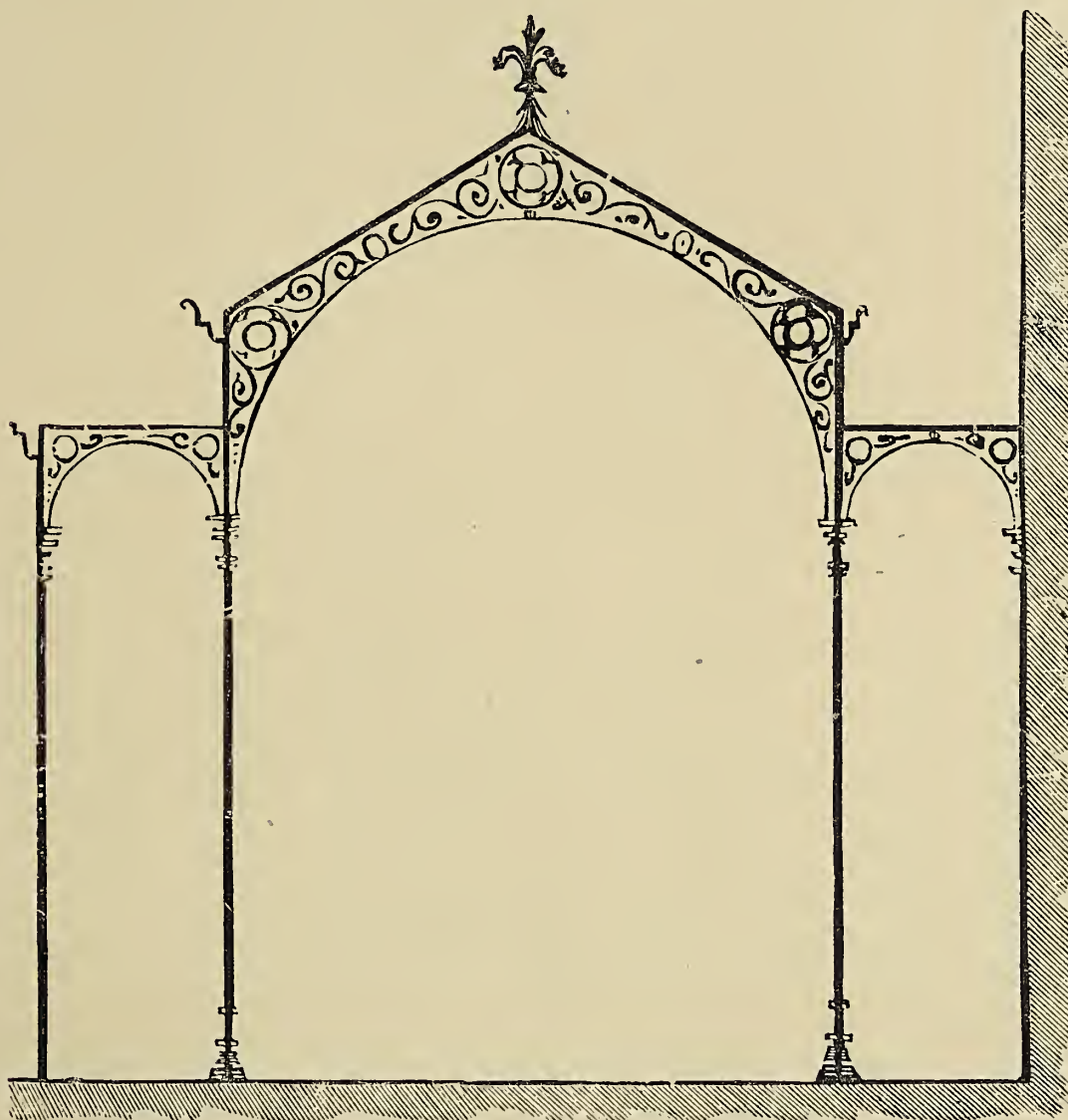
" Exotic beauty, warm and snug."

One good reason for building a large house is, that with proper heating apparatus it can be kept at a proper temperature in winter more easily than a small house; with proper ventilation the same may be accomplished with equal ease in summer. To put this consideration in a nutshell, the smaller the house the more is it subject to the alternations of temperature that prevail without, and the maintenance of an equable temperature is one of the most important aids towards success in plant-growing. As to the consumption of fuel, the larger the house the less is the cost proportionately; and the same may be said as to the cost of labour. We say nothing of the advantages of broad clean walks, a sweet moving atmosphere, and the nobler plants that are available for furnishing, except that, if we are cramped for room, we cannot have them at all.

A few other remarks demand attention yet. A conservatory should be substantial, elegant, and light. It is no difficult matter to put up shading, but it is impossible to let in more light than the unshaded glass will give.



Therefore, heavy pillars and cumbrous roofs are objectionable ; given strength enough, and for the rest the plants should be exposed to the fullest possible intensity of daylight, or there can be no satisfactory results. The dimensions and the design must be, to some extent, determined by the owner, but the



ORNAMENTAL SPAN ROOF AGAINST HOUSE.

requirements of the case demand that the roof of every kind of plant-house should be no higher than needful for the plants it shelters and the comfort of its occasional human inmates. Regard it as a golden rule to make the roof as low as you dare, for lofty roofs have killed quite as many plants as any other particular folly in conservatory construction. Lastly, a good system



of heating is indispensable. It is true, a few very fine plants may be kept in conservatories without the aid of heat in winter, especially when in close connection with the warm walls of a dwelling-house; but for weeks together these are cheerless places, and there is at least some risk of loss in the event of sudden and severe frost occurring when the plants are not yet as



CONSERVATORY LEADING FROM DWELLING-HOUSE.

dry and dormant as they should be to endure it. For the heating there is nothing to be thought of but hot water, and if this part of the work is well done there need be no fear of loss in winter, and in the dullest days of the dreary season the winter garden will prove as tempting for its genial temperature as for its beauty and scientific interest. For heating structures up to 20 feet by 10 feet in extent hot-water apparatus heated by gas or oil may be employed



but for larger sizes a Horse-shoe, Loughborough or Saddle boiler and piping is more satisfactory.

The conditions imposed upon us by the scientific view of the subject—which is the only view to be taken if satisfactory results are desired—are quite compatible with all the requirements of art. We might multiply designs to any extent, but happily there is no need for them : the horticultural builders publish admirable plans and proposals, combining beauty of outline with facilities for the most successful cultivation of plants.

What shall we grow in the conservatory ? As this book is not intended to dictate on matters of taste, the question cannot be answered. But it is our duty to advise, and we begin by saying that the best conservatory plants are such as have nobility of character, hardiness, and a power of duration—such as, when skilfully grouped, will furnish a beautiful scene : such as, if tended with reasonable care, will afford exhaustless interest and entertainment, varying with the seasons, and increasing always as time develops their several characters.

A word as to the arrangement of the interior. If a conservatory is to be a source of pleasure—and it certainly should be, since it is constructed with that end in view—every effort should be made to render its internal adornment as complete as possible, not so much architecturally as florally. There are many ways of setting about a task of this kind, yet out of the whole there is but one that can really be deemed satisfactory, and that is one which will not only beautify the structure by its natural appearance, but enable the plants used for the purpose to display their distinctive qualities to the fullest advantage. To do so the architect's work must be subordinate to that of the gardener ; all ugly formal staging, mosaic tiling, and ornamental edging must be abolished and its place occupied by material of a different character. This may seem a somewhat sweeping suggestion to make, and to some an impracticable plan. It is not so, however, in any sense, and certainly the carrying out of it will afford more pleasure to those who pride themselves on their garden and its contents than the orthodox plan generally does. Formal stages on which are arranged rows of plants in pots equally as formal, the pots forming one of the most important features, are anything but beautiful to look upon, yet they have been tolerated for years in gardens of all sizes. If the plants that are used for the beds and borders of the flower-garden were arranged on the beds in their pots, instead of being planted, the very incongruousness of this would at once suggest an infringement of the laws of good



taste. And what is the difference between the two cases just cited? There is none whatever, for, although in the case of indoor plants it is necessary to



ROCK-BED ARRANGEMENT IN CONSERVATORY.

grow these as far as possible in pots, there are ways and means of hiding their objectionableness. Instead of the staging round the sides, a bank of good earth, supported by stone boulders or large burrs, would not only have



a more natural and pleasing appearance, but also provide a good rooting medium for creepers of all kinds, and an excellent means of screening objectionable pots from view by plunging them below the surface. Such a bank should be formed according to the taste and means of the amateur gardener, avoiding any rigidness or formality in outline by making the latter and the surface as diversified as possible. Miniature hills, dales, nooks, and crannies can thus be formed by the aid of the soil and the stones, and over the whole surface ferns of well-nigh all sizes can be planted to grow up and give form and character to the rockery. Interspersed among these, seasonable plants in flower may be plunged, care being taken before doing so to see that the roots are thoroughly moist. The pots should be plunged low enough to conceal the rims, and a slight cup formed round the stem to receive water when necessary. Foliage plants as well can, of course, be similarly treated, and it will be found that not more than a third of the flowering plants necessary by the usual plan will be needed to produce a much more pleasing effect. The creepers will also have substantial root space, and, as a consequence, they will grow and flower more vigorously, and the extra atmospheric humidity engendered by the great body of soil will keep insects of the thrip and red spider class effectually at bay.

The bare walls may be covered with the foliage of *Ficus repens*, the plants growing in the bed; or large and small rustic pockets, fixed into the wall with cement and iron stays, may be filled with soil and planted with ferns.

Where dampness is of little consequence, a far prettier way of covering a wall is to fix some stout wide-mesh wire netting, about two inches from the wall, and to fill the intervening space with peat turves neatly packed together. This forms a good solid vertical bed of soil, in which ferns, tradescantia, *Ficus minima*, ornamental-leaved begonias, and other plants may be planted with a certainty of their thriving and forming a beautiful mass of greenery, if kept well moistened. Such a wall will last for many years—as long, at any rate, as the plants can find sustenance in the peat. Another good way of achieving a similar result is to drive stout iron hooks in the wall so as to project four or five inches, and then stretch a two-inch mesh wire netting tightly across, securing it to the hooks. When the first width is secured at the bottom, get some sphagnum or common moss, and place a thick layer of this against the inside of the wire netting, and fill the remaining space with a compost of two parts fibry peat and one part fibrous loam, all fine particles being previously removed by sifting. As the process of filling the first



width of netting proceeds, plant ferns, ornamental-leaved begonias, selaginellas, &c. ; then, when the top of the wall is reached, the whole will be complete. This is a better plan than putting up the whole of the netting first and



A FERN-CLAD WALL.

planting the ferns, &c., afterwards. Plants will grow luxuriantly in material arranged thus. End walls may have their surface covered with burrs, let into the wall and arranged in such a way as to form small recesses or pockets for the reception of plants. Cement must be used in this case to join the burrs



together. After fixing, wash the whole over with liquid cement; and if you like, dust this whilst moist with red sand, and you will have a very good imitation sandstone. An end wall may be treated so that its pockets project widely near the base, and gradually join the raised bank, and form, as it were, a miniature mountain side. The realistic nature of this may be increased by forming a cascade, gradually widening as it reaches the floor, and entering a tiny pond containing aquatic plants. The water may be supplied from a pipe at the top.

But supposing that neither of these methods of adorning the walls meets with the reader's approval, there is yet another to fall back upon. We refer to virgin cork. The whole of the walls might be covered with this, securing it to strips of wood firmly nailed to the wall at short distances. In affixing the cork, select cylindrical pieces to form pockets for holding soil and plants or plants in pots. Arrange these freely over the surface, and then when filled with suitable plants a good effect will be obtained. The uprights of the front of the house will be improved, too, by having cork affixed to them.

In the absence of a blank back wall, owing to the entrance from the dwelling rooms being on this side, the bank in the foreground may be continued across the floor in the shape of miniature banks, slopes, and walks, these being planted with low growing ferns and mosses, and having the smaller class of flowering plants plunged in the foreground. The whole surface of the soil should, as far as possible, be covered with *Selaginella Kraussiana* and *Tradescantia zebrina*. No attempt must be made to plant or plunge the plants in such a manner as to convey the idea of a perfect slope, but rather endeavour to break this up by placing large and handsome plants boldly to the front as well as at the centre or background. Avoid overcrowding, and especially in the vicinity of good plants. The walks will be better formed of clean gravel or spar rather than tiles, which are not appropriate in an arrangement of this nature. Of course, the hot-water pipes have to be taken into consideration in arranging the beds. If these run round the sides and ends they should either be elevated to nearly the top of the bank, the soil being kept from them by means of a wall of burrs, or the bank must be similarly formed against the pipes, leaving sufficient space for the escape of heat. Wherever the pipes show themselves, their horizontal lines may be broken by means of such ferns as nephrodiums and pterises with graceful arching fronds, these being planted in small rock bed



at the base. Any objectionable angle or feature may be toned down by the same means.

The management of a conservatory may, so far as it is possible, be described in a few words. In the first place, a temperature of 45 to 55 deg. must be maintained from September to April, and 55 to 65 deg. afterwards. As a general rule, when this temperature is exceeded by day, the ventilators must be opened more or less, according to the state of the weather. On wet days and in frosty weather these temperatures should never be exceeded by the aid of artificial heat. The gas or wick should at once be turned down, or the furnace-door opened, when the maximum temperature is reached. From October to March the ventilators, if opened, should be closed again about 2 p.m., and about 4 to 5 p.m. in summer. Shading is most essential on sunny days. This may be accomplished by the use of moveable canvas blinds fixed to rollers, or by the application of some temporary pigment, such as sour milk, whiting, and size, or the ready-made preparation sold by seedsmen under the name of "summer cloud." Of these several plans the moveable blind is the best, because it enables the plants to have full advantage of the light when the sun is not shining. Watering in winter should be performed very carefully. Examine the plants every morning, and give each sufficient to moisten the soil, taking care to spill none outside the pot, or on the staging or floor. Water spilt carelessly about in winter is converted by the heat of the pipes into vapour, which generally condenses on the petals of the flowers and discolours them. In spring and summer apply water more freely; on hot days it will be necessary to do so twice, morning and evening. Always use water of the same temperature as the air of the structure. In the event of any plant becoming so dry at the roots as to cause it to droop its foliage, do not apply water in the usual way, but stand it in a vessel of tepid water so that its pot is entirely immersed, and let it remain thus for ten minutes or a quarter of an hour. This will ensure the whole of the soil being equally moistened, and prevent the loss of the leaves. If stimulants of any kind are necessary, use chemical manures dissolved in water at the rate of a teaspoonful per gallon. As a rule, it is not advisable to give stimulants to plants in full bloom, because it is apt to make them shed their blooms too quickly. In winter especially remove all dead blooms and foliage, and sponge foliage plants frequently with a solution of soft soap and water, or milk and water, to disperse dust, and impart a beautiful gloss to the leaves. Flowering plants



infested with insects should be promptly removed before the latter have time to infest other plants.

## A SELECTION OF CONSERVATORY PLANTS.

ORNAMENTAL-LEAVED PLANTS.—*Acacia lophantha*; *Agave americana*, *A. americana fol. var.*, *A. applanata*, *A. cœrulescens*, *A. filifera*, *A. Schidigera*, *A. dasyliriodes*, *A. Verschaffelti*; *Aloe plicatilis*, *A. serrulata*; *Anthericum variegatum*; *Aralia leptophylla*, *A. palmata*, *A. papyrifera*, *A. quinquefolia*, *A. reticulata*; *Araucaria Bidwilli*, *A. Cooki*, *A. Cunninghamsi*, *A. excelsa*; *Arundo donax variegata*; *Aspidistra lurida variegata*; *Bambusa Fortunei variegata*, *B. aurea*; *Beaucarnea recurvata*; *Coprosma Baueriana variegata*; *Dracæna australis*, *D. indivisa*, *D. lineata*, *D. Veitchi.*; *Echeveria metallica*; *Eulalia japonica variegata*; *Fatsia japonica*, *F. j. variegata*; *Ficus elasticus*, *F. Chauvieri*, *F. Porteana*; *Grevillea Drummondii*, *G. elegans*, *G. robusta*; *Hydrangea japonica variegata*; *Lomatia elegantissima*, *L. ferruginea*; *Osmanthus ilicifolius aureus variegatus*; *Phormium tenax*, *P. tenax variegatum*; *Rhopala australis*, *R. corcovadensis*, *R. Porteana*; *Saxifraga Fortunei*, *S. sarmentosa*; *Sedum carneum variegatum*, *S. Sieboldi variegatum*; *Veronica Andersoni variegata*; *Yucca aloifolia variegata*, *Y. filamentosa variegata*, *Y. quadricolor*.

PALMS.—*Areca Baueri*, *A. lutescens*, *A. sapida*; *Brahea calcarea*; *Chamærops excelsa*, *C. Fortunei*, *C. humilis*, *C. palmetto*, *C. sinensis*; *Cocos australis*, *C. Bonnetti*, *C. chiliensis*; *Corypha australis*; *Kentia Belmoreana*, *K. Fosteriana*, *K. Canterburyana*; *Latania borbonica*; *Phœnix dactylifera*, *P. humilis*, *P. sylvestris*; *Raphis flabelliformis*, *R. flabelliformis fol. var.*; *Sabal Adansoni*, *S. Moccini*, *Seaforthia elegans*; *Thrinax parviflora*, *T. elegans*.

CLIMBERS. — FLOWERING. — *Acacia dealbata*; *Akebia quinata*; *Berberidopsis corallina*; *Bignonia speciosa*, *B. grandiflora*; *Bougainvillea glabra*, *B. speciosa*; *Clematis indivisa lobata*; *Clianthus magnificus*; *Cobæa scandens*; *Habrothamnus elegans*; *Hibbertia dentata*; *Jasminum grandiflorum*; *Lapageria rosea*, *L. r. alba*; *Lophospermum scandens*; *Mandevillea suavolens*; *Mikania scandens*; *Passiflora Constance Elliot*; *Plumbago capensis*, *P. c. alba* *Rhodochiton volubile*; *Rhyncospermum jasminoides*; *Solanum jasminoides*; *Swainsonia galegifolia*; *Tacsonia insignis*, *T. van Volxemi*; *Tecoma jasminoides*; *Tropæolum Lobbianum*. VARIEGATED. — *Abutilon vexillarium*;



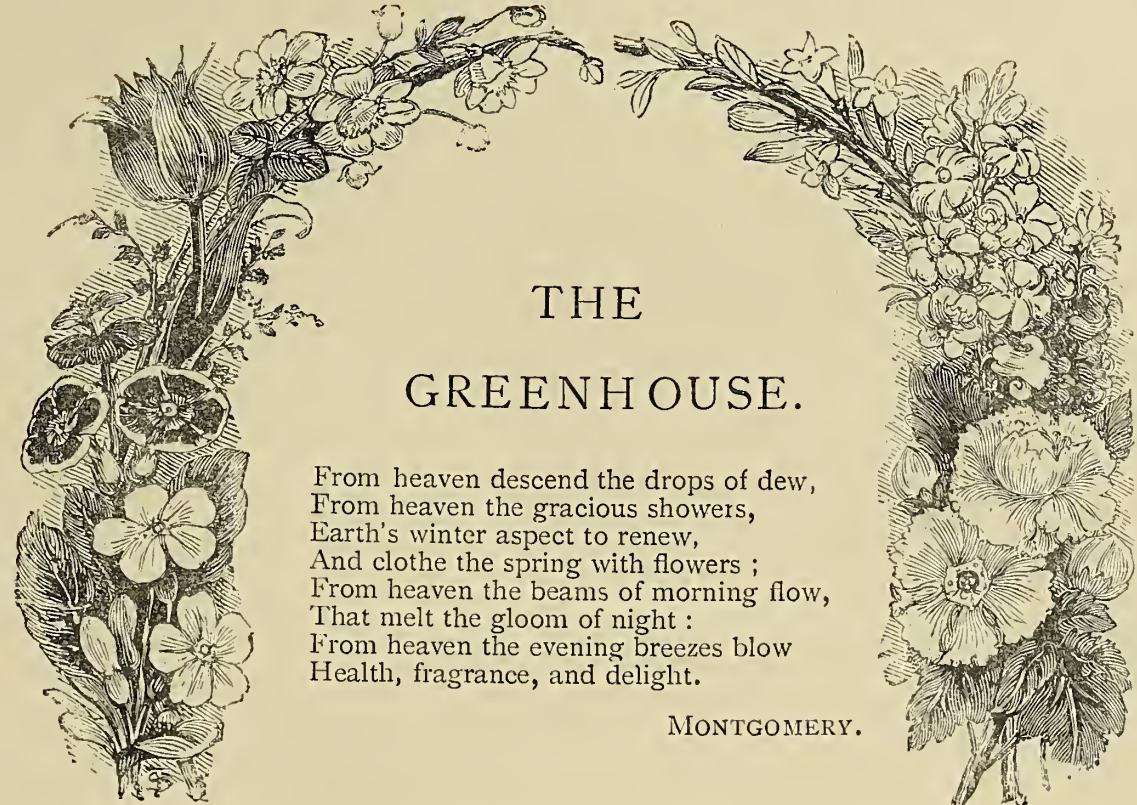
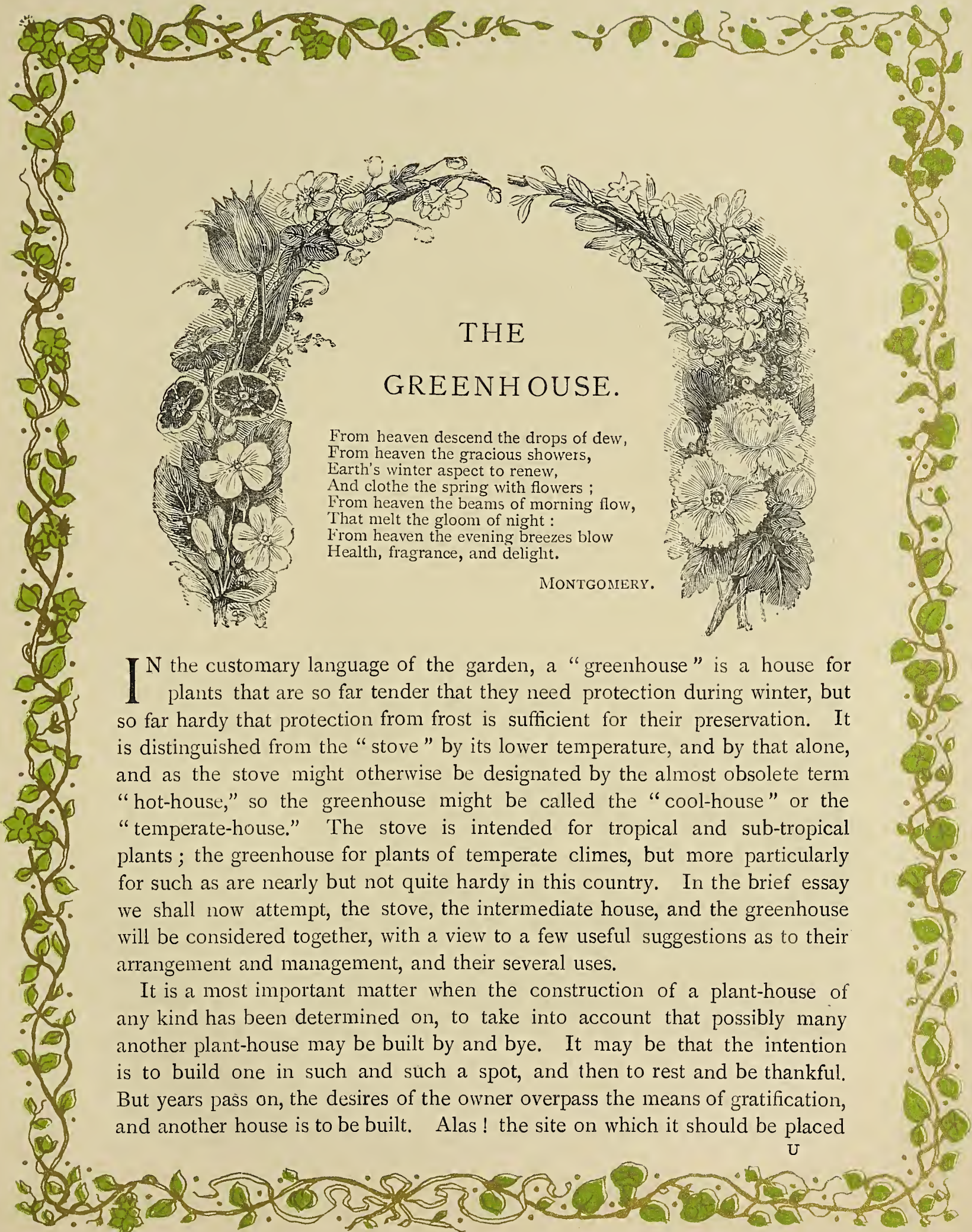
*Cobæa scandens variegata*. GREEN-LEAVED.—*Asparagus plumosus*; *Ficus repens*; *Myrsiphyllum asparagoides*.

DROOPING PLANTS FOR BASKETS.—*Othonna crassifolia*; *Panicum variegatum*; *Saxifraga sarmentosa*; *Sedum Sieboldi variegata*; *Tradescantia discolor*, *T. zebrina*; *Vinca major elegantissima*.

FERNS.—TREE.—*Dicksonia squarrosa*, *D. antarctica*; *Cyathea dealbata*; *Cibotium Scheidei*. TALL.—*Blechnum australe*; *Litobrochia vespertilionis*; *Lomaria Gibba*; *Marattia elegans*. MEDIUM.—*Adiantum formosum*; *Asplenium bulbiferum*, *A. flaccidum*, *A. lucidum*, *A. viviparum*; *Goniophlebium subauriculatum*; *Lastrea aristata variegata*, *L. decurrens*; *Microlepia hirta cristata*; *Nephrodium molle*; *Nephrolepis exaltata*, *N. Duffii*; *Phlebodium aureum*; *Polystichum proliferum*; *Pteris Cretica albo-lineata*, *P. hastata*, *P. longifolia*, *P. scaberula*, *P. argyrea*, *P. tremula*, *P. umbrosa*; *Woodwardia radicans cristata*. DWARF.—*Adiantum capillus-veneris*, *A. cuneatum*, *A. concinnum latum*, *A. hispidulum*, *A. Pacotti*, *A. Williamsii*; *Cyrtomium caryotideum*, *C. falcatum*; *Doodia aspersa*, *D. caudata*; *Hypolepis distans*; *Pteris serrulata*.

FLOWERING PLANTS.—SPRING.—*Cytisus racemosus*; *Boronia megastigma*, *B. heterophylla*, epacris of sorts, tea and noisette roses, lily of the valley, hyacinths, tulips, and narcissus; *Deutzia gracilis*, hybrid rhododendrons, hippeastrums, clivias; *Acacia armata*, *A. grandis*; *Azalea indica*, *A. mollis*; camellias; *Choisya ternata*; *Coronilla glauca*; *Daphne indica*; *Lachenalia tricolor*, Calla lily (*Richardia æthiopica*), *Lilium Harrisii*. SUMMER.—Large-flowered, fancy, ivy-leaved, and zonal pelargoniums, petunias, hydrangeas, *Lilium auratum*, *L. speciocum*; Celosias, cockscombs, heliotropes, balsams, abutilons, oleanders, achimenes; *Agapanthus umbellatus*; mignonette, calceolarias, tuberous begonias, carnations, musk, fuchsias, gloxinias. AUTUMN.—*Valotta purpurea*; *Salvia splendens*, *S. Pitcheri*; *Nerine sarniensis*; chrysanthemums; *Eupatorium odoratum*, *E. riparium*; *Schizostylis coccinea*; cyclamen, zonal pelargoniums. WINTER.—Bouvardias, tree carnations, Chinese primulas, *Primula obconica*; Christmas roses, cinerarias, Roman hyacinths, narcissus, *Spiræa japonica*, *Begonia nitida*, *B. socrotrana*, forced shrubs, &c.





## THE GREENHOUSE.

From heaven descend the drops of dew,  
From heaven the gracious showers,  
Earth's winter aspect to renew,  
And clothe the spring with flowers ;  
From heaven the beams of morning flow,  
That melt the gloom of night :  
From heaven the evening breezes blow  
Health, fragrance, and delight.

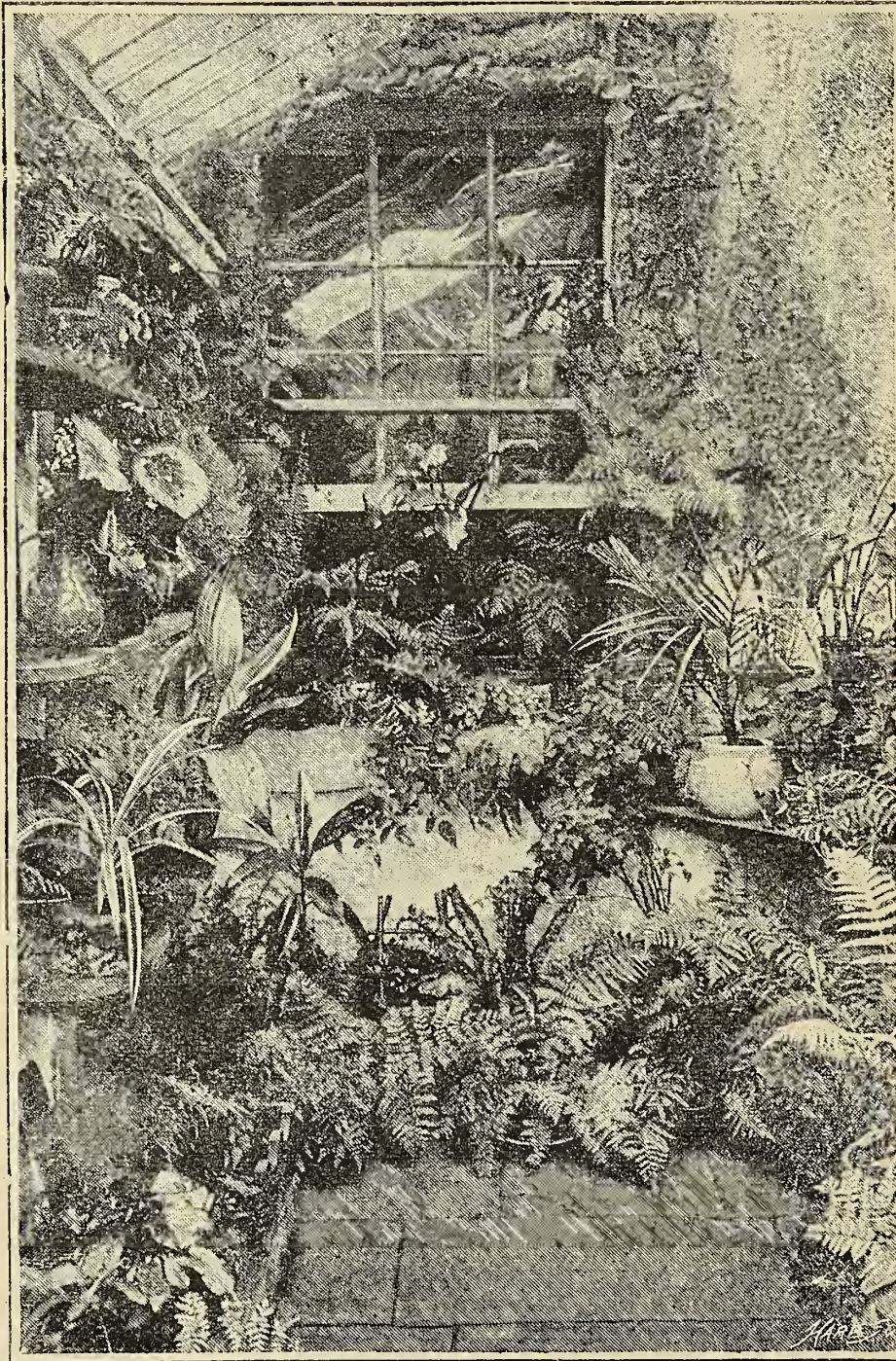
MONTGOMERY.

**I**N the customary language of the garden, a "greenhouse" is a house for plants that are so far tender that they need protection during winter, but so far hardy that protection from frost is sufficient for their preservation. It is distinguished from the "stove" by its lower temperature, and by that alone, and as the stove might otherwise be designated by the almost obsolete term "hot-house," so the greenhouse might be called the "cool-house" or the "temperate-house." The stove is intended for tropical and sub-tropical plants ; the greenhouse for plants of temperate climes, but more particularly for such as are nearly but not quite hardy in this country. In the brief essay we shall now attempt, the stove, the intermediate house, and the greenhouse will be considered together, with a view to a few useful suggestions as to their arrangement and management, and their several uses.

It is a most important matter when the construction of a plant-house of any kind has been determined on, to take into account that possibly many another plant-house may be built by and bye. It may be that the intention is to build one in such and such a spot, and then to rest and be thankful. But years pass on, the desires of the owner overpass the means of gratification, and another house is to be built. Alas ! the site on which it should be placed



is no longer available, and it is placed just where it should not be, because, forsooth, it cannot be placed where it should be. The amateur is no



AN AMATEUR'S SUNLESS GREENHOUSE.

greater victim of a finality delusion than the plant merchant and nurseryman. In private gardens and nurseries alike, we commonly see the plant-houses far separated, of all forms and sizes, having no relation one to another, and costing for management, heating, and repairing, perhaps ten times more than if they were all compact together, arranged on a definite plan, and the whole heated by one boiler, with a supplementary boiler as a safeguard against loss in the case of any accident. Perhaps the reader is startled by this portentous preface, and ready to exclaim, "What! if I put up a little greenhouse, must I

of a finality delusion than the plant merchant and nurseryman. In private gardens and nurseries alike, we commonly see the plant-houses far separated, of all forms and sizes, having no relation one to another, and costing for management, heating, and repairing, perhaps ten times more than if they were all compact together, arranged on a definite plan, and the whole heated by one boiler, with a supplementary boiler as a safeguard against loss in



keep in view the probability that I shall some day cover an acre of land with glass?" The reply to the imagined exclamation is that we cannot at this moment fix the rule of our lives for all the moments that are coming. The suggestion with which we open this essay applies to great gardens and to little gardens alike, and we repeat that it is advisable in determining the site for a plant-house to keep in view the possibility that some day the house itself will be enlarged, or another house added to it. There may be good reasons in particular cases for scattering the plant-houses all over a property, but it is the duty of a practical essayist to say that they can be more easily and more cheaply managed, and will yield more enjoyment to their owner, generally speaking, when they are all closely connected and built according to a predetermined scheme.

In the chapter on the Conservatory enough has been said about facility of access at all seasons, and those remarks apply to plant-houses of all kinds. It is, however, neither possible nor desirable to have every plant-house so contiguous to the dwelling that we may go to it in slippers and bare-headed any day in the year as we go to the breakfast-room or library. But the amateur who purposes to grow a great variety of



Fig. 1.

plants would do well to consider the convenience of having the several houses so connected that they may all be traversed as one structure, glass doors and divisions alone separating them, with no intervening yards, or paths, or open spaces, to chill the visitor who has been stewed in the stove and might very well bear to be cooled in the greenhouse, if only it could be reached without the agony of three minutes' exposure to a biting north-east wind.

The horticultural builders offer us an endless choice of greenhouses, and many of the modes of construction are patented. As it is our fixed rule not to recommend traders in any department, we refrain from offering any opinion as to the relative merits of these various inventions. But a few remarks on first principles may be useful. Abundance of light and abundance of air must



always be at the command of the cultivator. To shade out excess of light and to close all ventilators is easy work enough, but if the house is so constructed that neither light nor air can obtain access in sufficient plenty, healthy vegetation will never be seen within it. As to the forms and dimensions of houses, and the uses to which they are to be put, the length of the proprietor's purse must determine. The best possible house for all general purposes is one with a span roof (Fig. 2), the roof as low as possible to afford sufficient head-room and to accommodate the plants, with stages on each side and walk through the centre, and beneath the stages a sufficient service of hot-water pipes heated by a saddle or upright boiler. The lean-to form (Fig. 1) is admirably adapted for the utilization of a suitable wall ; if

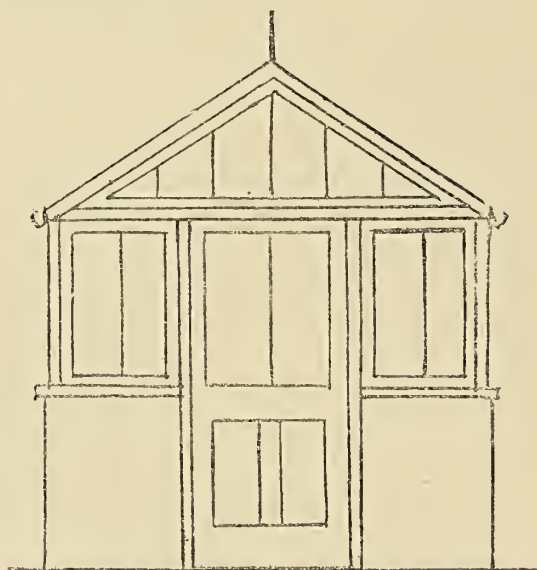


Fig. 2.

the aspect is full south, a lean-to would answer admirably for vines, and almost all kinds of flowering plants : in a north aspect ferns would thrive ; in east and west aspects camellias, oranges, and a number of valuable hard-wooded plants, such as heaths, epacris, and azaleas. A safe angle for a roof is 45 deg., but low nearly flat roofs answer admirably for flowering plants in the case of span-roofed houses in open sunny positions, as we obtain thereby the immense advantage of having all the plants "near the glass."

Next to the lean-to the three-quarter span (Fig. 3) is a most useful form of house. It is more especially adapted for erecting against walls that are not high enough to admit of a lean-to being built against them. It has also this advantage over the latter, namely : assuming it to be built against a south wall, it not only gets all the mid-day sun, but a portion of the morning and afternoon sun, too. Such a house is also more roomy than a lean-to, and therefore should have preference in the case of a low wall. Both lean-to and three-quarter span structures are not so difficult to heat as a span roof, because the back wall freely absorbs the solar heat, and thus by reflection warms the air of the house to a marked degree.

The staging in greenhouses should be arranged in such a way that the



plants to be stood thereon occupy a position not too far from the glass. In a large span-roof it should take the form of a narrow ledge from two to three feet wide round the house. Next this a path two or more feet wide, with a flat stage in the centre. Small span-roof structures, say twelve feet by eight feet, should simply have a central path, the remainder being staging. In the case of lean-tos, unless very large, it is generally best to have the path at the back, and the staging in front. The reason for this is obvious to the practical mind; it enables the plants to be as near to the light as possible. Shelves are generally affixed to the back wall. In three-quarter spans there is more light at the back, and therefore the staging may be fixed against the wall, and the path be taken along the front. Of course, the exact position, as well as height and other dimensions, must be governed entirely by the size of the house.

With reference to methods of heating, there are, of course, very many. The old-fashioned flues are quite out of date, being supplanted by the more efficacious and less troublesome forms of hot-water apparatus. Of the latter there are apparatus heated by oil, gas, and ordinary fuel. Those heated by oil and gas are, as mentioned in our remarks *re* heating the conservatory, very suitable for heating small structures. Their forms are legion, however, and we cannot, therefore, go into the details of their construction. A reference to one of the horticultural journals, say *Amateur Gardening*, will supply the names of manufacturers. Where the structures exceed, say twelve feet by eight feet, a Loughborough, Horseshoe, or Saddle boiler, heated by coal, cinders, or coke, will be more suitable than oil or gas. Hot-air stoves are also much used for small houses, but they are apt to render the atmosphere too dry for most plants, and hence cannot be recommended very strongly. The oil and gas apparatus are the most portable; the others require to be fixed in the ends of the houses. In a lean-to the piping should be arranged along the front and the end opposite the door, not along the back. In a span-roof, however, it should run along both sides and the two ends, with the exception

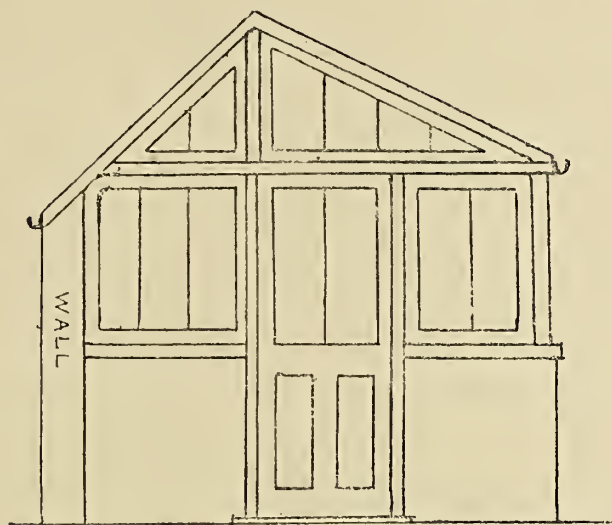


Fig. 3.



of the doorway ; the same remarks apply to a three-quarter span. Where the span-roof does not exceed twelve feet by eight feet, the piping may simply go round the one side—the coldest—and one end. It is, however, a difficult



A GREENHOUSE IN FEBRUARY.

matter to lay down any precise rules on the subject. In all cases a practical gardener who understands plant culture and the management of greenhouses should be consulted as to what is necessary in each individual case.

Greenhouses may be divided into two classes—heated and unheated. The



former is, of course, the most useful of the two, because they offer greater facilities for propagating as well as for growing plants. By their aid, moreover, plants may be forced early into flower for conservatory and house decoration, a feat which cannot be accomplished by the aid of an unheated structure. A heated greenhouse should be provided with sufficient hot-water piping to enable the temperature to be maintained at 55 to 65 deg. from October to June, if it is required for forcing plants into flower in winter and early spring. For ordinary purposes, however, a temperature of 45 to 55 deg. is high enough from September to March, and 55 to 65 deg. afterwards. In this temperature oranges, myrtles, and oleanders, camellias, and azaleas may be safely grown, together with the ordinary run of greenhouse plants. In the higher temperatures Roman hyacinths, lily of the valley, roses, flowering shrubs, azaleas, spiræas, and a host of other plants may be forced into bloom from Christmas onwards. Not only this, but vegetables, such as rhubarb, seakale, and French beans, may be forced into early growth, and early supplies of saladings grown too. Grapes and other fruit do not come within the scope of this work; hence they cannot be dealt with here. Wherever there is a conservatory a heated greenhouse is a *sine quâ non* for ensuring a supply of flowering and other plants for its decoration; for, as everyone will soon find to their cost, plants cannot be grown continually in a conservatory. Another important point, it should contain a propagating frame for raising plants from seeds and cuttings. But granting all this, an unheated greenhouse is not to be despised. It is true it cannot be turned to such profitable account for ensuring early supplies of flowers and vegetables, but it may, nevertheless, be turned to good use and made a source of interest all the year. In early spring, for instance, bulbs in pots, together with alpine primulas, primroses, and many of the lovely alpine plants that are generally grown on rockeries—these can be removed outdoors in May, and their place taken by tuberous begonias, zonal pelargoniums, and similar plants. When autumn arrives, chrysanthemums galore may worthily supersede these, to be followed in November by ornamental foliage and flowering shrubs, with a collection of Christmas roses in pots. If preferred, tomatoes or cucumbers may take the place of the summer plants; and so, after all, a cold greenhouse may really be profitable as well as interesting. Wherever possible, it is a wise plan to build the greenhouse sufficiently large to enable it to be divided into two compartments—the one heated and the other cool. This will enable seedlings, cuttings, and other plants that require their growth



to be hardened somewhat before removal to the conservatory or outdoors, to be transferred from the higher to a lower temperature with less risk of injury.

The management of a greenhouse embraces such important phases of cultural routine as ventilation, watering, shading, heating, and expulsion of insect pests. With regard to the first, no definite rule can be laid down as to when this should begin. Generally speaking, however, air should be admitted to the heated greenhouse when the maximum temperature is reached, closing the ventilators again when the sun loses its chief power. In the case of unheated greenhouses, open the ventilators first thing in the morning and close them again in the evening. Of course, wet days and frosty weather are exceptions to this rule. In such cases air must be cautiously admitted. Water should be administered carefully in winter, but freely at other seasons. Shade, too, should be given in a similar manner to that advised for conservatories. As to artificial heat, this should be used with caution. Keep the fire going steadily till the maximum heat is attained, then check or allow it to go out altogether until required again. Insect pests may be got rid of by fumigating with one of the many preparations of nicotine or tobacco in the market, by syringing with liquid insecticides, or by the application of tobacco powder or sulphur.

The proper association of plants in houses is a matter of the utmost importance. A hot wall and long rafters may answer admirably for vines, but we shall not succeed in growing any great variety of flowering plants beneath them; yet it may happen that a few ferns, begonias, and even camellias, will thrive there if not too heavily shaded, especially as we can remove the camellias into the open air towards the end of the summer to finish their growth, and all winter and far into spring the vines will make no shade at all, or too little to be of any consequence. So again, hard-wooded and herbaceous plants do not generally thrive under the same roof with the same treatment, for the hard-wooded plants need abundance of light and air, and such herbaceous subjects as cinerarias and begonias need far less of both; yet much may be done by means of skill and care if the selection is judiciously made. Succulent plants are but little grown by amateurs, yet they have high claims to their attention, and will abundantly repay the genuine lover of plants who will take them in hand in earnest. Abundance of light is one of the first essentials of success in the management of these, and they must be dry in winter. But of all the plants that are grown for ornament,



those that flower in winter are without doubt the most deserving of our care, for the simple reason that nature is niggardly in this clime, and



THE GREENHOUSE IN SPRING.

through half the year she denies us out-door flowers, at all events in plenty. What a wealth of beauty is at our command for the enrichment of our



plant-houses in winter, and what a very small use we make of it! None will deny, though few enjoy, the preciousness of winter flowers. The earth is barren where they should abound, for nature's grim denial may be put to scorn by art, and we may walk through bowers of bloom when

"Dread winter spreads his latest glooms,  
And reigns tremendous o'er the conquered year,"

A SELECTION OF FLOWERING PLANTS FOR THE ORDINARY  
GREENHOUSE.

SPRING.—*Acacia armata*, *A. dealbata*, *A. Drummondii*, *A. grandis*, *A. pubescens*, *Blandfordia Cunninghamsii*, *B. nobilis grandiflora*, *Boronia Drummondii*, *Camellia alba plena*, *C. Chandleri elegans*, *C. Comtesse Lavinia Maggi*, *C. Mathotiana*, *Chorozema cordata splendens*, *C. Lawrenceana*, *Correa Harrisii*, *Cyclamen persicum*, *Cytisus racemosus*, *Epacris Exquisite*, *E. impressa atrococcinea*, *E. Kinghornii*, *E. miniata splendens*, *Erica Wilmoreana*, *Imatophyllum miniatum*, *Polygala oppositifolia*, *P. cordata*, *Tetralochea hirsuta*, *Camellia Auguste Delfosse*, *C. Countess of Orkney*, *C. Donkelaari*, *C. imbricata*, *C. Prince Albert*, *Boronia heterophylla*, *B. megastigma*, *Hippeastrum in variety*, *Choisya ternata*, *Clivias of sorts*, *Coronilla glauca*, *Lilium Harrisii*, *Primula obconica*, *Richardia æthiopica*, *Hyacinths*, *Tulips*, *Narcissus*, *Cinerarias*, *Azalea indica*, *A. mollis*, *Rhododendron Balsamiflorum album*, *R. Countess of Haddington*, *R. Princess Royal*, *R. Prince Leopold*.

SUMMER.—*Acrophyllum venosum*, *Adenandra fragrans*, *Aphelexis macrantha purpurea*, *Chorozema varia Chandleri*, *Dracophyllum gracile*, *Epacris Eclipse*, *Erica Aitoniana*, *E. Candolleana*, *E. Cavendishi*, *E. depressa*, *E. elegans*, *E. jasminiflora alba*, *E. Massoni major*, *E. obtata*, *E. tricolor elegans*, *E. tricolor superba*, *E. ventricosa alba*, *E. ventricosa coccinea*, *E. ventricosa rosea*, *E. vestita coccinea*, *Genetyllis fuchsoides*, *G. tulipifera*, *Kalosanthes coccinea*, *Leschenaultia formosa*, *Pimelea Hendersonii*, *P. decussata*, *P. spectabilis*, *Pleroma elegans*, *P. sarmentosa*, *Roella ciliata*, *Rhynchospermum jasminoides*, *Statice Holfordi*, *S. profusa*, *Azalea A. Borsig*, *A. Charles Pynaert*, *A. Comte de Chambord*, *A. Deutsche Perle*, *A. Duc de Nassau*, *A. Empress of India*, *A. Flag of Truce*, *A. Flambeau*, *A. imbricata*, *A. La Superba*, *A. Mademoiselle Marie Van Houtte*, *A. Sigismund Rucker*, *A. Souvenir de Prince Albert*, *Abutilons in variety*, *Tuberous Begonias*, *Zonal Pelargoniums*, *Ivy-leaved Pelar-*



goniums, *Fuchsias*, *Heliotropes*, *Celosias*, *Balsams*, *Lilium Auratum*, *L. Speciosum*.

AUTUMN.—*Agapanthus umbellatus*, *A. umbellatus alba*, *Browallia Jamesoni superba*, *Brugmansia sauveolens*, *Diplacus glutinosus*, *Erica Austini*, *E. Macnabiana*, *E. mammosa major*, *E. Marnockiana*, *Hæmanthus coccineus*, *H. punicens*, *Hedychium Gardnerium*, *Lilium auratum*, *Nerine Fothergilli*, *N. coruscans*, *Nerium album plenum*, *N. roseum plenum*, *Plumbago capensis*, *Schizostylis coccinea*, *Tremandra verticillata*, *Vallota purpurea*, *Veronica Andersoni*, *V. Blue Gem*, *V. salicifolia*, *Early Flowering Chrysanthemums*, *Salvia splendens*, *Eupatorium odoratum*, *Bouvardias*, *Zonal pelargoniums*.

WINTER.—*Acacia platyptera*, *Coronilla glauca*, *C. variegata*, *Correa Brilliant*, *C. cardinale*, *C. magnifica*, *Crowea saligna latifolia*, *Cylamen Atkinsi*, *C. persicum*, *Cystisus Everestiana*, *C. racemosus*, *Daphne indica alba and rubra*, *Epacris autumnalis*, *E. delicata*, *E. hyacinthiflora*, *E. hyacinthiflora candidissima*, *E. hyacinthiflora fulgens*, *E. Lady Alice Peel*, *E. Mrs. Pim*, *E. Lord Palmerston*, *Erica colorans*, *E. gracilis autumnalis*, *E. hyemalis*, *E. regerminans*, *Habrothamnus fasciculatus*, *Jasminum grandiflorum*, *Primula obconica*, *P. chinensis*, *Late-flowering Chrysanthemums*, *Forced bulbs*, *Spirea Japonica*, *Lily of Valley*.

A SELECTION OF FLOWERING PLANTS FOR THE WARM GREENHOUSE.

SPRING.—*Æschynanthus splendidus*, *Anthurium Scherzerianum*, *Begonia Digswelliana*, *B. fuchsioides*, *B. weltoniensis*, *Clerodendron Thompsoni*, *Dalechampia Roezliana rosea*, *Eucharis grandiflora*, *Franciscea eximia*, *F. Hopeana*, *Gardenia citriodora*, *G. florida major*, *G. Fortuneana*, *Meyenia erecta*, *Monochætum Lemonianum*, *Nidularium fulgens*, *Plumbago coccinea superba*, *Rondeletia speciosa major*, *Thyrsacanthus rutilans*, *Hippeastrums*, *Amasonia punicea*, *Begonia John Heal*.

SUMMER.—*Achimenes*, *Allamanda Hendersoni*, *A. nobilis*, *Clerodendron Balfouri*, *C. fallax*, *Dipladenia amabilis*, *D. amæna*, *Gloxinias Franciscea confertiflora*, *F. calycina major*, *Hoya bella*, *Ixora acuminata*, *I. coccinea superba*, *I. javanica floribunda*, *I. salicifolia*, *Medinilla magnifica*, *Rondeletia speciosa major*, *Urceolina aurea*, *Vinca alba*, *V. rosea*, *Stephanotis floribunda*, *Ixora Westii*, *I. Williamsii*, *Bougainvillea glabra*, *Torenia Fournieri*.

AUTUMN.—*Æchmea fulgens*, *Amaryllis reticulata*, *Clerodendron Kœmpferi*,



*Gloriosa superba*, *G. Planti*, *Impatiens Jerdonæ*, *Lasiandra macrantha*, *Nidularium fulgens*, *N. pictum*, *Pentas carnea*, *P. rosea*, *Strelitzia regina*,



GESNERA REFULGENS.

*Torenia asiatica*, *Impatiens Sultani*, *I. Hawkeri*, *Hibiscus rosea sinensis*, *Libonia floribunda*, *Pancratium fragrans*, *Scutellaria mociniana*, *Seriocographis Ghiesbreghtiana*.

WINTER.—*Aphelandra aurantiaca*, *Begonia manicata*, *B. parviflora*, *B. Saundersiana*, *Centradenia rosea*, *Cyrtanthera grandiflora*, *Epiphyllum truncatum*, *E. truncatum albo-violaceum*, *Eucharis amazonica*, *Euphorbia jacquiniflora*, *Gesnera cinnabarina*, *G. exoniensis*, *G. refulgens*, *G. zebrina splendens*, *Goldfussia isophylla*, *Heterocentrum roseum*,

*Justicia speciosa*, *Luculia gratissima*, *Monochætum ensiferum*, *M. sericeum multiflora*, *Poinsettia pulcherrima*, *Rogeria cordata*, *R. gratissima*.

A SELECTION OF PLANTS SUITABLE FOR UNHEATED  
GREENHOUSE.

*Achillea millefolium rosea*, fol. var. ; *Acorus gramineus*, fol. var. ; *Arum Italicum*, *Aspidistra lurida*, fol. var. ; *Aubrietia purpurea*, fol. var. ; *Bambusa Fortunei*, fol. var. ; *Carex pendula*, fol. var. ; *Centaurea argentea* ; *Chamærops humilis*, *Cineraria platanifolia*, *Convallaria majalis*, fol. striatis ; *Cyclamen coum album*, *C. marmoratum*, *Cypripedium calceolus*, *C. spectabile*, *Dactylis glomerata elegantissima*, *Dianthus hybridus striatiflorus*, *Dielytra spectabilis*, *D. spectabilis alba*, *Dodecatheon meadia*, *Echeveria glauca*, *E. metallica*, *Erythronium dens canis roseum*, *Eucomis punctata*, *Funkia Japonica lutea*, fol. var. ; *F. ovata*, fol. var. ; *F. undulata*, fol. var. ; *Goodyera pubescens*, *Hoteia (Spiræa) Japonica*, *Iris reticulata*, *Ligularia Kempferi*, *Orchis mascula*, *Ornithogalum thrysoideum*, *Phoenix dactyliferum*, *Phormium tenax*, *Polemonium*





STANDARD TREE IVY.



*cæruleum*, fol. var.; *Polygonatum multiflorum*, fol. var.; *Polygonum filiforme*, fol. var.; *Primula concolor*, *P. denticulata*, *P. farinosa*, *Richardia æthiopica*, *Saxifraga incrustata*, *S. pyramidalis*, *S. sarmentosa*, *Sedum Japonicum*, fol. var.; *S. Sieboldi*, fol. var., *S. spectabile*, *Symphitum officinale*, fol. var., *Vallota purpurea*, *Veratrum album*, *V. nigrum*, *Vitis hederacea*, *Yucca filamentosa*, fol. var.; *Y. recurva*, *Alyssum montana*, *Iberis Gibraltarica*, *Aubretia purpurea*, *Primula auricula*, *P. Sieboldi* in var., *P. intermedia*, *P. Japonica*, *P. viscosia nivea*, *P. rosea*, *P. marginata*, *P. Cashmeriana*, *Iris reticulata Krelagi*, *I. alata*, *I. histrio*, *I. pavonia*, *I. persica*, *Allium neapolitanum*, *Anomatheca cruenta*, *Anthericum variegatum*, *Chionodoxa Lucilæ*, *C. Sardensis*, *Narcissus bulbocodium*, *Crocus Aucheri*, *C. Sieberi*, *Nerine sarniensis*, *Ornithogalum umbellatum*, *Schizostylis coccinea*, *Tree ivies*.

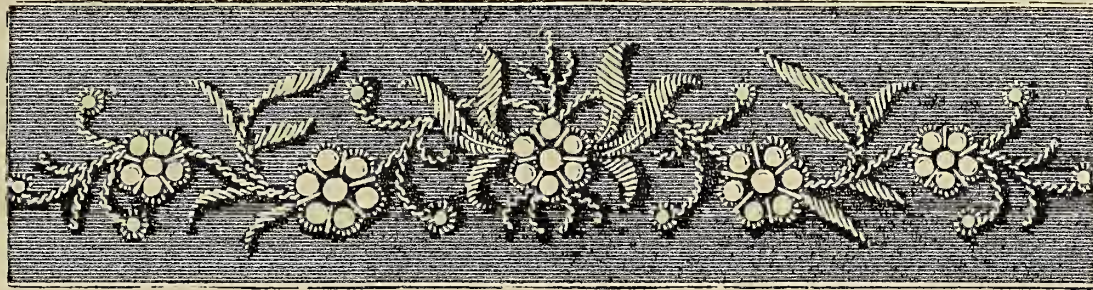
## A SELECTION OF GREENHOUSE CLIMBERS.

ORDINARY GREENHOUSE.—*Bignonia*, *Clematis Fortunei*, *C. John Gould Veitch*, *C. lanuginosa*, *Cobæa scandens*, *C. scandens variegata*, *Gompholobium splendens*, *Habrothamnus elegans*, *Hibbertia volubilis*, *Hoya carnosa*, *Kennedyia coccinea major*, *K. inophylla floribunda*, *K. monophylla*, *K. racemosa*, *K. rubricunda superba*, *Lapageria alba*, *L. rosea*, *Solanum jasminiflorum*, *Tacsonia Buchanani*, *T. ignea*, *T. mollissima*, *T. Van Volxemi*, *Tecoma jasminoides*, *Passiflora Ipératrice Eugénie*, *Mandevillea suavolens*, *Clanthus puniceus*, *Jasminum grandiflorum*, *Lapageria rosea*, *L. r. alba*, *Rhodochitum volubile*.

WARM GREENHOUSE.—*Dipladenia splendens*, *Echites Harrisi*, *Hoya imperialis*, *Manettia bicolor*, *Passiflora Decaisneana*, *P. kermesina*, *P. princeps*, *Stephanotis floribunda*, *Thunbergia Harrisi*, *Ipomæa Leari*, *I. Horsfallea*, *Rhynchospermum jasminoides*, *Clerodendrom Balfouri*, *Bougainvillea glabra*.

COLD GREENHOUSE.—*Passiflora Constance Elliott*, *Clematis indivisa lobata*, *C. Jackmanni*, *C. J. alba*, *C. lanuginosa*, *C. l. Lady Bovill*, *C. Florida*, *Countess of Lovelace*, *Stauntonia latifolia*, *Solanum jasminoides*.





## THE FERN HOUSE.

That which may profit and amuse is gathered from the volume of creation,  
For every chapter therein teemeth with the playfulness of wisdom.  
The elements of all things are the same, though nature hath mixed them with a difference,  
And learning delighteth to discover the affinity of seeming opposites :  
So out of great things and small draweth he the secrets of the universe,  
And argueth the cycles of the stars, from a pebble flung by a child.

TUPPER.

ONE of the best possible of "rustic adornments" is a well-furnished fernery, both because of its constant attractiveness and the comparatively small amount of labour and skill required to keep it in perfection. To institute comparisons amongst the various features of a garden is by no means, in order to assess their relative values, desirable. To one ardent amateur an orchid-house may afford the best amusement in the world ; to another neither ferns, nor orchids, nor greenhouse plants, nor florists' flowers may offer the slightest permanent interest ; but this one may be happy in the orchard-house, and may consider the cultivation of fruit-trees in pots glorious pastime. *Chacun à son gout.* There cannot be a doubt, however, that for recreative purposes, and more or less of botanical study, a fern house will suit the tastes and convenience of a greater number of persons, especially in towns, than any other of the many elegant appendages of the household that might be fairly put in competition with it for favour and acceptance. The probabilities are all in favour of the fern house proving to be the most beautiful feature, even in a large and well-kept garden, but it is ten times more to be



desired in the small garden, or where there is no garden at all; for as a mere "annexe" to the dwelling it may be made a delightful place of resort, to refresh the eye with its cheerful verdure and variety of graceful forms, and so make a blessed change from the depressing monotony of daily life in the heart of a great city. Granted that it ranks first in importance as to its suitability to gratify a diversity of tastes, while making but small demands on the purse or skill of the possessor, there is yet one word more to be said in its favour of the utmost importance. A position may be selected for the fern house which would be quite unfit for a greenhouse intended for flowering plants. A sunless spot will suit for ferns, and, indeed, if there is but a mere glimmer of daylight, provided other conditions are suitable, it is still possible to create a fern garden under glass; for we can easily find a number of the loveliest of ferns that will actually thrive in twilight. We will not, however, consider extreme cases; it is sufficient that an aspect full south, with many hours' exposure to the summer sun, is *not* suited for a fern house, but any other aspect will suit; and the best of all is one due north, but fully exposed to the daylight, that is to say, not over-shadowed by trees or very closely hemmed in by high walls. Reserve the sunny spots for plants that need the sun, the ferns will thrive without sun; at the same time, an hour or two of sunshine every day throughout the year is good for a fern house, and that is the reason we say that any aspect not exposed to the full glare of the summer sun for many hours together will answer for the purpose.

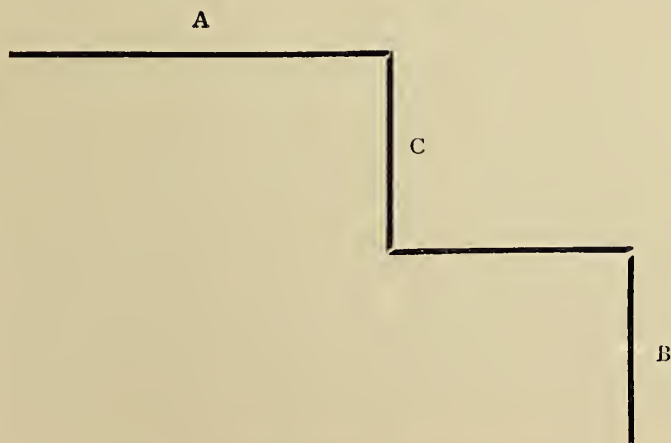
Although the terms are commutable, we make a distinction between a fern house and a house for ferns. We are thinking of a cool house, spacious enough for the formation within it of a rockery, in which the ferns are to be planted out, and where there will be room to move about freely for enjoyment as well as for work. A house for ferns may be a different affair altogether, filled with pot plants, maintained at a tropical temperature, affording scarcely room enough for a man of ordinary size to turn about in it, and perhaps everywhere damp and dirty, as happens to be the case with many a house in which valuable collections are kept in a wonderful state of health and vigour.

It need not be explained that equal success may attend the effort to construct a fern house, though very different plans are adopted. We may find a high dark wall on which, perhaps, ivy would scarcely grow, and by constructing a lean-to house in front of it, accomplish all that could be desired. Thousands of so-called "conservatories" and "greenhouses"



annexed to town dwellings in sunless aspects would make pretty little ferneries, but when occupied with flowers, make no other return but vexation for the wasteful outlay incurred in keeping them furnished. If we had to build a house for the purpose, expense no object, no restriction as to space, the well-doing of the ferns and the comfort of visitors alone to be considered, we should proceed as follows:—Four strong walls of brick or stone, six to eight feet high at least; on these walls a low span-roof, the glass to be Hartley's rough plate; ventilators at intervals along the ridge-line and in the walls; the ground to be laid out in walks and rockeries; all the walls to be built over with rock and planted, and, if to the taste of the designer, a few arches thrown across, both to break the hard sky-line of the roof, and afford aërial sites for ferns. A cave might be added, either above or below ground, to suit the filmy ferns and their allies; a pond for gold fish would be appropriate; a bountiful supply of water would be necessary; a service of hot-water pipes sufficient to exclude the severest frost would be desirable. From first to last, however, it must be remembered that artificial heat is not absolutely necessary, and, therefore, no one need be deterred from establishing a fern house by the consideration of the expense of heating it, and the subsequent labour that advantage would involve. A lean-to house on the wall of a dwelling would have more power of resisting frost than a span-roofed house standing apart from other structures, and, as we rarely have frosts of long duration, the possessor would not often be shut out from the miniature Arcady by reason of the cold.

A few examples may be useful. First, for a small one, but a good one of its sort. The fern house we



have in view is a lean-to, occupying a position on the west side of the dwelling, where, owing to contiguous buildings and large trees, sunshine is so far excluded that flowering plants would not quite prosper in it. Suppose A to be the west wall of the dwelling-house; B, the north wall; C, an ugly corner that

or a time we may be puzzled what to do with. We alter the state of things by constructing a fern house there, to fill up the gap,  
 Y

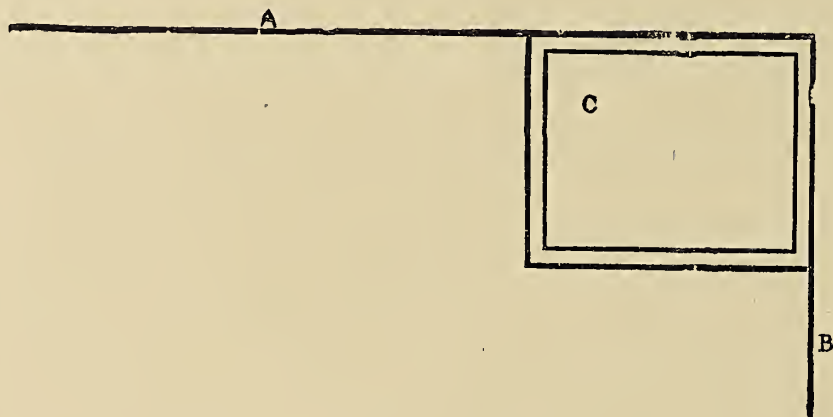


and gain for our advantage two warm walls, against which to pile up a rockery, and in this rockery the ferns and lycopodiums are planted. A neat paving of tiles affords a comfortable footing; the rockeries rise to the roof, and consist of banks of peat, faced with burrs from the brick-kiln planted with ferns everywhere except on the top next the glass, where a few sedums, sempervivums, and other succulent plants enjoy the extra light and less moisture incident to their position. There never was a better work in the way of gardening accomplished here than the building of that little fern house, in which about a hundred and fifty species and varieties have thriven during twelve years past, making summer all the year round in their perennial greenness.

Another example that we are acquainted with is worth special mention. This is partly excavated, so as to be below the ground-level. Instead

of brick walls, broad solid banks of peat are provided for the support of the roof, which is a low span: one side, that to the north, being of glass, the other side covered with felt. At the lowest end is placed

the furnace, and a sufficient service of hot-water pipes to maintain there a tropical temperature. In the centre of the house the hot-water pipes are reduced in number, and the result is a greenhouse temperature. At the upper end there is only one four-inch pipe, just to keep out frost; and here we have only a little better climate than prevails outside, but with the advantage of glass to shelter the ferns and the visitors. Thus in one house the ferns of all climates may be represented, and we pass by pleasant degrees from the cool department to the tropical, and may take time to recover from the bath of warm vapour we are treated to in the lower part of the house ere emerging again into the open air. It will be understood, of course, that in a district where peat is plentiful, such a house is a comparatively inexpensive luxury; and we can assure the reader it is so furnished and kept that we might wander far and wide to find its equal in interest and beauty.







SMALL GREENHOUSE AND FERNERY COMBINED.



Yet another example may be cited. Assuming the reader to have a small structure only, and a desire to utilise this for growing ferns and flowers, he can construct a rockery under the staging and plant ferns in this, together with *Selaginella Kraussiana* and *Tradescantia zebrina*. Then on the staging above, flowering and foliage plants with a few of the choicest ferns may be grown. The roof also may be turned to account for suspending ferns in baskets and other creepers; and the end wall, if any, covered with cork pockets filled with ferns and trailing plants. A small greenhouse thus arranged is depicted in the accompanying illustration.

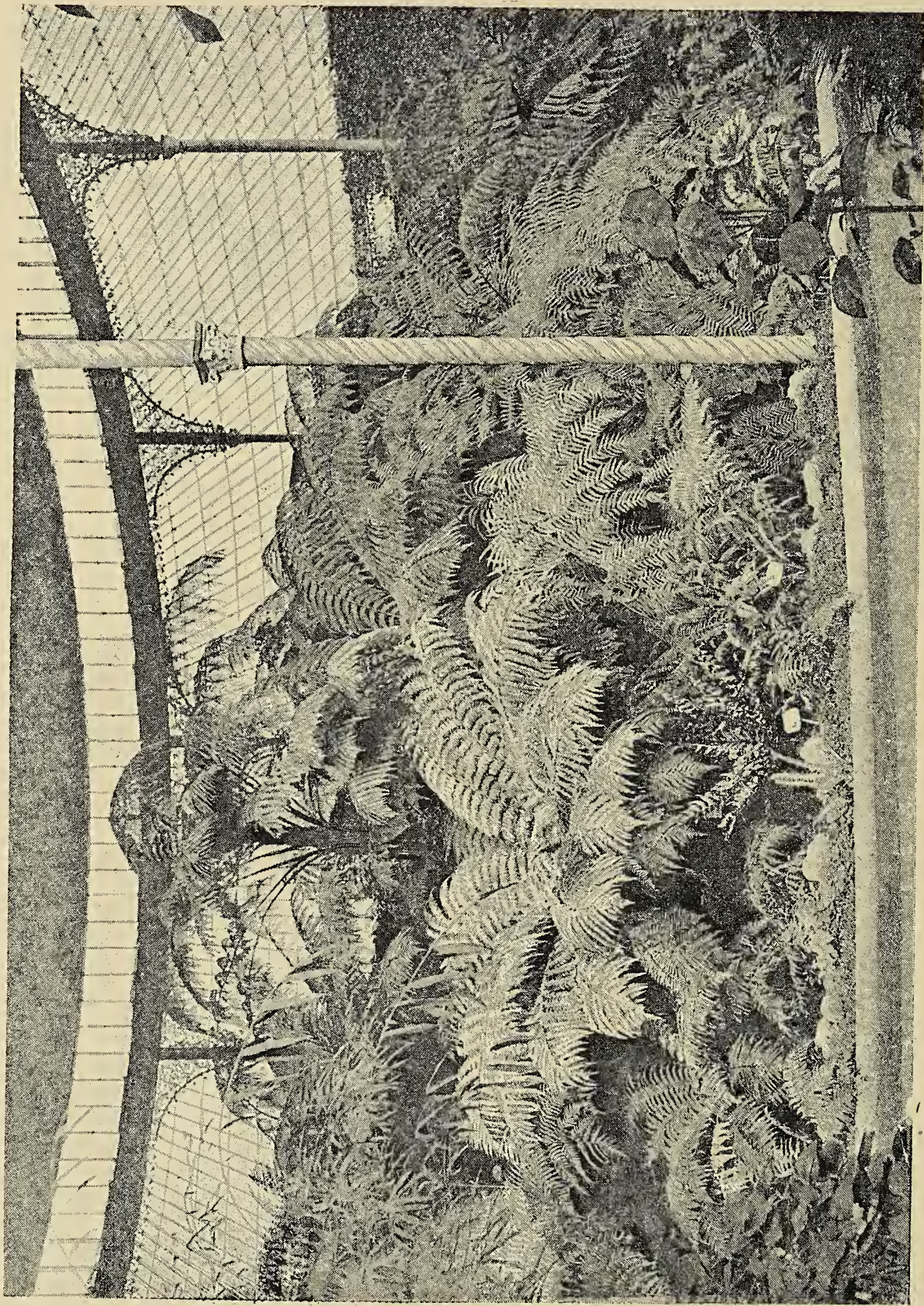
In the formation of a greenhouse fernery it is not enough to gratify a particular taste, which, by the way, may happen to be a bad taste; it is essential to provide for the plants, so that there shall be no struggle with difficulties afterwards to keep them alive. If the work is well done, the ferns will grow and fill their owner with delight, and nothing short of the most luxuriant growth possible should satisfy the cultivator. Enough has been said perhaps on the form and construction of the house, and the next point for consideration is the rockery. Now, it is necessary to guard against a fatal error in this matter. We occasionally obtain a peep into ferneries that are founded on a delusion. We see fantastic pyramids and arches studded with myriads of sharp projections in the fashion of stalactites, the colouring of the whole a repulsive tone of bright yellowish grey, the material being furnace clinkers artistically coloured, with not a crumb of soil for the ferns to root in except what can be thrust into wretched little "pockets" of the capacity of a tea-cup each. There may be in the house a few good ferns in pots on the floor, or surrounding a fountain in the centre, and a few more very bad ones in pots thrust into unhappy chinks in the fanciful rockery; but the affair at best is only a costly extension of the idea on which a peep-show at a country fair is founded. The sham stalactites are the attraction, if there be any attraction, and the deluded folks who declare it "beautiful," declare also by that utterance that they have not the least idea of what a fernery should be, or what ferns require. A fernery is for ferns, and must be so ordered that ferns will thrive in it. One good tuft of maiden-hair or marine asplenium, beaded with moisture and glistening with health, is to be preferred to all the painted clinkers and childish frippery that was ever seen in a house of this kind, no matter what it may have cost, or how much weariness and solicitude may have been entailed upon the owner to secure its construction. We must have first of all a mass of soil, that the ferns may have abundant root-room,



not simply to *live*, but to *grow* and *increase*. For the rockery there is nothing better than brick or stone, because of the retention of moisture by these materials and the liking of ferns to root next to their surfaces, and even into their substance. Circumstances may prohibit the selection of the material known to be the best, and we must then be content with the next best. Hard vitreous substances, impenetrable by moisture, are unfit for rockeries for ferns under glass, yet they may be used if nothing better can be obtained, provided always there is a large body of soil and abundant openings amongst the facings for the searching roots of ferns to push their way for nourishment. In towns, the most convenient and suitable stuff for rockeries is the waste of the brick-kiln. The large masses of brick that come from the base of the kiln, and which are commonly known as "burrs," are as good for the purpose as can be desired; their crannies and crevices suit the rooting habits of the plants, and they are suitable also in colour, and after a time a slow decay of their surface takes place, the result being that troops of mosses come of their own accord, and dot the structure with patches of emerald. Stone is better still, if in rough blocks, and sandstone especially, if it can be had, will favour the well-doing of every inmate of the house. We have seen roots piled up and planted, and they answered well; but they decay too fast, and are apt to become suddenly clothed with a myriad kinds of objectionable fungi, which are difficult to eradicate. The best staple soil for the purpose is good peat; but as in many districts this is a costly material, it is necessary to eke it out. Our rockery was built by a bricklayer who thoroughly understood the requirements of the case. We made a bed of loam for the foundation, and upon this the peat was piled or thrust in as the work proceeded; and when the bricklayer had finished his work, we found plenty of large and small pockets opening into the solid bank behind; in these the plants were placed and filled in with a good mixture of peat and sharp sand.

Drainage is of more importance with reference to the comfort of the cultivator than the well-doing of the ferns. It must be understood, however, that the accumulation of stagnant water at the base of the rockery is an evil to be guarded against, to say nothing of a possibly sloppy state of the paths or pavement, if the house is unprovided with drainage. Let it suffice that this point has been mentioned, for in practice it is of less consequence than in theory. If the fern house stands on a tolerably dry soil, and the cultivator acts judiciously in the management of it, there will never be such an accumulation of water as will be objectionable or inconvenient.





FERNERY AND CONSERVATORY COMBINED.



In the selection of ferns, the matter for first consideration is their relative hardiness. If the house is heated, there is a wider range for selection than otherwise, but in a house wholly unaided by artificial heat an immense number of the most beautiful kinds may be grown to perfection. If the question were pressed for a decisive answer, whether, speaking in a general way, a fern house should or should not be heated, we should pronounce it highly desirable to heat it to ordinary greenhouse temperature, both because in that case it might suit, *cæteris paribus*, for full nine-tenths of all the ferns known, and because also it would be enjoyed in all weathers, and would be almost as bright on New Year's Day as at Midsummer. Therefore our advice to all is, be content with the proper range of your opportunities; plant such ferns as the house will accommodate without necessitating a strain upon your attention at any time, for when a hobby swells out like a nightmare into a gigantic vexation or anxiety, it ceases to amuse, and increases instead of relieving the cares of life.

At this point the whole subject of fern-culture opens before us, and it is therefore time to stop. It must suffice to say here that sufficient room should be allowed in planting for the plants to extend themselves and attain perfect development; that they should be planted firm and filled in with a good mixture of peat and sand, and in many cases it will be necessary to *build* them in, to secure to plants of peculiarly noble aspects commanding positions. The after-attention consists chiefly in watering, which must be attended to with regularity, copious supplies being given in summer, but very little in winter, and during frost none at all, unless the house is heated, in which case the supplies must be continued in moderation.

Ventilation will be necessary, but ferns need less air than most other plants, and especial care must be taken to avoid exposing them to cold draughts in spring, and to the exhaustive sultry breezes of high summer.

“ He is the happy man, whose life e'en now  
Shows somewhat of that happier life to come ;  
Who, doomed to an obscure but tranquil state,  
Is pleased with it, and, were he free to choose,  
Would make his fate his choice ; whom peace, the fruit  
Of virtue, and whom virtue, fruit of faith,  
Prepare for happiness ; bespeak him one  
Content indeed to sojourn while he must  
Below the skies, but having there his home.”

COWPER.



## A SELECTION OF FERNS FOR A COLD FERNERY.

- Adiantum capillus-veneris*, *A. pedatum*.  
*Asplenium adiantum-nigrum*, *A. marinum*, *A. fontanum*, *A. rhizophorum*  
*A. trichomanes*, *A. viride*.  
*Athyrium filix-fœmina*, *A. f.-f. corymbiferum*, *A. f.-f. crispum*, *A. f.-f.*  
*Fieldiæ*, *A. f.-f. Frizelliæ*, *A. f.-f. grandiceps*, *A. f.-f. latifolium*, *A. f.-f.*  
*mucronatum*, *A. f.-f. plumosum*, *A. f.-f. Vernoniæ*, *A. f.-f. Victorix*.  
*Blechnum spicant ramosum*.  
*Botrychium virginicum*.  
*Ceterach*, *C. officinale*.  
*Cyrtomium falcatum*, *C. Fortuneii*.  
*Cystopteris bulbifera*.  
*Davallia Mariesii*.  
*Dictyogramma Japonica*.  
*Gymnogramma leptophylla*.  
*Lastrea œmula*, *L. atrata*, *L. cristata*, *L. dilatata*, *L. fragrans*, *L. Goldieana*  
*L. filix-mas Bollandiæ*, *L. f.-m. cristata*, *L. thelypteris*, *L. prolifica*.  
*Lomaria alpina*, *L. chilensis*, *L. pumila*.  
*Lygodium Japonicum*, *L. palmatum*.  
*Onoclea sensibilis*.  
*Onychium Japonicum*.  
*Osmunda cinnamomea*, *O. Claytoniana*, *O. gracilis*, *O. regalis*.  
*Pellœa atropurpurea*.  
*Polypodium alpestre*, *P. dryopteris*, *P. phegopteris*, *P. Robertianum*, *P. vulgare*,  
*P. v. cambricum*, *P. v. semilacerum*, *P. v. serratum*.  
*Polystichum acrostochoides*, *P. aculeatum lobatum*, *P. angulare cristatum*,  
*P. a. concavum*, *P. a. grandiceps*, *P. a. plumosum*, *P. a. proliferum*, *P. proliferum*  
*Haleanum*, *P. pungens*, *P. setosum*, *P. triangulum laxum*.  
*Pteris scaberula*.  
*Scolopendrium vulgare*, *S. v. crispum*, *S. cristatum*, *S. v. laceratum*, *S. v.*  
*marginatum*, *S. v. ramosum*, *S. v. Morgani*, *S. v. multifidum*, *S. v. submar-*  
*ginatum*, *S. v. Wardi*.  
*Struthiopteris germanicum*.  
*Woodsia ilvensis*, *W. obtusia*.  
*Woodwardia orientalis*, *W. radicans*.



SELECT FILMY FERNS FOR COLD FERNERY.

*Hymenophyllum demissum*, *H. d. nitens*, *H. chiloense*, *H. Tunbridgense*,  
*H. Wilsonii*.

*Trichomanes radicans*, *T. r. crispum*, *T. r. dissectum*, *T. reniforme*.  
*Todea pellucida*, *T. superba*.

SELECT LYCOPODIUMS FOR COOL FERNERY.

*Selaginella Kraussiana*, *S. K. aurea*, *S. K. variegata*, *S. iaponica*, *S. denticulata*.

SELECT FERNS FOR A WARM FERNERY.

(All the species enumerated in the preceding list will also thrive in an intermediate house.)

*Adiantum æthiopicum*, *A. assimile*, *A. cuneatum*, *A. c. grandiceps*, *A. concinnum*,  
*A. decorum*, *A. formosum*, *A. Farleyense*, *A. gracillium*, *A. hispidulum*,  
*A. reniforme*, *A. scutum*, *A. Williamsii*,

*Alsophila australis*, *A. excelsa*.

*Asplenium bulbiferum*, *A. Colensoi*, *A. formosum*, *A. palmatum*, *A. Veitchianum*.

*Blechnum brasiliensis*, *B. corcovadense*.

*Cibotium Barometz*.

*Cheilanthes elegans*.

*Cyathea dealbata*.

*Davallia bullata*, *D. canariense*, *D. dissecta*, *D. Mooreana*, *D. tenuifolia stricta*.

*Dicksonia antarctica*, *D. squarrosa*.

*Doodia aspera multifida*.

*Drynaria musæfolia*.

*Gleichenia dichotoma*, *G. rupestris*.

*Goniophlebium appendiculatum*, *G. subauriculatum*.

*Gymnogramma ochracea*.

*Lastrea Richardsii multifida*.

*Leucostegia immersa*.

*Lomaria ciliata*, *L. gibba*, *L. g. major*.

*Lygodium palmatum*, *L. scandens*.



*Microlepia hirta cristata.*  
*Nephrodium molle, N. m. corymbiferum.*  
*Nephrolepis exaltata, N. pectinata, N. tuberosa, N. davalloiides.*  
*Nothochlæna lævis, N. ruja.*  
*Phlebodium aureum, P. sporodocarpum.*  
*Platynerium alcicorne.*  
*Platyloma cordata.*  
*Pellœa ternifolia.*  
*Polypodium effusum.*  
*Pteris argyrea, P. cretica albo-lineata, P. tricolor, P. tremula, P. t. Smithiana,*  
*P. serrulata, P. s. cristata, P. umbrosa, P. Victoriae.*

## SELECT LYCOPODIUMS FOR WARM FERNERY.

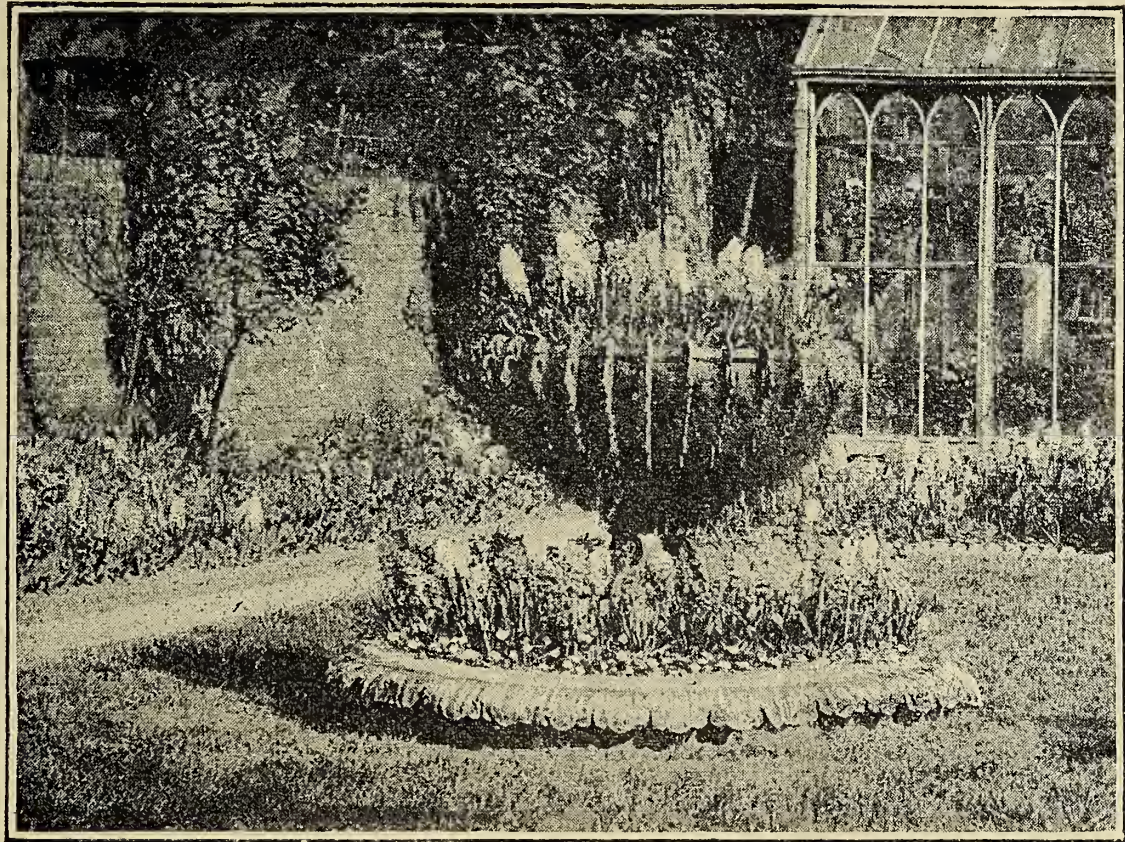
*Selaginella Kraussiana, S. K. aurea, S. K. variegata, S. densa, S. cœsia,*  
*S. Martensii, S. involvens, S. pubescens, S. caulescens argentea.*

## SELECT FERNS FOR HANGING BASKETS.

*Adiantum assimile, A. gracillium, A. lunulatum.*  
*Asplenium flaccidum.*  
*Davallia canariense, D. dissecta elegans, D. Mariesii.*  
*Gymnogramma schizophylla.*  
*Microlepia hirta cristata.*  
*Nephrolepis exaltata.*







## THE FLOWER GARDEN.

### CHAPTER I.

The gaudy peacock boasts not in his train  
So many lights and shadows, nor the rain  
Heaven-painted bow, when that the sun doth court her ;  
Nor purple pheasant, while his mate doth sport her,  
To hear him crow, and with a beauteous pride  
Wave his discoloured neck and purple side.  
I have not seen the place could more surprise,  
More beautiful in nature's varied dyes.  
Lo ! the blue bind-weed doth itself unfold  
With honeysuckle, and both these entwine  
Themselves with briony and jessamine,  
To cast a kind and odoriferous shade.

BEN JONSON.

**I**T is time we found our way into the garden, for there we shall find enough of pleasant work to do. No one will expect in these pages a systematic treatise on horticulture, or on any one of its many branches ; yet we must have a chapter on the subject of laying out a garden, if only to serve as a



preface to the essays that will follow on certain of its features, which more especially come within the scope of this work. We shall be as fragmentary and discursive as possible, if only to keep the reader constantly conscious that this is not a treatise in any sense of the word. It would not be fair to say that a Home of Taste cannot be created except in the vicinity of a garden, nevertheless it is certain that a garden is a very essential portion of such a home. It has always been so, for at the birthday of the world "the Lord God planted a garden eastward in Eden; and there He put the man whom He had formed," "and the Lord God took the man, and put him into the garden of Eden, *to dress it and to keep it,*" for until this first of men and first of gardeners received "into his nostrils the breath of life," "there was not a man to till the ground." So far then from the tilling of the ground being a special part of the curse of the fall, it was from the first an occupation sanctioned by divine command; and though man's highest duty was to love and worship the Father of all things, he was, nevertheless, made to till the ground—created *ab initio* a gardener. Nor did the Almighty spare His mercy, when the fall brought on "the man" a merited punishment. The joy of gardening was still vouchsafed to him, and the eternal penance of himself and his race was to be tempered by a consideration of the lilies "*how they grow*"; for when he went "forth from the garden of Eden," his first sweet task was renewed to him, "to till the ground from whence he was taken."

Through every succeeding period of human history the culture of plants has taken prominence among the sober occupations as well as among the amusements of mankind, and this "iron age" finds a strong contrast to its harsh commercial tendencies in the increasing love of flowers and the expansion of taste in their arrangement and cultivation. Gardening is now one of the completest of the arts, for it is an art as well as a pursuit, subject to rules as definite as those which control its sister arts of painting, sculpture, and poetry; and to which indeed it furnishes innumerable materials, and acts at once as nurse, teacher, and standard of comparison.

It is beyond possibility in one short essay to convey anything like a full expression of distinct opinions on the principles of taste in gardening, for the subject ranges, wide and far, over a variety of associated topics. But a few suggestions may be useful, and as we cannot ignore the subject, it must be treated with a view to usefulness. And the first thing that occurs to us is the fact, that as very few persons, especially in suburban districts, build their own



houses and plan their own grounds, so it is often impossible to realize distinct ideas of gardening taste. We cannot have any great varieties of surface when we take up our residence on a flat plain, nor can we command a slope to the south where the house is already built on a slope to the north. But where the choice can be made, it is undoubtedly of the first importance that a garden should slope to the south, that its surface should be diversified, that it should admit of some kinds of water scenery, and be surrounded either with fine open country or picturesque woods, or with some objects, natural or artificial, on which the eye may rest with pleasure when the walks themselves are exhausted, and we have arrived at the boundary of the domain.

Then as to the laying out: every person who really loves a garden has some idea of the plan and style that will be most pleasing to himself, and a predetermined opinion as to the extent of space to be devoted to the several departments of wood and water, roads and lawns, flower borders, shrubs, and the culture of edibles. The nature of the ground itself must always be first considered in relation to such matters, but whatever the arrangement, everything must conform to certain principles of taste, or the most sincere efforts will be wasted.

Two important matters should be kept in view from the first. We must endeavour to develop the natural features of the place, and we must subordinate every detail to the production of a *complete effect*. Every contrast should help to conserve and strengthen the harmony of the whole, the details should mutually assist each other in creating a succession of pleasing cares, anxieties, and occupations, and a varied scene of ever-changing delight. It should be borne in mind by every cultivator of taste in gardening, that a garden is an *artificial* contrivance, it is not a piece scooped out of a wood, but in some sense a continuation of the house. Since it is a creation of art, not a patch of wild nature, so it should everywhere show the evidence of artistic taste in every one of its gradations, from the vase on the terrace to the "lovers'" walk in the distant shrubbery. True nature is not to be shut out of the scene, but nature is to be robed, dressed, and beautified, and made to conform to our own ideas of form and colour; and while we delight in some amount of picturesqueness, we are to consider art rather than nature as the basis of every arrangement.

The gardens of the Romans were magnificent in their splendour. Their pleasantries combined all the graces of the modern terrace, the display of architectural and sculptural beauty, the freshness of well-kept lawns divided



by clean paths, with the old geometric evergreens and the fanciful arbours that delight so many in pictures and descriptions of old English gardens. To the formal scene they added the umbrageous coolness of quaint grottoes and retired nooks, each in its place ; the rustic scene removed from the immediate vicinity of the house, and approached through groves of myrtle, laurel, and cypress, all reduced to order by the skill of the gardener. The interior of the house itself formed the first portion of the garden. Here was an open space surrounded by walks, and enclosing a grassy plot with a fountain in the centre. This was the *viridarium*, sometimes ornamented with the myrtle and the plane, and always with the ancestral laurel, a tree sacred to many an old divinity, and which is still a household god with us degenerate Britons. The inner court or *cavæ dium*, was indeed a sheltered garden, and formed a distinct portion of the house ; and even the *atrium*, which was next the entrance, had its rows of pillars, its fountain, its plots of grass, and vases of flowers, all placed within the daily gaze of the inmates, as essential portions of the domestic furniture. Then the *tablinum* and other choice rooms opened upon the *peristylæ*, or colonnade, and this was the true Pleasure Garden of the affluent Roman citizen. Sometimes the *peristylæ* were of vast extent, with superb fountains, vases, and statuary, and gloomy groves of evergreens ; and frequently a forest of umbrageous leafiness, in which singing birds found happy homes amid the shadows which gave coolness to the retreat. Nor were flowers wanting to perfect the artistic arrangement, spite of the sneers that modern writers have heaped upon the old patricians for their love of fruits and other eatables, as elements of a well-planned ground. Aristophanes frequently alludes to the floral glories of Attica ; and every classic poet, not forgetting even Juvenal, has in some way or other celebrated the *elegance* of the gardens in and about the imperial city. Virgil describes the old Corycian as rejoicing in his "white lilies," his "roses in spring," as well as his "apples in the fall" ; and did he "not so near his labours end," he says he would sing, not only of the cucumber and parsley, but of "*flowery gardens*," and of the roses of Pœstum, as well as of the narciss, green myrtles, and the trailing ivy.

" Quôque modo potis gauderent intyba rivis,  
 Et virides apio ripæ, tortusque per herbam  
 Cresceret in ventrem, cucumis : nec sera comantem  
 Narcissum, aut flexi tacuissem vimen acanthi,  
 Pallentesque hederas, et amantes littora myrtos.'

FOURTH GEORGIC, v. 120.





AN INFORMAL BORDER OF SHRUBS AND HARDY FLOWERS.



So far indeed from the gardens of the ancients being composed only of "potherbs and sepulchral cypress," the legends that remain of Semiramis and Adonis, Alcinous and Laertes ; and the historical instances of the gardens of the academies, the villas, and gardens of Cicero, Pliny, Sallust, and Mæcenas ; and the splendid grounds of Lucullus on the Pincian Hill, overlooking the field of Mars and the Flaminian Way, sufficiently attest that a taste for horticultural embellishments is by no means of modern origin—nay, did not the Romans, cooped up two millions strong in a space of less than fourteen thousand yards circumference, revenge themselves on the *city* by placing the *country* above it ; that is, did they not build indestructible roofs of larch, and beech, and pumice stones, in order to lay down mould for the growth of fruit trees, myrtles, laurels, arbutuses, oleanders, and roses ? So they not only had their gardens on the house tops, but frequently miniature forests there also, in which wild birds found nesting quarters, and tame birds in cages were hung about to attract the savage songsters by their madrigals.

Indeed, Horace makes it a special subject of complaint, that in his time the ornamental gardens were fast usurping the place of the old olive and apple grounds, and that the demands of luxuriance were fast destroying the profitable groves and orchards ; proof enough that a cabbage or bulb of garlic was not the *ne plus ultra* of a Roman garden.

" Jam pauca aratro jugera regiæ  
Moles relinquent ; undique latiùs  
Extenta visentur Lucrino  
Stagna lacu ; platanusque cœlebs  
Evincet ulmos : tum violaria, et  
Myrtus, et omnis copia narium,  
Spargent olivetis odorem,  
Fertilibus domino priori."

LIB. II., ODE 15.

Though these roof gardens might be worthy of revival at the present day, in London and other great towns, it concerns us most here to get back quickly to the garden proper, and renew the thread thus broken, in an attempt to set forth something like a code of taste in gardening.

Such is an outline of the ancient style of laying out gardens, and one which more or less found favour in modern times, until within a comparatively recent period. But happily taste has changed considerably of late years, the erstwhile formal walks, geometrical beds, massive statuary and squirting fountains, being gradually replaced by a more natural style, one showing less of



the work of the architect and more of the taste of the true artist. The former now very properly confines his attention to the erection of the dwelling and its immediate adjuncts, where strict uniformity in lines and curves, horizontals and perpendiculars—the indispensable essentials of his art—are more in harmony than in direct contrast with nature. The landscape gardener, the student of Nature and her varying forms, now meets the architect on the verge of the threshold of the home, and brings his special knowledge, his taste, and his skill, born of a more intimate acquaintance with all that is lovely and exquisite, in the form and colour of the many beautiful trees, &c., that grace sylvan scenery, to bear on the creation, so to speak, of the garden, and tone and soften the harsher lines of the building, and impart a finishing touch to the surroundings of the house. Too frequently, alas! the fashioning of a garden is regarded as of a mechanical character. The plans are drawn, and the contractor proceeds to lay out the ground with mathematical exactness. This is not true landscape gardening. A garden to be really beautiful and a reflex of Nature's choicest sylvan scenery, cannot be laid out with rule and level, any more than a landscape can be painted with life-like realism on a canvas by the aid of the compass and the ordinary paraphernalia of the draughtsman. Like the painter, the landscape gardener must paint his living picture little by little until a complete and harmonious whole has been obtained. Then, and then only, will an ideal garden be formed, a picture charming in all its parts, and a perennial source of interest at all seasons of the year.

But in a work of this kind, we are bound to study the varying tastes of the reader. While we give at least one example of the present-day style of gardens, which will indicate by its free and graceful curves, its pleasing groups of shrubs and hardy flowers, combined in happy association, its variety of charming scenes and its utter freedom from conventionalism, how vastly superior in all its parts it is to the more formal style, we also include examples of the latter to enable the reader to make his choice between the two.

In proceeding to carrying out the first plan, with a view to ensuring a garden at once graceful and natural, the efforts of art should be so perfectly directed that they impose no artificiality, and while restraining mere license, foster and encourage the generous impulses of nature. Bacon says, "I do hold it in the royal ordering of gardens there ought to be gardens for all the months of the year, in which, severally, things of beauty may be then in



season," and what he would have thought of ribbon and carpet gardening may be judged when we read further on: "As for the making of knots or figures with divers coloured earths that they may lie under the windows of the house, they be but toys, you may see as good sights many times in tarts." If there be one lesson we learn when we study in Nature's school, it is that she holds not with that uniformity most gardeners crave, and which, to the average professor, is the be-all and end-all of his craft. He works by rule, and fain would have his plants to grow by measure, and with a due sense of restraint and discipline. Not a twig may break the level line, or a floweret stray beyond its allotted place, but the knife is invoked, and every tree and shrub bears upon its limbs the tokens of a barbarous code. Much of this might be remedied if people who possess gardens, and are gifted with ordinary knowledge and good taste, would take a sufficiently active interest in them. When everything is surrendered to the gardener, no wonder the result is disappointing. We are not referring to those who command the whole time of one or more highly-trained gardeners, but of many of the suburban occupiers, who devote some of their leisure to their gardens, and supplement this by the more or less regular employment of a jobbing man. They at least might reserve to themselves liberty. The garden is a part of the home, and some portion of the attention we bestow indoors is due to our outside surroundings—whence comes the air we breathe, and upon which our eyes must rest whenever they are turned to the light of day.

"There is an art even in the shutting and opening of windows," says Leigh Hunt, and we frequently witness a room ordered with careful regard to propriety and refinement, spoiled with the ugliness which obtrudes upon the windows. The canvas landscapes we covet for our walls are valued, as the art they display is true to Nature in her most beautiful phases—idealised they may be—but Nature still—yet we entrust our window-pictures, where leaf and flower might be made to reflect and idealise every season of the changeful year, to men whom Nature, in her most captivating moods, fails to thrill, and whose souls never knew the inspiration of art. In these days there are many evidences of improved feeling in matters of form and colour, and glare and glitter have ceased to be accounted lovely. It is impossible then that a fairly cultured taste can be satisfied with a central blaze of red and yellow issuing from a blue crater, and believe that the addition of a grass plot makes the enclosure a garden. The truth of Keats' oft-quoted aphorism receives, perhaps, its most perfect illustration in the delight derived from a well-ordered



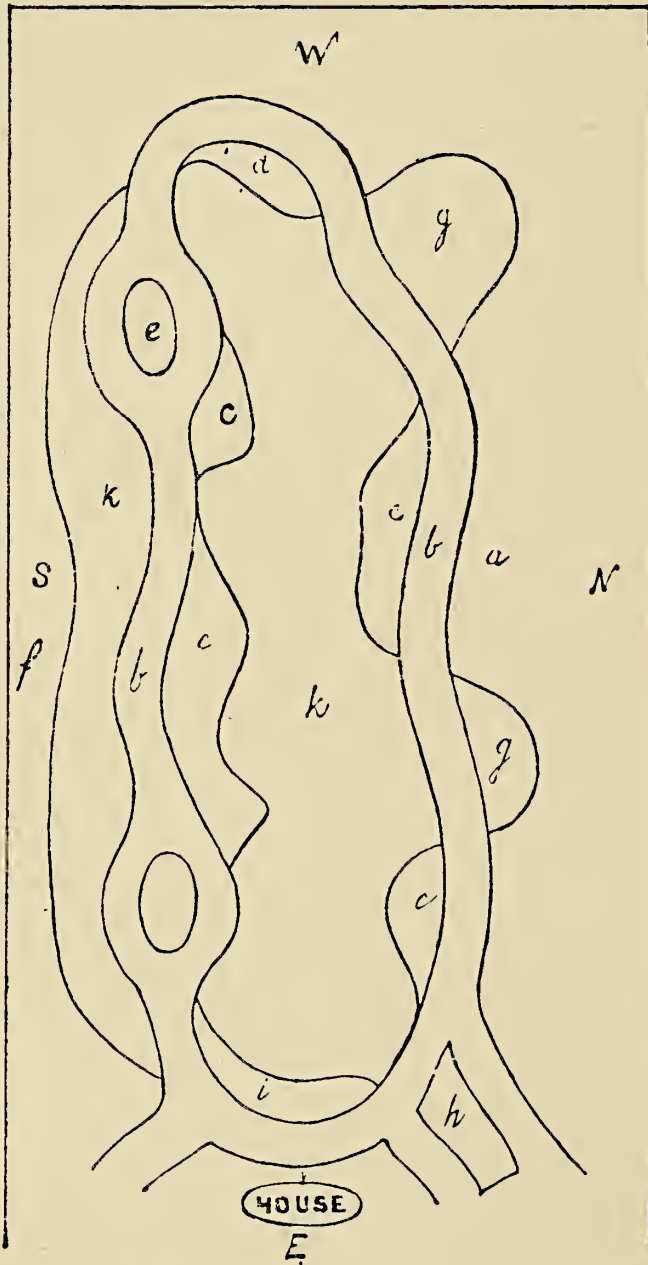
garden. Such a garden is beautiful always, and so it is "a joy for ever." The beauty never palls, for it is ever changing; day by day it unfolds fresh charms, and while it never ceases to call for our tenderest care, it repays our solicitude with present smiles and promises of joys to come. It is a work of art with a thousand natural graces, and it has this advantage over some other things of beauty—it is quick with life, and a life that is always young. For a practical question, we have to ask ourselves how is this perennial beauty to be attained? The first thing, of course, is to design the garden with due regard to the results we wish to achieve; we must take care to provide conditions in themselves favourable to beauty. To this end let us venture upon the following general directions:—banish formality; eschew straight lines; learn how to group gracefully (1) growths perpendicular, horizontal, and pendulous; (2) deciduous with evergreen trees and shrubs; and (3) fruit with shrubs and flowers. Have regard to the general effect, but at the same time break up the garden into a series of contrasts and harmonies in form and colour, so that a different picture is revealed at every few paces. Remember, sunshine is all-important, but do not forget that shadow is in itself one chief source of beauty, while shade is a necessity to many beautiful flowers; mass your colours, but let them be relieved and intensified by an abundance of foliage.

As an example we will take the annexed ground plan, which suggests a method of dealing with a modest piece of ground measuring, say, from 100 to 150 feet, with a width of 60 feet. The house occupies the E extremity, and is supposed to have windows looking west or gardenwards. On the north we have a border (*a*) running the whole length of the garden, and on its outer margin we propose to plant a medley of trees, deciduous and evergreen, including apples, pears, plums, and medlars, an almond, a white poplar or two, several yews, hollies, and thujas, a purple beech, a maple, one or two golden elders, a Bird Cherry (*Prunus padus*), etc. Never mind if they soon begin to overlap each other a little, that will be in itself an element of beauty, and, moreover, it is easy to thin out here and there when it becomes really necessary. Medium and low-growing shrubs and bushes should be placed irregularly in front and about them, some of the more dwarf and recumbent kinds coming down to the edge of the gravel pathway (*b*) at uneven intervals, although in general they should obtrude no further than a point varying from three to five feet away, to allow of room for flower roots. In the north-east corner plant two or three spruce firs, a deciduous cypress and a laburnum. In the north-west corner there is room for one or two silver



birch, a Weymouth Pine (*Pinus strobus*), a larch, a Yellow Cypress (*Thujopsis borealis*), and a Mock Orange (*Philadelphus coronarius*), and nearer

the centre of the west border a couple of the East Indian Cedar (*Cedrus deodara*), and some of Darwin's Barberry (*Berberis Darwinii*). Beyond these, in and about the south-west corner, plant some Hemlock Spruce (*Abies Canadensis*), a variegated elder, one or two scarlet thorns, a lilac, a Guelder Rose (*Viburnum opulus*); and turning the corner on the south side plant phillyreas, flowering currants, a purple berberis, and some of the spiræas. From this point eastward, the planting of the border (*f*) may be limited to a hedge of yew and privet, with an occasional laurel and holly. The hedge may be kept trimmed without offence, and the mixture of foliage will redeem it from formality. At the south-east corner, where the border widens, a group of variegated hollies, Lawson's Cypress (*Cupressus Lawsoniana*), and juniper would look well, and by their aid a neighbour's windows may be judiciously screened. In the oval border (*e*) we should be



PLAN OF A SUBURBAN GARDEN.

inclined to put a Pendulous Birch (*Betula pendula*), flanked by plants of the Hemlock Spruce (*Abies Canadensis*).

The setting of foliage in which our Garden of Pictures is to be framed is now complete, and unlike frames generally, it will be found to be picturesque





A SUBURBAN GARDEN.



in itself—quite as beautiful and almost as varied as those we are about to enclose in it. Think, too, of the beauty of such a garden upon a day of hoar frost, when every spray and twig is glistening white, save in the glow of the rayless sun, where the white gems kindle red; and do not let anyone run away with the notion, sometimes expressed, that such a garden will need long years of waiting to render it presentable. There is a delightful sense of substantiality about it from the first, and a short period will see most of our trees well established. Witness the accompanying view, taken in the fifth year of the existence of a garden laid out upon what had been a bare piece of meadow-land. We have remarked that shade is a necessity in order that some flowers may be seen in perfection. In the garden we are contemplating will be found most of the conditions needful to the display of a large variety of flowers. If the planting of trees and shrubs has been carried out tastefully, there will be a series of what we may term indentations amongst the foliage—most of them opening sunwards. In these place groups of hardy lilies, especially *Lilium umbellatum*, *longiflorum*, *auratum*, *candidum*, and *tigrinum*, foxgloves, *Campanula pyramidalis*, the magnificent Cardinal Flower (*Lobelia cardinalis*), etc., completing the planting of the border with a good assortment of hardy perennials, not dotted here and there in single roots, but massed as though they had lived there long, and spread and multiplied and grown strong and become naturalized, as many of them will if left undisturbed. The portion of the plan marked *k* is intended to be grass. The grass is intersected at one or two points by the pathway, leaving corners (*g*) which penetrate into the border, and might be wrought into charming little nooks where at any hour of the day, but especially in the dewy morning, you might be sure to come upon a blackbird or a thrush; for among the recommendations of a garden of this kind must be reckoned the certainty that many a bird will find a home there and make it musical. Abutting on the grass are several irregular borders, marked *c*, well fitted for such bold plants as hollyhocks, perennial and annual sunflowers, pampas grass, hardy fuchsias, oriental poppies, pæonies, delphiniums, tritomas, cannas, dahlias, the Summer Hyacinth (*H. candicans*), and gladiolus, arranged with due regard to sequence of bloom. Hollyhocks never show so grandly as when their stately stems rise from among clumps of dark-leaved evergreens—*Mahonia aquifolia*, *escallonia*, *box*, and the like—and it may be safely said that every flower border will look the better, in summer and winter alike, for a liberal but judicious use of dwarf shrubs, not planted in stiff geometric figures, but made



to appear as though they and their neighbours had grown up together on terms of easy relationship.

With a choice of plants practically unlimited, and tastes so various, it is impossible to do more than offer a bare suggestion of the finishing touches needed for our garden. But we think there should be found in it an abundance of flowers during nine months of the year, that everything it contains should look to be in its right place, and growing under conditions as natural as possible. No more violets and primroses struggling for life upon a parched border; no more sun-loving flowers pining in the snail and toad haunted purlieus of a "north wall." In a garden of the kind we are contemplating, the ground under the trees should be carpeted with ivies, periwinkles, anemones, and creeping jenny. Clumps of snowdrops, crocus, scillas, narcissus, and even hyacinths may be grown there with advantage; ferns may unfold their fronds amid the shades they love so well; primroses and violets will cluster about them, and if we manage rightly, we may have in two or three years' time a tangle here and there worthy of a Devonshire coombe. One of the borders (*h*) might be planted with bush roses, and for summer colouring allot another to the Blanket Flower (*Gaillardia grandiflora*), and a third to zinnias. Border *d* might be made the home of the Japanese iris, lovely in blossom and foliage, and *i* might be bright with the tints of the Iceland poppy. A yucca ought to find a place here and there at an angle, and tufts of silver grass and of Sheep's or Lamb's Ear (*Stachys germanica*) may relieve a shrubbery, while as a concession to "bedding out" proclivities, room could be made for two or three informal groups of crimson or scarlet geraniums, and patches of blue lobelia, echeveria, coleus, the ice plant, and such things, but as you love the proprieties no arrangement of ribbons or edgings! Do not omit a few groups of autumn chrysanthemums for sheltered places. They will richly repay the scanty attention they ask, by rendering dull November capable of vieing for colour with many more favoured months. Into such a garden, climbers should be freely admitted, and will add much to its beauty. Varieties of clematis, tropæolums, Chinese Bindweed, nasturtiums, and the canary creeper, will all be welcome to cover stumps, or trellis, or rough arches, but let there be but a moderate use of the last, for they are apt to look artificial. Rather, let the climbers find their way to the shrubs, and the lower branches of the trees if they will, where they will arrange themselves in graceful festoons.

Our garden is now well-stocked, and with such material there is an

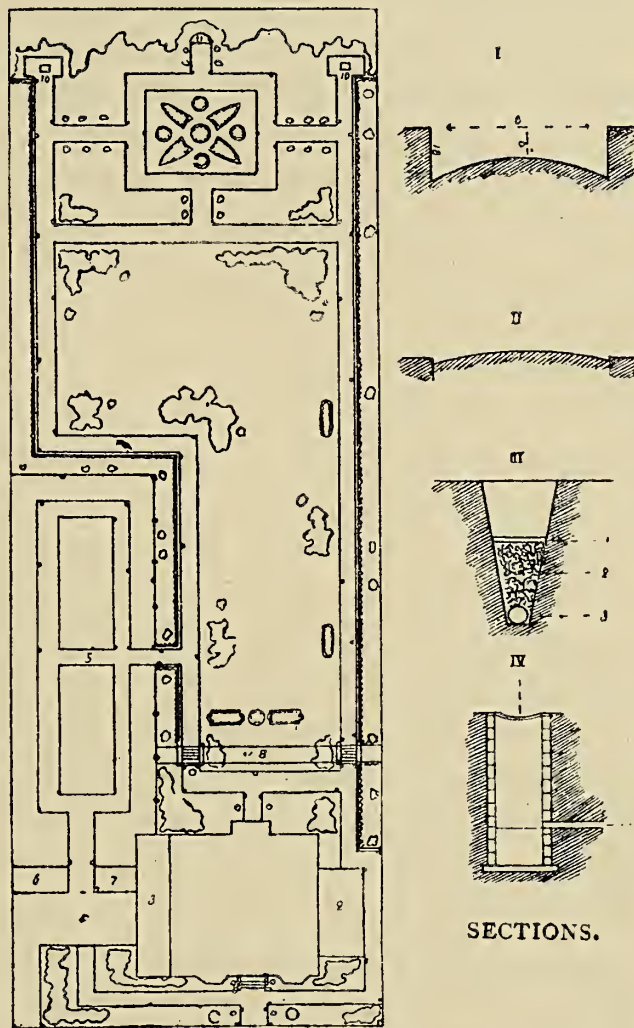


opportunity for an endless variety of arrangement. Do not let us be too ambitious to include a vast number of plants in the collection. If it be a sin to condemn our gardens to the poverty of the "bedding out" system, it is equally an offence to overload them with a motley crowd of ill-assorted plants. The mere absence of formality will not make amends for a graceless superfluity. When a personal acquaintance is desired with more varieties of flowers than the garden will well hold at one time, attention may be given every year to some fresh family or group, and this may be the chief feature of that season. In this way we get fresh gratification, and perhaps quite as much in the planning as in the realization. Those who would have our suburban gardens things of greater beauty than they now are must never cease to demand for them needful thought and attention in the late autumn and winter. That is the time when the arrangements for the next year must be settled and in a measure carried out. Fie upon the man who limits his gardening to the spring and summer. He is only doing things by halves, and deserves no more than the small amount of success he is likely to obtain. But to the man who loves his garden, every month will bring opportunities for pleasant labour, flowers will smile upon him during three of the seasons, and there will be a harvesting of delight all the year round.

The foregoing is the style that we most heartily recommend to be adopted where a really charming garden is desired. But still, pretty as it is, it may not suit everyone's taste, and therefore we supply another style, of a more utilitarian character, one that will afford space for lawn tennis and for growing fruit and vegetables. The plan here given is intended for a garden of an acre, and is in the shape of a rectangle or right angled parallelogram, the longest sides being from west to east. The natural surface of the ground which is flat towards the east gradually rises to the west. Fig. 1 is the house, having a conservatory on the south side at 2, and on the north side a house yard at 3, and a back drive for carts, &c., with space sufficient for them to turn round at 4. At 5 is the kitchen or vegetable garden, in close proximity to the back part of the house, and divided off from the rest of the garden by a low ornamental wall five feet high, and having tool and potting sheds at 6 and 7. The lawn east of the terrace bank 8 is quite flat, and at 9 is a rose garden, the beds of the figure being cut out on grass, and the whole design encircled by a walk six feet wide, and hidden from view of the house by clumps of shrubs, as it is as uninteresting and gloomy in winter as it is brilliant and bright in summer. Some degree of irregularity is attempted in the treatment of the



lawn with reference to the placing of the shrubs and flower beds, variety being better attained by this means. The walks, with the exception of where the walk passes round the kitchen garden, are all disposed quite regularly, those down the north and south sides terminating with two large vases on pedestals at 10. At 11 is a summer house, facing the rose garden, and flanked by a shrubbery, which extends all along the east wall. A border, where perennials and creepers, &c., can be grown to great effect, eight feet wide, with one foot of turf, runs down the north side, while on the south side is a corresponding border for such perennials and creepers as will thrive under or on a north wall, specimen evergreens, as will be noted, being freely introduced. On the north side a few specimen evergreens have also been introduced for the sake of breaking up the appearance of stiffness that otherwise the ornamental wall would have. The walks, with the exception of the one eight feet broad, in front of the terrace bank, and the others, ten feet broad, leading from the road to the front and back doors, are all six feet wide.



PLAN OF A GARDEN OF ONE ACRE.

In carrying out this design, have the walks, plantations, and beds set out by actual measurement from the plan in order to obtain the same easiness of lines and curves, and an accurate distribution of the various parts. The walk and drive to the front and back doors should then be formed and finished, with the exception of putting on the fine gravel, in order that the workmen and builders, &c., engaged on the house may not trample over the ground.



After this has been accomplished, the next operation, and one that is of primary importance in laying out new grounds, is to drain the land thoroughly, for no comfort and enjoyment can be obtained on undrained land, and besides, no plant will thrive well where the land is not dry and porous, while the sun is unable to penetrate and sufficiently warm the earth when it is saturated with water. In garden land, as well as any other, deep drainage has been proved to be the best, as the roots of trees, shrubs, and vegetables strike down so far into the earth that shallow drains impede their progress. About three feet six inches is quite deep enough for the ordinary drains, and three feet eight inches, or two inches lower, for the main drain. The drains should be laid in parallel straight lines, fifteen feet apart, taking care that the main drain has a quicker fall than the ordinary drains, on account of the amount of water it has to carry away, and bearing in mind that a good outlet is absolutely essential. Section III. represents a drain as it ought to be laid, the scale being four feet to an inch; at 3 is the tile pipe, three inches in diameter, resting on a flat piece of slate or stone, and filled round the sides and above with rubble (2), while over the top is an inverted sod (1), placed there in order to prevent the soil working into the drain and disturbing the fall of water. One word more before leaving the subject of drainage, and this is, that as you proceed in the work of laying out the ground, the soil should always be dug over to the depth of at least eighteen inches to two feet, especially if the subsoil be of a close retentive nature, in order that the water throughout the garden may work its way into the drains, otherwise they will be of little or no effect. While the draining is in progress the builders can be getting on with the ornamental wall which separates the kitchen garden from the pleasure grounds, so that by the time the drains are laid, the wall ought to be nearly finished; in the meantime the terrace bank can be roughly formed, and the clumps or plantations, so as to gradually work the surface of the ground into its proper form and shape, as no trenching or levelling ought to be done until the bricklayers are out of the way.

The walks can then be formed, and as they constitute an important factor in the pleasure and comfort of a garden, Sections I., II., III. are given, to show the most satisfactory and best way of making perfect walks or drives. Walks, to be perfect, should be dry, smooth, and hard, during every season and in all weathers, otherwise you are robbed of a good deal of enjoyment, comfort, and exercise. Section I. represents the bed of a walk cut out before the rough gravel, clinkers, or any other angular material has been



placed upon it. The ground, as will be noted, is higher in the centre for the sake of obtaining the utmost dryness, and then gradually slopes away to the sides, which are eighteen inches in depth. These sides are filled with coarser gravel and clinkers than the centre for the purpose of acting as drains to take off any water that may accumulate. The whole walk is then filled up to within four inches at the sides, with rubble, coarse gravel, or any angular material that will remain dry and porous, the crown of the walk being kept two or three inches higher than the sides. The whole should then be thoroughly beaten, in order that the various materials may set well; and finally, after all the rough work in the garden has been finished, three inches of fine gravel may be spread evenly over the whole surface, and the walk carefully rolled. The crown of the walk will then be about two inches higher in the centre than the level of the grass, in order to give it a slight prominence (Section II.).

In order to obtain the utmost degree of dryness, eyeholes with gratings, or grids as they are called, on the top (Section IV. 1), should be built at various distances along the sides of the walks, in order that the surface water may drain off into these lodges, and from thence, by means of a small branch pipe (2) into the nearest common drain. These lodges or eyeholes are generally built of loose bricks, about twenty to thirty to each one; on the top is placed an iron grid or grating, level with the walk, through which the surface water drains off into the eyeholes.

Just a few words on the borders, lawns and clumps. Firstly, as regards the borders both of the pleasure ground and kitchen garden. These borders should not have more than three feet of rich alluvial soil, as they then become unsuited to the perfect growth of fruit trees or shrubs, since the roots pass away too far from light and air, two essential requisites to the healthy growth of a plant. A good plan is to place a layer of stones or rubbish below that depth in order to obtain this. The borders in the pleasure ground should be raised a few inches above the level of the strip of turf, in order to give greater prominence to the flowers and shrubs, which will have the effect of setting them off to better advantage.

As regards the lawns, the turf should be taken off in strips one foot wide, three feet long, and two inches in depth, and the ground thoroughly dug over to the depth of at least two feet, and then well rammed, in order to avoid after sinking; level pegs should be put in, to obtain a perfect level, which is essential for the well-being of the garden, and, before putting back the turf, a



sprinkling of finely-sifted ashes would be beneficial to the growth of the grass. With reference to the clumps, the surface of the ground should be gradually raised to about eighteen inches to two feet at the centre in a convex shape, thus giving greater prominence to the trees and shrubs, bringing them more on a level with the eye, and affording them better drainage. There should, however, be a very careful and almost imperceptible blending with the level of the lawn. The same remarks apply, in a modified extent, to specimens on lawns, as each should stand on a little hillock, thereby giving the tree or shrub greater importance, and bringing the roots more within reach of air.

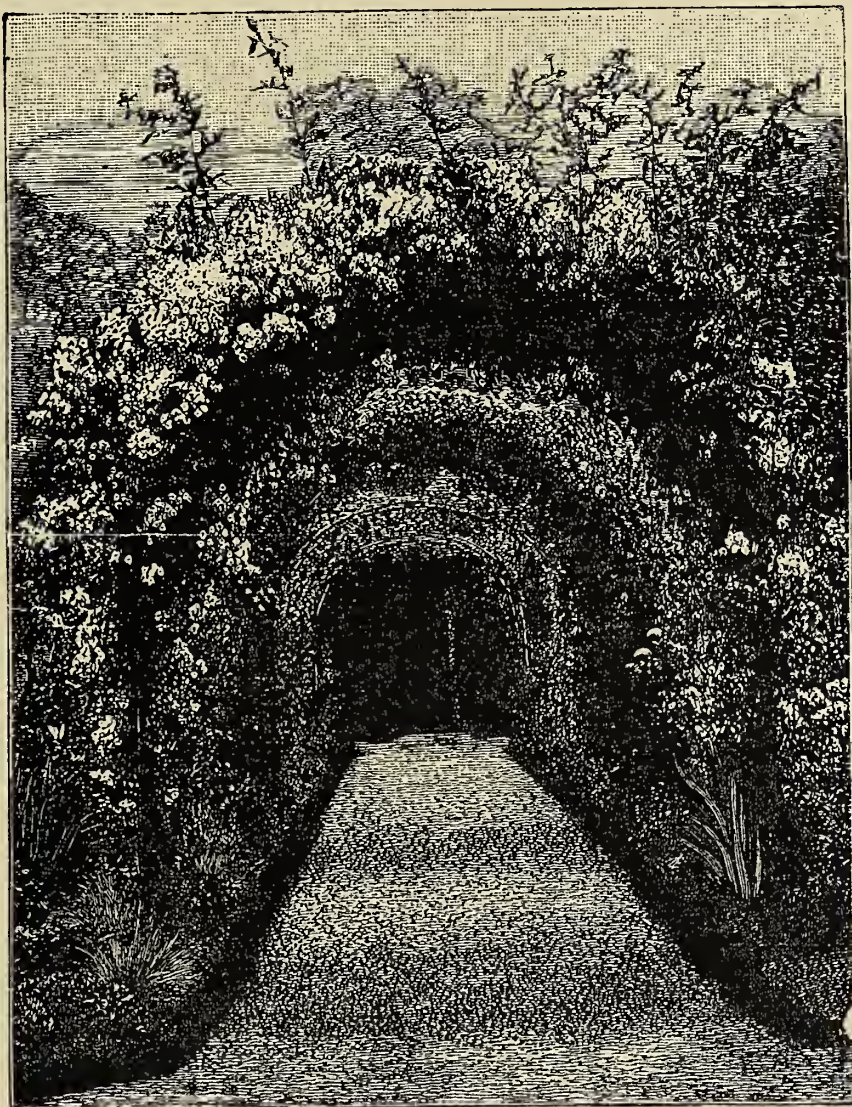
As to shrubs, the following evergreen kinds would be suitable as specimens, in a border facing the north, viz.: *Arbutus unedo*, silver and golden hollies, sweet bay, arborvitæ, Chinese and Irish junipers, *Garrya elliptica*; while on the border round the ornamental wall, *Aucuba Japonica*, laurestinus, hybrid rhododendrons, silver and golden hollies, and sweet bay, would all be suitable. For specimens on the lawn a selection could be made from the following trees or shrubs, viz.: Red-flowering arbutus, *Daphne pontica*, *Cydonia Japonica*, *Cupressus macrocarpus*, flowering almond, *Sophora Japonica*, grafted on a standard laburnum, &c. For the single specimen trees on each side of the steps leading down from the front door, Irish yews are suitable; and for the single specimens on each side of the front gate, laurestinus would be effective; while on the other side of the house *Aucuba Japonica* would be suitable as single specimens facing the terrace walk. In the centre circle of the rose garden, a very pretty effect would be produced by planting a bed of noisette roses, with a climbing rose trained to a pole in the centre, while in the middle of the other circles half standard roses might be planted. The following trees and shrubs amongst others ought to find a place in the clumps, viz.: *Robinia pseudo-acacia*, *Ribes sanguineum*, *Phillyrea media*, thujas, *Aucuba Japonica*, common laurels, laurestinus, common privet, *Platanus occidentalis*, Portugal laurel, sycamore, laburnum, euonymus, single and double thorn, red-flowering horse chestnut, &c.

A brief reference to arches and pergolas must not be omitted. Although we do not approve of too many of the former in the garden, because of their artificial appearance, still there are frequently positions where they are permissible, and where they really form an ornament. These may be constructed with galvanized iron, or of tree branches fixed in as informal a manner as possible. Pergolas are also formed of wire arches or tree branches, and generally cover the entire length of a walk. If planted with



climbing roses, such as the Ayrshire, evergreen and Polyantha, and vigorous growing trees, also with honeysuckles, clematises, as, *C. Jackmanni*, *C. montana*, *C. flammula*, *Jasminum officinale*, *J. nudiflorum*, *Passiflora cærulea*, &c., they will form a delightful cool promenade in summer. But pergolas, like arches, should never be an obstructive feature in the garden. A path leading from the side or end of the foreground to another portion used for greenhouses or vegetable culture is the proper place for them.

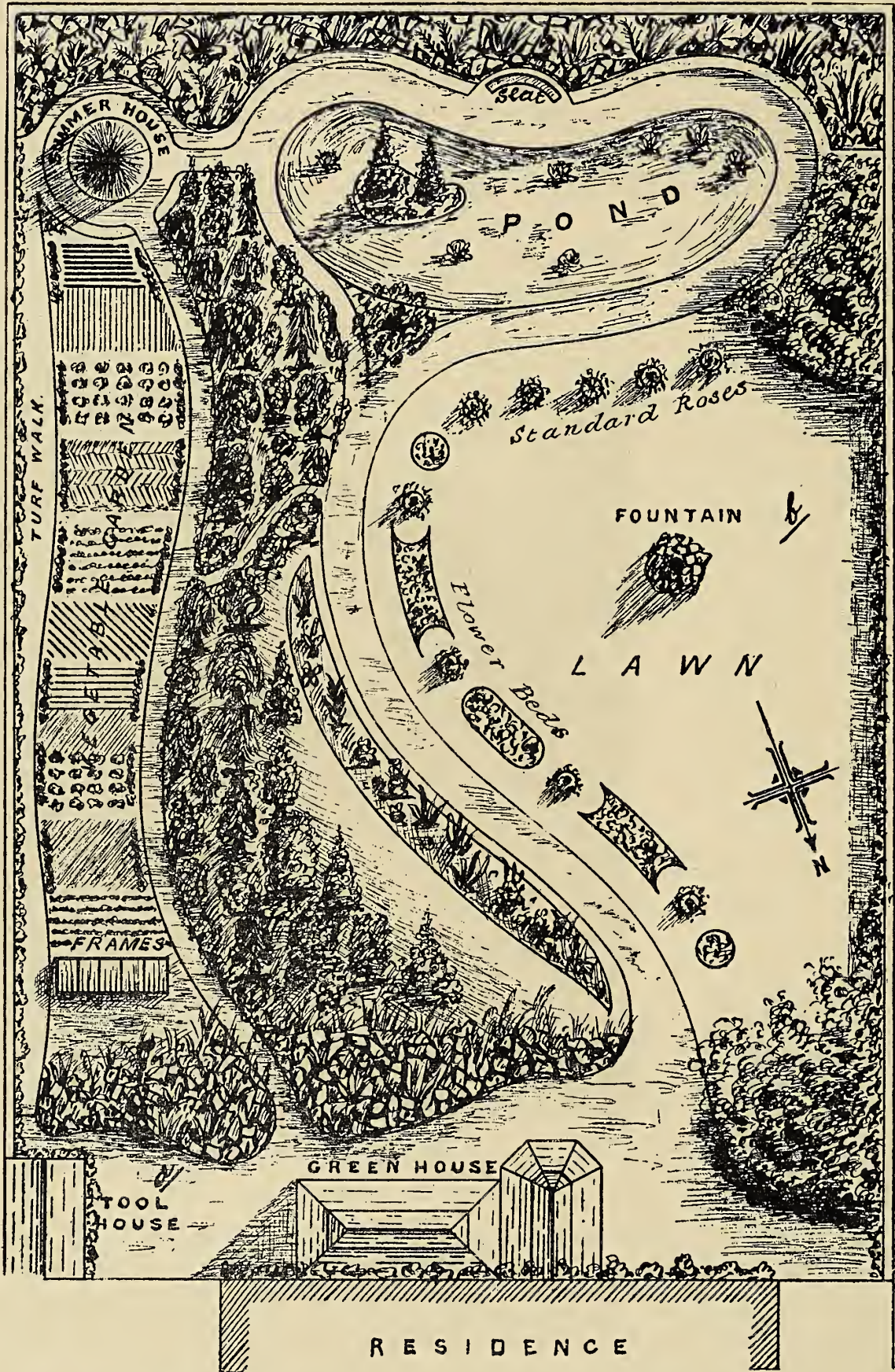
For a smaller garden, combining the advantages of the preceding plan, the following design, on page 190, is commended. It represents a garden a quarter of an acre in extent, and the ground is arranged in such a manner as to permit, not only vegetables, fruit, and flowers to be



ARCHWAY COVERED WITH POLYANTHA ROSES.

grown, but also the erection of one or more greenhouses. The aspect of the ground, indicated in the plan, is south-south-west, this being the best position for a house and garden. With a wall on the east side the garden is effectually sheltered from east and north winds, and it gets the full benefit of the sun the whole time it is above the horizon.

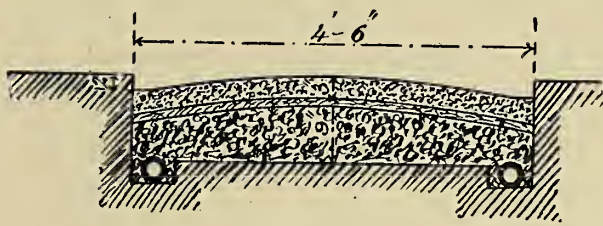




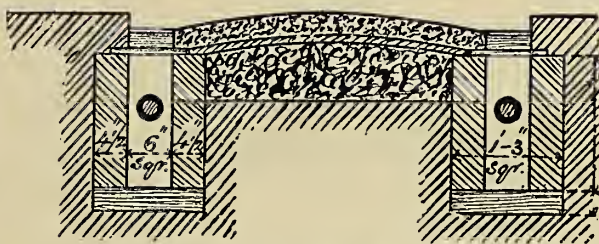
DESIGN FOR GARDEN OF A QUARTER OF AN ACRE.



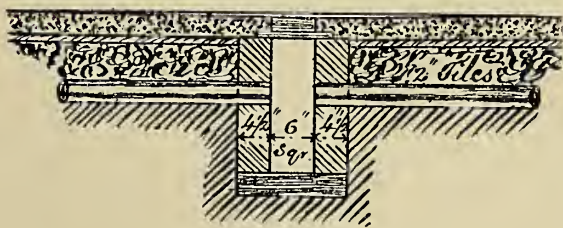
The main path for a garden of this size should be from four feet to four feet six inches wide, but not wider. The centre of it should be about level or perhaps a very little higher than the lawn, and rounded to a fall of two inches at the sides to carry off the water. (See Section 1.) After the position of the path has been very carefully marked out, a trench the full width of the path and one foot deep should be dug out. Then some two-inch earthenware drain tiles or pipes should be truly laid in small channels with open joints, having a



Section 1.



Section 2.



Section 3.

very slight fall towards the discharge end; this must not go into the pond but may join the overflow pipe from it or be carried to some other convenient outfall. Build the gully-holes with four-and-a-half-inch brick sides, standing on a three-inch stone flag, and place them at about thirty or forty feet apart, on both sides of the path and opposite to each other. Next put a six-inch cast iron gully grating over each hole, as shown at Sections 2 and 3. Drains will only be required on one side of the path, around the pond. About seven inches of the trench may be filled with broken bricks or large stones, and well beaten down; on this put a layer about two inches thick of smaller stones or very coarse gravel, and well beat it down—or preferably a layer of slate chips, as the latter material will answer the threefold

purpose of preventing the surface gravel from going through to the bottom of the trench, checking the growth of weeds, and at the same time keeping the worms from coming to the surface. If slate chips are used, they should be also carried up the sides of the trench, nearly to the top, to prevent the worms coming out from under the turf. The path should be finished off with three inches of good binding gravel and a thin layer of finer gravel or broken sea shells on the surface, and afterwards well rolled. Now we have an excellent garden path; the surface

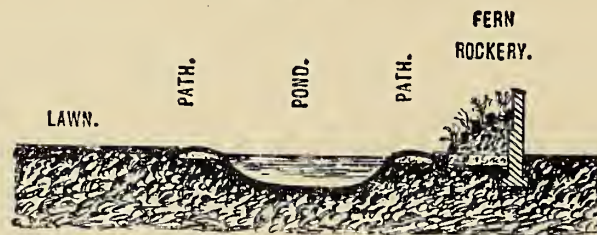


drainage being all taken away through the gullies, and the water below through the open joints of the tiles; perfectly dry, without worm casts, and without weeds. The narrow path should be from three feet to three feet six inches in width, the one crossing the shrubbery about two feet six inches wide, and that in front of the residence shaped as shown in Section 1, page 191. They should all be formed and drained in a similar manner to the main path.

The shrubbery, which runs nearly from one end of the garden to the other, and separates the vegetable portion from the flower garden, should be raised three or four feet in the centre, and slope down on both sides, as shown in Section 4. The lower portion of the west slope between the shrubs and the perennial border is to be turfed. The material required for raising the



Section 4.



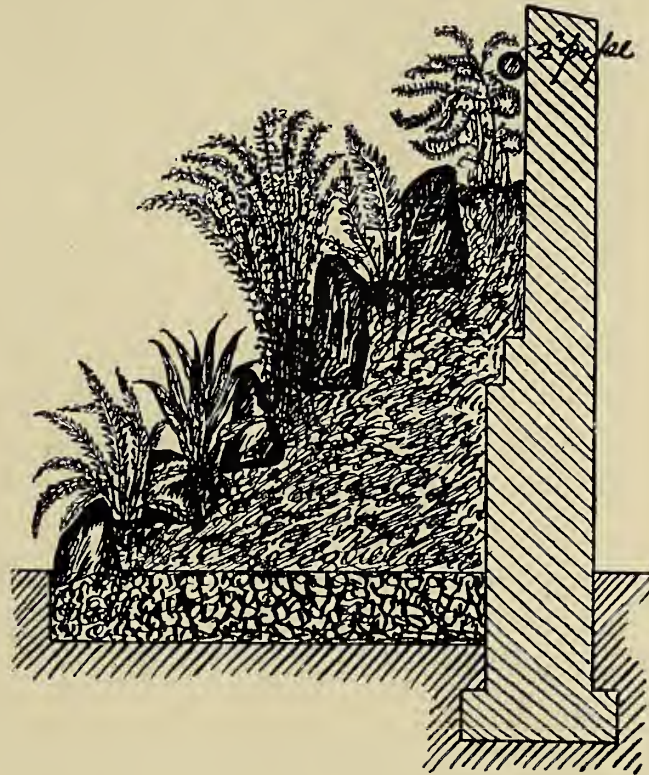
Section 5.

shrubbery may be taken from the trench when making the paths, the pond, and the fountain. Raising the ground here above the level of the other surface adds greatly to the beauty of the garden.

A fountain is shown in the centre of the lawn. This should be formed of brick or tile-clinkers, flints, or large stones, placed in a circle six feet in diameter by three feet high, the necessary water being supplied through a two-inch wrought-iron pipe under pressure, connected either to the main water-pipe or to a high-level cistern, and passing along underground at a depth of at least two feet, to ensure its being out of reach of frost, then up through the stone



receiving trough to the jet. The trough should be four feet in diameter by six inches deep; the two-inch outlet pipe being the inlet pipe to the pond. The openings through the bottom of the trough must be made watertight around the two pipes with cement. A two-inch valve on the supply pipe should be provided to regulate the water to the fountain. A trench nine inches deep should next be dug out and filled with large stones or broken



Section 6.—ROCKERY.

bricks, to drain away any water that may escape falling into the trough, and consequently keep the lawn around the fountain dry.

The small pond shown in the plan is fifty feet long by sixteen feet wide, and the depth one foot six inches at one end where the water enters the pond, and slopes down towards the other end to two feet six inches where the overflow and cleansing pipes are placed. It gets its supply of water from the receiving trough which is below the fountain. The pond should of course be stocked with aquatic plants. The foremost of these is the magnificent British White Water Lily (*Nymphaea alba*), its head rising above the water during the day, and falling below the surface as the night draws

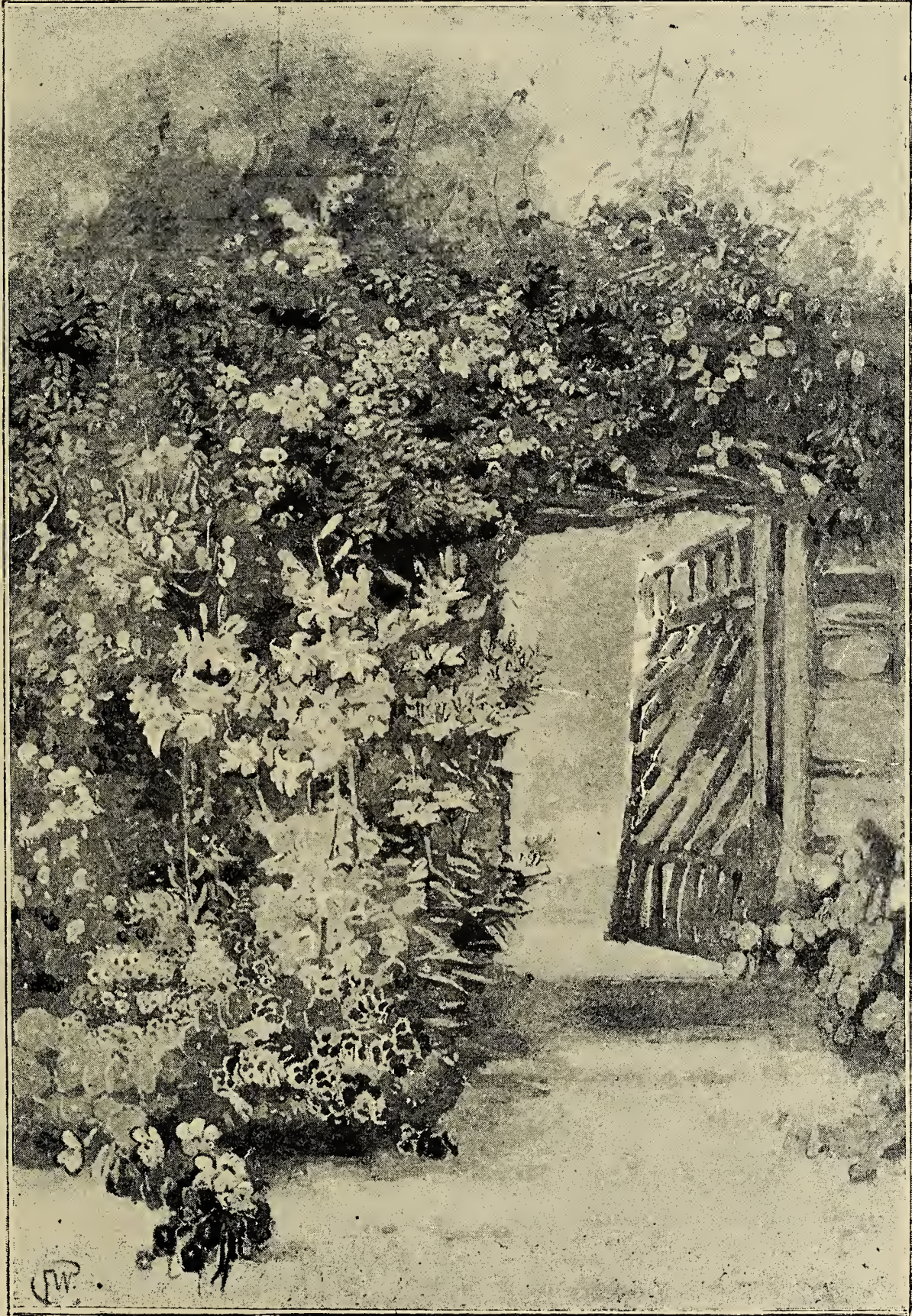


near ; the common Yellow Water Lily (*Nuphar lutea*), called in some parts of England the Brandy-bottle ; the great Water Plantain (*Alisma plantago*), with its rosy white or lilac flowers ; the Common Arrowhead (*Sagittaria sagittifolia*), with its very peculiar arrow-headed leaves and flesh-coloured flowers ; this is one of our native plants which London smoke cannot drive away. Before leaving this list of aquatic plants, we must mention the two Cat's Tails, *Typha latifolia* and *T. angustifolia*, commonly but wrongly called Bulrushes.

A fern rockery is shown at the south end of the garden under the shady north wall (see pages 190 and 193). To form this dig a trench nine inches deep and fill it with draining material similar to that under the paths. This trench must follow the shape of the rockery shown in design on page 190. The compost most suitable for open-air ferns generally is a mixture of peat, ordinary garden loam (that taken out of the trench below will answer for this purpose), leaf-mould, and coarse sand, in about equal proportions. This compost will allow the water to percolate freely through it. After it is well mixed it must be made up to the proper shape the rockery is intended to assume in the finished state, with all its ins and outs and pockets for the ferns, before any of the "rocks" are placed upon it. Then we have what is too often overlooked in building a rockery, a solid mass of earth for the ferns to send their roots into. Any of the stony materials mentioned in the description of the fountain may also be used for the rockery, and in addition cork bark and tufa are very suitable for this purpose. The "rocks" adopted should be in large pieces to give a bold appearance, and be scattered over the surface in an irregular manner, leaving plenty of spaces between them for the ferns. A two-inch pipe, perforated with very fine holes on the outside only, must be fastened to and run the whole length of the wall. This pipe being connected to the fountain supply pipe and under pressure will send a spray all over the ferns. A two-inch valve should be fixed on the inlet end.

The rockery in front of the greenhouse is for alpine and rock plants. These require an open position, and should be so arranged that the sun-loving varieties are planted on the top and south slope, whilst those requiring shade are on the north side. The rockery itself should be carried out on the same lines as the previous one. The soil most suitable is gritty loam and peat, about a quarter of the total amount of the latter. The watering





A PICTURESQUE GARDEN GATE.



pipe in this case should be carried along on the top of the bank, and be finely perforated on both sides, and fitted with a stop valve similar to the other.

The wall situated on the east side of the garden should be fourteen inches thick and at least twelve feet high, for the double purpose of protecting the garden from the north and east winds and for fruit growing. Between the foot of this wall and the vegetable garden a turf walk is shown (see design, page 190). We have here 120 feet available for single cordon trees, planted two feet apart, and trained obliquely to an angle of forty-five degrees.

If the boundary on the west side be a wall, nine inches thick and six feet high will be the dimensions for it, and this may be covered with the following climbing plants: Evergreen—Irish Ivy (*Hedera canariense*), and the white-flowering Evergreen Rose (*Félicité perpétué*); Deciduous—Veitch's Virginian Creeper (*Ampelopsis Veitchi*), and the Virgin's Bower Clematis (*C. flammula*); or, if the adjoining property will permit of it, a hedge of common privet, with an iron railing on the outside, may be planted.

On both sides of the garden shown on page 190, which is eighty feet long by twelve feet wide, horizontal cordon fruit trees may be planted, seven on each side; and of course here may be grown in addition to vegetables, currants, gooseberries, raspberries, strawberries, &c.

On the east side of the main path leading to the pond a border about fifty feet long by four feet wide, for the culture of hardy perennials, is shown on page 190. This may be planted with *Lilium auratum*, *L. candidum*, *L. chalcedonicum*, *L. croceum*, *Alstromeria chilensis*, *A. brasiliensis*, German and English Irises, *Hemerocallis flava*, *H. fulva*, *Helleborus niger*, *Tritoma uvaria*, *T. grandiflora*, Solomon's Seal, winter aconites, *Cyclamen europæum*, crown imperials, *Anemone japonica*, phloxes, pyrethrums, *Helianthus multiflorus plenus*, pentstemons, lupins, and delphiniums.

Lastly, the front of the residence may be covered with roses, the summer-house with *Clematis Jackmanni*, and the lawn and narrow grass edgings laid with the best turf. In the north-east corner a tool and potting-house is provided for.

It may be useful to many readers to have an estimate of the approximate cost of laying out a garden according to the last-named plan. The prices are the ordinary ones prevailing in London:—



	£	s.	d.
212 yards super. garden path, as before described, including drains and gullies, other materials, cartage and labour, at 2s. 6d. ... ..	26	10	0
65 yards cube, earth removed from path trenches to shrubbery bank, and forming to proper shape, at 1s. ... ..	3	5	0
1 dozen ornamental trees, at 24s., £1 4s; planting and staking, at 6d. each, 6/- ... ..	1	10	0
3 dozen shrubs of sorts, at 20s., £3; planting, at 2d. each, 6s. ... ..	3	6	0
Fountain, materials and labour, laying and fixing pipes and valve ... ..	6	0	0
Pond, digging, making water-tight, laying and fixing pipes and valves... ..	12	10	0
1 dozen plants for pond, at 9s., 9s.; planting at 2d. each, 2s... ..	0	11	0
15 yards cube, digging out trenches for rockeries, filling them with draining material, including material, cartage and labour, at 2s. ... ..	1	10	0
4 yards cube materials to form compost for rockeries, at 15s. ... ..	3	0	0
30 yards cube, forming the two rockeries, foundation to be made from the earth taken from the pond and trenches, at 1s. ... ..	1	10	0
Brick clinkers or stones, cartage and labour in placing them on rockeries ... ..	2	0	0
200 ferns, at 20s., £2; planting, at 5s. per 100, 10s. ... ..	2	10	0
9 dozen Alpine and rock plants, at 6s., £2 14s.; planting, at 6d. per dozen, 4s. 6d. ... ..	2	18	6
Watering pipes and valves for rockeries, including laying and fixing ... ..	4	0	0
6 dozen fruit trees, at 18s., £5 8s.; planting and training, at 4d. each, £1 4s. ... ..	6	12	0
1 dozen climbing plants, at 10s., 10s.; planting and training, at 4d. each, 4s. ... ..	0	14	0
6 dozen fruit bushes, at 3s., 18s.; planting, at 1s. per dozen, 6s. ... ..	0	24	0
Forming flower beds, manure and labour ... ..	2	0	0
6 dozen perennial flowers, at 7s., £2 2s.; planting, at 6d. per dozen, 3s. ... ..	2	5	0
1,200 turves, lawn, and edgings, cartage, preparing ground, and laying, at 10s. per 100 ... ..	6	0	0
9 standard roses, at 2s. each, 18s.; planting and staking, at 3d. each, 2s. 3d. ... ..	1	0	3
	90	15	9
Add 10 per cent for contingencies ... ..	9	1	6
	99	17	3
Greenhouse, 20 ft. by 10 ft. ... ..	60	0	0
Conservatory, 15 ft. by 10 ft. ... ..	55	0	0
Rustic Summer house, 8 ft. diameter ... ..	15	0	0
Tool and potting-house, 12 ft. by 8 ft.; foundation of concrete, 9 in.; brickwork one foot above ground line, 4 in. by 4 in.; wrought and chamfered panel framing, filled in with glass and match-boarding, painted in three coats of best oil colour; roof slated; and fitted inside with potting bench, shelves, and three earth-bins; floor wood ... ..	12	0	0
Frames, 10 ft. by 4 ft. ... ..	4	0	0
Total ... ..	£245	17	3



The garden wall is not included in the above estimate. A fair rate for ordinary brick walls is one shilling per cubic foot, or twenty-seven shillings per cubic yard, measuring from the bottom of the foundation to the top of the wall. The excavation at ninepence per cubic yard.

Many more designs might be given, but space forbids. The three described are, however, fairly typical ones, and with slight modifications will meet the requirements of many anxious to lay out their gardens to the best advantage. The more important adjuncts in the shape of rockeries, ferneries, ponds, and summer-houses are dealt with more fully further on.

This chapter would be incomplete did it not include selections of the trees and shrubs best adapted for the embellishment of the garden. The following kinds may all be relied upon to give the fullest satisfaction :—

#### DECIDUOUS TREES.

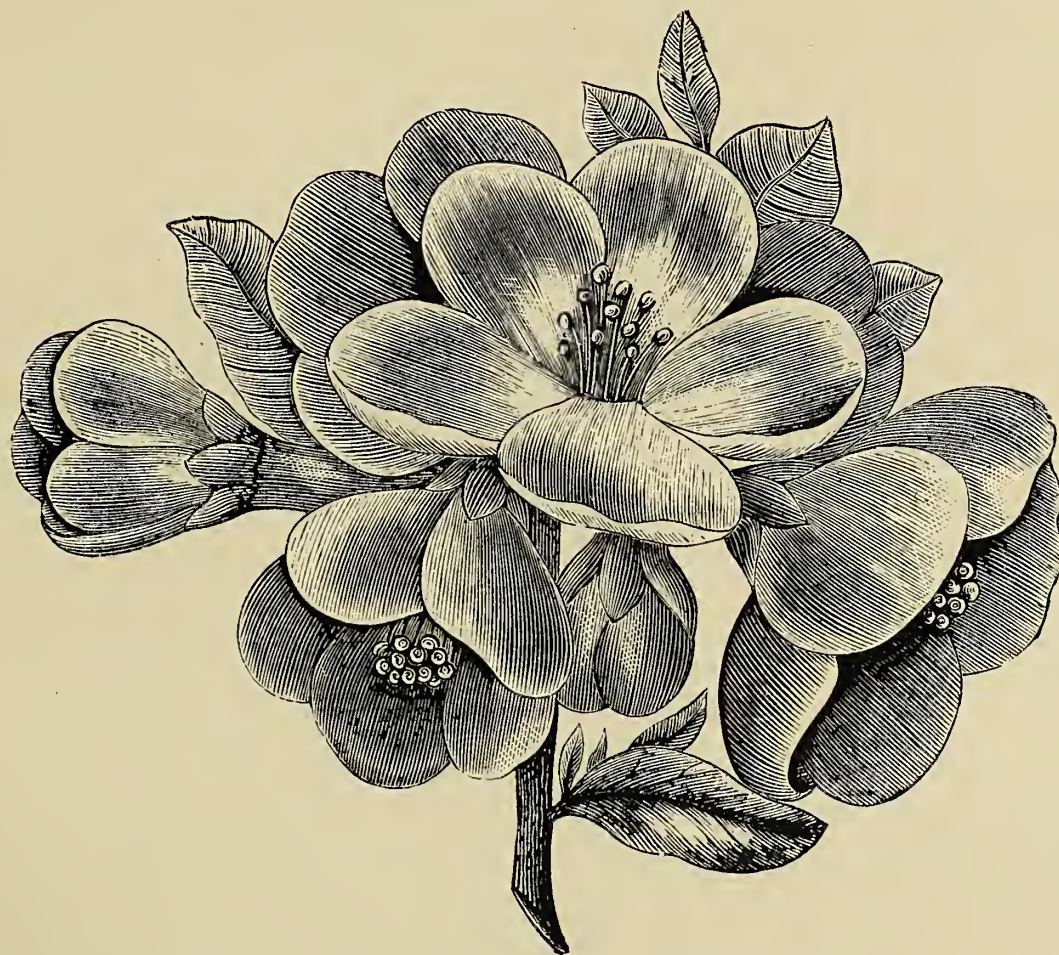
FLOWERING.—*Æsculus Hippocastanum* (Horse Chestnut); *Æ. rubicunda*, *Amygdalis communis* (Almond); *A. persica* (Peach); *Catalpa bignonioides*, *Cerasus vulgaris fl. pl.* (Double Cherry); *Cercis siliquastrum* (Judas Tree); *Cladrastis lutea*, *Cratægus oxycantha* (Double White, Pink, and Scarlet Hawthorn); *Fraxinus Ornus* (Flowering Ash); *Halesia tetraptera* (Snowdrop Tree); *Kolreuteria paniculata*, *Laburnum vulgare* (Laburnum); *Liriodendron tulipifera* (Tulip Tree); *Magnolia conspicua* (Yulan); *Prunus padus* (Bird Cherry); *Pyrus spectabilis fl. pl.*, *Robinia pseud-acacia* (False Acacia); *R. hispida* (Rose Acacia).

ORNAMENTAL LEAVED.—*Acer dasycarpum* (Silver Maple); *A. platanoides* (Norway Maple); *A. pseudo-platanus* (Common Maple); *A. polymorphum* (Japanese Maple); *Ailantus glandulosa* (Tree of Heaven); *Betula alba* (Birch); *Carpinus betulus* (Hornbeam); *Fraxinus excelsior* (Common Ash); *Negundo fraxinifolium variegatum*, *Platanus orientalis* (Oriental Plane); *P. occidentalis*, *Populus alba* (Abele Poplar); *P. balsamifera* (Balsam Poplar); *P. fastigata* (Lombardy Poplar); *P. nigra* (Italian Poplar); *Quercus cerris* (Turkey Oak); *Q. coccinea* (Scarlet Oak); *Q. Robur* (Common Oak); *Rhus typhina* (Sumach); *Salix purpurea* (Purple Osier); *Sophora japonica*, *Sambucus nigra* (Elder); *Tilia europæa* (Lime); *Ulmus Campestris* (Elm); *U. montana* (Wych Elm).



DECIDUOUS SHRUBS.

FLOWERING.—*Abelia uniflora*, *Æsculus macrostachya*, *Æ. pavia*, *Amelanchier canadensis*, *A. vulgaris*, *Amygdalis nana*, *Azalea pontica*, *A. mollis*, *Berberis vulgaris*, *Calycanthus florida*, *Chimonanthus fragrans*, *Chionanthus virginica*, *Colutea arborescens*, *Cornus mascula*, *C. sanguinea*, *Cytisus purpureus*, *C. scoparius*, *Daphne mezereum*, *Deutzia crenata fl. pl.*, *D. gracilis*, *Forsythia suspensa*, *F. virdissima*, *Hamamelis virginica*, *Hibiscus syriacus*, *Hypericum*



JAPAN QUINCE (*Pyrus japonica*).

*androsænum*, *Kerria japonica*, *Leycesteria formosa*, *Lonicera tartarica*, *Philadelphus coronaria* (Mock Orange), *Pyrus japonica*, *P. Maulei*, *Rhus cotinus* (Wig Tree), *Ribes aureum*, *R. sanguinea* (Flowering Currant), *Spartium junceum* (Spanish Broom), *Spiræa aricefolia*, *S. Douglassi*, *S. Lindleyana*, *S. prunifolia*, *Syringa vulgaris* (Lilac), *S. persica* (Persian Lilac), *Tamarix gallica* (Tamarisk), *Viburnum opulus* (Guelder Rose), *Weigela rosea*.



ORNAMENTAL LEAVED.—*Acer polymorphum* and varieties, *Eleagnus angustifolia* (Oleaster), *Ligustrum vulgare* (Privet), *Symphoricarpus racemosus* (Snowberry).

## EVERGREEN TREES.

FLOWERING.—*Arbutus unedo*, *Magnolia grandiflora*.

ORNAMENTAL-LEAVED.—*Ilex aquifolium* (Holly); *I. latifolia*, *Laurus nobilis* (Sweet Bay); *Prunus lusitanicus* (Portugal Laurel); *Quercus ilex* (Evergreen Oak); *Q. suber* (Cork Oak).

## EVERGREEN SHRUBS.

FLOWERING.—*Arbutus Andrachne*, *Berberis Darwinii*, *B. dulcis*, *B. Fortunei*, *Buddlea globosa*, *Ceanothus azureus*, *Cistus ladaniferus*, *Cotoneaster microphylla*, *C. Simmonsii*, *Daphne collina*, *D. pontica*, *Erica carnea*, *Escallonia macrantha*, *Garrya elliptica*, *Hypericum calycinum*, *Ligustrum japonicum*, *Rhododendrum ponticum* in variety; *Ulex europæus* (Gorse), *Viburnum Tinus* (Laurestinus), *Vinca major*, *Yucca gloriosa*.

ORNAMENTAL-LEAVED.—*Aucuba japonica*, *Azara microphylla*, *Berberis aquifolium*, *B. Beali*, *Buxus japonica* (Box), *Cerasus Lauro-cerasus* (Laurel), *Cratægus pyracantha*, *Euonymus japonica* in variety, *E. radicans*, *Ilex* (Hollies), *Osmanthus illicifolium*, *Phillyrea angustifolia*, *Ruscus racemosus*, *Skimmia japonica*, *S. oblata*.

## CONIFERS.

SINGLE SPECIMENS FOR LAWNS.—*Abies Englemanni glauca*, *Pinus cembra*, *Cryptomeria elegans*, *Cupressus Lawsoniana*, *Abies exelsa*, *A. Nordmanniana*, *A. pinsapo*, *A. Douglassii*, *Cedrus Deodara*, *C. atlantica*, *Pinus austriaca*, *P. ponderosa*, *Araucaria imbricata*, *Wellingtonia gigantea*, *Thuia Lobbi*, *Salisburia adiantifolia*, *Biota orientalis*, *Juniperus chinensis*, *Abies alba*.

TALL KINDS FOR THE SHRUBBERY.—*Pinus austriaca*, *Larix europæa*, *Thuia Lobbi*, *Abies excelsa*, *Pinus laricio*, *Abies nigra*, *Pinus sylvestris*.

DWARF KINDS FOR SHRUBBERY.—*Cryptomeria elegans*, *Cupressus Lawsoniana lutea*, *Retinospora plumosa nana*, *Juniperus communis*, *Thuiopsis dolobrata*, *Taxus baccata aurea*, *Biota orientalis aurea*, *Thuia occidentalis*, *Thuia baccata fastigiata*.



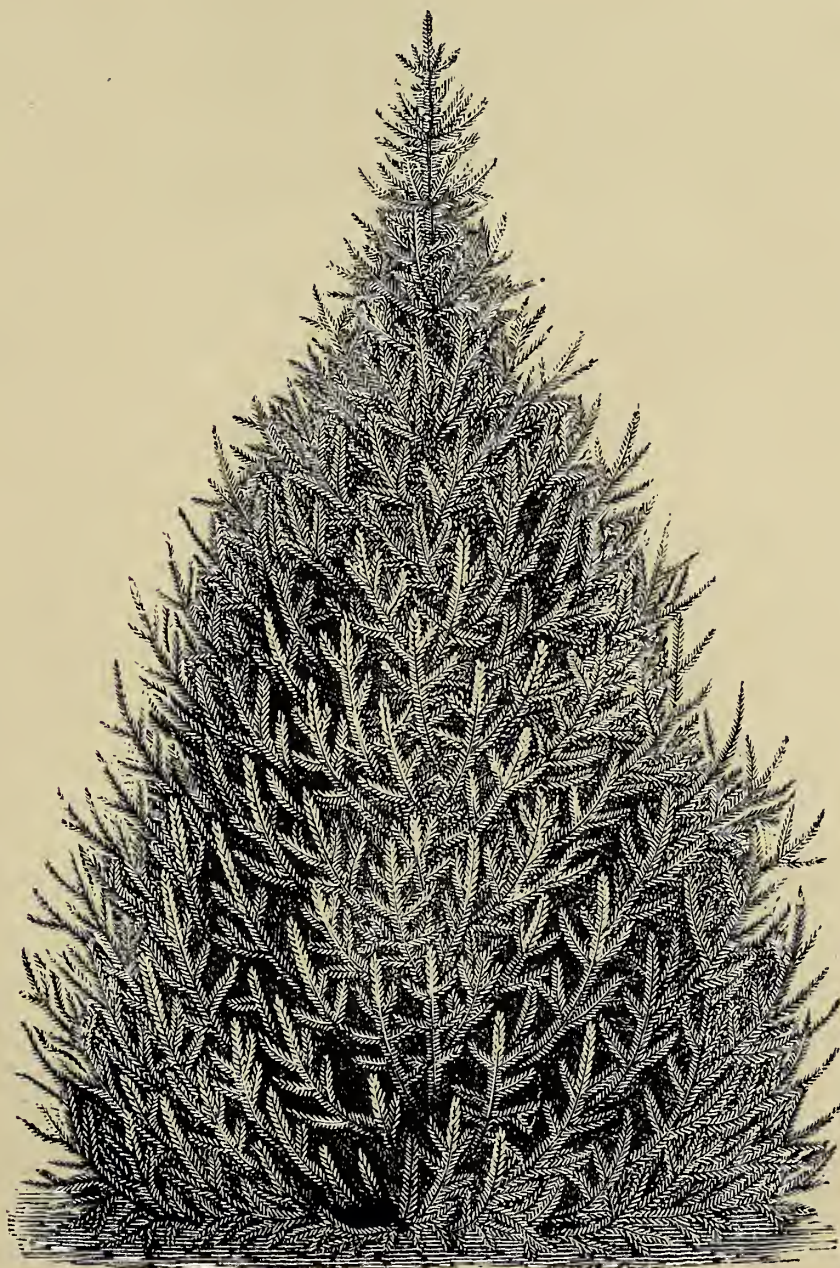
EVERGREEN CLIMBERS.

FLOWERING. — *Berberidopsis corallina*, *Akebia quinata*, *Bridgesia spicata*, *Jasminum revolutum*, *Lonicera sempervirens*, *Rosa sempervirens* (Evergreen Rose), *Escallonia macrantha*.

ORNAMENTAL-LEAVED. — *Euonymus radicans*, *Azara microphylla*, *Cotoneaster microphylla*, *Lonicera brachypoda aureo-reticulata*, *Hedera* (Ivy), Gold, Green, and Silver-leaved, *Crataegus pyracantha*, *C. p. Lelandi*.

DECIDUOUS CLIMBERS.

FLOWERING.—*Aristolochia siphon*, *Bignonia capreolata*, *Clematis Jackmanni*, *C. flammula*, *C. montana*, *C. florida*, *C. lanuginosa*, *C. patens*, *C. viticella* *Jasminum nudiflorum*, *J. officinale*, *Lonicera caprifolium*, *L. flexuosa*, *L. periclymenum*, *Lycium barbarum*, *Passiflora cœrulea*, *Periploca græca*, *Banksian*, *Ayrshire*, and *Noisette Roses*.



WHITE SPRUCE (*Abies Alba*).

ORNAMENTAL-LEAVED.—*Ampelopsis hederacea*, *A. Veitchi*, *A. Hoggi*; Claret, Parsley, and Miller's Grape Vines.





AZARA MICROPHYLLA.





## CHAPTER II.

### FLOWER BEDS AND BORDERS.

Along these blushing borders, bright with dew,  
And in yon mingled wilderness of flowers,  
Fair-handed spring unbosoms every grace.

\* \* \* \* \*

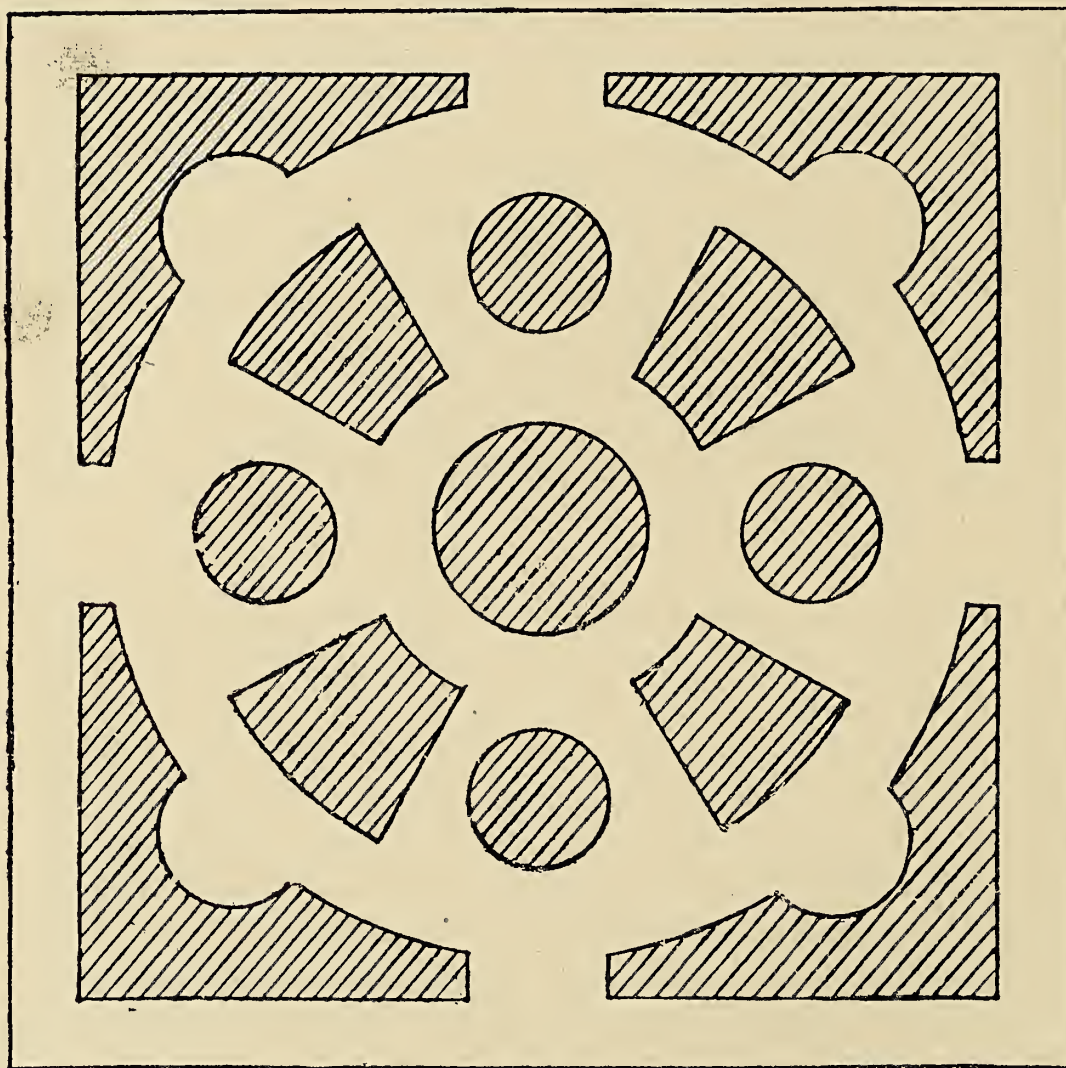
Infinite numbers, delicacies, smells,  
With hues on hues expression cannot paint,  
The breath of nature and her endless bloom.

THOMSON.

HAVING in the previous chapter described the formation of a garden, it naturally follows that the present one should be devoted to saying something on the subject of its decoration. As already remarked, taste in the matter of gardening has changed considerably, not only in the style of laying out a garden, but in its decoration also. At one time it used to be the fashion to have the portion of lawn immediately contiguous to the house occupied with numerous beds of fanciful patterns. Sometimes these beds were on the level lawns; in others, sunk panel-like a few feet below the surface, with edgings of box, and paths of various coloured gravel, spar, or bricks. And then they were planted in summer with gaudy flowers or plants, arranged in geometrical patterns so as to resemble an intricately designed carpet or rug, rather than a flower bed. The flowers and plants used in these beds were not allowed to grow of their own sweet will. Oh, no; that would spoil the effect of the designs! Finger and thumb, scissors and knife, had to be called into requisition frequently to keep their growth within the desired bounds. Not content with this artificiality, the devotees of this style went a step further, and had hideous pyramids of geraniums dotted about at regular intervals on the lawns and circular mounds, with one or two tiers,



and these planted with bright coloured calceolarias, crimson geraniums, and similar plants. In a word, the individual beauty of the flowers were totally disregarded ; they were simply used for their colour, just as the lithographer uses his various coloured inks for pictorial posters—to make a grand display of colour and attract the eye. Whilst this rage for bold displays of colour

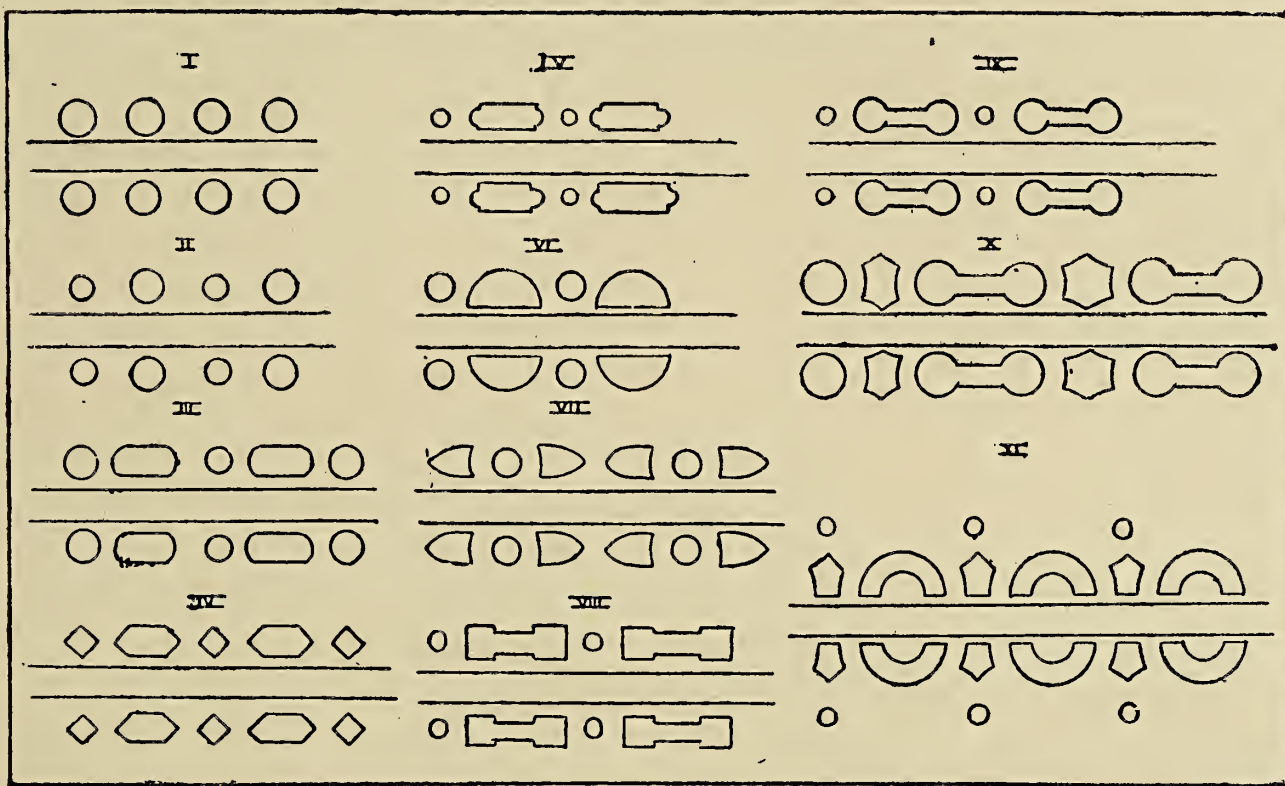


BEDS FOR A FORECOURT GARDEN.

prevailed, the many beautiful hardy plants that are now so generally grown were neglected, and hence borders, now happily restored to their proper use, were planted with line after line of geraniums, zonal pelargoniums, calceolarias, and lobelia. A magnificent display, no doubt ; but once seen, its beauty and interest ceased to exist and it became monotonous.



Fortunately for the true interests of flower gardening, the period of artificialities in style and decoration did not continue very long in popular favour. The lawn no longer, except in special cases, remains disfigured by sunk panels, coloured paths, and numerous fantastically designed beds. No longer are beds seen planted geometrically, or borders with line after line of flowering plants arranged like a battalion of soldiers. All this has had to give way to a bold, open expanse of turf, unencumbered with beds in the fore-



DESIGNS FOR FLOWER BEDS ON THE MARGIN OF PATHS.

ground, and groups of beautiful shrubs forming a foil to borders of intensely interesting hardy flowers. This is as it should be. Is it not far more pleasing to stand at the window and to cast your eye upon the lovely turf, and then let it travel across its wide stretch of reposeful greenery to the borders filled with hardy flowers, and thence to the handsome trees and shrubs behind them, than to immediately gaze upon a blaze of colour and nothing of interest beyond?

We have said that the number of beds formed on lawns are considerably reduced, as compared with a decade or so ago; and so they are. Now they



are used as little as possible, and of the simplest form. No hard and fast rule can be laid down as to where beds should be permitted, because so much depends upon local circumstances. We may safely venture to say, however, that they should not be permitted in front of a large lawn, but rather at the sides, in angles or corners where the eye requires a little colour to brighten up the back-ground. And even then their outlines ought not to be the stereotyped circles or ovals, but made to conform to the prevailing lines of the surroundings. In small forecourts where there is no room for borders and beds, and where the space is too limited to render the turf by itself of sufficient expanse to be interesting, a group of beds may legitimately be formed. But in the case of a good sized lawn it is unwise, as well as wanting in good taste, to have beds except in the vicinity of groups of trees or shrubs, where a good back-ground of foliage may be obtained to tone down the bright colours of the plants used in them. Beds are, however, permissible by the side of walks where there is no risk of interfering with the view across the lawn. As to the style of beds, any of those depicted in the accompanying plan are suitable. They should be 4 to 6 feet in diameter, and 15 feet from centre to centre, according to the width of the walks. The style of bed we are most in favour of are those known as rock beds. These are formed by placing long burrs or stones on the ground so as to form an irregular outline, then filling the centre with soil and placing a few burrs or stones here and there on the top to create small beds. This plan may be varied so that a narrow bed cut in the turf may gradually develop into a miniature rocky promontory at the opposite end, conveying an impression that the stones were the result of an upheaval rather than an artificial arrangement. Beds of this character are best suited for placing near a bank or large rockery, and should never be permitted on an open level lawn.

And then comes the question of what shall be planted in these beds. Those near the margin of a walk or building are best planted with dwarf plants, such as primroses, polyanthuses, scillas, crocuses, snowdrops, hyacinths tulips, forget-me-nots, and *Silene pendula compacta* for spring flowering with lobelia, golden pyrethrum, *Mesembryanthemum cordifolium variegatum*, variegated and zonal pelargoniums, calceolarias, etc., for a summer display; and dwarf shrubs for autumn and winter. The selection given for the summer months may be replaced by pansies, violets, ten-week stocks, china asters, Indian pinks, and verbenas, if something slightly less formal be preferred. Those who have a fancy for carpet bedding may appropriately



devote one or more beds to this purpose, where the latter occur close to the house, not otherwise. Beds situated near groups of shrubs, and away from the dwelling and walks, require to be planted with something of a bolder



GROUP OF LILIUM CANDIDUM AND SWEET SCENTED TOBACCO.

character—something that will harmonise in form and stature with the background. To plant beds in such a position with dwarf plants would have a similar effect to placing a mole-hill at the foot of a mountain. All such



violent contrasts should be studiously avoided. Here tall-growing tender plants, such as the dahlia, sweet scented tobacco (*Nicotiana affinis*), *Humea elegans*, *Canna indica* in its many forms, *Solanum robustum*, and others of similar stature, would be more in character with the surroundings than zonal pelargoniums and allied plants. Some judgment must, however, be exercised in the use of these plants. Avoid the too common practice of mixing a number of them together in one bed. Plants with broad leaves do not contrast well with those of fine foliage. It is better to group the two distinct forms by themselves in separate beds, than together in one. To impart colour to beds of this character, add the purplish-bronze *Ricinus Gibsoni*, the purple-leaved Orach (*Atriplex hortensis atrosanguinea*), the crimson-leaved Beet (*Beta cicla variegata*), the silvery-foliaged *Cineraria maritima*, *Centaurea ragusina*, *C. Clementii*, and *Chamæpeuce diacantha*, the dark-leaved *Amarantus bicolor*, *A. melancholicus ruber*, and *A. caudatus*, all with more or less showy foliage. The many forms of *Gladiolus Brenchleyensis* and *G. gandeensis*, also *Hyacinthus candicans*, *Lilium auratum*, and *L. speciosum*, will add greatly to the general effect when judiciously intermixed with the foliage plants.

The value of hardy annuals for beds must not be overlooked. The seeds are to be obtained so cheaply that they may be said to be well within the reach of every one's means; and they are certainly very effective for the present purpose. The dwarfer kinds that do not exceed a foot in height may take the place of zonal pelargoniums, etc., for beds near the house; while the taller sorts can be used instead of cannas and the foliage plants described for the other positions. Of course we are well aware that a continuity of bloom cannot be depended upon always in the case of annuals, but if the precaution be taken to remove seed vessels as soon as the flowers fade, and the plants are not allowed to grow too thickly together, their season of blooming will, as a rule, extend into the middle of September. Among the dwarfer annuals suitable for massing, the godetia may be specially mentioned. Next to this are the nemophila, candytuft, dwarf nasturtium, virginian stock, sweet alyssum, limnanthes, sanvitalia, mignonette, eschscholtzia and dwarf convolvulus. Then in the way of taller sorts, growing one to two feet high, the following are good, viz.: calliopsis, *Chrysanthemum tricolor*, clarkias, erysimums, love-in-a-mist, love-lies-bleeding, poppies (Shirley and Pæony-flowered), sweet sultans and viscarias. A few still taller sorts are sweet peas, cornflowers, sunflowers, *Chrysanthemum coronarium*, and prince's feather. These are best sown by them-



selves or simply with another kind as an edging. With the exception of the sweet peas and sunflowers, the seeds of which should be sown



MICHAELMAS DAISY.

an inch deep, those of the foregoing should be sown thinly in April on the surface of the soil, and afterwards lightly raked in. To ensure mignonette thriving satisfactorily, fork or rake in before sowing a liberal



quantity of slaked lime or old mortar. Without a fair amount of lime in some form or other in the soil, it is next to impossible to get mignonette to succeed.

A word must now be said in favour of hardy perennials for growing in beds. These, of course, have long been favourite border plants, but until within the last few years their value for bedding purposes has not been fully appreciated. The pink, sweet william, carnation, auricula, primrose, polyanthus, pansy, and viola, cannot well be surpassed for brilliancy, long duration of flowering period, and general adaptability for small beds. With even this small selection of plants it is possible to have a display of bloom from March to October, and with the exception of the carnation, which requires to be propagated annually by layering, they only require replanting every three or four years—a consideration for those with limited purses. To these may be added taller kinds, as the Japanese Wind-flower (*Anemone japonica*), Canterbury bell, Michaelmas daisies, hybrid pyrethrums, lilies of sorts, perennial larkspurs, potentillas, aquilegias, early-flowering chrysanthemums, campanulas, perennial cornflowers, and lychnises, all specially suitable for beds, &c. Early-flowering chrysanthemums, *Lilium elegans*, and *Aster amellus bessarabicus*, make a showy trio for a large bed. The lilies flower in June, the chrysanthemums in July and August, and the asters in September. If such a bed be edged with primroses or polyanthus the flowering season will then extend from March to October. Hybrid pyrethrums and *Anemone japonica* do well together, the former flowering in June and July, and the latter in August and September. Violas may be used as an edging to such a bed.

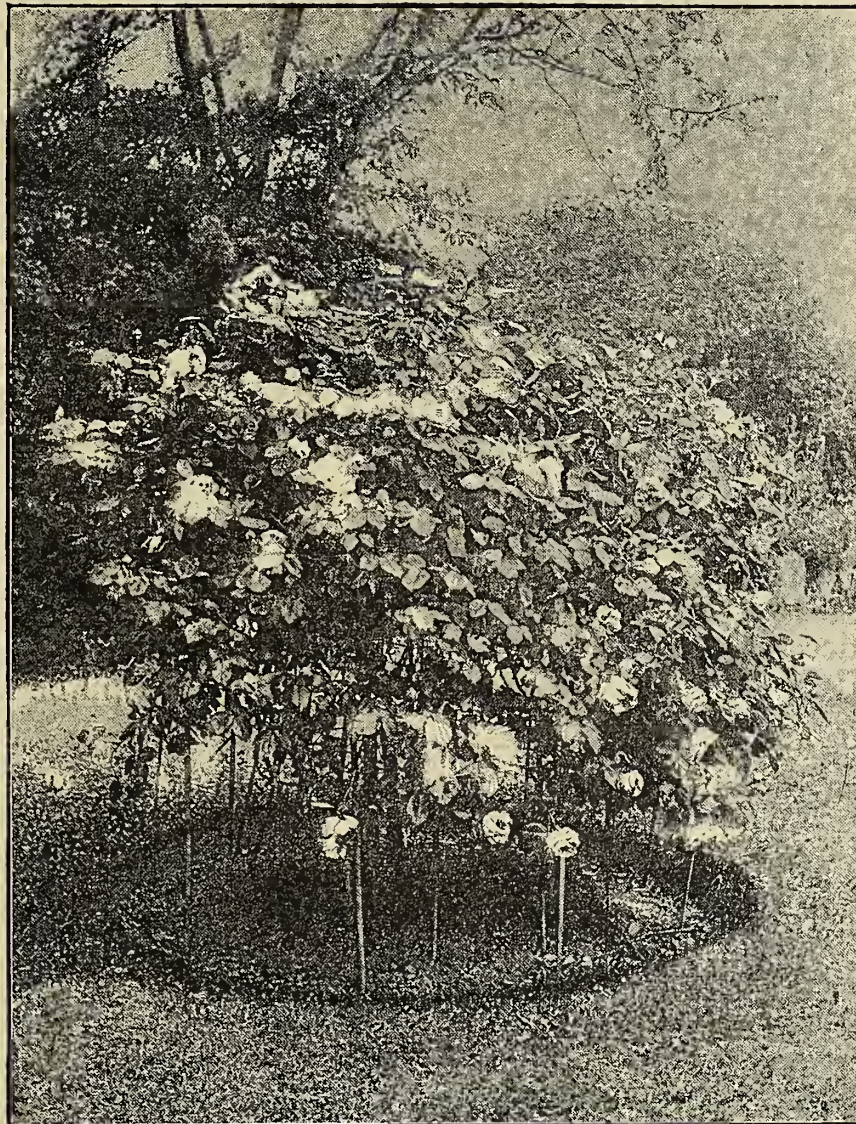
In fact, no end of pretty combinations of hardy plants may be obtained in small or large beds; and while they are quite as showy, they are really less expensive than the ordinary bedding plants, because they will last for several years in the same position. Violas are becoming very popular bedding plants, and do well either in masses or as an edging to taller plants. They are wonderfully showy, free flowering, and continuous blooming, so that we feel we cannot speak too highly of their many good qualities. Pansies, again, are remarkably fine bedding plants, their season of flowering extending from spring until autumn.

In planting hardy perennials in beds, it is most important that the ground be properly prepared beforehand by deep trenching and liberal manuring, as the supply of food is required to last for at least three years. It is of little use



planting in impoverished soil. The plants might do fairly well the first season, but after that they would decline in vigour and beauty and prove a miserable failure. Treat them generously in the first instance, mulch annually with decayed manure, assist occasionally with liquid manure, and then the plants will not only thrive, but flower profusely.

Another class of plant that possesses excellent qualifications for bedding is the rose. The several forms of it—the tea-scented, moss, noisette, hybrid perpetual, cabbage, and china varieties—may be grown as standards or dwarfs together in the same position. This is a better way to grow standards than the usual plan of arranging them sentinel-like on the lawn and exposing their bare stems. Standard roses of the Gloire de Dijon, Aimée Vibert, evergreen or Ayrshire type, that are of a weeping habit, are exceptions to this rule. Such kinds look very pretty when well grown and placed in suitable positions. The former succeed so much better when planted together in a properly prepared bed, and the plants, moreover, can be better attended to in the



GLOIRE DE DIJON ROSE IN BED.



application of stimulants and keeping the foliage free of insects and other pests. Grown thus the bare stems of the standards can to a certain extent be hidden by planting dwarf roses between. The remaining spaces between the dwarfs and standards can be planted with primroses for flowering in spring, or sown with mignonette for summer flowering. A rosary thus planted becomes an interesting feature in the garden, and the effect when in bloom is very striking indeed—very much more so than it would be if the standards were dotted about here and there on the lawn, or the dwarfs grown in twos or threes in the borders. The position for the bed must be a sunny one, and not in any way shaded, or the wood will not get sufficiently ripened to flower well the following season. In deciding on the position, bear in mind the important fact we have already drawn attention to in the case of beds intended for tall plants, namely, avoid selecting one near the house or in too prominent a spot on the lawn. Rather give preference to a sheltered corner, protected from north and east, but fully exposed to the sun, or near a fine bold group of shrubs or trees that will form a pleasing background. Prepare the soil in the autumn by trenching it three spits deep. If light, bury cow or pig manure liberally between the first and second spits. If heavy, add cinder ashes, wood scrapings, sand, old mortar, decayed vegetable refuse, and horse manure, working it thoroughly in amongst the soil as it is turned over. Very light soils will be improved by adding clay or marl. As to planting, this should be done in autumn or February in the case of hybrid perpetuals, provence, moss, and other hardy kinds; and in April or May only in the case of tea-scented, noisette, and bourbon sorts. Plant the standards and half-standards 3 ft. apart each way, and a dwarf rose between each. To get a good effect, plant the standards in the centre; next these half standards, then strong growing dwarfs, finishing off with the weakest at the margin. Where space permits, the various classes of rose, as the tea-scented, cabbage, and hybrid perpetual, may be grown in beds by themselves; but for ordinary purposes they will do well together, and make an interesting display. As to pruning and other cultural details, these are outside the scope of the present work. Those who desire information on this subject are referred to “The Amateur’s Rose Book,”\* a work dealing with rose culture in all its phases.

From the beds we now pass on to the consideration of the borders. These

\* “The Amateur’s Rose Book.” London: W. H. & L. Collingridge.





GROUP OF FOX-GLOVES IN A SHADY CORNER.



have to a great extent taken the place of the former, and the change has, we are bound to say, proved beneficial. We are not alluding, however, to the old-fashioned long and straight borders that formerly prevailed, but to the more modern and pleasing style—those that fringe the shrubbery or groups of shrubs on the lawn, and thus provided with a noble background of foliage to serve as a foil to the many showy and beautiful hardy flowers grown therein. A group of hardy perennials, however beautiful in itself, loses half its charm in the absence of a background of trees and shrubs; and the latter, too, except in the case of single specimens grown by themselves, are not nearly so interesting as when their usually sombre hues are contrasted with bold masses of hardy flowers in bloom. To our mind, the ideal flower garden is one with a lawn free from beds as much as possible, and with judiciously disposed groups of trees and shrubs margined with borders of irregular width planted with masses of our brightest and best perennials, roses, bulbs, and annuals; with shady dells for ferns, and rocky banks for upland plants.

Such a garden is always interesting and attractive, because whichever way you turn you always find something to engage your attention. In the sunny spots hardy flowers or roses are to be seen, and in the shady ones ferns and so on. It is clear, therefore, that to have a really pretty garden we must avoid the too free use of beds, and instead endeavour to have borders on the fringe of the various groups of shrubs. These borders must be of varying width according to the size of the shrubs and the local circumstances. In any case avoid straight lines; choose easy curves for the outlines, so that nothing formal shall offend the eye. Remember this, too, that where the shrubs are comparatively dwarf the borders should be narrow, where tall gradually swell out into a wide space, so that tall growing plants may be put in to make a bold display. It must not be inferred that we advocate forming a border all round a group of shrubs on a lawn. Such a plan would at once stamp the whole business as quite contrary to the principles we are advocating. Judgment and discretion must be used in this as in other matters. In some positions a border might be as much as ten feet in width, and the space planted with roses. The great aim should be to study every coign of vantage in the garden, and in all prominent positions to make provision or a group of plants. In places where the trees and shrubs are not particularly trim and neat in appearance, but more of a natural character, the boundaries of the border need not be defined. Groups of ferns, hellebores





PERENNIAL SUNFLOWER (*Helianthus multiflorus maximus*).



polygonums, etc., may grow in the turf as well as the border, while between and behind, fox-gloves, willow herbs, and monks'-hoods will impart a rural appearance to the spot.

In regard to planting the borders, many things have to be considered. The first and most important is the choice of plants adapted for the position. Some plants, for instance, will only thrive well in the sun, others in the shade. Others, again, born in the woodland and copse, like the fox-glove, would not be at home in every part of the garden, but in a corner more akin to its native habitat. A *Lilium auratum*, again, though it likes a little shade, would not look well in company with the fox-glove, and so on. In the wilder and more shady positions plant ferns, fox-gloves, mulleins, golden rod, hellebores, Solomon's seal, lily of the valley, primroses, the common columbine, Japanese wind-flower, crown imperial lily, creeping jenny, periwinkle, asphodel, St. John's wort, daffodils, scillas, crocuses, and snowdrops, to blossom the greater part of the year, or to render the spot attractive in other ways. In large borders in out-of-the-way corners, where it is not quite so shady, Michaelmas daisies, perennial larkspurs, cow-parsnip, Leopard's bane, evening primrose, snapdragon, wallflower, sweet rocket, Canterbury bell, polygonums, day-lilies, daffodils, crocuses, snowdrops, scillas, and snowflakes, with a few lilies, will make a charming display. Coming to borders in more important positions, these can be beautified with perennial sunflowers, rudbeckias, perennial larkspurs, white Japanese wind-flowers, Michaelmas daisies, carnations, pansies, roses, violas, sweet williams, bergamot, goat's rue, and other plants, which will be found in the list at the end of this chapter. These should be planted in groups of not less than three plants, if possible a dozen of each, so as to produce a good effect. One or two plants make a miserable display, but a group of a dozen or so, as shown in the illustration of foxgloves on page 213 is most effective. Avoid planting in lines or placing all the tallest at the back and the dwarfest in front. An arrangement of this kind is very artificial and objectionable. The better plan to follow, and the one which will prove the most effective, is to boldly bring the tall plants to the front here and there, and place some of the dwarfer towards the back of the border. What is wanted is to make the arrangement of the plants as diversified as the other parts of the garden. Groups of monthly or other dwarf roses may be intermixed with hardy flowers in a border if desired. Bare trunks of trees in a border, or old stumps, can also be effectively decorated by planting honeysuckle, everlasting peas, clematis, or climbing roses at their

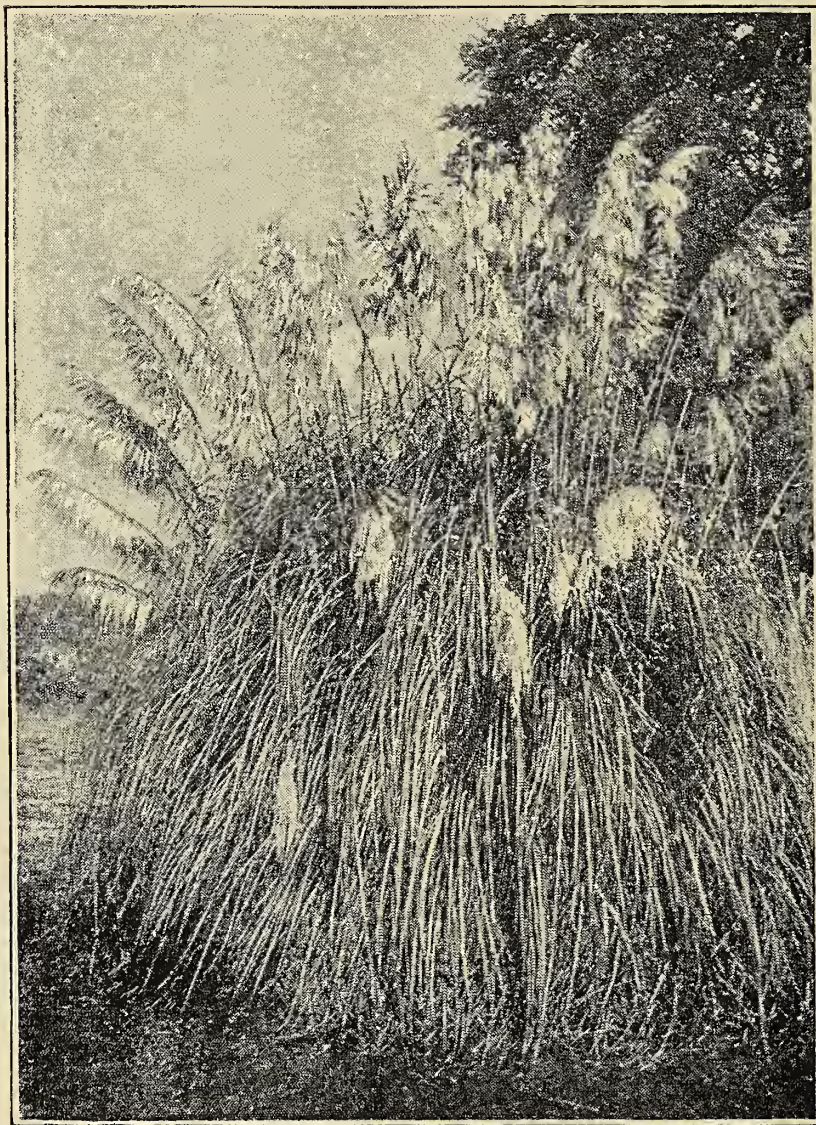




SINGLE HOLLYHOCKS.



base and allowing the shoots to climb up these ; and among the shrubs, groups of lilies may be planted to fight their way through the front branches. Spaces between the hardy perennials can be planted with spring-flowering bulbs in autumn ; sown with hardy annuals in April ; or planted with half-



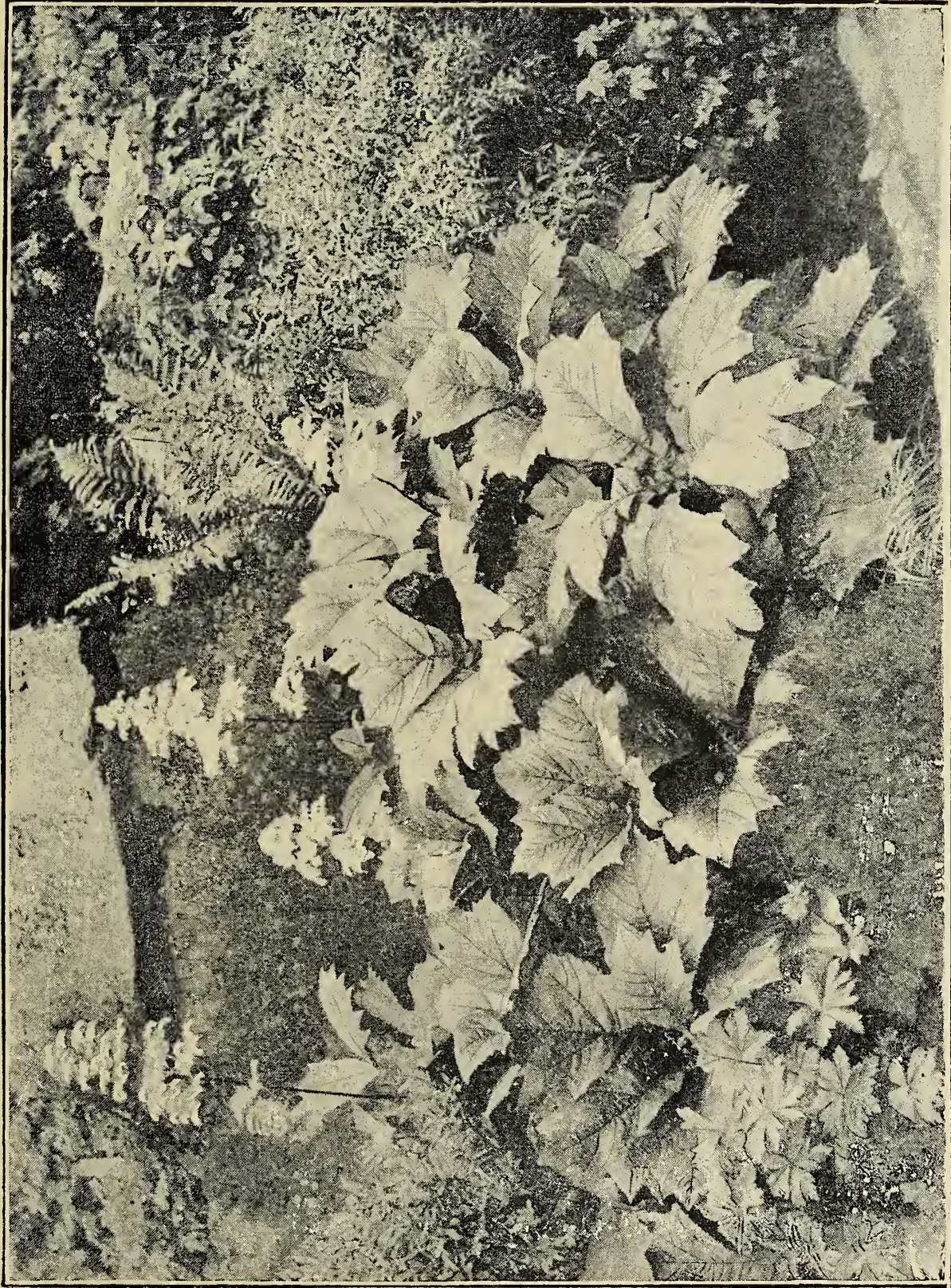
PAMPAS GRASS (*Gynerium argenteum*).

hardy annuals, zonal pelargoniums, petunias, calceolarias, lobelias, fuchsias, violas, or pansies in May or June. Again, summer - flowering chrysanthemums, planted in April, will bloom nicely in July and August, and gladioli, planted in March or April, in September and onwards. After the initial cost of planting the borders with perennials, there will be little after-expense, and the result will be a gay garden from March to October.

There are one or two other modes of decorating a flower garden that must be described ere this

chapter is brought to a close. We refer more particularly to groups of noble foliage plants on the lawn. The tree pæony, for instance, is very frequently grown singly or in groups in sunny spots, and where the soil and situation suits its growth it has a charming effect when in bloom. The common rhubarb (*Rheum officinale*) is a particularly handsome





RODGERSIA PODOPHYLLA.





plant, and so is its near ally *Rheum emodi*. Then there is the stately but graceful Pampas Grass (*Gynerium argenteum*), the equally graceful Bamboos (*Bambusa falcata* and *B. Metake*), the Giant Fennel (*Ferula communis*), the Yucca, the giant Cow-parsnip (*Heracleum giganteum*), *Polygonum sachaliense*, the Bronze-Leaf (*Rodgersia podophylla*), and the New Zealand Reed (*Arundo conspicua*), all with very handsome foliage and well suited for single specimens or in groups. These require to be planted in good soil, but the turf may be allowed to grow close up to their base. They are most effective when planted near groups of shrubs.

Bare banks may be made to look green and interesting by fixing thereon a few large stones or burrs here and there, planting shrubs behind them, and hardy ferns, fox gloves, mulleins, golden rod, and columbines between, and carpeting the surface with periwinkle, St. John's wort, and ivy. Bare spaces under the spread of tree branches may be planted with ivy; there is really nothing better for the purpose. For covering old tree stumps or dead trees of small stature in the shrubbery or in the open, *Clematis Jackmanni*, *C. montana*, *C. flammula*, *Pyrus Japonica*, *Cotoneaster microphylla*, *Jasminum nudiflorum*, honeysuckles, evergreen or Ayrshire rose, everlasting peas, and *Tropæolum podophyllum* are suitable. Again, if standard roses are grown singly, the bareness of their stems in summer may be obviated by planting ivy-leaved pelargoniums, tropæolums or petunias at their base and training the shoots loosely up them. The subject of rockeries, ferneries, and wild gardening being dealt with separately further on, it is unnecessary to touch upon this in the present chapter. Very much more might be said on the present subject if space permitted, but still enough has, we trust, been written to convey a general idea as to how beds and borders should be formed and planted.

#### SELECTIONS OF PLANTS, &c.

##### ANNUALS.

DWARF HARDY ANNUALS, NOT EXCEEDING 6 INCHES IN HEIGHT.—*Sweet Alyssum*, white; *Calandrina speciosa*, white; *Campanula pentagonia*, purple; *Gypsophila muralis*, pink; *Hymenoxis californica*, yellow; *Kaulfussia atrovioacea*, violet; *Limnanthes grandiflora*, yellow and white; *Lupinus nanus*, various; *Mignonette*; *Nemophila insignis*, blue; *N. i. alba*, white; *N. maculata grandiflora*, white and violet; *Sarvitalia procumbens*, crimson and yellow;



*Saponaria calabrica*, rose; *S. c. alba*, white; *Venus' Looking Glass*, blue and white varieties; *Virginian stock*, white, red, and yellow varieties; *Sphenogyne aurea*, yellow; *S. sulphurea*, sulphur; *Leptosiphon densiflorus*, rose; *L. hybridus*, various; *Ionopsidium acaule*, blue; *dwarf Nasturtiums* and *Convolvulus*.

*Culture*.—Sow in open ground where required to grow—in April and May for summer flowering, in June for autumn flowering, in September for spring flowering. Thin 1 to 3 inches apart when 1 inch high.

DWARF HALF-HARDY ANNUALS, NOT EXCEEDING 6 INCHES IN HEIGHT.—*Abronia umbellata grandiflora*, rose; *Anagallis grandiflora*, blue; *A. sanguinea*, ruby red; *Grammanthes gentianoides*, orange-scarlet; *Nycteria capensis*, brown; *N. selaginoides*, pink; *Palavia flexuosa*, rose; *Platystemon californicum*, cream; *Portulaca*, mixed; *Tagetes pumila*, yellow.

*Culture*.—Sow seeds thinly in March in well drained pots or shallow boxes filled with light mould. Cover lightly with fine mould, and place in a temperature of 55 degrees to 65 degrees. Harden off gradually, and plant outdoors in June.

MEDIUM HARDY ANNUALS, 9 TO 18 INCHES HIGH.—*Adonis autumnalis*, crimson; *Asperula azurea setosa*, blue; *Bartonia aurea*, yellow; *Cacalia coccinea*, scarlet; *Calendula pluvialis*, white; *C. officinalis*, various; *Calliopsis bicolor nana*, yellow and crimson; *Callirhoe pedata nana*, crimson; *Candytuft*, various; *Chrysanthemum tricolor*, various; *Clarkia pulchella*, various; *Collinsia bicolor*, purple and white; *C. grandiflora*, blue and white; *Erysimum arkansanum*, yellow; *E. Peroffskianum*, orange; *Eschscholtzia crocea*, in variety; *Eutoca viscida*, blue; *Gilia tricolor*, white, lilac, and purple; *Godetias*, in variety; *Jacobæas*, various; *Larkspur*, double dwarf, various; *Lasthenia californica*, yellow; *Layia elegans*, yellow and white; *L. glandulosa*, white; *Linum grandiflorum*, scarlet; *Lupins*, in variety; *Mignonette grandiflora*; *Love-in-a-mist*, white and purple; *Nemesia compacta*, various; *Poppies*, Shirley, French, Chinese, and Victoria Cross, various; *Sweet Scabious*, orange, white, and purple; *Silene pendula*, in variety, red, white, &c.; *Viscaria cardinalis*, crimson; *Whitlavia grandiflora*, blue.

*Culture*.—Same as for dwarf annuals, except thinning, which should be 3 to 6 inches apart.

MEDIUM HALF-HARDY ANNUALS, 9 TO 18 INCHES HIGH.—*Ageratum mexicanum*, blue; *Alonsoa*, mixed varieties; *Bidens atro-sanguinea*, crimson;



*B. grandiflora*, yellow; *China asters*, various; *Cuphea purpurea*, scarlet; *Dianthus sinensis*, in variety; *Gaillardia Drummondii*, scarlet, yellow, and white; *Mesembryanthemum tricolor*, rose; *Mimulus tigrinus*, in variety; *Phlox Drummondii*, various; *Salpiglossis*, dwarf, various; *Ten-week Stocks*, various; *French Marigold*, various; *Nemesia strumosa Suttoni*, various; *Zinnias*.

*Culture*.—Same as advised for dwarf kinds.

TALL HARDY ANNUALS, 2 TO 5 FEET HIGH.—*Argemone grandiflora*, white; *Calliopsis bicolor*, yellow and crimson; *C. Drummondii*, yellow; *C. Burridgii*, crimson and yellow; *Chrysanthemum coronarium*, yellow and white; *Clarkia elegans*, rose; *Larkspur*, tall, various; *Lavatera trimestris*, rose and pink; *Love-lies-bleeding*, red; *Malope grandiflora*, crimson and white; *Poppies*: *Danebrog*, *Mephisto*, *Mikado*, and *Carnation*, various; *Sweet Peas*, various; *Prince's Feather*, crimson; *Sunflowers*, yellow.

*Culture*.—Sow as advised for dwarf kinds, and thin 6 to 12 inches apart.

TALL HALF-HARDY ANNUALS, 2 TO 5 FEET HIGH.—*Cosmos bipinnatus albiflorus*, white; *C. b. purpureus*, purple; *Datura ceratocaula*, white and purple; *Marigold*, African and Scotch, yellow; *Balsams*, various.

*Culture*.—See dwarf kinds.

FRAGRANT HARDY ANNUALS.—*Amblyolepis setigera*, yellow, 1 ft.; *Ambrosia mexicana*, fragrant foliage, 1 foot; *Asperulea azureus setosa*, blue, 6 inches; *Schizopetalon Walkeri*, white, 1 foot; *Candytuft*, sweet scented, white, 1 foot; *Malva zebrina atro-rubens*, white and purple, 2 feet; *Mathiola bicornis*, lilac, 1 foot; *Mignonette*; *Oenothera Drummondii nana*, yellow, 1 foot; *Sweet Scabious*, various, 1 foot; *Sweet Sultans*, yellow, purple, and white varieties, 18 inches; *Sweet Peas*, various, 4 to 6 feet; *Nycteria capensis*, brown, 6 inches.

*Culture*.—Same as for Dwarf Annuals.

FRAGRANT HALF-HARDY ANNUALS.—*Abronia arenaria macrophylla*, yellow, 6 inches; *Datura chlorantha, fl. pl.*, yellow, 2 feet; *D. ceratocaula*, white and purple, 2 feet; *Martynia fragrans*, crimson-purple, 1½ feet.

*Culture*.—See Dwarf Half-Hardy Annuals.

HARDY ANNUALS WITH ORNAMENTAL FOLIAGE.—*Beet*, dracæna-leaved and Brazilian, crimson, 1 foot; *Cannabis gigantea*, green, 5 feet; *C. sativa atropurpurea*, red, 5 feet.

*Culture*.—Same as Hardy Annuals,



HALF-HARDY ANNUALS WITH ORNAMENTAL FOLIAGE.—*Amaranthus bicolor*, scarlet and green, 1 foot; *A. melancholicus ruber*, carmine, 1 foot; *A. salicifolius*, orange red, 3 feet; *A. tricolor*, scarlet, yellow, and green, 18 inches; *Ice Plant*, crystal-like leaves, 3 inches; *Perilla nankinensis*, mulberry, 18 inches; *Ricinus Gibsoni*, crimson, 5 feet; *R. sanguineus tricolor* red, 8 feet; *Zea japonica*, in variety, white and green.

*Culture*.—Same as Half-Hardy Annuals.

ANNUAL EVERLASTING FLOWERS.—*Acroclinium album*, white, 1 foot; *A. roseum*, rose, 1 foot; *Ammobium alatum grandiflorum*, white, 2 feet; *Helichrysum monstrosum*, in variety, 2 feet; *Helipterum Sandfordi*, yellow, 1 foot; *Rhodanthe Manglesii*, rose, 1 foot; *R. maculata*, purple, 1 foot; *R. m. alba*, white, 1 foot; *Xeranthemum plenissimus*, in variety, 2 feet.

*Culture*.—Sow the seeds outdoors in April, and thin 3 to 6 inches apart when 2 inches high; or in pots or pans in a temperature of 55 degrees to 65 degrees in March, and transplant outdoors in May.

HALF-HARDY CLIMBING ANNUALS.—*Ipomœa hederacea*, blue; *I. limbata elegantissimæ*, purple; *I. Quamoclit*, scarlet. Ornamental Gourds.—*Caiophora aurantiaca*, orange; *Cardiospermum hœlioacatrum*, white.

HARDY CLIMBING ANNUALS.—*Convolvulus major*, purple, crimson, and white; *Humulus japonica*, large green foliage; *H. j. variegatus*, silvery foliage; *Tropœolum majus*, scarlet.

*Culture*.—Treat both as recommended for Hardy and Half-Hardy Annuals.

HARDY ANNUAL GRASSES.—See List on page 42.

#### BIENNIALS.

\* The kinds preceded by an asterisk are strictly perennials, but are included here because they succeed best treated as biennials.

FLOWERING AND ORNAMENTAL LEAVED.—*Canterbury Bells*, various, 2½ feet; *Carduus acanthioides* (Scotch Thistle), silvery-leaved, 6 feet; *C. benedictus* (Blessed Thistle), silvery-leaved, 3 feet; *Silybum Marianum* (the Milk Thistle), white and green mottled foliage, 3 feet; \**Centaurea candidissima*, silvery-leaved, 1 foot; \**C. Clementii*, silvery-white foliage, 3 feet; *Chamæpeuce diacantha* (Fishbone Thistle), silvery-leaved, 1 foot; \**Hedysarum coronarium* (French Honeysuckle), white and scarlet, 2 feet; *Lunaria biennis* (Honesty), purple



and white, 2 feet; *Meconopsis nepalensis*, sulphur, 4 feet; *M. Wallichii*, blue 4 feet; *Michauxia campanuloides*, white, 3 feet; *Oenothera biennis* (Evening Primrose), yellow, 3 feet; *Sweet Rocket*, purple, white, 18 inches; \**Sweet William*, various, 18 inches; *Wallflower*, 9 to 18 inches.

*Culture*.—Sow the seeds of the centaureas, chamæpeuce, meconopsis, and michauxia in sandy soil, in a temperature of 55 degrees to 65 degrees, in February or March, and plant out in June; the others in a sunny border out doors in May or June, transplanting into their permanent positions in September or October.

## PERENNIALS.

TWENTY-FIVE FOR SUNNY BORDER.—*Achillea ptarmica fl. pl.* (Double Sneeze-wort), white, 18 inches; *Aconitum japonicum* (Japanese Monk's-hood), blue, 4 feet; *A. napellus bicolor* (Two-coloured Common Monk's-hood); *Anthericum liliastrum* (St. Bruno's Lily), white, 18 inches; *Aquilegia Chrysantha* (Golden-flowered Columbine), golden, 18 inches; *Armeria cephalotes rubra* (Red Sand-wort), crimson, 3 inches; *Asphodelus ramosus* (Branching Asphodel), white, 24 inches; *Aster amellus bassarabicus* (Dwarf Amellus Star-wort), purple, 3 feet; *Aster ericoides* (Heath-leaved Star-wort), white, 3 feet; *Campanula dahurica* (Dahurian Hare-bell), purple, 18 inches; *Centaurea montana* (Mountain Centaury), blue, 18 inches; *Coreopsis lanceolata* (Lance-leaved Tick-seed), yellow, 3 feet; *C. grandiflora* (Large-flowered Tick-seed), yellow, 3 feet; *Delphinium formosum* (Showy Larkspur), blue, 4 feet; *Galega officinalis alba* (Common Goat's Rue), white, 4 feet; *Geum coccineum plenum* (Double Scarlet Avens), scarlet; *Harpaliun rigidum*, (Rough-leaved Sunflower), yellow, 4 feet; *Helianthus multiflorus plenus* (Double Perennial Sunflower), yellow, 4 feet; *Hemerocallis flava* (Yellow Day Lily), yellow, 2 feet; *Lupinus polyphyllus* (Tall perennial Lupine), blue, 3 feet; *Lychnis viscaria splendens* (Large German Catchfly), rose, 1 foot; *Papaver orientale* (Oriental Poppy), crimson, 3 feet; *Pyrethrum hybridum* (Florists' Pyrethrum), various, 2 feet; *Rudbeckia Newmanni* (Newman's Cone-flower), orange, 2 feet; *Sidalcea candida*, white, 2 feet.

TWENTY-FIVE FOR A SHADY BORDER.—*Anemone japonica* (Japanese Wind-flower) white, rose, 2 feet; *Anemone Sylvestris* (Snowdrop Anemone), white, 1 foot; *Aster lævis* (Smooth Star-wort), blue, 2 feet; *Campanula carpatica* (Carpathian Hare-bell), blue, white, 15 inches; *Cardamine pratensis fl. pl.*



(Double Ladies' Smock), lilac, 9 inches; *Convallaria majalis* (Lily of the Valley), white, 6 inches; *Digitalis purpurea* (Foxglove), various, 4 feet;



RHEUM EMODI.

*Epilobium angustifolium* (Bay Willow), rose, 4 feet; *Helleborus niger* (Christmas Rose), white, 1 foot; *H. colchicus* (Plum-coloured Christmas-



rose), purple, 18 inches; *Hypericum coris* (Heath-leaved St. John's-wort), golden, 4 inches; *Iris Germanica* (German Iris), various, 15 inches; *Megasea cordifolia purpurea* (Purple Heart-leaved Saxifrage), purple, 6 inches; *Pæonia officinalis* (Pæony), crimson, 30 inches; *Phlox suffruticosa* (Herbaceous Phlox), various, 2 feet; *Polemonium Richardsoni* (Richardson's Jacob's Ladder) blue; *Pulmonaria azureus* (Azure-flowered Lung-wort), red-violet, 4 inches; *Pyrethrum uliginosum* (Giant Ox-eye Daisy), white, 4 feet; *Ranunculus aconitifolius fl. pl.* (Fair Maids of France, white; *Solidago canadensis* (Golden Rod), yellow, 3 feet; *Spiræa aruncus* (Goat's Beard), white, 4 feet; *Spiræa palmata*, crimson, 3 feet; *Symphytum officinale variegata* (Variegated Comfrey), variegated leaves, 2 feet; *Tritoma uvaria* (Red-hot poker Plant), scarlet, 4 feet.

ORNAMENTAL-LEAVED PERENNIALS.—*Aciphylla squarrosa* (Bayonet Plant), 6 to 9 feet; *Arabis albida variegata*, 3 inches; *Eryngium giganteum* (Ivory Thistle), 2½ feet; *Funkia Sieboldi variegata*, 18 inches; *Gunnera scabra*, 3 to 6 feet; *Festuca ovina glauca* (Sheeps' Fescue), 6 inches; *Dactylis glomerata elegantissima* (Cock's-foot Grass), 9 inches; *Phalaris arundinacea variegata* (Gardener's Garter Grass), 3 feet; *Lamium maculatum aureum* (Golden Dead Nettle), 15 inches; *Melissa officinalis variegata* (Variegated Balm), 12 inches; *Acanthus mollis*, 2 to 3 feet; *Farfugium grande* (Spotted Calf's-foot), 12 inches; *Onopordon acanthium* (Cotton Thistle), 5 feet.

TALL PLANTS OF NOBLE ASPECT.—The following possess either very handsome foliage, or fine foliage and flowers combined, and are specially suitable for growing singly on the lawn or in groups in the border: *Spiræa aruncus* (Goat's Beard), 5 feet; *Bambusa metake* (Bamboo), 9 feet; *Bocconia cordata* (Plume Poppy), 5 feet; *Dipsacus laciniatus* (Teasel), 5 to 8 feet; *Hollyhock*, 8 to 10 feet; *Ferula tingitanæ* (Fennel), 6 to 10 feet; *Heracleum giganteum* (Giant Cow Parsnip), 10 feet; *Phylotacca decandra* (Virginian Poke), 10 feet; *Polygonum cuspidatum* and *P. sachalinense* (Knotweed), 8 to 10 feet; *Silphium laciniatum* (Compass Plant), 8 feet; *Verbascum chaixi*, 8 feet; *Yucca gloriosa* (Adam's Needle), 5 feet; *Rheum emodi* (Rhubarb), 6 to 7 feet.

DWARF PLANTS FOR BEDS.—*Ajuga orientalis*, blue, 3 inches; *Alyssum saxatile compactum*, yellow, 9 inches; *Arabis albida*, white, 6 inches; *Aubretia purpurea* (Rock Cress), purple, 6 inches; *A. Leitchlini*, red, 6 inches; *Campanula turbinata*, blue, 6 inches; *C. carpatica*, blue and white,



12 inches; *Doronicum caucasicum*, yellow, 12 inches; *Gentiana acaulis*, blue



ARUM DRANUNCULUS.

6 inches; *Geum montanum*, yellow, 12 inches; *Iberis gibraltarica*, white, 9 inches; *Lobelia cardinalis*, scarlet, 12 inches; *Lychnis viscaria splendens*,



rose, 12 inches; *Myosotis azorica*, blue, 6 inches; *Papaver nudicaule*, orange, yellow, and white, 12 inches; *Phlox frondosa* *P. setacea*, and *P. subulata*, white and pink, 6 inches; *Pinks*, various, 12 inches; *Saxifraga Wallacei*, white, 6 inches; *S. umbrosa*, pink, 6 inches; *Sedum spurium*, pink, 6 inches; *S. carneum*, pink, 12 inches; *Silene maritima*, fl. pl., white, 6 inches; *Veronica saxatilis*, blue, 3 inches; *Violas* and *Pansies*.

TALL PLANTS FOR BEDS.—*Anemone japonica*, rose, and *A. j. alba*, white, 2 feet; *Aster amellus bessarabicus*, blue, 3 feet; *Campanula persicifolius* fl. pl., white, 18 inches; *Coreopsis lanceolata*, yellow, 3 feet; *Carnations*, various, 1 to 2 feet; *Gaillardia grandiflora maxima*, yellow and crimson, 2 feet; *Geum coccineum plenum*, scarlet, 2 feet; *Pentstemons*, in variety; early flowering *Chrysanthemums*; *Herbaceous Phloxes*, 2 to 3 feet; *Potentillas*, hybrid, 2 feet; *Pyrethrum hybridum*, various, 2 feet; *Rudbeckia Newmanii*, yellow, 2 feet; *Scabiosa caucasia*, blue, 2 feet.

PERENNIALS FOR SPRING FLOWERING.—*Hepatica angulosa*, *H. triloba*, *Arabis albida*, *Aubretia purpurea*, *Iberis sempervirens*, *Doronicum austriacum*, *Corydalis nobilis*, *Cheiranthus Marshalli*, *Gentiana acaulis*, *Primroses*, *Polyanthuses*, *Daisies*, *Geum coccineum*, and *Pæonia officinalis*.

PERENNIALS FOR SUMMER FLOWERING.—*Dictamnus fraxinella*, *Delphiniums*, *Hybrid Pyrethrums*, *Carnations*, *Campanula dahurica*, *Aquilegia glandulosa*, &c., *Ænothera Youngi*, *Galega officinalis*, *Aconitum japonicum*, *Iris*es in variety, *Pentstemons*, *Antirrhinums*, *Campanula persicifolia plena*, *Potentillas* *Perennial Sunflowers*, *Sidalcea candida*, *Violas*, and *Pansies*.

PERENNIALS FOR AUTUMN FLOWERING.—*Rudbeckia Newmanii*, *Anemone japonica*, *Michaelmas Daisies*, early-flowering *Chrysanthemums*, *Schizostylis coccinea*, *Tritoma uvaria*, *Harpalium rigidum*, and *Helianthus* in variety.

*Culture*.—Plant in soil previously dug two spits deep and liberally enriched with decayed manure. October and November or March and April are the best times to lift, divide, and replant.. Lift and replant every third year.

PERENNIAL GRASSES.—*Andropogon argenteus*, 5 feet; *Arundo conspicua*, 5 feet; *Bambusa gracilis*, 5 feet; *Chloropsis Blanchardiana*, 2 feet; *Eulalia japonica*, 5 feet; *E. univittata gracilis*, 3 feet; *Gymnothrix latifolia*, 5 feet; *Gynerium argenteum*, 5 feet; *Panicum virgatum*, 4 feet; *Melica altissima*, 3 feet.



*Culture.*—Plant in March or April, in good rich well-drained soil, and in sunny positions.

BULBS AND TUBERS.

SPRING BEDDING. — *Crocuses*, *Snowdrops*, *Scilla siberica*, *Chionodoxa*



LILIUM AURATUM.

*luciliæ*, *Tulips*, *Hyacinths* *Narcissus*, *Anemone hortensis*, *Turban* and *French Ranunculus*, *Daffodils*, *Winter Aconites*.

SPRING FLOWERING FOR BORDERS.—Same as for spring bedding, with the additions of *Leucojum vernal*, *Crocus alatavicus*, *Fritillaria Moggridgei*, *Galanthus Elwesii*, *Iris reticulata*, *Bulbocodium vernal*, *Scilla bifolia*,



*Lily of the Valley*, *Solomon's Seal*, *Tritelia alliacea*, *T. uniflora*, *Anemone appenina*, *Iris pumula alba*, *Dodecatheon media*, *Anemone alpina*, *Lilium tenuifolium*, *Fritillaria imperialis*, and *Muscaria botryoides*.

SUMMER FLOWERING FOR BORDERS.—*Brodicæa coccinea*, *Calochortus Bentharii*, *C. mauveanus*, *C. venustus*, *Iris germanica*, *English and Spanish Irises*, *Trillium grandiflorum*, *Gladiolus Colvillei*, *G. ramosus*, *G. venustus*, *G. nanus*, *Hemerocallis Middendorffiana*, *Alstromeria chinensis*, *Hyacinthus candicans*, *Tigridia pavonia*, *T. conchiflora*, *Montbretia Pottsi*, *M. crocosmæflora*, *Tritoma Macowana*, *T. Saundersii*, *Ixias*, *Sparaxis*, *Tritonia aurea*, *Watsonias*, *Leucojum æstivium*, *Anthericum liliastrum*, *Allium moly luteum*, *Iris alata*, *I. Kämpferi*, *Arum dranunculus* (Dragon's Mouth).

AUTUMN FLOWERING FOR BORDERS.—*Colchicum autumnale*, *Crocus nudiflorus*, *C. speciosus*, *C. pulchellus*, *C. irridiflorus*, *Cyclamen europæum*, *Schizostylis coccineus*, *Gladiolus Brenchleyensis*, *Sternbergia lutea*, *Amaryllis belladonna*.

WINTER FLOWERING FOR BORDERS.—*Cyclamen Atkinsii*, *C. hederifolium*, *Iris stylosa*, *Anemone fulgens*, *A. blanda*, *Narcissus pallidus præcox*, *Eranthis hyemalis*.

LILIES FOR A SUNNY POSITION.—*Lilium candidum* (Madonna Lily), white, 3 feet; *L. chalcedonicum* (Scarlet Martagon Lily), scarlet, 4 feet; *L. croceum* (Orange Lily), yellow, 3 feet; *L. elegans*, orange-crimson, 2 feet; *L. monadelphum Szovitzianum* (Crimson-anthered Lily), yellow, 2 feet; *L. tigrinum* (Tiger Lily), orange, 6 feet.

LILIES FOR A SHADY BORDER.—*Lilium pardalinum* (Panther Lily), orange-crimson, 5 feet; *L. auratum* (Golden-rayed Lily), white, purple, and yellow, 4 feet; *L. Hansonii* (Hanson's Lily), orange, 4 feet; *L. canadense* (American Wild Yellow Lily), orange, 3 feet; *L. testaceum* (Nankeen Lily), yellow, 5 feet; *L. Martagon* (Martagon Lily), scarlet, 3 feet.

*Culture*.—Plant the spring flowering bulbs in October and November; summer kinds in February and March, autumn ones in April or May, winter sorts in July or August. In planting the liliiums, dig out a hole eighteen inches deep and fifteen inches wide. Put six inches of manure in the bottom, and six inches of soil on this; then arrange three bulbs at equal distances apart, and cover with soil. In the case of *L. Hansonii* and *L. pardalinum*, fill the hole with a compost of equal parts loam, peat, and leaf-mould; and



with equal parts of peat, leaf-mould, and sand for *L. canadense*. Plant the lilies in November or March.

TENDER BEDDING AND BORDER PLANTS.

FLOWERING PLANTS FOR BEDS.--*Zonal Pelargoniums, Petunias, Fuchsias,*



CHRYSANTHEMUM PALLENS.

*Heliotropes, Gazanias, Ageratums, Lobelias, Verbenas, Lantanas, Ivy-leaved Pelargoniums, Tuberous Begonias, Zinnias, Indian Pinks, French Marigolds, Ten-week Stocks, Marguérites.*



COLOURED-LEAVED PLANTS FOR BEDS.—*Golden Pyrethrum*, *Perilla nankinensis*, *Iresine Lindenii*, *I. Herbstii*, *Mesembryanthemum cordifolium variegatum*, *Centaurea ragusina compacta*, *C. Clementii*, *Cineraria maritima*, *Coleus*, silver, golden, bronze, and tricolor-leaved, *Pelargoniums*, *Alternantheras*.

TALL PLANTS FOR BORDERS.—*Single and double, Show, Fancy, Cactus and Pompon Dahlias*, *Marvel of Peru*, *Humea elegans*, *Nicotiana affinis*.

CLIMBING PLANTS.—*Cobœa Scandens*, *Eccremocarpus scandens*, *Tropæolum Lobbianum*, *Lophospermum scandens*, *Thunbergia alata*.

LARGE ORNAMENTAL FOLIAGED PLANTS FOR SUB-TROPICAL GARDENING.—*Acacia lophantha*, *Ricinus Gibsoni*, *R. communis*, *Grevillea robusta*, *Fatsia japonica*, *Chamærops humulis*, *Agave americana*, *Caladium esculenteum*, *Cordyline australis*, *Phormium tenax*, *Solanum robustum*, *Yucca aloifolia*, *Cannas*, *Hedychiums*, *Carex japonica*, *Eulalia japonica variegata*, *Abutilon Darwinii*.

PLANTS FOR CARPET BEDDING.—White leaved: *Antennaria tomentosa*, *Cerastium tomentosum*, *Dactylis glomerata elegantissima*, *Kleinia tomentosa*, *Leucophytum Brownii*, *Cineraria maritima compacta*. Crimson: *Coleus Verschaffelti*. Glaucous: *Echeveria glauca*, *Sedum glaucum*, *S. dasyphyllum*, *Pachyphytum bracteosum*. Carmine: *Alternanthera amœna*, *A. magnifica*. Yellow: *Lysimachia aurea*, *Mesembryanthemum cordifolium variegatum*, *Golden Pyrethrum*, *Sedum acre elegans*, *Stellaria graminnea aurea*. Orange: *Althernanthera paronychoides*, *Nertera depressa*. Blue: *Lobelia and Kleinia repens*. Green: *Cerastium arvense*, *Sedum lydium*, *Sempervivum montanum*, *S. calcareum*, *Pyrethrum Tchihatchewi*. Purple: *Iresine Herbstii*, *I. Lindenii*, *Ajuga reptans purpurea*, *Perilla nankinensis*.







A sounding grotto, vaulted, vast,  
O'erstudded with a thousand, thousand pearls,  
And crimson-mouthed shell with stubborn curls  
Of every shape and size, even to the bulk  
In which whales harbour close, to brood and sulk  
Against an endless storm. Moreover, too,  
Fish—semblances of green and azure hue,  
Ready to snort their streams.

KEATS.

## CHAPTER I.

THE aquarium is an established household ornament ; and fully entitled to the first place in the list of recreations we have engaged to discourse upon. It graces the drawing-room, the conservatory, and the greenhouse ; is a welcome and highly-prized addition to the student's resources in the acquisition of knowledge ; it extends the sphere of domestic education for the young, enlivens the solitary hours of the invalid, and gives delight to everybody.

Considered as a domestic ornament it is insurpassable, and, while in its humblest form it presents a constant succession of beautiful and novel objects, so to all the accessories of artistic decoration it adds the charm of life in some of its most beautiful and strange developments. The merest



glimpse of water is always refreshing to the eye ; its clear, cool aspect, the mingling of many colours and forms ; the peculiar growth of aquatic plants, and the still more curious forms and movements of aquatic animals, combine to form an assemblage of delightful and ever-changing pictures. The Naiads need no longer dwell in forest lone, dipping their white feet in streams haunted only by the robin and the humble bee, but may sport in gay drawing-rooms, in homely parlours, in the study of the recluse, or the chamber of the valetudinarian. No longer need they fear winter storms and March hurricanes, but shall henceforth have homes within sheltered walls, impervious to frost, and shadowed by curtains, where love whispers, and young children play.

To the naturalist the aquarium opens up new studies of the choicest wonders of the deep sea. Those departments of zoology which have for their regard the creatures of mid-ocean, or even of the pebble shore, have hitherto made the slowest and least satisfactory progress of any ; now they are to experience a "sea-change," for the dredge brings up the

"Pale glistening pearls, and rainbow-coloured shells ;"

and by the preservation of the creatures in their own element, and under circumstances approximating in character to those in which they were produced, we may study their habits and economy even to the minutest particulars.

It is mostly in the season when the deep green of summer begins to wane, and the first tinge of autumnal orange appears like a blotch of lost sunshine on the landscape, that our thoughts revert to the vast, and unchangeable, and mysterious sea—

"The glorious mirror, where the Almighty's form  
Glasses itself in tempests."

Unchangeable it is, though relatively ever changing ; unchanging in its character, its office, and its plenitude of life, yet changing to us in its many moods of storm and calm, the glittering of its white foam in the sunshine, and the roar of its stormy waters in the awful darkness. We have never seen enough of the sea, for it never tires, though we visit the same bay, or the same creek, or the same breadth of snow-white beach, day after day ; for the water has a life of its own, and its successive phases of playfulness,



rolling grandeur, gentleness, and power, chain the mind to it; and while intellect strives to master some of the problems its phenomena suggest, the imagination and the fancy find therein inexhaustible poetry, indescribable beauty, and all the elements of fear, and joy, and wonder, and repose. Besides its own individual life, which compels us to invest it with some of the attributes of a creature gifted with purpose and volition, and capable of both love and hate to man, it holds another life within it, which the mind reaches after, which the hand reaches after, and, like another and a new creation, demands that man should stand in the midst and name the creatures. The fresh sea breeze—the calm expanse of blue, shading into mists flaked with distant sails on the horizon—the towering moorland and the grandeur of the cliffs, that show the scars of centuries of storm and battle—the music of the breakers, following in quick succession along the yellow strand, maintaining there a constant line of whitening foam—the vastness of the expanse, and the nothingness of man in the presence of it;—these do not suffice us as we stand upon the shore, yearning after knowledge of the creation that is hidden in the depths. There is one comfort: the conquest of the earth, given to man as a high and blessed privilege, extends to the sea also; it is to him a storehouse of wealth, to be sought in danger; and a storehouse of wisdom, to be explored in reverence; every one of its strange people offering a fresh lesson of the infinite goodness and infinite power of the Source of all things.

It is in this search that we betake ourselves to the aquarium, and find it of priceless value, because it places before us for daily observation, in the quiet retirement of our homes, things born and nurtured in the depths of great waters, and enables us, in places far away, still to believe that the sea is near us in the tiny imitation of it we have set up for our amusement. The marine aquarium ranks as much higher than the river aquarium as the sea itself transcends in glory the smallest of the hillside rivulets that hurries towards it as its final home. The range of subjects it embraces is a hundred-fold more extensive and wonderful than the river tank can ever be, and it provides occasion for the study of creatures that lie out of our ordinary path of observation, and which charm us by their novelty and beauty no less than by their structure and habits and several phases in the order of created life. Therefore the setting up and managing of a marine tank is a higher task than that of furnishing one with fluvial subjects, and, like all other such enter-



prises, it is less easily accomplished, and calls for a larger exercise of judgment, and a more complete knowledge of first principles.

As it is not intended to treat any subject scientifically in this volume, the reader is desired to dispense with discourses on the reciprocity of influences, chemical, mechanical, and vital, concerned in the maintenance of "the balance" which it is the first object of the manager of an aquarium to secure. Neither shall we attempt to trace the history of the experiments by which this valuable auxiliary to scientific study has been established on so firm a basis that the aquarium has become a public institution; and no one interested in the subject would willingly forego the pleasure of visiting Paris, Hamburg, and Berlin, expressly to see what has been accomplished in this respect in those cities. A good public aquarium is a thing as yet unknown in the British Islands, but we may, at all events, learn how it should be constructed and managed by the examples afforded in continental cities. The aquarium is to be regarded here as a recreation, and though we must be practical, we need not be dry, and we do not intend to indulge in technicalities or scientific disquisition beyond the most obvious necessity of the practical treatment required.

An aquarium, whether filled with fresh or salt water, and no matter whether large or small, is a prison; and as birds in cages require special care to compensate them for confinement, so gold-fishes and sea-anemones must be looked after, with love of course, for there can be no success without that, but also with skill, for the merely putting so many creatures into a tank is not to establish an aquarium. A few fundamental principles must be borne in mind at every stage of the enterprise. These may be explained in few words. In the first place, then, all the inhabitants of the waters, the lively fishes, the sleepy actiniæ, the awkward crabs, all without exception, *breathe atmospheric air*. It is true they do not gulp in dry air as we do, but they sift out, as it were, from the water, the air contained in it, and if it so happens that it contains none they die, and there is an end of them. It is usually said in the books that it is absolutely necessary to keep healthy vegetation in an aquarium for the purpose of generating oxygen to supply the animals with the means of breathing. It will be shown further on that this is not absolutely necessary, and in some cases not even desirable. Nevertheless, oxygen the animals must have, and to secure its constant presence in the tank must be the first care of the keeper of an aquarium.

Remembering that the tank is a prison, we must remember also that prisons



are hurtful to life if over-crowded. In the measureless volume of the sea itself, there is a measureless and inexhaustible supply of oxygen for all the inmates of the depths. Every crest that forms on the top of a wave, every streak of froth and foam, consists of atmospheric air entangled in the water. There is no such agitation of the surface of the water in a tank to refresh it in this way unless artificially produced; nor does the fresh breeze play over it perpetually; nor can it nourish forests of vegetation as the sea does, serving as breweries of oxygen for its stores of animal life. It follows from these considerations that an over-crowded tank is likely to become a dead-house. The prudent practitioner will always keep fewer animals in a given space than might be kept, rather than proceed to the other extreme, and risk the whole through aiming at too much.

The question is of the utmost importance. It is a matter of common experience and observation that small quantities of water are quickly affected by changes of temperature, while large bodies are affected slowly, and never to such an extent as the smaller quantities. A small river varies in temperature more quickly and extensively than a large one, and all rivers vary in temperature more than the sea in the same latitudes. The larger the aquarium, therefore, the safer is it against extremes of temperature. Moreover, if built of heavy materials that are comparatively non-conductive of heat, the safer will it be during periods of great heat in summer, as, before the heat of the day can penetrate the mass, the cool of the evening will have returned; and perhaps the opening of a window, and the sprinkling of water on the outside of the vessel, may suffice to keep the temperature to a safe standard. Slate is one of the best materials for marine tanks, because of its great power of resisting sudden changes of temperature. Metal is the most convenient material in which to make rectangular vessels, but it is not the best in other respects, though in many cases it may be used with safety and advantage.

Between marine and fresh-water aquaria there are many distinctions independent of the radical distinctions indicated by their names. The aëration of a fresh-water vessel is a matter of comparatively small consequence as compared with the difficulties that arise through deficiency of oxygen in a marine aquarium. So again, variations of temperature are less hurtful to fresh-water than to marine animals, and metal tanks may be employed for river fishes, though most unfit for genuine mariners. Other distinctions will be pointed out as we proceed. It is sufficient for the present that we have regarded the aquarium



as a world in miniature, subject to influences the same in kind, however different in degree, to those which prevail in the economy of the great depths where God has hidden, as it were, many of His most wondrous handiworks, as He has also hidden knowledge of other kinds from us until we for ourselves search it out.

Our little systems have their day ;  
They have their day, and cease to be :  
They are but broken lights of Thee,  
And Thou, O Lord, art more than they.







## CHAPTER II.

### TANKS FOR MARINE AQUARIA.

I see the shipwrecked mariners, a bold Phœnician band,  
Gathered around their sea-weed fire, upon the ocean strand ;  
And mark the wonder and amaze their dusky features wore,  
When the first glass before them lay upon the sandy shores.

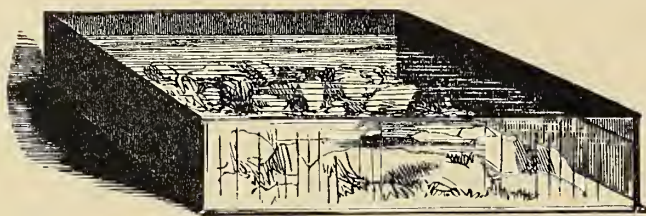
ELIZABETH PRIDEAUX.

**A**N aquarium must be constructed with a view to the particular purpose it is intended to serve. As remarked in the general observations on first principles, one and the same form of vessel will not answer equally well for marine and fresh-water collections. Marine creatures are not so easily kept as river fishes, and the dimensions and forms of tanks are matters of the very first importance. For instance, we may have river tanks of any depth without fear of losses, because the supply of oxygen can be obtained more readily and more abundantly ; and the tanks will bear more light than would be safe for marine vessels. Besides this, the inhabitants of river tanks are possessed of higher powers of locomotion, and can travel where they please within the limits of the vessel ; but a sea-anemone, or a star-fish for example, will be likely to travel to the bottom, and die there, for want of the life-sustaining element. Therefore it is important that whatever are the dimensions or forms of marine tanks, *they must be shallow* ; and the object sought in determining



their forms and sizes should be to expose as large a surface as possible to the atmosphere, consistent, of course, with the cubical contents of the vessels. If they were made so shallow as to afford only just sufficient depth for the creatures to be quite immersed, it would be far safer than to proceed in the other direction, of giving more depth than needful. Take account of whatever aquarium failures you can remember amongst your friends, and you will invariably find that the vessels which caused the most trouble and gave the largest per-centage of losses, were over a foot deep; and if we adopt for marine stock the rectangular vessels that were made in plenty when the aquarium first became popular—vessels that were generally constructed with four sides of glass and a depth equal to half or more of their length—we shall consign to the tomb every item of marine stock committed to it. Instead of preservatives, such tanks are sepulchres; river fishes may need no better, but marine zoophytes soon perish in them.

You must have observed, if at all conversant with these pursuits, that marine



RECTANGULAR ROCK-POOL TANK.

zoophytes consigned to a glass or earthenware dish while the tank is being prepared them, exhibit every sign of vigorous health. When transferred to the tank the trouble and vexation begin; the conclusion may be drawn therefrom that the dish is the best

place for them, and the tank the worst. It is a common mistake to consign marine animals to deep tanks in which they are more likely to perish than prosper. True, the sea is deep, and true also that most of the creatures kept in tanks are from its shores, where they are often laid bare by the receding tide, or with the merest film of water over them, to preserve them cool and moist in the sunshine. But there is another reason why we must not be led astray in supposing that deep vessels offer the best conditions for our purpose. The sea is too vast a mass in itself to bear comparison as to its internal economy with a tank containing a few dozen, or even a few hundred, gallons of water. Its constant motion suffices to entangle and carry far down below the surface immense supplies of atmospheric air, and its abundant vegetation insures the most complete aëration of its waters. Therefore, for the pelagic or deep-sea life, shallow tanks are still the best, and if you are at this moment puzzled how to make a deep vessel answer for marine stock,

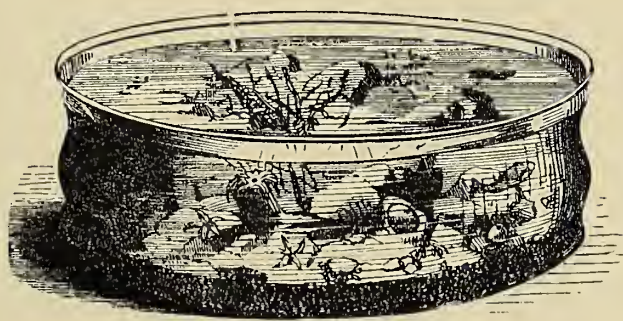


give it up, and provide yourself with one of proper make and character. These shallow vessels, made expressly for beginners, may be imitated in an expensive way by means of a glass dish, an earthenware foot-bath, or any other vessel not metallic, of similar form and dimensions.

The very best and cheapest ready-made vessel in which to preserve a few sea anemones is a glass dish, such as is used in dairies for cream, or the glass which forms the lower half of a common fern-shade, as here figured.

From this simplest of all forms of vessels, let us proceed another step. The tanks with four sides of glass admit a vast deal too much light, which is not only injurious to marine animals, but causes the vegetation to become rampant and unmanageable. Instead of a velvet-like growth of minute *Algae* on the rock-work, involved ropes of *Confervæ* appear, or, what is worse, the water becomes opaque with "green stuff"; there are more spores set free than can find resting-

places, and they float in the liquid, and make it of the consistence of pea-soup. Light alone must not have all the blame, for heat is also a powerful agent to bring about such a state of things. It is evident, therefore, that the heavier the vessel is in bulk, proportioned to its size, the more slowly will it be affected



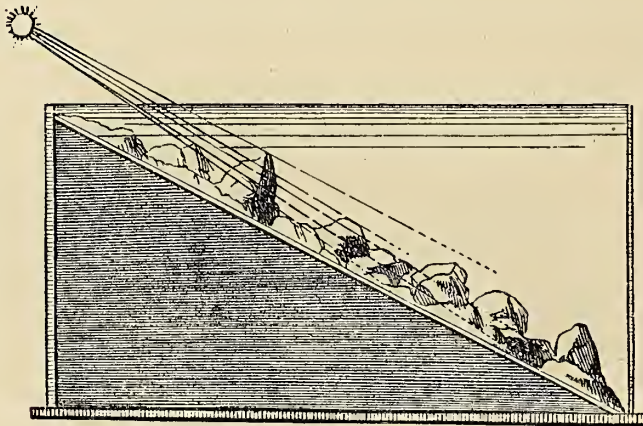
CIRCULAR GLASS ROCK-POOL TANK.

by heat; a heavy non-conducting opaque material should largely predominate in the construction of the tank, and nothing has hitherto been found so suitable as slate. The lighter and more fully illuminated the vessel, the less is its value for marine purposes; it must be heavy, and but partially open to the effect of light, and then an equable temperature is obtained, and a more constantly pellucid state of water. Mr. Warrington's name must have honourable mention here, as the inventor of the slope-back tank, which realizes the conditions of success more completely than has been accomplished by any and every other means.

The object sought to be accomplished by this form of vessel is a closer imitation of the conditions under which marine animals exist in their native waters. *There* the light which reaches them is wholly vertical, or at least the laterally-refracted rays are but of small account. In the



slope-back tank the back and ends are of an opaque material, and light is admitted from above only, so that the tank is in itself the closest possible imitation of a rock-pool, with the advantage of affording an uninterrupted view of the contents. The form in which these tanks were originally made has been improved upon, as shown in the annexed cut. After the shallow square tanks and the glass pans, these are certainly the next best in efficiency; and, so far from being inelegant, nothing can surpass or even equal the beauty of the scene they present when well stocked, the subdued light being in favour of the view rather than against it. Were it otherwise, the health of the inmates would be a sufficient compensation, for in a matter of this sort it would be absurd to advocate any form of vessel, however elegant, which did not fulfil the conditions essential to the preservation of the creatures.



WATER CHAMBER TANK.

Let us consider for a moment what are the advantages of this form. Owing to the slope of the back it can be fitted and unfitted more quickly than any other kind of vessel, except the little shallow ones already described. In fitting rockwork, not a particle of cement is needed; hence, instead of losing the whole stock two or three times

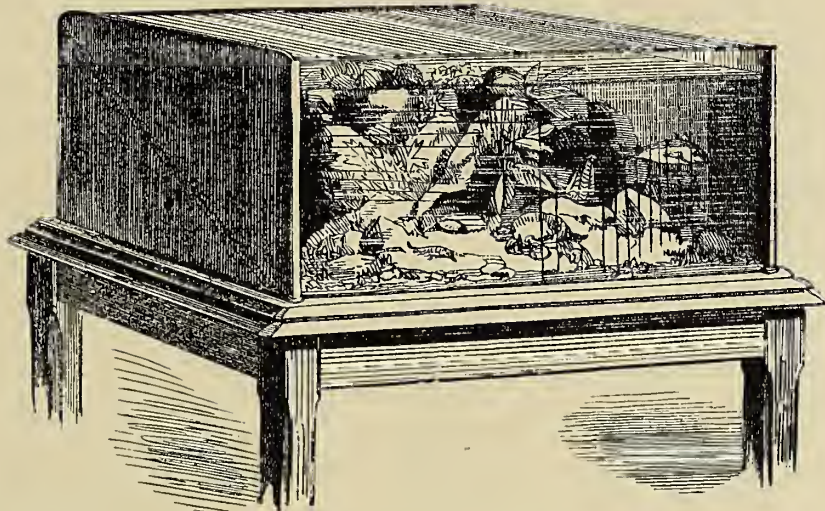
over, as is the case sometimes when cement has been used, and has been supposed to be properly seasoned, the risk from that danger is reduced to *nil*. Any rough non-metallic mineral may be piled upon the slope in a few minutes, tufts of *Algæ* inserted if desirable, and removed again when they decay, without the smallest disturbance of the general furniture. Better still, the most beautiful and appropriate background may be made up of old serpulæ, oyster, and other shells; blocks of coral, and such light rough *debris* as will be sure to accumulate in the hands of an aquarian. Oyster shells, incrustated with serpulæ, balanæ, and other small marine masons, add nothing to the weight of the vessel, yet serve all the purpose of heavy rockwork; and if the spontaneous vegetation so necessary to the success of the tank does not appear on them with sufficient profusion,



a few pieces of mica-schist may be mixed with them and left alone, and there will soon be plenty.

Another advantage of these tanks is their strength. When properly made, they will last a lifetime without becoming leaky, which cannot be said of any vessel having four sides of glass. Perhaps four-fifths of the glass tanks made and sold at the first start of the aquarium are now in lumber-rooms inhabited by spiders, and the majority of their owners have given up aquarium pursuits, under an impression that the construction of water-tight tanks is an impossibility; whereas the Warrington tank, having three sides of slate, can be made sufficiently strong to endure a lifetime. The amateur who constructs his own vessel must be on his guard against the folly of attempting to make it light; the heavier the better, consistent with neatness and soundness of the joints.

A still more important advantage of the slope-back tank is the equable temperature of the water within it. Even if the sun's rays be allowed to play on the back of the vessel—which they should



WATER CHAMBER SLOPE-BACK TANK.

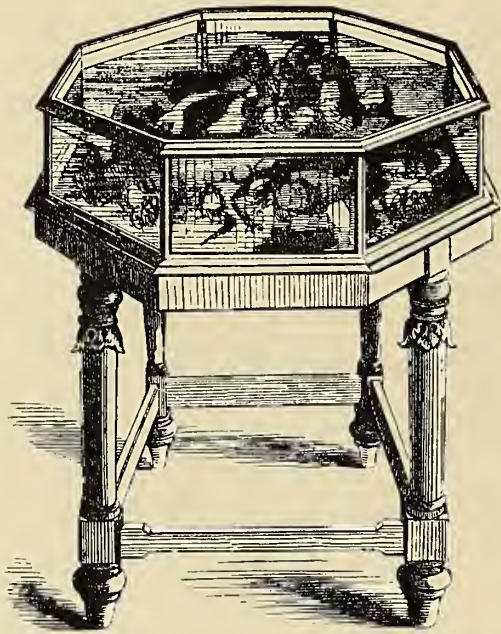
not—there is so large a bulk of slate for them to heat before the water can be affected, that there are no sudden changes of temperature to destroy the lives of the inmates. Vessels of this sort are therefore essentially *cool*, and during the trying months of July and August marine animals will endure the heat with patience, when, in any vessel having glass sides, they would perish rapidly.

The improvements since effected have rendered this form of vessel still more acceptable than it was originally. On the principle that the larger the bulk of water the greater the variety of creatures that may be preserved in it, a form was adopted by which the triangular space under the sloping back is converted into a water chamber, communicating with the space in front. Into this chamber none of the animals can find access, and in one sense the



bulk of water it contains may be regarded as a reserve, the whole of which can be pumped into a tank proper whenever, by the death of an animal or other causes, the water there has become impure. A further advantage of the water chamber, in addition to the increased resistance to changes of temperature which the increased bulk of water offers, is a rapid restoration to purity which the water undergoes in it, and the obliteration in the course of a few hours of that peculiar malady of the marine tank, known as "pea-soup greenness," the result, generally, of the too free admission of solar light. Should the tank become cloudy by the presence of an excess of microscopic sporules, the whole can be changed from the light to the dark chamber, and

*vice versâ*, by the action of a small pump; and thus, in case of any accident, there is a reserve of fresh sea-water ready, without fetching or carrying, in the body of the tank itself. Being comparatively shallow as to other dimensions, there is a large surface exposed to the action of the atmosphere; and by adding a glass cover, to be raised or lowered by means of a cord and pulley, all the conditions of success are insured by the simplest possible arrangements.



OCTAGONAL TANK FOR CRUSTACEANS.

For special purposes other forms of tanks must be used. It is not advisable, for instance, to associate together crustaceans and anemones, and instead of the slope-back tank, which is unequalled for the latter, the former are most conveniently preserved in shallow octagon tanks, which are fitted with rockwork rising above the surface of the water, so as to allow the creatures to leave the water entirely, and scramble about on the rocks above the surface. If a cover be needed to prevent escape, one of wire gauze, fitted on a movable frame-work, would be the best. If a glass cover is used, it should be in two or more pieces, placed sufficiently far apart to admit air, and raised above the level of the edge of the tank at least a quarter of an inch, so that the air may circulate underneath it.

In the furnishing of aquaria, whether for marine or fresh-water life, the



simplest arrangements usually prove the best ; and it is advisable to avoid the use of cement, if, by any possibility, the intended design can be carried into effect without it. Blocks of water-worn stone and old serpulæ and oyster shells can be easily worked up into picturesque rockeries without the aid of cement ; and it is equally easy to provide places of concealment for creatures that love to hide, by merely lodging a flat stone or large shell in such a position as will allow the creatures to enjoy the shelter and still remain within view. If, however, cement must be used, let it be the best Portland, mixed with two or three times its bulk of sand. As it hardens quickly, but a small quantity should be mixed at one time. It is a bad plan to construct an elaborate rockery in a tank, for we do not know how soon we may wish it away, and find that in this particular case it is less easy to destroy than to construct. It is better to construct the affair in separate blocks, which will fit together in the tank without being made fixtures. Empty flower-pots form good centres for blocks of rock-work, affording strength and a firm base without weight. Common coke washed with cement to alter its colour is an excellent material for small rockeries, being extremely light and manageable. All cemented work should be steeped in fresh water in the open air for at least a fortnight before being consigned to its final place in the aquarium.







### CHAPTER III.

#### THE FORMATION AND MANAGEMENT OF A MARINE AQUARIUM.

Here too were living flowers,  
Which like a bud comparted,  
Their purple lips contracted ;  
And now in open blossom spread,  
Stretched like green anthers many a seeking head.  
And arborets of jointed stone were there,  
And plants of fibres fine as silk-worms' thread,  
Yea, beautiful as mermaid's golden hair,  
Upon the waves dispread.

SOUTHEY.

THE beauty of a richly-stored and well-kept aquarium is sufficient to recommend it to one who would have a "home of taste." But perhaps it will be best enjoyed, because best understood, by one who has collected its materials in sea-side rambles and dredging expeditions, and who regards it as an aid to study much more than an adornment of the house. Our business is to consider it rather as a recreation and an ornament than as a depository of scientific truth, and therefore we shall not attempt any systematic description of the forms of life it presents to our notice as a microcosm of the all-embracing sea. It must be borne in mind that, whatever may be the primary object of the possession of an aquarium, judicious management is a matter of the first importance. The



scene, however beautiful at first, will soon change, unless every needful precaution is observed from first to last, and so if we turn from the scientific aspect of the subject, we must not cease to comply with those requirements in matters of management, which the scientific aquarian finds essential to success. Many of these requirements have been explained already; and indeed for a first fair launch in practice the reader has sufficient information in the preceding chapters; yet it seems that we may make a few more observations with advantage, in order to gather up a few generalities connected with the actual work of forming and keeping a marine collection.

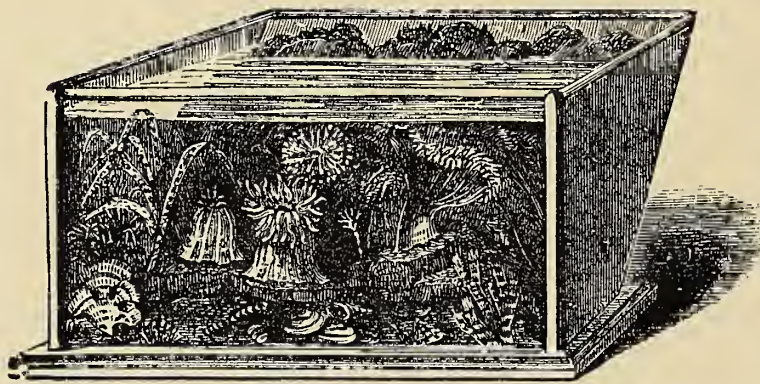
The pleasant way to form a collection is to turn collector; to haunt the shore and skim the surface, and drag the bottom of the sea—with such nets, dredges, jars, and baskets as suit the scene, the seasons, and the collector's turn of mind. This is a pastime for all seasons, but of course is most practised in autumn, for then the seaside becomes the home of thousands who at other times are far removed, and it may be, in their town residences, as much estranged from ruralities as from the less familiar scenery of wave-washed cliffs and sandy beach. The best seasons for collecting are summer and autumn, so our social customs do not jar with this pursuit.

It will be a very poor coast indeed that will give nothing suitable for the aquarium. Amongst unfrequented rocky inlets where many tide-pools are formed will be found the richest harvest. The bleak and bare reaches of sand and mud that connect low-lying coasts with the sea are usually comparatively barren, but rocks are fruitful, and even sand and mud are never utterly barren. It is well to know what to collect, or at all events what to keep. We may pick up all sorts of things for amusement, and be instructed by our observations of their character, but it is not every product of the sea that may be obtained in this way that is adapted for the aquarium. For example—the example being an unwelcome one—scarcely any sea-weeds, of whatever kind of colour, will live for any length of time in a tank. My own rule of action is to exclude from the tank every scrap of vegetation except such as is actually produced in the vessel itself—its own spontaneous growth. But at first start, and in forming temporary collections, whether to be abandoned when the season is over, or to form the nuclei of permanent collections, a few of the small-growing green weeds will be useful. Two at least may be specified as the



best of their class, namely, the sea lettuce, *Ulva latissima*, and *Enteromorpha compressa*. The first is a riband-like plant, the second grass-like; both of them are of a rich light green colour. These must be obtained on small blocks of stone or on old oyster shells: if torn from their footholds they are sure to perish.

Probably the very first animal that will be captured will be the common Beadlet, *Actinia mesembryanthemum*, which is almost everywhere abundant, and seeks no concealment, being exposed for hours together between tide-marks when the tide is out. This anemone bears confinement with complacency, and is therefore most valuable. Moreover, the species varies so much that the several varieties constitute in themselves a pleasing collection, affording rich tints of brown, red, green, olive, and buff. The Beadlet may be



SEA ANEMONES IN SLOPE-BACK TANK.

considered the pioneer, both for its fellows of the sea who are to follow it to the tank, and for the happy possessor, who by observation of its habits will learn how to deal with other anemones that are less hardy. Therefore this very "common" creature must never be despised, and it will afford

a pretty pursuit to search for the varieties, and a study calculated to lead to a broad perception of the teachings of the aquarium, to determine their specific identity with the type. A shallow vessel, such as a glass milk dish or the lower part of a glass fern shade, with two or three tufts of *Enteromorpha compressa* and half-a-dozen Beadlets, may be considered a good aquarium for a beginner.

In capturing anemones some tact and judgment must be used. The safest way always is to chip off, by means of a hammer and chisel, a block of the stone on which they are seated. This is sometimes an easy task, oftentimes difficult, occasionally impossible. Certain of the more delicate-habited species are pretty sure to die if forcibly removed from their holdings, but these we need not enumerate. It is sufficient to say that by far the larger proportion of all that are ordinarily met with may be detached by carefully working beneath



them with the thumb nail, and provided the base of the animal is not injured they will rarely be the worse for it. The blunt end of a large pewter spoon may be used as a persuader to remove anemones with good effect, but the greatest care must be taken; there must be no hurry, the shrinking pulpy creature must not be torn; and although, perhaps, as to sensation they occupy a very low place, we will say they should not be tortured; and it is wanton waste of time to tear them off rudely, for that is simply to kill them.

More abundant than anemones on some coasts are such mollusks as the top, the winkle, and the limpet. These should never be collected in any great quantity, for they are likely to die, and their rapid and offensive putrescence may kill all else in the tank with them. I have kept winkles and tops in a tank for years, but it needs experience to determine the best mode of procedure: attention they really do not need, if the affair is made right in the first instance. If you can afford to appropriate a tank expressly to them you may hope for success. Then fit up a bank of old serpula shells, oyster shells, and bits of mica schist over a bed of clean pebbles, have no weeds at all, place the tank *opposite* a window, so that the only light that reaches it is that which has passed across the room, and with much water and few mollusks all will go well. The spontaneous growth will suffice for their maintenance, and you may find much entertainment in watching their movements. The mode of feeding of these creatures is a most interesting study: the tongue of the winkle is a marvellous construction.

Shore crabs are abundant on sandy and shingly coasts, and easily captured. In rock-pools Soldier crabs, and in deeper water Hermit crabs abound. These are grand acquisitions where a tank can be appropriated to them, but they do not group well with anemones, except under skilful management. But their near allies, shrimps and prawns, are well suited for a mixed collection, and you will easily obtain them, if not by actual capture, by means of a small fee to a shrimper. Their weird outline and ghost-like movements add very markedly to the attractions of the aquarium, for whatever moves in the miniature sea is fascinating and sustains its interest.

Star-fishes are rarely captured by the sea-side wanderer. We must go out and dip for them, and when we obtain them we may reasonably fear that they will rather die than live. So too of fishes, yet a few blennies and sticklebacks captured in a rock-pool will be well worth keeping, if a large bulk of water can be afforded them; their pretty gambols and occasional mischievous freaks will



furnish dramatic scenes for general entertainment, and arrest the attention of the least studious members of the household.

After all, sea anemones (see p. 254), are most to be desired, and the choice afforded even to the merest tyro is a large one. The hardy Beadlet, already referred to, the pretty gem (*Bunodes gemmacea*), the daisy (*Sagartia bellis*), the cave anemone (*Sagartia troglodytes*), and the great plumose anemone (*Actinoloba dianthus*), afford examples of species unsurpassed by all the rest in beauty, yet all so hardy that they need but little skill to keep them in health and vigour for years. In truth, useful as are many of the smaller kinds for the sake of variety, and because, if we love these things at all, we hunger for as many as can be got, the plumose anemone is the

grandest of the group, and a marine aquarium of any pretensions is incomplete without it.

In the conveyance of sea-side gatherings there must be as much care taken as in obtaining them. Such things as baskets, bottles, and jars, will naturally suggest themselves as useful. As a matter of course also, there will be need for sea-water (artificial sea-water is never to



STAR FISH AND ALGÆ.

be thought of if the real article is obtainable) for the use of the creatures captured. But it is well to bear in mind, that with the exception of fishes, which must be conveyed in water, almost everything else will travel more safely packed in wet sea-weed, more especially as when so treated they are not liable to injury by being shaken about as when immersed in a body of fluid that must be more or less agitated. Anemones will live for several days in a mass of wet sea-weed; shore crabs and shrimps will hold their own for several hours under the same conditions. There need be but little conveyance in water, and when that plan is adopted, it is advisable to employ a sufficient number of vessels to avoid over-crowding, and also to allow of some kind of classification to prevent warfare and its



accompanying destruction. One precaution must always be taken, namely, to pack the stock in such a way as to lessen to the utmost the probability of jarring and attrition; a rough piece of rock, for instance, may chafe a few anemones into a lifeless paste in a very short time if in contact with them, and subjected to the jolting of a fast train.

In the stocking of a tank, the first essential is to avoid over-crowding. It is important also to keep in separate vessels animals that are likely to make war upon their neighbours. Little fishes, for example, have but small chance of their lives in a collection of anemones: they may at any moment be caught by the tentacles and tucked into the appropriating cavity, without having time to fight for it or even sigh for deliverance.

To keep the water bright and always at the same standard of density are easy tasks, needing regular attention more than peculiar skill; the deeper the vessel the more difficult will it be to maintain in the fluid a sufficiency of oxygen. My own idea of a well-managed tank is, that with the exception of feeding the animals and a little occasional cleansing, one that manages itself—one, for example, that never needs artificial aëration. The removal of the dead is of course to be accomplished as soon after a death occurs as the fact becomes known. But there may be observed a general languor of the inmates; this will indicate insufficiency of oxygen. The remedy for this is aëration. A simple though tedious way of impregnating the water with atmospheric air, is to dip with a jug and pour back from as great a height as possible without injury to the surrounding furniture by splashing. This should be continued as long as possible, and should be frequently repeated. Another method is to employ a garden syringe or a common squirt; the instrument should be filled and the water ejected into the tank with force, taking care that it passes through some space before reaching the surface, in order to ensure the entanglement of air with the water ejected; this also is a tedious work and must be continued for a long time and be frequently repeated. There is yet a third mode, a self-acting system, which may be kept at work day and night, and generally speaking it answers well. Procure any kind of vessel of glass or porcelain that can be adapted to the purpose, and that will not by its unsightliness make the aquarium ridiculous. It may be possible to place it out of sight above the tank in a position where it can be conveniently got at as required. The vessel must hold a body of water—say a pint, a quart, a gallon, according to the size of the aquarium. It must also discharge the water into the vessel below it, in a succession of drops or in a fine stream



—thus carrying with it constantly a certain amount of atmospheric air. A jar fitted with a bung in which a small hole has been pierced will be found the simplest and most easily obtained form of dropping aëratèr. It scarcely need be said it must be suspended mouth downwards. Better than that is a bell-glass of the kind made for bee-hives, the top being perforated for ventilation. Into the ventilating hole fit a cork that will allow the water to pass in drops. Suspend it by a cord passing over a pulley. Fill it at the surface, and draw it up; when empty fill again, and so on for ever.

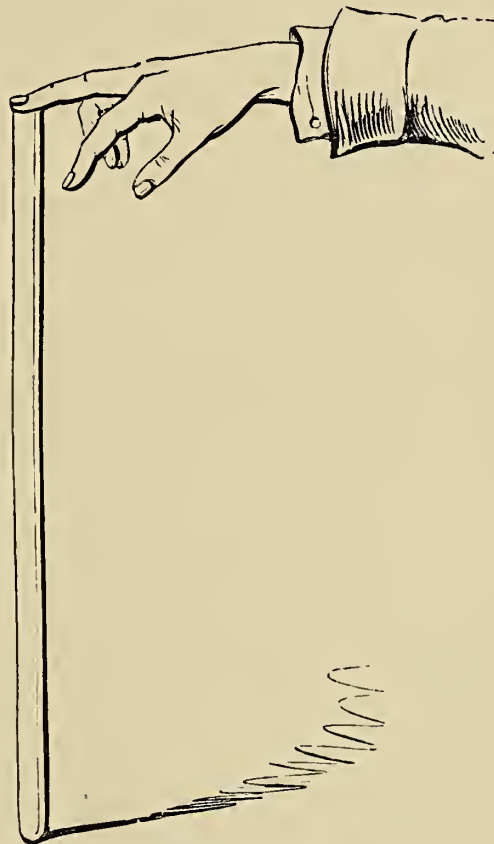
The feeding of the animals must not be neglected. The best food is the fresh flesh of a mussel or oyster cut very small. Lacking such pabulum, minute morsels of raw mutton or beef may be employed, but no vegetable substance is admissible. For example, a few crumbs of bread may be considered poison to a marine aquarium, though in a river tank such food is always acceptable in moderation. It will not do to drop in bits of meat, whether of oyster or mutton, indiscriminately. The little morsels must be guided to the mouths that are to eat them. The always hungry opelet, *Anthea cereus*, will almost always eat all it can get, and help itself to a little fish occasionally as well. Many of the smaller kinds will never take a scrap of food when it is offered, but will close their flowery tentacles as the meat reaches them, and there it will lie untouched for hours, perhaps will never be taken at all. It is of the utmost importance to study the art of feeding, for every scrap of food is a possible element of mischief, its rapid decomposition may render the water turbid and poisonous, and cause the death of every creature in the tank. If you are not already tired of directions, please pay attention to what follows. Anemones are not naturally accustomed to butchers' meat, and hence they are apt to deal with it differently to food they are born to. A limpet may be sucked in alive, all its soluble parts may be appropriated, and the shell at last cast out as "rubbish to the void." The anemone has but one orifice. It takes food and absorbs from it all the nourishment it contains, and casts up what remains. Observe the consequences: when you give them morsels of meat they may or may not take them in; but if they do, they cast them up again. Now, do not, when you see the little mites of white meat lying upon their tentacles, or on the pebbles beside them, hastily conclude they have not been accepted, for the probability is, that they have been swallowed and digested, and are but the gastric ghosts of what they were. However, the lesson of the case is that these unsightly bits must be removed, and there is a very simple way of accomplishing it by the use of the dipping tube. This is a glass tube



half an inch in diameter, open at both ends, employed in dipping as represented in the figure. Lower it carefully with the finger applied until it is exactly over the object to be removed. Then lift up the finger, and the water will rush in, carrying with it the fragment. Apply the finger again and lift it out, and you have accomplished your object.

Remark was previously made on the necessity of maintaining the density at its proper standard. Rain-water has a specific gravity of 1,000; sea-water is heavier, its specific gravity is 1,028. As there is always more or less evaporation going on, the water becomes more and more saline, and consequently attains a higher specific gravity, unless fresh-water is added as the need for it occurs. A specific gravity bulb, graduated for the purpose, should be kept floating in the tank, and in adding fresh-water to make good the loss by evaporation, enough should be supplied to cause the bulb to descend an inch or so below the level, and at that point, or nearly, it should always be kept. A well-doing tank in which the animals are fairly proportioned and thoroughly seasoned, will not suffer by a little neglect of this matter, for if the water attains a density of 1,100, the anemones and mollusks will simply close and become dormant. But of course it is better to do things well, for the aquarium is not only designed to keep the creatures, but also to display them, and any departure from the best conditions possible will be attended with a suspension of the exhibition, for discomfort will cause the animals to sulk and retire out of view.

In the case of an emergency, artificial sea-water may prove of immense value, but it is never to be used when real sea-water is obtainable. The following is a formula for preparing it:—Take 14 oz. (avoir.) of common table salt; 1 oz. (avoir.) Epsom salts; 800 gr. (troy) chloride of magnesium; 160 gr. (troy) chloride of potassium; mix with spring-water, and adding it a small



DIPPING TUBE.



quantity at a time until the hydrometer registers 1,028,—a few degrees higher will be better than a few degrees lower, as it is easy to dilute further in the course of a day or two. In this mixture place, if possible, a few tufts of sea-weed, and any other *fresh* sea gatherings. These will communicate to the fluid a trace of iodine, and will promote and complete blending of the ingredients. Remove the sea-weed and other such materials in a day or two, then pass the fluid through a filter, and it will be ready for use. If artificial sea-water should be needed at the shortest space of time possible, make a very small quantity, sufficient to cover the animals with a mere film, and place them in it at once: this plan will afford time for preparing a larger quantity properly.

## LIST OF SEA ANEMONES

## ADAPTED FOR CONFINEMENT IN AN AQUARIUM.

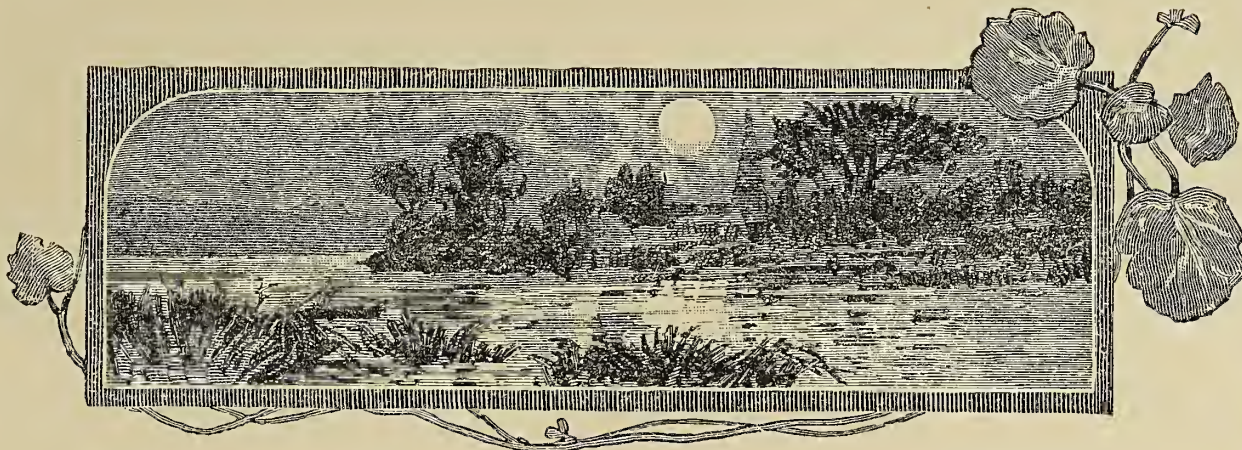
The most desirable species for beginners are marked with an asterisk.

*Actinoloba dianthus*,\* the Plumose Anemone; *Sagartia bellis*,\* the Daisy Anemone; *Sagartia miniata*, the Scarlet-fringed Anemone; *Sagartia rosea*, the Rosy Anemone; *Sagartia venusta*, the Orange-disked Anemone; *Sagartia nivea*, the Snowy Anemone; *Sagartia sphyrodeta*,\* the Sandalled Anemone; *Sagartia troglodytes*,\* the Cave-dwelling Anemone; *Sagartia viduata*,\* the Snake-locked Anemone; *Sagartia parasitica*, the Parasitic Anemone; *Aiptasia Couchii*, the Trumplet; *Anthea cereus*,\* the Opelet; *Actinia mesembryanthemum*,\* the Beadlet; *Bunodes gemmacea*,\* the Gem Pimplet; *Bunodes coronata*,\* the Diadem Pimplet; *Tealia crassicornis*, Dahlia Wartlet; *Pachia hastata*, the Arrow Muzzlet; *Edwardsia carnea*,\* the Crimson Pufflet; *Cerianthus Lloydii*,\* the Vestlet; *Aureliania heterocrea*, the Yellow Imperial; *Corynactis viridis*,\* the Globe-horn; *Zoanthus Couchii*, the Sandy Creeplet; *Zoanthus sulcatus*, the Furrowed Creeplet; *Caryophyllia Smithii*,\* the Devonshire Cup-Coral; *Balanophyllia regia*, Scarlet and Gold-star Coral.

He prayeth well that loveth well  
All things, both great and small;  
For the dear God that loveth us  
Made them, and loveth all.

COLERIDGE.





## THE FRESH-WATER AQUARIUM.

THE mosses of thy fountain still are sprinkled  
With thine Elysian water-drops ; the face  
Of thy cave-guarded spring, with years unwrinkled,  
Reflects the meek-eyed genius of the place  
Whose green, wild margin now no more erase  
Art's works ; nor must the delicate waters sleep,  
Prison'd in marble ; bubbling from the base  
Of the cleft statue, with a gentle leap  
The rill runs o'er, and round fern, flowers, and ivy creep.

BYRON.

### CHAPTER I.

#### CONSTRUCTION AND MANAGEMENT OF RIVER TANKS.

RIVER tanks are far inferior to marine tanks in scientific interest, but they make ample amends for their failing in that respect. As embellishments they must have the first place, because of their freshness and beauty when skilfully managed, and the accessibility of materials for furnishing them, and the comparatively small amount of skill required to bring them to perfection.

The marine aquarium may be likened to a museum, and the fresh-water aquarium to a panorama. The first will attract the student and afford a study for a lifetime to a few. The second is well adapted for the delight of



thousands ; the liveliness of its inmates and our own familiarity with them, whether they be

“Weird inhabitants of lonesome pools,”

or, as is much more likely and desirable,

“Fairy fishes from the mountain tarn,”

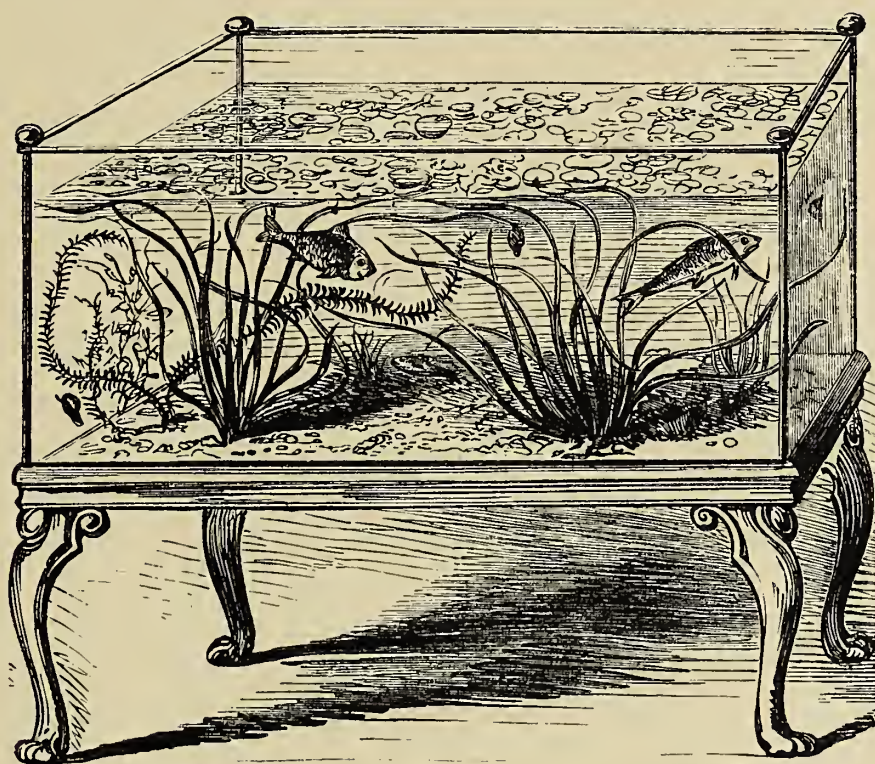
we cannot but be amused by their gambols, and we may find in their recognition of our attentions, the basis of an intimacy resembling friendship. Here are the finny favourites of our rills and lakes, the mosses of our own moors, the ferns that we have wandered miles to see waving under their native waterfalls ; the traditional glories of our own old English water scenes—the lilies, the arrow-heads, and, if you will, the bonny flowering rushes, over which, in the green old time, the bride walked in fragrance to the altar.

Each rising charm the bounteous stream bestows,  
The grass that thickens, and the flower that blows.  
And while the vale the humid wealth imbibes,  
The fostering wave sustains the finny tribes ;  
The carp, with golden scales, in wanton play ;  
The trout in crimson-speckled glory gay ;  
The red-finned roach, the silver-coated eel ;  
The pike, whose haunt the twisted roots conceal ;  
The healing tench, the gudgeon, perch, and bream ;  
And all the sportive natives of the stream.

Although much that has been said as to the construction and management of marine aquaria applies to the subject before us, nevertheless, the river tank needs somewhat different treatment, and we must consider its several requirements in detail. It may be remarked in the first place, that we have here ample scope for the exercise of taste and ingenuity ; almost any kind of vessel may be employed, and there is no great difficulty in associating with the fishes many forms of both fluviate and terrestrial vegetation, as for example, ferns and mosses, as well as vallisneria and anacharis. To consider the case in the first instance in the most elementary manner, we may safely discard the heavy slope-back tanks of slate recommended for marine animals for a lighter vessel more freely illuminated. A good form for a river tank is suggested by the accompanying engraving.



To keep any of the higher kinds of fresh-water vegetation in health the tank must be placed in a window, which, in respect to all the rest of its contents, is the very worst place for it. By the way, it is fortunate that aquaria should be kept away from windows, for those who have a taste for such things are constantly tempted to block up all their windows with tanks and fern-cases, to the injury of their health by the loss of light and air which should have free access to every apartment. Provided the tank is well



RIVER TANK, CONTAINING GOLD CARP, ROACH, AND MINNOW ; VALLISNERIA SPIRALIS, ANACHARIS ALSINASTRUM, AND FLOATING FROG-BIT.

made and placed upon a stand well able to bear it, the form is not of much consequence, but a plain rectangular figure is for all general purposes to be preferred, because, in a case like this, the form of the vessel should be subordinated to its use, and we want the best view possible of its contents.

The "natural system" of tank management, as its name implies, is the only one by which satisfactory results of a permanent nature are to be obtained. The history of aquaria in the most extensive sense is simply



a history of the rival pretension and diverse results of the artificial and natural systems of management. The artificial system is, perhaps, no system at all, because the practitioner seeks merely to gratify his fancy in forming an assemblage of aquatic plants and animals; the tanks are elaborately decorated with fountains, grottoes, and banners of vegetation, and stocked with crowds of fish.

Under some circumstances the artificial system answers admirably; in others it is a failure from the first, and every repetition of the experiment ends in the same disappointment. For all show purposes the artificial system is invaluable. We have often exhibited tanks at soirees, conversaciones, etc., and they have always been greatly admired; but so thoroughly artificial have been the arrangements, that we have sometimes taken up from the garden tufts of *Holcus saccharatus*, *Arundo donax*, and other large plants of graceful habit, and having washed the earth from their roots, have planted (*i.e.* fixed) them in good positions, *pro tem.*, for crowds of gold-fishes, minnows, bleak, etc., to gambol amongst. We remember some years ago inspecting some tanks which were the most satisfactory exemplifications of artificial management we had ever seen. A very elegant room was appropriated to a series of vessels, in which was kept up a constant and copious run of water, the stream passing from tank to tank, the tanks being in a succession of levels, so that from one end of the room all were visible in an ascending series, which produced an agreeable *tout ensembl* and at the same time made one source of water supply sufficient for the whole. This was a strictly artificial arrangement, but it was perfectly successful. The tanks were all well stocked with fishes, reptiles, insects, &c., classified according to their habits and proclivities, and so grouped that when viewed collectively, the scene was beautiful in the extreme. One more instance of artificial management for show purposes will, perhaps, suffice. When lecturing on aquaria some years ago, we had an accident, and spoiled nearly all the sea-water that had been secured for the display. But we were not to be beaten by trifles. Enough sea-water was left to fill a few large shallow glass pans; into these we transferred the anemones, star-fishes, &c., and gave just enough water to cover them, and in the show tanks we grouped the large handsome specimens of algæ that had been collected for the purpose, so as, with serpulæ shells, rocks, &c., &c., to make handsome groups, and filled those tanks with rain water. That was a perfectly successful undertaking; the tanks looked beautiful by gaslight, with their



grand groups of algæ; and as for the animals, the thin film of water over them, and their recent travel and subsequent transference from their places in the tanks, caused just enough of that peculiar irritation which seems to be needful to cause a full display of the beauties of certain of the radiates, and the audience had the advantage of beholding star-fishes, plumose anemones, and other marine subjects, in the attitudes they habitually assume when safely anchored fathom deep in ocean brine.

The natural system is an imitation of nature, not in outward appearances merely, but in *conditions*. Tanks managed on the natural system may be

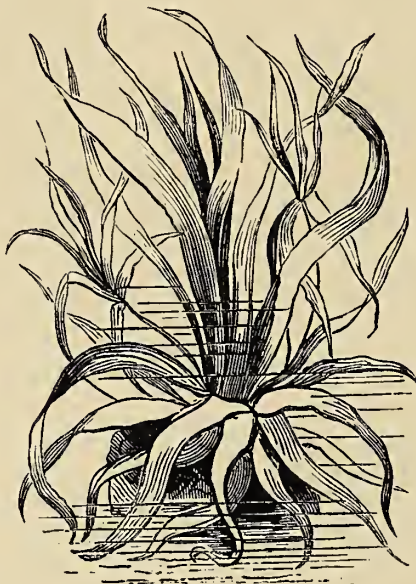


AQUARIUM AND FERNERY COMBINED.

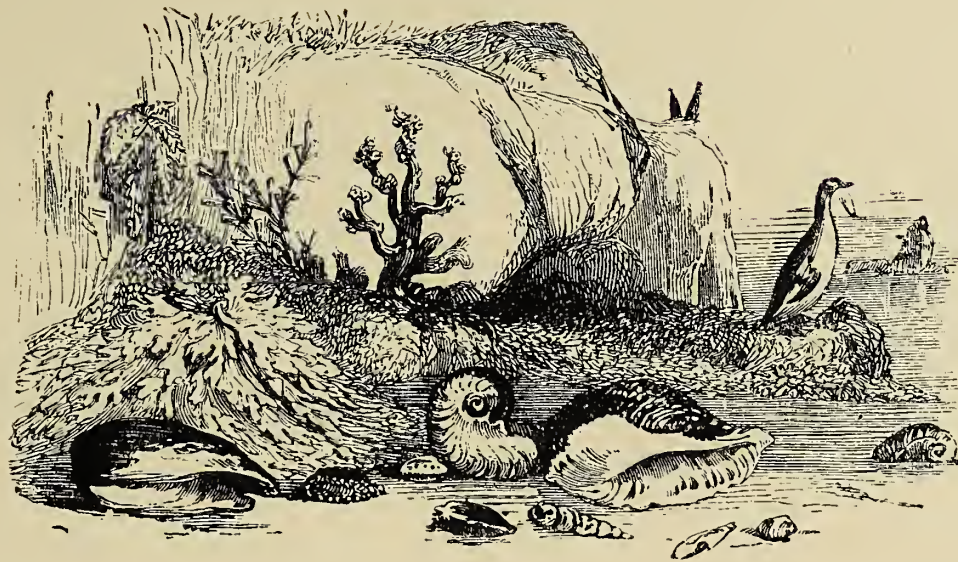
made to have a most beautiful appearance, and form an appropriate item in a "home of taste." But it is impossible to use such vessels for show purposes; any disturbance of the furniture would be a violation of the most essential conditions, and mere decorations are not to be tolerated; they are, in fact, forbidden by the laws on which the system is based. How do we proceed to carry out the natural system? We form within a vessel or vessels a group or groups of objects in imitation of rock pools, running streams, lakes, ponds, and so



forth. If it is intended to keep in any of the vessels creatures that habitually dwell in mud, there must be a bottom of mud for them. If retiring places and dark recesses are needed, they must be built; whatever is to be the purpose of any particular vessel, it must be prepared in the first instance so as to contain within itself all the conditions essential to success, and when it is completely stocked it must be left to take care of itself; and if it becomes unsightly, or the animals become diseased and perish, then, in that particular instance, the natural system has failed through some error or oversight of the practitioner. Of course, in all this there is much that is artificial; for instance, it is artificial to put fishes into glass vessels of any kind, and very artificial to build miniature caves and grottoes of coke or broken bricks; but the term "natural system" is nevertheless quite legitimate, because the endeavour at every step is to illustrate the operation of natural laws; whereas on the other system the endeavour may be simply to carry out a fanciful device, or a scheme which in its first elements sets the laws of nature at defiance.







## CHAPTER II.

### THE AQUARIUM AND ITS MANAGEMENT.

Restless forms of living light,  
Quivering on your lucid wings,  
Cheating still the curious sight  
With a thousand shadowings ;  
Various as the tints of even,  
Gorgeous as the hues of heaven,  
Reflected on your native streams  
In flitting, flashing, billowy gleams.  
Harmless warriors clad in mail  
Of silver breastplate, golden scale ;  
Mail of nature's own bestowing,  
With peaceful radiance mildly glowing ;  
Keener than the Tartar's arrow,  
Sport ye in your sea so narrow.

HARTLEY COLERIDGE.

THE tank now to be described was fitted and furnished a good many years ago. It is a simple rectangular vessel, in form nearly a double cube, and its position is in the entrance-hall adjoining the rear wall, where it is sufficiently illuminated to render every part of its contents agreeably visible to the eye, yet it receives scarcely any direct light whatever. It is impossible there should be anything more simple than the furnishing of this vessel, yet it does not lack certain features that render it attractive to



unscientific eyes. It was a home-made affair. We procured from the cellar a number of large pieces of coke, some of which were broken to afford ample choice of blocks of various forms and sizes. Those were preferred which had a somewhat rugged face, but which nevertheless were large and flat, giving plenty of linear surface, so as to be best adapted for building a wall of very moderate thickness. These were two or three times dipped into a thick batter of Portland cement, and were finally cemented together in blocks of suitable width for convenient lifting, with one or two empty flower-pots at the base and within every block. The flower-pots were used to create a flat basis, so that each block would rest on the bottom of the tank securely, and for the additional reason of the increased lightness of the blocks so constructed, the front being made solid and massive, yet hollow within, and the pots not at all or only slightly covered with rock on the sides intended to form the backs of the blocks. Thus a rugged wall was formed in a series of detached pieces, massive in appearance, yet of no greater weight than admitted of convenient lifting. Such a wall made of mica schist—which is the best of rocks for aquaria where its weight is of no consequence—would soon have ruined the tank, and perhaps have brought down tank and stand within a few hours of the first fitting. With coke and flower-pots you may build another Tower of Babel, and its weight would scarcely make an indentation on a newly-ploughed field.

The rocks were, as soon as tolerably hard, placed in a large vessel of water. A tank in the garden, used for ordinary garden purposes, answered admirably for the soaking process that all newly-cemented work must undergo before it should be used in an aquarium. The only preparation the tank itself underwent was to colour the back, so that glimpses of the wall should not be seen through any possible interstices of the rockwork. We took some sheets of green tissue paper, smeared the back plate of the glass all over with copal varnish, pressed the paper smooth on it, and by that experiment determined that if it ever becomes needful to colour one side of a tank, the paper and varnish afford the most effectual method that can be adopted. In due time—a fortnight, perhaps, not less—the blocks were taken from the bath and placed in position. A bottom of clean well-washed pebbles was laid down, the tank was then filled with water, and the gold-fishes and minnows were introduced.

That is nearly all that has ever been done to the tank. Yet a few things remain to be said. In the first place, it has been a complete success, and the nature of that success may, perhaps, surprise some of our



non-successful aquarians. For instance, the water has never once been pea-soupy, or even cloudy, or otherwise than as brilliant as all that we have in our mind's eye when talking of the "crystal spring" and the beverage of Castaly. There have been deaths in it—deaths by compulsion, the result solely of experiments made with a view to test the extreme capabilities of the system; but we have managed to keep gold-fishes healthy and happy therein, during a period of *more than twelve years*. Furthermore, to keep this tank in order is a matter of such small trouble that it may be literally said to take care of itself. Ordinary dusting and occasional cleansing of the exterior are, of course, necessary, and for the interior there are two operations only that are needful. The fishes are fed with rice boiled in water, or with bread crumbs. Undoubtedly bread is as good a food as they can have, and as it is always handy, it is a great advantage to be able thus simply to perform a duty which is generally too much neglected, for there are still to be found some benighted people who think that gold-fishes can live on the invisible tenants of the tank, and get fat, as it were, upon nothing. The other operation is the occasional cleansing of the front plate inside. This is accomplished by means of a piece of sponge, attached, by means of twine, to the end of a stick, and the stick is thrust behind the tank, so as to be always handy for the purpose. This cleansing of the front plate is performed about once a fortnight during summer, and not more than once in three months during winter; in fact, it might be left undone from November to March, and the view would be unimpaired by even the slightest film of confervæ; but from March to October the growth is sufficiently rapid to produce a perceptible green tinge on the glass in eight or ten days, and this is easily removed by the sponge. In cases of long neglect we find the most effectual mode of cleansing to be with a cloth on which a little silver sand is sprinkled; this, drawn over the glass with the sand, brings away the crust at once, and if carefully done, appears not to cause any serious scratching of the glass, though if the glass were of poor quality, perhaps it might.

The reader has, of course, taken note of the omission from this history of all mention of the introduction of plants to the tank. We have never introduced a plant of any kind, yet the rocky wall is richly coloured with microscopic forms of vegetation in beautiful green, bronze and russet patches, and if the glass ends are left untouched, they in time become quite opaque with a dense coating of olive-coloured vegetation. This is one of the grand features of the natural system. We may introduce a thousand plants, Anacharis, Vallis-



neria, Stratiotes, etc., etc., and they may all perish. But those Dame Nature introduces are sure to live. Being developed *in situ* they are of constitutions adapted to the conditions which exist in the tank, and though it requires a long time for a vessel, *situated as this is*, to become richly clothed with suitable oxygen makers, some supply of oxygen is secured from the very first, for we have seen ciliated spores and beginnings of genuine vegetable deposits within a few hours of the first furnishing of the tank. Hence it was that fortified by previous experiences of the natural system, we did not hesitate to introduce the fishes as soon as the tank was furnished, without waiting for the full development of the microscopic forest, as we knew that before the fishes exhausted the oxygen in the fresh river water, there would be the beginning of a new supply for them, and there was never any distress through that procedure.

We have italicised above the words "situated as this is." The situation of this tank is the secret of its success. Near it on one side is a window facing west. This window lights the hall abundantly, but very few rays of light from it fall directly on the tank. The only direct light which strikes upon the tank comes from the fanlight over the door directly opposite, and that is, of course, but moderate in amount. Now, in the early days, when we desired a quick growth of Oscillatoria, and other oxygen makers, the blind was drawn up at the side window, and there was then no fern-case there. The abundance of light caused a speedy diffusion and germination of spores, and as soon as it was seen that the vegetation was likely to be too plentiful, the blind was drawn down, to intercept the light that still came by means of a fern-case. Thus, by toning down the daylight, and having the tank where an access of light was impossible, we secured a moderate yet plentiful growth of plants, and have never had one vegetable filament more than needful, except on the front glass, where of course it intercepts the view of the interior.

Now a word for the fishes. We find that for a vessel of this sort, which though to us an experimental and scientific affair is in all other respects a piece of elegant furniture, there are no fishes that may be kept with such certainty as gold carp. As common carp abound in a pond close by, a good many have had temporary residence in the tank. Minnows have been used in the same way, and we have also added gold carp, and other fishes which are generally tolerably adaptable in constitution. But it always happened that when the fishes exceeded a certain number there were signs of distress. We could not begin changing the water to obviate this

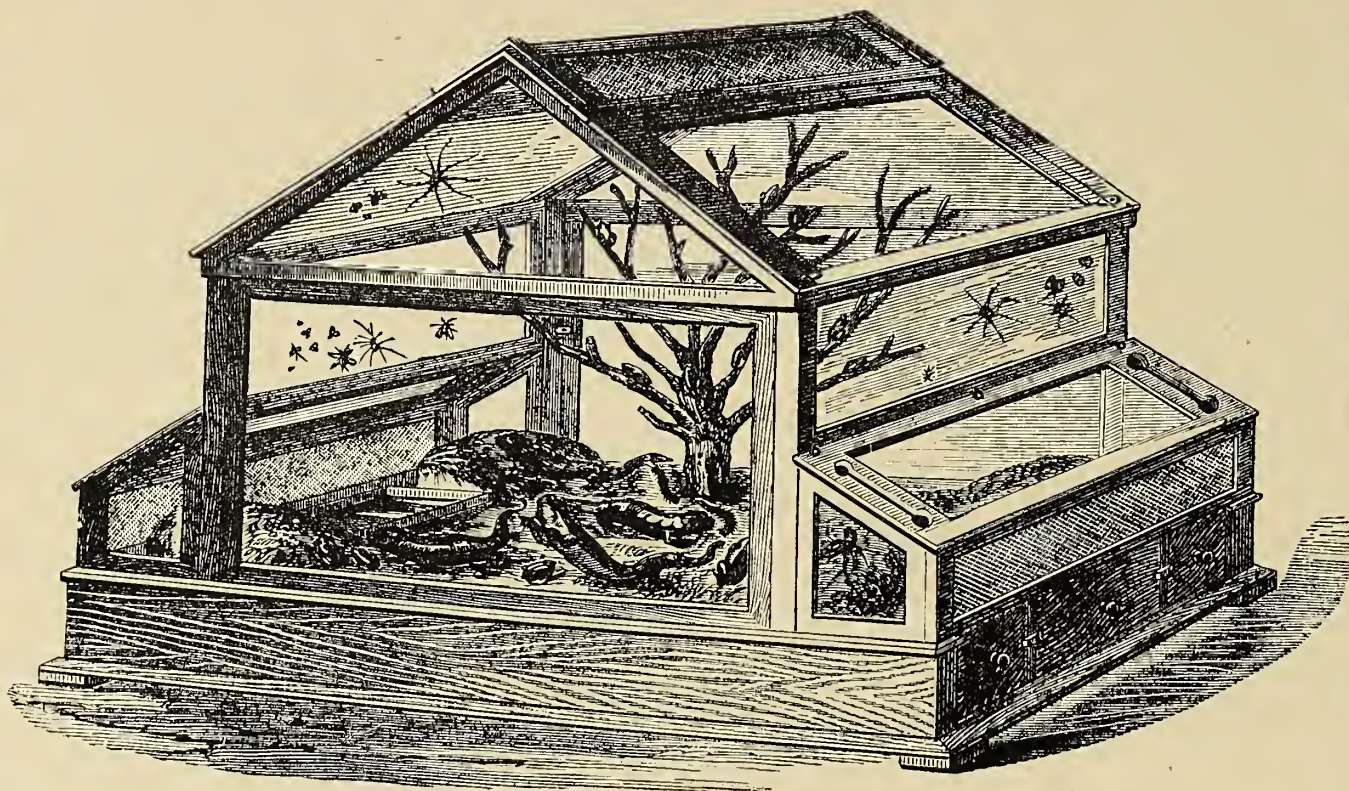


because that would be to annihilate the natural system "at one fell swoop." No, the water has never been changed, though, of course, it is necessary occasionally to make good the loss by evaporation. But we did try on a few occasions of extreme distress to aerate the water by the use of a garden syringe. Charging this from the tank the water was ejected back with force through some slight atmospheric distance, carrying streams of bubbles to the bottom of the vessel. This would be amusing, because the fishes would rush at the streams of bubbles and absolutely gulp them ; but it was tiresome work, and, of course, was only performed by impulse and not by system. The end of every one of these experiments was the same. One or two of the newly introduced fishes would, after the lapse of about a fortnight, be found dead and "floating on its watery bier." Next a few more would die, and so on till the whole of the new comers were cleared off, and the old, well-seasoned members of the "happy family" remained unhurt, but breathing more freely for the relief, and no doubt rejoicing to have got rid of the innovators. Suppose now that you have some gold-fishes, averaging four to six inches in length ; if you desire to preserve them for any length of time by the natural system, and under circumstances at all resembling the case here described, for half-a-dozen of those fishes you must have a vessel holding at least twenty-four gallons of water. The smallest of your fishes will need three gallons, all larger four or five gallons. Most of the failures in tank management have resulted from over-stocking, but the modification of the light is an equally important matter. This chapter may reasonably conclude with three lines from Cowley :—

Let Art use method and good husbandry ;  
Art lives on Nature's alms, is weak and poor ;  
Nature herself has unexhausted store.







### CHAPTER III.

#### CABINET VIVARIA.

The heart is hard in nature, and unfit  
For human fellowship, as being void  
Of sympathy, and therefore dead alike  
To love and friendship both, that is not pleased  
With sight of animals enjoying life,  
Nor feels their happiness augment his own.

COWPER.

**D**OMESTIC vivaria may be of many kinds for the gratification of many tastes, and as aids to the acquirement of a knowledge of Natural History. It is not intended here to present even the faintest sketch of the possible extensions of the idea on which the aquarium is founded, but it would be a too summary method of procedure to omit mention, at least, of a few groups of animals that possess peculiar attraction for the home student.

Amongst those which will be likely first to claim attention after the



aquarium proper has been fully furnished, are certain reptiles and batrachians. For the accommodation of these, the best arrangement is that of an island surrounded with water, and enclosed in part with strong wire gauze, and in part with glass. Whatever design may be determined on, provision must be made for ensuring the utmost cleanliness and perfect ventilation ; for not only is it desirable to help the collection in health, but it should at all times have a seemly appearance—our hobbies should be decently dressed, and bear at all times an inoffensive aspect.

The figure placed at the head of this chapter represents a vivarium, which for many years was devoted to a collection of lizards, tortoises, and frogs, a few of them really beautiful creatures, all of them interesting and affording endless amusement. In the centre was a block of peat, with its natural herbage of moss, and a dead tree firmly fixed for such of the inmates as were accustomed to climbing. The two troughs were receptacles for water, to which the animals had ready access, whether to bathe or drink. The greater part of the frame-work was filled in with glass, let into grooves without putty, but the ridge line of the roof and the sides of the water troughs were wire gauze. House flies, spiders, butterflies, and other small lively insects were introduced to afford the proper inhabitants a choice of diet, and generally speaking, when these became scarce, the animals were so far torpid that food was not required. The general plan of such a structure may be varied almost indefinitely, and to almost any degree of elaboration. A suggestive design for the combination of an island, for ferns and a few lizards, with a collection of fishes, will be found in the figure of the fernery aquarium at page 49. In carrying out a design for such a purpose a few precautions will be necessary to ensure success. Ventilation and cleanliness have been remarked upon as of the utmost importance. Now it will tend greatly to the attainment of these conditions, if as many parts as possible of the construction adopted are made movable ; where it is not necessary that the glass should be water-tight, it will be folly to make it air-tight. A good plan is to have the glasses fixed in movable frames, which can be held in their places by pins or buttons, as the handling of sheets of glass might at times prove dangerous. The receptacles for water should be as readily accessible as any other part. Those in the figured case are zinc troughs or boxes which can be lifted out at any time. A more convenient method would be the adoption of an open sliding trough, made to draw out, a piece of wood or something of the kind taking its place until returned.



Amongst the more easily obtainable and amusing animals that should be sought for a vivarium, are lizards and frogs. Chameleons are not well adapted for confinement in these constructions, but may be kept in perfect health and safety on a shelf over a fireplace, or in a sunny window, a twiggy branch of a tree firmly fixed in some kind of stand being all they require.

It is not desirable to enumerate the creatures likely to be kept in small vivaria, but we must give especial attention to one which must be regarded as most desirable of all—the pretty green tree-frog.

There are several species of frogs which may be collectively described as “green,” but the green tree-frog is most distinct in appearance and habit from all the marsh-inhabiting ranæ, for it is amphibious in only a qualified degree, and, as its name implies, it lives very much among the branches of trees. It is known among naturalists as *Hyla arborea*, sometimes as *Hyla viridis*, on account of its bright green colour. It is a native of France and Germany, hence readily adapts itself to the climate of this country, and will, perhaps, some day be acclimatized as an addition to our fauna. This little agile frog is of a vivid emerald green colour over the whole of the upper surface of the body, with the exception of two black marks, which extend from the eyes to the inner side of the shoulders. Beneath, his colour is a greenish white, and the skin is semi-transparent, and of a most delicate texture. The eyes are prominent and of a lustrous black.

Though it delights in water, and needs to have it always within reach, it is in summer-time but partially amphibious. It will now and then swim round, and then ascend the glass, where it would remain motionless for hours, holding tight by means of its toe-suckers and the delicate membrane of the stomach, which indeed it depends on chiefly when attached to a smooth surface. A ten-inch bell-glass affords plenty of room for half-a-dozen of these frogs, and escape is prevented by covering the top with wire gauze. Once or twice a week they should have liberty to leap about and climb the windows, to catch flies for themselves. Meanwhile, the rockwork is lifted out, the pebbles washed, and the glass cleaned, and the whole made bright for use again. They become very tame, and will sit on the finger, and leap from it when the buzzing of a blow-fly arouses them.

Chameleons and green tree-frogs are desirable reptiles to keep in a heated greenhouse. They are exceedingly partial to aphides and will generally keep the plants free of these pests. The temperature of the house must never fall below 50 degrees, or the chameleon especially will not live.





POLYSTICHUM ACULEATUM PULCHERRIMUM.

## THE FERNERY.

To-morrow, ere fresh morning streak the east  
With first approach of light, we must be risen,  
And at our pleasant labour to reform  
Yon flowery arbours, yonder alleys green,  
Our walk at noon, with branches overgrown,  
That mock our scant manuring.

MILTON.

OUR first parents, if we credit Milton (as we must), were not wholly indebted to the spontaneous growths of their happy garden for their green bowers and mossy seats; but with delicate fingers wove the pliant branches into arches of umbrage, and set alleys of sweet-scented herbs before their favourite retreats. Who knows but that a fernery was one of their choice.



delights? Few rustic adornments would better have become their sylvan home, where shade and coolness, fragrance and verdure, soften the song of love and the hymn of praise.

The fernery belongs to the truly rustic rather than the rural department of gardening. Though ferns are beautiful anywhere, and may suitably adorn the trim border, and mingle with ornaments of formal design, they are more at home, more befitting among tree-stumps, and in boldly designed rock-work or water-scenery, where they appear in their proper character of wildness and simplicity. Aye, and even in a town garden overshadowed by lofty buildings and walls, where it is almost next to impossible to grow flowering plants, how welcome the many forms of our vigorous native ferns are! How bravely they defy the murky atmosphere, and how refreshingly green their fronds appear during the spring, summer, and early autumn months! And again how well adapted they are for clothing a dull, damp, and otherwise unattractive area with beautiful fresh greenery, thriving where nothing else will succeed. These are only a few of the many typical uses to which hardy ferns may be put in the decoration of our gardens, however small they may be.

Ferns artificially grown, and tended with proper care and skill, frequently exceed much in beauty those grown by nature. True, we cannot always secure the scene as well as the ferns—we cannot have the dark glen, the dank moss-grown cave, the decayed tree trunk, or the crumbling archway of the waterfall. The scenes amid which ferns grow, the lovely secluded spots which they seek out—shy wood-sprites that they are—are the chief charms of the associations they always suggest to us; for they do haunt the greenest and coolest nooks, the most mossy and ancient banks above water-brooks that trickle from unseen founts, in the deep recesses of wild rocky caverns, and under the branching arms of twisted grey-beard oaks and ancestral beeches—spots only discovered by the explorer of woodbine coverts and deep-hidden shades, where, searching for rare beauty, he finds it far excelling his anticipation, and checking his silent footsteps by sights that hold him breathless with surprise. Yet if we cannot have the mountain dells, and creeping thorns, and purple knolls of wild thyme, we may have the emblems of them in our mural paradise; we may have the ferns to suggest such things, and to keep alive remembrances of pleasures and of scenes that made a coolness in the brain and a freshness in the heart—breathings of fragrance from the green world that sweeten the resting-places in the march of life.



Turning to the practical aspect of the subject, it is our business in a work of this kind to give a few suggestions how to make use of the many beautiful ferns available for outdoor culture. We have two classes of cultivators to consider. Firstly, those who are ambitious to grow as complete a collection as possible; and secondly, those who only desire to decorate a shady corner, dell, or area in their gardens. Well, we will try, as briefly as our space will permit, to assist both with a few words of practical advice.

First, then, as to large collections. We have already drawn attention to the fact that ferns in a state of nature delight in shady nooks and dells, and this fact should be a sufficient hint to the cultivator that they require to be grown in the shade. It is true ferns of the hardier and more robust type will succeed fairly well in the sun, but their number is not legion. To grow a collection really well, it is a *sine quâ non* that their habitation be located in a position having a north aspect, where light but not sun, may have full access to them. The latter point is a most important one, and should not be overlooked if success is desired. And then another point for consideration is whether the fernery shall consist of beds, or banks raised above the level ground, or a dell or ravine naturally or artificially constructed. In deciding this point the natural conformation of the ground must be considered. If a dell or a natural depression of the ground exists in the garden, and this is sufficiently shaded from sun by trees, or if it is possible to secure the needful shade by planting trees, then by all means give preference to such a position. The "compressed surface can be easily rendered deeper by excavating the soil and adding this to the sides, and so ensure an excellent position for ferns. But if, on the other hand, you have the level surface only to deal with, then it will be necessary, unless you are prepared to go to the expense of excavation, to form raised beds and banks with burrs, stones, or tree stumps, and transported soil in some shady position. Here, however, let us point out that raised beds, &c., are not so well adapted for growing choice moisture-loving ferns like the *Osmunda* as the sunk fernery. In the latter, all classes of ferns can be accommodated—those requiring much moisture in the bottom, those a moderate amount higher up, whilst those that require little moisture can be planted at the summit. Taking every point into consideration, therefore, it is undoubtedly preferable to incur the cost of excavating the ground where a natural hollow does not exist. Of course, in some positions the surface is naturally very damp, and here there would be no objection to



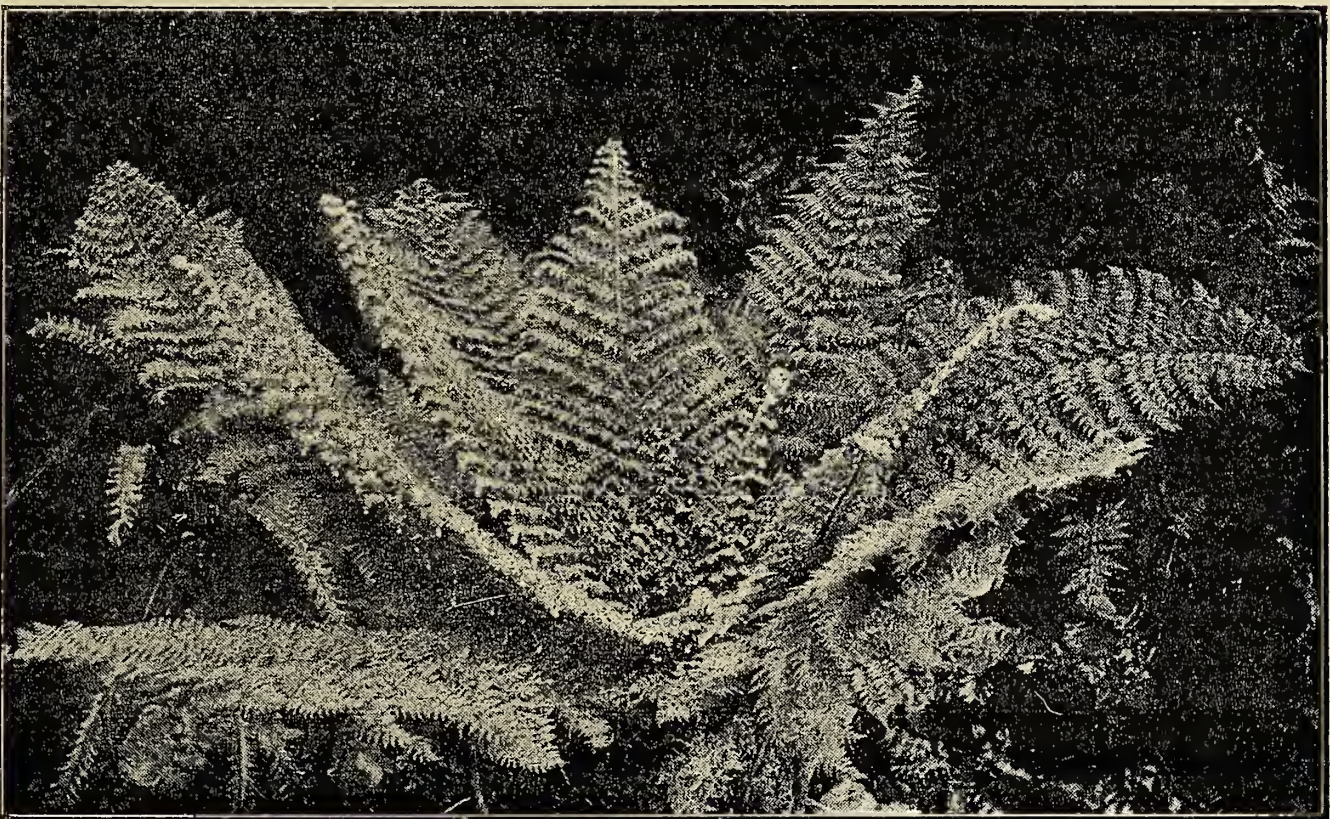
forming mounds of soil, interspersed with burrs and stones or tree roots, for almost all kinds of ferns. It is impossible for us to lay down rules suitable for every case, but if the main points regarding light and shade, absence from sun, and provision for moisture are observed, the reader will not go far wrong in selecting a suitable position.

The materials required for the construction of a fernery are burrs, sandstone, limestone, ragstone, Pulhamite rock, and tree stumps and roots. Burrs are accessible to almost everyone, being easily obtained as a rule from a neighbouring brickfield. They have, however, a decided artificial appearance, and do not harmonize so well with the ferns as do sandstone or, say, Kentish rag. Still, where expense is a great consideration, this defect must be overlooked and an endeavour made to use them in such a way as to minimize their ugliness. For example, use them as sparingly as possible, and then always expose their most rugged surface to view, hiding the objectionable portions in the earth, and when fixed in position, wash the exposed surface with liquid cement, afterwards dusting it whilst moist with red sand. This simple device will greatly improve the appearance of burrs, and make them harmonize better with the ferns. Sandstone is the best material, both for appearance and for keeping the soil cool and moist in its vicinity. But, except in districts where it abounds, it is an expensive material. Almost any kind of limestone is suitable; indeed it is indispensable for growing ferns obtained from limestone districts. Ragstone, again, is specially suitable, the roots of most ferns delighting to push their way beneath its cool, moist base. Although we have mentioned these stones as specially desirable, it by no means follows that others are unsuitable. Those who happen to live in districts where stones other than those described abound should certainly not pass these over, but make use of them to the best advantage. Where expense is no object, and sandstone is difficult to obtain, recourse should be had to Pulhamite rock, an artificial stone manufactured by Messrs. Pulham and Son, of Broxbourne, Herts. It is a wonderfully good imitation of natural stone, and is employed on an extensive scale for rock scenery in almost all the leading gardens and parks in this country. Lastly, there are tree stumps and roots. These answer the purpose better than rock when the fernery is to be formed in a wood or in close association with trees. We have seen some very picturesque ferneries composed of tree roots, rough branches, and roots, with the taller and more vigorous ferns, accompanied with foxgloves, epilobiums, solidagos, mulleins, and other woodland plants growing between and among



them. For choice ferns, however, the preference should be given to the rock and burrs already described, using the tree-stumps where the commoner kinds only are to be grown.

And now just a word or two as to actual construction of the fernery. In the case of a dell or ravine its proportions must form a guide to the arrangement of the rock, &c. If extensive, good bold effects must be aimed at by the use of large blocks of stone disposed in such a way as to convey the



POLYSTICHUM ANGULARE PLUMOSUM.

appearance of accidentally cropping out of or falling on the ground. The beds must be extensive in area too. There must not be an appearance of a multitude of tiny beds, arranged with uniformity of size and outline. Provision must be made for displaying the larger ferns boldly, and at the same time providing nooks and crannies for the tinier ones. If the fernery can be arranged so as to break it up into a series of pretty views which can only be seen by following a winding path, so much the better. Still, even this should be avoided if it has to be obtained at the expense of a fine bold effect. Any



arrangement which conveys a suggestion of neatness and orderliness is entirely out of place in a fernery. Here we want to imitate nature as closely as we can in all the ruggedness, grandeur, and quiet beauty which distinguishes the natural homes of our own native ferns, and which anyone can study for themselves in the coombes, glens, and ravines of Devon and Wales.

Then there is the soil. For growing a complete collection, such as our remarks have been hitherto confined to, a variety of soils will be required. Some, for instance, will require loam only, others loam and leaf mould, a few peat, or a combination of the three materials, together with sand and lumps of limestone. Here, however, we shall confine ourselves to the materials for the foundation, and leave the special mixtures for each class to be provided according to the kinds to be grown. First of all, good drainage must be provided, for be it clearly understood that, although ferns require and delight in abundant moisture at their roots, yet they abhor anything approaching the nature of stagnation. This must be avoided, therefore, by the introduction of a thick layer of brick-bats, clinkers, or stones where the sub-soil is of clay, and there is no possibility of the superfluous moisture escaping. But where the sub-soil is naturally well drained, there is no need to introduce artificial drainage, except for very choice kinds. The depth of soil should not be less than eighteen inches for the small growing ferns and two to two feet six inches for the taller ones. Half of this depth should consist of two parts good decayed turfy loam, and one part of decayed leaves (leaf mould). The remaining half should consist of the special mixture described for each class at the end of the chapter.

The best time to plant all kinds of hardy ferns is in April, just as new growth is about to commence. Never plant in autumn or winter if it can be avoided, because then the roots are at rest and there is a risk of their dying and of the plant failing to grow a second season. It is perhaps not generally known that a fern will grow, or rather develop, its fronds the first season, if it has practically no roots when planted. The plant has sufficient nourishment stored up in its caudex to support the fronds, but having no roots to draw a fresh supply from the soil, it cannot store up any for forming the second year's embryo fronds, and hence in the autumn it dwindles away and dies. This really is the reason why the ferns purchased from itinerant vendors fail to grow the second year. The latter, for convenience of transit, usually cut off the caudex close to the soil, scarcely ever preserving any of the roots, and therefore it is most important not to purchase such plants, however



cheap they may appear, but instead to obtain really good plants at an enhanced cost from a nurseryman. Besides, is it wise to encourage such senseless acts of vandalism as that of robbing our country lanes, hedgerows, and woods of their rural charms, by uprooting our native ferns? Certainly not, and hence it behoves all true lovers of nature to do all in their power to check this growing evil.

In planting, do not bury the caudex—the root-stock or base of the fronds—below the surface of the soil, but allow it to just rest its base thereon. Spread the roots evenly and quite straight in every direction, and make the soil firm about them. Immediately after planting give the soil a thorough watering, and if possible mulch the surface with rotten leaves, cocoanut-fibre refuse, or decayed manure. Every plant, too, should be legibly labelled, giving the common, generic, specific, and varietal names, if any. The best labels are those known as the “Imperishable,” prepared from cast iron, and having raised letters. Ordinary labels prepared from strips of zinc and written with indelible ink are less expensive, but not so durable.

The general management of a hardy fernery is not a formidable matter. The primary requirements are abundance of water in dry weather and a rigid abstinence from frequent lifting and dividing the plants, unless there is some special reason for it, such as ill-health or overgrowing their limits. Never remove dead fronds from any of the plants until new ones form, because the former constitute a natural protection for the crown or caudex in severe weather.

We have now to deal with the culture of ferns in a general way in the garden. All the strong growing kinds—and there are plenty of them—may be grown in any shady corner, or on any bank in ordinary garden soil, enriched with a little decayed manure or leaf-soil. Most of the lastreas, athyriums, struthiopteris and polystichums have a charming effect when grown in company with fox-gloves, epilobiums, solidagos and mulleins in a wild part of the garden, in the woodland, and by the sides of a pond or lake—anywhere, in fact, where there is a fair amount of shade. When grown on banks, a few large burrs or tree branches should be used to keep up the soil and form small beds for the ferns. The lastreas will grow without this provision, but when the necessity for watering arises in dry seasons like those of 1893, it is impossible to apply water to the best advantage.

Then in damp positions, near or along margins of ponds, lakes, or streams, such ferns as *Osmunda gracilis*, *O. cinnamomea*, *Struthiopteris germanica*,



lastreas and athyriums of all sorts, will do exceedingly well, growing most vigorously and needing no attention after planting. The osmunda, struthiopteris and the *Onoclea sensibilis*, a North American fern, absolutely revel in a moist position.

In the ordinary level herbaceous border, which gets very little sun, the Male Fern (*Lastrea Filix-mas*), Lady Fern (*Athyrium Filix-fœmina*), Buckler Fern (*Lastrea dilitata*), Spring Buckler Fern (*Lastrea spinulosa*), Bracken Fern (*Pteris aquilina*), and its varieties, *P. a. cristata* and *P. a. congesta*, will succeed highly satisfactorily in association with shade-loving perennials. One thing must be guarded against when grown thus, and that is, disturbing their roots by digging. Ferns dislike disturbance at the roots, and therefore it is advisable to guard against this by growing them in groups here and there; then the necessity for digging between them will be dispensed with.

In small town and suburban gardens there is ample scope for growing ferns. Here there are usually one or two shady corners in which most other plants fail to grow. A small fernery can easily be formed in such positions, by first placing a heap of soil and then dropping a few stones or burrs here and there over the heap, so as to form a few small beds for the ferns. A narrow border, too, by the side of a shady fence can be raised a foot or so above the surface by means of burrs and mould, and converted into an excellent position for growing ferns. Again, round or oval beds in the shade raised in the same manner may be turned to a similar account, and so on. No elaborate rockery is required for common ferns; simply a heap of good soil and a few burrs or stones, as already described, are all that is needed. The surface of the soil can be carpeted with creeping jenny, London pride, periwinkle, or musk, and between the ferns primroses and lily of the valley may be grown to flower in spring. To keep the ferns in good health, a fresh layer of good soil should be added annually to the surface, and abundance of water given in dry weather. As previously explained, do not lift oftener than you can possibly help. Whenever it is necessary to do so, April is the best time.

Thus far we have briefly sketched an outline of the cultivation of hardy ferns. The scope of the present work precludes us from entering into minute details, but we think sufficient has been said to give the reader a general idea of this most popular branch of horticulture, so far as it applies to the garden.



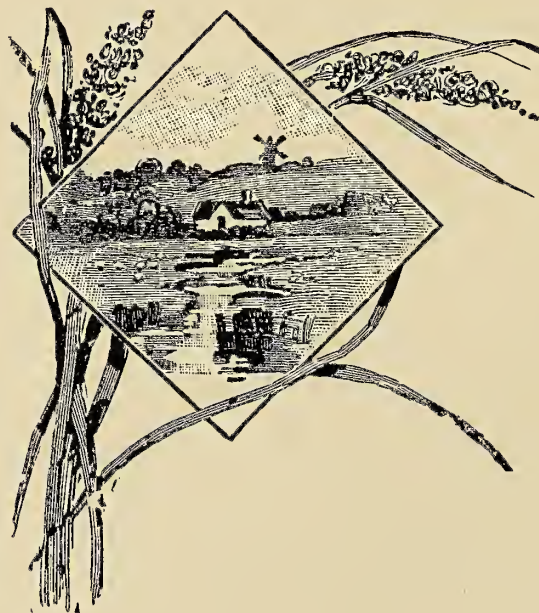
## SELECTION OF HARDY FERNS.

BRITISH SPECIES AND VARIETIES.—*Allosorus crispus*, 6 inches, equal parts loam, sand, leaf-mould, and sandstone. *Asplenium adiantum-nigrum*, 9 inches; *A. ruta-muraria*, 6 inches; *A. trichomanes*, 6 inches; *A. viride*, 6 inches, all equal parts loam, leaf-mould, sand, and a little old mortar. *Athyrium Filix-fœmina*, 2 feet; *A. F.-f. corynubiferum*, 2 feet; *A. F.-f. grandiceps*, 18 inches; *A. F.-f. plumosum*, 2 feet 6 inches, loam, leaf-mould, peat, and sand, in equal parts. *Blechnum spicant*, 6 inches; *B. s. ramosum*, 1 foot, similar soil to Athyriums. *Ceterach officinarium*, 4 inches, equal parts loam, leaf-mould, sand, and old mortar. *Cystopteris fragalis*, 6 inches; *C. montana*, 6 inches, similar soil to Ceterach. *Lastrea æmula*, 15 inches; *L. dilatata*, 2 feet; *L. d. grandiceps*, 18 inches; *L. Filix-mas*, 2 feet; *L. F.-m. grandiceps*, 3 feet; *L. propinqua cristata*, 2 feet; *L. pseudo-mas cristata angustata*, 2 feet 6 inches; *L. montana*, 1 foot 6 inches, equal parts strong fibrous loam, leaf-mould, sand, and peat. *Ophioglossum vulgatum*, 6 inches, turfy loam. *Osmunda regalis*, 3 feet; *O. r. cristata*, 2 feet, equal parts loam and peat, half a part each of sand and leaf-mould. *Polypodium vulgare*, 1 foot; *P. v. Cambricum*, 1 foot, equal parts peat, loam, leaf-mould, and sand. *Polypodium dryopteris*, 9 inches, *P. phegopteris*, 9 inches, equal parts loam, peat, sand, and lumps of sandstone. *Polypodium Robertianum*, 9 inches, two-thirds sandy loam and one-third pounded limestone. *Polystichum aculeatum*, 2 feet; *P. a. cristata gracile*, 18 inches; *P. angulare*, 2 feet; *P. a. Baylicæ*, 15 inches; *P. a. grandiceps*, 15 inches; *P. a. proliferum*, 2 feet; *P. a. p. Wollastonii*, 2 feet, equal parts strong fibrous loam, leaf-mould, and sand, and a little peat. *Pteris aquilina cristata*, 2 feet, similar soil to Polystichums. *Scolopendrium vulgare*, 1 foot; *S. v. crispum*, 1 foot; *S. v. cristatum*, 6 inches; *S. v. muricato-marginatum*, 1 foot; *S. v. ramo-marginatum*, 1 foot, equal parts loam, peat, leaf-mould, sand, old mortar and broken oyster shells. *Woodsia alpina*, 4 inches; *W. ilvensis*, 6 inches, equal parts loam, leaf-mould, sand, and broken sandstone.

EXOTIC SPECIES AND VARIETIES.—*Adiantum pedatum*, 2 feet 6 inches, equal parts fibrous loam, leaf-mould, and sand. *Allosorus acrostichoides*, 6 inches, equal parts loam, leaf-mould, sand, and broken sandstone. *Aspidium cristatum*, 1 foot; *A. fragrans*, 6 inches, equal parts loam, leaf-mould, peat, and sand. *Asplenium angustifolium*, 1 foot, equal parts loam,



leaf-mould, sand, and old mortar. *Athyrium Filix-fœmina Americanum*, 2 feet, equal parts loam, leaf-mould, peat, and sand. *Cryopteris bulbifera*, 1 foot, equal parts loam, leaf-mould, sand, and old mortar. *Deunstaëdia punctilobula*, 2 feet; *Lastrea decurrens*, 2 feet; *L. intermedia*, 18 inches; *L. prolifica*, 1 foot; *L. fragrans*, 6 inches; *Lomaria alpina*, 6 inches; *Lygodium palmatum*, 2 to 3 feet; *Onoclea sensibilis*, 2 feet, all equal parts loam, peat, leaf-mould, and sand. *Osmunda cinnamonea*, 2 feet 6 inches; *O. Claytoniana*, 2 feet; *O. gracilis*, 2 feet 6 inches, two parts peat, one part each of loam, leaf-mould, and sand. *Polystichum acrostichoides*, 1 foot 6 inches; *P. minutum*, 4 feet; *Struthiopteris germanica*, 2 feet; *Woodwardia radicans*, 3 feet, all in equal parts loam, leaf-mould, peat, and sand.







## ROCKERY AND ALPINE GARDEN.

I know a bank, whereon the wild thyme blows,  
Where oxlips and the nodding violet grows,  
Quite over-canopied with luscious woodbine,  
With sweet musk roses, and with eglantine.

SHAKESPEARE.

A GOOD deal has been said on the subject of rockeries in the preceding chapter, but as the remarks there applied wholly to ferns, it is necessary to say something regarding their construction for the culture of alpine plants. No garden, however large or small its area, can be said to be complete without some provision for growing this most interesting and beautiful class of plants which hail from the mountain side, and make such a particularly charming display in the spring and summer months. We must, therefore, even at the risk of repetition, devote another chapter to the subject so far as it applies to these.

What is a rockery? In too many instances, alas! it is a mere heap of deftly and mathematically arranged stones with no pretensions to beauty, and with no regard to its special fitness for the culture of plants. And then, again, how frequently do we not see this sense of utter unfitness aggravated by a coating of whitewash applied to the exterior of the material used in its construction? And to go a little further, one may often come across rows of neatly-arranged oyster shells, bottle ends, and a hundred and one other positively ugly combinations. These are not rockeries, they are utterly unworthy of the name; they are mere toy arrangements, which no one with any due appreciation of the beautiful in nature would ever dream of admitting into



his garden. A rockery worthy of the name is an adjunct of the garden which is primarily a home for mountain plants, a feature in landscape gardening pleasant to the eye, and with all its parts in harmony with the surrounding trees, shrubs, plants, and ground. It should bear as little of the stamp of art as possible, have a bold, free, and natural appearance, and then no phase of garden scenery can equal it in point of beauty or interest.

There are two or three types of rockery in garden scenery. There is the large, bold, and extensive kind, which plays such an important part in the decoration of a small valley or slope, and which forms a suitable position for the growth and display of many of the larger and bolder growing trees, shrubs, and plants, and may be the groundwork for some rippling rill or flowing cascade. Rockeries of this magnitude require to be constructed by a master hand—a true landscape artist—to be perfect examples of garden scenery. No amount of detailed description can possibly convey an accurate idea of the construction of this type of rockery. The most we can do here is to lay down a few general rules, and leave the rest. And among these the first and most important one is, to never attempt the introduction of rock-scenery on a large scale in a small garden, or where the conformation of the ground does not readily lend itself to it. A hollow, a dell, or a ravine with steep sloping sides, and with tree and shrub-crowned summits, are particularly happy positions for a large and bold rock scenery. Level ground, or nearly so, is not adapted for rockwork on a large scale, but with skill and taste it is possible to introduce it to a moderate extent, and add very largely to the beauty and interest of the garden. And the next point is to avoid over fussiness and exactness in the formation of the rockery. Large and bold masses of stone, arranged so as to have the appearance of natural strata, should be aimed at, rather than a pure formal arrangement. The surface, moreover, should be as diversified, as rugged in outline, and as bold and as free as possible.

The next type of rockery is the moderate one, formed by throwing up artificial mounds of earth in certain positions in the garden where they will harmonise with the surroundings. For example, some objectionable object in the background may require to be screened from view. This can be very happily effected by throwing up a large mound of soil, planting the summit with trees and shrubs, and transforming the front or most conspicuous slope into a rockery. In small gardens it is possible to get some charming effects by slightly excavating natural depressions in the surface of the ground on the





ROCKERY IN THE ROYAL GARDENS, KEW.



outskirts of the garden and throwing the soil into irregular mounds at the side, and if these are planted with shrubs at the top, and the sides adorned tastefully with burrs or stones, the sunny portions may be utilised for growing alpine plants, and the shady ones for ferns. We have ourselves made some very interesting nooks and corners in this manner, and have been able to grow alpines and ferns extremely well. As pointed out elsewhere, the foreground of a garden should be a bold free expanse of turf, and cut up as little as possible with formal beds. From this central foreground the turf should gradually melt away into nooks and corners and miniature valleys, and wherever a slope occurs, it should be utilized for a rockery. But care must be taken not to make the rockeries too obtrusive by the too free use of stone or burrs. Sufficient should be employed to keep the soil in position and to form beds for the various plants, and no more. It should be remembered that the object of a rockery on a small scale is not so much to display the material it is constructed of as to provide a suitable home for the plants. A winding path leading from one portion of the garden to another often provides suitable positions for a little rockwork. Then, again, a charming rockery may be obtained by excavating a winding hollow from three to six feet deep and ten to twenty feet wide, and decorating the sides with stones or burrs. This will afford a splendid opportunity of growing not only alpines, but aquatics, ferns, and choice shrubs, and will make a grand feature in the garden. The rockery in the Royal Gardens, Kew, is of similar construction.

The other type of rockery to which we wish to draw attention is one particularly suitable for a small garden. It enables the best use to be made of limited space for the culture of alpine plants, and takes the form of small raised beds or mounds on the level surface. These, however, must not be allowed to obtrude themselves too much, or they will mar the beauty of the garden and diminish the effectiveness of the plants, &c., grown on them. One of the most interesting and best grown collections of alpine plants existing in this country are cultivated on low rock beds in Mr. and Mrs. Minard Cammell's garden near Billinghamurst, in Sussex. An excellent description of this garden appeared in *Amateur Gardening*, and we cannot do better than repeat it, as it shows so well how thoroughly adapted the plan is for growing all kinds of alpines. The correspondent—one of the highest authorities on the subject—who saw this garden, says:—"So admirable an object lesson is it in alpine culture, so good an instance of how much may be done by good taste and knowledge, but without great outlay, that I think



I shall be doing a service to many by describing it ; perhaps with sufficient particularity to enable them to imitate its plan more or less if they so please. For where there is one person who can spend money freely enough to give him a rock garden, or even a rockery of any pretensions, constructed on lines hitherto usual, there are scores who would gladly reach the same result if only the *res augusta domi* did not prevent.

“But I do not wish to exaggerate or mislead. This garden could not have been a tithe as fine as it is without a considerable knowledge of plants, nor without a judicious outlay upon them, nor without much care and enthusiasm annually spent upon it and its tenants. It has profited, too, from being upon a fine soil, and from being set in rural and pleasant surroundings of lawn and shrubs. But after all allowance made on these accounts, it remains perhaps the best practical working model which I can recall for the man who wants a beautiful result without an elaborate or costly construction, who cannot afford a big rockery or rock garden, but who wants to make a fine alpine collection at only a moderate expenditure of money and labour. The key to this success is found in the simplicity of its plan, in the substitution of plants for large rocks or stones, and in the avoidance of weedy subjects in the planting.

“I do not mean to say that a good deal more fine effect of a sort may not be got by large rock garden constructions, nor even that some cultural advantage may not be secured by the skilful employment of rocks, large or small, for that purpose. But I do say that such effect is the quality which the genuine plant-lover may most readily dispense with if cost is an object, and that fine plants are a very fair substitute indeed for much stone. And as regards the relative cultural advantages of the two systems (which I will call respectively the elaborate and the simple), all I now need say is that, with some knowledge of the subject, and of rock gardens public and private, I do not recall any space of equal size containing a greater number of plants, choice, interesting, beautiful, and well-grown, than this simple and exquisite ‘mound garden’ at Loxwood, for thus it may fairly be described. A series of mounds or ‘hummocks’ made of good gritty soil ; in form slug-shaped, kidney-shaped, or irregularly oval ; some much or little higher than others ; some sinking at intervals to the ground level, and enabling you to step across them over sunk stepping stones ; such stones again used casually and at odd intervals to vary the surface, or to help hold up the soil (but not necessarily forming any part of the scheme of construction) ; the pathways gravelled,



perhaps, or rudely paved, and with plants encroaching upon them, and left none too regularly or formally between these mounds. There, roughly, is the simple plan upon which this alpine garden has been, easily and gradually, home made. If I rightly recollect, it nowhere (or rarely) sinks below the original ground level, and therefore, doubtless, the soil for the mounds has been brought on. But were it desired to save that labour such soil, if good enough, might be excavated on the spot (as shown in the illustration on p. 281), and the hollows thus formed would then become in their lowest level the sunk pathways of the garden, while the sides of these hollows would become the lower flanks of the mounds.

“The one plan I believe to be better under some conditions ; the other the superior under others. Excavate I should say when the soil is light and the drainage ample, for the sunk levels thus secured will give moist lower levels for water-loving plants, such as so many bog plants exact. But where the soil is otherwise and in itself sufficiently retentive, or the situation low-lying, and where drainage is therefore the desideratum rather than aids to moisture excavation is generally better avoided, and the whole of the mounds kept above the original ground level. The wealth and quality of the choice alpines and other dwarf plants which met the eye as it glanced over this small garden was astonishing. For the secret, if such it be, is here well known, that to get the best and most congruous result from this glorious class of plants, shrubs, or weedy or tall subjects which would interrupt the *coup d'œil* should not be intermixed ; that as much as possible of the surface of the garden may be brought into the picture at a glance.

“At the first glance one was inclined to find here a proof that the choicest and rarest mountain plants may be grandly grown on heaps of garden soil without aid from rock or from water. And so not a few may ; and very many more lowland plants of great beauty, which pass for and resemble true alpines. With such let the gardener furnish the most of his mound garden, if it be not possible for him to bestow time and care in tending and watering it when made. But here time and constant care have been spent to grow well those plants which need them, and not only the many commoner beauties which need them not. For if the construction of the garden which I am describing has been simple and inexpensive, its furniture is choice, rich, and varied in the extreme ; and though an equally gay, and, in a sense, perhaps an equally pretty garden (regarded merely as a colour arrangement) might be had without the expenditure of thought, labour, and money, not a little of



these have been necessarily and wisely (gradually it might be) expended to form this fine collection. Less perhaps than might be supposed, for the owners are their own head gardeners, and are rare judges of good hardy plants."

We adopted a similar plan some years ago in a suburban garden, and found it to answer exceedingly well. Beds consisting of stones, burrs, and soil, and raised more or less above the surface, were formed on the lawn or grassplot. They constituted an excellent means of growing alpiners and were far more interesting than an ordinary rockery. Our practice was to drop a few stones or burrs about on the turf to form an irregular bed. We then had the turf dug up inside the stones and left roughly. On this a thick layer of cow manure was placed, and then enough ordinary good mould to fill the bed to the top of the stones. A few stones or burrs were next placed here and there inside, and the spaces filled up with mould. If it happened to be a large bed, dwarf-growing shrubs were planted here and there to break up the flatness, and the remainder planted with alpiners. Sometimes we had groups of these beds of all shapes and sizes, and sometimes they occurred singly. Being raised above the surface, the aubretias and other showy plants looked extremely pretty, draping the sides of the burrs, &c., on the green turf. They had, moreover, another advantage; visitors could walk around them with ease, and one could more easily attend to the wants of the plants than when growing on a rockery.

So far, our remarks have been confined to the employment of rockwork as a minor element in garden scenery. Were we to leave off at this point we should entirely pass over those who have only very small back gardens, and who have such a *penchant* for the culture of alpiners, that to gratify their tastes they have to devote the whole of the space at their disposal to the pursuit of their favourite hobby. Our business is to cater for all, and therefore we must have something to say on the subject of rockeries in back gardens. That alpiners can be grown with great success in a back garden we have had ample evidence, and that a properly and tastefully constructed rockery occupying the whole of the area of the latter is one of the most interesting and beautiful methods of laying it out, there cannot be the slightest shadow of a doubt. Here, for example, is a description of a garden laid out by Mr. Edward Lovett, of Croydon, an amateur cultivator of alpine plants.

It is very generally supposed that an alpine garden, or, in fact, anything that deviates from the orthodox rectangular garden of a suburban villa,



necessarily involves great expense ; also that alpine plants of all others are most difficult to grow near towns, and most exacting in their demands for their mountain air and normal altitude. This is really not so, although it does involve plenty of work, a certain amount of care and knowledge, and some judgment as to how to proceed. Many a square, flat, uninviting, and inartistic garden could be made a thing of beauty and a joy for, at any rate, a considerable time, if the owner would only leave the beaten track ; destroy the straightness of his paths, break up his level, cover the nakedness of his wall or fence, and judiciously hide his dust-bin—that chronic ornament of nearly all suburban gardens.

Before we “lay out” the garden we must have the rock to do it with, as, of course, we are really dealing with what is usually known as a rockwork, only on a somewhat different scale. The old idea of a rockwork was usually a heap of earth or rubbish, or both, generally put in a corner most unsuited to it, and studded over with “burrs,” clinker, slag, or some such material, and ornamented with bits of “spar,” shells, and such like incongruous objects. In this mound a few sickly ferns, creeping jenny, &c., lived a short life, until cold, damp, slugs, and absence of sun put an end to their existence.

The question of rock is such a wide one that it must be dealt with according to the locality in which the alpine garden is proposed to be constructed. For example, in many parts of Scotland, Cornwall, and the Channel Islands, granites and other igneous rocks are readily obtained, and are excellent for our purpose. In parts of Wales shales and slates can be utilized. In the North of England the limestones and sandstones of the carboniferous rocks yield suitable material at one’s door, whilst in the South and West of England the similar rocks of the oolitic strata are capital for the purpose.

But when we come back to our suburban gardens we find rock of any kind scarce, chiefly because most of our cities, and notably London, are built on large clay basins, for reasons which need not be gone into here. However, the fact remains that “rock” is very expensive, because scarce on clay areas, and hence the “burrs” and clinker rockwork of the London villa garden. Now, nothing is much worse for plants of any kind than this ; you might just as well try and make a garden on a Tyneside slag heap (unless a very old one, when it might be done). Flints are not injurious, but they are too dense for the delicate root fibres of plants to cling to or penetrate, and are only useful to build up the terrace to be described later. Trimmings of stone



from a stoneyard, though small, are very useful, and can be cemented together to form large blocks, presenting a nice rough serrated surface. Such material is often cheap, and always good for our purpose. The burrs from the base of brick kilns are useful, if *old* and very rough and irregular in outline; indeed, the older and rougher the better for our purpose, and it often happens that a load or two of old moss-grown burrs may be obtained at a cheaper rate on that very account, whereas they are really worth more than new ones. If, however, new ones are the more readily obtainable, they may be vastly improved by a cement wash, as described below, or a fairly lasting effect may be produced by a properly made limewash, applied, of course, in both cases some time before being used in building the rock garden.

This will not only minimise the bad effect of new burrs upon plant life, but will give the rock masses the appearance of a grey limestone, which is more pleasing in every way than that of the burrs, for they always proclaim the fact that they are simply distorted bricks, and therefore unnatural in constructing a miniature mountain pass.

We will now suppose that no real rock or even burrs are obtainable; it is still possible to make a very good substitute for rock, and that, too, at a very small cost. Brick rubbish, composed mainly of damaged bricks (that is, not absolutely rubble, although even that can be used), is obtained almost anywhere, and, except for foundations of roadways or paths, has a low value; indeed, it is sometimes a material to be got rid of. After getting as much of this as may be required, make a mortar of good fresh cement (one part) to from two to four parts of gritty sand or fine coal ashes. The proportion of four parts to one will stand fairly well under ordinary circumstances, but the mixture of two parts to one will make a rock mass, if properly done, that will last like granite. The brick fragments, which should of course be wetted, may be built together in the form and size required with the mortar, and must on no account be exposed to frost until well set and dried; the washing may be done at time of making, or at any time afterwards. It is a good plan to procure a certain quantity of cement, such as may be requisite for the other materials on hand, and use it at one time, as nothing is so disappointing as to find one's work all wasted on account of "perished" cement.

Of course, useful blocks of material can be made of almost any refuse, and even flints, but they would cost too much in cement. Good blocks of old refuse concrete are by no means to be despised, and a very pretty rock garden indeed may be made of this material, resembling as it does the



conglomerates and "pudding stones" of some of our geological formations. It may be thought somewhat trivial to thus dwell on such details as cement work, but as this is intended for amateur gardeners, and is no actual record of experience in making a rock garden under difficulties, it is best to show now it is possible not to do it, as it is easy to succeed with a little care.

There is an apparent disadvantage in the use of cement-washed rock as also in concrete; it exists also in many real rocks, and it is that the rootlets of plants cannot penetrate it. Most rock-loving plants certainly like a porous stone, but it is equally true that they will do remarkably well without it, provided, of course, that the pocket of soil they are planted in is plentifully intermingled with suitable material; but to this we shall refer further on, when dealing with the laying out of an alpine garden.

One thing is unfortunately very certain, namely, that the more porous and loose the rock, the less likely it is to stand the ravages of weather, and more especially of frost. The garden to which this experience refers has, after seven years of more or less severe winters, proved that one severe prolonged frost reduced all the softer sandstones to mere heaps of sand; two or three years' exposure finally disintegrated some of the harder and more compact sandstones; some of the brick and cement rock, made under adverse conditions and of stale cement, parted company after a frost of 15 degrees whilst the bulk of this artificial rock, made four years ago, is still as sound as ever, and has the appearance of compact limestone where not covered by alpine plants. The use of wood, either in the form of tree trunks or roots, is not to be recommended. It is utterly unnatural, and not best suited to alpine plants. Still, it certainly helps to break up what might otherwise be a monotonous level; and a large number of plants and, perhaps, more especially ferns, like to grow amongst the gnarled roots.

We will presume, for the sake of argument, that we are dealing with a suburban garden plot of the, unfortunately, rectangular description, so universally characteristic of all small modern gardens, and we will suppose that the size of this plot is fifty feet by thirty feet. It will be obvious then that if the piece of ground to be dealt with by the reader be larger and more favourable than this, why so much the better; whereas, if it be smaller, the owner can curtail his operations correspondingly, but in either case the following suggestions will apply equally.

We will take the building of an ordinary rockwork first, and the general arrangement of the whole garden afterwards, as the latter is not so likely to be



undertaken as the former. The general type of the so-called "rockwork" usually met with, and described in the opening remarks upon this subject, possesses several very marked disadvantages. Being a mere heap, the surface soon cakes, and no catchment ledges exist upon which the rain can find a resting-place, but runs off, doing no good to the poor unfortunate plants trying to grow in such an unnatural position. Again, being more or less equally exposed, there exists little or no shelter for such plants as may require it. The

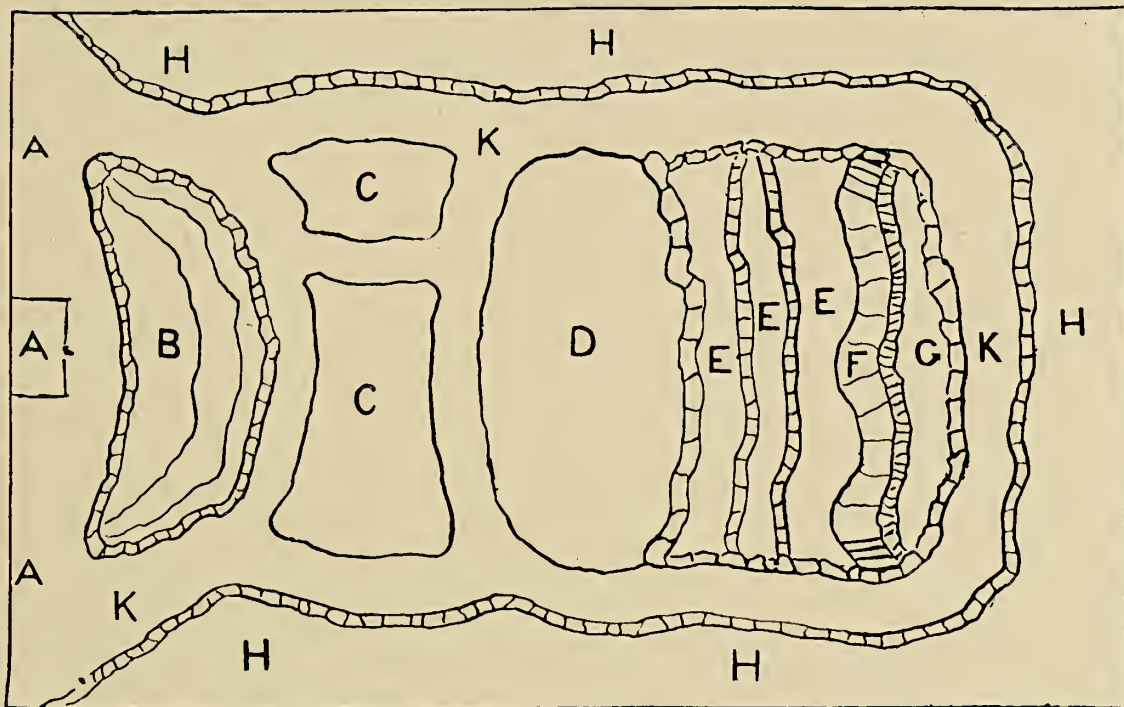


Fig. 1.—GROUND PLAN OF GARDEN PLOT, FIFTY FEET BY THIRTY FEET, LAID OUT AS AN ALPINE ROCK GARDEN, SHOWING ROCK TERRACES, VALLEY, BORDERS, AND PATHS.

A, Back of House; B, Rockwork in Terraces; C, Beds for Ordinary Plants; D, Valley for Moisture-Loving Plants; E, Large Rock Terraces; F, High Rock Path; G, Highest Part of Rockwork; H, Boundary Rock Borders; K, Paths (Gravel or "Rock," *i.e.* Concrete).

position, too, in which this so-called rock-work is placed, usually adds to, rather than diminishes, the difficulties with which the plants have to contend.

The general form most suitable for a satisfactory rock garden is in a series of steps or ledges as shown above, modifying it as occasion or necessity may demand. The bolder and more irregular, the more picturesque will it be, though it must always be borne in mind that what looks picturesque in a large



garden looks untidy in a small one, so that the boldness must match the size of the whole work to be in proper harmony with it. Again, every rock-work should be accompanied by a corresponding hollow or miniature valley. Where a level garden exists this is imperative, in order to obtain soil for the elevated portion, and where the soil is shallow it will be necessary to work the ground as also shown in Fig. 2. When we come to deal with the different kinds of

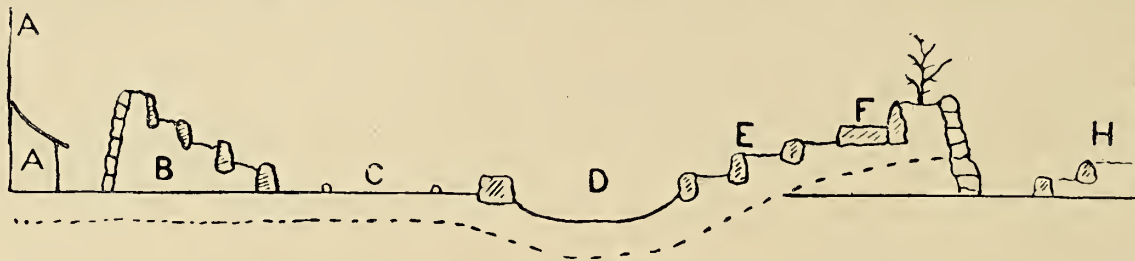


Fig. 2.—LONGITUDINAL SECTION OF FIG. I, SHOWING ELEVATION.

plants suitable for the different positions, the great value of a hollow as an accompaniment to a rock garden will be appreciated.

Having excavated sufficiently for our purpose, we proceed to lay the first row of rock, making up the soil level with the top; the second tier can then be deposited in such a way as to give a ledge which should on no account be of equal width all along, but should vary as much as possible in order to add picturesque irregularity to the mass. When a sufficient number of such terraces have been constructed the termination may be made in a more or less

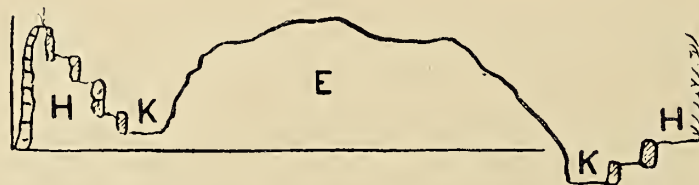


Fig. 3.—TRANSVERSE SECTION OF FIG. I, SHOWING DIFFERENCE IN LEVEL OF PATHS, ETC.

abrupt cliff; or if desired, another series of steps; or again, it may terminate against a boundary wall.

In building up these terraces it is very important to see that the earth is well packed down as the work proceeds, for if this be not done before planting, the future settlement will not only cause the bulk of the plants to die, but probably spoil the whole effect of the rock garden. It is a good plan to do



this work in the autumn and let the winter's rains settle it as it is done, or the hose can be turned on with good effect; for remember that earth settled by water is much more natural than when pressed in dry with the foot or a rammer. See also that all the chinks and crannies are filled up; as when a plant is placed with its roots just over a hollow, death ensues sooner or later. When the terraces are completed, it is a simple matter to arrange pockets here and there for such soils as may be wanted; for example, one spot can be made up of all loam, another all peat, a third made sandy, and a fourth calcareous, for such plants as may require these various soils, and yet the one need in no way interfere with another.

In the diagram sections the idea is shown of dealing with the normal suburban garden plot as already referred to. In addition to the rockwork just described, it is not only possible but easy to quite mask an uninteresting wall or even a fence, and get a most pleasing result. The ubiquitous dustbin, too, can be hidden in the manner shown in the cut. Of course the amount of rock required for a whole garden, even if a small one, would be great, and the labour, perhaps, even more so; but the results would be most gratifying, and the enormous number of plants of a most beautiful kind that could be successfully grown would astonish anyone; for with good well-drained terraces and ledges like these, proper soil and a little attention, many of the rarest and most beautiful alpinists will flourish as well in the suburbs of a town as on their native mountains.

Another very pretty way of dealing with an alpine garden is to entirely do away with the straight gravel paths and substitute for them winding rock paths, with steps here and there for descending the little valley or ascending to the higher parts of the rock garden. The gravel can be utilised for making concrete, and a capital resemblance to natural conglomerate rock thereby produced.

Suppose it is not desirable, or possible, to mask the whole of the boundary wall or fence with rock terraces, but only partially so, then the rest should be covered with some dense growing climbers; but nothing is really so incongruous in an otherwise tastefully laid out garden than the orthodox ugly bare fence or wall. Perhaps the most difficult question in this matter of an alpine garden in a suburban plot is that of soil. In most places there is certainly some vegetable mould, but in others the soil is a stiff, cold, unworkable clay, and very disappointing stuff it is. Much can be done with this by mingling it with ashes and putting it up in ridges during frost, so as to get it broken up



and pulverized. In many places clay may be as badly wanted, but on the whole we may assume that the existing soil, with slight modifications, is suitable for our purpose.

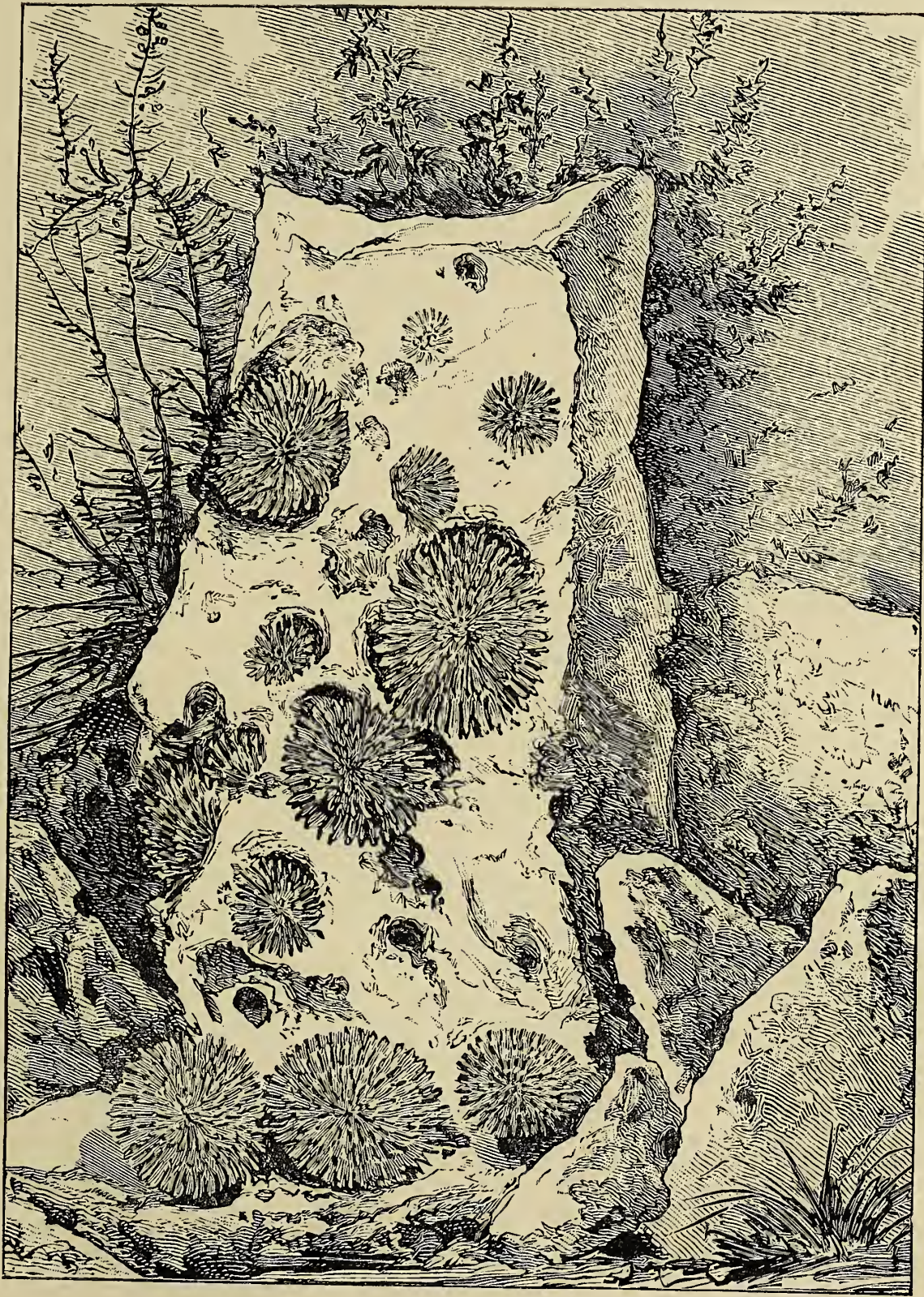
Having dealt with the subject of rock, and shown how good substitutes for the real thing can be easily and cheaply made when nothing else is procurable; and having also laid out our rockery or rock garden, we now come to the finishing stage of our subject, namely, the stocking of the terraces, hollows, and borders with plants. This is perhaps the most difficult part of the subject, as it would be inadvisable to be at all strict as to one group of plants; and tastes vary so much in this direction that half-a-dozen rock gardens may be devoted to as many groups of alpine plants. However, each one may follow his own favourite group, for there is perhaps no species but what will find a happy spot suited to its growth in such a garden as we have described.

However, one of the greatest difficulties we have to contend with in this country, and, consequently, one of the things we are always trying to succeed with, is to have an outdoor garden that will look nice in winter, or at any rate in very early spring, as well as in summer, and this, with a good alpine rock garden, is not only possible but easy to do. For this purpose we select as the principal groups to be dealt with, the saxifrages, sedums, and sempervivums, using such herbaceous stuff, bulbs, annuals, and miniature shrubs and even trees, as may lend themselves for the sake of really forming a background for the above-named genera. Even in the depth of winter it is wonderful what a charming object is a fine big clump of, say, *Saxifraga notata*, creeping over a rocky ledge, its bright encrusted foilage tinged here and there with carmine, brought about by its dry and well-drained situation. Or what is more beautiful to see, when all the trees are bare and the flower beds empty, than a large mass of the always richly green *S. ceratophylla*, or perhaps a vertical dense mass of *S. densa*?

And here we would put in a word of advice to the owner of a small and unfavourable garden. Don't try and grow rare and delicate things, but find out what plants will thrive under the circumstances, and go in for them. In fact, follow Nature, and select such things as can readily adapt themselves to their existing and surrounding conditions.

But to return to the rock beds. We will take the various portions seriatim, and briefly suggest what plants would best suit each little locality. In the elevated terraces it is a good plan to plant deep down a good stock of bulbs to begin with, as desired or selected, the various narcissus forms, snowdrop,





LONG-LEAVED SAXIFRAGE (*Saxifraga Longifolia*).



etc. These need never more be touched, and will in no way interfere with the other plants put over them, but form charming effects in spring, peeping up here and there through the bright green clumps of saxifrages. The bulbs of lilies may likewise be placed in the little valley for the sake of being in a moist position. Such saxifrages as *notata*, *crustata*, and *Hostii* form striking clumps on the terraces. Let them be near the edge, putting at the back primulas, auriculas, campanulas, etc. The choice *Saxifraga longifolia* often does well planted in a vertical crevice, and *S. densa* delights in growing down the face of a little cliff, as shown in accompanying illustration.

For filling up large pockets there is nothing like sedums, selecting *album roseum* and the very beautiful *glaucum*. Sempervivums will do well on any exposed point, but the curious cobweb one, *S. arachnoideum*, likes to grow vertically in a partially sheltered nook. *Veronica rupestris* will soon render a barren slope lovely with its sessile growth and bright blue flowers, whilst the white or pink creeping *Phlox setacea* can be used to relieve it. Whilst some sedums like a rather calcareous soil, it is curious to find *Sedum anglicum* delighting in peat. Wallflowers and little coniferous trees form an admirable finish on the topmost ridge of the rock-work, of the former the beautiful pale yellow *Cheiranthus alpinus* being a lovely sort. In the hollow which we call a valley, in addition to the lilies we may grow that gem, *Primula rosea*, and there is a host of moisture-loving beauties to keep it company. A large space can soon be filled if required in this situation by one or two fine *Osmunda regalis*. Iris of the various sorts go capitally with rock, and always seem to suggest the presence of water.

As to the boundary borders, what can be more beautiful for covering any wall or fence, not faced with rock, than Japanese flowering shrubs, *Pyrus japonica*, for example, with its lovely red or pink flowers. Choice ivies, too, may here be grown, or any creeper that takes the fancy of the planter. The rock borders around the garden will suit a host of things, if variety be desired, but in some of the rocky, well-drained pockets, a few of our choice little British ferns will flourish like weeds. In the borders, too, *Ceterach officinarum*, *Asplenium adiantum-nigrum*, *A. trichomanes*, *A. Ruta-muraria* form quite large clumps. They are always beautiful and very interesting. Supposing we have devoted the large centre terrace rockwork chiefly to saxifrages, let the soil be so selected for any that require very special treatment, which are but few; for a fairly good soil, sandy loam preferably, will do for anything almost.

See that the soil is thoroughly well-drained, this being, perhaps, the great



feature for success. To do this well, use potsherds, etc., well under the earth, and mingle amongst the soil little bits of sandstone. When this cannot be got, broken bits of rough and decayed old mortar will do pretty well. In towns it is often possible to get a very rich sandstone from men who collect "hearthstone" on their own account, the border stuff not being good enough for their usual merchandize.

The greatest enemy, in our climate, to alpine plants is the cold dampness of our winters. Drizzling fogs, for which perhaps London stands first, are fatal to many things, but especially to saxifrages. Unfavourably situated, they rot off in the most heartrending manner, and yet with care they will withstand it in the very heart of London. Indeed, it is possible to grow saxifrages really well in a window box, or on a ledge in a back yard, whilst many a flat house-top in London might, with proper arrangement and care, actually be transformed into an alpine rock garden.

Having dealt with the various types of rockeries, it is necessary now to offer a few remarks on the materials available, method of construction, and mode of planting. With regard to the first-named, as we have already described them pretty fully in the preceding chapter, it is hardly worth while repeating the information here, because the same materials are required in the present case, and nothing new can be added to what has already been said. Mr. Lovett, again, has alluded pretty fully to the matter, consequently the reader will find abundant information of this phase of the subject elsewhere.

Much, too, that has been said in the chapter on constructing a fernery applies to an alpine rockery also. The great aim should be to avoid anything like stiffness or formality, either in the outline of the rockery or in the arrangement of the materials. Don't attempt to level or place the soil in a formal heap. Pick up the burrs or stones and drop a big one down here and there. Don't touch them again to attempt to make them appear "nice and level" and so forth. Just imagine that a stone or a burr is a meteor dropped from the heavens, and is too hot or too heavy for you to move. Don't put all your big stones or burrs at the top of the mound and finish off gradually with small ones. Big ones should be dropped anywhere about the heap—front, middle, or top. These will form the ground work. Now get some smaller ones and distribute these about here and there, so that unconsciously you get an outline of tiny beds, some showing boldly, others receding, and so on. Next settle the outline of the rockery. Attempt no regular order. If the soil comes out a foot or more in one place than another, don't push it back,



but place the burrs for the specific object of keeping the soil in position, not for forming an edging. Don't let the burrs meet and form a continuous edging, or let their upper edge form a level surface. Now fill the nooks, crannies, and spaces generally between the burrs or stones with compost, and the rockery will be ready to receive the plants.

The next thing to settle about is the soil or compost. For forming the back of a large rockery any ordinary good mould will suffice. For the nooks and crannies and ledges, after the burrs or stones are in position, a special mixture of decayed turfy loam, thoroughly well rotted manure—preferably cow-dung—leaf-mould, old mortar from which the finer particles have been sifted, and if you can get it, granite or stone chippings from a stonemason's yard. Peat must be added in some cases. A layer of the foregoing compost, not less than six inches in depth, will be needful. A good supply of sifted mortar rubble, granite chippings, etc., must be kept in reserve so as to be able to add some more of it when planting kinds that need greater porosity in the soil than others. Slaked lime is frequently needful for mixing with the soil in which plants coming from a carboniferous habitat are to be planted, as some of the saxifrages, for example. If loam be difficult to obtain, good garden soil will do nearly as well for most kinds. We do not pin our faith absolutely to orthodox mixtures or proportions, as we are of opinion that plants can and are frequently grown successfully in soils of a diverse character. We firmly advocate experimenting with soils as well as positions, and therefore urge those who cannot command an ideal compost, to obtain and try the best substitute available.

In planting see that all alpines of trailing habit, such as the White Rock Cress (*Arabis albida*), the Purple Rock Cress (*Aubretia purpurea*), the Gromwells (*Lithospermums*), pinks, and Sun roses (*Helianthemums*) are planted close to the inner edge of the burrs, so that the shoots may droop over them. The tufted kinds—such as many of the saxifrages, erinuses, androsaces, etc., do best in the chinks or fissures of the rocks or burrs. To secure the plants firmly there mix a composition of clay and cow-dung, and use it above and below them to close the fissure; this will keep the plants and the soil in position, and afford them a certain amount of nourishment. The Sandworts (*Arenarias*), phloxes, ranunculus, primulus, Moonworts (*Soldanellas*), Heron's Bills (*Erodiums*), gentians, etc., do best in the nooks and crannies, planting each kind in a nook to itself. In planting these, small burrs and stones will be required to prevent the soil being washed away by storms. Plant tall



alpines, such as the aquilegias, where they will show boldly and break up the uniformity of outline of the nooks. It is also necessary to bear in mind that some alpines require shade and others plenty of sun. The planting of alpines is best undertaken in spring, say between March and June. All spring-flowering bulbs should be planted in September or October, and summer-flowering kinds in March or April. Plant evergreen shrubs and trees in September, April, or May, and deciduous kinds between October and February.

## LIST OF PLANTS FOR ROCKERIES.

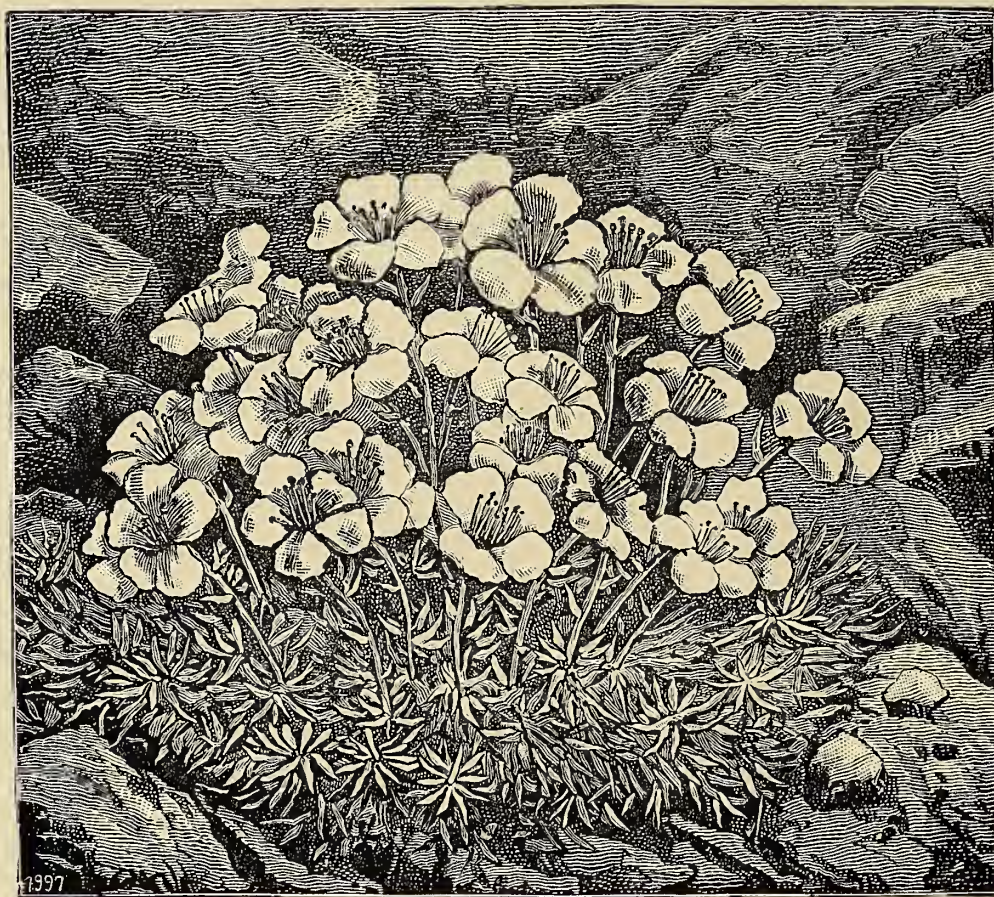
Subjoined are carefully-prepared lists of plants adapted for sun or shade :—

TWELVE CHOICE ALPINES FOR A SHADY ROCKERY.—*Cyclamen Atkinsi*, white and pink, December to March, 3 inches; soil, loam and leaf-mould; position, ledges of rockery. *Myosotis rupicola*, blue, May, 2 inches; soil, loamy; position, chinks of rockery. *Primula rosea*, rose, April, 3 inches; soil, rich loam; position, ledges of rockery. *Primula marginata*, violet-rose, May, 3 inches; soil, loamy, with small stones between; position, ledges of rockery. *Ramondia pyrenaica*, rosy purple, June, 4 inches; soil, sandy peat; position, crevices or chinks of rockery. *Linaria alpina*, violet, May to September, 3 inches; soil, ordinary; position, ledges of rockery. *Omphalodes verna*, blue, April, 3 inches; soil, rich loam; position, ledges of rockery. *Nierembergia gracilis*, white, July, 3 inches; soil, ordinary; position, ledges of rockery. *Campanula muralis*, lilac, June, 3 inches; soil, ordinary rich; position, ledges of rockery. *Haberlea rhodopensis*, lilac-purple and white, May, 4 inches; soil, sandy peat; position, chinks of rockery. *Primula Allioni*, rosy purple, April, 4 inches; soil, rich calcareous loam; position, ledges of well-drained rockery. *Pinguicula grandiflora*, bluish purple, June, 4 inches; soil, moist boggy peat; position, under shade of moist rock or stone.

TWELVE DWARF ALPINE SHRUBS.—*Erica carnea*, rose, winter, 6 inches; soil, peaty; position, sun or shade. *Daphne cneorum*, rosy-pink, fragrant, summer, 6 inches; soil, rich loam; position, sun or shade. *Andromeda fastigiata*, white, spring; soil, peaty; position, shady. *Andromeda tetragona*, white, May, 10 inches; soil, peaty; position, shady. *Azalea procumbens*, pink, May, 2 inches; soil, sandy peat; position, sunny. *Cistus lusitanicus*, white, yellow, and crimson, 18 inches, May to July; soil, rich loam; position, sunny. *Gaultheria procumbens*, white, spring, succeeded by red berries,



3 inches ; soil, peaty ; position, shady. *Rhododendron chamæcistus*, pink, May  
 6 inches ; soil, sandy peat ; position, sunny. *Rhododendron ferrugineum*,  
 scarlet, May, 12 inches ; soil, peaty ; position, sunny. *Dabæcia polifolia*,  
 crimson-purple, July, 15 inches ; soil, sandy peat ; position, sunny. *Hypericum coris*,  
 yellow, June, 6 inches ; soil, sandy loam ; position, shady. *Bryanthus erectus*,  
 pink, summer, 8 inches ; soil, sandy peat ; position, shady.



SAXIFRAGA BURSERIANA.

TWENTY-FIVE KINDS FOR GENERAL CULTURE.—Under this head will be included those that will succeed in any fairly good ordinary soil, and in a sunny or shady position : *Achillea tomentosa* (Woolly Milfoil), rose, 9 inches, May to June ; *Alyssum saxatile* (Gold Dust), yellow, 12 inches, April to May ; *Arenaria grandiflora* (Balearic Sandwort), white, 3 inches, May ; *Arabis albida* (White Rock Cress), white, 3 inches, April and May ; *Aubretia purpurea* (Purple Rock Cress), purplish blue, 3 inches, April and May ; *Campanula isophylla* (Ligurian Harebell), blue, 6 inches, July to September ;





SAXIFRAGA CAMPOSI.



*Dianthus neglectus* (Grass Rose Pink), pink, 4 inches, May and June; *Dryas octopetala* (Mountain Avens), yellow, 3 inches, May; *Erinus alpinus*, purple, 3 inches, May to August; *Gentiana verna*, blue, 3 inches, May; *Hutchinsia alpina*, white, 3 inches, March to May; *Iberis sempervirens* (Evergreen Candy-tuft), white, 9 inches, May; *Lithospermum prostratum* (Purple Gromwell), blue, 6 inches, April to June; *Myosotis azorica* (Azorean Forget-me-not), blue, 6 inches, May and June; *Phlox amœna* (Rosy Phlox), rose, 3 inches, April and May; *Phlox setacea*, rose and purple, 3 inches, April and May; *Potentilla nitida* (Shining Cinquefoil), rose, 3 inches, June and July; *Primula auricula* (Alpine Auricula), various, 4 inches, March to June; *Primula nivalis* (Snow White Primrose), white, 2 inches, May; *Primula japonica* (Japanese Primrose), purple-crimson, 12 inches, May; *Saxifraga sancta*, yellow, 2 inches, May; *Saxifraga cotyledon pyramidalis*, white, spotted pink, 2 inches, May; *Saxifraga Camposi*, white, 3 inches, April to May; *Sedum Sieboldi* (Siebold's Stonecrop), pink, 6 inches, September; *Sempervivum arachnoideum* (Cobweb Houseleek), carmine, 3 inches, May; *Veronica saxatilis* (Blue Rock Speedwell), blue, 4 inches, May. The arabis, aubretia, campanula, iberis, phlox, and lithospermum are trailing plants, and should be planted near the edge of the stones, the others in nooks, crannies, or ledges of the rockery.

TWELVE CHOICE ALPINES FOR A SUNNY ROCKERY.—*Androsace carnea*, rose, April, 3 inches; soil, sandy loam and peat; position, chinks of the rockery. *Saxifraga oppositifolia major*, rose, March, 2 inches; soil, rich loam; position, fissures or chinks of rockery. *Saxifraga Burseriana*, white, March, 3 inches; soil, sandy loam and old mortar; position, chinks of rockery. *Saxifraga longifolia*, white, May, 12 to 15 inches; soil, sandy loam and old mortar; position, chinks of rockery. *Rubus arcticus*, rosy pink, May, 6 inches; soil, peaty; position, ledges of rockery. *Arenaria purpurescens*, purplish, May, 1½ inches; soil, sandy; position, edges of stones. *Aubretia Leitchlini*, crimson, May, 3 inches; soil, sandy loam; position, edges of stones. *Dianthus cœsius*, rose, May, 3 inches; soil, sandy loam; old mortar and grit; position, chinks of rockery. *Soldanella alpina*, blue, April, 3 inches; soil, sandy loam and grit; position, ledges of rockery. *Silene acaulis*, pink, April, 1½ inches; soil, sandy loam; position, ledges or clefts of rockery. *Onosma taurica*, citron yellow, July, 8 inches; soil, sandy loam and grit; position, chinks of stones. *Primula integrifolia*, purplish rose, March, 3 inches; soil, rich loam and leaf-mould, with lumps of stones between; position, ledges of rockery.





## ORNAMENTAL WATER, FOUNTAINS, ETC.

At the foot thereof a gentle flud,  
His silver waves did softly tumble downe,  
Unmarred with ragged mosse or filthy mud ;  
Ne mote wylde beastes, ne mote the ruder clowne,  
Thereto approch ; ne filth mote therein drowne :  
But nymphes and faeries by the bancks did sit  
In the wood's shade which did the waters crown,  
Keeping all noisome things away from it,  
And to the waters fall tuning their accents fit,

SPENSER.

**T**HE Romans delighted in their fish-ponds not so much as ornaments as preserves for epicurean delicacies. The lampreys were their water-gods, which, as in the case of Hortensius, they alternately petted and adored, and to whom they now and then sacrificed a human victim, not to appease the anger of the deities, but to satisfy their appetites, and improve them for the table. Our English fish-ponds and aquaria bring suggestions of a more domesticating character, in unison with our national feeling and love of rural elegance. Water is the life and soul of a garden, whether on the ground-plot



of a suburban cottage, or the embellished lawn of an extensive villa. It can be rendered appropriate to any style of gardening, and is equally adaptable to the classic refinement of Italian terraces and gay parterres, as to the shrubby umbrage of a rustic wilderness.

We will venture to say that water is rarely used to such an extent as it might be, and should be, in English gardens. Frequently the abundant supplies of water on an estate are looked upon as a calamity; the owner frets himself to find outlets; the legislature comes to the rescue with a drainage act; and oftentimes when the drainage has been effectually diverted away from the place, it is discovered that it might have been put to better use than to swell the woodland rivulets and add to the volume of a stream which contributes to the wealth of lands miles away by means of many such contributions. We call to mind a property we were engaged to lay out not many years since, and where we were permitted to indulge our taste freely in forming a beautiful scene. While scheming to carry water away from the land, and carrying out great drainage works for that purpose, the engineers were at work on the highest part of the ground boring an artesian well. Every one to his trade: the landscapist must drain, drain, the engineer must bore, bore; one is getting rid of the very element the other seeks, and the proprietor who pays for the work simply occupies the position of a means of separation between agents who ought to work together, and according to one plan, from the first. It is true that land needing drainage must be drained; it is true that water stagnating in the soil is like so much poison; but having once persuaded that water to move in channels provided for it, having guided it into small pipes, and thence into large mains, and thence into lakes, ponds, and outlets, ought we to dismiss it at the boundary, lose it for ever, while the domestics are perhaps crying out against the scanty water supply, and the proprietor contemplates sinking another well in hopes of the second being less intermittent than the first? Generally speaking, the economy of country houses in respect of water may be likened to the act of a farmer who should pay fifty shillings a quarter for imported wheat, and at the same time give the produce of his own farm to the fowls of the air; and yet should persevere in growing wheat, that he might continue to waste it in the same manner.

It is said that all possible ranks of industry are filled up, which is equivalent to saying that human invention is exhausted. Having made this quite superficial remark on the paradoxical management of water on landed properties, it must be further remarked that there is ample room and verge



enough for any thoroughly competent and ingenious person to make a fortune by the establishment in country houses of economical water-works. In many private houses small gas-works are in operation, but there are many substitutes for gas, and there is no substitute for water. When you have a great supply of water by surface drainage, the only question of its conversion to tank water for domestic purposes is one of pure mechanism, and a mere beginner in engineering could devise plans for the appropriation of every drop at such a comparatively low rate of cost as should, in many instances, render well-sinking and boring most ridiculous.

Let us suppose a property to be completely drained, it is a mechanical matter to collect the water somewhere; a mechanical matter to take it from thence by means of the hydraulic ram to any higher level if there is anywhere near a moderate fall, whether natural or artificial. Even the water used to afford mechanical power to the ram need not be wasted; and, having got a ram to work, the water may as well be carried to the top of a house or the top of a hill or tower, as to any level midway between such extremes. The next business is to make this water subservient to utility and ornament at one and the same time. The quantity which can be kept flowing, and the volume of the reserve, on which the works will have to rely during a long drought, must to some extent determine the nature of the ornamental purpose to which the water may be applied; it may sometimes furnish a cascade, and send silvery spray through a rocky glen clothed with myriads of mosses and ferns, or furnish a little spring or fountain to splash over a stone into a nook full of freshness, and thence flow to the lake again, or to fill the tanks which supply the garden.

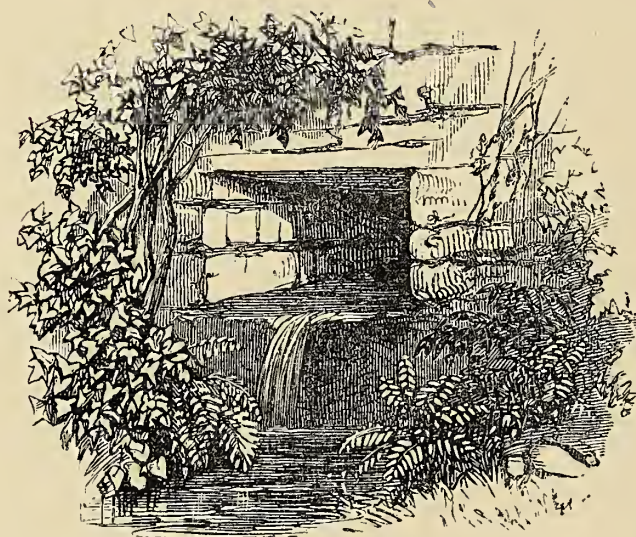
And, me before, I saw a little well  
That had his course, as I could well behold,  
Under a hill, with quick streamis and cold.  
The gravel goldn; the water pure as glass,  
The bankis round the well environing,  
And soft as velvet was the younge grass  
That thereupon hastily came springing.  
The suit of trees, abouten compassing,  
Their shadow cast closing the well around,  
And all the herbis growing on the ground.

It must never be forgotten that the disposal of water-scenes demands the exercise of great taste and judgment. Water of itself is always beautiful, but



its association with objects of interest enhances its beauty, and supplies also the justification of usefulness. Where the space and circumstances admit, water should always be enriched by plantations; clumps of trees, ferneries, rockeries, and belts of shrub are appropriate accessories; but they must be adapted in style to other surroundings, and the general character of the place; and there is a certain point at which to stop in the work of embellishment, or the whole affair may be overdone.

Fountains are not so generally employed in garden embellishment as they were prior to the change in taste from the formal to the natural style of landscape gardening. But still there are many who yet remain faithful to the



A NATURAL SPRING.

old style, and who consequently would not consider their garden complete without its fountain. And as we are bound to study all tastes as far as we can, we must not omit a brief reference to the subject in this chapter. It may be as well here to say, that for a fountain there must be a reserve of water at a higher level than the fountain itself. In towns this is easily accomplished by constructing a cistern in some elevated part of the residence, and securing a supply to it from the ordinary water-

pipes. Then from the cistern there must be another service to the fountain. If the house is far removed from the fountain, it will be better to place the cistern on the summit of a tower, shed, summer-house or other structure, as the longer the supply-pipe the more will the play of the fountain be lessened by friction; for though water will always rise in a pipe to the level of the point of departure, it requires time to do so, and friction reduces the rapidity of the flow, and hence the force with which a fountain will play cannot be determined solely by the difference of altitude between the jet and the cistern. If the supply-pipe is one hundred yards in length, the height of the fountain will be reduced one foot below what it would attain if the supply were close



beside it. Suppose that, according to the respective levels of the jet and the cistern, a fountain ought to rise ten feet, we have only to remove the cistern to a distance of one thousand yards to nullify the whole effect of the descending force of the column of water, and, consequently, destroy the jet altogether. To determine the adjutage is easy enough by experiment with a leaden nozzle, which can be pressed or opened to the dimensions found to suit the circumstances, and this course is absolutely necessary where the engineer has no ready means of ascertaining the power of the head. As a rule, the adjutage, or opening of the pipe, should be one fourth the size of the pipe itself, but every fountain should be supplied with a series of adjutages to produce different forms of jets, as the force of the head may vary, or as the caprice of the possessor may determine.

Having said so much by way of introduction, we will now proceed to deal with the construction of small ponds and lakes. It is not our intention here to go into the question of large sheets of water, because such work can only be properly carried out by an engineer, after a thorough survey of the site. Our remarks therefore will be confined to water scenes on a small scale.

In forming small sheets of water in places of limited extent, simplicity should always be aimed at. Circular or octagonal basins, with or without fountains, are perhaps the best suited for the formal or geometrical style, while for the mixed or gardenesque, where a nearer agreement with nature is sought, roundish or oblong pools or ponds are the most suitable. If, however, larger sheets of water, such as lakes, are being treated, then the shape may be more varied and irregular, so that the whole will not be seen at the same time, and by a tasteful treatment of its terminations considerable indefiniteness may be obtained.

We will now turn to small sheets of water, treated architecturally, offering a few remarks with reference to the most suitable positions, and afterwards, with the help of the diagram (Fig. 1), explaining shortly their construction. As regards the position, architectural basins should, as a rule, be (i) in near proximity to the house or some subordinate building; or (ii) be included in or form part of some specially-designed figure; or (iii) have the ground immediately around treated in a formal or geometrical style. Of course there are exceptions, owing probably to some peculiar formation of the ground, where water, "treated architecturally," is admissible in positions other than those mentioned; but, as a general rule, those referred to above will be found the proper and correct ones.



Let us now pass on to the construction of a circular basin, of which Fig. 1 is part of a section. No sheet of water, whether treated artificially or otherwise, should be shallower than three feet or deeper than five feet, otherwise evaporation of too great a rapidity takes place through the action of the sun, and consequently vegetation is inconveniently stimulated on the one hand, while on the other a greater depth would have the appearance of being dangerous, and also unnecessary labour and expense would be thrown away.

Assuming we take five feet as the required depth of the circular basin in the centre. Having marked out the ground, the soil should be taken out to the depth of six feet, so as to allow a foot for the concrete and cement. This done, the ground should be well rammed and made firm to avoid after-sinking (a most important matter); then the position of the pipes for conveying the water and receiving the overflow should be determined upon, and the pipes put in. The next step is to have a wall of brick work built

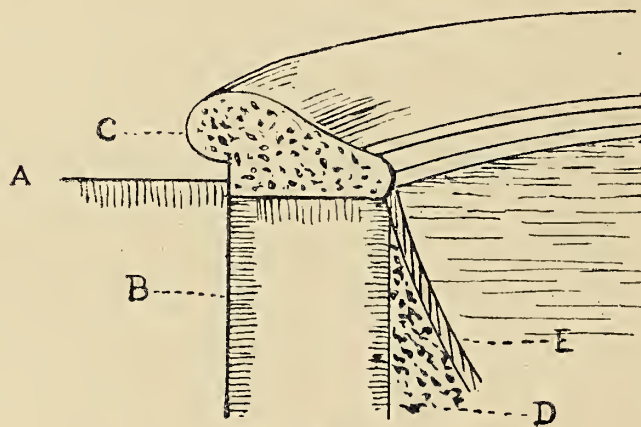


Fig. 1.

(Fig. 1, B), on which is placed a stone coping or kerb (Fig. 1, C), which should possess architectural appropriateness to the neighbouring structures. Generally it is desirable to keep the edging not more than one foot above the ground level, but the coping may itself be as much as three feet in height, and may have architectural embellishments, such as vases, sculptural figures, etc., according to the taste of the designer. The inside of the basin should then be lined with a covering of concrete (Fig. 1, D), a foot in thickness at the bottom, and gradually lessening in thickness to the margin, so as to form a sufficient angle in the slope for the margin that when ice is formed there may be sufficient room for its expansion. This concrete is best composed of a mixture of either one part hydraulic lime with four parts broken stone and sand; or one part portland cement with six parts broken stone and sand. Over the top of this concrete is then floated a layer of cement about one inch in thickness (Fig. 1, E), thus completing the construction of the circular basin of which Fig. 1 is part of a section.

The treatment of water in the natural style, in the form of roundish or





WATER SCENE IN SUMMER.



oblong pools or ponds, next demands our attention. In the natural style the primary object is to imitate on a small scale real lakes, rivers, etc., and their accompaniments: so in choosing the position in gardens or grounds, we must take nature as far as possible as a guide. There are on the natural surface of the ground but three situations in which water can exist, and expand itself into a large compass, and these are, a vale, a plan, and a hollow. Now, one of these three situations would, as a rule, be found in the lowest portions of the garden or grounds. Here then you should, if possible, fix on the position for a small lake or pool, bearing in mind the two following general rules: First, that, just as formal sheets of water should, as a rule, be in near proximity to the house or some subordinate building, so should sheets of water treated naturally or gardenesquely be far removed from the same; Secondly, that where water is found already existing in a spot, generally implies suitableness of soil for retaining it, and consequently a fitting position for the formation of a pond or lake.

Before passing on to the formation of a small lake or pond, we desire to point out that a vast amount of labour is wasted in the excavation of a lake, however small it may be, unless the practical work is well directed and carefully planned. In carrying out the work we have two important points to consider, namely, the removal and disposal of the earth, and then the formation of the bed and margin. With regard to the first, care and thought should be expended as to the amount of earth that has to be removed and where it is going to, so as to necessitate as little as possible the removal of the same soil a second time to any great distance. The following hints may be of practical service with reference to the above subject. Firstly—That the best soil should be preserved and set aside for forming what is to be the future surface of the ground. Secondly—That the poorest soil should as much as possible be kept from contact with the roots of trees. Thirdly—That gravelly soil should not be placed anywhere near the lake or pond, so as to avoid all chance of percolation of the water. Fourthly—That the utmost care should be taken that no unseemly excrescences or lumps be eventually formed on the surface of the ground from heaps of excavated earth badly disposed of, but that the outlines of the new surface should artistically, gracefully, and almost imperceptibly blend with those already existing. So much for the disposal of the soil. With regard to the removal of it, care should be taken that the ground is staked out, and level pegs put down so as to ascertain the amount of earth to be removed before commencing digging.



In passing on to the formation of the bed and margin, observe that the same rule holds good as regards the depth as that mentioned in connection with artificial sheets of water. Having removed the soil to the depth of six feet (allowing one foot for puddling or concreting), the sides below the water-line should be sloped in proportion of about one and a quarter to one, so that, in the event of the water falling, no stretch of muddy foreshore would be discernible. This done, we then come to the knotty question of the most suitable way of making a small lake watertight. There are three ways: namely, concreting and cementing, which is described above; puddling; and puddle gutters (Fig. 2). Just as concreting is more suitable for architectural basins, so do we think that either puddling or puddle gutters are the most suitable for ponds or lakes treated in the natural style. A few words then about the two last. Puddle is formed by cutting and cross-cutting clay, pouring water on it, and working it with the feet or in a mortar-mill till it is plastic. The method of applying it is as follows: after excavating the ground to the required depth, the puddle should be laid on one foot in the middle to eighteen inches at the sides. As each layer of puddle is laid on, it should be well rammed and trodden till the required amount has been completed, and the whole mass is as homogeneous as possible. A puddle gutter can only be brought into use where there is a substratum of water holding clay at a moderate depth beneath the surface soil. From this substratum then should be constructed a wall of puddle (Fig. 2, A) to the height of at least one foot above the water level, being not less than two feet to two feet six inches at the base, and eighteen inches at the top. As the layers of puddle are put in the gutter each should be well rammed until the formation is complete. Before puddling the ground, or making use of puddle gutters, if the substratum allows of it, thought should be expended and arrangements made for the filling and emptying of the pond if necessary. Now in small lakes or ponds, a small sluice to the emptying drain will be quite sufficient; this being made of a plate of boards running in a grooved frame, and having a handle attached so that it can be lifted when required. The frame also should be built into

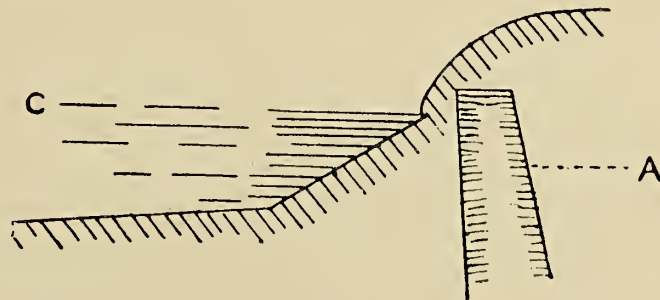


Fig. 2.



solid ground in preference to made ground, so as to avoid leakage. As regards obtaining water, the best way in small lakes or ponds is to drain the whole ground into the said lake, except the kitchen garden. By this means a moderate fresh supply will always be provided except in the very driest of weather. A small drain or pipe above the water level should be constructed so as to carry off any overflow water, and in front of it should be placed a grating to prevent the escape of fish, leaves, or any substance which may choke up the overflow drain. After the pipe question has been settled, the ground should either be puddled or have a puddle gutter formed around it, following out what I have mentioned above. This done, then the slope below where the water enters the pond above the water level should be paved, that is, have an approach

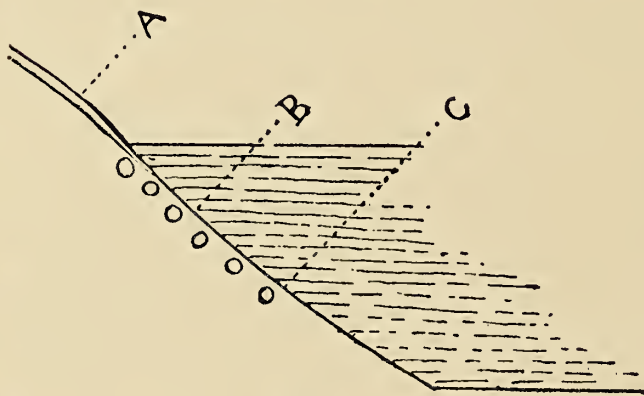
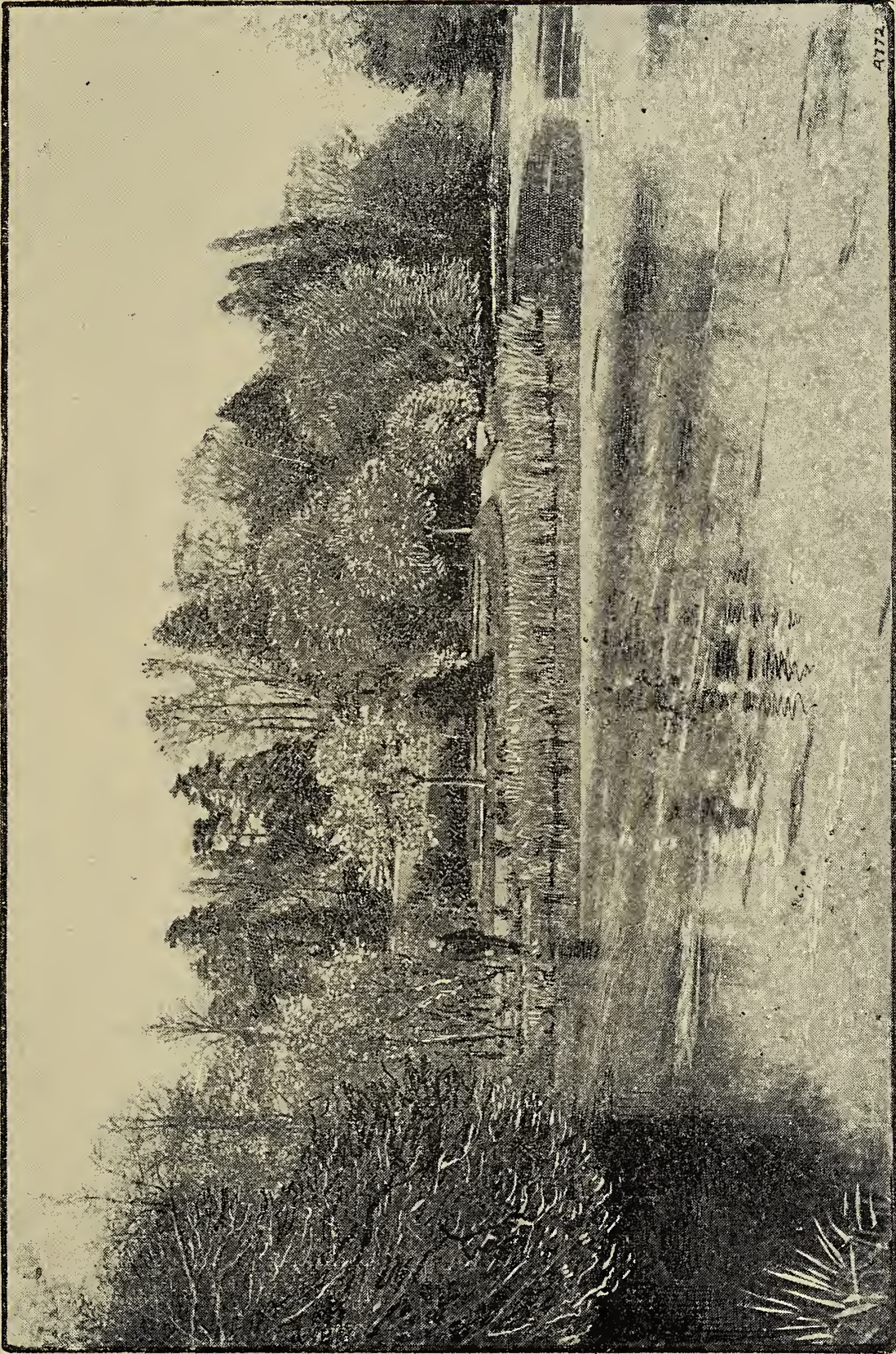


Fig. 3.

about three or four feet wide laid down the slope to prevent the water washing away the soil. Finally, the banks around the pond should be pitched with stone (Fig. 3, C), so as to protect them from being washed away by the action of wind or the water. These stones may either be rough boulders or more irregular small blocks set on edge. They should be well bedded into the bank and extend about eighteen inches in vertical depth (Fig. 3, C), below the surface of the water, presenting a somewhat rugged face. One word more as to turving the banks. The turves (Fig. 3, A) should extend down into the water at least nine inches (Fig. 3, B) below the water level; by this means there is no hard line of earth visible between the turf and the water.

We have now to say a few words with respect to the planting of the margins of ponds and lakes. It is only by the tasteful and appropriate planting of these that the many pleasing features of water can be effectively displayed; no irregular sheet of water, however graceful the curves may be, will appear pleasing to the eye and taste, unless diversified by planting, a matter which requires consummate taste and skill. What an immense amount of colouring, vivacity, and variety of scenery can be obtained by the careful and tasteful





WATER SCENE IN WINTER.



distribution of trees or shrubs, whether singly or in masses. A sheet of water entirely shaded or fringed by trees would tend to render the water impure and stagnant, rob it of its glitter, its sparkle, and its capacity for reflecting objects which constitute some of its most agreeable attractions, while on the other hand a sheet of water without any planting would look bare, cold, and entirely distasteful to the eye. It is almost impossible to give any definite rules as to the arrangement of the clumps and specimen trees, everything being left to the judgment and good taste of the designer. The following hints, however, with the help of the subjoined diagrams, may be of use and interest. Firstly, it is necessary, as a rule, to throw up a bank as well as plant on all the promontories round the margin, otherwise the curves would appear needless and consequently improper; by these means also you add variety and intricacy, you create a feeling that there is something more to see, that the sheet of water must be viewed from different points in order to ascertain its beauty, its sparkle, its power for reflecting objects, which, as we mentioned above, constitute some of its most agreeable attractions. Secondly, all hollows, of which we shall treat directly, should be left bare, the sides, however, being planted with clumps of shrubs and one or two specimen trees. Thirdly, great care should be taken in selecting the proper trees and shrubs, otherwise the grand effect produced by light and shade and the reflections of the branches in the water will not be obtained to its full advantage. Large trees, for instance, overhanging and dipping their branches into the water at certain points will be highly effective.

Contrast of colour and form again requires serious consideration and thought. In Fig. 4 we have endeavoured to illustrate a hint or two as to the profile of clumps or groups which may prove of use to intending planters, while in Fig. 5 a suggestion has been offered as to arrangement of the various clumps and specimen trees. Among the trees and shrubs suitable for planting around a sheet of water may be mentioned the following: Weeping kinds of trees are especially suitable, such as weeping willows (especially the American kind, which is an exceedingly graceful tree, as is also the Kilmarnock willow), weeping birches, and beeches. Again, the Alder (*Alnus glutinosus*), both the fern-leaved and the cut-leaved varieties; the Tamarisk (*Tamarix gallica*), Deciduous Cypress (*Taxodium distichum*), Sweet Gum (*Liquidambar styraciflua*), and the Strawberry Tree (*Arbutus Unedo*), are useful for planting. To add colouring, large masses of flowering shrubs, such as rhododendrons, azaleas, laurestinus, lilacs, syringa, laburnums, double furze, and hydrangeas,



will prove highly effective, or even if the pond or lake be within the pleasure grounds or garden, patches of showy geraniums or dahlias.

Before leaving the subject of planting, we desire to add a word as to aquatic plants. Although these can be grown in any piece of water, yet the more artificial in form the sheet of water is the less appropriate they will be, as they are more suited to informal and rustic accompaniments. They should be planted near the side or margin of the water, and opposite, as a rule, to the more prominent points of the shore, being equally good, if planted in this way, as specimen trees or shrubs planted in front of clumps or swells in lawn plantations.

We now propose to deal with the subject of undulation and the formation of the margin. Firstly, it is most essential that there should be a perfect union between grass and water, as it is a manifest beauty. There is, however, one exception, and that is where in secluded parts of a lake the bank is naturally precipitous, then great variety may be obtained by partially broken ground with heather and rough grass, jutting rocks, old stumps of trees, and if there be a stream or brook running into the lake or pond on that side, additional beauty and picturesqueness may be obtained by miniature waterfalls and cascades. This treatment, however, to be successful requires consummate taste and ingenuity. Secondly, in undulating the ground the hollows and swells should gradually and gracefully blend with one another, no hard ridges or abrupt excrescences being observable. Before continuing, let us explain what a "hollow" is with reference to undulation. It is the taking out of the ground, so that the surface assumes a concave shape, the lines gracefully, yet almost imperceptibly blending with the rising surface of the ground, and on the margin of a sheet of water not only should the ground be taken out in the bay or creek where the water-line is formed, but the rising ground inland should be hollowed out, gradually diminishing in extent as it touches the water edge, thus carrying out the idea that water, nature's grand agent, by means of which she formed the surface of the ground, once flowed along that hollow, finally accumulating in the form



Fig. 4.



of a lake. Lastly, it should be borne in mind that the extent of reflecting surface of the pond or lake should be in proportion to the extent of visible

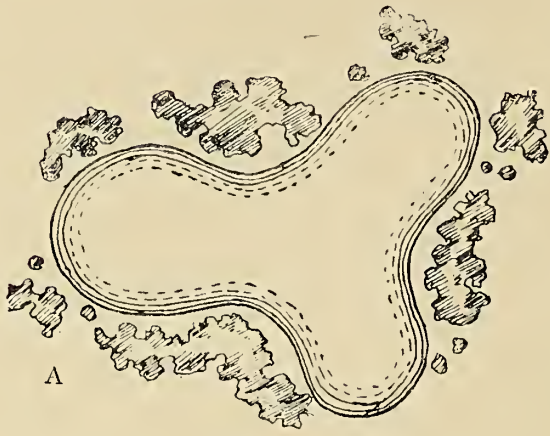


Fig. 5.

surrounding ground, so that if the surface of water be too great, and the land immediately around flat, portions of the distant bank should be raised and planted. By these means you not only lessen in appearance the expanse of water, but also give proximity and nearness to those portions of the distant bank. The question now arises where should be the rising ground, where the hollows and glades? The answer is, most, if not all, promontories should be raised and planted, while, as already mentioned, the glades and hollows should remain bare, the surface of the ground gracefully, yet almost imperceptibly blending with the rising ground on each side.

Now a few remarks with reference to clumps and plantations. A pleasing and required expression is aimed at; there must be no neglect of the elegancies of finish, no inattention to the most delicate propriety. The mounds or banks of the margin of a lake are no doubt features expressive of great beauty if treated properly, and the two chief points to be observed are naturalness and connection with other parts of the ground. In nature, undulation or swells of the ground possess the greatest possible softness, and bend with the surrounding ground in the most gradual manner. A raised bank, to realize much of beauty, should be varied in its ground outline (Fig. 6,

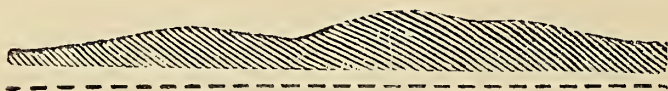


Fig. 6.

Sec. A), and have more or less undulation on its surface, but this is chiefly obtained by a correct and practical eye. There is, however, one rule to follow, and that is, that the more prominent and higher points of a clump should be the fullest, roundest, and steepest, while the retiring portions should be hollowed out and sloped back into a kind of scooped-out basin. This is what, without doubt, is generally found in Nature. One word more as to the formation of a clump, and, perhaps, its chief characteristic, namely, that

of the distant bank should be raised and planted. By these means you not only lessen in appearance the expanse of water, but also give proximity and nearness to those portions of the distant bank. The question now arises where should be the rising ground, where the hollows and glades? The answer is, most, if not all, promontories should be

raised and planted, while, as already mentioned, the glades and hollows should remain bare, the surface of the ground gracefully, yet almost imperceptibly blending with the rising ground on each side.



it should be well tailed out into the ground, and by a decided under-curve This gives the crowning stroke of finish and elegance.

Lastly, as to islands. In lakes or larger ornamental ponds islands are permissible, but not in small ponds, because, though they increase the variety and beauty of an extensive sheet of water, they are apt to fritter away and impoverish the extent and size of smaller ones. If, however, there seems to be sufficient expanse of water for one, then it should not be placed in the centre, but at the side; and if there is not more than fifteen to



POLYGONIUM SACHALINENSE.

sixteen feet of water between it and the mainland, great variety and picturesqueness can be introduced by a rustic bridge connecting the two. Islands, too, are of great use for the safeguarding and resting of water-fowl of different species, which add vivacity and animation to the scenery around.

A few hints must be given on the subject of growing aquatics in ponds or lakes. In small shallow ponds it is advisable to grow the plants in pots, immersing these in the water. But in the deeper water of large



ponds or lakes this plan is not practicable; it is better in these cases to plant them in or on the bed. This is easily accomplished by enclosing the roots and a moderate quantity of mould in a piece of sacking or garden mat, and then dropping the plant in the water. It will sink by its own weight, and as the sacking gradually decays, the roots will establish themselves firmly on or in the bed of the pond. This is the best way to plant water lilies, and in fact all kinds of aquatics that are difficult to plant in the ordinary way. As to the best time for planting, we prefer March or April, the plants then establishing themselves so much more quickly than at any other time.

And then as to the most suitable kinds to plant. For the centre of large ponds or lakes, there are no plants to equal the nymphæas and nuphars. These cover the surface of the water with their ample floating leafage and yield a sparkling mass of white and yellow blossoms in summer. Then along the margins, especially of small ponds, the Cape Hawthorn (*Aponogeton distachyon*) is a charming plant to grow. Like the water lilies it has floating leaves, and bears white fragrant flowers. The Water Violet (*Houttonia palustris*) is a pretty little plant with fern-like foliage and white flowers for the margin of a pond. Its foliage requires to be entirely submerged. Of taller plants for the margins there are plenty. For example, there is the Sweet Flag (*Acorus calamus*), with fragrant foliage; the Water Plantain (*Alisma plantago*), bearing white flowers; Flowering Rush (*Butomus umbellatus*), Bog Arum (*Calla palustris*), Sweet Cyperus or Galingale (*Cyperus longus*), Bog Bean (*Menyanthes trifoliata*), Golden Club (*Orontium aquaticum*), Water Arum (*Peltandria Virginica*), Pickerel Weed (*Pontederia cordata*), Arrow-head (*Sagittaria sagittifolia*), Water Soldier (*Stratiotes aloides*), Cat's Tails (*Typha latifolia*, *T. angustifolia*, *T. minima*), all charming plants for growing in the water at the margin of the lake or pond.

For growing close to the sides in moist soil, we have also a good selection of plants. First and foremost are the Royal Ferns (*Osmunda gracilis* and *O. regalis*), the Shuttlecock Fern (*Struthiopteris germanica*), the North American Sensitive Fern (*Onoclea sensibilis*), the Male Fern (*Lastrea filix-mas*), and the Lady Fern (*Athyrium filix-fœmina*). Then come the Meadow Sweets (*Spiræa ulmaria*, *S. palmata*, and *S. aruncus*), the Willow Herb (*Epilobium angustifolium*), the graceful Bamboo (*Bambusa metake*), the Great Bamboo (*Arundo donax*), the noble Knotweed (*Polygonium*



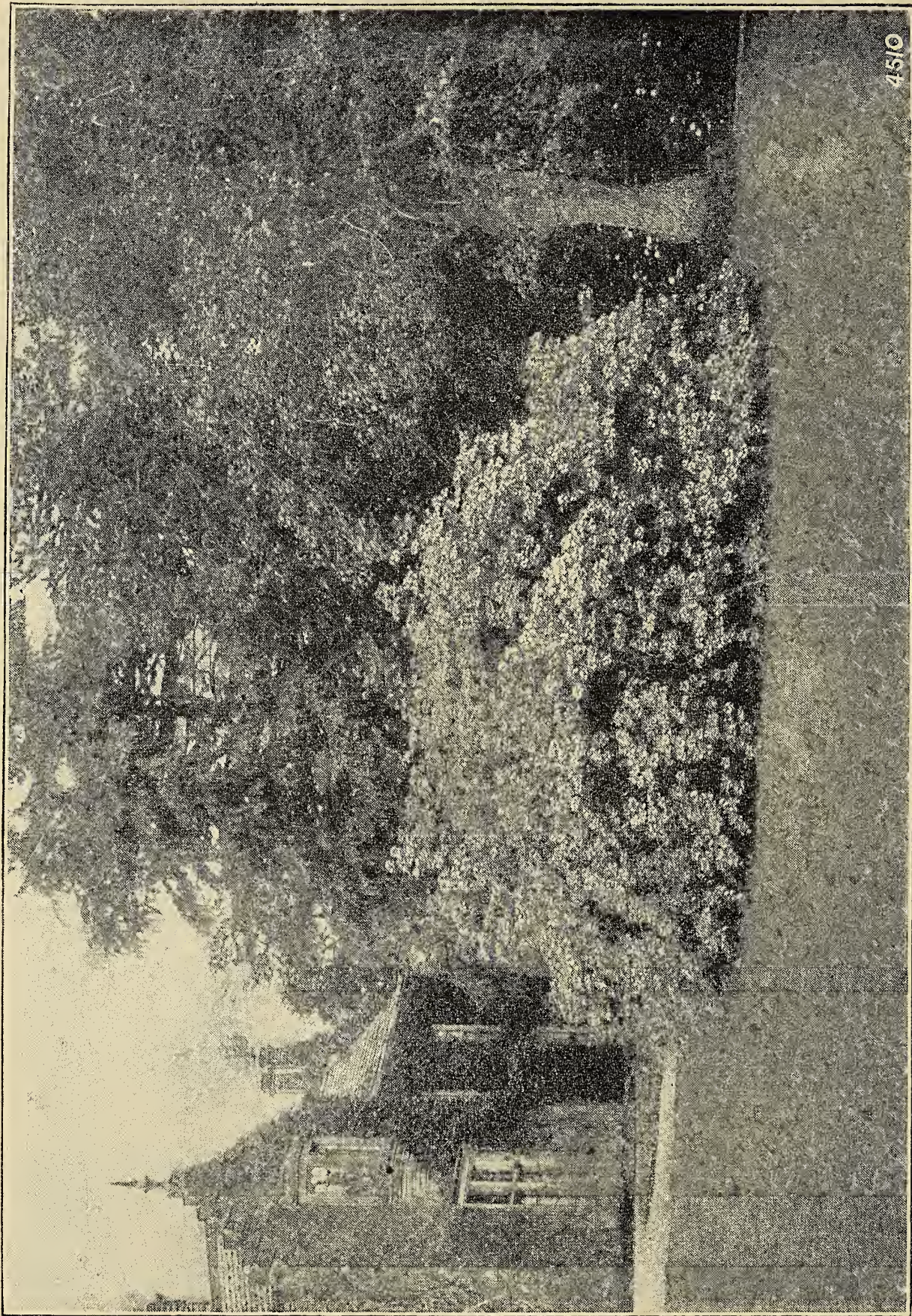
*sachalinense*), Common Loosestrife (*Lysimachia thyrsiflora*), Purple Loosestrife (*Lythrum salicaria*), with one or two Sedges, as *Carex atrovirens* and *C. lupuliformis*, plants with more or less graceful growth and beautiful flowers in summer.

We have by no means exhausted the list of suitable plants. Those we have named are all thoroughly hardy, robust, and well suited for imparting a most diversified and interesting appearance to a pond or lake. If a few more of a choicer type are needed, we can recommend the following for the sides: *Primula rosea*, *Parnassus palustris* (Grass of Parnassus), *Saxifraga Fortunei*, *S. peltata*, *Iris Kämpferi*, *Cypripedium spectabile*, *Orchis foliosa*, and *Caltha palustris plena*. The nymphæas we would advise as the best are *N. odorata*, *N. pygmæa*, *N. maritima*, *N. alba*, and *N. candida*. Equally good among the nuphars, are, *N. advena*, and *N. luteum*.



CORBEL FOUNTAIN





PONTIC AZALEA.





## THE SUMMER-HOUSE.

Oh ! by yonder mossy seat,  
In my hours of sweet retreat,  
Might I thus my soul employ,  
With sense of gratitude and joy,  
Raised, as ancient prophets were,  
In heav'nly vision, praise, and pray'r,  
Pleasing all men, hurting none,  
Pleas'd and bless'd with God alone.

PARNELL.

SUMMER-HOUSES of some sort are desirable, and indeed almost necessary features in gardens of all dimensions and styles. Indeed, the grander the garden, the greater need for places of retirement, for rest, shelter, conservation, and sometimes for that blessed change "out of the house" which comes over every one of us at times, when the air is balmy, the trees leafy, and the routine of domestic life a little tame or wearisome, as it will be on occasions in the best-regulated homesteads.



The subject cannot well be kept within a narrow compass, but we shall take care to say only a small part of all that will occur to us as we go on, for to deal with it thoroughly we should need hundreds of pages and thousands of designs, and a few years of luxurious leisure to bring our ideas to a measurable focus. "We aim above the mark to hit the mark," says Emerson; be it ours, in this short essay, to aim below the mark lest we hit it too hard, drive it into illimitable space, and regret too late our earnestness, and abandon it. Sweet Horace gives the cue for the essayist of the moderate persuasion—

Pindarum quisquis studet æmulari, etc.

Summer-houses, good friends, may be regarded as simply useful, as simply ornamental, or as combining both these qualities. Our own peculiar idea about them is that if they are not useful, they are but as stored up firewood, no matter how beautiful in appearance, or how much they may have cost. To begin with the most obvious uses, a summer-house should be adapted for rest, shelter, meditation, conversation, reading, observation, and perhaps conviviality.

Our own out-door sanctum serves all these purposes, and more. For very many years past all our literary work—and it amounts to something as the year runs round—so long as weather permitted has been accomplished in a summer-house, and we are now building a little cottage by the side of a stream in a grass field, on a spot shaded by a glorious clump of trees, wherein there will be accommodation for a few hives of bees, with a snug room set apart for books, papers, gossip the fragrant weed; as an observatory, too, for shelter while star gazing; and as an auditorium into which the skylarks, thrushes, and nightingales will gladly "pour their vernal strains."

In this sweet haunt, thy blissful life  
 Shall glide, like meadow-streamlet flowing  
 Unreach'd by sounds of demon strife,  
 Unknown to passion and unknowing;  
 For thee the fragrant airs shall rise,  
 For thee shall bloom those opening roses;  
 Till far beyond yon trembling skies,  
 Thy heart in endless peace reposes.

GERALD GRIFFIN.

Where shady trees invite the wanderer to a seat, how pleasant it is to find the means of rest and shelter in a garden. What more delightful when the



sun burns in Leo, or when the Virgin holds empire in the meridian, than to lounge in a cool shady recess, with a favourite volume and a canister of that seductive, sedative weed, which wafts us on its thin blue wreaths of smoke to the highest region of the most dreamy Elysium. The bees hum about full of business, reproaching us for the listless mood in which we watch their earnestness—everything but the bee is sleepy; the flowers nod as if napping, the air hums itself to sleep, and, lo! when we thought we were fast anchored to that favourite book, we, too, have drifted, like a reed upon the wave, into that tropical region where sleep, the “comfortable bird,” broods “over the troubled sea of mind, till it is hushed and smooth.” There is no better vindication of a summer-house than the opportunity it affords for the quiet enjoyment of a book or an afternoon nap. There are some books which seem to have been written for such reading. You could not read Herrick with such pleasure in the presence of a lamp and curtains, nor Jean Paul—no, nor Tennyson. Did the latter write the “Passing of Arthur” in such a spot? He could hardly have produced it with his feet on a carpet hassock, cramping his chest to a vile mahogany table.

The question, then, is what style of structure will best fulfil the foregoing requirements. In respect of this matter we must be latitudinarians, and in no haste to quarrel if the dwelling-house has a Grecian frontage and the far-off garden-house is of the homespun school, showing gnarled wood supports and moss or thatch for the roof. Nevertheless, a certain unity of tone in all the features of a place is desirable, and a rustic summer-house will be more appropriate in a garden connected with a rustic dwelling, than in one surrounding a grand mansion severely classic in style, with terraces, fountains, and geometric gardens. We must confess, however, that there is not much in this view of the case, as for example—suppose a Druidic circle, or a cromlech hoary with the weather-wear of centuries, to be carefully preserved as a devout man would preserve it, on a property where the residence happens to be spick and span new, and in very new and very sharp style that can be thought of. We should not blame the proprietor for preserving the old stones, though it is impossible they should harmonize with the mansion: nor should we blame him for adopting a modern style, which may happen to suit modern ideas of comfort, in place of the style suggested by the ancient relics. So much for the great question of propriety,—a question always worth considering; but not to the extent of making convenience subservient to extreme views on matters of taste. It is



desirable, if incongruity is a necessity of convenience, that the summer-house be far removed from the dwelling and its accessories; and for the matter of that, who wants a summer-house within a dozen or even a hundred yards of the principal entrance? All possible uses of a summer-house may be secured in every imaginable style of structure, but the rustic style is the best where the house is to serve also for bees or birds, or as a tool-house or fruit-room, both because a picturesque effect can be secured at a comparatively small

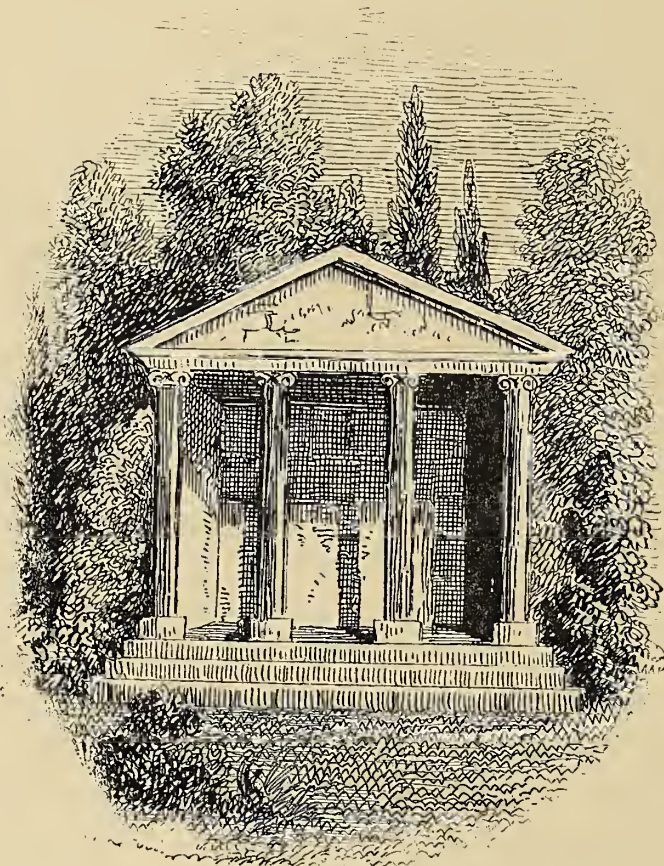


Fig. 1.

expense by the employment of wood, thatch, and moss, and because, also, these materials have great protective power: as a good old country bee keeper expressed it, "the thatch drahs the kule in summer and the warm in winter."

Wanting a summer-house in close proximity to the dressed grounds in a formal garden, we may easily obtain, by adapting classic outlines, a good effect and a great convenience, as illustrated above. This style, which we



shall call a Grecian house, would serve as a summer aviary, and afford a suitable termination to a straight walk, more especially in gardens of limited extent, in which tasteful termini are often greatly needed. Stone, or the



Fig. 2.

best substitute obtainable, is the only material suitable for structures of this sort.

But elaborate structures of the foregoing description are out of the reach of the means of most people as a rule; and besides, they are altogether out of



place except in gardens of some considerable magnitude, laid out in an imposing style, with terraces, fountains, statuary, and formal walks *ad lib.* A more suitable style of summer-house for the average large garden is shown in the illustration (Fig. 2) on p. 323. Another appropriate design is a summer-house standing under a canopy of leafage, with an uninterrupted view of beds of roses, handsome trees, lawn and woodland scenery of the most exquisitely beautiful character. It lies in a snug, retired nook, hidden from the general view, but yet sufficiently exposed to render its existence fully visible to those wending their way to this part of the garden. This example is one of two in the beautiful garden of the Viscountess Portman, Buxted Place, Uckfield, and was built by an ordinary workman many years ago. It is an example which those who, living in country districts and having an opportunity of getting the necessary oak and hazel wood, might do well to imitate. If the inside cannot be so elaborately finished off as this is, the front part and general form may be the same, since the roof and back can be made of ordinary stained deal. Those, however, who desire to build a similar example may, we doubt not, succeed in doing so with the aid of very little trouble, by following the detailed instructions given below.

The house is hexagonal in shape. Having made the ground level, fix a kerb stone nine inches wide so as to form the above figure. At the six points of the hexagon, oak posts having the bark left on them, and about nine inches in diameter and seven feet long, should be fixed. One end must be drilled to receive a pin let into the kerb stone about four inches from each of the points of the figure. The pins should be six inches long, two inches being let into the stone and four into the wood; by this means the posts will be made firm at the bottom and kept in position. Six other pieces of wood, the length of the sides of the figure, must next be fixed to the top of the posts to form the plates for the roof to rest on. Leave the three front sides open, and plant climbers against the pillars to grow up to the roof. From the three front sides, which are left open, gables should be formed. These may be made by causing two rafters to meet the ridge boards, meeting together over the centre of the building. Cover the gable ends with hazel and birch rods, split and nailed on to the boards in the most artistic manner, so as to form diamonds and triangles. The weather board should project about four inches beyond the face of the building, and be scalloped and covered with hazel and birch rods. Then the three back sides of the house should be boarded from floor to ceiling, the boards being fixed between the pillars, and covered with hazel



and birch rods to form panelling, each opening being formed into four panels. Fix a rustic seat round the three enclosed sides, make the legs of pieces of oak with the bark on, and the seat with strips of wood. Underneath the roof, and on a level with the top of the pillars, fix the ceiling by means of boards secured to the plates. To these boards nail hazel and birch rods in the form of diamonds. The whole of the inside and gables should then be varnished, to give the place a noble appearance. Pave the floor with glazed hexagon tiles, and in the centre stand a rustic table, the legs of which should be of oak, and the top covered with hazel and birch rods, forming an octagon.

The building must next be roofed with sheet zinc, this being much lighter than any other material. For an ornamental, and at the same time a rustic house, this is neat in appearance and substantial in build. Some of the gables may be covered with golden ivy, and the pillars with the Dutchman's Pipe (*Aristolochia siphon*). On the left a plant of *Berberis Darwinii* may be planted, and the whole be well backed with rhododendrons.

The disadvantage of summer-houses of this type is they are not tenant's fixtures. The law lays down the axiom that "whatever is attached to the freehold becomes part of it, and hence cannot be removed by the tenant." Too many of us, alas, cannot afford, except on our own freehold, to spend a large sum of money on the erection of a summer-house, and then on the expiration of a tenancy to have to leave it behind. It is clear, therefore, that we want something of a more portable nature, something, in fact, that will answer the purpose of the expensive permanent summer-house and yet remain the property of the tenant. Happily we have long been able to gratify this wish, for several manufacturers of repute have made the tenant's fixture or portable summer-houses a speciality. Those, therefore, who have a few pounds only to spend on the luxury of a summer-house can easily obtain what they require ready made and quite complete for placing in any position in the garden.

But there are many perhaps who would prefer to construct their own, and hence it behoves us to give the needful instructions to enable them to do it satisfactorily.

A summer-house only large enough to comfortably seat one person is the smallest we can conceive, but this hermit idea is too suggestive of a sentry box to be pleasant. The house should be large enough to accommodate four persons at least. A house to hold and seat two persons comfortably, similar to Figs. 3 and 4, should have a floor space of 4 feet by 3 feet 6 inches.



Of course some thought must be given to the seat capacity of individuals, which in some is very much larger than in others. The usual dimensions of portable summer-houses are as follows: 5 feet by 3 feet 6 inches, 5 feet by 4 feet, 6 feet by 5 feet 6 inches, 10 feet by 5 feet. These are good practical dimensions for floor space, and may be safely followed. The inside height must in no case be less than 6 feet 6 inches, and may be higher than this with advantage.

The materials for a rustic summer-house are rough natural branches of wood, combined with, or nailed to, a framework of sawn and planed wood. The frame-work may be of pine, common deal, larch, oak, ash, elm, or any

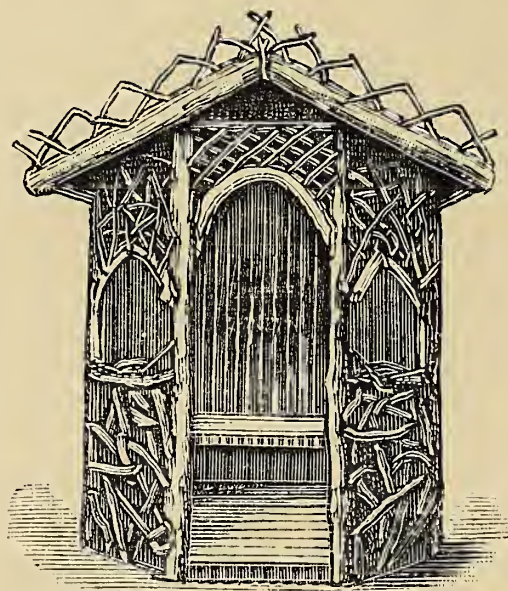


Fig. 3.

other suitable sawn wood employed for building purposes. Common yellow deal will do very well, and larch poles may be utilised for the purpose if sawn wood cannot be cheaply obtained. The house may be floored with ordinary deal flooring boards, or with any other sawn wood, or it may be paved with pebbles, or it may be made of asphalt. The wooden frame may be match-lined if so desired, or lined with ling or heather, or the rough wood may be left inside without lining, but we prefer having the house lined for the sake of comfort, as draughts are undesirable in summer as well as winter. We shall, therefore, need some match-lining. The outside coat or shell must be of rough branches. These may be short branches of rough oak with the bark on, or oak bangles—that is, small branches of rinded oak. They may be of



larch, not exceeding two inches in diameter, and stripped of their bark or not as may suit the fancy. Larch, elm, and hazel, with the bark on, has a very handsome effect when nicely arranged. Rinded withy or alder will look well if varnished. Sycamore is not sufficiently durable. Suitable summer-houses for shrubberies have been built of a frame-work of larch covered with thin bundles of gorse or furze, and lined with thin bundles of fern, ling, broom, or heather. These obtain preference in country districts where such material can be had in abundance.

The foundations of a summer-house must vary with the design. If the house is to be an owner's fixture, with posts firmly driven into the land on

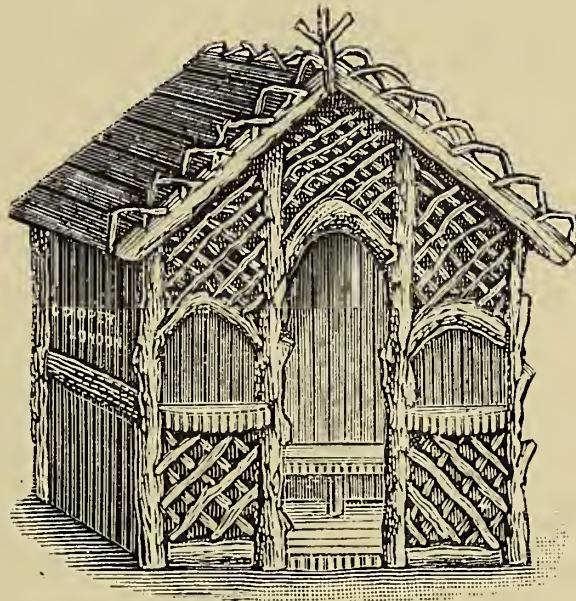


Fig. 4.

which it is to be built, the ground will be merely levelled, the posts inserted in holes dug for them, and a stone or brick floor laid down first to preserve the floor boards from damp. If, however, the land is not our own, if we are merely yearly tenants, or lease the land in dependence on the will of the owners, the house must be merely a tenant's fixture, and the foundations prepared accordingly. By a tenant's fixture is meant a house that can be removed by the tenant at any time without disturbing the soil—that is, a house resting *on* the soil, but not rooted in it in any way. If its foundations are sunk in the soil, it becomes the property of the owner of the soil, and must not be taken down or removed. In the case of tenants' fixtures, if wood



is laid on the bare soil, and this is at all damp, which it is almost sure to be in winter time, the wood will rot. If the latter be allowed to sink into the soil, and is deprived of a free circulation of air, it will decay and suffer dry rot. To avoid both, the foundations of the house, being of wood, must rest on a material which will allow of free access of air to the wood, and the foundation must be raised above the level of the surrounding soil. If the levelled space for the site of the house can be paved with bricks or stone, or covered with a bed of concrete, so much the better; but if not, it will be advisable to lay down a bed of brick rubbish, shingle, gravel, or clinkers, some four or five inches in thickness, on which the floor joists of the house should rest.

A thatched roof is even more in unison with the surroundings of a summer-house than a roof of weather boards. The thatch may be of straw, of wheaten reeds, of long grass, of rushes, of whin, broom, birch twigs, or any other similar bushy material, or it may be of furze or gorse. Wheaten reed may be regarded as the most tractable material, but this and straw has a new appearance when first put up, which does not always quite harmonize with other surroundings. Long coarse dried grass, or rye grass, is less tractable because shorter and more brittle. Rushes, when dried, or even half dried, look fairly well as a thatch on a summer-house. Whin or heather, broom, birch, and furze are only suitable for overthatching on weather boards, to give the house a finished rustic appearance, as these materials do not lie straight and compact together.

The house being constructed, we may next turn our attention to its ornamentation. The frame-work is complete, the floor laid down, the roof is on, and the back and sides secured, but the house is a mere skeleton. If constructed of natural unsawn wood, this feature will not be so prominent, for we shall have rustic posts in front, and a rustic frame-work only needing a few pieces of rough wood to give it a finished appearance. If, however, the frame has been built of sawn deal or other sawn wood, we must cover this with pieces of rough wood to give it a rustic finish. Taking the design (Fig. 3) as an example. If the four front pillars have been of untrimmed larch or elm, with the bark left on, it will be necessary to get three very crooked branches of oak, elm, or similar crooked wood, and cut from them the curved pieces seen over the doorway and window. A notch should be cut in each post for the ends of the arched wood to fit into, and the ends of the wood must be chamfered off to fit the notches, then secured therein by long nails. A similar arrangement must be provided for the doors and



windows of the other designs. It will be seen that the spaces above and below the windows and doors are filled up with a lattice-work of rough branches. These must, of course, be selected with an eye to their fitness for the position to be occupied. If they can be chosen to the form of Fig. 3 p. 326, and chamfered at the ends as shown in this figure, they may be easily laid across each other and nailed in position. Some irregularity in the disposition of these external decorations will, however, have a pleasing rustic effect.

If the house has been built of sawn wood, the fronts of the pillars may be disguised by bits of virgin cork nailed to them, or split branches of wood may be nailed on with the rounded sides outward. The roof may be lined with match-board, and then stained and varnished to match the back and sides. This will give the whole a very neat and comfortable appearance, and have the advantage of securing this retreat from the intrusion of noxious insects, which are such a terror to ladies.

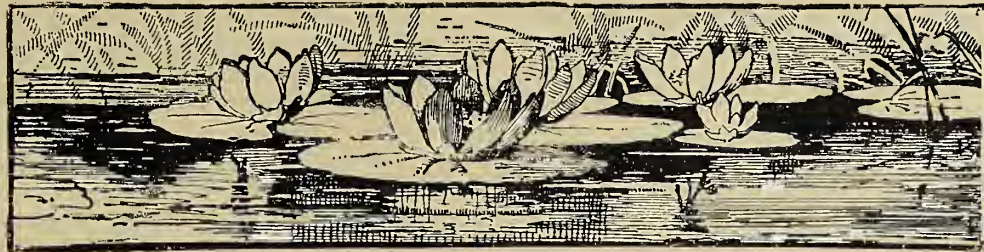
If the match-board is new, it may not be necessary to use a stain for it before varnishing, as the varnish may be found dark enough to suit the taste of the owner. If the wood has been stained by exposure to weather, it will be advisable to alter the weather stains by others of a more agreeable character. This may be done by an application of one of Stephens' rosewood stains, or a substitute may be provided by boiling barberry roots and a scrap of camwood in water, and brushing the wood with the hot liquor. If the stain is not red enough add more camwood. The barberry root stain will be a deep bright yellow. A similar yellow stain may be obtained by using turmeric instead of barberry. Before we apply the stain, however, the wood should be prepared by stopping all cracks and nail-holes with plaster of Paris, coloured with a little turmeric, or made into a paste with the barberry liquor. Only a large spoonful of plaster should be made into paste at a time, as it soon sets hard. The stain should be briskly applied with a soft hair brush, then the wood must be left to dry before it is sized. The next operation is sizing—that is, coating the wood with a solution made of 1 lb. of size dissolved in one gallon of boiling water, and applied hot with a soft brush. Brush the wood with the grain, not across it, and let the strokes be in one direction only. If rubbed to and fro the size may lather, and it will then be impossible to get a smooth surface for the varnish. Two coats of size should be given if the wood is at all porous, as the size will fill the pores and prevent them taking in a large quantity of varnish. The varnish to be used is fine oak varnish, costing



from 5s. 6d. to 7s. 6d. per gallon. This must be laid on with a soft brush carefully, in long strokes running with the grain of the wood ; never rub the brush to and fro, or up and down on the wood to get the varnish into it, as the result will be a lather and consequent rough surface on the varnish. Two or three coats of varnish may be applied with advantage on permanent work, as a good coat well put on will last a lifetime. If the ornamental parts are of rinded oak, or of wood with smooth bark, such as hazel and birch, it will be advisable to give these also two coats of oak varnish to preserve the wood. A cheap substitute for outside work may be found in Stockholm tar, but the odour of this is objectionable to some persons. The rinded oak "bangles" (as they are named) may be darkened by immersing them in freshly-slaked lime before nailing them to the house. When varnished, they will have an appearance of old oak. The backs of rustic summer-houses are generally hidden by shrubs or trees, or placed against a fence. When this is not the case they may be ornamented with branches nailed to the boards much the same as the sides are covered.







## GARDEN ACCESSORIES.

This quiet garden's humble bound,  
This homely roof, this rustic fane,  
With playful tendrils twining round,  
And woodbines peeping at the pane.

That tranquil, tender sky of blue,  
Where clouds of golden radiance skim,  
Those ranging trees of various hue—  
These were the sights that solaced him.

TAYLOR'S Visit to Cowper's Arbour.



FASHION has undergone a wonderful change since the appearance of the last edition of this work, now many years ago. In those days people were wont to lay great stress on the lavish employment of statuary and other ornamental accessories in the adornment of their gardens, and to overlook the superior value and charm of the wealth of tree and plant life at their disposal. But in modern garden adornments these accessories occupy, as they ought to do, a second place, and greater attention is rightly paid to the more liberal use of trees, shrubs, and beautiful plants; in other words, less artificiality and more natural beauty is the predominant feature of garden decoration of to-day.

It were idle, however, to assert that we can dispense altogether with the aid of such accessories as statuary, fancy wirework, etc. There are in every garden opportunities for their use, but they must not be employed too lavishly. For example, vases may be used to embellish the steps, if any, leading from the house to the garden, or one or two



may be disposed about the front of the house on, say, a wide expanse of gravel. But none should be placed, as formerly, on the lawn, or in the centres of beds, even near the mansion. Here they are quite out of place and spoil the effect of the nice bright green expanse of turf. Nor should fancy wirework margins be placed round beds, or rustic boxes or stands be disposed about the turf. Banish all these from the lawn and rely upon the far more effective use of trees, shrubs, and plants to ensure a pleasing *tout ensemble* in garden adornment.

In small gardens in front of suburban residences, where there is little space for turf or for making a bold display of shrubs and plants, there is less objection to the use of artificial devices, but even here it is always advisable to employ them as little as possible. The same remarks apply to the too lavish use of wire arches. They should never form a prominent feature in the garden. Their utility and effect are seen to the best advantage when employed to define the boundaries between one portion of the garden and another, and where their sides are flanked by a group of shrubs so as to tone down their formal outlines. Standing alone, even when covered with creepers, they are not objects of beauty, and tend to mar the effect of an otherwise prettily-arranged garden.

Here we propose to allude to vases only, excluding figures which are objects of greater concern to the architect and the artist than the gardener; not that they may not be employed with good taste for the purpose, but because we cannot utilise them in association with plants so happily and effectively as the former. Now vases may be divided into two classes—the low type, measuring eighteen inches or so high and eighteen inches to two feet wide, or *vice versa*; and the tall type or pedestal shape, four to five feet high. The former are chiefly serviceable for ornamenting the base of steps and the tops of balustrades, etc. There is an infinite variety of shape and style. The smaller sizes are capable of holding one plant, and the larger ones several; consequently, apart from their artistic features, they may be turned to good account as receptacles for plants, and rendered objects of interest at all seasons of the year. Then among the tall types there is equally as great a variety of form; indeed, most of the low type can be used for the same purpose by placing them on a pedestal. The pedestals average two feet in height and twenty-one inches in width at the base, and are made plain or ornamented. Another, and very desirable piece of statuary is a combination of vase and bed with an ornamental edging, and is especially



suitable for adorning the centre of a wide gravel walk in front of the house, or for the centre of a conservatory. If used outdoors, the bed can



A RUSTIC POT STAND.

be planted in summer with a mixture of tender flowering and foliage plants and the vase above with those of a trailing habit. In winter and spring, evergreen shrubs and bulbs may be used with good effect for a similar purpose.



Indoors, the bed and vase can be filled with cocoa-nut fibre refuse, and plants in pots plunged therein. Another use to which this form of statuary may be put is that of a fountain. The bed, for example, may be converted into a basin, and a fountain be substituted for the vase in the centre. There are many other forms of and uses to which statuary may be put in garden embellishment, but enough has been said on the subject for the purposes of this work.

Artificial edgings, whether of stone, composition, or wood, are not used so extensively as formerly, turf being employed wherever possible, because it is more pleasing to the eye and more in harmony with the surrounding trees and plants. However, there are positions sometimes where an artificial edging is desirable, and for that reason we must describe some of the materials suitable for the purpose. The simplest of these are flints or rough stones arranged on the surface or partly buried in the soil. Another equally simple edging, and old-fashioned withal, consists of ordinary bricks placed in a sloping position and buried three parts of their depth in the soil. Such edgings are, however, not neat enough for the pleasure garden, and so recourse must be made to ornamental tiles or stone edgings. The former are made in various patterns and colours.

Window Boxes exist in great variety, and are mostly constructed of wood. Some are made of plain wood, painted green and faced with mosaic tiles or virgin cork. Others, again, are decorated with strips of hazel, arranged in ornamental designs in front and embellished with fretwork. There are several forms, too, constructed entirely of earthenware, either in the shape of a box or in separate pots, these being connected at will by small ornamental appendages, so as to fit any sized window. Window boxes may also be obtained in Doulton ware and terra cotta, and in almost any design.

Wire-work baskets, arches, and trellises are to be obtained in infinite variety. It is needless for us to describe these in detail, as their number is legion, and examples can be seen at any ironmonger's.

Wood Trellises deserve a word of mention here, because they are so useful for placing against cement walls for training up creepers and for forming screens to hide objectionable objects. What is known as extending trellis work is sold in lengths of twelve to fifteen feet and two to four feet in width, at prices varying from 1s. 6d. to 2s. 6d. per length. It is cheaper to purchase trellis work ready made than to make it personally. After fixing, the wood should receive three coats of paint.



Pergolas come next. A pergola is an archway formed of branches or trunks of trees over a pathway, and covered with roses, etc., as described on p.p. 188 and 189. The branches should be as rough as possible, in order to give the climbers an opportunity of displaying their growth and blossom in a free and natural manner. An arbour may be formed in the same way, arranging the branches accordingly. These, when planted with roses and clematises, will look exceedingly pretty. Arches may be formed in a similar manner of rustic tree branches in a corner of the garden; and if these are connected with strands of wire and planted with climbing roses and clematis, an excellent effect will be produced.

Rustic Pot Holders are useful contrivances for holding pot plants. The materials used in their construction are by no means of an elaborate character, but consist simply of any rustic-looking wood available.

Here our labours end. If the reader should derive but a hundredth part of the pleasure in the perusal of this book that it has already afforded the writers, there will be some little gain to the present life, which in its turn may tend to gain in a life exceeding this. The ideas and the illustrations embodied herein reflect the experience of many years' practice and study in garden and indoor embellishment, and therefore may be regarded as thoroughly practical in the fullest sense of the word. We shall rest in the hope that this humble endeavour will be of service to some genial spirits, who will pardon its shortcomings for the sake of the object to which our labours have been directed—to establish nearer and dearer relations between the home and the country, between the heart of man and the glorious creation by which he is surrounded.









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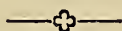


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