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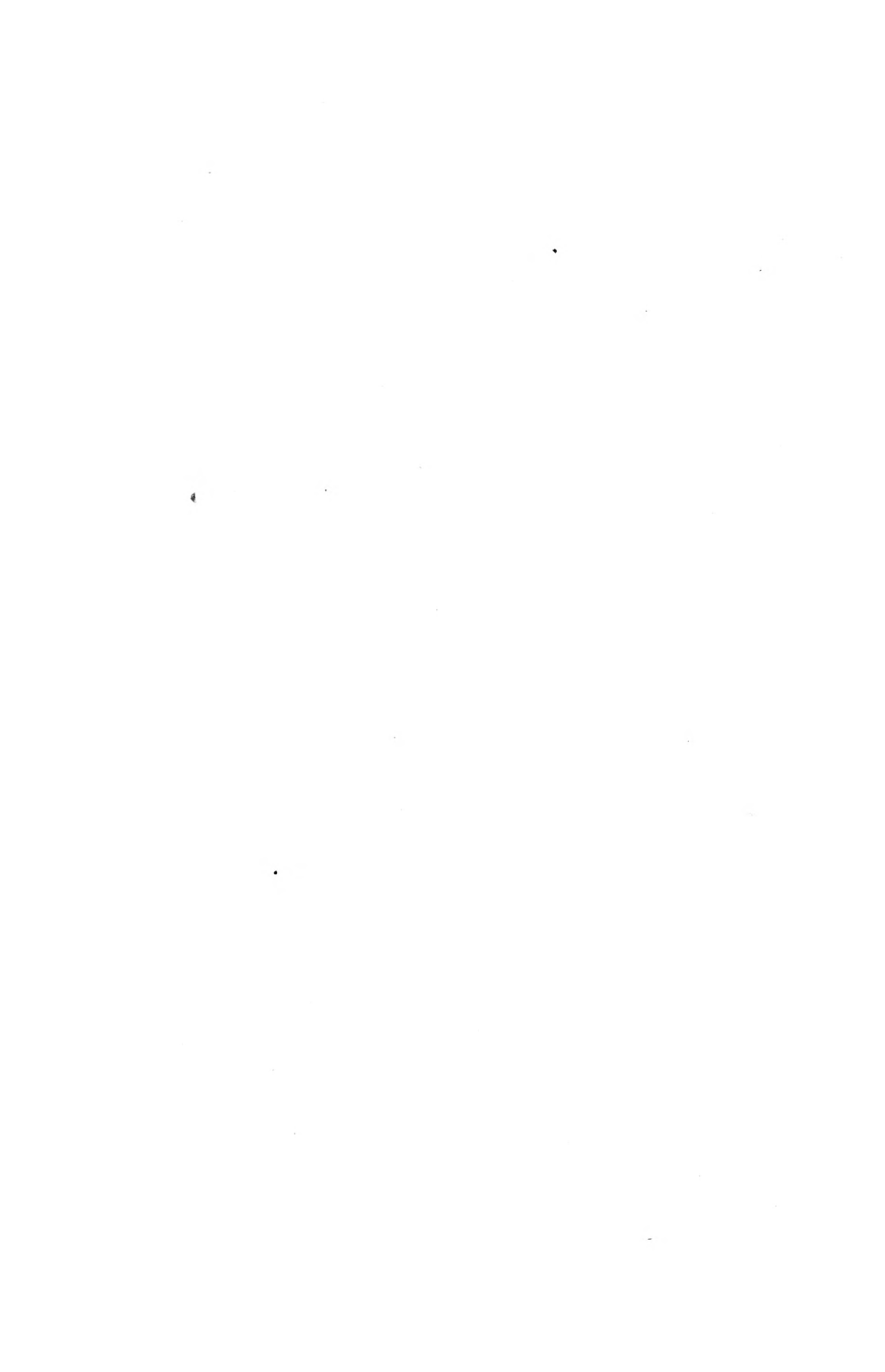
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JOURNAL OF THE
INTERNATIONAL
GARDEN CLUB



VOLUME III, 1919

GENTES FLORIBUS INTERTEXTAE

For
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v. 2

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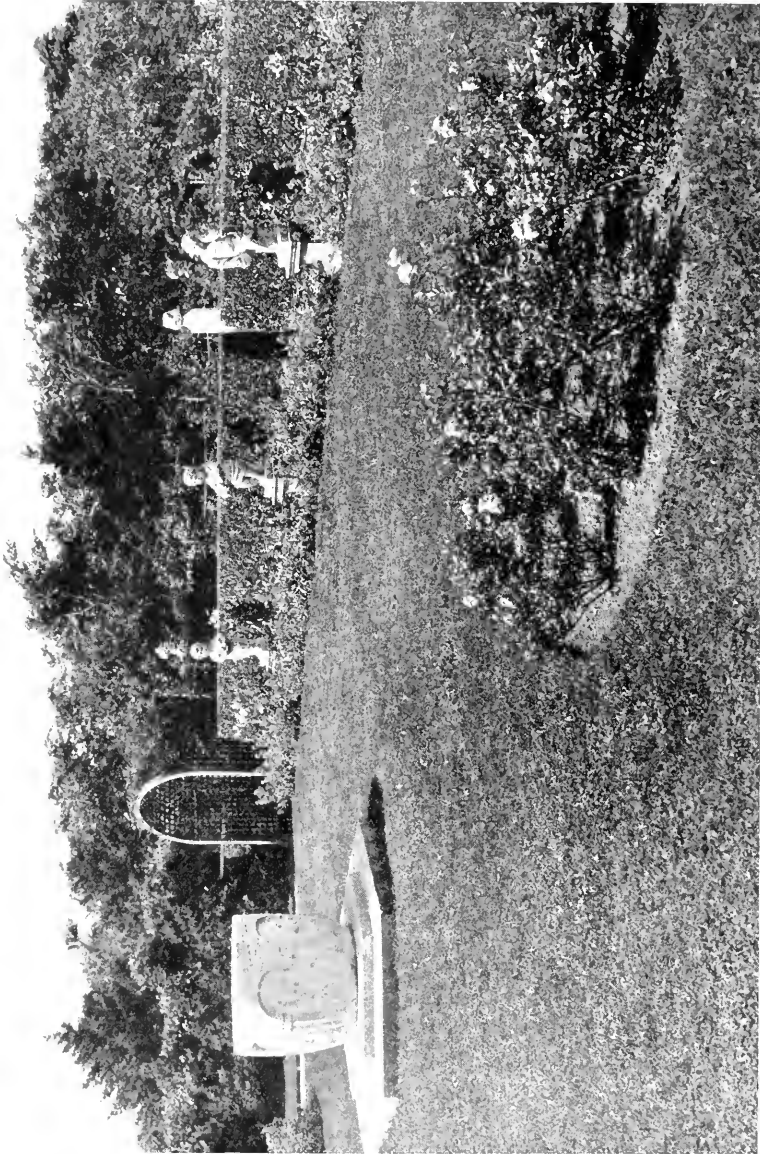
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A SHELTERED SPOT WHERE ROSES BLOW
BESIDE THE SEA
THE REEF, NEWPORT

*Song of the English Rose**

Sing we the Rose,
The flower of flowers most glorious!
Never a storm that blows
Across our English sea,
But its heart breaks out wi' the Rose
On England's flag victorious,
The triumphing flag that flows
Thro' the heavens of Liberty.

Sing we the Rose,
The flower of flowers most beautiful.
Until the world shall end
She blossometh year by year,
Red with the blood that flows
For England's sake, most dutiful,
Wherefore now we bend
Our hearts and knees to her.

Sing we the Rose,
The flower, the flower of war it is,
Where deep i' the midnight gloom
Its waves are the waves of the sea,
And the glare of battle grows,
And red over hulk and spar it is,
Till the grim black broadsides bloom
With our Rose of Victory.

Sing we the Rose,
The flower, the flower of love it is,
Which lovers aye shall sing
And nightingales proclaim;
For O, the heaven that glows,
That glows and burns above it is
Freedom's perpetual Spring,
Our England's faithful fame.

Sing we the Rose,
That Eastward still shall spread for us
Upon the dawn's bright breast,
Red leaves wi' the foam imperaled;
And onward ever flows
Till eventide make red for us
A Rose that sinks i' the West
And surges round the world;
Sing we the Rose!

—*Alfred Noyes.*

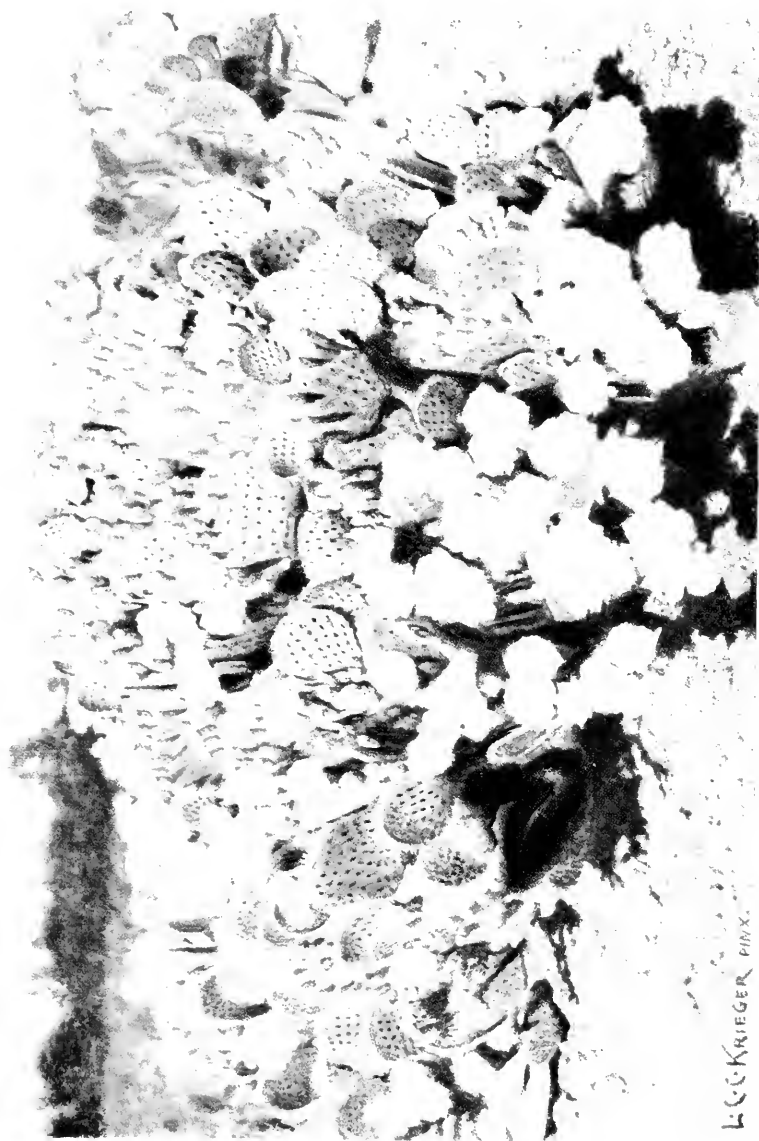
*This poem of Mr. Noyes so expresses England's share in the great war, we are sure it will be read by our American readers with sympathy.

.

But this I know God meant who set us here,
And gave each soul the Infinities to fulfil
From its own widening sphere.

To annex new regions to the soul's domain,
To expand the circle of the golden hours,
Till it enfolds again and yet again
New heavens, new fields, new flowers.

—*Alfred Noyes.*



L. C. KRIEGER, PH.D.

OPUNTIA
CHLOROTICA
SANTARITA

Journal of the
INTERNATIONAL
GARDEN CLUB

VOL. III

MARCH, 1919

No. 1

*Decorative Materials in the
Prickly Pears and
Their Allies*

By David Griffiths



THE decorative value of cactus plants appeals with particular force to any one who has traveled at the proper season in our Southwest, or among the tremendous stretches of cacti on the Mexican Highland. The appearance of the plants in the average conservatory in the north, however, is often not conducive to favorable impressions, for they are with few exceptions illy suited to greenhouse or conservatory conditions.

The remarks which follow are applicable mainly to that Southwestern Empire stretching from Texas to California, and northward nearly to the limits of our Mexican border states. Throughout this region grow forms of these plants of widely varying size which are well adapted and extensively utilized for ornamentation. Throughout the Gulf States also some of the hardier, larger, a few low, prostrate, and one or two hemispher-

ical shrubs of this group may be grown successfully. In the remainder of the United States only five or six low, prostrate forms can be successfully grown out-of-doors except the cane cactus of Colorado. This withstands below zero temperatures and reaches a height of 5 feet.

Throughout our Southwest territory are to be found many very effective ornamental plantings of cacti, a very large proportion of which are various species of *Opuntia* of either the flat jointed or cylindrical forms. These usually predominate, if not in variety certainly in quantity of material, mainly owing to their rapidity of growth and ease of propagation. A few collections are classic. Among the most noted should be mentioned that in the A. S. White Park at Riverside, Cal.; the Huntington collection at San Gabriel, Cal.; the Letz collection at Hollywood, Cal.; and the small but effective University collection at Tucson, Arizona; all of which are unique parking examples.

Whether for individual specimens or mass effect the plants possess an individual charm which might be described as grotesque by some, formal, stiff or delicate in coloration and blend of tone, depending on the temperament and point of view of the observer.

Probably the most effective planting, all things considered, is one made of a great variety of species of cacti planted hit and miss with, however, careful attention to banking. This requires a knowledge of habit of the different individual varieties and species. This feature was kept well in mind by Mr. H. C. Thompson, in the preparation of Bulletin No. 262; of the Bureau of Plant Industry, U. S. Department of Agriculture, long since out of print. Here lists were given of desirable species arranged according to stature and habit, one of the most useful lists ever published. Such a planting will contain a very large number of individuals in a very small space, but will need considerable pruning to keep the rampant prickly pears from over-running the other genera.

Such a collection will have the taller species of prickly pears, *Cereus*, etc., in the center or in the distance with the low and small *Mamillarias*, *Echinocereus*, *Echinopsis*, low *Opuntia*, etc.,



FORMAL PLANTING OF CENTURY PLANTS,
GIANT AND CANE, CACTUS
GILA BEND, ARIZONA

in the foreground, with the intermediate forms between. In a large planting this is possibly the most pleasing.

Farther north where the tender forms must be protected during winter they are frequently set out during the summer in conventional beds according to much the same plan, or, if a sufficient number of plants of a number of varieties are available geometrical designs in formal bedding are possible. In such plantings only small plants, of course, are suitable. The prickly pears can not be profitably employed in this way for the reasons that they are too large and not uniform enough in their habit of growth.

The greater appeal is usually made by these plants when they are in flower or fruit. While the flowers in the whole genus are on the same general plan and very similar in structure there is a tremendous difference in their general effectiveness. The differences in the various species relate mainly to size and coloration, abundance and continuity of blossoming. A very striking and attractive floral characteristic of a large number of species is found in the changes which occur as the day advances. Large groups have flowers which change very markedly upon exposure to sunlight. As an example they may be light yellow in the morning with only a little red at the base, but by mid-afternoon two-thirds of the flower may be a brilliant red. Owing to varying exposures on different portions of the plant a riot of color is often produced toward mid-afternoon. The effect produced is truly striking in a well grown plant of a glaucous green general aspect, covered with large blossoms varying from yellow to various proportions of red. The effect is still heightened if the young growth is copperized as is the case in *Opuntia chlorotica santarita*, some forms of *Opuntia robusta* and *Opuntia macrocentra*.

The following annotated list of species will serve as an indication of the wealth of variation and ornamental adaptability in the prickly pear group. It does not exhaust the possibility by any means, but it will serve as an indication of the wealth of material available here for the use of the gardener situated in regions not suited to the conventional shrubs and herbs of

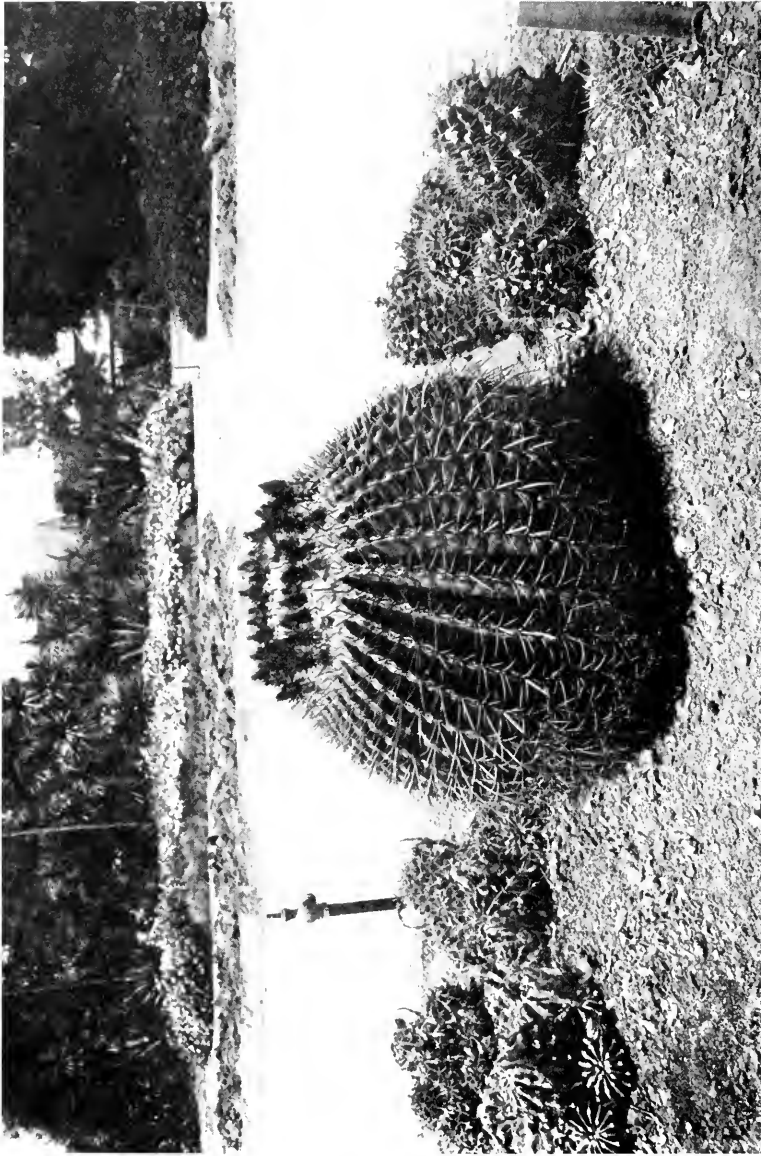
more humid climates. In most cases the scientific name is used, because horticultural ones have generally not been adopted for these plants yet, except in a very general way and in comparatively few instances.

Salient Species of Decorative Value

Opuntia fuscoatra. A native of the prairie region of South-eastern Texas is one of the most floriferous species we have under California conditions. The flower is large, a very bright yellow, and has a deep red center which enlarges and becomes brighter as the day advances. It is usual for this species to be covered with blossom for two to three weeks in May, to have a good sprinkling of blossom during the heat of the season, and to blossom heavily again in September and early October. It is a low, prostrate, spreading, yellowish plant, whose main attraction is its flowers.

Opuntia chlorotica santarita, from the Santa Rita Mountains of Southern Arizona, is indeed handsome in early season when in blossom. This is especially the case when the temperatures get low at night while the young growth is forming. Under such conditions the young joints become very brilliantly colored, which, taken in connection with the glaucous blue-green of the previous year's growth and the large lemon colored flowers, produce a display that is gorgeous. The coloring of the young joints is much more pronounced in cool seasons and more noticeable in some forms of this variety than in others (see colored illustration at beginning of the article).

Opuntia robusta. We have here a complicated group of closely related things, natives of the Mexican Highlands from the region of Chihuahua far beyond the City, and cultivated and even naturalized in many places as far south as Oaxaca. Its ponderous joints and deep red to maroon glaucous fruits, often weighing a half pound, make an imposing sight that never fails to attract attention. Some forms have peculiar wavy joints and their young growth is a deep dull to brilliant red which, in connection with the bluish, ashen-green older growth and lemon-



ECHINOCACTUS GRUSONII WITH
ECHINOPSIS ON EITHER SIDE
A. S. WHITE PARK
RIVERSIDE, CALIFORNIA

yellow flowers, certainly make a unique specimen when standing alone and a striking variation when growing in conjunction with other species. The plant commonly grows 4 to 8 or more feet high. In the group a number of species have been segregated as botanically distinct. Some are spineless and some spiny; some of the forms are comparatively small jointed, but the majority of them are large; some are tall trees and others hemispherical shrubs; but plants grown from seed are always much more certain to be of tree form than those grown from cuttings, but this characteristic is true of a large number of species.

Opuntia arborescens. This is one of the cane cacti of Colorado to Mexico. It is so called on account of the use made of the stems by the natives and the curio dealers of the Southwest. It grows into a beautiful small, symmetrical tree 4 to 7 feet high. Some of its varieties are attractive on account of their dense spination, peculiar tuberculate stems, and bright purple flowers. To all intents and purposes there are several species which fill about the same function as this. *Opuntia spinosior* in Southern Arizona, and *Opuntia imbricata* of the Mexican Highlands belong to the same horticultural group.

To the same horticultural group also should be added forms of what is as yet a polymorphic species called *Opuntia Whipplei* of Northern Arizona. This is yellow flowered. Forms of it are tall and erect with branches in perfect whorls, and others even more attractive are low, or nearly prostrate. These forms all endure low temperatures. Here also should be mentioned the truly desert species *Opuntia echinocarpa* and *Opuntia deserta* of the Mojave desert region, as well as *Opuntia versicolor*, mostly of the mountain valleys lying eastward.

These cane cacti are commonly used for ornament throughout our Southwest, as is also the related and similar *Opuntia texans* which is of more rapid growth than any of the others.

Opuntia Engelmannii. Forms of this variable species are very attractive with their spines white at tip, and varying through brown to almost black at its lower half. Its joints are also gray-green and its fruits large and maroon in color. The spe-



ECHINOPSIS IN FORE GROUND, AND
CEREUS, OPUNTIA AND NOPALTEA BEHIND
A. S. WHITE PARK
RIVERSIDE, CALIFORNIA

cies is tremendously variable and some forms are very much more attractive than others. It is native of the region of Chihuahua northward to San Angelo, Texas.

Opuntia Wootonii is in my opinion one of the most attractive of any of the flat jointed forms in character of its spination. It is not uncommon to find the spines 5 to 6 inches in length and varying from bright light yellow distally, and bright light to dark brown toward the base. It is a very variable species inhabiting the mountain valleys of Southeastern New Mexico and adjacent Texas.

Opuntia linguiformis is commonly grown on account of its peculiar strap-shaped median joints. Here we have a curious differentiation of joint form, the main branches being strap-like and the lateral ones simply ovate. It is a curiosity in a curious group and is to be considered from a standpoint of variability of form rather than any other attractiveness.

Opuntia brasiliensis, as the name indicates hails from Brazil, but next to the spineless forms is probably the most widely distributed of any of the prickly pears. It is again a curiosity in the matter of form. It is a perfect tree and may be looked upon as a connecting link between the cylindrical and flat jointed species of the genus *Opuntia* since it possesses characteristics of both groups. Being of tropical origin it is barely hardy in even our warmer regions, but there is probably no species of the genus so well adapted to dwelling-house conditions as this one. It commonly grows into perfect specimens in pots and tubs under the same conditions as the most common of house plants.

Opuntia leptocaulis. This is the tasajillo of the Mexicans, an exceedingly variable species ranging from Northern Texas to Northern Arizona, and southward to the State of Oaxaca, Mexico. Its stems are no larger than a pencil and some of its forms are nearly spineless. The most ornamental of its forms, however, have long spines with loose, papery sheaths which may be deep yellow, white with a silvery sheen, or a deep rich brown. These three forms are an ornament at any time. Some of the short spined forms, however, are very heavy fruited, being covered through autumn and winter with a mass of coral-red berries.



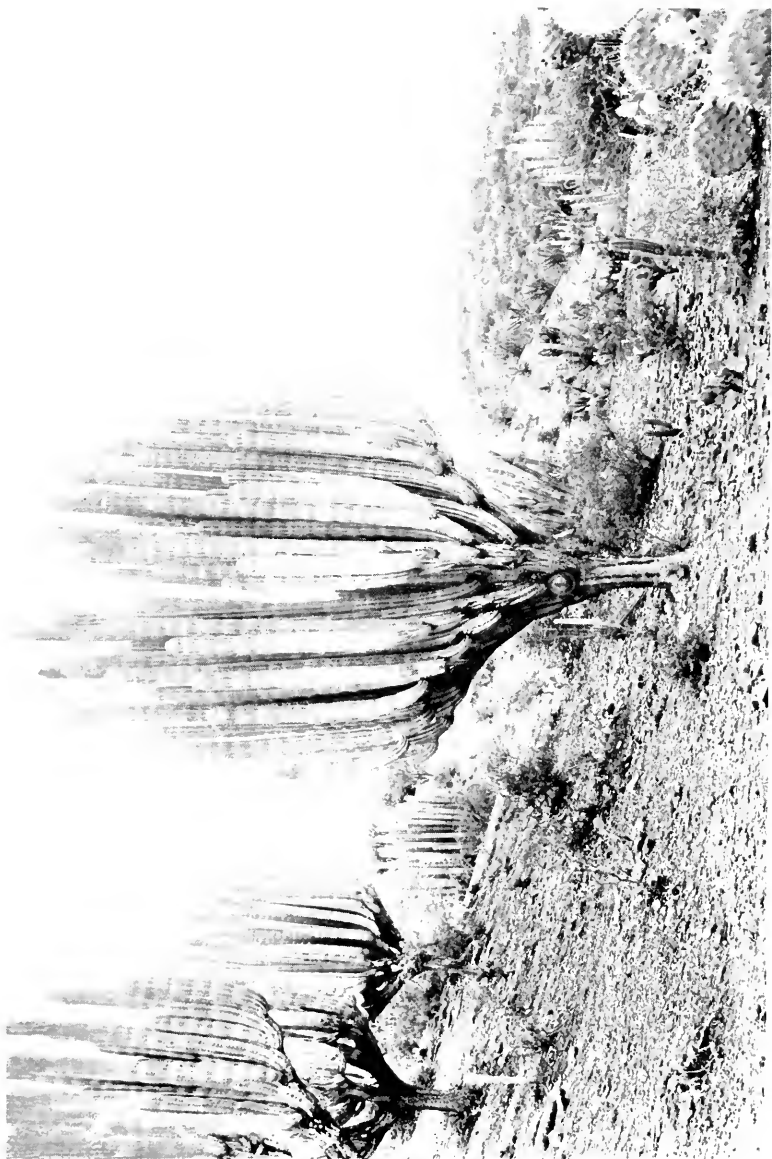
OPUNTIA GORDA
IN FULL FRUIT

Opuntia basilaris. Of the score or more of the smaller prickly pears commonly grown in borders as well as in pots in conservatories in colder regions, some forms of this species or closely related ones are more common than any other except possibly *Opuntia microdasys*, which is horticulturally similar. The species is tremendously variable and inhabits a territory fully as diverse, stretching from the San Francisco Highlands of Arizona across the Colorado desert and the foothills of the San Bernardino Mountains to the San Gabriel Valley of Southern California. The large purple flowers of some of the forms are very attractive indeed, and, although lasting usually but a day like most of the prickly pears the season of blossom is quite long and the floral coloration quite variable, there being forms occasionally found with white flowers. The latter are found in several of the varieties, although in cultivation it is the white form of the variety *ramosa* that is represented almost, if not quite entirely, and it seems to be wholly the original collection made long years ago by Mr. H. A. Alvord, of San Bernardino, California.

The species is spineless but viciously spiculed, gray-green, and in cold weather copperized about the upper arcoles. Forms may be found in nature which have the young growth highly colored like that described for *Opuntia chlorotica santarita*. I have never seen these forms in cultivation, but have met with them rather frequently in nature and have grown them to maturity in some of our plantations.

Opuntia laxiflora. This is another extreme Southern Texas and coastal species, very floriferous, with lax, purplish-red flowers produced in varying numbers throughout the summer season in California. The plant body is yellowish-green and the joints of a different nature from *Opuntia cyanella* from the same region, which is even more attractive in its blue-green coloration and is more floriferous. These, as commonly seen, form hemispherical shrubs 4 to 6 feet high.

Spineless forms of the genus *Opuntia* are commonly grown for ornament. All of the Indian-fig group are useful wherever hardy and are more attractive in fruit than in flower. In the dryer



AN IMMENSE CACTUS FROM
TOMELLIN, OAXACA, MEXICO
CEREUS WEBERI



UNUSUAL FORM OF
GIANT CACTUS
SOUTHERN ARIZONA
CARNEGIEA GIGANTEA

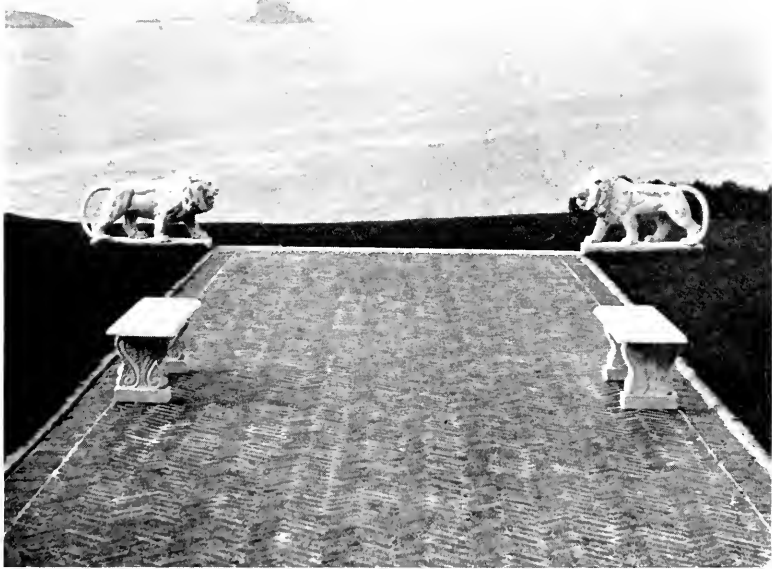


HEDGE OF *CEREUS MARGINATUS*
ROADWAY IN MEXICO

regions it is common to have the plants half covered with fruits until late winter. In color the fruits vary from red through yellow-orange to white. As commonly grown the plant is only 5 or 6 feet high, but some forms may become 10 feet under proper management.

This list by no means exhausts the possibilities in the genus *Opuntia* which includes the prickly pears and cane cacti. Indeed, it is to be understood that very desirable things have been necessarily omitted entirely. My purpose has been to call attention to some of the important decorative features of the genus *Opuntia* alone. The other cactus genera which are of even greater importance in some respects in decorative features are purposely not considered. In any list of prickly pears or other cacti recommended for decorative uses, if it be of practical application, availability has to be taken into consideration. This leads to another point of vital importance.

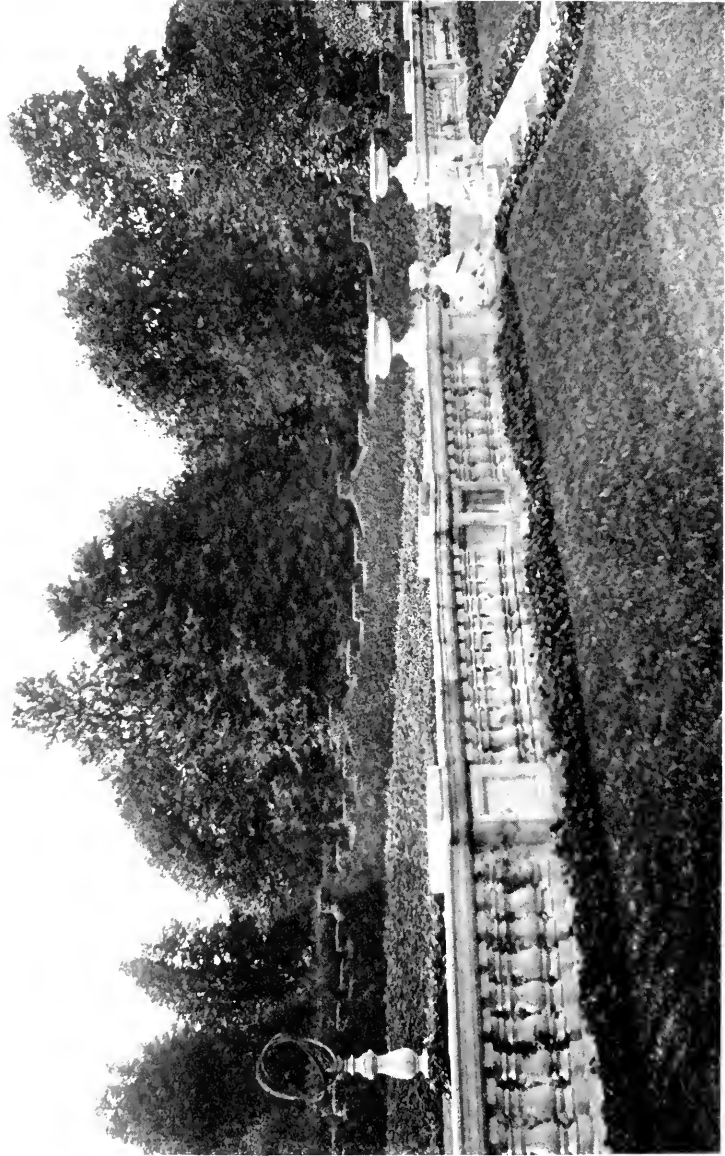
There is today little opportunity in a trade sense of securing propagating material of prickly pears. There are a number of people who undertake to supply species growing locally, but almost none in this country maintaining horticultural collections of any note. The collections which are maintained are in either private or public parks. The elements of these collections have been brought together through long years of effort and are from various sources. These institutions are, of course, limited in both facilities and desires to supply public needs except in so far as they are able to exchange plants. An effort has consequently been made to give in more or less detail the natural habitat of the different items for convenience of collectors and others who may desire to secure the plants.



LOOKING UP NARRAGANSETT BAY
ARMSEA HALL
NEWPORT

*Some Beautiful Examples of
American Gardening in the
Eastern States: With
Extracts from the
Annuaire of the
Newport Garden
Club**

* Reprinted by permission of the Board of Governors of the Newport Garden Club.



THE GREEN GARDEN
HOPEDENE

Hopedene *Newport, Rhode Island**

AUTUMN NOTES

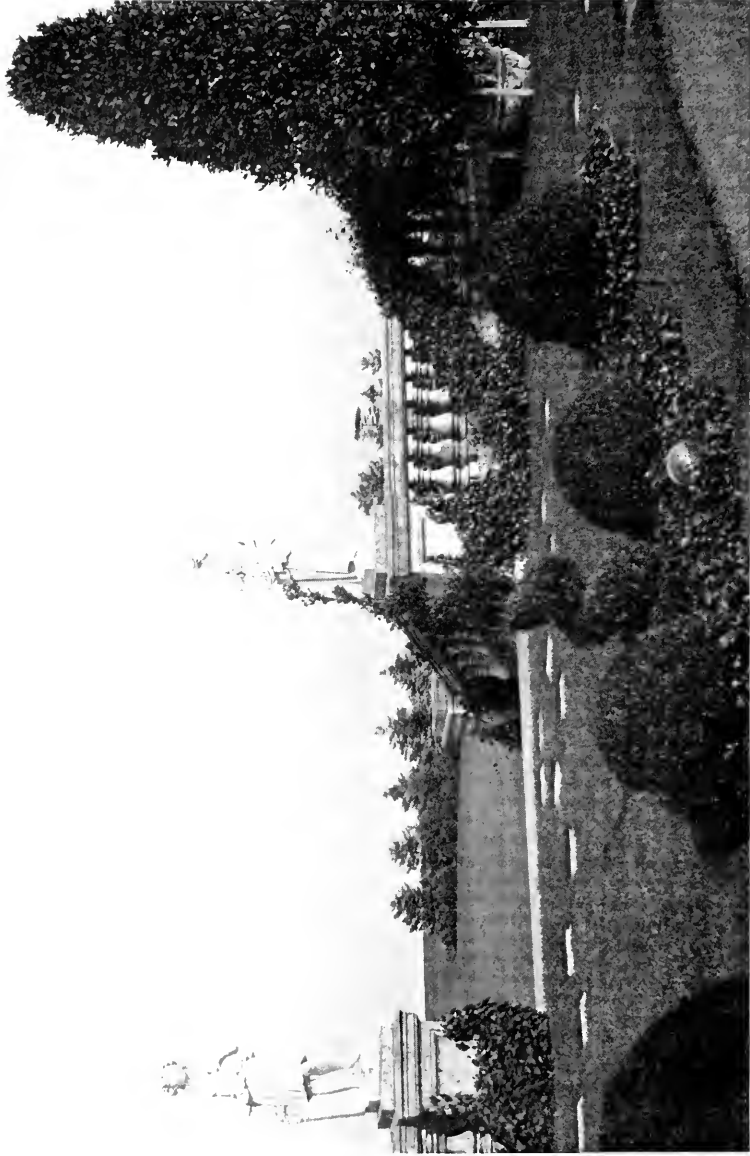


THE Nerines (see Johnson's *Gardener's Dictionary*) have flowered well and been charming this year. *N. Fothergillii* is the finest colour, but all are most useful autumn bulbs, and last a long time in water. They are easily managed, and like many cape bulbs, flower before the leaves are produced. During the growing of the leaves they must be carefully attended to and watered; and even now and then, a small dose of liquid manure does them good. They are best not re-potted, except very rarely; and as the leaves die down they must be laid on their sides, and dried and well baked in the sun, just like the Freezias, only not shaken out and re-potted, as recommended for them. The bulbs, too, should be planted, like Vallotas or Hyacinths, well on the top of the pot. I never can understand why these very ornamental bulbs are not grown in larger quantities, especially as they increase and improve, instead of being almost useless, as is the case with the spring bulbs, after forcing.

A Cape family of small, very sweet-smelling shrubs called *Diosma* (see Johnson's *Gardener's Dictionary*) are well worth growing in fact, no greenhouse ought to be without some of them. Their charm is principally in their foliage and scent, as the flowers are insignificant. They are easily increased by cuttings in spring under a bell-glass. The growing of Cape plants is always interesting. Small Cape Aloes have charming pink flowers in spring, which last long in water, not unlike the *Lachenalias* (see catalogues), all of which are worth growing.

Leontis leonurus has not flowered out of doors with me this year at all, either in large pots or planted out in a bed. The

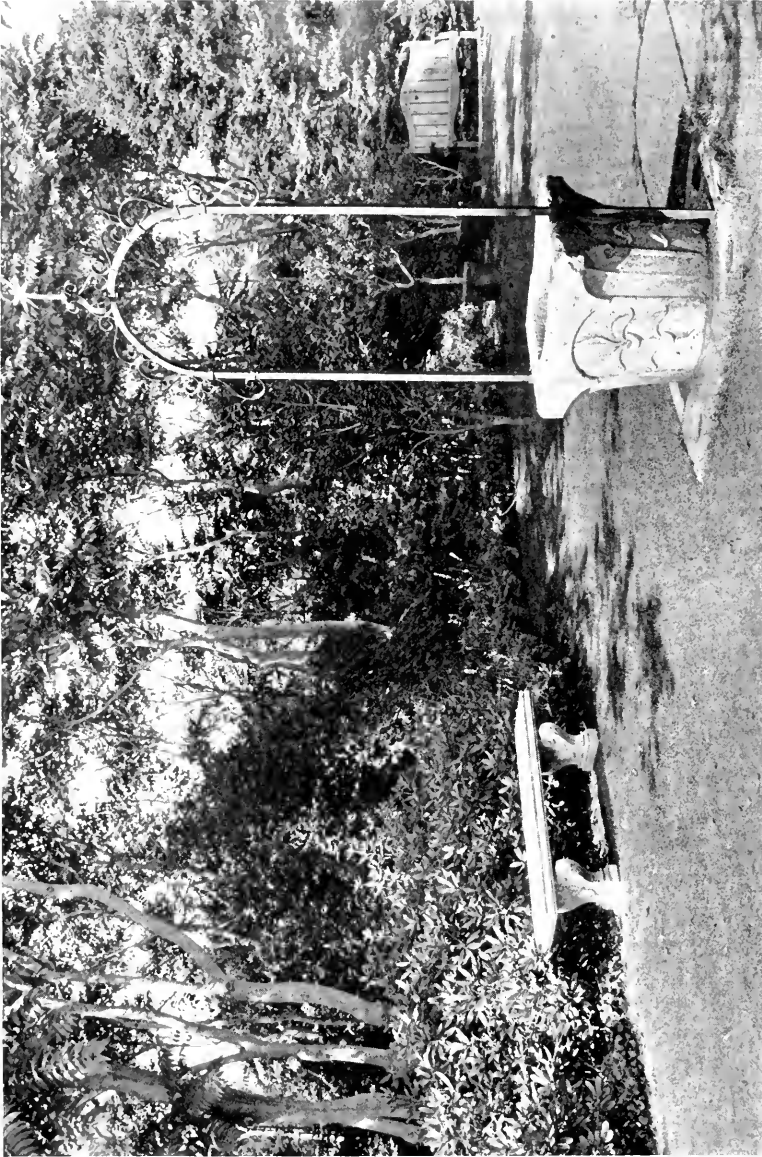
* Garden of Mrs. E. H. G. Slater.



HOPEDENE WITH THE
BLUE ATLANTIC BEYOND

plants were covered with buds, and so we lifted them at the end of September, and put them into heat, where they have flowered well. This would be worth while for anyone with plenty of room, as it is such a handsome flower when picked. Like the *Daturas*, they may be extra late from the excessive dryness of May and June, and the wet afterwards. It is a Cape plant; there it forms large bushes covered with bloom. Another African greenhouse plant well worth growing is *Sparmannia africana*. The covering of the bud is white, and showy, when the flower opens, between the four petals, forming an unusually pretty star-shaped flower with a brush of yellow stamens tipped with red.

Two new autumn Crocuses have lately been brought to my notice; one, *C. speciosus*, is very pretty standing up straight and strong on a border or rockery. It is of a very blue colour, with a center of lovely stamens and stigma forming a bright orange tassel. These species of *Crocus* are much more satisfactory to grow in borders than the pale *Colchicums* of the Swiss meadows, as they are true Crocuses, and only form in Spring slight narrow leaves instead of the despairingly coarse growth of the *Colchicums*, which, dying down in the end of May, make such an ugly spot in the borders; it seems best therefore to plant the latter in grass. My double and single Italian *Daturas* are later this year than usual, owing to the wet weather; but they are covered with blooms now, and very sweet. The double ones will last longer in water, scenting a room, than the single ones. We plant them out at the end of May; and when they have been out three weeks or so, a spade is passed around them to cut the roots, and a ditch made, which is filled with manure. This generous treatment makes the whole difference in their flowering well. I cannot say whether it would be necessary in a damper soil, but I think it would, as cutting their roots in spring stimulates them to flower earlier, before the frost comes. The old plants are taken up and put into pots, and housed for the winter. This is such a happy time of the year for the gardener. There is a sense of power about it; all the planting and planning and changing are done now.



“QUIET SPOT IN THE GARDEN THAT
I LOVE”
THE REEF

The Reef *Newport, Rhode Island**



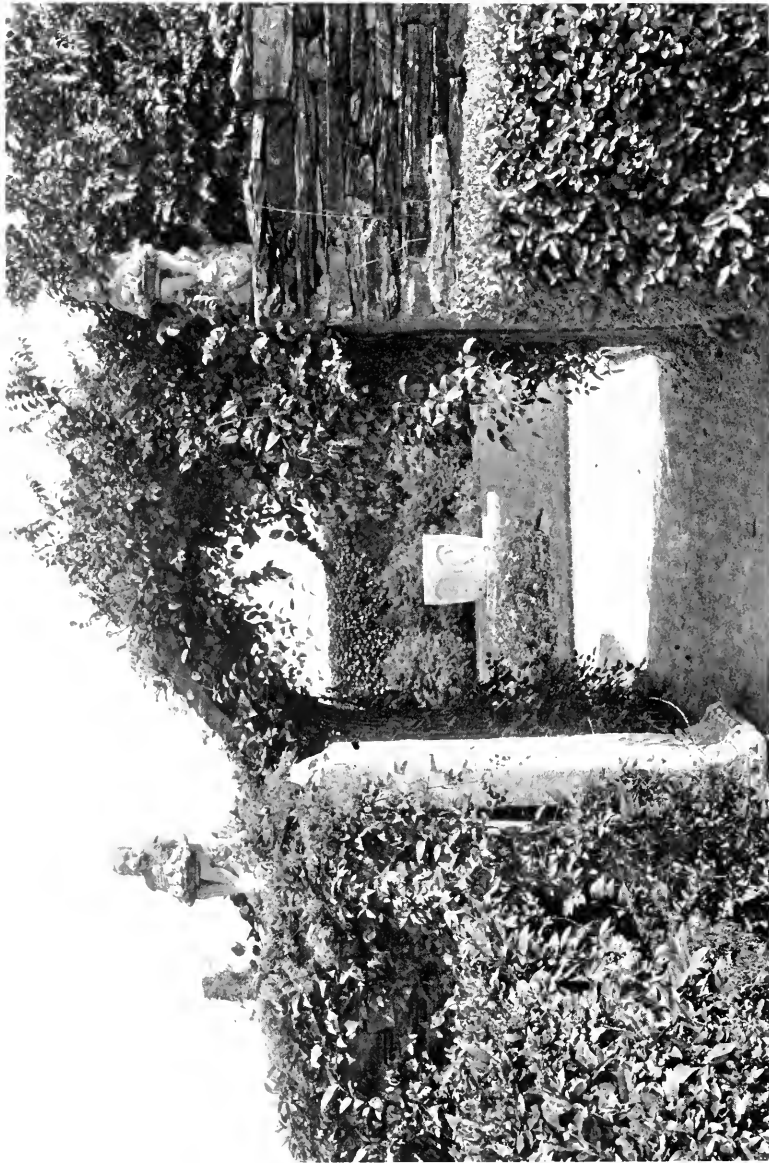
HAVE been asked to tell how this garden grew.

In looking back to the time the first efforts were made to cultivate the bare Rhode Island meadow, consisting of ten acres of coarse grass, without a shrub on it, and blown upon by all the winds of heaven, it seemed a vain thing to do. It never had a plan or design—and the first work done upon it in the way of planting, was to have five deeply plowed furrows made, running from the Ocean Drive to the east lane, and after thoroughly enriching them, to plant spruce trees and Austrian and Norway Pines, six feet apart alternately. This was the first defiance flung to the winds. As time went on and further planting took place, we knew that protection and support were essential—that everything must stand close together and lean upon the next thing—and that no individual planting could be attempted.

We have had to depend greatly upon the *Ailanthus* tree—a tree not desirable in choice shrubbery, but growing quickly and yielding easily to the winds—and with the added advantage of constantly throwing up suckers, which could in a year or more be utilized for planting. These trees with the indispensable *Rosa rugosa*, the Privets and the various conifers, have gradually given shelter and protection and with stone walls and hedges, have allowed more ambitious planting. It has all been tentative however, and, for that reason, very fascinating—for how much more interest must be felt in urging a garden forward oneself, in place of accepting a formal, settled design chosen by someone else!

One of the pleasant things we are trying to accomplish is the cultivation of some of our native American wild plants—so many of which are fast becoming extinct and lost to the world.

* Estate of Theodore M. Davis, Esq.



"OUR ANCESTORS"
ENTRANCE TO ROSE GARDEN
THE REEF

The Fringed Gentian—that “blossom bright with autumn dew”—the Marsh Pin, common along our Atlantic coast—the grass of Parnassus—with its white flowers rising from the crown of green leaves, and upstanding stem bearing the pretty seed pods, the *Pyxidantha*, and many others. These are charming for borders and rock gardens, the open garden, or bare spaces in a greenhouse, the indoor cultivation making a pleasant occupation for the dark days of Winter.

And so the garden advanced year by year. Paths arranged themselves, as it were. Special little plantings have given interest here and there. The Rose Garden asserted itself. Flower borders have formed themselves, the Rock Garden has given an indescribable interest, and always, as time goes on with a garden, one thinks of those lines of old Robert Herrick:

*“Great Mother, let me still be able
To own a garden, house and stable
That I may read and write and plant,
Superior to desire or want,
And as strength fails and years increase,
Sit down and think and die in peace.”*

I have been very busy here hollowing our new rockeries and digging holes, eight to twelve feet deep, and throwing up the sandy earth on either side, so making slopes and mounds of earth. Small, narrow paths lead into these hollows, and instead of catching the water at the bottom, as I did before, I keep the bottom dry, and sink petroleum barrels level with the ground to catch the water as it runs down the paths when rain falls, or after watering with a hose. In the tall walls of sandy earth every sort of aspect is to be found, little hollows are made, and all kinds of treasures can be planted on the flat or the slope. By making holes in the sandy walls, and helping to fix the plants with a mixture of cow-dung and clay, they adhere quite well on the steep slope. On one side of these sunk rockeries, so as still more to keep off the northeast wind, there is a wall about four feet in width and four feet high, built up gradually with pieces of stone and earth between them—no mortar.



WOODLAND PATH, WITH
JAPANESE ANEMONES
THE REEF



STEPS TO THE ROCK GARDEN
THE REEF



BEAUTIFUL, OLD TREES
OAKLAND FARM

Oakland Farm Newport, Rhode Island*

MODERN GARDENING BOOKS

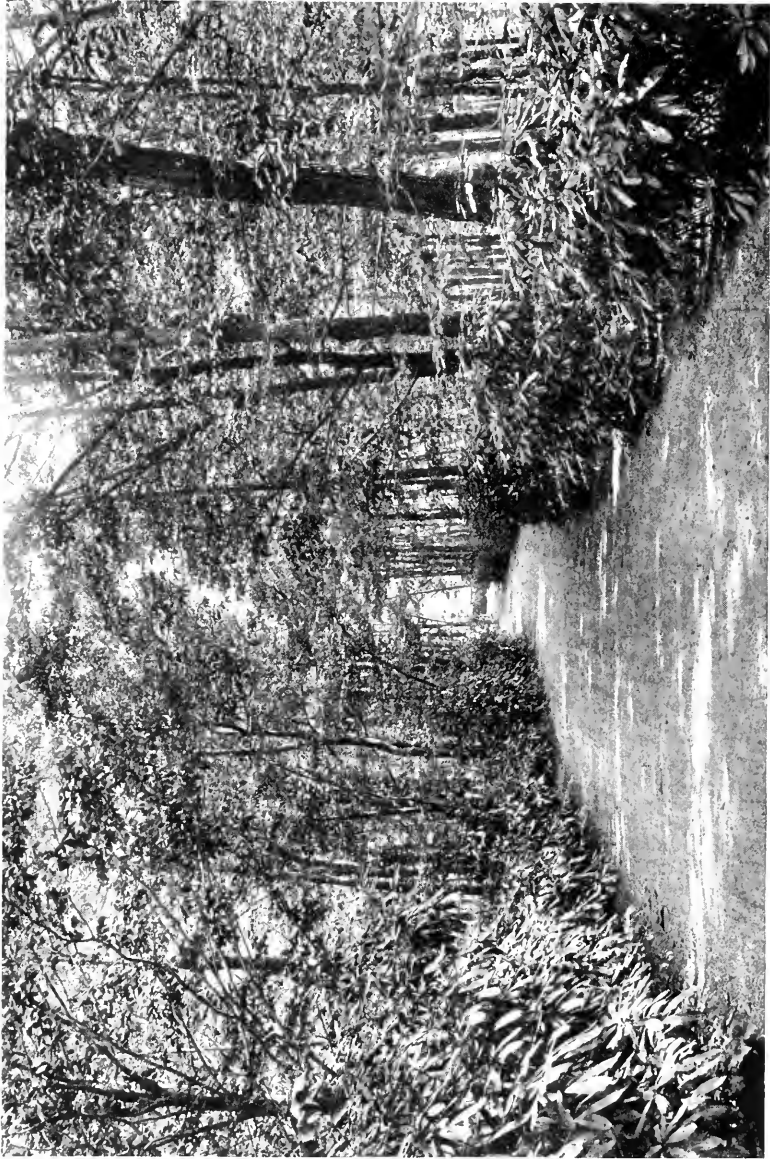


IN THE month of March I finished noticing the books in my possession up to the end of the last century. I begin again with this century, and shall carry them down to the present day.

1803. (An XI.) *Le Jardin de la Malmaison*. By Ventenat. Illustrated by P. J. Redouté.

In two folio volumes. This is one of my great possessions—a handsome book, sumptuously produced, as was likely to be at the time, dedicated as it was to Madame Bonaparte, just at the height of her power and influence. The implied flattery in the dedication to her is as large and magnificent as the paper is beautiful and the printing perfect. On the title-page is a little motto in Latin, saying that if the praises of the woods are to be sung, the woods should be worthy of the Consul. The Book is an obvious imitation of Jacquin's *Flora Schoenbrunnensis*. The illustrations are, I think, less artistic and certainly less strong than Jacquin's. They are not hand-coloured, like his, but are very fine examples of the best and most delicate (then newly discovered) method of colour-printing. The reason why Redouté's work is artistically inferior to Jacquin's is, that in his delicate rendering of the flowering branch he always puts it exactly in the center of the page, without reference to size or growth. The plates are at the end of each volume, and the descriptive text, which is in French, at the beginning. Poor Joséphine! She was so fond of her gardens; and I am told there is still an order preserved in our Admiralty that, when French ships were captured in the War, any plants or seeds that were on board for Madame Bonaparte were to be expedited. That was a gracious order; and gardening in those days meant

* Residence of Alfred G. Vanderbilt, Esq.



RHODODENDRONS
OAKLAND FARM



THE DRIVE
OAKLAND FARM

so much more than it does now. A flower blooming then was an interesting event all over Europe, and the gentle perfume of it rose and permeated through the smoke and din of the Napoleonic wars. Nevertheless, there always have been, and there always will be those who would rather sing the old French rhyme:

*Jardiner ne m'amuse guère
Moi je voudrais faire la guerre*

Pernettyias, which are lovely little shrubs, will not do in sun at all; but in shade they seem to do excellently, and are quite healthy in sandy soil. All those I planted in full sun have simply died this dry year, having been very much parched up. *Coton-easter microphylla*, on the contrary, never berries so well or is so satisfactory as in a very dry place fully exposed to the southern sun.

The other day as I was working in this new Alpine garden, a caterpillar fell off a tree just in front of me. His head and body were green; his long, pointed tail bright pink. The spaces between the tufts of hair were deep black. His legs and pro-legs were green. I thought I had got hold of some wonderful, rare beast, as I had never before found a caterpillar with a pink tail like a horn. A friend to whom I refer all my natural history questions informed me that this was the caterpillar of a moth called the "Pale Tussock," because of the tussocks upon his body. The moth is pale grey coloured, with various markings, and is fairly common. He feeds upon most trees, often on Oak, but also on Hazel, Birch, and, oddly enough, Hops. He will eat Plum and Pear. I have found that *Crocus speciosus* does admirably in this light soil, and comes up year after year, but is very much better not disturbed, when it decidedly increases.

*You promise heavens free from strife,
Pure truth, and perfect change of will;
But sweet, sweet is this human life—
So sweet I fain would breathe it still;
Your chilly stars I can forego,
This warm kind world is all I know.*

*You say there is no substance here,
 One great reality above;
 Back from that void I shrink with fear,
 And child-like hide myself in love;
 Show me what angels feel. Till then
 I cling, a mere weak man, to men.*

*You bid me lift my mean desires
 From faltering lips and fitful veins,
 To sexless souls, ideal quires,
 Unwearied voices, wordless strains;
 My mind with fonder welcome owns
 One dear dead friend's remembered tones.*

*Forsooth, the present we must give
 To that which cannot pass away;
 All beauteous things for which we live
 By laws of time and space decay.
 But oh, the very reason why
 I clasp them is because they die.*

“The presence of these fine plants of rhododendron dates from the 'forties, when Sir Joseph Hooker, with youthful ardour, was revelling in the floral wealth of the Himalayas. Dr. Campbell, of the family of Oronsay, who founded the sanatorium of Darjeeling in 1835, shared Hooker's enthusiasm, and sent home quantities of seed, some of which found its way to Stonefield. A noble crop has sprung from it. Here are trees of *Rhododendron arboreum* 30 feet high with blood-red, pink or white blossoms, and with stems thicker than any wood-nymph's waist; *R. Falconeri*, 25 feet high, carrying among its great felted leaves between 200 and 300 trusses of waxy bells; *R. eximium*, probably a local variety of the last named, loaded with bloom; *R. barbatum*, the bearded rose-bay, in both varieties, one a month later in bloom than the other, both excelling all their kind in the glow of blood-red flowers. *R. Thomsoni* stands 15 feet high and 20 feet in diameter, and among other treasures may be mentioned *Rhododendron grande (argenteum)*,

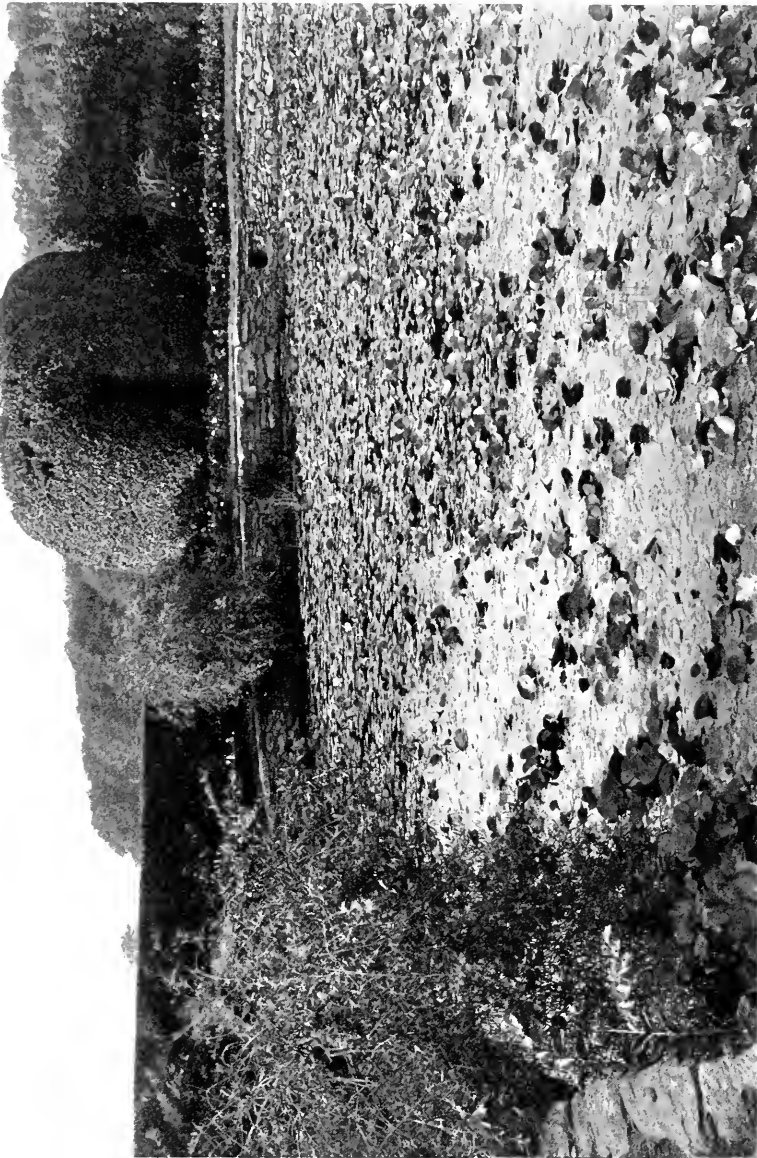
a shy flowerer, but worth growing for its splendid foliage alone; *R. niveum*, with purple flowers and leaves lined with white *peau de Suède*; *R. Hodgsoni*, with leaves like *Falconeri*, but with rosy flowers; *R. fragrantissimum*, *campanulatum* and *ciliatum*, all revelling in conditions of season and temperature as unlike their native levels of 8,000 to 12,000 feet as one could well imagine. In the Himalayas, all growth is restrained until late in spring, when it is suddenly released for a summer burst, and as suddenly brought to a stop for a long winter's rest; whereas in the West Highlands of Scotland there is no such demarcation of seasons; growth is encouraged from year's end to year's end, subject to sharp snaps at uncertain intervals. It is truly remarkable how well these fine plants accommodate themselves to every trial except that of rude winds.

Perhaps the most distinguished, because the rarest, of the rhododendrons which were in flower at the time of my visit was *R. campylocarpum*, 9 feet high, bearing trusses of beautiful waxy bells, clear canary yellow with a purple stain at the base of each bell.

There is great wealth of rhododendrons in the Hirsel woods, not only the common—far too common—*ponticum*, but the finer hybrid varieties, which are not crowded together in clumps, as one too often sees them arranged, but planted in large measure and with liberal space in the glades of old Scots pine and birch. It is in chequered sunshine and shade that these princely shrubs attain their highest development. Planted in the open, the blossoms get seared by summer heat; but in thin woodland they display and retain the purest hues."

AUTUMN NOTES

One or two hardy Bamboos should be in all gardens, because of their appearance just now, apart from all other reasons. The "English Flower Garden" gives the best kinds which must be selected according to the size of the garden and the situation in which they are to be placed. They by no means require to be planted in wet places—in fact, I imagine it is that which kills them in Winter—but a few cans of water daily in dry

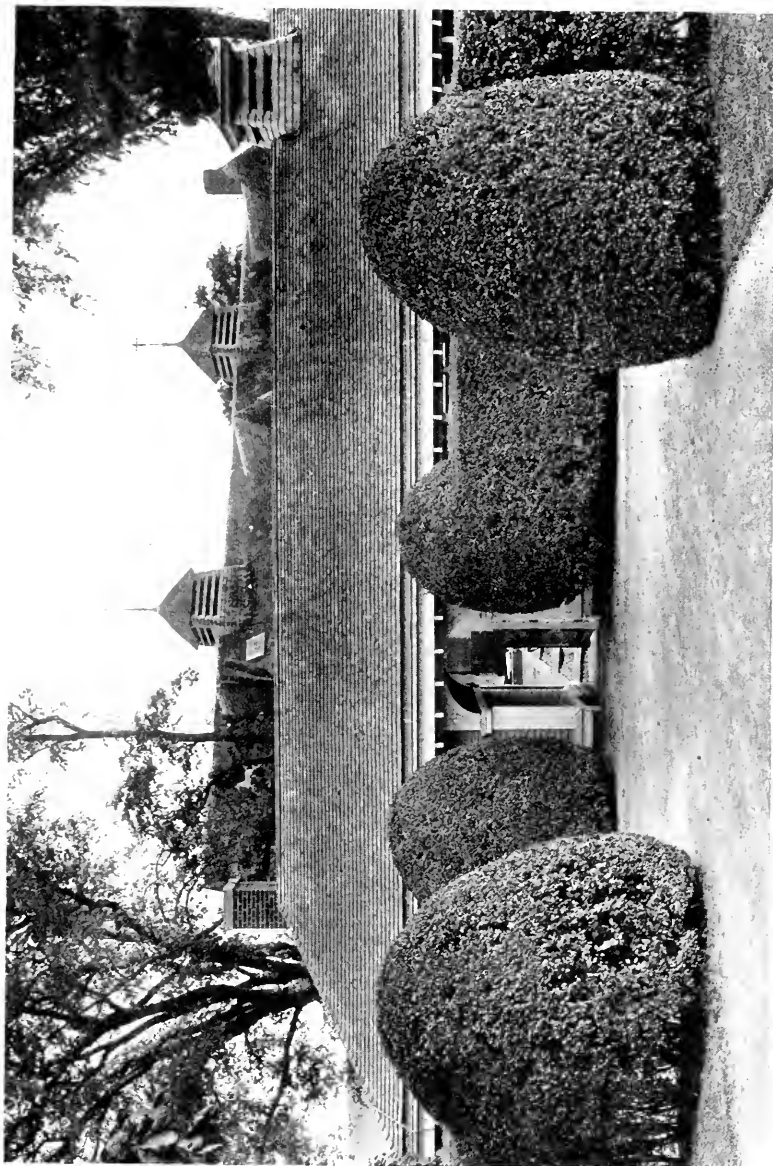


THE POOL
OAKLAND FARM

weather, at their quick-growing time of May and June, helps them very much to throw off sooner that shabby appearance in spring which is one of their drawbacks. Another drawback is that they live such a short time in water after they are picked. The Japanese have many devices for preserving them; the simplest of these is burning their ends in the fire before putting them into water. This answers with many flowers. In a small garden, Bamboos look much better for thinning out every year, and the long canes make very useful, tidy sticks for pot-plants. At this time of year, when all else is dying or dead, they are healthfully and luxuriantly green. I have found by experience that if Bamboos are really injured by frost, it is best to cut them down entirely the following spring. It requires some courage to cut out the tall well-grown canes; but, once nipped by frost, they do not recover, and they make better plants the following year if cut right back.

The dear, bare branches of my favourite *Polygonum cuspidatum*, here planted in a hole in the grass, look lovely now at this time of the year, red in the sunshine against a background of evergreens. I have now on the table before me—cold and grey as it is out of doors—Marigolds, Tea rose buds (that are opening in the room, and looking so pretty with a shoot of their own brown leaves), Neapolitan Violets, some branches of small white Michaelmas Daisies, and, of course, Chrysanthemums—those autumn friends we are half tired of, and yet we could so little do without. Another striking feature in the garden just now are some small Beech trees, quite small, grown and cut back as shrubs are pruned. In a soil where Beech trees do not grow naturally, it is well worth while to have them in this way, because of their peculiarity of retaining on their branches the red dry leaves more than half through the winter, causing a distinct point of colour against the evergreen shrubs.

This is my last day in the country, calm and warm. I eat my luncheon by the open window. All Nature is very, very still, the silence broken now and then by the chirp of a bird and the distant crow of a cock in some neighbour's yard; the sky is pearly and grey, and soft light grey mists hang about, just



BEAUTY OF CLIPPED PRIVET
OAKLAND FARM

enough to show up the glory of some autumn bush or leaf. In front of the window there are some little delicate leaves of one of the shrubby Spireas, planted on purpose to shine, coral and gold, late in the year. It does not matter about its being planted in a choice bed, as its growth is not coarse; if it looks a little dried up in summer, it is not noticed when all the flowers are about. The dear little black and white pigeons—"Nuns," they are called—with outspread wings, are flying down to feed. The flight of a pigeon is so beautiful; no wonder Dante immortalized it in the famous lines in the Paolo and Francesca episode. That old cynic, Voltaire, used to say that Dante's fame would always grow, because he is so little read.

As I sit and watch, the low yellow winter sun burst out, illuminating all things. Tomorrow he will not shine for me, as I shall be in that horrid dark London.

One other morbid little poem, appropriate to this time of year, I think I must give you, for it used to be a great favourite of mine in past days, before the cheerfulness of old age came upon me. If I ever knew who was the author, I have forgotten it now:

La Mélancolie

*Que me dis-tu, morne vent d'automne—
Miserable vent?
Toi dont la chanson douce et monotone
Jadis charmaït tant?*

*Tu me dis, hélas! qu'amour et jeunesse
M'ont fait leurs adieux
Et du fond de l'ame un flot de tristesse
Me déborde aux yeux!*

*Tu me dis, trop bien, où le sentier mène
Que l'espoir a fui
Et ton chant piteux, traduisant ma peine,
Triple mon ennui.*



A ROSE GARDEN
DEDHAM, MASSACHUSETTS

Garden Near Boston^{*}

MODERN GARDENING BOOKS

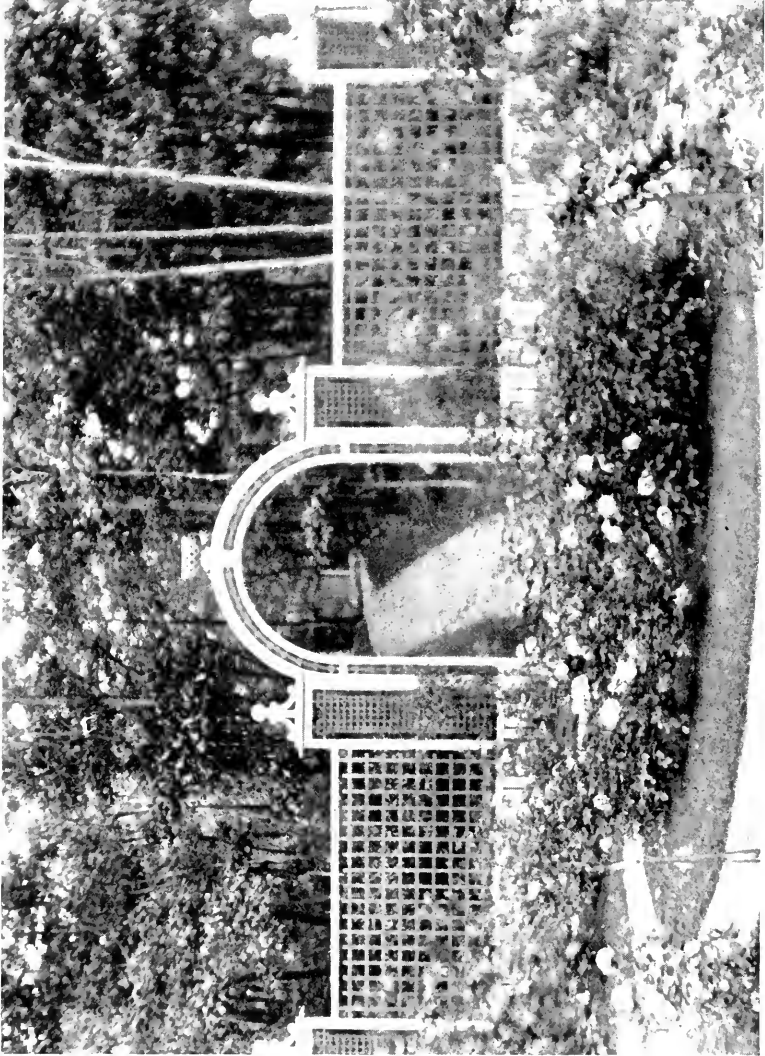


A BOTANIQUE de J. J. Rousseau, ornée de soixante cinq planches d'après les peintures de P. J. Redouté." Apparently Redouté brought out this book to please himself, for it is a reprint of Rousseau's *Elementary Letters on Botany to a Lady*. It has sixty-five such beautiful illustrative plates, exquisitely drawn and colour-printed like the last.

Were ever such beautiful things done for those who wished to adapt natural flowers to chintzes, needlework, or wallpapers? French artists, no matter of what school or of what period, always excel all others in the beauty of their actual draughtmanship. Among these illustrations there is a very fine old-fashioned dark-red single Chrysanthemum called *Astre de Chine*. I have never seen anything in the least like it growing. The Daisy and the Dandelion, too—were they ever more beautiful or more sympathetically rendered? Everything done is in honour of botany, nothing as a representation of a flower worth growing. The text is in French.

The order of the artist and author being just reversed from that in the work of his early days, *Le Jardin de la Malmaison*, the book begins with the following charming sentence: "Les poètes ont fondé dans l'opinion les seules monarchies héréditaires que le temps ait respectées: le lion est toujours le roi des animaux, l'aigle le monarque des airs, et la rose la reine des fleurs. Les droits des deux premiers établis sur la force et maintenus par elle avaient en eux-mêmes la raison suffisante de leur durée; la souveraineté de la rose, moins violemment reconnue et plus librement consentie, a quelque chose de plus honorable pour les fondateurs."

* Garden of Mrs. C. L. Harding, Dedham, Massachusetts.



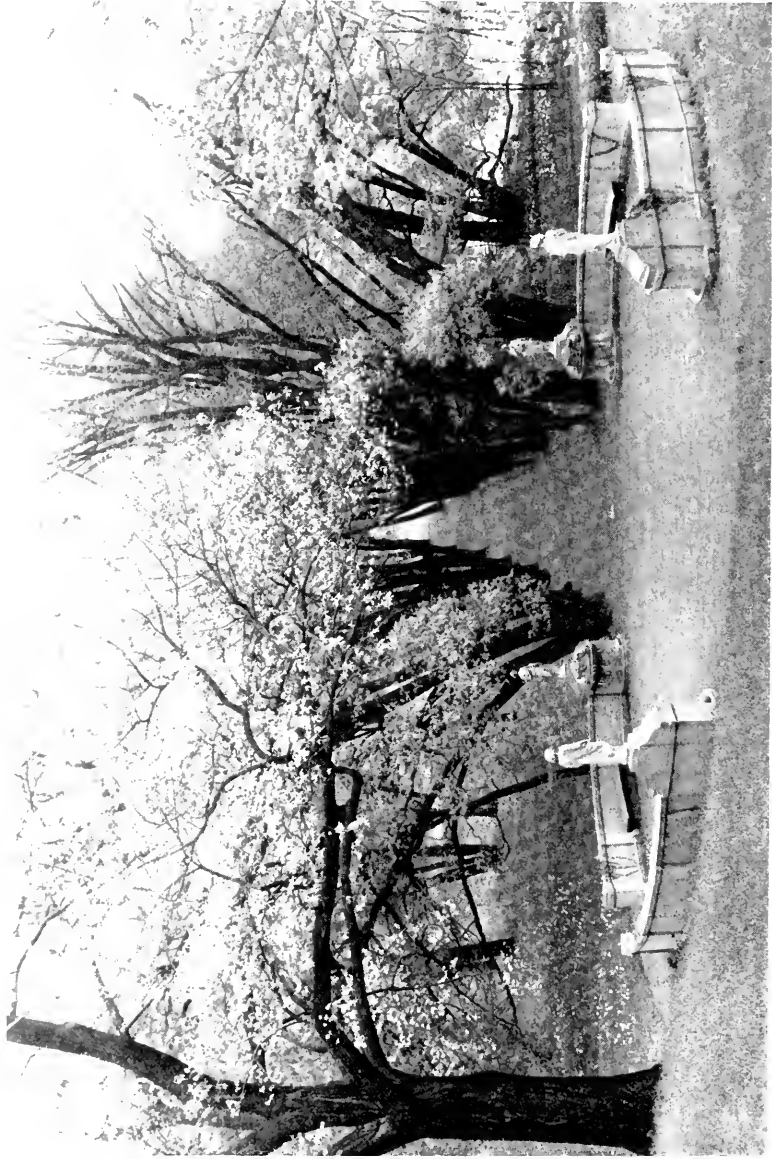
IN JUNE
DEDHAM, MASSACHUSETTS

Anyone who cares about roses ought to try and see this book at the Botanical Library of Natural History Museum at South Kensington, as it is very full of suggestions. Had I soil that suited roses, and room to grow them in, I should try and make a collection of the wild Roses of the world and the roses figured by Redouté in 1824, many of which I have never seen. The Banksia Rose, which now covers the walls all along the Riviera, is here called *Le Rosier de Lady Banks* (wife of the botanist, Sir Joseph Banks). There are Moss Roses and China Roses, and every form and kind of Eglantine; but nothing larger or more double than the Cabbage Rose. The Malmaison Rose, though called after Josephine's garden, must have been a much later introduction. In fact, in 1824, there were no Roses and no Strawberries in our sense of the word. Even what is now called the Old Maiden's Blush is not in the book. The *R. lucida*, which I grow successfully in Surrey (for it is easy of cultivation, and has a lovely foliage), the York and Lancaster, and the *centifolia* are all in this book.

I suppose few people have seen this book, otherwise I cannot imagine how anyone has ever had the courage to publish the modern illustrated Rose books with pictures that look so coarse and vulgar in comparison with these delicate coloured prints.

1804. *Exotic Botany*, by James Edward Smith, President of the Linnean Society; figures by James Sowerby. Two volumes in one. This book is, of course, an English one, but on the title-page is the following quotation from Rousseau's seventh "Promenade." I copy it, as it expresses the feeling of the times:—

"Il y a dans la botanique un charme qu'on ne sent que dans le plein calme des passions, mais qui suffit seul alors pour rendre la vie heureuse et douce; mais sitôt qu'on y mele un motif d'intérêt ou de vanité . . . tout ce doux charme s'évanouit. On ne voit plus dans les plantes que des instruments de nos passions, on ne trouve plus aucun vrai plaisir dans leur étude . . . On ne s'occupe que de systèmes et de méthodes; matière éternelle de dispute, qui ne fait pas connaître une plante de plus . . . de la les haines, les jalousies." etc.



IN SPRING
WILLOWS AND FRUIT TREES
WELD

*Weld Brookline**

SOME SUGGESTIONS FOR FINER GARDENING

By Arthur Herrington

*Lecture delivered before the Newport Garden Club at Newport,
July, 1914*



ART has been defined as the "power to see and give form to beautiful things," therefore art in the garden can be expressed in ways beyond number untrammelled by so-called rules of design. By this I do not mean that there should be an absence of design or plan, or order of arrangement, for there must be some appropriate adaptation of the garden to prevailing conditions and essential needs.

But the art of gardening is progressive. Travellers and collectors still bring to us new species and varieties of plants adapted to our gardens. The hybridist or plant breeder originates new forms and varieties of great garden value so that we have a veritable embarrassment of floral riches, and to such an extent that no garden can display or is even adapted to all.

It follows then that you must consult the gardener in the making of a real garden because it is his business to know trees, shrubs and plants, how they grow, what they need for their permanent well-being, why some would succeed where others fail from inadaptability, why certain plants and flowers are a success under some soil conditions and a failure under others. Underlying all these things there are certain basic laws governing life and growth, and unseen, but none the less real forces and agencies that are helpful if we work in harmony with them, but detrimental even to the extent of totally nullifying

* Estate of Larz Anderson, Esq.



TERRACE WALK
WELD

our efforts if they are misdirected through being contrariwise and out of harmony.

Time will not permit me to go into this matter in all its ramifying details, so I am merely making a few suggestions that may be helpful in making better gardens and I will commence with *Lawns*. I need say nothing about the importance of the lawn in its relationship to house and garden, but how rarely if ever are we satisfied with its quality and texture? It is something green to which "distance lends enchantment," but close inspection reveals many things other than grass that we would rather not have there. Yet, generally speaking, we are responsible for their presence by our impatient haste to secure immediate results. As soon as we have built our homes and made the necessary roads and walks we proceed to grade the ground and make a lawn. This work too, is often contracted without adequate supervision, to a contractor to whom dirt is dirt and the relative differences between top-soil and subsoil are not properly appreciated.

The fertility of Mother Earth is concentrated in a thin veneer of the earth surface, and every square foot of it is precious, for only in this thin upper crust is to be found all the elements of plant food that will nourish and sustain plant life. There are some who know and appreciate the importance of soil conditions, and spare no expense to have these right; who procure the best of grass seed and sow it only to reap disappointment.

FLOWER GARDENING IN MORE NATURAL WAYS

Another instance where too much formality and rigid adherence to design circumscribes the possibilities of good gardening is in relation to the growth of hardy flowers. Hence the floral poverty and meagre beauty of many so-called gardens wherein no place can be found for the planting of hosts of beautiful flowers that tell the story of the year from earliest spring till latest fall. Much of this may be attributable to the prevalent notion that a flower garden is a thing apart by itself, a set arrangement of beds and borders formal or otherwise.

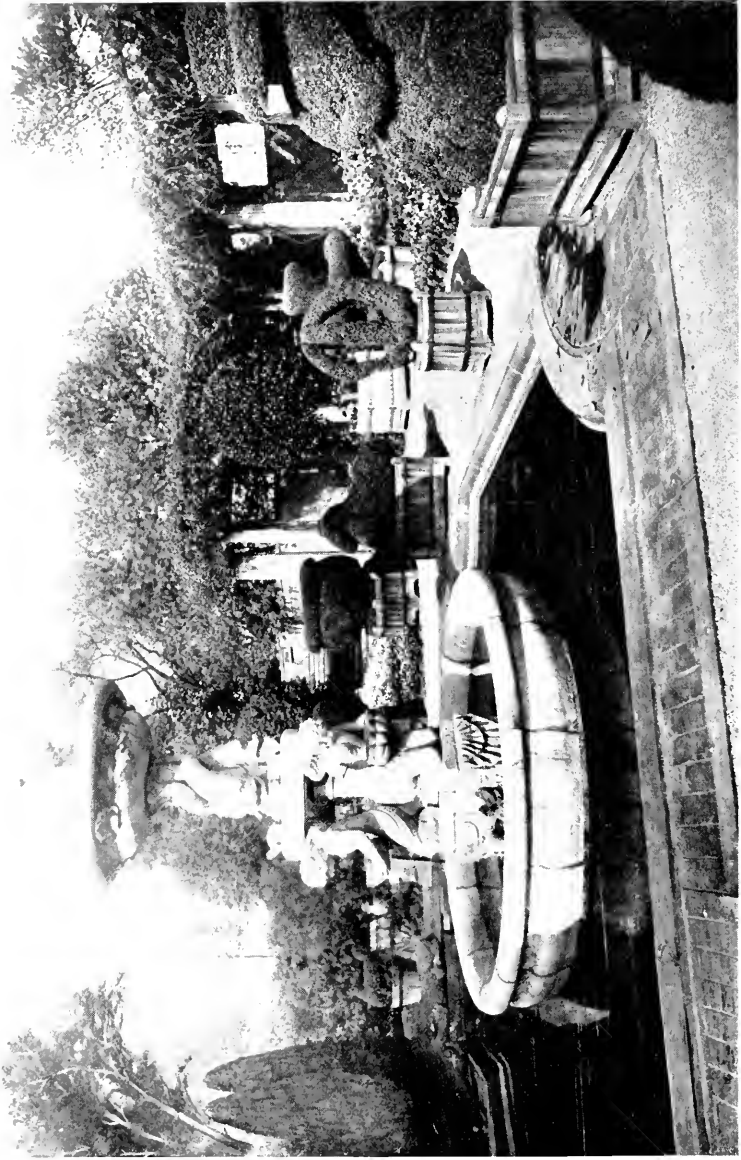
Hardy Flowers are not less important than the hardy trees



TREASURE WALK
WELD



TEMPLE AT THE LAKE
WELD



ITALIAN GARDEN
WELD

and shrubs. One of the pleasing signs of the times is that many garden lovers, having grown tired of the tender flowers that must be raised and planted each year at considerable cost are thinking more about the permanent hardy things.

The prettiest flower pictures I have seen this year were not the handiwork of man. During May I spent some time in the American and Canadian woods along the shores of the St. Lawrence River and here were pictures such as artists like to paint. Trilliums in countless thousands fringing the woods and reaching out into broad colonies in open glades, and the Columbine in sheer mantles of scarlet spread widely on ledges of rock where the soil is so thin and scant one marvels how it finds sustenance.

Just, for example, think of the many spring flowering bulbs: Snowdrops, *Scilla*, *Crocus*, *Chionodoxa*, *Anemone*, *Erythronium*, *Fritillaria*, Hyacinth, Daffodil, and Tulip. How do we grow these? If at all, is it not generally in a prim bed or border, planted with mathematical precision in some painfully spectacular design, for making which we seem to have a special aptitude.

Most of the spring bulbous flowers need no cultivation at all in the garden sense of the word. They often perish from disease if not killed by disturbance in the deeply dug and manured borders; yet in association with trees and shrubs and left undisturbed they go on from year to year increasing in numbers and spreading out into carpets and masses of true spring beauty.

A colony of the rich blue *Scilla sibirica* in a garden that I know may be cited. Some bulbs were planted through a group of *Rosa rugosa* to my actual knowledge 20 years ago. I have watched the development of this colony and got inspiration therefrom. Its extent and beauty have grown progressively as the years have passed, and in all that time nothing has been done but to annually prune the *Rosa rugosa*. A week to ten days is the average duration of that spring picture, but is it not worth while?



A CHARMING SPOT
MANCHESTER, MASSACHUSETTS

*Garden Near Manchester Massachusetts**

MODERN GARDENING BOOKS



THE Bamboo Garden, by A. B. Freeman, C.B. Mr. Mitford tells us in his preface that his book is simply an attempt to give a descriptive list—what the French call a catalogue raisonné—of the hardy Bamboos in cultivation in this country. We ought to be grateful that he has brought within the reach of everybody all that is to be said on this most beautiful family.

1895. "History of Gardening in England," by the Hon. Alicia Amherst. This is by far the most interesting and remarkable book that, I believe, has ever been written on the subject, and far surpasses in every way Mr. Johnson's "History of Gardening," before alluded to. The book is full of information, drawn from patient and most diligent research, and will be of real utility to students of the literature and history of gardening and to the owners of large places. It contains little that will practically help people who live in cottages and small villas. It alludes only very indirectly to the beautiful illustrated flower books, especially the foreign ones, which so far exceed our own in artistic beauty and skill. It is rather sad that when the Society of Gardeners wished to illustrate their plants in 1736 they had to engage the services of Jacob Van Huysum, brother of the Dutch flower-painter; and to this day the best periodical flower-printing, though painted by Englishmen, is printed in Belgium (*vide* "The Garden"). Miss Amherst's book is one for constant reference; and the greater one's knowledge, the greater will be one's appreciation of it. I cannot but regret, however, that it has been printed on the disagreeable, modern, shiny paper, which also makes the book most inconveniently heavy.

* Residence of Mrs. Scott Fitz.



POOL AND TREE
MANCHESTER, MASSACHUSETTS

This paper, I am told, facilitates the reproduction of the illustrations; but these, also, are very hard and ugly, and quite unworthy of the book.

Voyage autour de mon Jardin, by Alphonse Karr, is charming, and has been translated into English.

The Praise of Gardens, by Albert F. Sieveking, is a collection of quotations of all that has been written about gardens. The selection is very complete. Unfortunately the book is out of print.

In the November (1896) number of *The Journal of the Royal Horticultural Society* is an excellent lecture by Mr. F. W. Burbidge, the Curator of the Botanical Garden in Dublin. In the *Journal* the lecture is divided into three parts—called “Garden Literature,” “Reference Books on English Gardening Literature,” and “Garden Libraries.” It is interesting, besides other reasons, as being a somewhat new departure in the lectures delivered before the Horticultural Society. I strongly recommend those who care about the subject to read this lecture, as they will get a great deal of most useful information in a very condensed form. Mr. Burbidge strongly recommends garden libraries, in which I entirely agree with him. No large place should be without a room where gardening books and weekly gardening papers are within easy access of all the gardeners on the place, and no village club in England could not afford to take in Mr. Robinson’s excellent little weekly paper called *Cottage Gardening*, which I mentioned before. It costs one half-penny, and is full of all sorts of useful information. Surely at village shows no better prize could be given than the back numbers (bound) of this most useful publication. Mr. Burbidge says: “In America and in Germany the library seems to be thought as essential to good gardening and profitable land culture as here with us the seed room or the tool shed; and in England we are beginning to perceive the value of technical education, and to recognize the vital importance of the most recent scientific discoveries relating to our crops and their diseases, and the soil in which they grow. Private garden libraries, while most desirable, really form part of a much larger and wider



SAME GARDEN
MANCHESTER, MASSACHUSETTS

question. If libraries are essential for the garden, surely they are even more so on the farm." Mr. Burbidge winds up: "But to form libraries we must have good and useful books, and I shall give a short list of those I believe to be the best of their kind; and one of the best ways I know of getting the best gardening books into the best hands is to award them as prizes to the cultivators and exhibitors of garden produce at allotment, garden, and village flower shows." With this I most cordially agree.



AT THE ELMS

The Elms
*Newport, Rhode Island**

*“Poor heart! above thy field of sorrow sighing
For broken faith and love untimely slain,
Leave thou the soil wherein thy dead are lying
To the soft sunlight and the cleansing rain.
Love works in silence, hiding all the traces
Of bitter conflict on the trampled sod,
And time shall show thee all earth’s battle-places
Veiled by the hand of God.”*

* Residence of E. J. Berwind, Esq.

The Box and Its Enemies

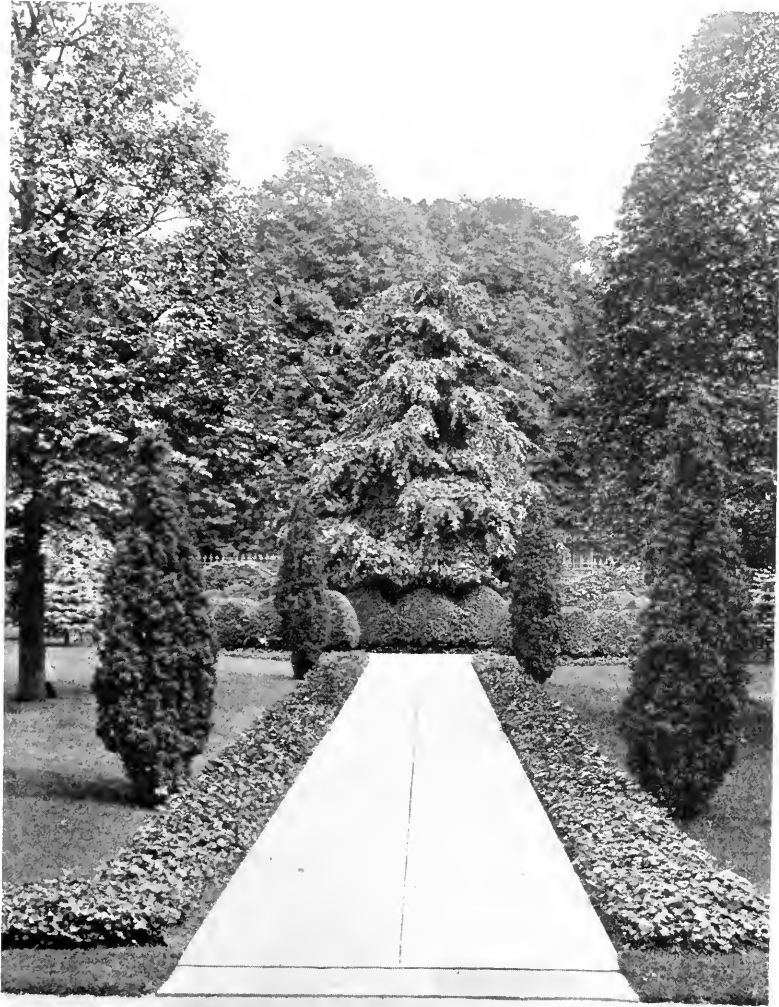
By Bruce Butterton,

Superintendent at "The Elms," Newport, Rhode Island



UNTIL recent years very little attention was given to the cultivation of the Boxwood in this country. Occasionally, without any special care on the part of the owner, a specimen would be seen growing upon a lawn or planted on the side of a path leading to the front door of some farm house; sometimes it was used by a private gardener to outline the walks of his vegetable or flower garden. On the whole, it was a very much abused and neglected little evergreen shrub, and was seldom seen in its full vigor and beauty. Since gentlemen of America, however, have begun building large villas and laying out beautiful French and Italian gardens, the demand for the Boxwood has become very great. As a result, the nurseries of England and Holland have been completely cleared out of large-size plants, and it is difficult at the present time to procure in Europe any great number of good specimens of Bush Box over thirty inches high, for last season there were more than 120,000 plants used in planting one Newport garden. Even a greater number would have been used, if it were possible to procure them in time.

With the increased popularity of the *Buxus*, the nurserymen and private gardeners have found it necessary to give it some thought and study. *Buxus* is always expensive, and many dealers and gardeners have met with heavy losses through ignorance of its proper care, and from the attacks of insect pests. Many of our growers believed that a severe winter was its only enemy, but more recently, however, they have found out at considerable expense that such is not the case.



PEGGED IVY AND
EVERGREENS
THE ELMs

The *Buxus* makes its entire growth during the months of June and the early part of July. At this season of the year it requires the greatest amount of care and watching in order to obtain perfect results. Thousands of plants are lost during the growing period from lack of water together with the ravages of the Leaf Miner, Oyster Shell scale, and Red Spider.

The Boxwood likes shelter from the cold winds but is soon injured by any close covering that comes in contact with its foliage. I have also found that if the snow is left lying against the plants for several days, the leaves will sometimes turn brown and die. A strong string tied around the plants to prevent them from being broken with the snow is all the protection that I give them in winter. The plants require an abundance of water during June and July; spray the foliage every day, if possible. It will wash off the aphids, kill the red spider and help keep the Oyster Shell scale under control, thereby increasing the health and beauty of the plants.

The Oyster Shell scale is very injurious to the Boxwood if it is not discovered in time and properly sprayed. If patches of yellow, unhealthy-looking foliage appear upon any part of the plant, it is well to break off a small branch of the diseased part and examine it very closely. It may be infested with this pest. Oyster Shell scale can be seen with the naked eye. The young shoots will be covered with a very small shell-shaped scale, sometimes so close together that they overlap each other like shingles.

If you should take a penknife and with the point remove one of these scales, turn it upside down upon the palm of your hand and examine it closely, you would find that it contained a number of very small bluish white eggs. Because these eggs are so well protected while under the mother scale, I know of no way of destroying them with poison; so we must wait a little while for our revenge. Examine the plants again about June 15. At this time the new growth upon the box will be about two inches long. You will then notice tiny white specks about the edge of the old scale. These white specks are the young scale coming forth to make a home for themselves upon



BOX AND ARBOR-VITAE
THE ELMS

the new growth. They sink their probosces into the tender young shoots and there remain through their entire life, robbing the plant of its sap and completing the deadly work which their parents so well began. At this time, which marks the tenderest period of the insect's existence, is the best time to attack it with some good contact poison. Use a force pump and a Bordeaux nozzle on the end of the hose; be sure and wet the stem of the plant as well as the leaves, and spray thoroughly. If soluble oil is used for spraying box, be sure that the mixture is fresh and that it has not been allowed to heat by standing in the sun; this may cause the raw oil to become free and float upon the surface. In this condition the free oil will come in direct contact with the leaves of the plant and burn brown spots in them, thus disfiguring them for the entire season. I have found it a good plan to spray box early in the morning when the plants are covered with dew. If the oil is free, it will mix with the moisture upon the plants and the leaves will not be burnt.

The arch enemy of the *Buxus* is the *Monarthropalpus Buxi*, commonly called Box Leaf Miner. It is a small fly about two-tenths of an inch in length and with a wing-spread of one-half an inch. It is colored a bright orange and its wings are pure white. The male and female have the same characteristics to the eye. This same fly is related to the Hessian fly, which is known as one of the worst destroyers of the wheat in the Western wheat belt. It was first discovered in Newport by the writer in the spring of 1910, when it did considerable damage to the Boxwood upon the private estate of Edward J. Berwind.

During the winter and early spring, the *Monarthropalpus Buxi* makes its home between the two skins of the box leaf and feeds upon the tissue. Later in the season it develops into a fly, eats a small hole through the skin of the leaf, and flies away to find a suitable place to lay its eggs in the soft new foliage. In a short time the injured box leaves begin to turn brown and drop off, sometimes the plant being left entirely defoliated. Because of its habit, the Leaf Miner was thought to be hard to destroy. It was found to be impracticable to spray or fumigate the plants



BEAUTIFUL PLANTING AT
THE ELMS

while the maggot was inside the leaf, because in such a case it would be necessary to use a very strong poison or gas which would destroy the leaf as well as the insect, if the poison penetrated sufficiently through the skin of the leaf.

I decided that in order to conquer the pest, we must learn more of its habits. At intervals I sent infested plants to Messrs. A. E. Stene, of the Rhode Island Agricultural College at Kingston, R. I., and H. L. Frost, of Arlington, Mass. Mr. Stene discovered that this pest is only in the flying stage of its existence about ten days; that is, usually in the early part of June when the new growth upon the Boxwood is very soft. During this time, the insect is very active. In the early morning they may be seen in great numbers hovering over the box plants. The female insect deposits her eggs not upon the surface, but forces them into the tissue of the leaf, where they will be protected from all harm.

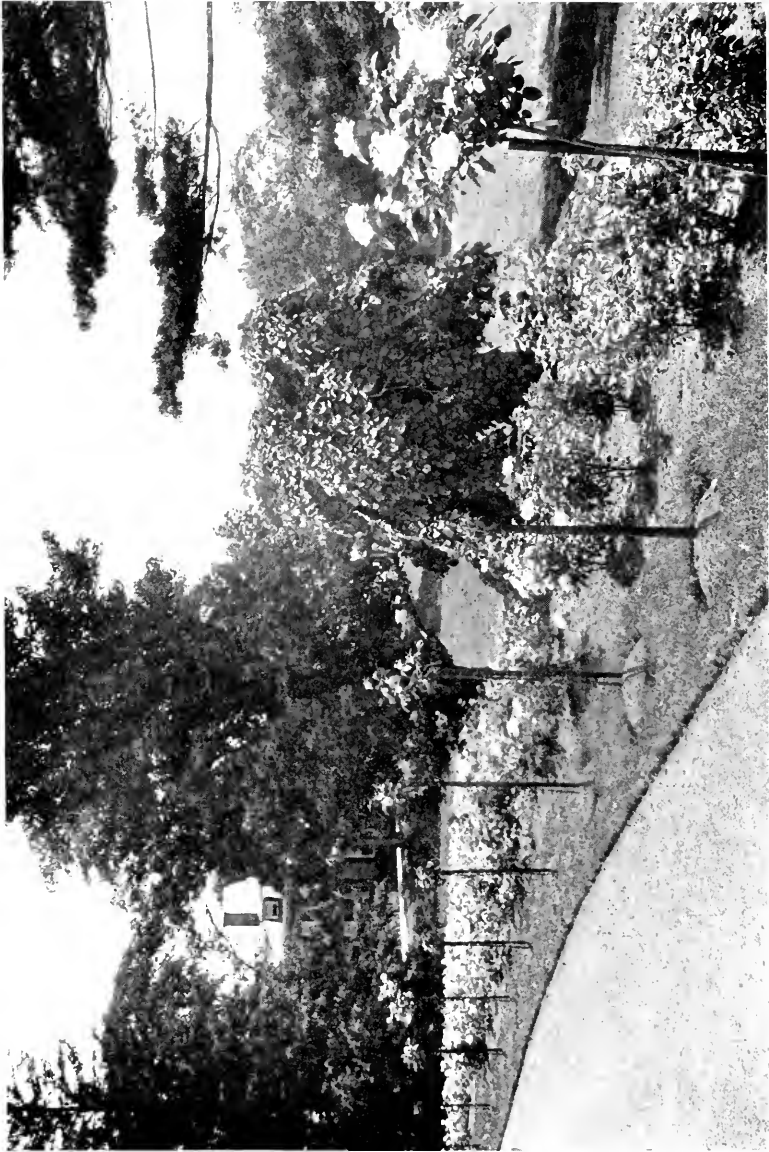
Buxus aurea and *Buxus sempervirens* were the first to be attacked with Leaf Miner. *Sempervirens suffruticosa* was also attacked, but the injury to this variety was not so great because the foliage is smaller and more dense. When watering has been neglected, this last named variety appears to suffer most from attacks of the Oyster Shell scale and the red spider.

With me, *Buxus arborescens* has been little attacked by the Leaf Miner. This useful variety is used extensively for growing into pyramid form. If allowed to grow without being sheared, it will very soon make handsome specimens. Untrimmed Boxwood has come into favor with some of our leading landscape men, who are paying fancy prices for large plants. *Sempervirens suffruticosa* is much prettier and more valuable for this purpose, but is very slow in growing.

I consider *Buxus macrophylla* the most beautiful variety to grow into specimens to plant singly upon the lawn or terrace. This charming Japanese Box is quite distinct from the European varieties. The foliage is larger, round, and of a dark glossy green color. It is very hardy, and does well when planted in shady places. It is seldom attacked by insects.



FOUNTAIN ALLÉE AT
THE ELMS



ROSE WALK
GLENCLYFFE

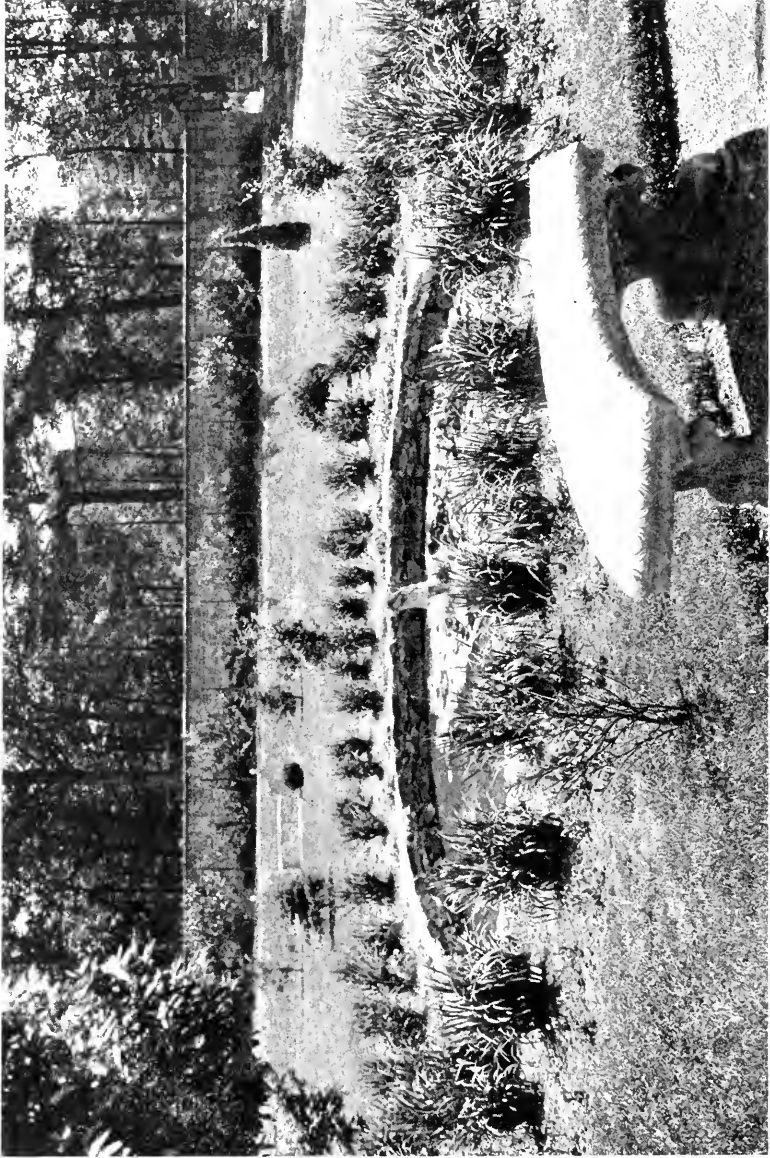
Glenclyffe

Garrisons-on-Hudson*



AMENESS is not so prevalent a vice in decorative horticulture as it was five-and-twenty years ago. It is the exception now to meet with a lady presiding over a country house who feels indifferent to the contents of her flower-beds. Most ladies, and many men, now take an active interest in cultivating a variety of flowering things. Disraeli had a hand in turning the attention of people of leisure to this source of enjoyment and perennial occupation. Probably no subject of Queen Victoria was more ignorant of the processes of horticulture. Had he been asked the definition of a herbaceous plant he would have found refuge in an epigram. But he had the saving grace of imagination which enabled him to perceive that beds of "Mrs. Pollok" geranium and "Countess of Stair" ageratum were no more capable than a Brussels carpet of inspiring affection. *Pereunt et non impu-
tantur*. They carry with them no associations—are redolent with no tender memories. Therefore, desiring to depict Corisande as devoted to her flowers, Disraeli filled her garden with old-world perennials—plants more abiding than the generations of men, yielding blossoms year by year to the children's children of those who set them in the borders. And, when Disraeli had stirred people's fancy with a longing for the old flowers that they could love, Mr. William Robinson began to teach them how that longing might be realised, and he has lived to see the revolution complete.

* Residence of Stuyvesant Fish, Esq.



AUTUMN AT
GLENCLYFFE

HORTICULTURAL NOTES

"Rose, Candeur Lyonnaisie." By D. Bois and G. T. Grignan (*Rev. Hort.*, p. 468, October 16, 1913). This rose is described as, without doubt, the largest and finest of the white Roses which have so far appeared, either for glass or the open. It has received a gold medal and other high awards. Raised by M. Croibier-Venissieux (Rhône).—C. T. D.

"Roses, New." By Kache (*Gartenflora*, vol. lxii, pt. xvi, pp. 362-368).—The following new roses are recommended "Yellow," "Sunburst," "Mme. Charles Lutaud," "Herzogin Marie Antoinette," "Dad Sterling" (vigorous, good-shaped flowers, sweet scent), "Sénateur Mascuraud," "Souvenir de Gustav Prat" (vigorous and sweet-scented), "Stadrat Glaser" (vigorous, healthy and floriferous), "Natalie Bottner" (vigorous, healthy, large, well-shaped flowers, good for cutting). The best reds are "President Vignet," "Lieutenant Chauré," and "Château de Clos Vougeot."

"Maman Lyly" is of moderate growth, healthy, and bears flesh-coloured flowers. "Tito Hékékyan" is a strong grower, with sweet-scented copper-pink flowers. "Mme. Lucien Baltet" is vigorous, and has flesh-coloured blooms with golden centers suffused with carmine. "Jonkheer J. L. Mock" and "Lili von Posern" are silvery pink. "König Laurin" resembles "Maman Cochet" in shape, but the center of the flower is milk-white, passing to pink at the edges.

"Bulbs, Flowering, Culture of, by the United States Board of Agriculture." By F. F. Matenaers (*Die Gart.*, February 1, p. 67).—On account of the great increase in the import of Dutch bulbs, the Board of Agriculture in the U. S. A. determined to make an attempt to grow them in their own land. For this purpose a 10-acre piece of land was acquired on Puget Sound, near Bellingham, Washington. In the year 1908, 170,000 bulbs were planted out, the number for planting out increasing in each consecutive year, reaching its maximum last year of 869,000. The Board's officials concerned with this maintain that they succeeded in growing bulbs quite as good as those of



VISTA OF THE HUDSON
GLENCLYFFE

Holland, if not better. To prove this, two rows of 50 of the same variety of respectively American and Dutch grown bulbs were planted out. The American bulbs bloomed from seven to ten days earlier, were superior in size, colour, and quality of flower, and remained absolutely free from disease, whilst those imported were inclined to be sickly and a considerable number of the same failed to bloom at all. The two drawbacks lie in the higher cost of producing and transport to New York. With the completion of the Panama Canal they will be enabled to transport to New York from the West Coast at less cost than from Europe, and the cost of producing could be minimized by the use of suitable machines.—G. R.

“*Salvia nemorosa*, Hardy European Species.” By S. Mottet (*Rev. Hort.*, pp. 470–472, October 16, 1913; 1 ill.).—Highly recommended for autumn blooming. Forms a bush about 2½ feet high with abundant spikes of large blue flowers. There is a pure white variety, *Salvia nemorosa alba*, not too tall, but equally floriferous, also recommended.—C. T. D.

“Seed Collecting” (*U. S. A. Dep. Agr. Year Book*, 1912, pp. 433–442; 4 plates). A most instructive account of methods used in collecting forest tree seeds. The winter hoards of squirrels offer a ready source of fir cones. An example of the magnitude of the work carried on was the gathering of 20,000 bushels of cones of *Pinus monticola* in 1911. A very readable and interesting article.—E. A. Bd.



ENTRANCE TO ADDISON'S WALK
MARIEMONT

Mariemont

*Newport, Rhode Island**

ANTIRRHINUMS AT WISLEY

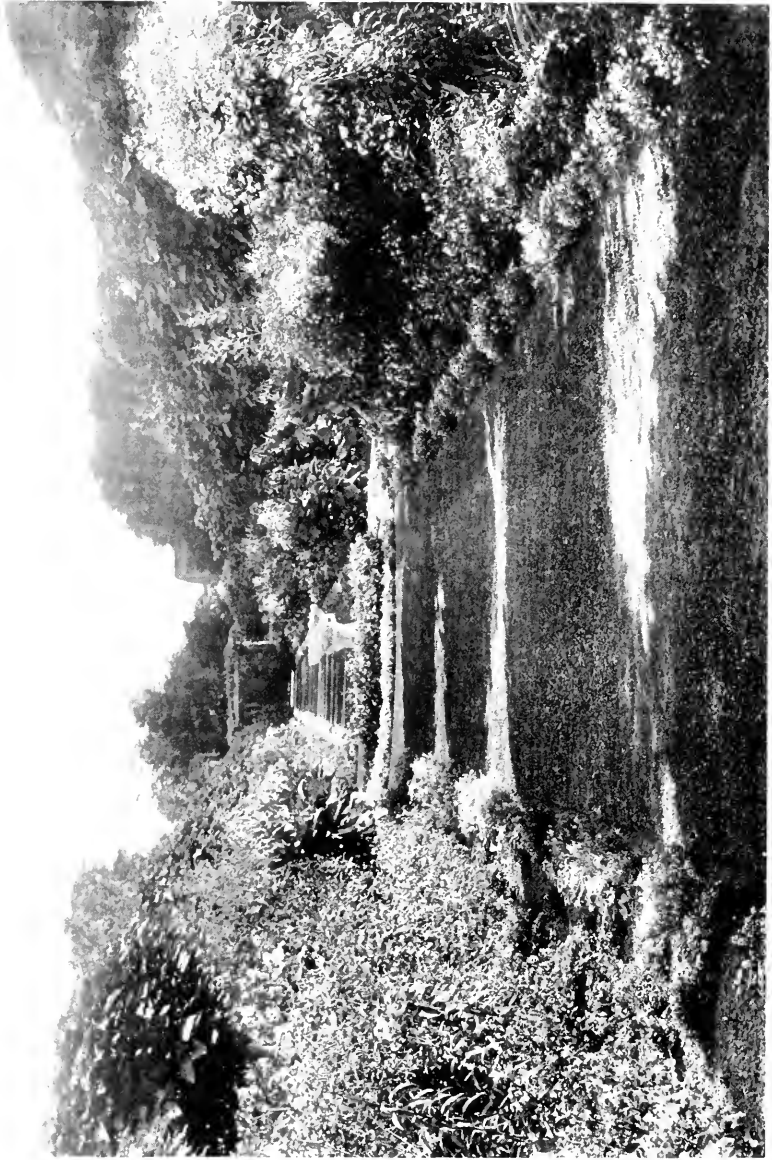


TWO hundred and seven stocks of Antirrhinums were sent to Wisley, all of which, except a few cuttings were sown on March 13th, and when large enough to handle were pricked out into boxes, and later on planted out in an open, sunny situation on soil moderately manured, and planted in rows 18 inches apart each way. All made excellent growth, flowered profusely through the summer and autumn, and gave a glorious mass of colour, which was much admired by visitors. The Committee recommended that the Antirrhinum should be classed as Tall, Medium and Dwarf or Tom Thumb. It was considered that the term *nanum*, often used for the *medium* section, was misleading. The height of the different sections varies a little on different soils. At Wisley the Tall ones are from 30 to 36 inches; the Medium ones 18 to 22 inches; the Dwarf or Tom Thumb about 12 inches high.

AUTUMN NOTES

It is a very good plan, when you want to cut a new bed or alter the shape of an old one, to shuffle along the wet, dewy grass on an October morning—and this leaves a mark which enables you very well to judge of size, shape, and proportion—before you begin to cut your beds out. I am taking up and replanting—in the way before described of massing all the plants of one colour together—my long herbaceous borders. These borders run

* Residence of Mrs. Thomas J. Emery.



HARDY BORDERS AT
MARLEMONT.

right across what was once a fair-sized lawn, and the principle of the garden is to have all beds and low-growing shrubs, except the paths, which are turf; the main paths are left gravelled for the sake of dryness in bad weather. I only replant the herbaceous borders every four or five years, mulching them well every winter; and even then it is best only to replant them partially, as certain fine plants are much injured, if not killed, by moving at all, and these plants remain as landmarks, both as regard height and colour, for the replanting of the borders. Keeping colours together and some empty spaces for annuals or filling up in spring or summer out of the reserve garden, makes it much easier to prevent the borders looking dull and shabby at any time during the summer months.

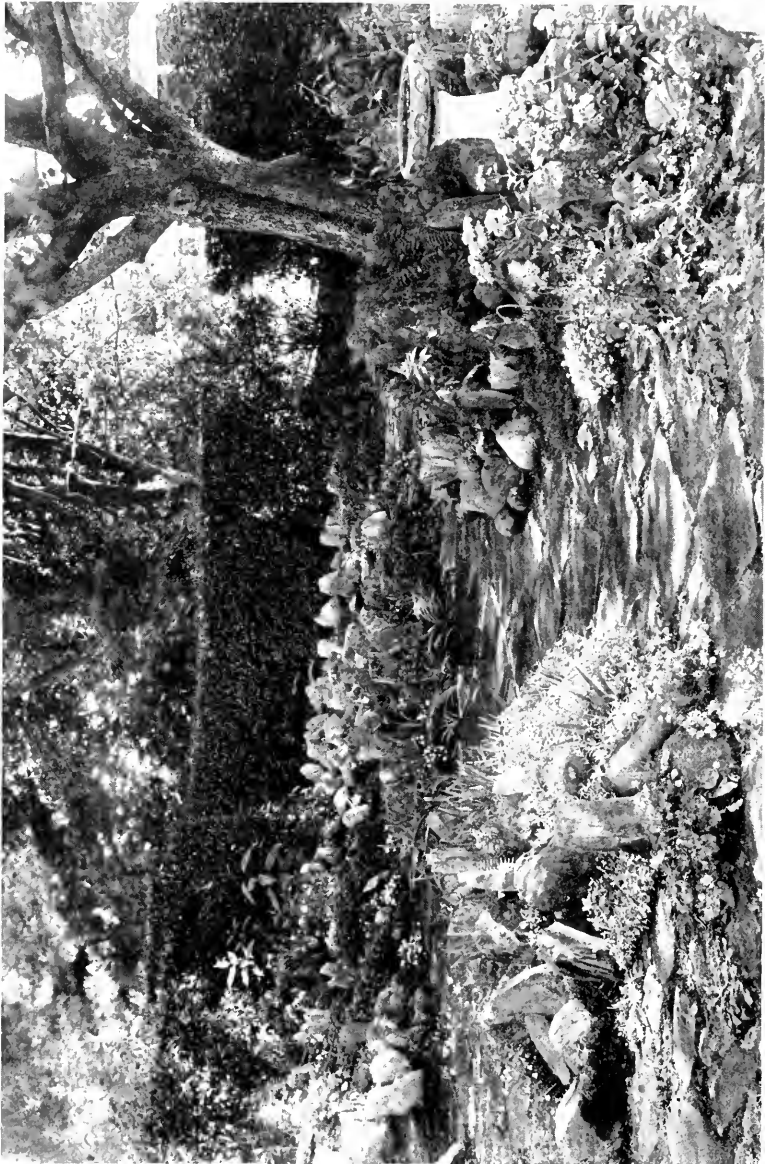
The large square beds are planted now with all kinds of spring-flowering things, not formally, but in broad patches—Wall-flowers, Forget-me-nots, Tulips, *Silene*, *Limnanthes Douglasii* (a Californian annual much loved by the bees), sowing a large patch of Love-in-the-mist and the annual *Gypsophila* (for early flowering, sown in September), Spanish Iris, Pinks and Carnations, Madonna Lilies, a large corner of Anemones, and another of *Scabiosa caucasica* (see "English Flower Garden"), both these grown originally from seed. And as the spring flowers pass away, their places are filled up from Autumn-sown plants, Snapdragons, etc., which are quite hardy when young and in the seed bed, but which get killed and injured by cold winds in the open. Let everyone read what is said in the "English Flower Garden" on the giant Saxifrages, Megaseas. There are several varieties, all worth growing, and they are most useful, satisfactory plants for all sorts of purposes, not nearly grown enough for covering the ground and making fine masses of low-growing foliage. To keep out weeds by planting low-growing and spreading plants is a great secret of gardens that are to have a picturesque appearance, and, in fact, to be a cultivated wilderness rather than a tidy garden.

A wise discrimination in deciding what to grow makes all the difference between struggling and cooperating with nature. For what, after all, does cultivation amount to? I speak not of the florist's craft, which takes a wild flower or shrub and, with



THE PERGOLAS
MARIEMONT

infinite cunning, transforms it into something different, so that a wild mother carnation could not recognise her own offspring in the monstrous Malmaison race (unless it were by accent, as a ewe does her lamb); nor the modest little wild heartsease, which covers with a blue mist the roofs of old log-houses in Norway, claim kinship with the show and fancy pansies which have developed such amazing colours and are judged, like poultry, by their points. For the gardener proper all this work is done by others; his function is to propagate and grow; his care is so to dispose plants that they shall be spared the intense struggle for life which every wild tree, shrub or herb has to undergo. It is surprising what fine qualities many of our British wild flowers develop under careful handling. We cause the ends of the earth to be ransacked for the furnishing of our borders, while all around us, in meadow and copse, on sea-coast and moorland, by riverside and hedgerow, there is material which will respond to thoughtful treatment with a display rivalling that of costly exotics. Among the many excellent, but unfilled, intentions of a desultory life has been the purpose to create an all-British garden, wherein nothing should be planted but native vegetation. Let me give a single illustration of possibilities. In the peat bogs of lowland Scotland, northern England and Ireland may be found a slender, little, heathlike plant, four or five inches high, sparsely clad with narrow, evergreen leaves, glaucous on the back, bearing in late summer a few pretty, pale pink, drooping flowers on the model of an arbutus or a bearberry. Strange to say, this plant is not found in the Highlands of Scotland, though it is abundant in Norway. It is the marsh andromeda (*A. polifolia*), according to modern classification the solitary species in the genus. It seems to prefer the sloppiest parts of the bog, where even heather declines to grow; but in fact it grows there only because there is no room for it elsewhere. Its hardy constitution enables it to maintain a precarious existence in a soaked mixture of sour peat and sphagnum, which would be the death of any other hardwooded plant. Nevertheless, it is as fond of good things as its neighbours. Remove some plants from their native slime (they are so feeble that it must be carefully done) and set them in a sunny border in a mixture of peat, sand and



ROCK GARDEN AT
MARIEMONT

loam, keep them from being overshadowed by grosser plants, lay some stones on the surface round them to keep some moisture about their roots, and in a couple of years they will grow into sturdy little bushes, nearly a foot high, with abundant leafage and a fine display of flowers. You have aided them in the struggle for life, and they regard you by developing into plants of really extraordinary beauty.

The list of suitable plants for this purpose might be made a long one. The following contains suggestions for a small collection which may be added to at pleasure, suitable for a northerly climate. Can be grown also at Aitken and in similar climates.

December to March

Iris reticulata and *persica*. Hepaticas in variety.
Cyclamen coum and *vernum*. *Adonis amurensis*.
Eranthis hyemalis.

March and April

Scilla sibirica, *amæna* and *bi-* *Erythronium* in variety.
 folia. *Muscari Szovitzianum* and
Chionodoxa Luciliæ and *Sar-* other choice species.
 densis. *Fritillaria aurea*.
Narcissus minor and other *Tulipa pulchella Lowanii*, *sax-*
 dwarf daffodils. *atilis*, etc.
Crocus in variety. *Sisyrinchium grandiflorum*.
Erica carnea. *Primula rosea* and *denticulata*.
Anemone blanda. *Callianthemum rutæfolium*.

May and June

Tulipa greigi, *linifolia*, etc. *Scilla verna*.
Daphne Cneorum and *Blageana* *Nierembergia rivularis*.
Muscari "Heavenly Blue." *Polygonum sphærocephalum*.
Sanguinaria canadensis. *Delphinium nudicaule*.
Anemone nemorosa var. *Robin-* *Ornithogalum nutans*.
 soniana. *Iris pumila* and other dwarf
Incarvillea grandiflora. species.
Hyacinthus amethystinus. *Primula luteola*, *sikkimensis*,
Ranunculus amplexicaulis. etc.



A CHARMING CORNER
CLIPPED PRIVET
MARIEMONT

July and August

Hypericum fragile and *reptans.* *Erica Maweana.*
Gaultheria trichomanes. *Andromeda polifolia.*
Allium pedemontanum and *Anomatheca cruenta.*
 other choice dwarf species. *Primula capitata.*

September and October

Colchicum speciosum and other *Cyclamen europæum* and *liba-*
 choice species. *noticum.*
Crocus speciosus and other *Cornus canadensis.*
 choice species. *Polygonum vacciniifolium.*

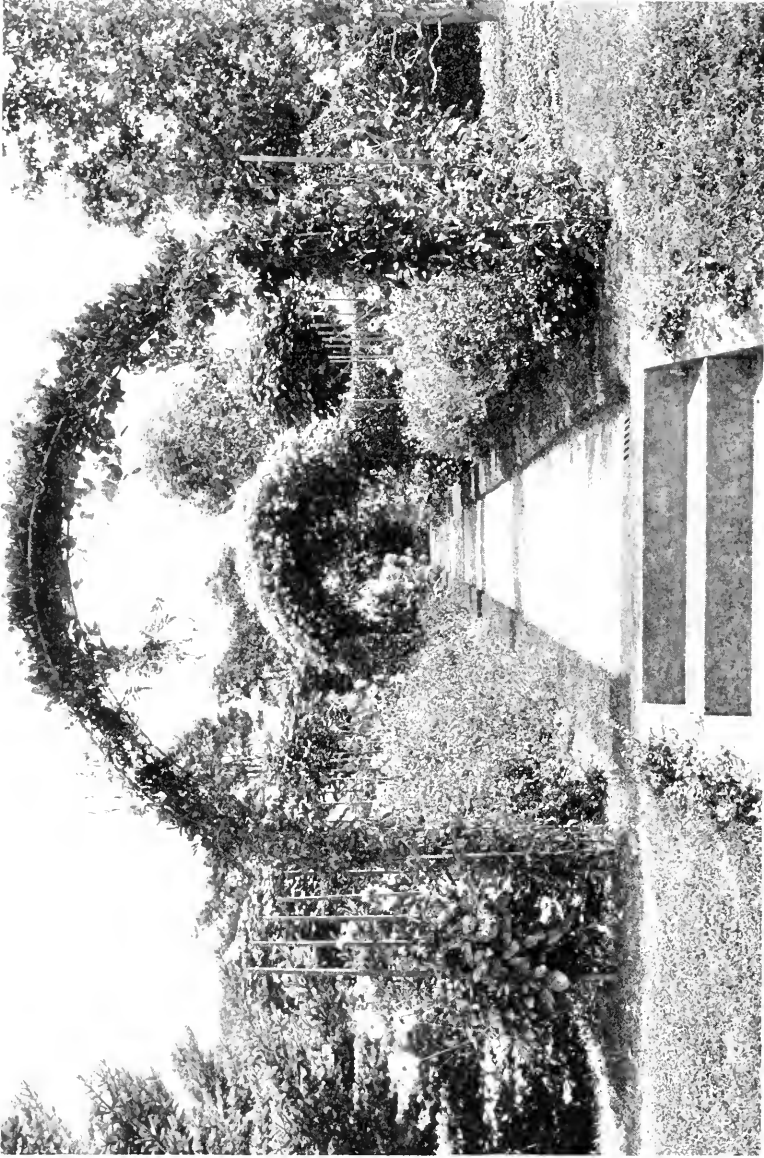
November and December

Schizostylus coccineus. Primroses, garden varieties.
Helleborus altifolius.

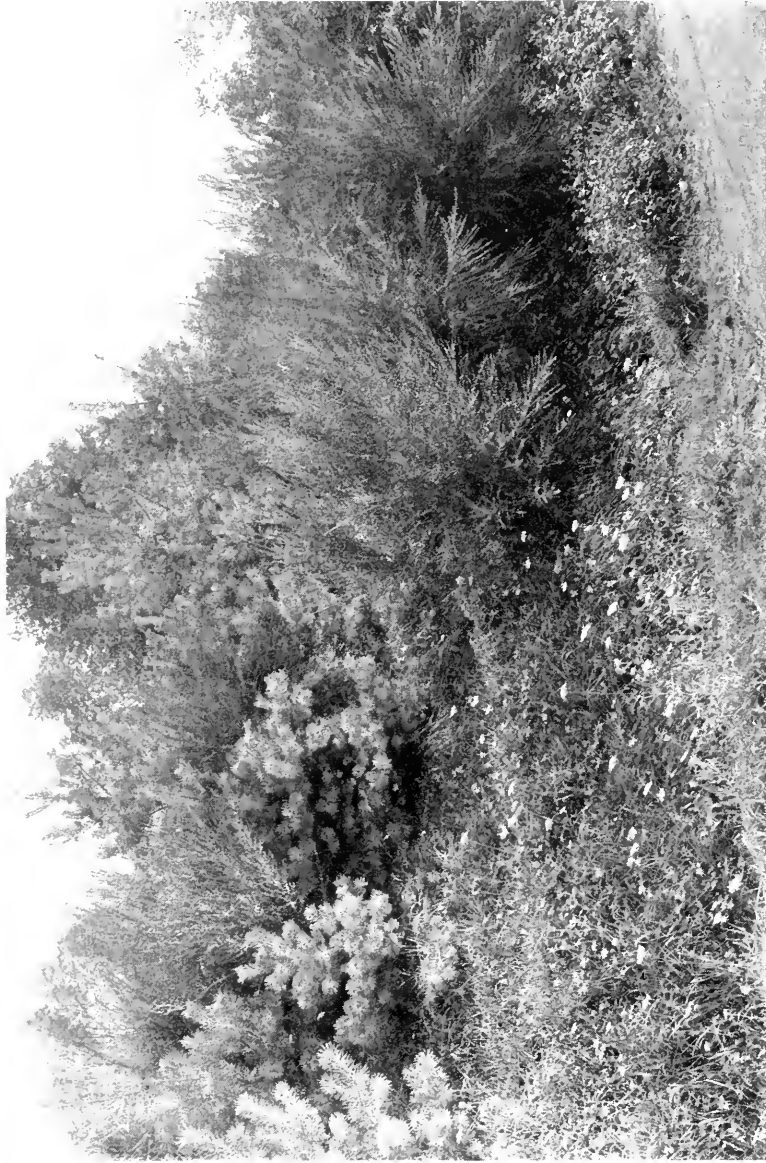
GARDENING BOOKS

Alpine Plants of Europe, Together With Cultural Hints. By Harold Stuart Thompson, F.L.S. 8vo., 287 pp. (Routledge, London, 1911.) 7s. 6d. net.

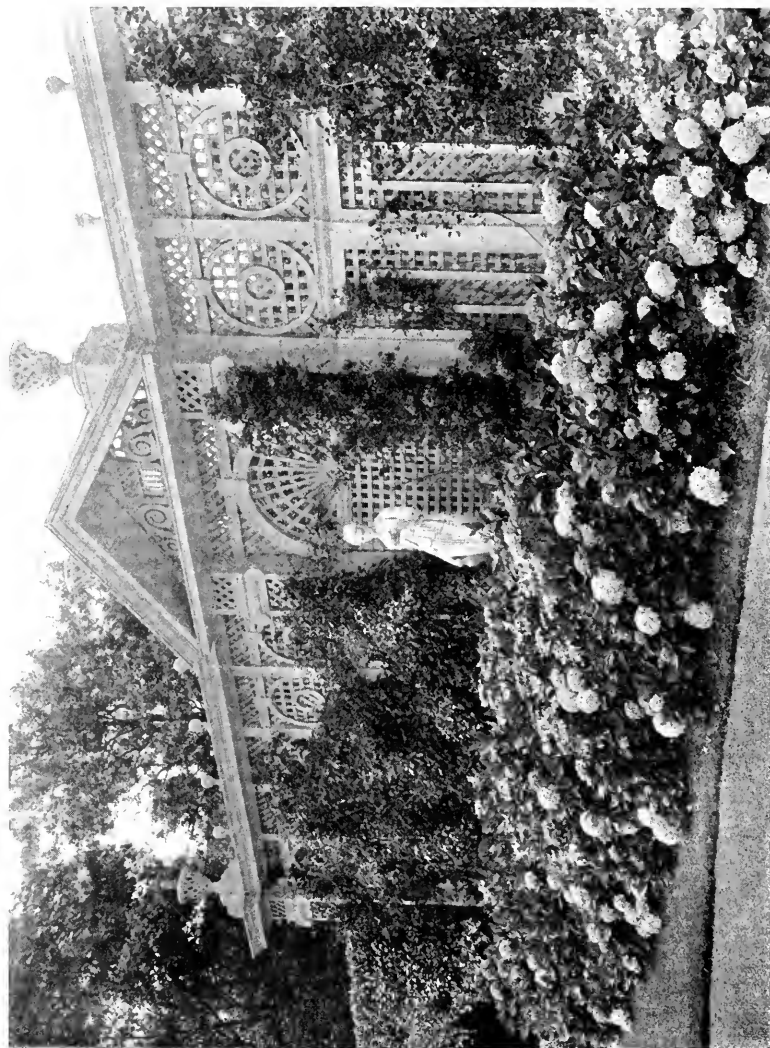
There has long been need for a well-illustrated book in the English language descriptive of the flowering plants of the whole range of the European Alps. Mr. H. Stuart Thompson is to be congratulated on having produced, very successfully, such a work. His "Alpine Plants of Europe" is a book which flower lovers and growers of alpine plants will do well to take with them on their alpine holidays, for with the aid of the beautiful coloured plates taken from Joseph Seboth's drawings, and Mr. Stuart Thompson's careful descriptions, there should seldom be much difficulty in identifying the plants met with on such a holiday. Some 700 species are described, mostly perennials, and these 700 have been chosen more for their decorative value and general interest to the tourist and gardener than for purely botanical interest. A few Southern rock plants—such, for instance, as *Morisia hypogaea*, from Corsica and Sardinia, which, though not alpine, are yet particularly suitable for cultivation in rock gardens—have been included.



SHELTERED WALK
MARLEMONT



WAYSIDE PLANTING
YELLOW BROOM AND EVERGREENS
MARHEMONT



BLUE HYDRANGEAS—AUGUST
ARMSEA HALL

Armsea Hall *Newport, Rhode Island**

*Here are sweet peas, on tiptoe for flight
With wings of gentle flush o'er delicate white
And taper fingers catching at all things,
To bind them all about with tiny rings.
Linger awhile upon some bending planks
That lean against a streamlet's rushy banks,
And watch intently Nature's gentle doings
That will be found softer than ringdoves' cooings.*

—KEATS.

THE MODERN METHOD OF GROWING SWEET PEAS

By William Gray

Secretary of the Newport Horticultural Society.



WITH the introduction of the Spencer or Orchid flowering type, the sweet pea has become of more importance than ever as a cut flower and more painstaking methods are being given in regard to culture than was formerly the case. The sweet pea being a deep-rooting plant, sending its roots down in prepared ground to a depth of 3 ft., the importance of trenching the ground deeply can readily be understood. In this, more than anything else, lies the secret of success in producing fine, long-stemmed blooms and extending the flowering period. Trenching should be done in the fall to a depth of $2\frac{1}{2}$ to 3 feet, thoroughly enriching the ground, especially in the lower stratum, with manure, bone

* Residence of Charles Frederick Hoffman, Esq.



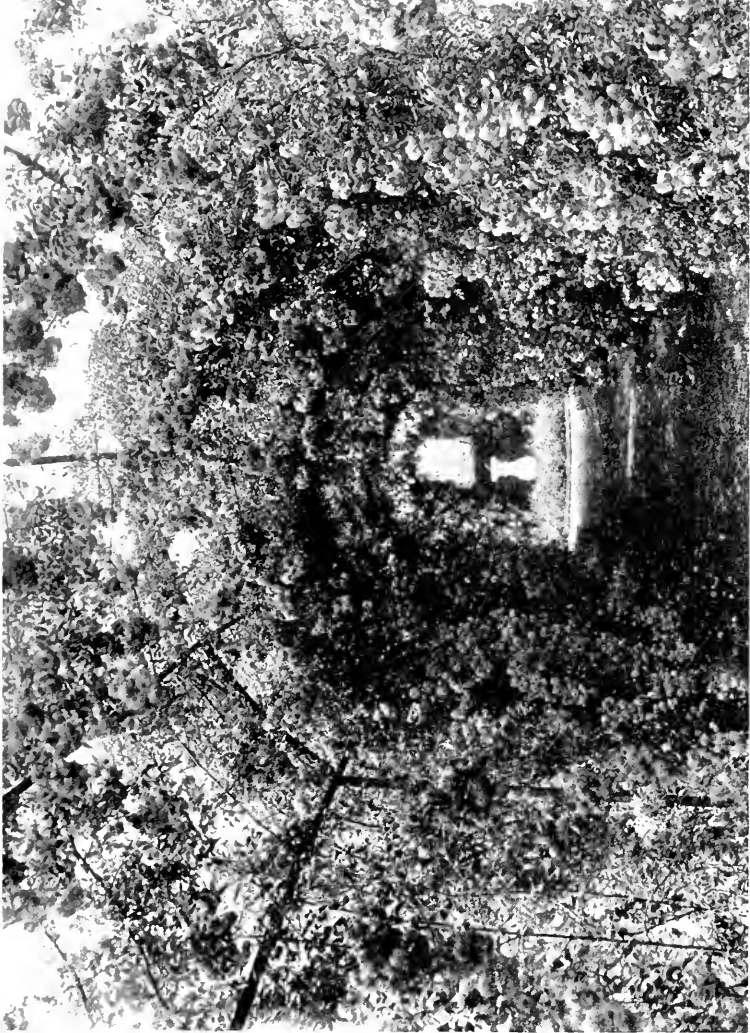
THE TERRACE
ARMSEA HALL

and wood-ashes. Where only one row is planted the trenching should be done at least 4 feet wide, or 2 feet on each side of the row. Good results can be had by sowing the seed in the open ground as early as possible in the spring, thinning the plants out to stand six inches apart, but much superior results are attained by sowing in pots in a cold-frame during the early part of February and planting to the open ground in April. This is explained by the start the young plants get over those sown in the open, ensuring a much stronger root system, and consequently a much stronger growth results. The seeds are sown singly in 3 in. pots, or else they can be sown in pans or flats, and transferred to the pots. A well protected cold-frame, from which frost can be excluded, is ideal for growing the young plants, as no coddling should be allowed, the idea being to bring them along as cool as possible to make the plants hardy and ensure planting in the open ground as early as possible. Planting in the open ground takes place about the 15th of April. After digging the ground over, a light dressing of super-phosphate worked into the surface before planting will give the plants a start. Space the rows off, 6 feet apart, and plant the young plants out in double rows, one foot between the plants, and one foot between each row, the double rows being 6 feet apart. Very satisfactory results will be had by staking the peas in the ordinary way with brush, and allowing them to grow without pinching, but if superior flowers are aimed at, the English method of growing on bamboo stakes should be tried. This consists of running wires lengthwise of the row, fastened at each end to strong stakes. To these wires are attached bamboo stakes spaced about 6 inches apart. The shoots of the sweet peas are tied, one to each bamboo stake, and all side growths from the shoot taken up are kept pinched out. Sweet peas with four, and sometimes five blooms to the spray on stems 16 to 18 inches long, can be produced by this method.

Thorough waterings should be given when necessary, followed by a loosening up of the surface with the hoe. Spraying the foliage is also very beneficial during hot, dry weather.



A GLORY OF PINK—JULY
ARMSEA HALL



THE ROSE WALK
ARMSEA HALL.

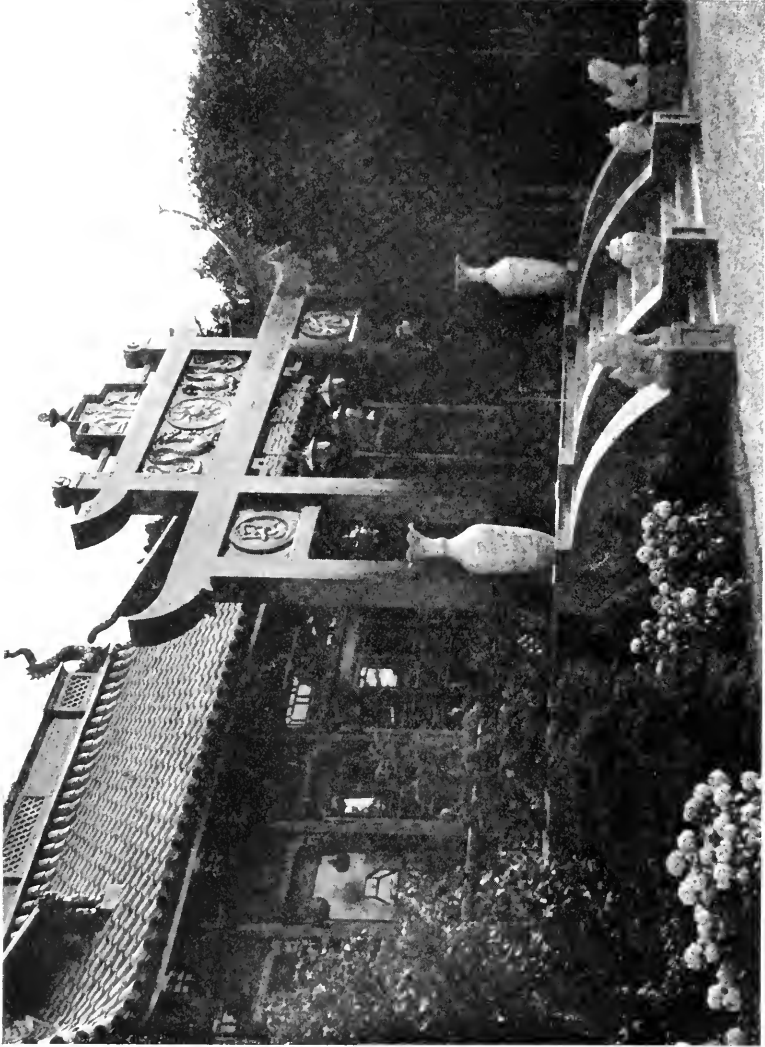
If the ground has been well enriched no feeding will be necessary until they are blooming freely, when manure water applied once a week will keep the plants growing freely and help to prolong the flowering period.

A PIECE OF TAPESTRY

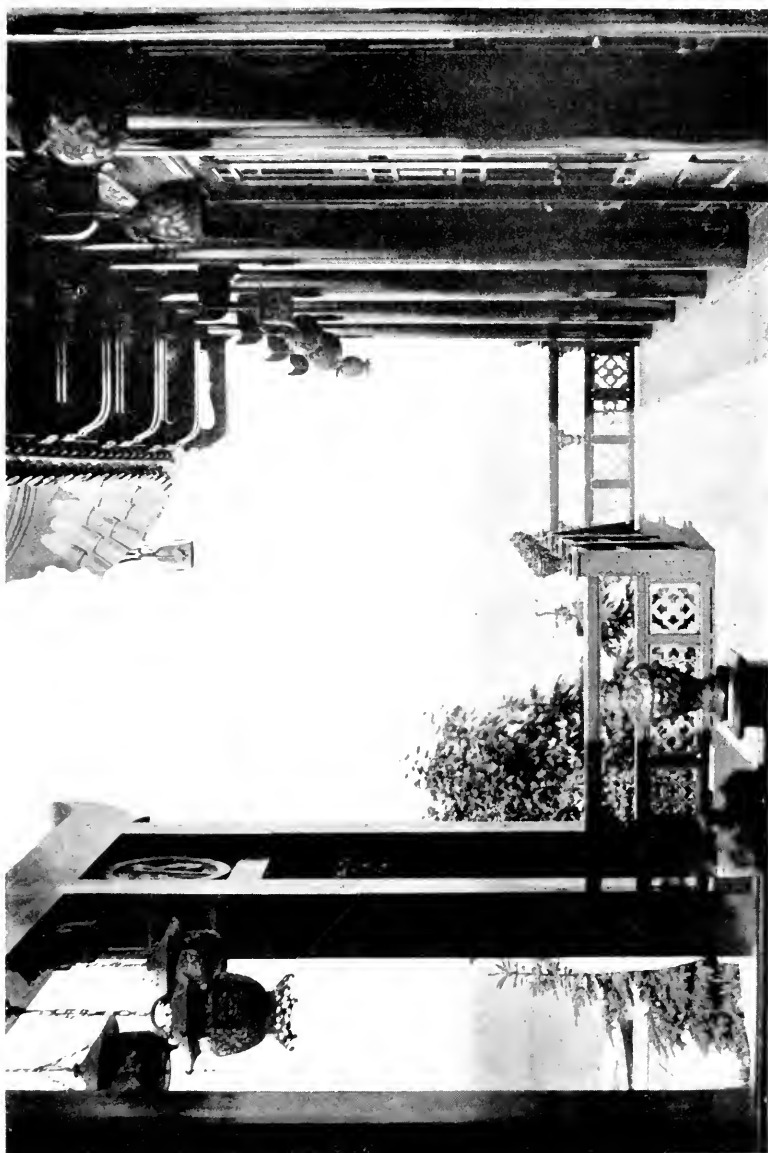
Monreith has been in possession of the same family for 427 years. That it has been for a considerable part of that period a home of flowers, there is the evidence of a fine piece of tapestry to prove. This was the work of the wife of the third baronet (he died in 1771), who set herself to depict in *appliqué* the flowers growing in the castle garden. They were laid on a maroon ground to serve as a carpet—literally a *parterre*—for the castle drawing-room. A laborious task, but evidently a labor of love, so faithfully are the dame's favourites set out in a design of remarkable grandeur. A large basket of flowers forms the centre; smaller groups fill the four corners, and round the carpet runs a continuous wreath looped with ribbons.

Stowed away in a lumber room, this fine piece of work was unearthed thirty years ago. Moths had played havoc with the ground cloth, but the needle work was almost intact, and the colours fresh. Skilful hands were set busy relaying the flowers upon cloth of an old gold colour, and the piece now hangs on the walls of the ante-room in the modern house of Monreith. Among the flowers most easily recognized in the design are the madonna lily (which refuses to flourish with us now), the Isabelline lily, clove carnations, mullein, lupine, hyacinth, red primroses, auricula, polyanthus, guelder rose, anemone, moss rose, scarlet lychnis, pink geranium (its leaves variegated with white), convulvulus, sunflower, sweet william, scabious, and Canterbury bells, whence one is able to form a good notion of the furniture of a Scottish garden in the eighteenth century. Strange to say, the common daffodil is not among them; the only representative of the family being that double form of *Narcissus incomparabilis*, which goes by the homely name of Butter-and-eggs.

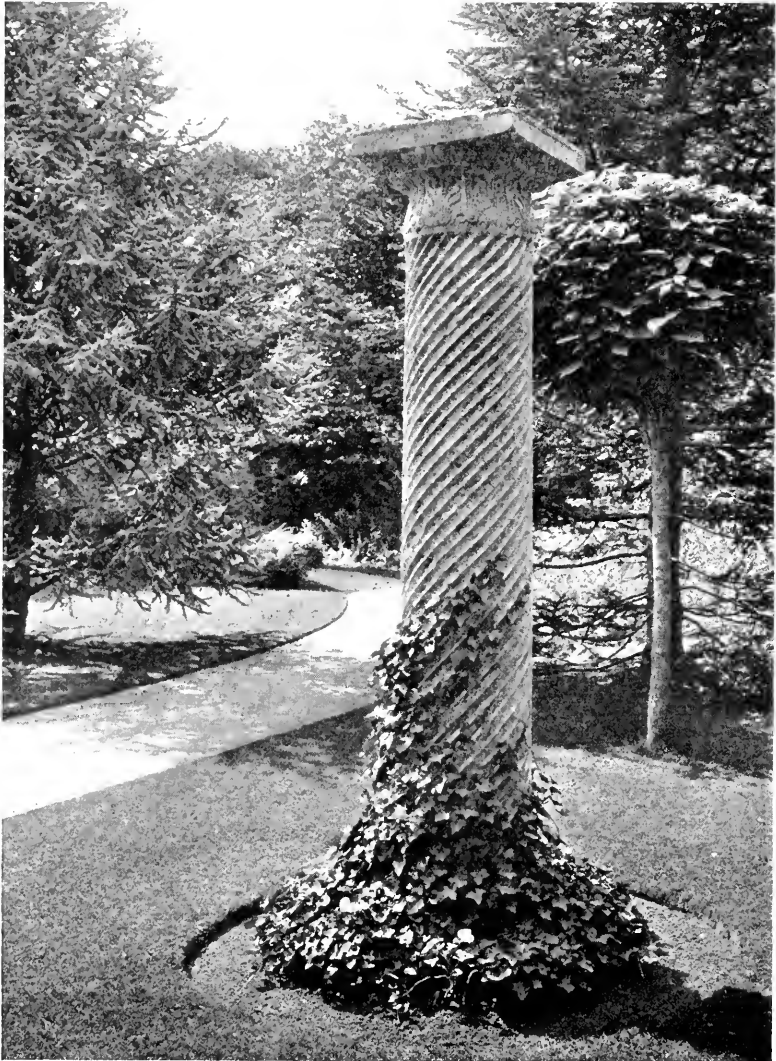
No doubt many of the flowers still adorning these grounds are borne on the same roots which furnished patterns for the gentle artist a century and a half ago, for there is no fixed limit to the life of some of the humblest herbs. The oxlip may outlive the oak, which overshadows it; yonder massive sycamore may be but a child in years compared with the celandine that stars the bank at its foot, and who shall declare the "expectation of life" in the lowly stonecrop that creeps beneath our feet. The green mound, whereon stands the keep of the old castle, breaks out each spring on its south side with a constellation of white violets, widespread on the slope. They have long outlived the memory of her who planted them, for it is more than a century since the castle was inhabited. On the terrace there is planted in clipped box the Psalmist's note of warning— *homo quasi flos egreditur et conteritur*; but those who covet length of days might willingly exchange terms of life with "the hyssop that springeth out of the wall."



ENTRANCE TO
TEA PAVILION
MARBLE HOUSE, NEWPORT
MRS. O. H. P. BELMONT.



WHERE FROM THE DEEP INDIGO BLUE, THE
BRIGHT SCARLETS AND YELLOWS OF THE
ORIENT, ONE LOOKS OUT ACROSS THE ATLANTIC
MARBLE HOUSE



AT THE BREAKERS

The Breakers *Newport, Rhode Island**

SOME GARDEN IRISES

By *W. R. Dykes, M.A.*



IT WOULD obviously be impossible in the short time at our disposal this afternoon to give anything approaching an adequate account of all the Irises that our gardens now contain. I propose, therefore, to deal primarily with certain groups of Irises among which confusion seems to prevail, and, as we pass from one group to another, to bring to your notice some of those Irises which are still not in cultivation, either by reason of their recent introduction or from what appears to me to be unaccountable neglect. It may be that I have a quite unreasonable prejudice in their favour. I probably have.

The first Irises, then, to which I propose to draw your attention are the three which appeared in this Society's list of plants for distribution at the beginning of this year. They serve to illustrate the fact that gardeners have—and indeed must have—tenacious memories for names, though the mental processes by which the names have become attached to the plants will not always bear logical analysis.

The first of the three names on the list is that of *Iris germanica*. It may be a paradox, but the only two facts on which I feel justified in insisting with regard to this Iris are, firstly that it is not a native of Germany, and secondly that of the vast series of plants which we find under this heading in catalogues

* Residence of Mrs. Cornelius Vanderbilt.

and garden lists only a very small proportion have **anything** whatever to do with Linnaeus' species, *I. germanica*.

Of all the twenty or thirty Irises known to Linnaeus this is perhaps the most difficult to identify. If we had only his short Latin diagnosis, we should be utterly unable to decide to which of a number of plants he gave the name. Fortunately he quotes his authorities, and by inquiring into the sources of his information, as well as by the process of eliminating those species of which his descriptions are more definite and adequate, it is possible to arrive at a definition of *I. germanica*. This can be checked by comparison with the dried specimen which is still preserved in his herbarium at the Linnean Society here in London. Of colour there is, of course, no longer any trace, and, since such words as purple, lavender, lilac, and violet convey such very different impressions to different individuals, we cannot be certain which of several colour-forms Linnaeus had in mind.

We may, however, define *I. germanica* as a rhizomatous, bearded species, with a branching stem, which in its typical form seems to produce four flowers, though a fifth may often develop immediately below the terminal head of two flowers. Apart from the inflorescence, the characteristic features seem to be the spathe-valves, which are half scarious at flowering time; the presence, usual but not invariable, of scattered hairs at the base of the standards on the inner side, the sharply three-sided capsule, the oval or pear-shaped and not compressed seeds, and the length of the perianth-tube, which measures about an inch. Lastly, and this is a feature to which I would specially draw your attention, this Iris is evergreen or practically so. It does not wait until after the turn of the year before pushing up its new growths. These develop rapidly during the autumn rains, and in mid-winter *I. germanica* is at once noticeable among its relatives in any collection of Irises.

It is precisely this characteristic habit of leaf-growth that shows us that the plant cannot be a native of Germany, or indeed of any part of Central Europe. If you search in winter for *I. aphylla* (forgetting for the moment that its very name means

leafless) or for *I. sibirica*, *graminea*, *pumila*, or *variegata*, all of which are undoubtedly natives of Central Europe, you will have some difficulty in seeing even the merest tips of the leaves above the surface of the soil. All are adapted to resist the rigours of the Continental winters, and have learned to restrain their energies in the direction of leaf-production until the worst of the weather is over and spring is at hand.

Here it may be well to digress for a moment to notice the confusion in our gardens between *I. pumila* and *chamæiris*. The former is comparatively rare, but may be known at once by being leafless in winter, by the almost complete absence of stem, and by the long perianth-tube. It is a native of Austria and Hungary, and stretches round the north side of the Black Sea to the Caucasus, all districts with rigorous winters. *I. chamæiris*, on the other hand starts into growth, just as does *I. germanica*, in autumn, and it is no surprise to find that it is confined to the South of France and to Northern Italy, where the winters are comparatively mild. It should be readily distinguished from *I. pumila* by its habit of growth, by its stem and by its relatively short tube. We may notice, too, that the only known Iris from Arabia, namely *I. Madonna*, and its albino form *I. albicans*, both retain their leaves in winter just as does *I. germanica*.

If we compare the growth and habits of *I. germanica* with those of the species already mentioned, we shall be forced to the conclusion that *I. germanica* is a native of Southern Europe or of some part of the Mediterranean basin. The question of its origin is indeed complicated by the fact that the form which we know as *atropurpurea*, or "Purple King," was described as *I. nepalensis* by Wallich, and is in cultivation in Nepal, while the well-known variety "Kharput," which Foster received from the town of that name in Asia Minor, has long been naturalized near Srinagar in Kashmir. It also, curiously enough, decorates the Guards' Monument at Sebastopol, and only last year I found that it is the common form of *I. germanica* at Mostar in Herzegovina. That *I. germanica* could have an Indian origin would seem to be very improbable, since such undoubtedly native

species as the real *I. nepalensis* of Don and *I. kumaonensis* lie entirely dormant for several months in winter and even until late in spring, as indeed the climatic conditions would lead us to expect.

A consequence of this southern origin of *I. germanica* is that it is not absolutely hardy here in England. Complaints that "Purple King" flowers but shyly are often due to the fact that the late spring frosts destroy the embryo inflorescences before they have emerged from the leaves. The brown decay-ing remains can be found by dissection enclosed in the tufts of leaves, although it is but poor consolation to have our theory of the origin of the plant confirmed in this negative fashion.

Still more important for our purpose is the further consequence that it is extremely rare that any form of *I. germanica* ripens sound seed in England, or, indeed, as far as I can gather, in Germany, or even in the South of France. *I. aphylla*, *I. variegata*, and *I. pallida*, on the other hand, all mature seeds readily, and this fact, together with the results of raising a number of seedlings from them, confirms me in the belief that our common garden hybrids are to be traced, not to *I. germanica*, but rather to *I. variegata*, from which they certainly derive their yellow tints, and to *I. pallida*, with its more complicated inflorescence.

Since these notes were written on a winter evening, when time was a little less scarce than it is at this time of the year, the flowering of some plants which I found last year on the Dalmatian coast has afforded striking confirmation of this theory of the origin of our garden hybrids, misnamed German Irises.

A few years ago there was discovered on the top of a mountain some 4,000 feet high in the Velebit range in Croatia, within a mile or two of the coast as the crow flies, an Iris which I did not recognize when Dr. Degen, of Budapest, was so good as to send me dried specimens. It appeared to be either a yellow form of *I. aphylla* or some new species. By the kindness of the late Herr Dobiasch, of Zengg, who provided me with a native guide, and to whose memory I wish to take this opportunity of paying tribute, I was able in April, 1913, to see this Iris in

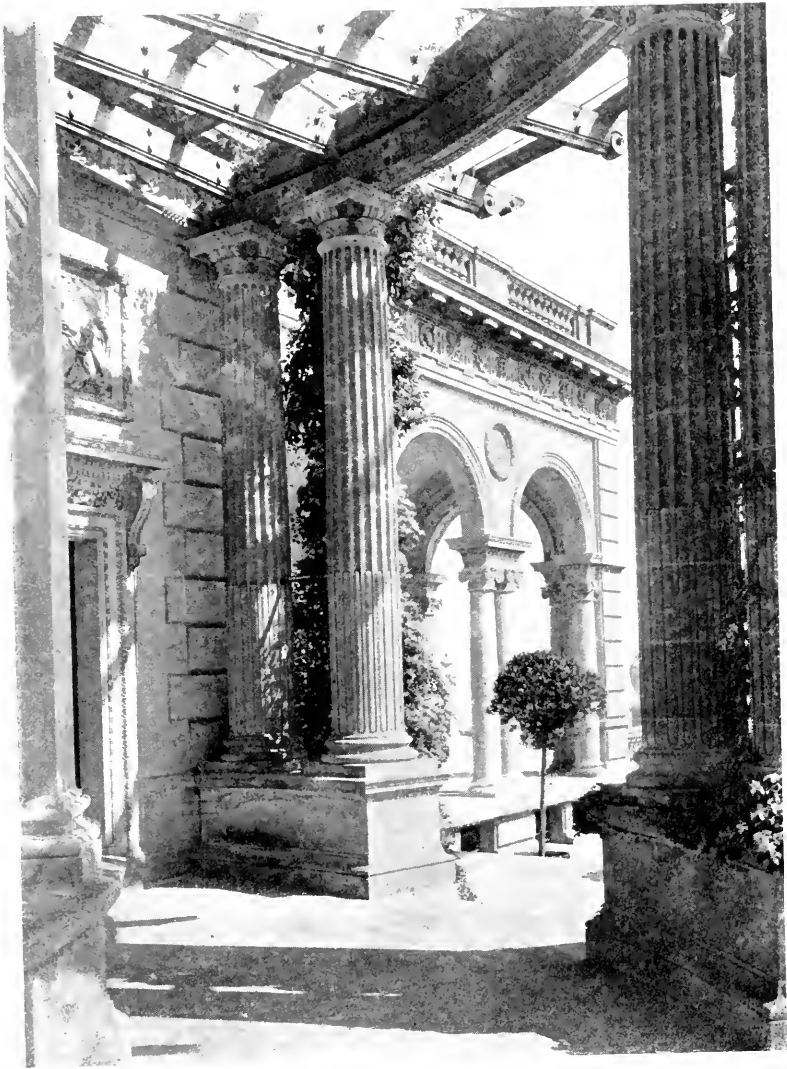


PATH TO THE CLIFFS
THE BREAKERS

its native home. It was a stiff climb up from the coast over the roughest and steepest of limestone hills. As I had been travelling all night by somewhat primitive means of conveyance, and as it was pouring with rain, I was beginning to wonder as we neared the top whether it was worth while to persevere, when I was cheered by the sight of a few Iris leaves among the rough limestone of the slope that faced the Adriatic and the island of Pago. My guide urged that it was not worth while to stop to collect any of these plants, as we were close to the cup-shaped hollow near the summit where the Iris of which I was in search was known to grow. However, I dug up a few of them and am now very glad that I stopped to do so, for they have turned out to be a small *pallida* of the same description as those which were first described as *I. illyrica*, to which the well-known *I. Cengialti* is closely allied, if indeed, as I am inclined to think, the one is not merely a local form of the other.

On reaching the hollow for which I was bound, I was rewarded by the sight of flowers on all sides, patches of *Gentiana tergestina*, which is closely allied to *G. verna*, a yellow *Primula*, Crocuses of a species which has not yet been determined, varying in all shades of colour from white to purple, and coming up through the Gentians and among the Crocuses the short immature leaves of an Iris. The soil was a black, almost peaty vegetable mould, very different from the scanty but strong reddish soil, familiar to all those who have dug plants out of the limestone hills of Southern Europe. Snow was still lying in patches, and no signs of flower-stems had yet developed on the Irises. However, I brought home a number of plants for my garden and for that of a friend for whom I was also collecting. In May of this year they have flowered freely.

These plants from the hollow at the top comprise at least two Irises, namely *I. variegata* with pure light yellow standards and red-brown veins on the falls, and another which is obviously a natural hybrid between *I. variegata* and the *I. illyrica* which has just been mentioned as growing in the immediate vicinity. The latter, being a *pallida*, has spathe-valves that are wholly dry and scarious at flowering time; those of *I. varie-*



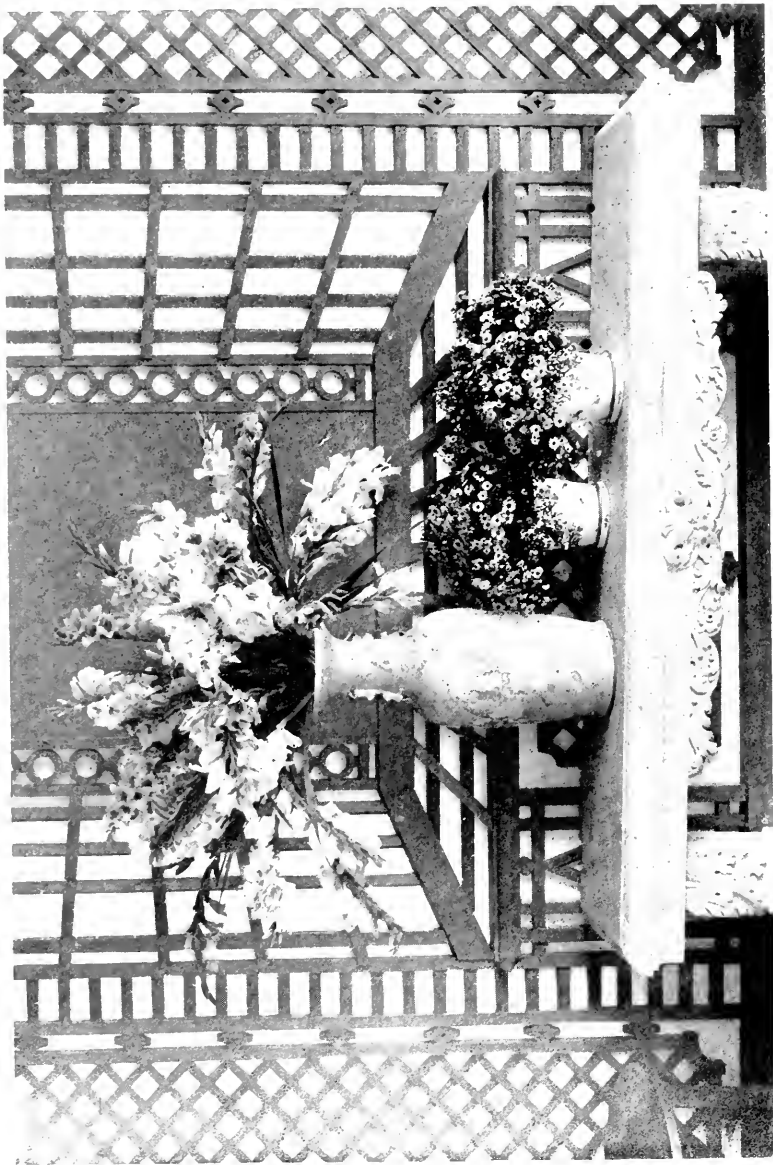
PERGOLAS AT
THE BREAKERS

gata are entirely green, while those of the hybrid are green at the base and scarious in the upper part. The latter is identical with those numerous hybrids which have long been common in gardens under the names of *squalens* and *sambucina*.

Of the newer hybrids I cannot too strongly recommend, as good border Irises, "Iriskönig," the best of the *variegatæ* "Oriflamme," which is nearly a pure *germanica* and an improvement on *macrantha*; "Black Prince," which is specially valuable for its deep velvety flowers and for its late-flowering habit; and "Isoline," of which I suspect one parent to have been *I. trojana*. To those who wish to raise hybrids I would specially recommend the latter, for it has already given me one seedling which produced a spike containing no less than fifteen flowers.

We will now pass on to the second Iris on the list, which appears as *I. laevigata* syn. *I. Kaempferi*. These two names have long been in horticultural use, but their association only serves to perpetuate an obvious confusion. One would have thought that even the most rapid consideration of the common Japanese Irises would have driven us to question the suitability of the name *laevigata*, which means "smoothed." Their leaves are rough, with a prominent central rib; the seeds are wrinkled, the petals crimped, and, indeed, it is hard to see what feature could possibly have suggested the name.

Like several other plants which we associate with Japan, such as *I. japonica*, which comes from the hills near Ichang in Central China, *I. Kaempferi* is a native of China and grows wild in the marshes along the Amur. In its natural state it appears to be always single, and there is no accepted explanation of the means by which the Japanese have evolved from it the long series of double, distorted and even bloated hybrids, with which the student of Japanese art has long been familiar. In the natural state the colour is a deep red-purple, though albino forms most undoubtedly occur. In the famous ditch which runs through the lower corner of the Wisley garden, *I. Kaempferi* has now been growing for many years since Wilson first planted these importations from Japan. Innumerable seedlings must have grown up there in the course of time, and it is



GLADIOLUS AND NEW DWARF ASTER
ST. ELWYN. (PINK MAUVE)
NEWPORT GARDEN CLUB FLOWER SHOW

interesting to notice that the self-sown reversions to the single wild form of a uniform red-purple or white now far outnumber all the other forms to be found scattered among them.

Curiously enough, this Iris also first reached us from Japan in the form of a quasi-albino variety, which came to Kew mixed with *I. Kaempferi*, and which was separated by Mr. Baker and described as *I. albopurpurea*. We must accordingly reduce this name to *I. laevigata* var. *albopurpurea* and try to realize that the two names *laevigata* and *Kaempferi* represent two totally different species. Among collected material now preserved in herbaria I have found no evidence that natural hybrids of these two species occur and efforts to cross them in the garden have so far proved futile, though I should be the last to attach any great value to such purely negative evidence. Of the conditions that determine the fertility of an Iris little is yet known, and, after succeeding quite unexpectedly in crossing a bearded Pogoniris with a crested Evansia, although many previous efforts had always resulted in failure, I am inclined to think that it may not be impossible to cross any two members of the genus.

In this connection, may I suggest to the hybridizer the interest that would attach to a hybrid between a bulbous and a non-bulbous species? Unless outward appearances are very deceptive, I am inclined to think that the point of contact, and consequently the greatest hope of success, lies in the neighbourhood of *I. Xiphium* and *I. spuria*. The flowers of these two species are curiously similar in shape, and we must also remember that the former sometimes, though rarely, produces one or two vertical lateral branches in the axils of the leaves precisely similar to those that we find in *I. spuria*. They are also still to be found growing wild in the same region, for they both occur in Spain and in Northwest Africa. Moreover, *I. Xiphium* has been recently rediscovered on the French coast between Marseilles and the Spanish frontier, where *I. spuria* is also not unknown.

If repeated attempts are made to cross these two species, sooner or later one may succeed, and the interest will then be to see what kind of rootstock the plant will form. The result-

ant plant might perhaps throw some light on the question whether the bulb arose from the rhizome or the rhizome from the bulb, or whether both have been evolved from a common ancestor.

We must now pass on to the third name on our list, namely *I. sibirica orientalis*, which may perhaps have been intentionally compounded to describe a hybrid between two species, for *I. sibirica* and *I. orientalis* are totally distinct. The former is, I believe, confined to Europe east of the Urals, between which and Lake Baikal there occurs a gap before *I. orientalis* begins in Northeastern Asia. I must admit in passing that there is apparently in Corea a puzzling plant which seems in some dried specimens to be merely *I. orientalis*, but which in other cases comes very near to being a dwarf, large-flowered *sibirica*. I live in hopes of eventually obtaining seed of wild plants of this Corean Iris, for I have always had some doubt about the authenticity of reputed specimens from Corea which I have grown from time to time.

I. sibirica and *I. orientalis* are totally distinct in habit, and, what is even more important, have entirely dissimilar seeds and seed-vessels. Both have hollow stems, and narrow, almost grassy, foliage. Here, however, the likeness ends, for the spathes of *sibirica* are entirely scarios, while those of *orientalis* are wholly herbaceous. The capsule of *sibirica* is broad, rounded and inflated, and the seeds large and flattened, while in the case of *I. orientalis* the capsule is much narrower relatively to its length and the seeds are much smaller, with a tendency to be cubical.

Of both species albinos are common, and the well-known and beautiful "Snow Queen" is a typical albino form of *I. orientalis*. It breeds true to the white colour, which acts as a Mendelian recessive.

Both *I. sibirica* and *I. orientalis* have great possibilities for the raiser of seedlings. Some of these are more floriferous and vigorous than others and the shade of blue in the flowers is also apt to vary. The finest sky-blue shades may be obtained by crossing *I. orientalis* with its albino forms, while the stature



POTTED *CAMPANULA PYRAMIDALIS*
(WHITE AND BLUE)

and habit of *I. sibirica* may be combined by hybridization with the larger flowers of *I. orientalis*.

With the recent introduction of two yellow-flowered relatives from Western China, *I. Wilsoni* and *I. Forrestii*, the possibilities are still further increased, and I have already obtained some very pleasing results, in one of which the yellow of *I. Wilsoni* is distinctly visible at the base of all the segments of a pale blue flower.

It is impossible to pass from the *sibirica* group without mentioning what is perhaps the finest plant of all, namely *I. chryso-graphes*, to my mind one of the best of the many beautiful Chinese plants we owe to Mr. E. H. Wilson. In its best forms it is really magnificent, and I shall never forget the experience of watching the first flower unfold, and of seeing for the first time the brilliant golden markings on the rich velvety deep purple-violet falls.

Before I conclude these notes may I venture to put before you a point which I had hoped to be able to illustrate to you more fully from living specimens? It concerns a confusion which has arisen around the name of *I. filifolia*. The true plant is still rare, though I hope that several hundred seedlings which I have raised will soon have all reached flowering size. The plant is found in Northwest Africa and in Southern Spain, and I considered myself very lucky when I obtained a few bulbs and some seeds through the kindness of a friend at Gibraltar, who, owing to his official position, was able to obtain them for me from a station near the top of the rock, where it grows in almost inaccessible places in a part to which visitors are not admitted. The colour is a rich red-purple with a central yellow blotch, round which the juxtaposition of the purple and yellow produces a kind of bluish halo. What I particularly want to point out is that a large and early form of *I. Xiphium*, which the trade dealers have put in their lists for years as *I. filifolia*, has nothing whatever to do with that species. The difference is at once apparent in the long, slender perianth-tube of *I. filifolia*, the false plant only having the short funnel-shaped tube of *I. Xiphium*.

French Gardening

By William Robinson

NOTE BY THE PRESIDENT OF THE INTERNATIONAL GARDEN CLUB



IN THIS number we continue, by request, the series of articles on French gardening begun in the December 1918 issue of the JOURNAL. The following account of some of the most famous public gardens of Paris is, more than ever, applicable, particularly now that the International Garden Club is affiliated with the Park Department of the City of New York.

ZELIA K. HOFFMAN.

The Bois de Boulogne



HIS park illustrates how we improve by friction, so to speak. Till 1852 the Bois was a forest; but Napoleon III, in his admiration for English parks, determined to add their charms to Paris, or rather to improve upon them, and the Bois is one result. In concert with the municipality, the Emperor dug out the lakes, and made the waterfalls. As a combination of wild wood and noble pleasure garden, it is magnificent. The deer are placed in an enclosed space. The Bois is splendid too as regards size—containing more than 2000 acres, of which nearly half is wood, a quarter grass, one-eighth roads, and more than seventy acres water. Though with large expectations in other directions, the reader will hardly be prepared for the statement that the French beat us in parks. When first entered this may not be much liked, the numerous Scotch pines around one part of the water giving it a somewhat barren look, but a few miles' walk through it soon dispels this idea. It has more than the beauty and finish of any London park in some spots, but, on the other hand, vast spreads of it are covered with a thick, small, and somewhat scrub-like wood, in which wild flowers grow abundantly, unlike the prim London parks. There are plenty of wild cowslip dotted over even the best kept parts of it in spring, while the planting on and near the islands is far superior to anything to be witnessed in our own parks. To see what the Bois de Boulogne really is, the visitor should keep to the left when he enters from Passy or the Arc de Triomphe and go right to the end of the two pieces of ornamental water. Then, standing with his back to the water, he will notice an elevated spot, and by going to that spot he will enjoy one of the finest views he has ever seen in a public park—the water in one direction looking like

an interminable inlet, beautifully fringed with green and trees, while in the other several charming views are opened up, showing the hilly suburban country towards Boulogne, St. Cloud, and that neighbourhood. Then by turning to the right and returning to Paris by the west side of the water, he will have a pretty good idea of what a noble promenade, drive, and garden this is.

It is in all respects worthy of its grand approaches, of the width and boldness of which those who have not seen Paris can have no conception. There is some bold rockwork attempted and well done about the artificial water; and very creditable pains are taken to make the vegetation along it diversified in character, so that at one place you meet conifers, at another rock shrubs, in another Magnolias, and so on; without the eternal repetition of common things which one too often sees at home. At Longchamps, near the racecourse, which attracts half Paris to this part of the wood on fine Sundays, there is a large and ambitious cascade. Above the spring or shoot of the cascade is an arch of rustic rocks, over which fall ivy and rock shrubs, the whole being backed with a healthy rising plantation. Although made at great expense, this cascade cannot be pronounced a happy one; to me it is less pleasing than the less pretentious ones at the head of the large lakes.

The fault of the most frequented part of the Bois de Boulogne is that the banks which fall to the water are in some parts a little too suggestive of a railway embankment, and display but little of that indefiniteness of gradation and outline which we find in the true examples of the real "English style" of laying out grounds. But you do not notice this from the position above described, from whence indeed the scene is charming. The fault just hinted at is common to almost every example of this style to be seen about Paris; and in most of their walks, mounds, and the turnings of their streams, you can detect a family likeness and a style of curvature which is certainly never exhibited by nature, so far as we are acquainted with her in these latitudes. But it is only justice to say that, taking the park as a whole, it is far before our London ones in point of design.

Apart from the perfect keeping of the whole, the chief lesson to be learnt here by the English planter is the value of paying far greater attention than we at present do to artistic planting of choice hardy trees and shrubs. The islands seen from the margin of the lakes are at all times beautiful, in consequence of the presence of a varied collection of the finest shrubs and trees tastefully disposed. They show at a glance the immense superiority of permanent embellishment over fleeting annual display. The planting of these islands was expensive at first, and required a good knowledge of trees and shrubs, besides a large amount of taste in the designer; but it is so done that were the hand of man to be removed from them for half a century they would not suffer in the least. Nothing could be easier than to find examples of gardens quite as costly in the first instance, which, while involving a yearly expenditure, would be ruined by a year's neglect. It is summer, and along the margins of these islands you see the fresh pyramids of the deciduous cypress starting from graceful surroundings of hardy bamboos and pampas grass, and far beyond a group of bright silvery Negundo in the midst of dark-green vegetation, with scores of tints and types of tree-form around. It is spring, and the whole scene is animated by the cheerful flush of bloom of the many shrubs that burst into blossom with the strengthening sun, and while the oaks are yet leafless the large swollen flower-buds of the splendid deciduous Magnolias may be seen conspicuous at long distances through the other trees. In autumn the variety and richness of the tints of the foliage offer a varied picture from week to week; and in winter the many picturesque and graceful forms of the deciduous trees among the evergreen shrubs and pines offer the observant eye as much interest as at any other season.

Looking deeper than the immediate results, we may see how the adoption of the system of careful permanent planting enables us to secure what I consider the most important point in the whole art of gardening—variety, and that of the noblest kind. Mr. Ruskin tells us that “change or variety is as much a necessity to the human heart in buildings as in books; that there is no merit, though there is some occasional use, in mo-

notony; and that we must no more expect to derive either pleasure or profit from an architecture whose ornaments are of one pattern, and whose pillars are of no proportion, than we should out of a universe in which the clouds were all of one shape and the trees all of one size." These words apply to public gardens with ever greater force. In them we need not be tied by the formalism which comfort, convenience, and economy require the architect to bear in mind, no matter how widely he diverges from the commonplace in general design. In garden or in park there is practically no noticeable tie; in buildings there are many. Vegetation varies every day in the year. In buildings more than in any other things unchangeableness is stamped. In the tree and plant world we deal with things by no means remotely allied to ourselves—their lives, from the unfolding bud to the tottering trunk, are as the lives of men. In the building we deal with things much less mutable, which have a beginning and ending like all others, but their changes are much less apparent to our narrow vision. Therefore the opportunity for variety is beyond comparison greater in public or private gardening than in the building art, or indeed in any other art whatever.

Without the garden, Lord Bacon tells us, "Buildings and palaces are but grosse handy works; and a man shall ever see that when ages grow to civility and elegancie, men come to build stately sooner than to garden finely: as if building were the greater perfection." As yet we are far from perfection as builders, and the garden holds still the relationship to the building art which is described by Bacon. Indeed, it is more backward; for in a day when building has eloquent champions to put in some such place as that quoted, and, moreover, give us practical illustrations of their meaning, we can find no proof that any knowledge of the all-important necessity for variety exists in the minds of those who arrange or manage our gardens, public or private. And yet this unrecognised variety is the life and soul of high gardening. If people generally could see this clearly, it would lead to the greatest improvement our gardening has ever witnessed. Considering the variety of vegetation, soil, climate, and position which we can command, it is impossible to doubt that our power to produce variety is unlimited.

The necessity for it is great. What is the broadly marked bane of the public as well as private gardening of the present day? The want of variety. What is it that causes us to take little more interest in the ordinary display of "bedding out," fostered with so much care, than we do in the bricks that go to make up the face of a house? Simply the want of that variety of beauty which a walk along a flowery lane or over a wild heath shows us may be afforded by even the indigenous vegetation of one spot in a northern and unfavourable clime. But in our parks we can, if we will, have an endless variety of form, from the fern to the grisly oak and Gothic pine—inexhaustible charms of colour and fragrance, from that of the little Alpine plant near the snows on the great chains of mountains, to the lilies of Japan and Siberia. And yet out of all these riches the fashion for a long time has been to select a few kinds which have the property of producing dense masses of their particular colours on the ground, to the almost entire neglect of the nobler and hardier vegetation. The expense of the present system is great, and must be renewed annually, while the gratification is of the poorest kind. To a person with no perception of the higher charms of vegetation the thing may prove interesting, and to the professional gardener it is often so; but to anybody of taste and intelligence, busy in this world of beauty and interest, the result attained by the above method is almost blank. There can be little doubt that numbers are, unknown to themselves, deterred from taking any interest in the garden; in fact, it is a blank to them. They in consequence may talk or boast of having a "good display," &c., but the satisfaction from that is very poor indeed, compared with the real enjoyment of a garden.

The one thing we want to do to alter this is to break the chains of monotony with which we are at present bound, and show the world that the "purest of humane pleasures" is for humanity, and not for a class, and a narrow one. Eyes everywhere among us are hungering after novelty and beauty; but in our public gardens they look for it in vain as a rule, for the presence of a few things that they are already as familiar with as with the texture of a gravel walk, must tend to impress them

with an opinion that our art is the most inane of all. In books they everywhere find variety, and some interest, if high merit is rare; the same is the case in painting, in sculpture, in music, and indeed in all the arts; but in that which should possess it more than any other, and is more capable of it than any other, there is as a rule none to be found. This is not merely the case with the flower-garden and its adjuncts; it prevails in wood, grove, shrubbery, and in everything connected with the garden. What attempt is made in our parks and pleasure grounds to give an idea of the rich beauty of which our hardy trees are capable, although these places afford the fullest opportunity to do so? How rare it is to see one-tenth of the floral beauty afforded by deciduous shrubs even suggested! Hitherto our gardening has been marked by two schools—one in which a few, or comparatively few, “good things” are grown; the other, the botanic garden school, in which every obtainable thing is grown, be it ugly or handsome. What we want for the ornamental public garden is the mean between these two; we want the variety of the botanic garden without its scientific but very unnatural and ugly arrangement; we want its interest without its weediness and monotony.

There is no way in which the deadening formalism of our gardens may be more effectually destroyed than by the system of naturally grouping hardy plants. It may afford the most pleasing results, and impress on others the amount of variety and loveliness to be obtained from many families now almost unused. To suggest in how many directions we may produce the most satisfactory effects, I have merely to give a few instances. Suppose that in a case where the chief labour and expense now go for an annual display, or what some might call an annual muddle, the system is given up for one in which all the taste and skill and expense go to making of features that do not perish with the first frosts. Let us begin, then, with a carefully selected collection of trees and shrubs, distinguished for their fine foliage—by noble leaf beauty, selecting a quiet glade in which to develop it. I should by no means confine the scene to this type alone, as it would be desirable to show

what the leaves were by contrast, and to vary it in other ways—with bright beds of flowers if you like. It would make a feature in itself attractive, and show many that it is not quite necessary to resort to things that require the climate of Rio before you find marked leaf beauty and character. It would teach, too, how valuable such things would prove for the mixed collection. Many kinds of leaf might be therein developed, from the great simple-leaved species of the rhubarb type to the divided ones of Lindley's spiraea, and the taller *Ailanthus*, *Kolreuteria*, *Gymnocladus*, &c. The fringes of such a group might well be lit up with beds of lilies, irises, or any showy flowers; or better still, by hardy flowering shrubs. An irregularly but artistically planted group of this kind would prove an everlasting source of interest; it might be improved and added to from time to time, but the original expense would be nearly all.

Pass by this rather sheltered nook, and come to a gentle knoll in an open spot. Here we will make a group from that wonderful rosaceous family which does so much to beautify all northern and temperate climes. And what a glorious bouquet it might be made, with American and European hawthorns, double cherries, plums, almonds, pears, double peaches, &c., need hardly be suggested. You would here have a marked family likeness prevailing in the groups, quite unlike the monotony resulting from planting, say, five or six thousand plants of *Rhododendron* in one spot, as is the fashion with some; for each tree would differ considerably from its neighbour in flower and fruit. Then, having arranged the groups in a picturesque and natural way, we might finish off with a new feature. It is the custom to margin our shrubberies and ornamental plantings with a rather well-marked line. Strong-growing things come near the edge as a rule, and many of the dwarfest and prettiest spring-flowering shrubs are lost in the shade or crowding of more robust subjects. They are often overshadowed, often deprived of food, often injured by the rough digging which people usually think wholesome for the shrubbery. Now I should take the very best of these, and extend them as neat low groups, or isolated well-grown specimens, not far from, and

quite clear of the shade of the medium-sized or low trees of the central groupings. The result would be that choice of dwarf shrubs like *Ononis fruticosus*, *Prunus triloba*, the dwarf peach and almond, *Spiraea prunifolia* fl. pl., the double Chinese plum, and any others of the numerous fine dwarf shrubs that taste might select, would display a perfection to which they are usually strangers. It would be putting them as far in advance of their ordinary appearance, as the stove and greenhouse plants at our great flower shows are to the ordinary stock in a nursery or neglected private garden. It would teach people that there are many unnoticed little hardy plants which merely want growing in some open spot to appear as beautiful as any admired New Holland plant. The system might be varied as much as the plants themselves, while one garden or pleasure ground need no more resemble another than the clouds of to-morrow do those of to-day.

In the rich alluvial soil in level spots, near water or in some open break in a wood, we might have numbers of the fine herbaceous families of Northern Asia, America and Europe. These, if well selected, would furnish a type of vegetation now very rarely seen in this country, and flourish without the slightest attention after once being planted. In rocky mounds quite free from shade we might well display true Alpine vegetation, selecting dwarf shrubs and the many free-growing, hardy Alpines which flourish everywhere. To turn from the somewhat natural arrangements, as the years rolled on, occasional plantings might be made to show in greatest abundance the subjects of greatest novelty or interest at the time of planting. In one select spot, for example, we might enjoy our plantation of Japanese evergreens, many of them valuable in the ornamental garden; in another the Californian pines; in another a picturesque group of wild roses; and so on without end. Were this the place to do any more than suggest what may be done in this way in the splendid positions offered by our public gardens and parks, I could mention scores of arrangements of equal interest and value to the above. If the principle of annually planting a portion of a great park or garden of this kind were adopted

instead of giving all the same routine attention after the first laying out, I am certain it would prove the greatest improvement ever introduced into our system of gardening. The embellishment of the islands in the Bois de Boulogne is very successful, but it is merely one of many fine results that artistic planting would secure. Plantations as full of interest and beauty might be made in other portions, and the fact is the vegetable kingdom is so wide that, although the combinations of plant knowledge and taste necessary to success might not often be found in the designer, the materials for any number of varied pictures in vegetation could never fail.

The principle here advocated should not only be applied to the details of one garden, but on a greater scale, and with even more satisfactory results, to all the gardens of any great city.

Take a city with half a dozen parks, a score of squares, and perhaps numerous avenues and open places where trees or flowers might be grown—take, in fact, the public gardening of Paris or London at the present day. Now, the ordinary course of things, several kinds of trees and plants, or several dozen kinds, will be found to do best in all these places, and under the usual management the same subjects will predominate in each. To the people who live in the neighbourhood of each the effect will be perhaps agreeable; but it must become monotonous. To prevent people endeavouring to see any life or interest in vegetation, the true way is to make a few things predominate everywhere. It is also a simple and easy way for the superintendents; there is no “bother with it,” but there is also little pleasure, and little of that enthusiastic effort which is the highest of pleasures, and one only enjoyed by those who work at things for their own sakes. Innumerable beds of *Canas* and *Pelargoniums* are better than nothing, no doubt, but are bad where the opportunity for a higher kind of embellishment exists. For the credit and encouragement of our city gardening, it is necessary that we confine ourselves to the better kind of trees, as many good kinds do not grow well in streets; but when it comes to the parks and open gardens, it is a very different matter. If each park and square in a city were

arranged entirely different from every other, the enjoyment of those in the immediate neighbourhood of each would be none the less, while the gardening treasures of the town would be greater in proportion to the number of parks or squares. A walk in any direction would reveal new charms to those having the slightest sympathy with nature, and help to sow the seed of love for it, were the ground ever so barren. A walk to distant parks or squares would furnish an object to the many, who might be expected to take an interest in gardens under such management; and objects for walks in towns and cities cannot be too numerous.

One park might display minute floral interest in all its variations, with the larger subjects only used as the necessary setting, shelter, and greenery. Another, with a good soil and favourable exposition, might be made to show the dignity and variety of the forest trees of northern and temperate Europe, Asia, and America. One square might, like Berkeley Square in London, or the little squares in the Place Napoleon III. in Paris, be made very tasteful and effective from simple inexpensive materials—such as green grass, hardy shrubs, and trees. Another might display leaf-beauty so as to remind one of the vegetation of the South Sea Islands; another, chiefly the dwarf prairie and hill flora of cold and temperate countries; and so on—each class of vegetation to be considerably adapted to soil, conditions, and surroundings of the place as regards shelter, liability to foul vapours, position in relation to other gardens and avenues, and so on. In fact, this great principle of variety is capable of doing so much for public gardens, that it should be made compulsory on the heads of these establishments to make each as different from its brother as it possibly could be made. Carried out, then, as I have slightly indicated, both in the private and public place, gardening would be nearer to proving the “greatest refreshment to the spirits of man” than it has ever been in any age.

There is one feature in the Bois de Boulogne which cannot be too strongly condemned—the practice of laying down here and there on some of its freshest sweeps of sloping grass enor-

mous beds containing one kind of flower only. In several instances, near the very creditable plantations on the islands and margins of the lake, may be seen hundreds of one kind of tender plant in a great unmeaning mass, just in the positions where the turf ought to have been left free for a little repose between the very successful permanent plantations. This is done to secure a paltry unnatural and sensational effect, which spoils some of the prettiest spots. Let us hope that some winter's day, when the great beds are empty, they may be neatly covered with green turf.

The Bois being rather level, heavy rains used to lie a long time on the surface of the roads, &c., before being absorbed; to have remedied this by means of sewers would have cost about 160,000£, so the plan was adopted of constructing a number of tanks at intervals, on an average, of 200 metres, and capable of containing from ten to twenty cubic metres of water each. These tanks are generally circular in form and crowned by a truncated cone—a form which of course requires less mason's work than the rectangular, the latter being adopted only when large trees interfere with the plan. The rectangular cisterns measure from four to six metres in length, one to two metres in width, and two to three metres in depth; they are arched at the top, and, like the circular ones, provided with a trapped hole, which serves, first, to withdraw the centrings, and afterwards to clean out the cisterns if they become choked with refuse carried down by the water; the floor is uncovered, and barbicans are left in the footwalls to aid the escape of the water. These cisterns are placed either under the footpaths or in side alleys, so as not to interfere with the grass or the flower beds. The water is conveyed to the cisterns by means of drain pipes 4 in. in exterior diameter, the first joint being embedded in a mouthpiece of Portland cement. These mouthpieces are nearly 20 in. in length; they are cast in wooden moulds, and cost 2f. 90c. per metre.

Not far from the lower lake, and at about the centre of the Bois, occurs the Pre Catalan—an enclosed space, occasionally the scene of fêtes, having several refreshment rooms, an open-

air theatre, and a peculiar feature in the form of a cow-house, containing about eighty milch cows. The milk is sold to those who frequent the place, especially to horsemen who ride out from Paris for exercise in the early morning, and call here on their way to have a draught of new milk. These features, however, are kept well in the background, and the place generally bears the appearance of an ornamental garden, well worthy of a few minutes' inspection from any horticultural visitor who is traversing the Bois or on the fashionable drive, which is near at hand.

Gardeners may be interested to learn that every year, on the 30th of August, the fête of their order is held here, the patron saints being St. Fiacre and St. Rose. Here the gardeners of Paris and their friends assemble to the number of three or four thousand, and amuse themselves with dancing, games, and the usual accompaniments of a Parisian fête, including fireworks, of course. As a garden, the Pre Catalan is distinguished by good specimens of standard Magnolias, both the evergreen *grandiflora* and the deciduous kinds, and large masses of flowers and fine-leaved plants.

Apart from these, which are well known and extensively employed elsewhere about Paris, I noticed that fine aquatic, *Thalia dealbata*—usually grown in stoves in England—in robust condition in the midst of a shallow running stream, the canna-like leaves large, handsome, and 22 inches long by 12 broad, and the flower stems 7 and 8 feet high (17th September). It is one of the handsomest and most distinct of all aquatic plants, quite different from the normal type, and should be much used with us. *Erianthus Ravennae*, an ornamental grass, was in flower at the same date, and 10 or 11 feet high. *Lantana delicatissima* was used as margining carpeting to some beds here. Simple and inconspicuous thing as it is, it is multiplied to the extent of from 12,000 to 20,000 every year, which may serve to give another idea of the way in which ornamental gardening is carried on by the municipality of Paris.

Watering the Parks

The climate of Paris being dryer than that of London, and the soil less conducive to the growth of grasses, the verdure maintained in the more ornamental parts of the Paris parks is naturally a source of some surprise to visitors. It is difficult to give the reader, who has not seen it himself, an idea of how perfectly the watering is done. The contrast between the parks and gardens of London and Paris is in this way by no means flattering to our way of managing them. It will be better to quote one of our journals to represent our own side of the question. "We have repeatedly called the attention of the authorities during the summer to the melancholy state into which the parks were falling. The mischief we desired to guard against is now done. The grass is of the colour of hay, and the little of it that remains is being so rapidly trodden down that in many parts what used to be greensward is now nothing better than hard road." So wrote the *Pall Mall Gazette*, one day last summer; and really, about the end of July and the beginning of August, nothing could look more unattractive than the London parks. These parks are supported at heavy public cost; and it is a great mistake to let them be rendered as brown and uninviting as the desert by an exceptional drought, which of course will happen at the very season when the grounds ought to be in perfect beauty and attractiveness. The French system of watering gardens, &c., is excellent, or at least the generally adopted system; for at the Jardin des Plantes there are yet watering-pots made of thick copper, which are worthy of the days of Tubal Cain, but a disgrace to any more recent manufacturer, and a curse to the poor men who have to water with them. Generally Parisian lawns and gardens are watered every evening with the hose, and most effectively. It is so perfectly and thoroughly done, that they move trees in the middle of summer with impunity; keep the grass in the driest and dustiest parts of Paris as green as an emerald, the softest and thirstiest of bedding plants in the healthiest state; and as for the roads, the way they are watered cannot be surpassed. They are kept agreeably

moist without being muddy, while firm and crisp as could be desired. Of course all this is effected in the first instance by having abundance of water laid on, but that is not all. With us, even where we have the water laid on, we too often spend an immense amount of labour in distributing it. In Paris generally it is applied with various modifications of the hose, which pours a vigorous stream, divided and made coarse or fine either by turning a cock, by the finger, or even by the force of the water.

This is the way they apply it to the roads, the smaller bits of grass about the Louvre, and other places; but when watering large spreads of grass in the parks the system is different. One day in passing by the racecourse at Longchamps I saw it carried out in perfection. The space had become very much cut up by reviews and races; but in any case it is watered to keep it as green as possible in summer. At first sight it would appear a difficult thing to water a racecourse, but two men were employed in doing it effectually. Right across the whole open space from east to west stretched an enormous hose of metal, but in joints of say about six feet each. The whole was rendered flexible by these portions being joined to each other by short strong bits of leathern hose, each metal joint or pipe being supported upon two pairs of little wheels. By means of these the whole may be readily moved about without the slightest injury to the hose in any part. At about a yard or so apart along this pipe jets of water came forth all in one direction, and at an angle of about 45 deg., and spread out so as to fully sprinkle the ground on one side; and thus four feet or so of the breadth of the whole plain of Longchamps was being watered from one hose. There were two of these hoses at work, one man attending to each of them; the only attention required being to pass from one end of the line to the other, and push forward the hose as each portion became sufficiently watered. The simplest thing of all is the way they make the perforations for the jets along the pipe. They are simply little longitudinal holes driven in the pipe with a bit of steel. They must be made across the pipe, or the water will not spread in the desired direction. The

wind causes the water to fall in the most divided form possible. With an apparatus thirty metres long a man can easily water 1500 square metres per hour, moving the hose three times. Of course the quantity of water depends on the force in the conduits and the length of the tubes. With a pressure of 22 metres and hose 320 metres long the quantity of water per metre and per minute is nearly two litres. The hydrants in the grass are placed about fifty metres apart, and the wheels of the trucks are of wood, in order not to cut the grass. There are many modes of spreading water in use about Paris, but none of them half as good as this simple method. More than a mile of this kind of hose may be seen at work at one time and with hundreds of jets playing.

The hose for watering the roads is arranged on wheels also, but, as it must be at all times under command when carriages pass by, it has only one rose or jet, which is directed by a man who moves about among the carriages with the greatest ease, and keeps his portion of the road in capital condition. Of course it is a much cheaper way than carrying the water about as we do, as then we must have horse and cart, wear and tear, and man also; whereas, by having the water laid on, all the men have to do in watering is to attach the hose and commence immediately. In the same way as much work can be done in a garden in a day as with ten men by the ordinary mode; so that in the end it is much cheaper to have the water laid on. There can be no doubt that to the efficient watering much of the success of the fine foliaged plants in Paris gardens is to be attributed.

As a good system of watering is of the highest importance to cities and towns in every region of the earth a more detailed and technical account of the watering of Paris gardens may prove useful to some. The article first appeared in the *Engineer*, and refers chiefly to the arrangements for the Bois de Boulogne, but the system is the same for all other places.

The watering is performed chiefly by means of long hose with a copper branch, the latter being provided with a stop-cock, so that the delivery of the water may be arrested

instantly, without having to turn off at the plug. The hose is generally twelve metres long and 2 in. in diameter; it is constructed either of leather, vulcanized india-rubber or canvas; the first and second costing from 6s to 6s. 8d. per yard, and the last only 10d. or 11d. The screw connecting pieces, which are made of gun metal, cost about 6s. The leather hose, losing the oily matters from its pores, through the pressure of the water, soon becomes brittle, but it lasts on an average two years; the rubber is light and has no other fault but that of wearing out in twelve months, while the canvas hose soon cuts to pieces on the gravel. A system of mounting such tubes on small trucks so as to keep them from trailing on the ground, and consequently making them lighter to handle and more durable, was tried for a long time, but this has been superseded by a very simple and inexpensive invention, that of tubes made of sheet iron, lined with lead and bitumen, and connected together by means of leather joint pieces, the whole being mounted on small wooden trucks. The cost of this apparatus complete, with the single exception of the branch, is only 70f., or 5f.20c. per metre, and it will last on the average four years, while the old hose on trucks costs 127f., or nearly double.

The cost of that now in use is made up as follows: Eleven metres of iron tubes, 19f.25c.; leather junction pieces, 25f.60c.; ten trucks 20f.; ligatures, 5f.15c.; total, 70f. The apparatus in use at the present moment in Paris consists of five tubes, each about 6 feet long, and a shorter one to which the branch is attached, so that only five trucks are required; the trucks also in practice consist of a piece of plain wood, a little more than a foot in length, the tube being bolted on to the upper side and the runners fixed to the lower. As regards the connexion of the joints, this is made sometimes with brass flanges, but a joint which answers equally well, and is much cheaper and lighter, is that made with copper wire; for the branch joint, however brass flanges are always used, as the branch itself is removed and carried away when not in use, while the tubes are simply folded together, fastened with a piece of cord, and left in any convenient corner.

It is found in practice that a man cannot manage an apparatus of this kind, which is more than about 40 feet long; but for watering grass, in which case the hose is left stationary in one place for some time and then moved to another, several apparatus are, if necessary screwed on to each other. The effect of these tubes or hose have been carefully studied. The following is a table of results with a twelve metre apparatus, the inner diameter of the nozzle of the branch being 0·012 meters, or rather less than half an inch, and the branch itself being held at an angle of 45 deg. :—

PRESSURE AT THE SURFACE	QUANTITY OF WATER GIVEN PER SECOND	EXTENT OF THE JET	QUANTITY OF WATER GIVEN WHEN THE BRANCH IS NOT ON
<i>metres</i>	<i>litres</i>	<i>metres</i>	<i>litres</i>
8	0-90	10	1-80
12	1-25	12	2-40
15	1-40	14	2-75
20	1-60	15	3-10
25	1-80	15	3-40
30	1-90	15	3-60
35	2-00	16	3-80
46	2-10	16	4-00

These results, it is stated, are averages, for some apparatus give superior or different results, although all the conditions appear the same. Experience shows that with the same amount of pressure in the pipes the extent of the jet is enormously reduced by the lengthening of the hose. Of course the diameter of the nozzle of the branch depends on the pressure within the tubes, but it was thought necessary to have a uniform model, and 0·012 metres was adopted as distributing the water most advantageously with a pressure of eight to fifteen metres. An apparatus twelve metres long, with a branch one metre in length, and giving an average jet of twelve metres, is effective over a radius of twenty-five metres. The plugs or hydrants are placed at intervals of thirty metres on roads twenty metres wide, and forty metres apart in narrower roads, when they are all on one side of the road.

Formerly all the roads in and about Paris were watered by means of carts which held one ton of water. It required twenty-four tons to water the Avenue de l'Impératrice properly, the road round the lakes, and some few others. The whole of the roads in the Bois de Boulogne, as they now stand, would require ninety tons of water, which would cost, men, horses, and carts included, 13f. per ton, or 200,000f (8000 l.) for the six summer months. The new system of watering by hose costs for the whole of the Bois but 55,000f., or little more than a quarter of the expense under the old system. In this estimate, however, no account is taken either of the cost of the water itself or of the capital expended for its conveyance. Finally, it is remarked, as regards the Bois de Boulogne, that the cost is, in fact, little more than that of the maintenance of the apparatus in repair, or about 250l. a year, the work being done by the body of men called cantonniers, who have little else to do during the summer months.

A water cart drawn by one horse, in cases where the hydrants are 400 metres apart, will water 1300 metres an hour over a width of four and a half metres—that is to say, a cart will water about 6000 square metres, using in the operation three tons of water. But in the parks it was found that the cart should pass over every spot once in the hour, and this gives, with an average of seven hours' effective work, an expenditure of three and a half litres, or more than seven pints per day per square metre. The cost of labour, cart, and horse is given at about 10f. per day. In calculating the cost of watering by means of hose and branch, the hydrants or plugs must necessarily be much more numerous, the intervals between them being in the case of watering by cart 400 metres, while in the case of the hose the intervals are on an average only thirty-five metres. The total length of the roads to be watered in the Bois de Boulogne is 53,000 metres, and the number of hydrants 1500, whereas under the old system 132 would have sufficed, a difference of 1380 hydrants, costing 4l. each, or 5s. a year for interest, and, in addition, 4s. for repairs, &c. The latter is contracted for at the following rate—namely, eight

centimes per metre, or about three farthings a yard run of conduit, and 4s. per hydrant.

A hundred and twenty men are required for watering the 540,000 square metres of road in the Bois; in five hours a man waters 4500 metres of road three times over, besides watering the side paths once, which the carts of course did not touch. The cost is given as follows:—

	<i>Francs</i>
Interest and maintenance of hydrants.....	13,800
Cost and repair of hose, &c.....	6,200
Wages of 120 men at half a day for six months.....	35,000
	<hr style="width: 100%;"/>
Total.....	55,000

The surface watered being, in round numbers 600,000 square metres, and the average number of days 180, the cost per square metre and per day is

$$\frac{550,000}{180 \times 600,000} = 0.00051$$

showing a great economy as compared with the expense of watering by cart. The hose and branch dispense (making allowance for interruptions caused by traffic and by moving the apparatus) a litre of water per second, or 18,000 litres in five hours; the quantity is therefore about the same as that dispensed by cart, only it is effected in five instead of seven hours. Previous to the general adoption of the hose and branch, experiments were tried with small handcarts containing a quarter of a ton, and drawn by two men, but these were found to cost more than the old carts.

Another method of keeping roads and pathways in order, namely, by the application of deliquescent salts, is interesting from its novelty. The salts used are chloride of magnesium or of calcium. The former salt does not exist in commerce, but large quantities have been obtained from the residue of the manufacture of carbonate of soda, at a cost of 15f. the 100 kilogrammes; it may, however, be produced for less than a third of that rate. The salt is well calcined (in order to make it lose as much of its water as possible), and then coarsely pul-

verized; it is sprinkled over the road by hand. The effects of this deliquescent salt, as compared with those of water, are not uniform; in the case of roads with much traffic the salt is twice as dear as water, because of the necessity of constant renewal, but in side paths and roads with little traffic the salt was found far more economical. The use of deliquescent salts has this great advantage, namely, that it does not interfere in any way with the circulation, and maintains the pathways clear of dust or mud, while of course in places where there is no grass to be watered the whole of the cost of water-pipes and hydrants would be saved.

The surface of grass which has to be watered with Seine water in the Bois de Boulogne is about 250 acres, and the quantity of water required to keep it in good condition averages ten litres, or more than two gallons, per square metre, every third day. To water this surface in the same manner as the roads would require more than a hundred hose working ten hours a day, and this would entail a very heavy cost. But as the grass does not require to be treated with the same regularity as the roads one system adopted is to place a branch on a stand at an angle of 45 deg., and allow it to play over the grass for a certain time, when it is removed to another spot; in this way one man can manage ten apparatus.

The total amount of water taken from the Seine for the purposes of the Bois never exceeds 240 litres, or about fifty-four gallons, per second. The natural meadows by the side of the Seine form about 400 acres, but the soil here is alluvial, and therefore irrigation is only necessary in very hot weather, whereas the soil upon which the artificial grass is planted is nearly all sand, and the greatest care is required to keep the turf in order. The total cost of the arrangements of conduits and pipes for the supply of water to the Bois and the avenues leading to it is given at 1,520,000f., or £60,8001; the number of stop-cocks is 385, and of hydrants 1600; and the length of the conduit is 66,200 metres. It results from these figures that the cost of the whole has amounted to 22f. 97c., or about 18s., 5d. per metre.

THE PARC MONCEAU

This is on the whole the most beautiful garden in Paris, and well shows the characteristics of the system of horticultural decoration so energetically adopted in that city. It is not large, but exceedingly well stored, and usually displays a vast wealth of handsome exotic plants in summer. In spring it is radiant with the sweet bloom of early-flowering shrubs and trees, every bed and bank being covered with pansies, Alyssum, Aubrietia, and all the best known of the spring flowers, while thrushes and blackbirds are whistling in the adjacent bushes, as if they were miles in the country, instead of only a few minutes' walk from the Rue du Faubourg St. Honoré. This park was laid out so long ago as 1778 for Philip Egalité as an "English garden," and passed through various changes, till it at last fell into the hands of the municipality of Paris, a very astute corporation, who have converted it into a charming garden, and are not likely to part with it in a hurry.

The system of planting adopted here as well as in the other gardens of the city is often striking, often beautiful, and not unfrequently bad. It is striking when you see a number of that fine showy tree, *Acer Negundo variegata*, arranged in one great oval mass, silvery and bright; it is beautiful when you see some spots with single specimens and tasteful beds, every one differing from its neighbour; and bad when you meet with about a thousand plants of one variety stretched around a collection of shrubs, or flopped down in one large mass, or when a number of plants too tender for the climate are put out for the summer months amidst those that grow with the greatest luxuriance. "The subtropical system will never do for England" say some practical men. The truth is, that it requires to be done very carefully in Paris, and there is a great mistake made by putting out a host of tender plants merely because they are exotics, unless indeed you wish to contrast healthy beauty with ragged ugliness. In the Parc Monceau there is usually a group of *Musa Ensete* worth making a journey to see, and masses of *Wigandia*, *Canna*, and such Solanums as *Warce-*

wiczii, that are worthy of association with it; but I have also seen there beds of Begonias without a good leaf or a particle of beauty—scraggy stove plants, with long crooked legs, and a few tattered leaves at the topband, poor standard plants of the sweet-verbena at the same time. If it were an experimental ground, one would not mind, of course; but this, in a garden where its omission would leave almost nothing to be desired, is too bad. In some respects this park is really unequalled, and therefore one regrets the more to see these blemishes, which let us hope will not be repeated.

What first excites the admiration of the visitor used to monotonous and highly-toned type of garden now seen so much with us is the variety, beauty of form, and refreshing verdure which characterize this garden—good qualities that are so often absent in too many of our own. The true garden is a scene which should be so delightfully varied in all its parts—so bright, so green, so freely adorned with the majesty of the tree, the beauty of the shrub, the noble lines of the fine-leaved plant, the minute beauty of the dwarfer plants of this world; so perpetually interesting, with vegetation that changes with the days and seasons, rather than puts the stamp of monotony on the scene for months; and so stored with new or rare, neglected or forgotten, curious or interesting plants—that the simplest observer may feel that indefinable joy which lovers of nature derive from her charms amidst such scenes, but which few, except those of a high degree of sensitiveness and power of expression, like Shelley, can give utterance to. It would be teaching him to use the words of Goethe—

“To recognize and love
His brothers in still grove,
Or air or stream.”

If any good at all is to be done by means of flowers and gardens, you must give men a living interest, a lasting curiosity in them, and some other objects than those which can be taken in by the eye in a moment. Numbers are occupied and delighted with gardening as it stands at present, but it can hardly

be doubted that a system with something like an aim at true art would be sure to attract many more; and it is patent that there are numbers even among the educated classes who take no interest whatever in the garden, simply because they can in few places find any real beauty or interest in it. To confine ourselves to a single phase of the subject, it is certain that if all interested in flower gardening had an opportunity of seeing the charming effects produced by judiciously intermingling fine-leaved plants with brilliant flowers, and of which there are such handsome examples in this park, there would be an immediate revolution in our flower-gardening, and verdant grace and beauty of form would be introduced, and all the brilliancy of colour that could be desired might be seen at the same time. The beauty and finish of many of the finer beds here, are of the highest order, in consequence of the adoption of the principle of variety. Here is a bed of *Erythras* not yet in flower; what affords that brilliant and singular mass of colour beneath them, a display which makes the visitor pause when he comes near the bed? Simply a mixture of the lighter varieties of *Lobelia speciosa* with variously coloured and brilliant *Portulaccas*. The beautiful surfacings that may thus be made with annual, biennial, or ordinary bedding plants, from mignonette to *Alternanthera*, are infinite. At the risk of driving off the general reader we must now begin to use hard names, and go deeper into purely technical and horticultural matters, for we shall not elsewhere meet an opportunity of doing so with so much advantage. It is only fair to warn the reader that this is a purely horticultural chapter.

The following are a few examples of these graceful mixtures seen in this garden during the past year:—A bed of *Arundo Donax verisicolor*, springing from *Lobelia speciosa*; a bed of *Ficus elastica*, the ground beneath perfectly hidden by luxuriant mignonette; *Wigandia*, springing from the little silvery sea produced by the mixture of the blue and white varieties of *Brachycome iberidifolia*; *Caladium esculentum*, from a rich surface of flowering *Petunias*; glowing *Hibiscus*, from *Gnaphalium*; graceful dwarf *Dracaenas*, from very dwarf *Alternan-*

theras; Aralias, from *Cuphea*; taller Dracaenas, from a deep and richly-toned mass of *Coleus Verschaffeltii*; *Erythrina*, from a sweet low carpet of soft purple *Lantana*; tall Solanums, on mats of that most finished little plant *Nierembergia*; sea-green Bocconias, from the dwarf dark-toned *Oxalis corniculata* var., and so on. Reflect for a moment how consistent is all this with the best gardening, and the purest taste. Your bare earth is covered quickly with these free-growing dwarfs; there is an immediate and a charming contrast between the dwarf-flowering and the fine-foliaged plants; and should the last at any time put their heads too high for the more valuable things above, they can be cut in for a second bloom, as was the case with some Petunias here which had got a little too high for their slow-growing superiors. In the case of using foliage plants that are eventually to cover the bed completely, annual plants may be sown, and they in many cases will pass out of bloom and may be cleared away just as the large leaves begin to cover the ground. Where this is not the case, but the larger plants are placed thin enough to always allow of the lower ones being seen, two or even more kinds of dwarf plants may be employed, so that the one may succeed the other, and that there may be a mingling of bloom.

It may be thought that this kind of mixture would interfere with what is called the unity of effect that we attempt to attain in our flower-gardens. This need not be so by any means; the system could be grandly used in the most formal of gardens laid out on the massing system pure and simple; besides, are there not positions in every place where such arrangements could be made without interfering with what is sometimes called the "flower garden proper?" Some may say we cannot grow the fine-leaved plants in England. But this is not so. The most beautiful bed of those above enumerated was that composed of variegated *Arundo* and *Lobelia*—the former a plant that may be readily grown on good soils in Britain, and merely requiring the protection of a little ashes, refuse, or an old mat over the crown in winter, even in soils that are not particularly favourable, while the *Lobelia* is one of the many

fragile and delicately pretty little plants that do perhaps best of all in England. The fact is, we can find numbers of plants among the hardy and free-growing kinds, which will enable us to enjoy all the desired variety and diversity, even if we cannot wisely venture to plant out *Wigandias* and coloured *Dracaenas* except in the more favoured districts of southern England and Ireland.

One of the most useful and natural ways of diversifying and dignifying a garden, and one that we rarely or never take advantage of, is abundantly illustrated here, and as it is perhaps the most important lesson to be learnt in the garden, we will discuss it at some length. It simply consists in placing really distinct and handsome plants alone upon the grass, to break the monotony of clump margins and of everything else. They may be placed singly or in open groups near the margins of a bold clump of shrubs or in the open grass; and the system is applicable to all kinds of hardy, ornamental subjects, from trees downwards, though in our case the want is for the fine-leaved plants and the more distinct hardy subjects. Nothing, for instance, can look better than a well-developed tuft of the broad-leaved *Acanthus latifolius*, springing from the turf not far from the margin of the walk through a pleasure ground; and the same is true of the *Yuccas*, *Tritomas*, and other things of like character and hardiness. We may make attractive groups of one family, as the hardest *Yuccas*; or splendid groups of one species like the Pampas grass—not by any means repeating the individual, for there are about twenty varieties of this plant known on the Continent, and from these half a dozen really distinct and charming kinds might be selected to form a group. The same applies to the *Tritomas*, which we usually manage to drill into straight lines; in an isolated group in a verdant glade, they are seen for the first time to best advantage; and what might not be done with these and their like by making mixed groups, or letting each plant stand distinct upon the grass, perfectly isolated in its beauty!

Let us again try to simply illustrate the idea. Take an important spot in a pleasure ground—a sweep of grass in face of a

shrubbery, and see what can be done with it by means of these isolated plants. If, instead of leaving it in the bald state in which it is often found, we try to place distinct things in an isolated way upon the grass, the margin of shrubbery will be quite softened, and a new and charming feature added to the garden.

If one who knew many plants were arranging them on the ground, and had a large stock to select from, he might make no end of striking effects. In the case of the smaller things, as the *Yucca* and variegated *Arundo*, groups of four or five good plants should be used to form one mass, and everything should be perfectly distinct and isolated, so that a person could freely move about amongst the plants without touching them. In addition to such arrangements, two or three individuals or a species might be placed here and there upon the grass with the best effect. For example, there is at present in our nurseries (I once saw quantities of it preparing for game covert at Mr. Standish's, of Bagshot) a great Japanese *Polygonum*, which has never as yet been used with much effect in the garden. If anybody will select some open grassy spot in a pleasure ground, or grassy glade near a wood—some spot considered unworthy of attention as regards ornamenting it—and plant a group of three plants of it, leaving fifteen feet or so between the stolls, a distinct aspect of vegetation will be the result. The plant is herbaceous, and will spring up every year to a height of from six feet to eight feet if planted well; it has a graceful arching habit in the upper branches, and is covered with a profusion of small pale bunches of flowers in autumn. It is needless to multiply examples—the plan is capable of infinite variation, and on that account alone should be welcome to all true gardeners.

The preceding part of this chapter was written in 1867; but as this park is so full of interest and instruction for all practically interested in the decoration of the flower-garden, the following description, written on the spot during the early part of last September, may be of some interest to the horticultural reader:—

Entering the park from the Boulevard Malesherbes we pass along an avenue of plane trees that leads from the high and ornamental gates. The walk on each side is bordered with roses in lines of different colours,—the front row well pegged down. They form long borders on each side, and are very ornamental in early summer. A carriage road leads through the park, so that it may be seen by those who drive through—but imperfectly, as the more interesting objects are along the shady side and boundary walks. On each side of the central drives glimpses are caught of very diversified and graceful foliage and flowers, but conspicuous on the margin is a great mass of *Caladium*, with leaves three feet long and two and a half feet wide, springing from a groundwork of blue *Lobelia*.

You can have no real beauty in an ornamental garden without the aid of full grown trees, their majesty producing an effect which cannot be dispensed with. Here they approach the drive in groups, some times overshadowing plantations of dense shrubs, at others springing clean from the grass. In some places they are so crowded as to make one wish for a little breath, in others they disappear, and spreads of grass and dwarfer plants permit the eye to range. On one side of the route may be noticed a hairy bamboo with black polished stems, and rods ten, twelve, and fourteen feet high; on the other, one with yellow stems of about the same height. An old specimen of the Abyssinian *Musa* is vigorously pushing up a massive flower shoot scarcely yet seen through the leaves, and in consequence they are by no means so ornamental as those of younger plants which devote all their energy to foliage. Tree ferns, and the curious and graceful *Beaucarnea* with the great swollen base, are seen here and there, the *Beaucarnea* apparently not a first-rate subject for placing in the open air. Next to the great *Musa Ensete*, the best Banana is the well-known edible *Musa Cavendishii*: it is in perfect health, emerging from a mass of *Tradescantia zebrina*; the leaves twenty-four to thirty inches long, and not often lacerated. A great mass of the variegated *Acer*—several hundred trees—is margined with rose-coloured geraniums, and all the space between filled with Dahlias, Sal-

vias, and the like: a good plan, inasmuch as it prevents a naked base. Groups of palms, single specimens of birch (as graceful as any exotic), and fine out-arching specimens of the hardy *Polygonum Sieboldi* form the most notable features of the central drive. Palms from regions comparatively temperate, like the dwarf fan palm of the south of Europe, the Palmetto of the Southern United States, and the Seaforthia, and some others, bear the open air of summer without injury, and add a very striking and valuable aid to the scene. From the cross-drive groups of Yuccas, rather thinly placed in masses of dwarf flowers and plants, a large specimen of the Angelica tree in flower, a mass of the Papyrus of the Nile, and tall specimens of *Colocasia odorata*, are the most conspicuous of the objects that approach the margin.

Again, commencing at the Boulevard Malesherbes entrance, and this time turning to the left, we meet with masses of *Musa rosacea*, *Blechnum*, *Lomaria magellanica*, the older specimens with stems two feet high; *Nicotiana wigandioides*; a telling, dark bronzy mass of *Canna atonigricans*, with some of the larger leaves two feet long, and the stems nearly seven feet high; groups of *Latania* plunged in the grass; and large leaved Begonias dotted amongst dense masses of *Tradescantia zebrina*. These Begonias do not grow well enough to warrant their being put out in our latitudes except under the most favourable conditions. Next come masses of Hibiscus, rather sparing of their great red flowers; numerous specimens of handsome plants isolated on the grass, from double scarlet Pomegranates to *Thuja aurea* and *Clanthus Dampieri*; masses of india-rubber plants with ground-work of mignonette, of *Wigandia macrophylla* with groundwork of *Coleus*, of silvery *Solanum marginatum* with groundwork of dwarf herbaceous Aster, of *Tupidanthus* in a carpet of *Cuphea*, and of variegated Arundo in one of German Aster. A mass of *Caladium bataviense*, with leaves three and a half feet long and dark stems, is very imposing. As a foliage plant, it is second to no other employed in Parisian gardens, though hitherto *C. esculentum* has generally been considered to be the best. Here there are large masses of both it

and *bataviense*. Usually *C. bataviense* makes leaves larger than *C. esculentum*, and as a rule its leaves are the largest this year, but the biggest specimens of the year were of *esculentum*, of which the largest measured four feet seven inches long, *bataviense* reaching four feet one inch. *C. esculentum* best withstands the winds, the leaves of *C. bataviense* often getting broken by them, so that many of the finer leaves made during the season were lost before September, their great stumps showing how vigorous they had been. It is usually and from the same cause denuded of leaves about the base; *C. esculentum* retaining them. The leaf-stalks of *bataviense* are of a dark hue, by which it is easily distinguished from *esculentum* with its pale green leaf-stalks. The stems of *bataviense* are also much larger than those of the *esculentum*, a few of those growing here being ten inches in diameter.

Of the Ficuses grown here, the best is yet the old *F. elastica*; but *Chauvieri* is also good, and *Porteana* has done well this season, though the Parisian summers are usually too cold for it; its leaves were fifteen inches long. *Yucca aloifolia* is hardy here. A fine old plant of it, ten feet high, and with a considerable portion of the stem naked, was in perfect health. Every winter the stem is protected as far as the leaves, and the snow prevented from remaining on these. *Melia Azederach* is also hardy here—at least, it has stood out during the past winter; and as its large compound leaves would prove so useful in the flower-garden, it should be tried out in favourable parts of England. *Andropogon formosum* does well here, and a group of Dasyliirions are plunged in the grass. The Erythrinas are a fine feature, the old *E. crista-galli* being considered the best on the whole; but *E. ruberrima* is very fine from its hue of scarlet and crimson. *Bocconia frutescens* is five and half feet high, with leaves two and a half feet long; and an *Encephalartos* is fine as an isolated specimen. *Agave americana* is left in the garden during winter and protected, but with more trouble and cost than would be incurred by taking it indoors. A mode of training various flowering climbers up the stems of trees is worthy of special notice. Clematises, honeysuckles, various

kinds of ivy, everlasting peas, and many other kinds of climbing plants may be used in this way with good effect. There is one plant grown here in quantity, which is rarely seen in England, but which should be in every English garden—*Funkia subcordata*, a dwarf, hardy plant with snowy white flowers sweeter than orange-blossom.

Two large carriage drives, laid out so as to interfere as little as possible with the old plantations, run through the park from one end to the other, and form a continuation of the boulevards leading to it. These drives are closed by iron gates of a highly ornamental character. The area of the park is about twenty-two English acres, of which thirteen are in turf, and five planted with flowers, shrubs, and trees, the remainder being devoted to walks and the small and unhappy piece of water. The total cost of alteration was over £48,000. The work was begun in the month of January, 1861, and finished in August of the same year.

The Ivy and Its Uses in Parisian Gardens



THE Irish Ivy is a very old friened that is often seen beautifying old walls and like positions, and one, as we may have thought, sufficiently appreciated and employed. Gaiety and grace I was led to expect in Parisian gardens, but that they should take up our Hibernian friend, so partial to showers and our mossy old ruins, and bring him out to such advantage in the neighbourhood of new boulevards and sumptuous architecture, was not to be expected. That “a rare old plant is the Ivy green when it creepeth o’er ruins old,” we Britons all know, but that it is no less admirable when mantling objectionable surfaces with its dark polished green in winter, would not appear to have yet sufficiently dawned upon us. Apart from the fact that the Ivy is the best of all evergreen climbers, it is the best of all plants for softening the aspect of town and suburban gardens in winter, not to say all gardens. The Parisian gardeners know this fully, and they, taking it out of the catalogue of things that receive chance culture, or no culture at all, bring it from obscurity and make of it a thing of beauty.

To rob the monotonous garden railings of their nakedness and openness, they use it most extensively, and there are parts about Passy where the Ivy, densely covering the railings, makes a beautiful wall of polished green along the fine wide asphalte footways, so that even in the dead of winter it is refreshing to walk along them. And if it does so much for the street, how much more for the garden? Instead of the inmates of the house gazing from the windows into the street swarming with dust, or splashing with mud, a wall of verdure encloses the garden;

privacy is perfectly secured; the effect of any flowers contained in the garden is much heightened; and lastly, the heavier rushes of dust are kept out in summer, for so admirably are the railings covered by planting the Ivy rather thickly, and giving it some rich light soil to grow in, that a perfectly dense screen is formed. Railings that spring from a wall of some height around the larger houses are covered as well as those that almost start from the ground. Frequently the tops of the rails are exposed, and often these are gilt, while wire netting on the inner side supports the Ivy firmly.

One day, as I was passing near the Hotel de Ville, and looking at its traceries, my eye was caught by something more attractive than these; a gilt-topped railing densely covered with Ivy, and between the mass of dark green and the bared spikes at the top a seam of light green foliage, here and there besprinkled with long beautiful racemes of pale purplish flowers. That was the Wistaria, one of the most beautiful of China's daughters, here gracefully throwing her arms round our Hibernian friend, and forming a living picture more pleasing to the eyes of a lover of nature than any carving in stone. If there are tall naked walls near a Parisian house, they are quickly covered with a close carpet of Ivy. Does the margin of the grass around some clump of shrubs or flower beds look a little angular or blotchy? If so, the Parisian town gardener will get a quantity of nice young plants of Ivy, and make a wide margin with them, which margin he will manage to make look well at all times of the year—in the middle of winter when of a dark hue, or in early summer when shining with the young green leaves.

When the Ivy is planted pretty thickly and kept neatly to a breadth of, say, from twelve to twenty inches, it forms a dense mass of the freshest verdure, especially in early summer, and of course all through the winter, in a darker state. The best examples of this description of edging that I know of anywhere are to be seen around the gardens of the Louvre, and in the private garden of the Emperor at the Tuileries. In the latter the Ivy bands are placed on the gravel walks, or seem to be so; for a belt of gravel a foot or so in width separates them from the bor-

der proper. The effect of these Ivy bands outside the masses of gay flowers is excellent. They are the freshest things to look upon in Paris during the months of May, June, and July. They form a capital setting, so to speak, for the flower borders—the best, indeed, that could be obtained; while in themselves they possess qualities sufficient to make it worth one's while to grow them for their own sakes. In some geometrical gardens we have panels edged with white stone—an artificial stone very often. These Ivy edgings associate beautifully with them, while they may be used with advantage in any style of garden. A garden pleases in direct proportion to the variety and the life that are in it; and all bands and circles of stone, all unchangeable geometrical patterns, are as much improved by being fringed here and there with Ivy and the like, as are the rocks of a river's bank.

It should be observed that an Ivy edging of the breadth of an ordinary edging is not at all so desirable as when its sheet of green is allowed to spread out to a breadth of from fifteen to eighteen inches. Then its rich verdure may be seen to full advantage. It must of course be kept within straight lines if the garden be symmetrical: if it be a natural kind of garden, you may let it have its own wild way to some extent. In nearly every courtyard in Paris the Ivy is tastefully used. I do not think I ever saw the scarlet *Pelargonium* to so great advantage as in deep long boxes placed against a wall densely covered with it, and with Ivy planted also along their front edge, so as to hang down and cover the face of the boxes. One of the best known of the floating baths on the Seine has a sort of open air waiting-room immediately outside its entrance—a space made by planks, and communicating with the quay by a gangway. On this space there are seats placed around, on which in summer people may sit and wait for their turn if so disposed, while the whole is elegantly embowered with Ivy, which looks as much at home as if the river was not gurgling rapidly beneath. This is secured by placing deep boxes filled with very rich light soil here and there on the bare space; then planting the Ivy at the ends of each box and devoting the remainder of the space to

flowers, keeping the soil well watered, and training the shoots of the Ivy to a neat light trellis overhead.

In the garden of the Exposition a pretty circular bower was shown perfectly covered with it, the whole springing from a tub. Imagine an immense green umbrella with the handle inserted in a tub of good soil, boards placed over this tub, so as to make a circular seat of it, and you will understand it in a moment. That and the like could of course be readily made on a roof, wide balcony, or any such position. One sunny early summer day, when the Ivy was in its youthful green, I met with a shallow bower made of it that pleased me very much. It was simply a great erect shell of green not more than five or six feet deep, so that the sun could freshen the inside into as deep a verdure as the outer surface.

The Ivy may be readily grown and tastefully used in a dwelling-house. I once saw it growing inside the window of a wine-shop in an obscure part of Paris, and on going in found it planted in a rough box against the wall, up which it had crept, and was going about apparently as carelessly as if in a wood. If you happen to be in the great court at Versailles, and, requiring guidance, chance to ask a question at a porter's little lodge seen to the left as you go to the gardens, you will be much interested to see what a deep interest the fat porter and his wife take in Cactuses and such plants, and what a nice collection of them they have gathered together, but more so at the sumptuous sheet of Ivy which hangs over from high above the mantelpiece. It is planted in a box in a deep recess, and tumbles out its abundant tresses almost as richly as if depending from a Kerry rock.

The Ivy is also used to a great extent to make living screens for drawing-rooms and saloons, and often with a very tasteful result. This is usually done by planting it in narrow boxes and training it up wirework trellises, so that with a few of such, a living screen may be formed in any desired part of a room in a few minutes. Sometimes it is permanently planted; and in one instance I saw it beautifully used to embellish crystal partitions between large apartments.

To make the Ivy edgings which are so abundantly employed in and around Paris, plants are easily procured in pots, and at a very cheap rate, at the markets on the quays, or of the nurserymen at Fontenay aux Roses, who every year grow it in large quantities. It is planted thickly in borders, and trailed along in strips from twelve to sixteen inches in width, according to the size of the beds. It is laid down with wooden pegs, a layer of earth being placed over the stems. When once planted, it only needs to be kept clear of weeds, and to be moderately watered. Under this treatment, it forms healthy borders the year after it is planted. In preparing the Ivy for growing against railings and trellis-work that encloses the various parks and gardens, it is trained carefully during the first one or two years, so that all empty spaces may be filled up. At the end of the second year, the railings will be completely covered, and for the future it is only necessary to keep it properly pruned.

The Ivy used by the City of Paris for ornamenting the flower beds in the squares, the trunks of trees, &c., is grown and propagated at the nurseries in the Bois de Boulogne. Towards the end of the summer the propagation of the Ivy by means of cuttings is carried on. Three or four leaves are left on each cutting, and they are planted very thickly in lines in a half-shady position. When they have taken root sufficiently, which generally takes place in the following spring, they are transplanted into pots of four or five inches in diameter. Afterwards stakes are fixed along the lines of pots, from which are stretched lines of thin galvanized wire, and to this slender but firm trellis from three to five feet high the plants are trained several times during the growing season. At the end of the second or third year the plants are strong enough to be employed to cover railings, and for many similar purposes. The nurserymen in the suburbs of Paris generally propagate them by layers. For this purpose old plants are placed at a certain distance from each other, and are allowed to grow long. Pots from four to six inches in diameter are then plunged in the ground around, the Ivy being fixed in them by means of small pegs, one shoot in each pot. Afterwards stakes are placed in the pots, and the Ivy trained

against them as it grows. When the layers are sufficiently rooted, they are separated from the old plants, and towards the end of the second or third year it is ready for use. If a wide belt of Ivy is desired, the young plants may be put in in two or three rows, as the French do when making such excellent Ivy edgings as are here described. In any case, after the plants are inserted the shoots must be neatly pegged down all in one direction.

The reason why Ivy edgings when seen in England look so poor compared with those in Paris, is that we allow them to grow as they like, and they get overgrown, wild, and entangled, whereas the French keep them the desired size by pinching or cutting the little shoots well in, two or even three times every summer, after the edging has once attained size and health. The abundant supply of established plants in small pots enables the French to lay down these edgings so as to look well almost from the first day.

*Report of the President of the International Garden Club for 1918**

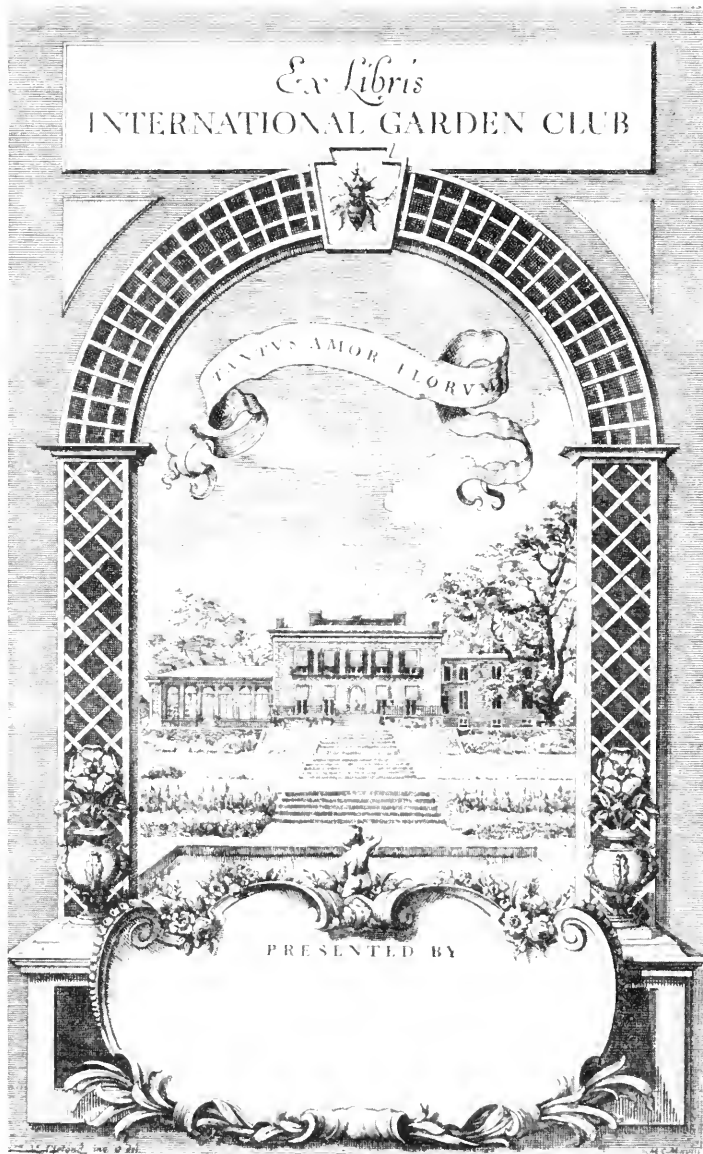


THE past Club year has been in some ways the best we have had. Our litigation with the City in regard to the property which we occupy and have improved, at Bartow, Pelham Bay Park, New York City, has been successfully contested and the outcome puts us in a much stronger position than heretofore.

The negotiations have resulted in making our work at Bartow coöperative with the park work of the City of New York, a consummation greatly to be desired. And the improvements to the grounds will be carried on from now on by both the City and the Club—the Club providing the materials and the City the labor and working force of the Park Department.

Because of our inability to establish a dairy at Bartow, owing to City ordinances, the War Work of the Garden Club necessitated taking other land and buildings and the Philip Schuyler estate of 67 acres at Irvington-on-Hudson was leased. The great success of the work has been partly due to the complete equipment found at "Nevis" and the advantage of having private property of our own has been demonstrated. It is hoped before very long through the generosity of certain of our members, to own this valuable property, pictures of which were published in the JOURNAL for June, 1918, and it is the desire of the President and the Governing Board to make this valuable philanthropic work of the Club, which was undertaken as a War

* Delivered at the Annual Meeting at Mrs. Charles Senff's, 16 East 79th Street, Wednesday, January 8, 1919.



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measure, a permanent feature of our public work, as it is far too valuable and necessary to be given up at present.

Owing to the conditions prevailing this autumn we were not able to carry out our intention of opening the house at "Nevis" to members, but by spring we hope to have the house in running order and it can be used to stop at.

The report of the Superintendent at "Nevis" and the report of the Head Nurse of the Union Settlement will give evidence of the faithfulness and energy with which our War Work has been carried on since it was started last May.

We have enlarged in all branches. Mr. Taylor's report for the JOURNAL will show how increasingly useful this publication is becoming and the request for membership from many college Professors and persons on educational staffs has necessitated the forming of several new classes of members; one a membership for the trade which we originally had in our first circulars but which had never been taken advantage of very much, and an associate membership for those who live at a distance from New York in all parts of the country but who wish to have the JOURNAL and to be affiliated with us in our educational work.

The principles of French gardening in the articles printed in our latest number of the JOURNAL are so valuable that if applied over here they would result in very definite advantages to our vegetables and flower gardens and to the public gardens in our cities. The series will be continued by request.

With the discontinuance of war with Germany, we intend to resume our usual Lectures stopped during the war, also the enlargement of our Library. In spite of the continued illness of the Chairman of the Library Committee, which we greatly regret, her efficient labours have brought excellent results in the Library, and we are happy to give the illustration of our charming Bookplate by Mr. Cleland which is at last a *fait accompli* and will be soon put in all the books with the name of the donor of each volume. Some valuable new members have been elected to the Board and we trust the New Year which opens before us so full to overflowing of all kinds of needed labour at home and abroad, will develop more and more and make prac-

tical the ideals which your Garden Club has set its hand to. We want your interest and coöperation more than ever, with which you have been so generous in the past, in helping to make our work of increasing benefit to the country and in maintaining its standard of a higher Education in Gardening.

ZELIA K. HOFFMAN,
President.

Additional Notes

The President reported that owing to Mr. Roosevelt's lamented death Dr. Butler would be unable to preside at the Annual Meeting, due to his absence at Oyster Bay.

Colonel George Graham Woodwark of the British War Mission spoke on "English and American Gardening" and Mr. Norman Taylor, Editor of the JOURNAL, gave the explanatory notes to some slides of very beautiful gardens in our Eastern States. These stereopticon slides were made specially for the International Garden Club. In succeeding Lectures the Gardens of the South and West and of Mexico will be shown as well as those in Europe to illustrate certain principles of gardening.

The Secretary reported that owing to the matter of the Bar-tow property not having been settled until the end of December the printing of the Club Book would be postponed until March.

A resolution of thanks to our very able lawyer Mr. Middleton Borland, who has brought to such a successful and advantageous conclusion the litigation with the City was unanimously passed.

The Garden Committee reported the usual planting of tulips for the spring and the employing of Mr. Arthur Herrington to work out a better scheme of color. Owing to the tardy arrival of bulbs from the other side, it is feared the Spring display will not be as fine as usual. No new work has been undertaken

during the past year except the erection of a small pergola and of benches in the experimental garden.

The sailors from the Pelham Bay Naval Training Station have enjoyed several afternoons in the Club Garden this autumn and a very nice letter of thanks was received from Commander Franklin.

A most successful Red Cross Tea was given last May at which the Pelham Bay Band played and Colonel Hawkes of the British Army spoke. Also the French painter of aeroplanes Lieutenant Farré.

Negotiations by the War Camp Community Service were begun during the summer to use the grounds at Bartow for an Officers Headquarters, but the abrupt closing of the War ended these matters.

The President wishes especially to thank those who generously gave contributions to purchase cows and for labour last Spring. They enabled the Committee to establish the Dairy work at Nevis immediately, with Mr. Edward Burnett's valuable coöperation, on the highest class basis. And being fortunate enough to have the Superintendent who had been in the Schuyler and Hamilton families for over thirty years, the Club has been able to found a plant which is a model one and has done untold good. We are having a medal struck off from a design which was made by a young Italian at the time of the New York State Milk Exhibit last March and which will be presented to those who founded the work last Spring.

We print beneath some reports of the War Work at "Nevis," by the superintendent:

IRVINGTON-ON-HUDSON, N. Y.

JANUARY 1, 1919

Eight months report of the produce of the International Garden Club at "Nevis." From May 1st, 1918 to December 31st, 1918.

Union Settlement
237 East 104th Street
New York City

Shipped via American Express:

5,220 quarts of Grade A Milk
29 crates of Vegetables and Flowers
192 eggs

Vanderbilt Clinic
60th Street

Shipped via American Express:

4,646 quarts of Grade A Milk
19 crates Vegetables and Flowers
190 eggs

Nursery and Child's Hospital
61st Street and Amsterdam Avenue

Shipped via American Express:

2,584 quarts of Grade A Milk
25 crates of Vegetables and Flowers
375 eggs

Respectfully submitted,

ELI JAGO,
Superintendent.

IRVINGTON-ON-HUDSON, N. Y.

JANUARY 1ST, 1919

Report of EXPENSES of the war work of the International Garden Club from May 1st, to December 21st, 1918.

Men's wages	\$2,520.00
Amount of Bills	2,881.44

Received from Mrs. Morrison	\$313.84
(For milk sold at the Union Settlement.)	

This money has been used for helping pay the expressage for shipping the milk to New York.

Respectfully submitted

ELI JAGO,
Superintendent.

IRVINGTON, N. Y.

JANUARY 6, 1919

Mrs. C. F. Hoffman,
New York City.

My dear Mrs. Hoffman,

I wish to say that the State inspectors who visited our plant from time to time have given us the credit of having one of the cleanest and best kept and up to date Dairy Plants in the State of New York.

Yours truly,

ELI JAGO,
Superintendent.

What the milk has meant to the New York Nursery and Child's Hospital may be gleaned from the following taken from the *Bulletin* for January, 1919:

"It has been a difficult time for all of us. Mothers with sick babies, when they found the milk man was no longer making his daily rounds, when the corner grocer showed them his empty milk cans and threw up his hands in despair at their pleading, came to us frantic with fear for the lives of their little ones; not alone our own mothers, but mothers of the neighborhood who turn to the hospital as to a helpful friend in times of trouble. What were they to do, they could get no milk and their babies would die, they told us. They waited in long lines at the dispensary window every morning, trusting us to help them in their difficulty.

And the splendid part of it was that we *were* able to help them. Every day since last July the hospital has been receiving a wonderful gift of bottles and bottles of milk, fresh and pure and yellow with rich cream, from the International Garden Club at "Nevis". No Dairyman's League or Distributers' Trust had control of this milk, and it came to us regularly all through the anxious, troublesome days, and we were able to give it out a litte at a time to our distracted mothers.

This wonderful gift to the hospital is the result of a happy inspiration of a group of wise, thoughtful women of Ardsley, headed by Mrs. Charles F. Hoffman, who purchased a herd of

thoroughbred cows for the purpose of supplying milk for the pre-natal work in New York City. At the suggestion of Miss Frances Perkins, Secretary of the Maternity Center, they offered to send this milk to us for our pre-natal work in the outdoor department, our only expense being the thirty cents expressage from Ardsley.

It is difficult to estimate the importance of this gift in our daily work among our poor, overworked, undernourished mothers, and no one will ever know what a God-send it has been in these days of the milk strike, what disaster it has averted, what agony and heartache it has saved.

We are indeed grateful to the friendly mother cow and we are grateful, too, to the far-sighted, tender-hearted women of Ardsley who have found this delightfully original plan of helping the Littlest Ones and their tired, anxious mothers."



THE GARDEN GATE

*Gardens—English and American**

*By Lieut.-Col. G. G. Woodwark
British Army*



SUPPOSE no one ever approaches the subject of gardens without a mental glance at Francis Bacon—and with the refrain ringing in his ears: “God himself first planted a Garden.” For in that essay of his seems presented every phase of the artistry of gardening.

And, indeed, that is the keynote of any consideration of the subject: Gardening is one of the finest of the arts; a beautiful garden is a work of art, just as surely as is a beautiful picture—or a piece of sculpture. As the painter works with brushes and tubes of color, and the sculptor with chisel and marble, so the gardener takes the most lovely of nature’s products, flowers, and moulds them to his heart’s desire into a garden.

A beautiful garden demands of the artist who produces it, just as the picture or the sculpture does, a sense of plan or composition; a facility in selection or arrangement; a taste for ‘lighting’ and color. And how far more various and rich are the opportunities of the gardener! For his work of art lends itself to all the progressive effects from “early dawn to dewy eve;” to all the changing moods of the successive seasons. It has a hundred ‘artistic moments,’ and can be responsive to or conjure forth a hundred moods, of body, mind and spirit. Such an organ for the artist to play upon never was created by mere man; such a power to play upon man’s heart-strings was never merely human.

*From a lecture delivered before the International Garden Club at the annual meeting in January, 1919.

No matter what may be the size of the garden, these things are true of it. The opportunity of creating 'a joy for ever' is as ready to the hand which cares for the cottage garden as for the many hands which carry out the will of the master-gardner in palatial surroundings. The spirit that goes into the work, in its conception as in its genesis, is everything. If a true work of art results, that bespeaks the soul of an artist; it is expressive of a personality, of devotion to a thing of beauty. A true gardener's garden becomes a setting for the finest intercourse with chosen friends; or it forms, perhaps, a record of the discriminating and observant traveller,—as it were a collected diary of travel, more vivid to the memory than all the written or pictured journals that can be devised.

It is thus, I think, that we in England have been wont to conceive of gardens and to make them. Those who know well our country-side, and have friends among people of varying means and establishments, will recognize that the cottager's Garden, the pleasaunce of the rectory or of the manor house, the gardens of the bigger places—all present to the visitor something of the spirit of the individual whose work or conception it is. Only in the English suburbs does one often find the mere planted plot spattered over with a few unhappy groups of ill-assorted flowers bought of the passing peddler—put in for the show of the thing, as it were, or, perhaps,—to feel more kindly about it,—to brighten the approach to the house.

Better than nothing, 'tis true,—for it may lead to finer things; but no true initiate could call such paltry planting by the name of garden. It mirrors no artist's loving thought or tender care; it reflects no spiritual vision, it conveys no mental atmosphere. It is a front yard—no more!

That, perhaps, leads one to the point of warning to America's gardeners which needs most emphasis. The national genius for practicality seems sometimes to stand in the way of the artistry of gardening, as we English view it. For instance, generally speaking—though decidedly in diminishing degree—one feels that gardens, in America, are the last thought rather than the first, when building a house or making a home. The garden is made

to conform to all other conveniences after they have been provided; it is not laid out along with the rest of the place, and given precedence in order of its proper importance. A pathway is needed, say, to run between this and that point on the place. The path is put where it is most practical—and laid down to cover the shortest distance between the two points it connects. Then, perhaps, when all these useful needs of the place have been furnished, the garden is thought of, and is set out as the remnants of space permit. No really successful effect can be obtained by this process. The lesser buildings should have been placed in due relation to the composition of the garden as a whole; and the paths connecting them should run between, also in due relation to the garden—its flowerbeds, shrubs, borders, etc. The space occupied by the garden should then be filled according to an artistic plan conceived of beforehand—height and coloring of plants or shrubs being well considered; arrangement of them thought out in due regard for seasons of flowering and to provide a changing succession of effects.

The same principle as to laying out a garden holds good as to cities: so long as physical convenience and material practicality are given precedence of beauty, there will be little realization of the latter. Gridiron plans of streets may be most convenient for traffic, house-numbering, etc.—but never can the architect's genius excel in such a utilitarian atmosphere, or on such a purely material city-plan. It requires the utilization of curves, of elevations, of vistas, of culs-de-sac even, to provide all the features of the city-beautiful. The older cities have been laid out in the artistic way, often as a matter of lucky chance than of design; but they provide, nevertheless, the architectural opportunities which have been utilized for the sake of beauty.

So, in planning a garden, every rise and fall of ground should be turned to most pleasing account; and, furthermore, art should devise effects which nature herself has not offered. Intimate nooks, sheltered and secret, can be made in the smallest of gardens; lovely vistas, susceptible of wonderful atmospheric effects, lit by the morning or the evening star, can be opened in larger grounds. Something that will echo laughing gladness,

something that offers tender sympathy, can be found in every garden worthy of the name.

These things cannot be brought to pass in a twelve-month; patient upbuilding, year by year, is what goes to make the garden of individuality, as it goes to make the woman or the man of individuality. Modifications and improvements will suggest themselves from time to time, and are of the essence of the joy of gardening—to linger at the task; to watch it grow under one's hand. But to accomplish at one fell swoop all that one first conceives of, that is to deprive oneself of half the pleasure of the art,—and confesses, besides, to a limited and stereotyped vision.

No true garden-lover thinks of his flowers and plants by the year, so to speak—any more than he thinks of his children or his friends as mere yearlings. Perhaps in America there is too often this annual attitude of making a garden as spring comes, or as one goes out to one's summer home, afresh, each year. A garden which inherits nothing from last year's care—that is no true garden! A garden should be put to sleep yearly, late in the fall,—tenderly and with thought for each and all of the flower-children in its beds,—and the keenest delight is to watch their awakening, and to tend their early needs after the long winter-dream.

It is human artistry, then, more than any other quality, that is needed in the making of a garden: to make the flowers our friends, and thus to provide, through love of those flower-friends, a perfect 'pleasance' in which to enjoy the friends we choose from among the circles of humanity.

*Curiosities of Plant Life**

*By Alexander Lurie, Horticulturist, and G. H. Pring,
Floriculturist*

Missouri Botanical Garden



SO MANY plants are of curious or unique form, have unusual ways of getting their food, or are protected by coverings that excite the wonder of mankind, that some account of the most interesting of them, with illustrations of the most striking are presented in this and further installments of an article which should interest readers of the JOURNAL. The often devious ways that Nature employs to preserve a given plant or to ensure its perpetuation are literally beyond belief, and the accounts that follow, some of almost dramatic import, are only the most salient features of the great scheme of the adjustment of plants to their living conditions. Such curiosities of plant life furnished a never ending source of wonder to Darwin,—they are just as vital and interesting to us to-day.

INSECTIVOROUS PLANTS

The insectivorous or carnivorous plants are like the parasites, the climbers, or the succulents, an assemblage belonging to several distinct families. They all agree in the extraordinary habit of adding to the supplies of nitrogenous matter afforded them in common with other plants by the soil, by the capture and consumption of numerous insects and small animals. All insectivorous plants inhabit bogs, marshes and other situations where water is abundant but where the plant does not receive sufficient nitrogenous food.

* Photographs for this article were taken at the Missouri Botanical Garden.

A process of digestion similar to that of the human being is ascribed to these insectivorous plants. The nitrogenous elements of insects are rendered fit for absorption by the action of a ferment. Similar to human digestion, the body of the insect is steeped in the digestive fluid, the secretion of which is stimulated by the presence of the substance to be digested. This secretion is acid.

The feeding and thriving of various insects upon plants has become such a natural course of events that the justice of it is taken for granted. But when the plant apparently turns about and sets traps for its enemies, a shock is experienced at the retaliation. The object of Nature in providing this state of affairs is to compensate these bog loving plants for the lack of nitrogenous food in their ordinary plant food.

Despite the various ingenious contrivances found among these plants, they are sometimes deprived of their lawful prey by other insects and even animals which feed upon decaying animal matter. In some species of *Nepenthes* and *Sarracenia*, white maggots live and thrive upon the decayed matter inside. Across the mouth of the *Nepenthes* pitchers webs are often spun by spiders which feed upon the remains in the cavity below.

The best known and the most important family of insectivorous plants—Droseraceae includes six genera *Byblis*, *Roridula*, *Aldrovanda*, *Drosera*, *Drosophyllum* and *Dionaea*, of which the last three are the better known. The Sarraceniaceae contain the genera *Sarracenia*, *Darlingtonia*, *Heliamphora*, while the true pitcher plants (*Nepenthes*) belong to the Nepenthaceae. These three families are closely allied. *Cephalotus*, *Pinguicula* and *Utricularia* are somewhat farther removed, the first belonging to the Cephalotaceae and the last two to Lentibulariaceae.

Bladderwort

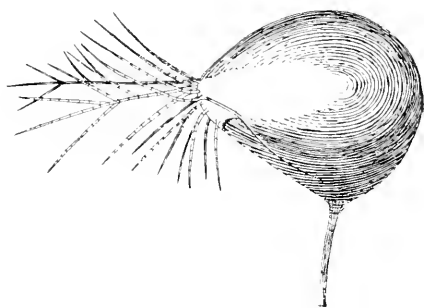
Utricularia vulgaris

Lentibulariaceae

An insectivorous aquatic plant native of Europe and North America.

The immersed stems are crowded with many-parted capillary leaves bearing many bladders. The flowering stalks bear 5 to 12 yellow flowers.

The most interesting part of the plant is the translucent green bladder which is supported on a short stalk. A valve-like door is located at one end through which insects and other aquatic animals enter in search of food or when trying to escape from other animals. The bladders contain water and air bubbles. It is presumed that decay is hastened by substances secreted in



BLADDERWORT, *UTRICULARIA*
VULGARIS

the interior and it is thought that some absorption takes place. Fish fanciers are reluctant to use this plant as an oxygen generator during the breeding period, because cases have been reported where the newly hatched fish have found their way into the bladder and become the prey of the plant.

Darlingtonia californica

Sarraceniaceae

A monotypic representative of the *Sarraceniaceae*, closely related to the trumpet pitcher plants and growing abundantly in swampy regions of California and Oregon. The open mouth of the *Sarracenia* is in this plant replaced by a hood which is translucent through its white markings. This hood bears many honey glands on the outside, while the interior is covered with downward pointing hairs which impel the insect into the

lower portion. Disintegration takes place in the sticky secretion, the nitrogenous matter being absorbed by the thick walls at the base. The action takes place during spring, when the pitchers become half filled with animal remains, amongst which centipedes and slugs have been found. The plant blooms from May to July, producing greenish-yellow and brownish flowers.

Dischidia Rafflesiana

Asclepiadaceae

An interesting plant of tropical Asia which was discovered during the middle of the eighteenth century near Malacca by a



DISCHIDEA RAFFLESIANA

missionary named Koenig. It is an epiphytic plant with numerous roots proceeding from its stem and with fleshy orbicular leaves. The irregular, angled pitchers are borne on short lateral shoots. Numerous adventitious roots arise from the base of the pitcher at the opening and dip into the cavity. The pitcher is really a modified leaf, the inner surface corresponding to the lower surface of the true leaf. The prevalent opinion is

that the pitchers merely collect water and retain it. Some believe that they act as ant shelter traps, but this view is hardly tenable as the roots hanging down into the inner recesses afford a ready means of escape. It is true that small inoffensive ants troop in great numbers to these pitchers, which secrete a liquid pleasant to their palate and often meet their death from drowning. There is nothing to show a carnivorous habit in the structure of the pitchers.

Fly Catcher

Drosophyllum lusitanicum

Droseraceae

A rare plant found in Portugal and Morocco, where it grows abundantly upon dry hills and is called fly-catcher.

The leaves arise from a narrow woody stem several inches in length. The upper surface is concave with a central narrow channel. Glandular, mushroom-like discs supported on slender stalks are arranged in regular rows on both upper and lower surfaces. The glands are variable in size, pink or purple in color, exuding large drops of a sticky secretion. In addition to these there are numerous, colorless, microscopic projections which are similar internally to the large glands. They differ, however, in one important respect—their spontaneous secretion upon contact with insects. The mushroom-like glands are incapable of movement, but their copious supply of sticky matter counterbalances this deficiency. In its effort to escape, the insect comes in contact with the numerous glands which eventually smother it with the secretion and cause complete exhaustion and death. The minute glands excited by contact then discharge the fluid which finally dissolves the animal matter.

Guiana Pitcher Plant

Heliamphora nutans

Sarraceniaceae

This unusual plant was first discovered in 1839 by the Schomburgk Brothers and was rediscovered in 1881 by an Englishman, Burke.

A perennial about 1 foot high, the leaves pitcher-like, tubular, enlarged at the top with a flaring opening and a small rudimentary lip terminating the midrib. The pitcher is hairy inside and winged down the front, conspicuously veined with red in its native habitat.

Similarly to the other members of the family, *Heliamphora* secretes a fluid for the destruction of insects.

Mexican Butterwort

Pinguicula caudata

Lentibulariaceae

Native of Mexico, being the most interesting species of the genus. The peculiarities of the plant are its two distinct manners of growth. During the growing season a rosette of large obovate leaves is formed. These are covered with thousands of minute glandular hairs. During the resting period a rosette of closely imbricated stipule-like leaves is produced. At this time it will withstand considerable drought.

The Pinguiculas are only capable of holding fast gnat-like insects because of the minuteness of the hairs. The exuded digestive fluid performs a function similar to that of *Drosera*. The flowers, appearing singly on a scape 10 inches high, are deep carmine in color with a lighter throat streaked with red. The lower lip is attenuated in a spur-like nectar tube.

The plants are propagated by means of leaf cuttings of both winter and summer stages.

Pitcher Plant

Nepenthes sp.

Nepenthaceae

The pitcher plants are native of tropical Asia, Australia, Malayan Archipelago and the island of Madagascar, where the climate is uniformly warm and moist. The flowers are greenish and inconspicuous. The leaves are, however, remarkable and are responsible for the classification of the pitcher plants among the wonders of the plant world. They are alternate, with a prolonged spirally twisted midrib terminating in an appendage called the pitcher. These appendages vary from flask shaped to cylindrical, with often decided differences in shape on the same plant and are colored green, yellow or purple. The mouth of the pitcher is furnished with a corrugated rim which serves three purposes, namely it strengthens the mouth and keeps it distended, it secretes nectar and often de-

velops into a funnel-shaped tube which projects into the pitcher preventing the escape of any insects that enter. A pathway of two rows of long teeth-like hairs extend from the rim to the base of the pitcher. The mouth is usually closed by the lid until fully developed; then the lid is permanently lifted. The popular impression that the lid closes when an insect enters is fallacious.



NEPENTHES DYERIANA AND NEPENTHES
CHELSONI EXCELEUS

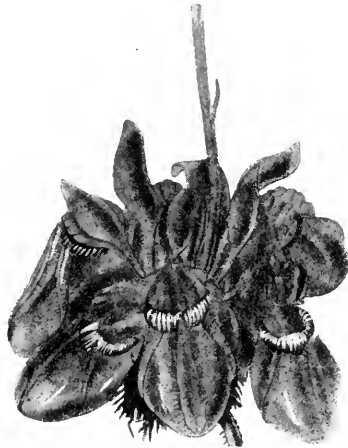
The interior is covered with numerous glands which secrete a digestive fluid before the opening of the lid. The insects are attracted by the nectar on the under side of the lid or the rim and usually enter, seldom being able to escape. They are drowned in the liquid which later partially digests them. This digestive fluid is said to be collected by the natives of Borneo from the fresh pitchers and used as a remedy for indigestion.

Handling of the pitchers soon causes them to wither and die, particularly if the fluid is turned out. Some of the larger pitchers will hold as much as a quart of water.

Pigmy Pitcher Plant
Cephalotus follicularis
Cephalotaceae

A native of southwest Australia where it abounds in the moist regions of King George Sound and Swan River. The plant has short rhizomes which throw a rosette of small rounded leaves. The minute ornamental pitchers are greenish crimson, 1 to 1½ inches long, covered externally with microscopic glands, which, combined with the coloration, attract insects. The external surface of the pitchers is provided with bristled wings which form pathways to the ribbed smooth rim. Upon reaching this the insect slips off into the secreted fermentation fluid below which is exuded by special glands.

It is rarely seen in cultivation due to the difficulty in propagation and successful transportation.



CEPALOTUS FOLLICULARIS

Sun Dew
Drosera capensis
Droseraceae

There are upwards of 90 species of this genus scattered over the world though most abundantly in Australia.

The marshy regions form the principal habitat of these plants. Some of the Australian species form tubers which carry them through a resting period. Our native species have the herbaceous perennial habit of losing the foliage during the

winter season. The leaves are strap-shaped forming a terminal rosette, and are covered with prominent glandular hairs. The flowers are purple, primrose-like, produced on scapes reaching 1 foot in height and all facing in one direction.

The plant is insectivorous through the action of the dew-like deposit on the numerous red hairs. When an insect alights upon the leaf it is held fast by the hairs immediately in contact. Later the entire leaf doubles over and in several hours encloses



SUN DEW *DROSERA CAPENSIS*

the insect. The clear acid fluid exuded by the hairs excretes proteinaceous ferments which aid in the digestion of the insect for the plant's own nutrition.

The tropical species are rarely seen in cultivation outside of botanical gardens. The plants are raised from minute black seeds which should be sown on the surface of peaty soil. Division of the thick roots of some species serves as another method of propagation. Full sunlight and tanks of water underneath are essential for the best development. The elongated growths

should be pegged to the surface in order to obviate the necessity of annual transplanting, which produces a deleterious effect.

Toothwort

Lathraea squamaria

Orobanchaceae

This plant has been suspected of carnivorous habits only a comparatively short time, having been previously classed with root parasites. During the greater portion of the year it feeds upon the roots of trees, to which it is attached by suckers. In the spring a number of short fleshy flower-stalks are sent up covered with white flowers tinged with violet. Below the flowers are located several fleshy scale like leaves, on the underside of which are located complex chambers to which entrance is gained through the tip of the leaf. Small insects seeking a cool shady retreat find their way into these chambers, rarely ever escaping therefrom.

It is not known whether a digestive fluid is exuded, some advancing the theory that bits of protoplasm are sent out from the inner cells which act as absorption organs, extracting the soft tissues of the insects. This theory is corroborated by the fact that shortly after imprisonment only the horny parts of the insects remain.

Trumpet Pitcher Plant

Sarracenia spp.

Sarraceniaceae

Bog plants of Eastern United States. They are of rhizomatous perennial habit producing a rosette of 3-8 pitched leaves in the spring. The shape of the pitcher varies according to the variety, from the small squatty trumpet with purplish pitchers of *S. purpurea* to the elongated ones of *S. Drummondii*. The pitchers of *S. flava* are 10 to 34 inches long, with prominent longitudinal yellowish veins and a crimson throat. The lid is ovate, slightly inflexed over the mouth. The flowers are curi-

ous as well as ornamental, extending above the pitchers and appearing first in the spring. They vary from 1 to 3 inches in diameter and are yellow to deep crimson in color. The five banner-like petals appear from the umbrella-like pistil which is covered with numerous nectar-secreting warts. The umbrelloid style is five-pointed, each point bearing a dry peg-like stigma on the under side. Directly above are situated the numerous stamens which discharge abundant pollen into the style cavity. The construction of the flower aids in ready intercrossing and hybridization among the existing species.

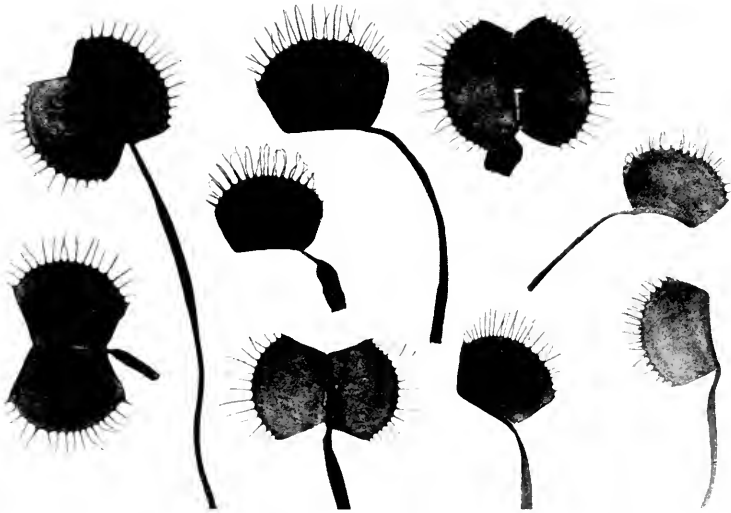


DROSERA CAPENSIS (LEFT)
 SARRACENIA FLAVA (BACK)
 PINGUICULA CAUDATA (FRONT)
 DIONAEA MUSCIPULA (RIGHT)

A fluid is secreted in the trumpet-like pitcher attracting various larvae as well as flying adults. The lid is densely covered with glands and downward pointing hairs which force the insect upon the glabrous surface of the upper part of the pitcher, which, offering no foothold, precipitates them into the secretion. No digestion takes place but the dissolved material is absorbed by the pitcher walls, affording nitrogenous food. An overabundance of this material causes the death of the pitchers.

Venus Fly Trap
Dionaea muscipula
Droseraceae

This most remarkable of all insectivorous plants is native of North Carolina where it thrives upon the edges of moist bottom lands. It is found wild only in a strip of territory 10 miles wide and 40 miles long. The plant is of perennial habit, forming a bulbous swelling which may be dug and distributed during the winter months.



VENUS FLY-TRAP, DIONAEA MUSCIPULA

The leaves are obovate, terminating in a trap-like appendage which when open resembles two hands joined at the wrist with the fingers distended. The bringing together and interlocking of the fingers represents the closing of the trap. On the interior of each lobe are located three highly sensitive hairs in triangular formation. The least contact with the hairs causes the immediate closing of the trap. The escape of the insect is

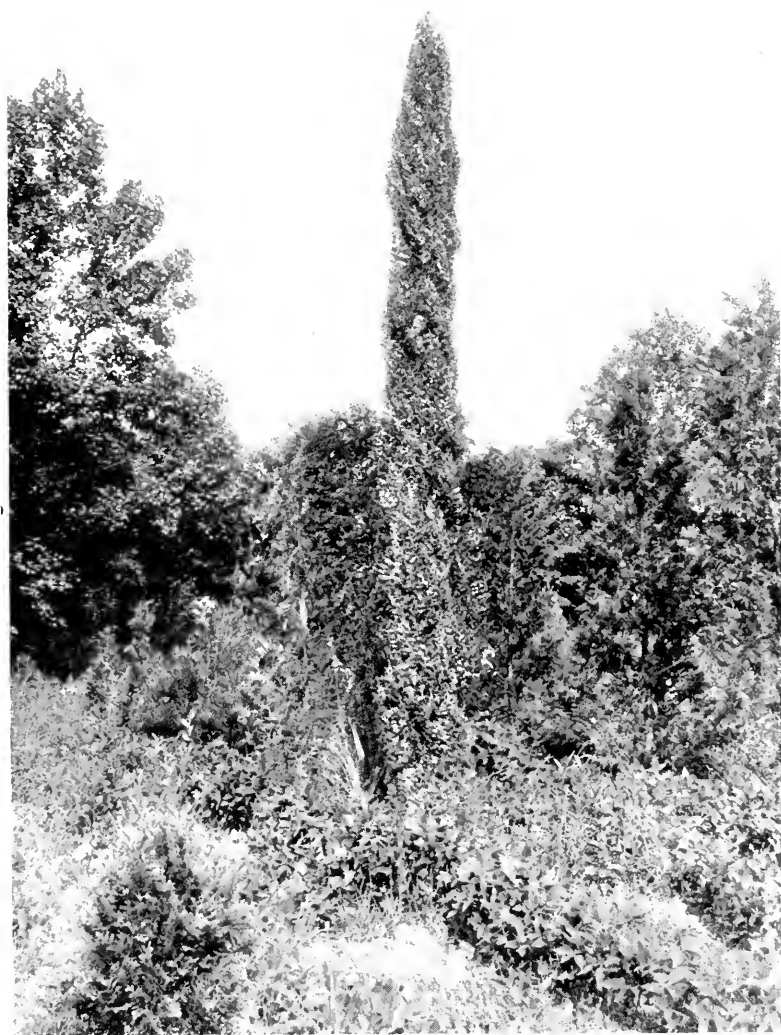
prevented first by the interlocking of the teeth-like horns. Later through the energetic struggle of the insect to escape it becomes necessary for the horns to unlock, at the same time exerting greater pressure upon the lobes and thus ending the struggle.

The interior of the lobes is lined with glands which are not active until brought in contact with the insect. The action which occurs is similar to that of *Drosera*, the peptonizing fluid readily dissolving the proteids of the entrapped insect, which are absorbed by the plant for its nutrition.

In the native state the traps open again after complete disintegration of the animal matter, exposing the shell of the insect, but under cultivation the reopening occurs rarely and only in the case of an exceptionally well-grown freshly obtained plant. The movement may be readily repeated however by touching the hairs with a needle, which causes the closing and reopening of the trap in 10 to 15 minutes.

The life of the average plant under cultivation is of short duration even when grown in virgin soil. Such unusual interest is attached to the behaviour of this plant that it is distributed to various botanical institutions of the world for experimental study and educational purposes. Several dealers in this country offer this and some of the better known insectivorous plants for sale. Their cultivation would add a note of interest to many greenhouse collections.

(To be continued)



COLUMNAR FORM OF
JUNIPERUS CHINENSIS

Plant Immigrants

The office of Foreign Seed and Plant Introduction of the Bureau of Plant Industry publishes a list, under the above name, of recently imported plants, many of which are valuable to the gardener, from a decorative or economic standpoint. Through the courtesy of Mr. David Fairchild, who is in charge of this work, we are enabled to reprint notes on such plants as have particular interest to our readers. To all who can demonstrate their fitness to care for these recent introductions, the office of Foreign Seed and Plant Introduction will send what is available. Recipients of such material, which often requires considerable skill in handling, obligate themselves to report, when requested, as to what the result of their observations has been. It is essential that the labels assigned by the Office should be firmly attached to the plant. Through these tests the government gets data on hardiness of the new introductions, and the growers have an opportunity for observing, first hand, plants that may prove important. Applications for or letters about these plants should not be sent to the Editor but to Mr. David Fairchild, Office of Foreign Seed and Plant Introduction, Bureau of Plant Industry, Washington, D. C.

PARTIAL LIST OF PLANTS FOR DISTRIBUTION 1918-1919*

ACER BUERGERIANUM, 42821. Maple. From Prof. Joseph Bailey, Nanking, China. Chinese name "Ya feng" (forked maple). A large tree with glabrous branches, small greenish flowers appearing at the same time as the leaves, and glabrous fruits which are sometimes as much as four-fifths of an inch long.

ACTINIDIA ARGUTA, 45241. From George V. Nash, New York Botanical Garden, New York. Cuttings from plants sent to the New York Botanical Garden in 1898, originally imported from Russia by the Office of Foreign Seed and Plant Introduction. A fine climbing shrub having beautiful dark-green foliage with reddish midribs. It is apparently free from diseases. It is a vigorous grower and will cover a trellis 20 feet long and 10 feet high in two or three years. The fruits, which are about the size of damson plums, have a very sweet, pleasant flavor, re-

* Mr. David Fairchild, the head of this Office has kindly sent this list of plants that are ready for distribution.

sembling that of the fig; they have very thin skins and are filled with extremely small seeds.

AMPELOPSIS ACONITIFOLIA, 36754. From F. N. Meyer, China. A very handsome vine, related to the Virginia Creeper, with finely cut light-green leaves, downy on the veins; dull-yellow berries. It is reported to be of considerable value as a porch or arbor vine, especially in semiarid regions. It grows rapidly and is comparatively hardy.

AMYGDALUS PERSICA, 33921. Peach. "Vainqueur" peach from Pedro Giraud, Granada, Spain, one of the earliest peaches to ripen. A medium-sized peach with a white skin flushed with red. Flesh white, soft, and juicy; pit pink. Not a good shipper but will prove an excellent home fruit.

EUCOMMIA ULMOIDES, 46061. Tu chung tree from China, sent in by F. N. Meyer. A Chinese caoutchouc tree, found wild in densely forested mountain slopes in southwest Shensi and southeast Kansu; also much cultivated in gardens and planted here and there along roadsides. This tree has the peculiar property of exhibiting rubber-like threads of shining whitish color when pieces of bark or leaf are snapped across, especially in its winged fruits. Owing to this it is called by the Chinese "Shih mien shu (stone cotton tree). The tree reaches a height of 80 feet, and seems to do best when sheltered by other trees. It has withstood the winters of Boston, Mass. and has proven a very valuable addition to our ornamental trees.

ARALIA CORDATA, 26565. Udo. A Japanese vegetable suitable for wide cultivation for its blanched edible shoots. Plant 3 to 4 feet apart. Plants are of bushy habit of growth and yield edible shoots for several years. To blanch shoots, mound with earth or cover with closed draintile in the early spring. Peel, slice into ice water and serve with French dressing for salad. As a vegetable, stew and serve like asparagus.

ARUNDINARIA PUMILA, 41924. Bamboo. From San Francisco, Cal. Presented by John McLaren, Superintendent of Parks and Squares. A pretty little dwarf bamboo, growing about 15 inches in height. The leaves are about 5 inches long and three-fourths of an inch wide. It spreads rapidly and is

an excellent low-growing plant for use as a ground cover under trees, or for planting on steep banks.

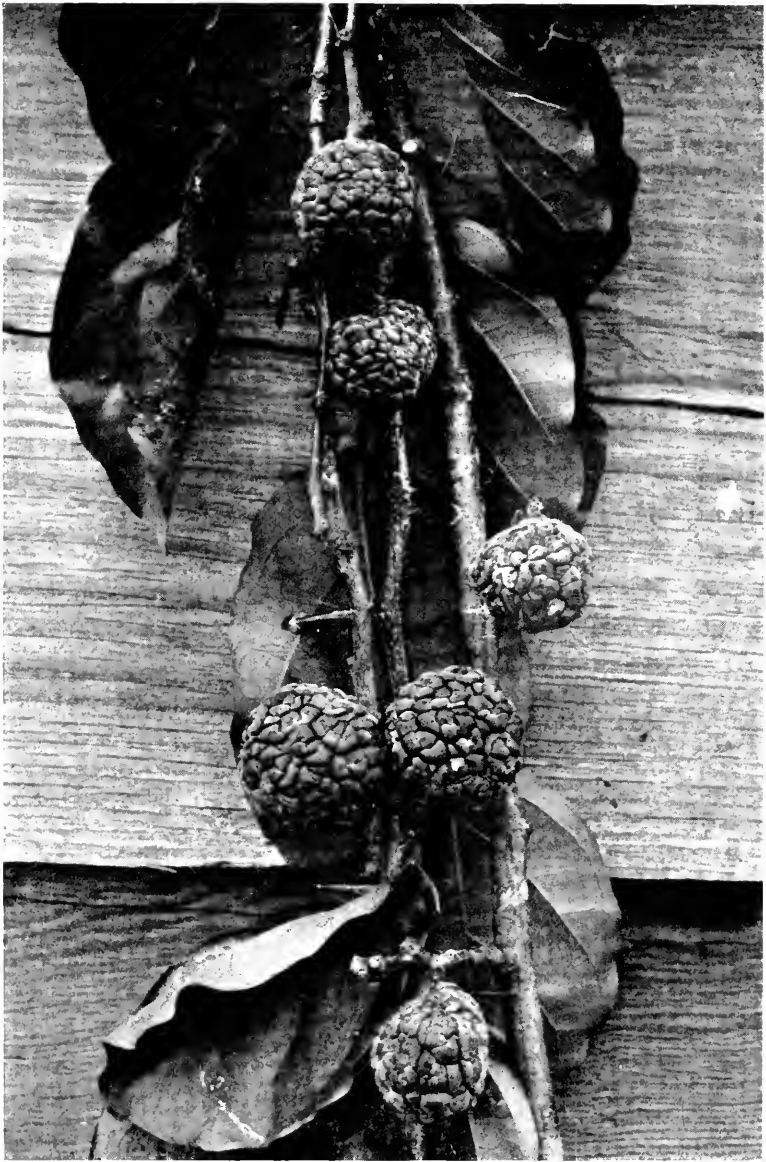
BERBERIS SP., 40687. Barberry. From F. N. Meyer, Kogoba, China. An ornamental barberry of very low growth, being only 1 to 3 feet high. The leaves are very small, and the very ornamental, bright-scarlet berries are produced in great profusion. Found along embankments at altitudes of 6,000 to 10,000 feet. Of value as a border shrub in the colder section of the United States.

CUDRANIA TRICUSPIDATA, 34493. Che. From Atlanta, Ga. Presented by the P. J. Berckmans Company. A close relative of the Osage orange, coming from Central China. The fruits which are borne in the greatest abundance are dark red in color and, when fully ripe, somewhat resemble a large raspberry. The fruit has a distinctive, agreeable flavor and probably has possibilities for jelly making. The plant shows promise as a hedge plant, being of less rank growth than the Osage orange.

CASTANEA PUMILA \times CRENATA, 41359. Chestnut. A hybrid between the American chinquapin and the Japanese chestnut produced by Dr. Walter Van Fleet. A good producer and strongly resistant to the chestnut bark disease. The nuts are of fair quality, intermediate in size between the chinquapin and the Japanese chestnut.

FRAXINUS SP., 44132. Imoden Ash. From George MacCartney, Kashgar, Chinese Turkestan. A tall-growing timber tree which is able to withstand considerable drought and alkali. Of probable value as a shade and timber tree in those sections of the United States where the summers are hot and dry and the winters are not too cold.

HELIANTHUS ANGUSTIFOLIA, 44103. Sunflower. A native sunflower, said to occur from New Jersey to Florida and westward to Texas. It has a small flower with long, graceful rays. The foliage is narrow, long, drooping and glossy. The main stem and each one of its branches are long and graceful, bearing a half dozen or more flowers on long graceful peduncles. But best of all it will cut and come again and is perennial inhabit. These characteristics make the species valuable for tall, massing effects, like the cosmos, as well as for cutting purposes.



FRUITS OF
CUDRANIA TRICUSPIDATA



CASTANEA PUMILA × CRENATA

ILEX CORNUTA, 24638. Holly. A broad-leaved holly from northern China. Leaves oblong, dark glossy green, the margins bearing several strong spines. The orange or scarlet berries are borne in clusters. This holly thrives under drier conditions than the English and, therefore, is better adapted to the Southern States.

JASMINUM ANGULARE, 45110. Jasmine. From South Africa. A climbing shrub with angled twigs and trifoliolate leaves. The flowers are white and in 3 to 7-flowered terminal or axillary cymes; the tube of the corolla is one-half inch long. Native of South Africa.

JASMINUM GIRALDI, 40705. Jasmine. From F. N. Meyer Hsiku, Kansu, China. Small ornamental shrub of erect growth, 2 to 4 feet high with small terminal clusters of yellow flowers, each three-fourths of an inch long, followed by showy blackberries. Foliage pinnate, the leaflets in five pairs, each three-fourths of an inch long and half as wide (except terminal one, which is twice as large). Of value for gardens and parks in dry, mild-wintered regions.

JUNIPERUS CHINENSIS, 18577. Chinese juniper. Plants grown from seed collected by Mr. F. N. Meyer from near Shan Hai Kwan, China. A new and beautiful form of this species, of straight, upright habit of growth, resembling somewhat that of the Irish juniper but not so spreading. It has a good stiff needle, of good length and bright silvery-green color. This tree is perfectly hardy and thrives in dry and exposed situations.

LILIUM CONCOLOR BUSCHIANUM, 22627. Lily. From F. N. Meyer, Shinglungshan, Chihli, China. A beautiful slender-stemmed lily, 1 to 3 feet high, of graceful upright habit, with narrow, lanceolate leaves about 2 inches long, and bright-scarlet unspotted flowers in clusters of one to six. A very thrifty plant, reported as being among the easiest of lilies to grow. Good as cut flowers.

LIQUIDAMBAR FORMOSANA, 44666. From Prof. Joseph Bailey, University of Nanking, Nanking, China. Chinese name Feng hsiang (fragrant maple). A handsome tree 65 to 130 feet in height, with a straight trunk, a much-branched head and fre-

quently buttressed roots. The leaves turn to a chestnut brown or red in the autumn and are retained late into the winter. In juvenile plants the leaves are five lobed, while in the adult trees the leaves are only three lobed and are smaller. This is one of the most widely distributed trees in China, being particularly abundant in western Hupeh.

MALUS SYLVESTRIS, 27060. Apple. From Dioscouria, near Souchoum, Kale, Caucasus, Russia. Collected by F. N. Meyer. "A native variety of apple generally called Afghasian, grown by the natives for centuries. The fruits are large, of a grayish green color except on the side exposed to the sun, where they are adorned with narrow vertical red stripes. Picked from the trees in the latter part of October and early November, but have to lie some time before ripening. Can be kept until late in the spring. A good apple for the warmer sections, especially for the Gulf Coast region. The young trees of this variety of apple are characterized by the very upright growth of the branches and the clean bark; when the trees get older, however, they become of spreading habit and the bark begins to be rough." (Meyer.)

MALUS BACCATA × *SYLVESTRIS*, 28489. Crabapple. A very promising hybrid of the Siberian crab with the Baldwin and Yellow Transparent apples made by Dr. Walter Van Fleet. Trees very prolific. Fruits $1\frac{1}{2}$ to 2 inches in diameter, slightly flattened at both flower and stem ends; yellow, streaked with red; flesh firm and crisp with a strong crabapple flavor. Promises well as a shipper and keeper.

MORUS ACIDOSA. 45708. Cliff mulberry. From the Arnold Arboretum, Jamaica Plain, Mass. A broad shrub 3 to 16 feet high; occasionally forming a small tree, up to 25 feet, with broad, very variable leaves, and shining black or dark-red edible fruits. The leaves are not used for feeding silkworms. Common in Hupeh and Szechwan, China, especially in rocky places. Remarkable for its habit of fruiting while still only a few feet tall and because of the sprightliness of the flavor of its fruits.

OSTEOMELES SCHWERINAE, 40033. From Frank N. Meyer, Kwatsa, Kansu, China. Dense shrub 2 to 5 feet high, found

on dry rocky cliffs and waste places; produces an abundance of white flowers in spring; bears small bluish black berries in the late fall.

POPULUS SIMONII FORMA FASTIGIATA, 22363. Poplar. From F. N. Meyer, Shiling, Chihli, China. One of the balsam poplars, the odor of which is particularly noticeable when the young leaves are developing. This form looks somewhat like the Lombardy poplar, but makes a more pleasing impression. Thrives in sandy soil. Hardy at the Arnold Arboretum, near Boston, Mass.

PRUNUS AVIUM, 33223. Cherry. Var. Garrafal le Grand cherry from Pedro Giraud, Granada, Spain, received through W. T. Swingle. A large variety possibly of French origin. This cherry ripens at the same time as the Black Tartarian. The fruit is of a dark glossy color and very high quality.

PRUNUS MUME, 45523. Japanese apricot. From the Yokohama Nursery Company, Yokohama, Japan. A tree with greenish or gray bark, somewhat similar in appearance to the common apricot, but with smaller foliage, which is duller in color. The yellow or greenish fruit is usually smaller than the fruit of the common apricot, and the dry flesh adheres to the pitted stone. The tree is a native of Chosen (Korea) and perhaps of China. Valuable as an ornamental, especially the double-flowered forms. The flowers are sessile or nearly so. The tree flowers about the same time as the almond, being when at its best almost as beautiful. The fruit is about an inch in diameter and is used in Japan as a pickle. The fruits are picked just before they ripen and are soaked in water for 24 hours; then they are mixed with salt and leaves of the red-leaved variety of *Perilla nankinensis*, after which they are allowed to stand a week or less, depending on the temperature. Following this, the fruits are spread in the sun to dry, and while drying are sprinkled with the juice of the perilla leaves. After three to five days they are put up in weak brine and will keep indefinitely. The pickled fruit is exceedingly sour and often forms a part of the Japanese soldier's ration. For the best results the tree should be grown in a shady place. There

are a great many varieties recognized in Japan, where it is quite as highly appreciated as the flowering cherry, especially by Japanese poets.

PTEROCARYA STENOPTERA, 45587. From F. N. Meyer, Kingman, Hupeh, China. "An ornamental tree belonging to the walnut family; growing to a large size. The foliage is pinnated and of fresh green color. In early spring, before the leaves are out, the trees are loaded with long greenish brown, staminate catkins, which give them a festive appearance; these are followed by racemes of small winged fruits which persist on the trees until September. The young foliage is covered with small yellow-brown glands and when rubbed smells like sour apples. The trees love moist situations especially near running water and in porous soil; however, they also thrive on dry fields, but do not grow so fast or so large as when near water. It is one of the best flowering trees in the Foreign concessions at Hankow and Shanghai and is called by foreigners "Chinese ash" on account of its resemblance to a *Fraxinus*. Chinese name *Ma liu shu*, meaning "Fiber Willow Tree,"—often abbreviated to '*Liu shu*.' This is a very promising shade tree for streets, parks and gardens in those sections of the United States where the summers are moist and warm and the winters but moderately cold. It does well where rice and cotton mature fully, and where the large-leaved privet (*Ligustrum lucidum*) and the tea Olive (*Osmanthus fragrans*) remain out of doors the year round." (Meyer.)

PYRUS CHINENSIS × COMMUNIS, 28497. Pear. Hybrid pear originated by Dr. Walter Van Fleet. Cross between the Chinese pear and our common pear. It produces fruits of large size and that keep well. A fine preserving pear. Tree vigorous and healthy.

PYRUS SERRULATA, 45688. Pear. From Jamaica Plain, Mass. Presented by the Arnold Arboretum. A tree native of western Hupeh at altitudes from 600 to 1,600 meters. "This species seems to be more closely related to *Pyrus serotina* Rehder, but differs chiefly in its serrulate, not setosely serrate generally broader leaves and in the smaller flowers with usually

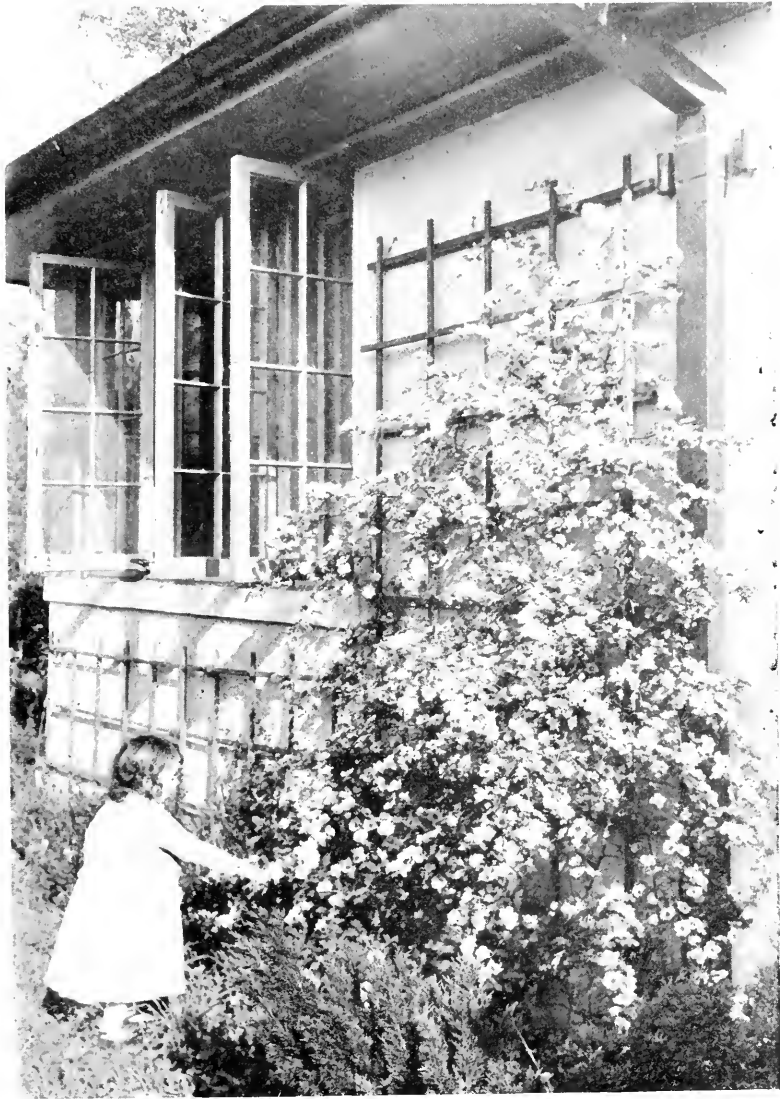
three or four styles and shorter sepals, and in the smaller fruit." (Rehder.)

RIBES FASCICULATUM CHINENSE, 45689. Chinese currant.

From Jamaica Plain, Mass. Presented by the Arnold Arboretum. A handsome shrub, native of northern China, growing to four feet in height, and chiefly valued for its persistent foliage and its bright-scarlet berries which remain on the branches during the whole winter. The small greenish flowers are dioecious; and the insipid scarlet fruit is subglobose, glabrous, and about half an inch across. The subspecies differs from the type in having larger leaves and the young branches petioles, and leaves pubescent.

ROSA HUGONIS, 40625. Rose. From the Arnold Arboretum, Jamaica Plain, Mass. "A bush of rounded habit, 8 feet high and more in diameter; branches slender, sometimes gracefully arching, armed with straight, flattened spines of varying length, which are associated on the barren shoots with numerous bristles. Leaves 1 to 4 inches long, quite smooth. Leaflets five to eleven, oval or obovate one-fourth to three-fourths of an inch long; finely toothed, deep grass green. Flowers 2 inches across, bright yellow, solitary on short lateral twigs; flower stalk smooth, slender, three-fourths inch long, entire, downy inside. Fruit smooth, nearly round, one-half to five-eighths inch wide black when ripe, the calyx persisting at the top. Native of western China. It is a most charming rose and the most vigorous of the yellow-flowered species, beautiful even when not in flower for its luxuriant, feathery masses of foliage. It shares with *R. serica* the distinction of being the earliest of roses to flower, usually by mid-May. It is allied to the Scotch rose, but differs markedly in habit. It is perfectly hardy, free, but neat and not rampant in growth. The spines vary much in character and are often altogether absent from some portions of the shoots; the largest are thin, flattened, triangular, one-half inch long, reddish, and translucent."

SOPHORA DAVIDII, 21967. From Shensi, China, collected by Mr. F. N. Meyer near Tchaulienli. A thorny shrub, growing from 3 to 5 feet in height, found on stony waste places. Utilized occasionally as a hedge plant. Foliage grayish green,



ROSA HUGONIS

flowers whitish lilac, pods somewhat downy, produced in immense quantities. Of use as a bee plant; also suitable for hedges when kept well under control.

TAMARIX CHINENSIS, 35261. Tamarisk. From F. N. Meyer, China. An extremely rapid growing tree or shrub, branching close to the ground, making excellent windbreaks and even hedges. The Chinese make baskets of the twigs. One of the most drought and alkali resistant of all plants. Cuttings put in the ground just after a rain grow easily. Recommended for the south side of wind belts on the Great Plains.

TAMARIX PENTANDRA, 34804. Tamarisk. From Novospasrko, Syrian-Riazan railway, Russia, through F. N. Meyes. The fact that the tamarisk can withstand unusual amounts of alkali, is cold resistant, and branches near the ground make it an excellent plant for windbreaks. It can be easily propagated by cuttings. This species from Russia is recommended for the Great Plains.

ULMUS FOLIACEA SUBEROSA, 43214. Cork-barked Elm. From St. Przedpelski and T. Antoniewicz, Kief, Russia. An ornamental tree of stiff, spreading, low habit, with corky winged branches and smooth, bright-green, obliquely oval leaves. The corky ridges, of which there are usually four, do not appear until the branches are 2 or more years old. Said to be common in the forests of central Europe, where it is a native woodland tree.

ULMUS PUMILA ARBOREA, 40898. Kataisky elm. From F. N. Meyer, Peking, China. A graceful, small, hardy tree, valuable as an ornamental in rather dry regions. The slender pinnately branched shoots, often somewhat drooping, render this form especially attractive. It is liable to lose its regularity of outline when old unless it has plenty of room.

VIBURNUM DILATATUM, 43731. Presented by the Arnold Arboretum, Jamaica Plain, Mass. A deciduous shrub, 6 to 10 feet high, with broadly oval, pointed, hairy leaves. The pure white flowers are all fertile, and are produced in June in hairy five-rayed cymes, 3 to 5 inches wide. The fruit is bright red, and roundish oval in shape. This shrub is a native of Japan and China, and is a very profuse bloomer.

Book Reviews

A VIRGINIA GARDEN IN 1774.

Philip Vickers Fithian. Journal and letters, 1767-1774. Edited for the Princeton historical association by JOHN ROGERS WILLIAMS. Princeton, N. J., The University Library, 1900.

Although Fithian's Journal was published a number of years ago, and may be known to some of the readers of this magazine for its historic and personal interest, I have never run across any mention of its contributions to the knowledge of gardening in colonial Virginia.

Philip Vickers Fithian was born December 29th, 1747; was a student at Princeton College, 1770-1772; entered the Presbyterian ministry in December, 1774, and was sent out as a missionary to Western Virginia and Pennsylvania, but was appointed a chaplain in the Continental army only a short time before his death, which occurred in October, 1776. During the period of his theological preparation he spent a year in Virginia, as tutor in the household of "Councillor" Robert Carter, at Nomini Hall, in Westmoreland County, and his journal and letters for that period, 1773-1774, were published in 1900 by the Library of Princeton University.

Fortunately for us, Fithian was a keen observer and practiced diarist, who did not scorn to write of many trivial matters. His descriptions of the country are often very suggestive, and there is an interesting, if slightly obscure, account (p. 128-131) of the arrangement of the buildings and grounds at Nomini Hall, which is unfortunately too long for reproduction here. Best of all, he had a delightful habit of walking in the garden, and from very early in the year till past midsummer, he gives frequent notes of garden operations, fruits and vegetables grown, field crops, etc. Meager as these comments are in comparison with what we desire to know, they yet afford the best record I have found of gardening in colonial Virginia, and while the *Journal and Letters* is perhaps chiefly valuable to the student of social life and customs, the importance of the work as a garden document alone, is sufficient reward for its publication.

Fithian arrived at Nomini on the 28th of October, 1773, but does not mention the garden until the very last day of the year, when he walked

there with Mrs. Carter, questioning her about a row of small slips, and as they walked along "she would move the ground at the Root of some plant; or prop up with small sticks the bended scions," and after taking two turns throughout the entire garden they went out into the Area to see the "Plumb-Trees." At this time he mentions the two negroes, who, he explicitly states, were "Gardiners by Trade," who were constantly employed in the garden whenever the weather permitted, but on February 24th he notes the arrival of Mr. Gregory the "Colonel's Gardiner," very likely brought over from England or Scotland, who began to work with the men who had been in the garden all winter, and under date of March 7th, he says that Mr. Gregory's wages are a half crown daily through the summer.

The spring gardening operations may well have begun on the 8th of February, when Mrs. Carter ordered the sowing of lettuce and peas. On February 21st he says: "They are beginning to work in the Garden with vigor," and on the 24th, he notes the planting of the common garden peas. On March 16th he walks in the garden with Mrs. Carter, and remarks: "It is beautiful, & I think uncommon to see at this Season peas all up two & three Inches—We gathered two or three Cowslips in full-Bloom; & as many violets—The English Honey-Suckle is all out in green & tender Leaves—Mr. Gregory is grafting some figs—Mrs. Carter shewed me her Apricot-Grafts; Asparagus Beds &c." On March 21st he writes: "The peas have grown admirably since my last Walk; & indeed all the Herbs seem sprouting."

The first of April he noticed people plowing their land for planting corn and tobacco, and even in one field saw women planting corn, though he remarks that it must be early, even for that locality. Under the same date he says (p. 140-141) that people hereabouts raise no flax, their land generally being too poor for the purpose, and continues that their method of farming is slovenly and wasteful, planting large quantities of land without manuring, working it very hard to make the best of the crop, and after cropping one piece of land removing the fences to another, leaving the first as a "common to be destroyed by Winter & Beasts till they stand in need of it again to plough." The soil is usually light and sandy, producing in great quantities "shrubby Savins & Pines, unless in the Vallies, (for it is very hilly) & near the Potowmack where it is often vastly rich." On the 7th of April he observes: "In every field we saw Negroes planting Corn, or plowing, or hoeing;" and on the 10th, in various parts of the Carter plantation the negroes were digging up the small plots allowed them by the master for planting their own peas, potatoes, etc. Harvesting began the latter part of June: on the 25th he is informed that people are reaping "not only Rye but Wheat in the Neighbourhood; certainly it is earlier than we reap

to the Northward." July 4th was the "Height of Harvest," while on the 7th Colonel Carter speaks of having his own rye mown down. On July 14th Fithian "was not a little Surprised to see Corn out in Tassel;" on the 19th he reports it as pretty generally beginning to tassel; and on the 21st he saw many of the hills in silk. On August 2d, at Mount Airy, the nearby estate of Colonel John Tayloe, he saw corn rank and set thick with ears, "three commonly on a Stalk," and on August 13th he mentions "Roasting-Ears." Near Colonel Tayloe's he also noted the only flax he had seen in the colony (although he was told that they raised much of it in the upper counties), about an acre and a half, which they were just pulling on the 2d of August, "exceedingly out of Season."

From time to time Fithian notes the fruits and vegetables in season. On May 25th, on his return from a visit to New Jersey, he had for supper "an elegant dish of Strawberries & cream," and the following day he says that they now have "great plenty of Strawberries, some Cherries, Gooseberries &c." On June 10th he went with Ben Carter "over to Mr. Turberville's to gather Cherries, which are there in great plenty." July 2d he sups on "Artichoks, & Huckleberries & Milk;" July 4th he mentions ripe mulberries, and on the 6th he writes that they have "every Day good Fruit for Dinner, caudled Apples, Hurtle-Berries with milk &c." The huckleberries, however, were probably not from the garden, but growing wild in the neighborhood. July 28th, figs were just beginning to ripen in the garden, and lasted for some time, as on the 26th of August he gathered figs, but remarks that while the ladies seem fond of them, he himself "cannot endure them." The early part of August must have been the height of the watermelon season, and the Virginia negro, then as now, an expert in melons, for we find "Dadda Gumby," an old slave to whom Fithian had shown kindness, offering him melons from his own garden. Once Fanny Carter, one of the little girls, presents the tutor with a half watermelon, and when she was ill, on August 15th, he records making her a gift of a large musk melon.

Other natural products beside figs were evidently new to Fithian. One suspects that his introduction to the persimmon occurred on March 6th when he "gathered & eat some Pisimmonds from a large Tree which were exceeding sweet, & agreeable" and on September 23d he saw "Barberry's, Sloe's, & Pomegranates, neither of which I had seen before." Few allusions to flowers occur; under date of June 23d, he was "diverted tho it was a little cruel, to see the Girls gather the Blossoms of some Prickly-Pears," probably growing wild; and once, on the 23d of July, he says that Priscilla and Fanny each presented him with a "Jesamine Nose-Gay."

On May 4th-6th, while away on a brief visit to New Jersey, Fithian noted a severe freeze, the effects of which were also felt at Nomini,* for on June 4th he says: "The Frost of the fourth of May has been much more severe and fatal here than in the northern colonies—The Peaches here, except on Farms lying near the Potowmack are wholly destroy'd And in these lower Counties in many places the Woods appear like November, & the Leaves are actually dropping!" He does not write further about the peach crop, though he states on September 22d that "Peaches & Fruit are omitted at Dinners," implying that they had been constantly served up to that time, and on August 22d he rode to Squire Lee's (Richard Lee, of Lee Hall, Westmoreland county), who took the party into his garden, which was large and had an abundance of fruit, and gave them fine peaches, nectarines, etc., and again on August 25th, at another neighbor's, they were given some excellent peaches.

In midsummer he dwells on the very hot and dry weather, which was apparently new to him. June 8th-9th the weather was very hot, and June 11th, "No rain has fell here since the 24th of May, & then but a Scanty Shower, & most of the time since windy," and from that time on until the first of September he records chiefly hot weather, long intervals between, or only slight rains; frequently commenting on the dry appearance of vegetation, and every shower that fell—after one occurring July 15th he says: "The Corn literally looks glad." To those acquainted with Virginia summers his picture of dry and dusty vegetation is particularly appealing, but it seems equally natural to read of cool days in the middle of June, requiring fires in the Great-House and School-Room; and again in July, when he notes chilly mornings, and on July 25th actually finds the day "disagreeably cold."

Although less conscientious in recording the weather than many diarists, Fithian gives a very good idea of the climatic changes, and constantly makes observations on other aspects of the season. On March 11th he notes "Robbins, & blue Birds singing all around us," and on the same day hears the song of the Mocking Bird; on the 31st "The Plumb-Trees are beginning to blossom," and on the 3d of April he writes: "The country begins to put on her Flowery Garment, & appear in gaity," with apricots, peaches, plums, and several sorts of cherries in bloom, remarking in this connection that the

* See also p. 281-282; letters to the Rev. Andrew Hunter and John Peck, under date of June 3d, 1774. In the former, Fithian writes: "The expected produce of Gardens and Peaches, (which were some planters chief dependence) are not only almost wholly destroy'd, but in ye upper parts of the province Wheat and Rye are so much cut off that the owners think it best to mow it down for fodder."

peach orchards at Nomini are very extensive. On the 7th of the month "We rode across the Country which is now in full Bloom," and again on the 10th, he comments on the "Country full of Flowers, & the branches full of lovely singing Birds." It is a very different picture that he gives in mid-summer, when he writes on August 18th: "The Face of the earth seems covered with mocking-birds, but not one of them sing . . . Not a bird, except now & then Robbin-Redbreast is heard to sing in this Feverish Month."

Fithian did not leave Nomini until the 20th of October, 1774, but makes no allusions to the garden during the latter portion of his stay, evidently preferring to go farther afield for his recreation. On September 19th he records: "Evening after Stroll with Mrs. Carter, & the Girls I took a Walk thro' the Pumpkin & Potatoe Vines," but more often he would ride to some neighbor's, or "the much Frequented Corn-Field," or would go afoot for a long stroll through the pasture, admiring "The Country emphatically in her goodly Variety!"—Marjorie Fleming Warner.

Manual of Vegetable-Garden Insects. By C. R. CROSBY and M. D. LEONARD, pages I–XVI, 1–391, 232 text illustrations. New York, Macmillan and Company, 1918, price \$2.50.

We have in this volume authoritative and concise accounts of a large number of insects troublesome in vegetable gardens. Some of these pests are well known enemies of staple crops while many are of little importance outside of the garden and there is therefore comparatively little knowledge, scientific or practical, in regard to a number of the latter.

The volume fulfills its aim by presenting in plain, untechnical language, the essentials regarding the life history and habits of the various species with enough of recognition characteristics, verbal or illustrative, so that the gardener may be reasonably certain of the identity of the pest. This, with a statement as to the place of the insect as a pest forms the basis for practical advice as to treatment. We congratulate the authors on not wasting space in discussing impractical or questionable methods of control. The general matter relating to injuries, transformations, etc., has been reduced to a minimum and the discussion of insecticides is exceptionally concise.

The authors, with access to the best sources of information, have in many cases been able to interpret the records in the light of personal experience and consequently have produced a readable, practical, well illustrated volume which is almost indispensable to gardeners and will prove of great service to many others, professionals included, interested in insect life. It fully sustains the reputation of the Rural Manuals issued under the able editorship of Professor Bailey.—E. P. FELT.

Manual of Tree Diseases. By W. HOWARD RANKIN, Pp. xx + 398. 70 illustrations. New York, The Macmillan Company, 1918. Price \$2.50.

This book, another of the series of Rural Manuals edited by Professor Bailey, promises to be especially useful to foresters, those in charge of city trees, park and estate managers; in fact, to all interested in the care of trees.

While this is strictly a scientific treatise, the descriptions and scientific language are sufficiently simplified so as to be easily followed by the lay reader. The 70 half-tone illustrations contribute materially toward this end. The diseases of fruit trees are not included; or at least only incidentally; only the principal American forest, shade and ornamental trees are treated. Their diseases are discussed for the most part under the headings *symptoms*, *cause*, and, when these are known, *methods of control*.

The first four chapters are devoted to a discussion of diseases more or less common to trees in general, such as damping-off of seedlings, smoke and gas injury, frost injury, root-rots, etc. Following are chapters in which the trees themselves are arranged alphabetically according to their common names; and under each their more specific diseases are discussed. The final chapters treat of the comparatively new subjects of tree surgery and dusting and spraying for the control of leaf diseases.

In the appendix follows a list of the common names of trees, opposite their scientific names, a glossary of scientific terms, and references to the more important literature of tree diseases.

The book should prove indispensable to the scientific worker as well as exceedingly useful to everyone interested in trees and in knowing how to take care of them.—E. W. OLIVE.

The Small Place: Its Landscape Architecture. By ELSA REHMANN. Pp. 1-164. Illustrated. N. Y., G. P. Putnam's Sons. 1918. Price \$2.50.

In the development of suburban properties there are always so many confusing features to be dealt with that the amateur is often at a loss where to turn for advice. Miss Rehmman, whose article on "The Flower Garden" appeared in the last issue of the JOURNAL, has done a peculiarly valuable service to owners in collecting descriptions, plans and photographs of fifteen small places from a half to five acres, designed by some of the best known landscape architects in the country. Each of the schemes exhibits some problem or combination of them and the different architects' solution. The book is therefore valuable to any one in the throes of wondering what to do with a place. It will serve a useful purpose if it shows that the wisest course is to have ones own ideas,—carried out by an expert.—N. T.

Peach-growing. By H. P. GOULD. 426 pages; 32 plates and 19 figures. New York, Macmillan Company. \$2.00.

Peach-growing is the latest of the two score of excellent books of the Rural Science Series edited by L. H. Bailey. The author might more precisely have defined the range of the treatise by the title, *Peach-growing in North America*, since his book most admirably covers the broad field of the continent.

Looking first for merit, one finds it in highest degree in the discussions of points of practice. Propagation, planting, orchard management, tillage, pruning, picking and packing are discussed excellently. The chapters on these subjects are written with clearness and precision, albeit now and then a little labored with detail, and so skillfully combine science and practice that a peach-grower following the teachings of the book can go through orchard routine with intelligence and skill that will go far toward success. The limitations of climate and location are well set forth, but taken with the chapter on adverse temperatures, at rather too great length. The chapter on insect and disease control, also, is too long, while much more of value might have been said on cost factors, transportation, storage and marketing.

A defect of the book is lack of regard to the relative importance of the subjects discussed. Thus, the scant treatment of peach varieties is most unworthy of the book and its author. Descriptions of varieties are limited to three pages from which a peach-grower can learn nothing not found in the catalog of any nurseryman. The author's excuse is: "detailed varietal descriptions would serve but little practical purpose." We do not agree to this. Half the questions asked experiment stations in regard to a fruit have to do with varieties. A fruit-book is used chiefly to look up varieties. The history of a fruit is mainly that of its discarded varieties, and progress is made chiefly by means of new varieties. The author should publish a manual on varieties to supplement his book on culture.—U. P. HEDRICK.

Practical Horticultural Notes

RESERVE GARDEN



THE reserve garden is an important section of commercial, private, or public establishments, for it provides material to keep the grounds attractive throughout the summer. It should contain a surplus stock of pot plants of such subjects as Liliiums, Campanulas, summer-flowering Chrysanthemums, Celosias, including Cockscombs, also Fuchsias, etc. The plants can be easily transferred to the beds to take the place of other plants passing out of bloom. In this way there ought to be no blanks in the borders or beds. The reserve garden might also contain young trees and shrubs to draw upon if required. Beds of hardy herbaceous perennials, or of annuals or bulbs, to provide cut flowers, can be made in such a garden.—S. M. BEER.

SCENTED PELARGONIUMS

During recent years we have heard much of old-time gardens, and of the various flowers and plants beloved by our grandmothers. The subject of this note was one of the treasures of "Great Grandmothers Garden" and a few varieties still retain the affection of garden lovers. They form a most interesting group of plants. The flowers in most cases are small, but some are very brilliant, and attractive. Their habit lends itself to making fine trained specimens for greenhouse decoration, the foliage of others are beautifully cut or divided, and marvels of scent, making them desirable plants for the Aromatic-garden during summer, reminding one of the Oriental Proverb

*To raise Flowers is a Common Thing,
God alone gives them Fragrance.*

In the end of the eighteenth, and early nineteenth century, nearly two hundred varieties were listed, but since that time have fallen away, probably owing to the introduction of more showy flowers.

Every one is acquainted with the rose scented *P. capitatum*, which was introduced into England from Cape Colony in 1690, and the lemon scented *P. citriodorum* introduced a few years later. We see them everywhere, and they are always in demand. These no doubt were brought here, by some humble emigrant, some one who wished to create a semblance of home in the land of his adoption. There are a few enthusiastic collectors today who find the hobby most fascinating and I believe, there are still about one hundred varieties grown. I would suggest a few of the better known, which deserve a place in every garden, including the two previously mentioned. There is the cinnamon scented *P. gratum*, nutmeg Prince of Orange, the more pungent peppermint scented *P. tomentosum*. The fine cut foliage of *P. denticulatum*, or Stags Horn, *P. asperum*, Pheasants Foot, and *P. filicifolia*. *P. artemisoides*, which reminds me of another old favourite aromatic plant (*Artemisia abrotanum*) the Southernwood or Lad's Love.

The oak leaved are represented by a few varieties—*P. quercifolius*, *minus* and *majus* are types. The brighter and stronger varieties probably are hybrids. Clorinda seems well known, and makes an elegant specimen. Pretty Polly is bright, as is Scarlet Unique, *P. Shottisham Pet*, and Shrubland Rose.

The variegated Lady Plymouth, introduced a century ago, is still extensively used for summer bedding in England. I believe that in the not far distant future these old favourites will again come into their own.—SAMUEL GOLDING.

LONGEVITY OF SEEDS in the open ground is often noticed with interest by the observing gardener. The writer has had occasion to notice seedlings of *Nicotiana affinis* persistently appearing for 9 years in a bed where formerly grown. Seedlings were never allowed to grow to maturity but treated as

weeds nor have any *Nicotiana* whatever been raised anywhere on or near the grounds during those 9 years. Winter temperature drops occasionally to 30° below zero. It must be that the small seeds are tightly encased in small particles of soil and so are able to retain their vitality. The annual spading must bring them up to the surface where their germinating power is liberated by the elements.—A. MARTINI.

STATICE PROFUSA

(*Limonium profusum*)

The Statice or Sea Lavender is so little known, a few words might tend to spread knowledge of its value. A perfect mass of flowers in various colors such as bright rose, mauve, white, yellow and purple, can be had almost all summer, if plants are started early enough. They would make a bed or border very gay. Its graceful and branching habit makes a fine centre piece and by choosing the right color will go with almost anything, with the exception of large blooms; especially with *Helichrysum* and Honesty, they being everlasting flowers. Statice is good also for winter decoration where flowers are scarce.

They also make a fine pot plant for the conservatory or window. They grow from one to two feet high, according to the variety, and being a half hardy perennial, except the variety *latifolia*, which is hardy.

They would, however, be better treated as hardy annuals. Sow seeds the first week in March in a hot-bed and when large enough to handle transplant in boxes, using a mixture of ordinary garden soil in equal parts with well decayed leaf mould, adding a little sand. When danger of frost is over they can be planted out in the open. They have a weedy appearance when small on account of growing flat on the soil. They also grow very slowly until they have taken a good hold in the open border. Anyone giving them a trial will not be at a loss as their chief merits are their durability and graceful habit.—THOMAS L. HUGHES.

SWEET PEAS

To produce good Sweet Peas it is necessary to trench the ground and to give the plants sufficient room. The preparation of the ground is best done in the fall. A trench or ditch should be dug out 3 feet deep and about the same width, put a good layer of cow manure in the bottom, dig this in, give a good sprinkling of bone meal, fill in about a foot of soil and on top of this add another layer of manure and bone meal and repeat the operation until all the soil is back in the trench again. See to it that the bottom soil gets back in the bottom again as most soils taken up this deep will remain practically sterile for the first year. If several trenches are to run parallel the centres should be at least five feet apart. Sow the seeds in sand-filled flats or boxes about the middle of February, and so as to secure an even germination chip each seed, that is, with a sharp knife cut out a small piece of the shell of the seed opposite the eye or growth, place the flats in a temperature of about 60°, until germinated, pot off the seedlings singly in two-inch pots and keep the plants growing slowly in a cool house or frame, after a little while they will be tough and hardy and even a slight freeze will not do the plants any harm. It is far better to keep the plants too cool than to get a soft growth by keeping them too warm, as the aim at this stage and until they are planted out is to secure good root action. After thoroughly rooting in the two inch pots a shift to four inch which will keep them until planting out time. Plant out as soon as danger of heavy frost is past. Plant in double rows in the previously prepared trenches giving the plants at least a foot each way. For support there is nothing better than bamboo canes; the 6 foot rather heavy canes are best for this purpose and will last for many years if taken care of. For support of the canes, drive rather strong posts in the center of the trench and on top of those nail a crosspiece about 18 inches long and about five feet from the ground and to this crosspiece run a wire parallel with the trench and tie canes to the wire. Place the canes between the plants about 6 inches apart so

that each plant will have two canes for support. As the plants start growing select two of the strongest shoots and tie each to a cane and cut away all others. Pinch out all side shoots and cut off the tendrils at the end of the leaves as the plants grow. After warm weather has set in mulch the whole ground with some light strawy material, this will keep the ground cool and will be clean to walk upon in wet weather. Should the weather keep dry for some time it will be necessary to water the plants as Sweet Peas enjoy a moist cool ground. If the plants should grow above the supports it will be easy to bring them down without injury by simply cutting loose a few ties and sliding the vine down. By following a mode of culture as given above we picked fine flowers last year from the 15th of June to the last of August.—S. W. CARLQUIST.

MARCH IN THE GARDEN

In our Eastern States March is hardly a month of active gardening operations. Its early days are likely to be as wintry as the coldest February and we are as likely to get a blizzard as gardening weather. Yet there is something of spring in the air, and when the sun begins to make his influence felt, one does get restless, with a desire to worry the soil, with one's hands. But it is not to be, at least so early in the month, for a tour of inspection through the garden, past the bulb beds, which are inspected, and found quite fast with frost, satisfies us that there is nothing to do but wait until Nature has showered her softening influence upon the soil before we can commence actual operations.

There is however much that can be done in the way of preparation for the Garden that is to be. While the ground is still frozen, and will bear the weight of wheels is a splendid time to get the manure onto the land, to be dug or ploughed under as soon as frost is out, and dry enough for working.

While carting manure onto the vegetable patches, and flower beds, don't overlook the fruit trees, these essentials of every well managed garden are seldom injured by too much manure,

unless it should be excessively rich in nitrogenous matter, which may set up rank soft growths, that won't ripen properly in the fall. Such instances are however seldom to be found, and one will be amply repaid for applying a good dressing of manure to the fruit trees.

Speaking of fruit trees reminds us that the winter or dormant spraying should be done this month if not already attended to. Pruning of course should be completed, before this, as we believe it always spells good workmanship to have all prunings cleaned up and burned before spraying is attempted. Of all gardening operations spraying is the most disagreeable, and like most other disagreeable things one is inclined to postpone it as long as possible, but it must be done now if one is to get any benefit from it. When the buds begin to burst, it cannot be done with the solution at winter or dormant strength, and a weaker solution is a waste of time, and material when dealing with San José Scale, and Oyster Shell Scale.

Commercial Lime-Sulphur, the standard winter spray is a jaundiced looking liquid almost as disagreeable to look at as it is to apply. It is rather oily in consistence, and most unsuitable to come in contact with any clothing of value. Any old suit, an old rubber coat, rubber gloves and a great deal of care to keep to the windward are essentials in doing this work.

For an early garden hot-beds are essential and now is the time before you begin digging and delving in the soil to get them ready.

The manure should be got ready without delay, and if you can get a few oak, or beech leaves to mix with it the heat from fermentation will not be so violent, and will last longer. A common cause of failure with hotbeds is that the soil is put on to the manure too soon, and the gases which are generated permeate the soil to the detriment of many kinds of tender seeds. Leave the soil off for twenty-four hours after making up the bed, to allow the gases to escape, then place the soil to the depth of four or five inches, and when by the aid of a thermometer, you find the heat has dropped to 85 degrees you may sow seeds of Egg-plant, Peppers, Tomatoes, and others that are needed.

The seed catalogues will need to be studied for the most reliable varieties of seed, as will the catalogues of shrubs and trees for new plantations that will be made next month. In looking over the catalogues one is impressed by the fine descriptions given, yet when one has had a little experience, the fact is forced upon one of how lamentably lacking are catalogues in general upon some vital aspects of plant life. Very little is said about how much space a plant will take up. Funkias for instance will soon cover a space of 3 or 4 square feet, while a *Dictamnus* is easily able to get along on a square foot of ground. Many experiences could no doubt be related where plants have had to be moved after a year or two, because of a lack of just this knowledge. In selecting shrubs and trees for vistas, one should have an eye for autumn and winter color, of fading leaf, and enduring twig as well as for seasoned bloom. Few shrubs bloom more than a month, and many hardly so long, but leaves are often a full month changing color before they drop, and the twigs and branches are in full view for more than six months. It is therefore desirable that we know the subject in mind will fit into the fall and winter picture, as well as what its budding, leafing, and blooming earlier will be like.

No one would think of furnishing a house that would look well, for three or four months of the year, and why should we furnish our gardens so wholly with plants that give us one big burst of bloom, with little to commend them for the rest of the year.

As the month advances the work of raking, and cleaning up the leaves, and rubbish may be commenced. This is an annual operation, that is usually heralded by numerous smother fires, started to consume the rubbish. Who dares to estimate the value of potential plant food that has thus gone up in smoke?

In these days of horseless carriages organic matter supplied to the soil in the form of manure is not so plentiful as it used to be, hence we are under the necessity of saving the rubbish that used to be consigned to the flames.

Leaves and rubbish collected from the garden should be made up into one big pile in some out of the way corner of the gar-

den, where it will decompose and make the best kind of compost for adding humus to the soil of the garden.

With the lengthening days, and increased sun heat, the plants in the greenhouse and window garden will feel the stimulus, and will respond with more active growth. More water will need to be given them, and all plants that have permeated the soil in the pots with roots will need to be repotted. Insect pests infest all plants, especially those whose vitality are at the lowest ebb after having passed through the dark trying days of winter. Plants so infested should have a thorough sponging with a good insecticide, such as "Fir-tree Oil," diluted according to the directions on the container.

Plants that were propagated last month, will now be sufficiently rooted to be potted up into small pots, and grown on to provide more material for propagating purposes. Seeds of all kinds sown last month will need to be potted off singly, or pricked out into flats so as to get the greatest development by setting out time.—HENRY GIBSON.

RECONSTRUCTION

Long before our country entered the great conflict, many gardeners and estate superintendents in coöperation with the farmers and food producers here, were doing their bit to increase food production. Statistics have since proven that their achievements were worthy of the effort made. It is yet too early to relax our efforts in this direction, and the needs of our less favored Allies should at least prevent us from easing up.

But while we are endeavoring to keep up the increased production of necessities, we should lose no time in the preliminary work of restoration as soon as labor conditions permit. A great deal of land, including beautiful lawns were ploughed up and put under cultivation, and it will take considerable labor and money to restore them. Perhaps, on some of the larger estates it will be wise to retain some of the war-time features, for a good pasture, with grazing herd of cattle or sheep, or a field of well grown corn if location permits, will be more pleasing than an ill kept lawn.

Undoubtedly, the sections reclaimed and restored for ornamental purposes would thus receive more and better attention, and the changes made be far more pleasing to both the owners and their employees, than if complete restoration is attempted too soon.

Much important landscape gardening, held up through war conditions will be continued. These improvements and extensions will help to provide work for those who return from overseas, and men from munition plants and factories can return to their former employment.

The grower and plant-breeder will be able to take up his special hobby once again. Horticultural Exhibitions will again come into their own with increased competition, and the various National Societies, handicapped no longer by war-time conditions, will redouble their efforts, in their enthusiasm for the improvement of the flower or plant that has their special interest.

The enforced economy practised by us during the past few years, has, in many ways taught us some valuable lessons. After all it was not so difficult to make two blades of grass grow, where only one grew before. This valuable experience we have gained will not be forgotten, and the ultimate result will be greater efficiency all around, better kept gardens and estates, leading to a better understanding between employer and employee which is so necessary to achieve real progress.—JOHN CARMAN.

EUPATORIUM AEGERATOIDES and *FRASERI* have proven their worth as most desirable perennials this past fall of extremely dry weather. Wonderful was their show. While growing 4 feet high in damp soil of mucky nature they were equally decorative on high and perfectly dry ground although only 18 inches to 2 feet tall. They are of easy culture and because of their numerous seeds freely establish themselves anywhere and soon become so plentiful in lowland and woods that armfuls may be gathered for interior decoration without depriving out-of-doors shows.—A. MARTINI.

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WHERE THE WILD
COLUMBINE GROWS
CHITTENANGO FALLS

COLUMBINE

Wild Columbine the Winter mocks,
In Spring-time, where the barren rocks
Amid the matted mosses first are seen
Upon the rugged hills, yet scarcely green.
They nod when April's breezes roughly
find
Their sralet coats, with yellow satin
lined.

And mocking still, with eager lip
Their flaming bells the cold rains sip.
They drink and mock, while sturdily they
swing
To beautify the trailing gown of Spring,
And form a lovely fillet, red and gold
To make a girdle where the rocks are
cold.
And with a scintillating dance they twine
A fringe of early Columbine.

—Gabrielle Mulliner.



A GLIMPSE OF UKIAH VALLEY
CALIFORNIA

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*Pacific Coast Wild Flowers:
Their History and
Cultivation*

By Carl Purdy



THE Pacific Coast of the United States, and California in particular, has made many notable contributions to the gardens, the forests and the shrubberies of the world.

Europe has benefited far more from these introductions than the Eastern United States yet neither Europe nor the Eastern United States have as yet secured and succeeded in growing any large part of the really fine things native to our Western Coast.

The flora of the Pacific Coast is wonderfully rich and it is probably fully equal to that of Japan and only excelled by the Chinese Highlands where Wilson and others have of late found so rich a field. Indeed it is probable that while the latter excels in shrubs and trees, our own West would lead in the great variety of annuals and perennials.

It is certainly worth while to consider what there is still unused among this wild material and the climatic and other factors which must be understood if success is to be attained.

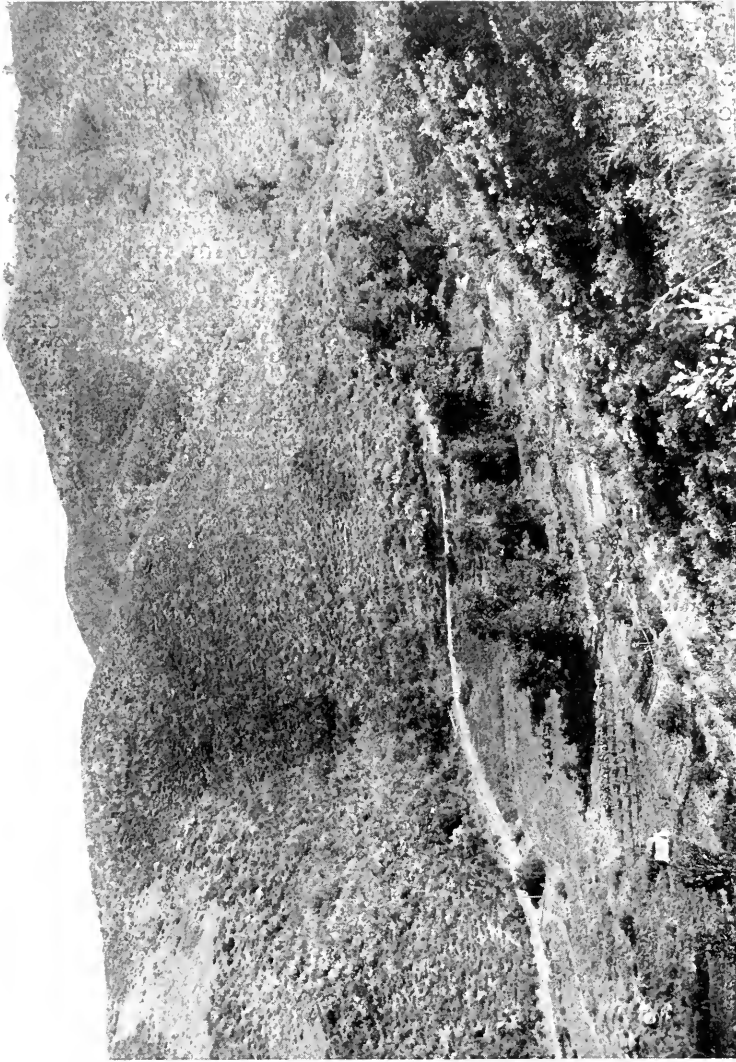
EARLY COLLECTORS OF WESTERN PLANTS

The botanical exploration of our Pacific slope is a most interesting story in itself. Up to 1791 it was an unexplored wilderness and a botanist attached to a Spanish exploring expedition in that year was the first to send herbarium specimens back to Europe. Soon afterwards Menzies, a surgeon on an English trading vessel collected and sent to England quite a number of species. The Russians had established a colony little more than fifty miles north of San Francisco Bay and botanists who visited this post and who accompanied exploring expeditions along the coast were the next contributors to our knowledge of Californian flora.

The first plant collector to reach the Coast was David Douglas, who was sent out by the Royal Horticultural Society of London for the express purpose of securing seeds and bulbs of fine new things. Douglas was both a great botanist and a real plant collector and he reaped a wonderfully rich harvest. Such lovely annuals as Clarkias, Godetias, Nemophilas, Gilias and Lupines were sent to England with the superb *Eschscholtzia*, with seeds of conifers and bulbs of *Calochorti* and Brodiaeas, and many of them found a congenial home in Europe and became the parents of superb races of garden flowers.

Douglas reached California in 1825 when the only settlements in California were a thin line of Missions stretching as far north as San Francisco Bay. He botanized and collected at various points and in a later trip went to the Columbia River and continued his great work. He needs no other monument than the grand conifer which he discovered—the Douglas Fir.

When next a plant collector visited the far west California had been taken by the Americans and the rush of gold seekers had penetrated every portion of California. Botanists had been here in the interval but no plant collectors, until in 1853



BULB BEDS AT THE TERRACES
CARL PURDY, ESQ.
UKIAH, CALIFORNIA

William Lobb was sent out by Veitch of London to seek new things.

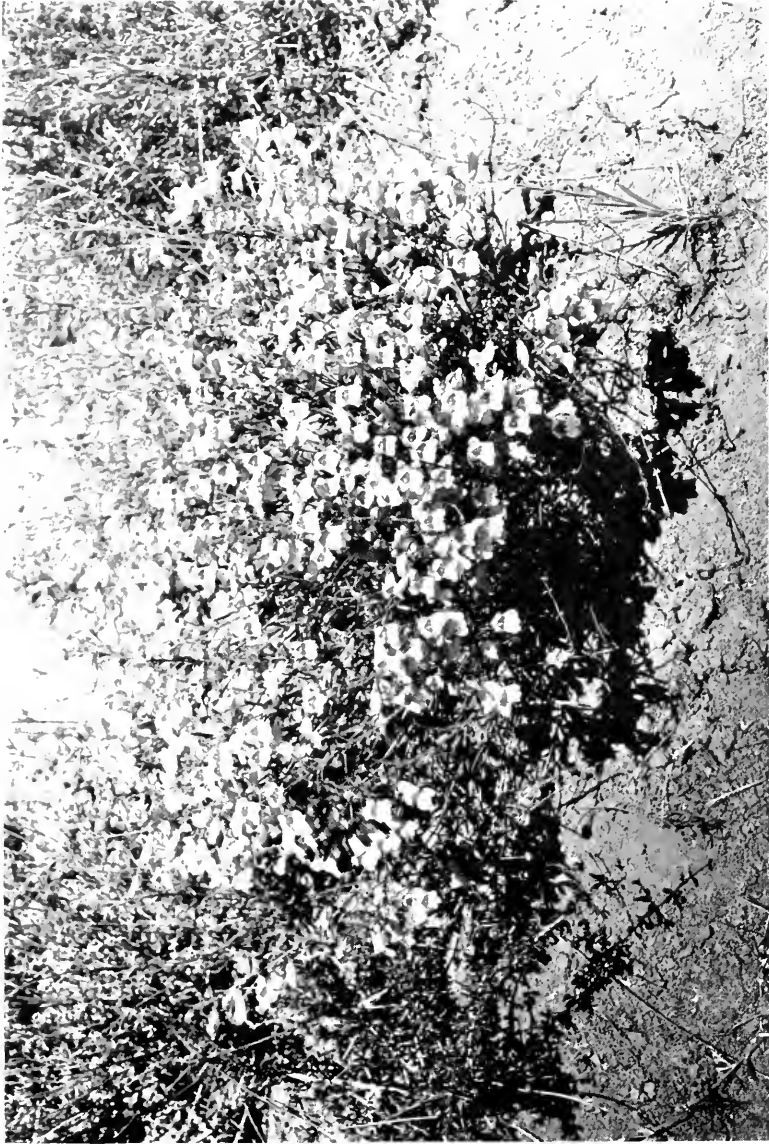
A year or two later a Scotch gardener, Thomas Jeffreys, was sent to California by a club of Edinburgh flower and tree lovers for the same purpose, and both collectors sent many excellent things to Europe.

For many years after that date little was done toward the collection and introduction of California flowers into European gardens. It is true that when the great interest developed in Lilies in the 60's large numbers of the bulbs of the three most common Californian species were collected and sent to Europe together with bulbs of a few *Calochorti*. Then, too, many seeds of the Douglas Fir and some of other conifers found their way to Europe to be used in forestry there.

This trade, was I believe, in the hands of a San Francisco florist, a Mr. Sievers. Later F. A. Miller was associated with Sievers and for many years Mr. Miller alone handled a trade in bulbs and tree seeds which were collected for him. But neither Mr. Sievers nor Mr. Miller were either botanists or collectors and few varieties were introduced.

In the late 70's a new element entered the field. At last America was being discovered by Americans in the sense of an appreciation of the wonderfully rich native flora both of the Eastern States and of the West. I am not sure, but I think that it was George C. Woolson, then of Passaic, New Jersey, who first realized how much we were missing by not using our natives trees and flowers to a larger extent in park and garden. He too was the American pioneer in Hardy Perennials and as early as 1879 issued a most creditable catalog of both.

That fine plant lover Edward Gillett then as now of Southwick, Massachusetts, became engaged in collecting his local flora at about the same time and in Charlotte, Vermont, Pringle and Horsford, started similar work. Later Mr. Pringle became one of the ablest of the world's plant collectors and traversed the United States and Mexico in his plant quests. In years that followed others engaged in the same work but the awakening of America is principally due to these three men. Mr.



WILD PENTSTEMON
P. CALIFORNICA

Woolson was unable to continue his work but Gillett and Horsford have given a lifetime to the popularization of American Natives.

I have said that America had at last come to a realization of the riches in the floral line that she possessed, yet the statement may not be entirely true, for I feel rather sure that for some time the demand for American Natives was European rather than native for all of these pioneers.

At least it was a European call which led these pioneer firms to seek Western collectors and through which several young and enthusiastic people engaged in the work in California.

Of these one was a lady. Mrs. Austin, working in North-eastern California was a most enthusiastic botanist and an able plant collector. In the extreme south of California C. R. Orcutt at San Diego was no less enthusiastic and in later years ransacked the American Southwest and Old Mexico for cacti. J. B. Hickman of Monterey became a most efficient bulb collector and far to the North on the Columbia River, W. N. Suksdorf became one of the best botanists and plant collectors that the West has had. Lastly among these recruits in the plant collector line was the writer. Partly because fate willed it, partly from love of nature and partly from having a gift for organization, it has been my pleasure to make a life work of collection of the Pacific Coast Flora and through a wide organization to make supplies of the desirable bulbs and plants of the coast as reliable as are those of Tulips and Daffodils.

This is however another story.

During my forty years of plant collecting there has been one other notable collector in this field. Mr. C. A. Purpus employed under foreign auspices did a great deal of seed and plant collecting and moved from station to station from California to Mexico.

THE PROBLEM OF CULTIVATION

It is enough to say now that the problem at this date is not to secure material to try out in new regions but rather one of acclimatization itself. My own work in bringing Western

natives into cultivation has been extensive and while all of it has been done in California it has helped to work out the problem in some particulars. My garden is situated at 2300 feet elevation in the Coast Range of California about 100 miles north of San Francisco. It is far enough from the coast to be out of the almost frostless belt which skirts our coast to the Oregon line.

The winter rainfall is heavy and light snowfalls are by no means rare. In cold winters periods of frost with bare ground may last weeks at a time with a minimum temperature as low as 10° above zero. In mild winters 18° to 20° above would be nearer the minimum but in both cases plants are exposed to hard freezing without cover. My experiences under these conditions will be referred to later.

As to the climate of California—there is no such thing. California alone is a vast region over 750 miles along the Pacific and extending from sea level to 15,000 feet. It has a considerable area east of the Sierras in the arid Great Basin, another area of desert in the south where rain seldom falls and the summer's heat is tropic, a long coast line of moisture where frost is seldom known; a great forest belt in the Northwest and the North where the rainfall is as high as 120 inches from October to April. As if this were not enough its mountain ranges and air currents create a multiplicity of local climates which I think can be said to have but one feature common to all.

Beginning in Central Oregon in the Umpqua Valley and extending the length of California it may be said that there are no summer rains or at the most freak thunder storms. In all of this region as well as the vast area east of the Sierras the moisture is precipitated as rain or snow from October to April or May and the summer is entirely or practically rainless.

Again, in all of this region root action at least, with all bulbous or perennial plants, starts with the first rains and is most active during the winter season. Top growth may or may not begin at the same time. That depends upon winter temperature. Even in the High Sierras where the snow banks may not melt



WILD PENTSTEMON ON A
CALIFORNIAN ROADSIDE

until July or even August the season is marked by a dry period so that all plants go into the winter well hardened.

North of the Umpqua Valley in Oregon and west of the Cascade Mountains there are local climates also, but in all cases with more or less summer rains. Naturally temperatures vary immensely in this great region and there are many places where the winter mean may be as low as or lower than in New York.

Take for instance an altitude of 5000 feet in the Sierras. It is a region of pine forests and the snowfall may be easily seven or eight feet on the level. The snow is apt to cover the ground by early November and not to melt before late April or early May. It would naturally be supposed that the trees and shrubs from there would be perfectly hardy in New York, yet as a matter of fact some of them are of doubtful hardiness in Philadelphia. Of course as the plants are snowed under before the ground is very wet or frozen hard they do not have to stand as hard conditions as obtain in New York, although after the snow melts severe frosts may occur.

But it has been well proven that many supposedly tender Californians can withstand the coldest Eastern winters without injury. Take the *Calochortus* for instance. Species of this occur as far East as Nebraska and as far north as British Columbia in the inner belt. In either case they have to withstand as much cold as they would in New York and it is a fact that practically all of this genus go through the Eastern winter unhurt if it is a cold winter. The danger comes in the spring.

Speaking of the effect of frost on these supposedly tender bulbs take this instance. Some years ago a bed had been planted with a species native to this region and not covered, when a heavy rain storm set in, followed by severe freezing weather. The bulbs lying on top of the ground threw down roots and made stems and flowered well in spite of the fact that they were frozen solid daily for some time and in the full sun at that.



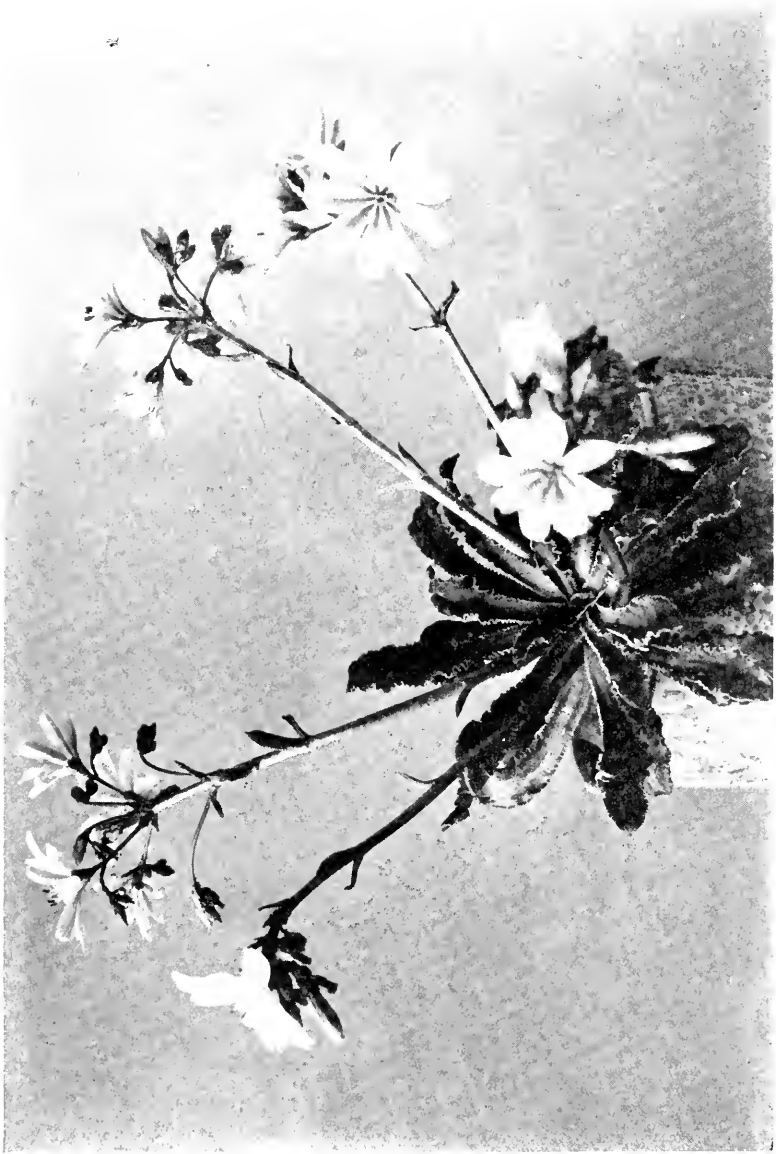
DARLINGTONIA CALIFORNICA
WILD IN THE MOUNTAINS OF
CALIFORNIA

In bringing the plants of the High Sierras to my garden there may be the same difficulties as in attempting to grow them in the East. Take this instance. On a peak of the Sierras at about 9000 feet there is on the north side a bed of *Primula suffrutescens* a very beautiful carpeting variety. Near it grow *Anemone occidentalis* a tall variety with large white flowers. Not far away in the crevices of the rock were *Heuchera rubescens*. And again a *Pentstemon*, a *Potentilla* and *Linum Lewisii*.

In my garden the *Linum* naturalizes itself, the *Heuchera*, *Pentstemon* and *Potentilla* are perfectly at home while I have never succeeded with either *Anemone* or *Primula* although I could give them soil and moisture conditions very like their home. *Mimulus Lewisii* from moist rich soils in this same region I grow easily but the *Gentian* has always failed me.

I think that in these instances the trouble is that in the Sierras the melting snow keeps the air cool and the sun's direct heat is not so strong as in these lower altitudes. Another factor in all acclimatization is as to whether a plant has fixed its habits or is pliable under new conditions. The best instance of this is with some of our Western *Erythroniums*. My garden is natural *Erythronium* soil and most species thrive wonderfully. From the high mountains of Washington I have often had *E. montanum*—the reader may have seen the photographs of the great masses of this in the meadows of Mt. Rainier—and *E. grandiflorum* of the higher mountains. Now while most species planted here make root growth whenever rains come in the fall and make leaf and flower when spring temperature invites, these two high mountain varieties will not make a single move until well into the summer and then it is too dry for them to develop. At one point *E. grandiflorum* is found down to a few hundred feet above the sea level and this form, while hardly distinguishable from the mountain form, can be grown most easily here. Our trouble with some other mountain plants may be due to this fixity of habits.

Then again the matter of soils. In the West they are as varied as the climates. To be sure there are considerable areas



LEWISIA HOWELLI

with similar soils, but then there are innumerable small mountainous areas where every half mile shows a change.

Vegetation too is distributed very often according to soil changes. If you wish to find a certain plant, look for a given soil. Sometimes this is very marked as in the instance of a certain Mariposa Tulip. It is only found in little islands of a peculiar stiff clay and these may be miles apart. Little colonies may be seen in areas of fifty feet across and none outside of those areas, and perhaps it may be miles to the next little deposit of soil and colony of bulbs.

This would seem to be conclusive evidence that this species requires this particular soil. As a matter of fact it is the most adaptable of its kind and will thrive in many soils when in cultivation.

But while some plants seem to be confined in nature to particular soils, others seem almost indifferent and are found in very many places. Soil may be a factor but is not by any means necessarily the controlling factor. I long ago came to the conclusion that we often confuse matters in laying stress on soil when the real factor of success is some unnoticed element.

Exposure—whether to sun or to air currents—is a most vital element in the West and more particularly because with our long dry summers, a cool exposure may mean everything in the way of moisture. Exposure is so vital an element that in seeking many species the first thing to think of is as to which way some hill faces. Of course in the West as in the East the vicinity of trees whether in forests or scattered has much to do with the distribution of plants,—everything to do with the flora of a given region. Yet even here one cannot rely much on appearances for it may be that the trees are not the controlling factor. For instance *Erythroniums* are typically woodland plants. Yet where woods have been cleared so that there is at most scattering underbrush you may find by far the finest and largest plants and the high mountain species grow in the open and full sun. The real controlling factor is in a certain temperature and a degree of moisture during the growing period rather than the shade of the trees.

Many other things control distribution of plants than their likings. In very many instances it is the competition of other plants which confines a species to poor soil and rocky places in spite of its soil preferences. This is well exemplified with many Mariposa Tulips. In nature they more often grow in rather poor soils and in barren places. Where a railroad passes through a region where they are already present in small numbers, the small colonies on the poorer spots rapidly spread and often become very numerous, in much richer soil than they have ever inhabited. This because it is the custom to burn over the right of way early in the summer and as soon as it can be burned. Coarser plants have their seed pods burned while the Mariposa Tulips, propagating by both seeds and offsets can increase without being crowded. This is a factor in plant growth and distribution which operates in innumerable districts in the West which can hardly be said to be known in the region east of the Rockies. It is this action of brush, grass or forest fires.

Generally speaking where a fire has passed over a section all vegetable growth is stimulated, often wonderfully. The spread of many species from seed is greatly increased, some species appear which were rare or unknown before, and the size and beauty of all flowers is increased sometimes 300 to 500 per cent. Always for the finest Bulbous plants and especially Lilies seek the path of a brush or forest fire of one to two years previous.

To just what action of the fire these results are due I do not know. Perhaps to several things. Of course there is a deposit of potash which we know is beneficial, yet spreading hard wood ashes over well tilled soil does not have the stimulating effect that burning brush over it would have. In brushy or wooded lands fungous growths are undoubtedly killed and I have long noted that lily bulbs which were much rotted before a fire would be perfectly bright and fresh afterwards. Opening out to the light by burning brush or small trees has its part in the result and soils are always loosened by a fire. Sometimes this loosening amounts to a fairly good surface cultiva-

tion. Of course it is entirely impracticable to use fire as a garden agent but if we could fully understand wherein its benefit lay we could greatly improve the growth of many plants.

I think that in the West as compared with the East as a rule soils are more open and open to a greater depth. This is not true in our forested regions, but everywhere else it is the result of our dry summers. This tends to make all Western perennials more deeply rooted, and without question should be considered as a matter of prime importance in attempts to cultivate them in the East. For this reason too I believe that greater success will be had in rockeries where there is more depth of loose well drained areas than elsewhere. That is, many plants which here are widespread would be at their best in the East in very well drained rock gardens.

Along the Pacific Coast from Central California north a belt from 10 miles to perhaps 20 miles wide in California and much wider to the north tends to acidity and is much improved by liming. But this is practically the forest belt and its flora is more of the woodland character and far less rich than that of the interior.

Drainage again is a factor of decided importance. Of course with the heavy rains in winter many sections of the West may have very wet spots in the rainy season but these same sections may be baked hard by fall. In handling Western plants and trees it is a safe proposition to drain well. That is as apt to be the necessary factor as anything else.

One other rather baffling thing is in the handling of plants which here grow in spots very wet in winter and perfectly dry in late summer. *Camassia* is an instance. It grows in winter swamps starting its root growth with the first rains and at flowering time often has a few inches of water around it. Yet later its bulbs are ripened as hard as those of the *Calochortus* growing on dry uplands.

In my acclimatization work I place the larger portion of a consignment of new plants in that situation as to soil, shade and moisture which my knowledge indicates most suitable, but I place some of them in various situations as an experiment



LAKESHORE AT THE
TERRACES. UKIAH

and very often it proves that the shade, moisture or soil element is accidental and that the really necessary thing is something entirely different. For instance the plant from Western Oregon in full sunlight may require shade in this region of brilliant summer sun. The plant from a moist place in the Great Basin may be perfectly happy in the dryer portions of this much moister climate, the rock plant of the Sierras may be happy in my perfectly drained and permeable gravels, the bog lily of the Sierras well satisfied with the well drained soil where moisture is applied artificially to the extent of its needs, and so on interminably. An instance in point is *Epimedium alpinum* which grows in the open in the Alps. Here it succeeds admirably in moist spots in rather heavy shade.

One interesting generalization can be made. Plants or bulbs growing in woodlands make roots more slowly after moisture comes in the fall and make tops much later. If planted in the East this would insure that no fresh growth would be made in the fall to suffer from either winter cold or to be exposed to the spring thaw.

This for theory. As to facts. Quite a lot of our woodland plants, mostly of the Saxifrage Family, have proved quite able to stand a woodland situation near Boston. All of the Western Erythroniums have had repeated tests from Michigan to New England and proved hardy, and, as far as I can learn all Western Liliums are perfectly hardy throughout the East and all may be called woodland plants. The same reasoning would make us believe that the undershrubs of California would prove hardy for they too are slow to start.

Rather dissonant from this is the fact that the Matilija Poppy, *Romneya Coulteri*, native of the very mild Southern Californian coast seems from various accounts to be almost or quite hardy in New York. One factor in this may be that it is not at all harmed by losing its entire top as it flowers from new sprouts.

One would expect the plants from the Mid Sierras, we will say at 5000 feet elevation, to be hardy in the East. The snow-fall is heavy, it does not fully melt until late April or even

May, heavy frosts may come after it has gone or before the snow comes in the fall and sometimes foliage is very badly burned. The forest trees standing out of the snow one would say would surely have to withstand as much cold as in many portions of the East. As a matter of fact many of them will not grow at Philadelphia.

Or again take the flora of the Higher Sierras where the snow fall is very great and summer frosts frequent. Surely they ought to be hardy in the East. We do not know. I am inclined to think that with them failures are rather due to culture than to climate, for when I bring them to this comparatively mild climate I have my troubles.

I believe that with a large number of Western plants the real trouble is not in climate at all but in other conditions. If these conditions can be met there is a wonderfully attractive amount of material to be added to the Eastern garden and especially of rock plants. This is true especially of rock plants because in the West there is one soil condition not so prevalent in the East. That is a considerable depth of permeable perfectly sweet soil. Our Pentstemons for instance are more apt to grow in gravelly or rocky soils with their roots penetrating to a foot or two and maintaining growth after the surface is quite dry. This condition can readily be given in rock gardens; not so readily in the common garden.

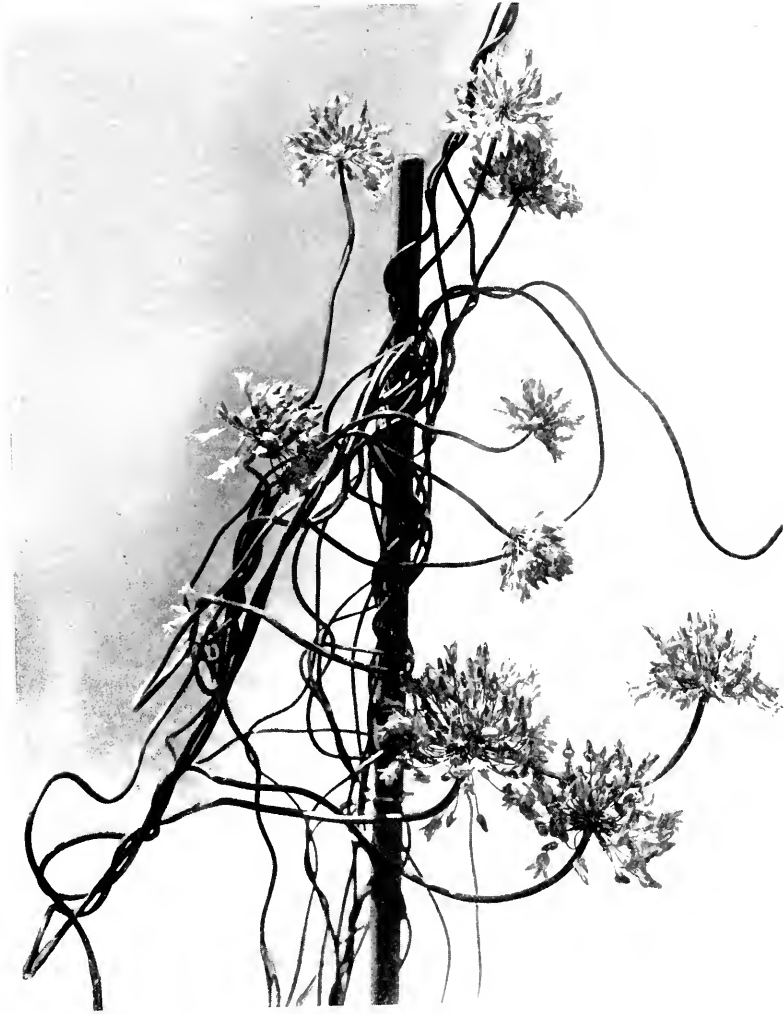
It has been my experience in plant growing and acclimatization generally that success lies in some small and often trifling particular. Things which would seem material may be of little consequence.

SOME PLANTS OF ARID REGIONS

Take *Delphinium cardinale* for instance. This plant is native to the semi-arid tablelands and open gorges of Southern California but does admirably in well drained soil where the winter rains may reach a total of sixty inches, with thirty-five inches as ordinary. But while I grow collected plants readily I cannot save fall grown seedlings of this plant. They always



CLEMATIS LIGUSTICIFOLIA ON A ROADSIDE
BANK IN THE SIERRAS



BRODIAEA VOLUBILIS

damp off even if sown wild. Or again I found the trouble in growing *Calochortis* from the arid regions was not in temperature or in winter moisture. *Calochortus Kennedyi* from the Mohave desert grows admirably until the warm spring weather comes and the flowering stems start up, and then within a few days the Lily leaf rot gets nearly every one. To some degree I have the same trouble with all species from the arid regions. Here it would seem that the fungous diseases are not prevalent in their native dry regions and that they have not developed resisting powers. In addition to this is the fact that forms of *Calochortus venustus* growing in Northwest California are very close to others in the dryer sections yet the latter suffer considerably from the leaf rot while those native here are immune.

All of the wonderfully varied Western Pentstemons carry some wood above the ground in winter but many of them withstand very severe freezing when uncovered. This because they are very often found in the crevices of rocks or on exposed dry points where the snow covering is blown away.

Here in California we find it best to plant a subject of doubtful hardiness where the sun cannot strike it early in the day. It thaws out gradually if frozen and suffers much less.

My next article will begin a review of the best plant material of the West both that which has had trials in the East and Europe and less known species.

UKIAH,
CALIFORNIA

Progress in Breeding Freesias

By Walter Van Fleet



THE Freesia is the most popular of a group of Iridaceous plants with bulbous root-stocks that form, during the season of growth, a substantial portion of the herbage of certain South African localities and which have scarcely received the appreciation their merits deserve.

Ixia, *Sparaxis*, *Tritioma* and *Babiana* all have their characteristic charms in the way of rich and varied colorings and graceful outlines as well, but the Freesia has the inestimable advantages of a peculiarly grateful fragrance that never cloys, and of lasting remarkably well as a cut-flower. These qualities coupled with its ease of culture and certainty of bloom endear it alike to florists and amateurs who have greenhouse facilities, as it is too great a lover of light to be well adapted for ordinary window culture.

The original wild Freesia and the only species known to growers until quite recent times, is *F. refracta*, introduced to European cultivation about 1816. It has a rather tortuous horizontal scape, or flower spike, with five or more blooms with bulging corolla tubes pointing irregularly up or down and is lurid greenish yellow with a pronounced orange blotch, rather than clear white in its coloring. Florists, however, soon found the Freesia so acceptable for their uses that bulb growers set about the improvement of the type which soon began to lighten its colors under culture and critical selection. As much as forty years ago a superior variety of *F. refracta* appeared with larger foliage and well shaped, almost white, flowers, though retaining the deep yellow blotch. This is known as *Freesia refracta alba* and may be considered as the usual garden



HYBRID FREESIA
NEW COLOR PATTERN WITH
"PICOTEE" EDGING

variety, having entirely displaced the type except in critical botanic collections. The ideal of a pure white Freesia of extra vigorous growth was still striven for, culminating a dozen years ago in the introduction of the variety Purity, developed by Mr. Rudolph Fischer, a Long Island grower now resident in California. Purity is now the standard Freesia for florists use and, when well grown, is large and fine with a greatly increased number of blooms that, at least in the beginning of the forcing season, are entirely white, though later as the plants weaken the yellow blotch often reappears. It is normally so handsome, fragrant and easily grown that it about meets the present desires of the flower-buying public for a white Freesia, although there are other good strains of *F. refracta alba* in cultivation.

YELLOW FREESIAS

Although yellow may be said to dominate in the typical wild *Freesia refracta*, it is anything but a pleasing shade, often tending toward green, and growers usually expend their main efforts in suppressing it. A few fanciers however, have endeavored to bring out more acceptable tints of this color and have been greatly aided by the dissemination of an unusually vigorous variety or garden species, known as *Freesia Leichtlinii*, discovered growing in a neglected state in an Italian nursery by the late well-known continental plantsman Herr Max Leichtlin. *F. Leichtlinii* is by far the strongest growing *Freesia* in general cultivation, producing a wealth of large, well-shaped blooms with wide tubes, sulphur to deep yellow in color, free from greenish shades, but with a deep orange throat-blotch. Mr. Herbert Chapman in England has bred from *Leichtlinii* a charming golden-yellow variety, now known to the European trade as *F. Chapmanii*. Yellow freesias from this source have highly developed fragrance, usually exceeding in intensity that of the white varieties. *F. Leichtlinii*, by inter-crossing with *F. Armstrongii*, the new pink flowered species and the yellowish reversions of *F. refracta alba*

that still appear, has lately given rise to some quite remarkable undisseminated apricot-colored and even flaming orange varieties, rivalling Tritonas and Montbretias in bright appearance.

PINK FREESIAS

A few European nurserymen were offering twenty years ago colored freesias other than yellow, but on trial they turned out to be only variants of *refracta alba*, with the palest possible tintings of rose, lilac and purple, often only on the exterior of the corolla tubes or petals where coloration is certainly not wanted. All had conspicuous yellow blotches in the throats. Those personally tested had little value as distinct varieties and were at once discarded. The very natural desire for greater variety of effective coloring in a plant already well endowed with cultural attractions however, was gratified about the year 1905 by the dissemination in workable quantities of the newly described pink, or rather lilac flowered species *Freesia Armstrongii*, found near Natal, South Africa. *F. Armstrongii* is taller and rather more slender in growth than *refracta alba*, with branching scapes, bearing rosy lilac flowers with white tube and yellow blotch, well carried and of fair size and shape. The fragrance is scarcely perceptible, the corms are smaller than those of *F. refracta alba* and the blooms come about a month later when grown under similar conditions. As was to be expected this attractive new-comer was quickly utilized for breeding in bulb gardens, notably in Italy and Holland, and to a lesser extent in this country. Some meritorious hybrids, mostly with superior varieties of *F. refracta alba*, characterized by shades of pink, lilac, mauve and even violet, practically all with yellow base are now in commerce, and *Leichtlinii* has also been used with good effect in developing shades of brown and orange, sometimes with much spotting and veining. The best named hybrids we have raised were grown in Holland, seedlings from Italy have produced some good flowers, and we hear of a practical florist's pink variety being lately developed in California.

The writer's breeding experience with Freesias dates back to the introduction of *F. Armstrongii*, hybridizing this very distinct species as soon as obtainable with typical forms of *F. Leichtlinii* and the best strains of *F. refracta alba* then to be had. Previous attempts had been made to deepen by selection and cross-pollination the occasional rose and purple shades found in *refracta alba* seedlings, but with little success. Many beautiful hybrids of *F. Armstrongii* were soon obtained, duplicating to some extent, as was to be expected, the results obtained by other workers in the field. The most distinct of these hybrids were bred together when fertile, and occasionally pollen was used from the parent sources to fortify especially desirable features in the offspring, but no hybrid varieties from other sources were used in developing the strain. Twelve generations in all, representing a complicated series of inter-crossings and a considerable number of controlled self-pollinations, have been grown, giving most varied and interesting results. The color range has been extended from the original lilac and yellow tints to include brilliant yellow, bright orange, copper red, various pink shades, some very clear and bright, to intense rosy purple and even violet blue. The pink and rose varieties were quite satisfactory in general as regards color, form, and vigor from the earliest crossings, but the extreme shades of blue, purple, brown, and copper red were only developed by repeated pollinations of critically selected parents, at times highly desirable in coloring, but often defective in form and finish. By growing hybrid seedlings in sufficient numbers however, it has been possible to develop varieties having the desired qualities in almost every instance and also to induce certain wide departures from the usual color pattern, which consists of a conspicuous yellow throat-blotch on a uniform white or colored ground.

DEPARTURES FROM NORMAL FORM AND COLOR PLAN

The departures from normal flower-form of a wide or narrow-tubed trumpet-shaped corolla with six broad petals or terminal divisions are not numerous, but may be expected to increase

with further development. One type has the petals narrow and pointed like the familiar "star phlox" of our annual flower beddings and is quite effective in the white and light lilac colors. Another shows strong indications of "doubling" by increasing the corolla divisions to eight or more, making quite a massive flower. This is particularly noticeable among the light yellow or cream tinted varieties. Any tendency to true doubling or hose-in-hose corolla form as with certain *Primulas* and *Daturas*, or filling up of the throat with a confused mass of petals will doubtless be discouraged by breeders as lessening the natural beauty of the blooms. There are also tendencies to dwarfness and gigantism in stature among the later cross-breeds. The former is very welcome. Compact, short-jointed plants with good blooms suited for window culture would be an acquisition in view of the rather lanky habit of some of the better varieties. On the other hand increase in height, unless accompanied with marked enlargement of bloom and leafage does not appear desirable. Purity and some of the *Leichtlinii* hybrids can now be grown quite two feet in height. The most acceptable form-variation that has yet appeared results from the swinging of alternate blooms in each flower scape and branch to the right and left, together with a shortening of the nodes, thus forming a two-ranked cluster that is very attractive, giving in the blush and light rose varieties a pretty imitation of a greatly enlarged inflorescence of the trailing arbutus, *Epigaea repens*, a similitude further borne out by the pleasing fragrance. The number of blooms on the central scape in some varieties have been increased to thirteen and a well-grown plant may easily yield fifty or more flowers, as side branches develop, during its blooming season.

The principal variations in color pattern consists in the replacement of the yellow blotch with streaks and spottings of a contrasting color. Thus certain red-orange varieties have chestnut-brown blotches or stripes, and large blue or violet blotches in pairs are found in some of the new white sorts, giving an odd and not unpleasing *Cattleya*-like orchid effect. The throats of other varieties are tigered and streaked with diverse colors, at times in a manner more unique than pleasing.

A PICOTEE EDGING

A welcome variation in color pattern is the concentration of the color at the edges of the petals in the manner of the picotee carnations of the older gardens. When associated with the almost total suppression of the yellow blotch it gives a cheerful and pleasing effect. The colored plate opposite page 232 shows one of the first of this type to develop and it appears likely that picotee Freesias in many colors may in time be evolved.

LONG SEASON OF BLOOM

The extended season of bloom, covering eight weeks or more, of the new varieties is an unexpected but never-the-less valuable feature. *Freesia Armstrongii* is naturally some weeks later in coming into bloom than the older species, and a certain amount of variation in season among the hybrids was to be looked for, but the newcomers bloom in succession though planted at the same time in September and grown under exactly the same conditions, from early January until March. This lengthened season will do much to popularize these attractive plants as flowers can be had in long succession without the trouble of starting batches as with the old varieties.

FUTURE OF THE FREESIA

Freesias are now well entrenched in popular favor and will doubtless be increasingly grown even if no striking advances are made in the way of perfecting varieties, but added interest will arise as the range of color and form is extended. The best of the newer hybrids appear rather sterile as regards seed and pollen production, though most of them produce an abundance of good cormels, and it may be that the development of new varieties of outstanding merit by means of seed selection and cross-pollination may slow up, but cultural mutations or vegetative "sports," possibly of a startling character, may be looked for at any time, as with other intensively cultivated plants, and in any event the Freesia has taken its place as a not unimportant part of the winter equipment of florists and amateurs alike.

THE CULTURE OF FREESIAS

The culture of the *Freesias* is of the simplest character. The plants like rich, open and fairly light soil, cool temperature, abundance of sunlight at all stages of growth, and plenty of moisture as the blooming season approaches. Bulbs or corms should be potted up in August or September, as it is not well to keep them long out of the soil. Seven large bulbs, or about ten smaller ones, can be well accommodated in a six-inch pot which should be provided with ample drainage. Press the bulbs to the level in the damp compost and cover with half an inch or more of coarse sand, or fine gravel if available. Place outside in a sheltered situation and water sparingly until growth starts, then more freely. At the approach of hard frost in October the pots or boxes should be removed to a light, cool greenhouse bench and given free ventilation and sufficient moisture to maintain a slow but steady growth. The ordinary carnation temperature of fifty degrees at night with a reasonable rise on bright days suits them to perfection if ventilation is well attended to. By the middle of December the plants will need support, which is best given by four bamboo or wire stakes sixteen inches long with encircling cords to each pot, or a similar arrangement if grown in boxes or the open bench, as florists sometimes attempt. Blooms appear from February to March or earlier if the temperature is run higher, but forced *freesias* are usually deficient in texture and keeping quality. After blooming the bulbs should be allowed five or six weeks to mature their growth, then gradually dried off and stored in the earth in pots or boxes or even in the open bench, keeping a wary eye for the depredation of mice or rats which occasion frequent losses. In midsummer they should be shaken free of soil and assorted, the small cormels or bulblets being separately grown much closer together, if it is desired to increase the variety. Seedlings for the production of new varieties may be grown in much the same manner, but they cannot be relied on for the perpetuation of the parent types. From twelve to fifteen seeds are about right for a six-inch pot of compost similar to that in which the flowering bulbs are grown, or seeds can be spaced an inch apart in rows six or more inches apart in

boxes of the same depth. They should be well firmed in and covered with half an inch of clean sand. August appears a good month in which to sow Freesia seeds, as the plants grow slowly throughout the fall months and early winter and are usually strong enough to bloom by the following April. Seedlings should have exactly the same treatment as the larger bulbs as regards temperature, light and moisture. If space is limited seeds may be sown as thickly as one hundred to a six-inch pot, but there is risk of "damping off" and the resulting corms are so small that they cannot bloom until given ample space in succeeding years.

The commercial culture of Freesia bulbs is concentrated about the warmer portions of the Pacific and Mediterranean Coasts. In California the regions from Santa Cruz to Ventura afford protected localities where bulbs may successfully be grown in the open, but lath sheds or glass structures are needed even short distances from the actual coast line. In Europe successful cultures appear to cluster about Nice and Naples, where nearly frost-free conditions may be had. The commercial outdoor grower of Freesias has a serious condition to contend with that does not confront the glass-house grower to anything like the same extent. He can only grow one variety in the same locality for successive years if he wishes to maintain the integrity of his stocks. Seed capsules are closely cropped to conserve energy for bulb increase, and every effort is made to prevent seeds getting into the soil, but many small cormels remain after digging to plague the grower in after years. Little harm is done where cultures are restricted to one variety, but unpleasant mixtures occur if another type is planted before the first one is thoroughly eradicated. The glass-house grower uses entirely new soil each season and is thus able to keep his varieties true to type. It is quite likely that the choice new hybrids will for sometime be grown by the greenhouse method by careful specialists near the larger eastern centers of population. Any well equipped carnation house is adapted for the purpose and it is more than probable that the financial returns for the choicer strains of new Freesias may at least equal those to be had from staple glass-house crops.



THE DYKE LEADING
TO THE LAKE

An Up Country Community With an Old World Charm

By Zelia K. Hoffman



HERE is a village in the uplands of the Lake Country of Central New York which still preserves many of the traditions of life of the Old World, and gives the visitor that same delightful feeling that comes when visiting the country communities of England and France —aloofness from the rush and restlessness of modern life and immediate and intimate relation with Nature which is not always possible for places near the great cities.

Foxes still live in the woods and beavers and many little wild animals of that underworld which babbles unceasingly down the "wind in the willows" have their happy existence in stream and lake and meadow land. Birds build in the eaves and the rafters and the parliaments of crows still carry on their busy life like real English rooks. In the lush green of May and June when the sheep and lambs are on the hillside and the primroses are foaming along the garden paths (for the English primrose loves this climate), the far upland feeling and remoteness of this countryside and the masses of hawthorn blooming along the hedgerows, make a true English countryside.

The traditions of the place are Dutch, however, not English and the charming old Manor House built by Mr. Jan Lincklaen in 1797 recalls the Hague, not England. This delightful house has been more fortunate than are many of our beautiful old houses in this country, as it has ever had the constant, intelligent and loving care of the same family, the inheritors of Mr. Lincklaen's properties, and it is probably due to this and the



BACKWATER NEAR ESTATE
OF GEORGE LEDYARD, ESQ.



THEOPHILUS CAZENOVE—1790, AGENT
FOR THE HOLLAND LAND COMPANY,
PHILADELPHIA, FOR WHOM CAZENOVIA
WAS NAMED. PORTRAIT PRESENTED TO
VILLAGE LIBRARY BY HIS GRANDSON THE
MARQUIS DE CAZENOVE

sequence of traditional education and refinement in the village life that has preserved for Cazenovia that atmosphere which is found there.

Theophilus Cazenove was the first General Agent of the Holland Company. When the Company made their first purchase of lands in the interior of the State of New York and Pennsylvania, soon after 1790, he had arrived in this country and acted as their agent. In all the negotiations and preliminary proceedings connected with the large purchase of Robert Morris, of this region, the interests of the Company were



JOHN LINCKLAEN
FOUNDER OF CAZENOVIA

principally confided to him. His name is intimately blended with the whole history of the title. When the purchase was perfected he was made General Agent, and under his auspices the surveys were commenced and the perfecting of the title completed.

He returned to Europe in 1799, ending then his connection with the Company. He resided for a time in London, after which he went to Paris and died in the house of M. De Talleyrand.

* * * * *

Jan von Lincklaen was born in Amsterdam, Holland, December 24, 1768. His boyhood was principally passed in Switzerland, where he was educated by a private tutor. At the age of fourteen he entered the Dutch Navy, remaining in the service for some years, and attaining promotion to the rank of Lieutenant under Admiral De Winter. While in this service he visited the most important places in Europe and Asia, and passed considerable time at Smyrna and Ceylon.



ORMOND WOODS
OWAGHENA LAKE

In the year 1790, he came to this country under the patronage of Mr. Stadnitski of Amsterdam, the principal director of the Holland Land Company's affairs in America.

In the year 1792, he penetrated the wilderness of Central New York, and surveyed the land subsequently purchased by the Holland Land Company, and early in the following year (1793), intrusted with the agency of the tract, he commenced the actual settlement of Cazenovia, naming it after his friend Mr. Cazenove. Young, active, and persevering, he turned his attention to the needs of his new settlement, and at once commenced laying out roads, building bridges, erecting mills

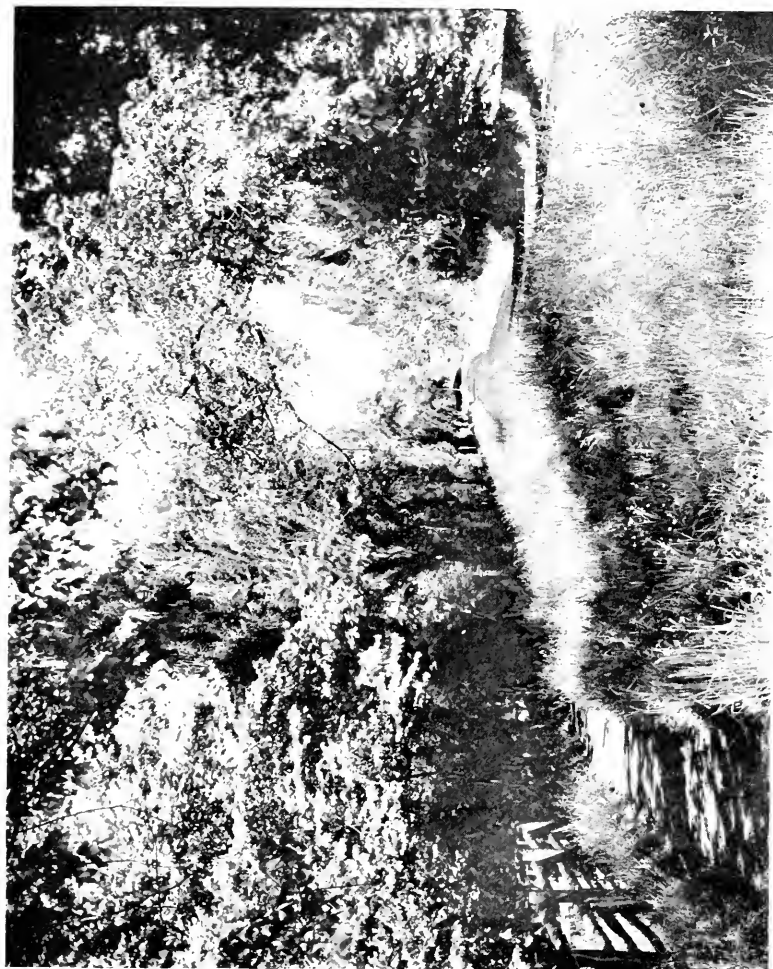
and warehouses, and all that a new home demanded, and he soon found himself surrounded by a prosperous community, in the place where his refined taste had induced him to make his new home.

In this active way he labored for nearly thirty years, and won for himself a reputation for integrity and accuracy, and proved himself in all ways a friend to the poor, and a neighbor devoted to the welfare of his townsmen.



THE MANOR HOUSE
LORENZO

John Lincklaen's name was also connected with the Holland Purchase in the Genesee country. According to the then existing laws of this State, those of the Holland Company then in Holland, could not purchase and hold real estate, being aliens. After several changes in the trustees, and transfers of portions of the land, sanctioned by the Legislature, the whole tract of the celebrated "Morris Reserve," containing about three and a quarter million acres was deeded to the individuals, in their own names, who represented the three separate branches of the Holland Company. These were:—Herman Leroy, John



THE HAWTHORN IN BLOOM
ON A COUNTRY ROAD



THE VILLAGE FROM
THE HILL



WHERE THE DUCKS FLY
IN AUTUMN



ONE OF THE EARLY GARDENERS OF
CAZENOVIA, HELEN LEDYARD (MRS. ALEXANDER
KRUMBHAAR) ADOPTED DAUGHTER OF THE
FOUNDER OF THE VILLAGE

Lincklaen and Gerrit Boon. In conveyances of these vast estates made subsequently, we find the names of Herman Leroy and Hannah his wife, John Lincklaen and Helen Ledyard his wife, Gerrit Boon, Paul Busti, William Bayard, James McEvers, the Willinks and others.

His acquaintance embraced many learned and distinguished men, (among them Talleyrand, at the time seeking in America a refuge from European disturbances;) and his reading, as evinced by his library, was varied and extensive, in English, Dutch and French.

* * * * *

Cazenovia was formed from Paris and Whitestown, Herkimer County, March 5th, 1795. It is the center town on the western border of the county, and is bounded on the north by Sullivan,* east by Fenner* and Nelson,* south by DeRuyter, and west by Onondaga County. The surface of this town is a rolling upland, broken by the deep valleys of the Chittenango and Limestone Creeks. The summits of the hills are 200 to 500 feet above the valleys. Cazenovia Lake (called Owahgena, meaning "the lake where the yellow fish swim," or "yellow perch lake,") a beautiful sheet of water about four miles long, lies in the northern part. Its shores slope gently back from the water's edge, where handsome farms, unrivalled for richness by any in the county, are spread out to view fourteen hundred feet above sea level.

The lake lies at a great elevation above tide water, and Chittenango Creek which bears away its waters, is a feeder of the Erie Canal. This stream has in its course a fall of several hundred feet, affording a great number of mill sites.

At Chittenango Falls, about three miles from Cazenovia village, the water plunges in a beautiful cascade, perpendicularly, over a ledge of limestone rock, 136 feet in height. There is no scenery in this part of the State more charming than along the course of this creek from the village to the Falls.

The DeRuyter and Oneida Plank Road, which was built in 1848, in passing this route, found its most difficult obstacles in the gorge near the falls, where an elevation of 800 feet was over-

*Named for General Sullivan and the famous admirals of those days.

come by a gradual ascent, which in no place exceeds six feet in one hundred. The old road required an aggregate ascent of 1,600 feet. The plank road rendered available a water-power hitherto useless; its entire fall is 750 feet. From Cazenovia to Chittenango this road has been recently macadamized.

Limestone Creek flows across the south part of the town. On this stream, near the southwest border of the town, are two beautiful cascades, called Delphi Falls, one of which is ninety feet in height, the other between sixty and seventy. Hydraulic and common limestone are quarried near Chittenango Falls, in the northern and central parts; the soil is a gravelly loam. In the southern part of the town a clayey loam soil prevails.

As we turn our attention to the history of this region, we are enabled to go beyond the day when it was called Cazenovia, into the ancient time when it was a part of the broad territory of Whitestown. The far-reaching trails of the Iroquois had pointed the way of emigration into northern Madison County. A sort of semi-civilization was accomplished through the intercourse of the Indians and whites, in their days of war and of peace, as far back as the sixteenth century, so that the savage had learned many of the useful arts, with, probably, some additional viciousness; and the Englishman and Frenchman, more often the latter, had mingled his blood with the race of the red man; for the white man desired this beautiful country, and rather than not dwell in it, he willingly took up his abode with the aboriginal possessors. When peace succeeded the troublous times of the Revolution, the controllers of the public welfare, knowing well the value of these lands, and knowing, also that the time had come when peaceable arrangements could be made with the Indians, effected amicable treaties with them, by which large tracts were obtained for settlement. In 1788, treaties were made, through which the "Military Tract" of Onondaga, the Chenango "Twenty Towns," and the "Gore," lying between them, were obtained. The Military Tract was appropriated to "Soldiers' Rights;" and while the Twenty Towns were sold to different purchasers, the Gore, or its proceeds, were to be appropriated to the laying out of new roads. There-



CHITTENANGO FALLS

fore, it was named "Road Township." It was a tract about thirty-five miles long, from north to south, four and a half miles at the northern extremity, and about four miles at the southern containing about 100,000 acres of land. The project of opening the great Genesee, as well as a road from the salt springs in Onondaga County, which should traverse Road Township to Chenango, in the Twenty Towns, was in contemplation, but nothing was done until after the sale of this tract to the Holland Land Company.

Previous to the treaties of 1788, this town was in the domain of the Oneidas, and was considered as their reserve hunting ground; and the lake, so well stored with fish, was their especial property. Though their village lay at the northward (at Canaseraga), yet they kept a well-defined path to and up the Chittenango Creek to the lake, where they built their temporary cabins, reduced the timber, constructed apparatus for fishing, and otherwise betook themselves to the pursuits of their race. At the head of the lake they evidently, at some time, established themselves with some degree of permanency, and cultivated small fields of corn. There some of their number have been buried. In 1861, when the citizens of this School District (No. 5) were sinking a hole to set their liberty pole, near the school house, a large skeleton of an Indian was found buried in a sitting posture, with hatchets, pipes, beads and other articles which the Indian was supposed to need on his journey to the Spirit land. The circumstance of the remains of a breast-work-like fortification, which could be seen for many years after the settlement by white people, just east of this school house, and the frequent bringing to light as the soil was cultivated, of various implements of domestic use, such as heavy stone mallets or pestles, worn smooth by friction,—apparently of the kind used in pounding corn,—of stone hatchets, (sometimes broken,) of rather ingenious make, and other peculiarly-formed implements—the use of which is unknown at the present day—curious beads, etc., all would indicate something like a permanent residence, where their Indian arts flourished for a season, where they found abundant sport as well as sus-



VILLAGE LANDING
CAZENOVIA

tenance in fishing, and also in hunting,—for bears and deer were plenty, and otter and beaver were not scarce,—and where their little fields of corn grew thriftily. They were undoubtedly one of the families of the great Confederacy, established here for a season.

* * * * *

*Chittenango Springs**

The famous white sulphur Springs are situated two miles south of Chittenango village, and a few miles north of Caze-



WHERE THE FORGET-ME-NOTS
GROW

novia village. Since the first building up of accommodations about 1840, were from time to time improved till admirable appointments were attained. It was a popular watering-place, with every convenience for promoting the comfort and amusement of the invalid or devotee of pleasure; hot baths of the mineral water with efficient medical supervision; charming drives, boating, fishing, etc. These buildings were destroyed by fire about twenty years ago.

The water has been critically analyzed by the best chemists in the State and pronounced equalled by only one other spring

* Property of Mrs. Charles F. Hoffman.



UPPER AND LOWER
DELPHI FALLS
PROPERTY OF MRS. CHARLES F. HOFFMAN



MAPLES AND HICKORIES
AT ORMOND



THE MEADOWS AND WOODLANDS AT
ORMOND, WHERE THE TRILLIUMS
GROW



OLD WILLOWS
ESTATE OF L. W. LEDYARD, ESQ.
CAZENOVIA

in the country—the “White Sulphur Springs,” of Virginia—in medical qualities. The following is a statement of an analysis of one pint of water from each of these Springs:

	WHITE SULPHUR	YATES
Carbonate of lime	1.33	0.88
Sulphate of lime	8.22	
Sulphate of magnesia	3.11	12.75
Sulphate of soda		1.66
Chloride of calcium	Trace	0.14
Organic matter	Trace	Trace

Their curative properties are greatly recommended by medical men.

A new mineral Spring, the water of a bluish color, was discovered near the hotel about 1869; the water having a remarkably tonic effect.

At different dates, the patronage of the Springs was very large; in 1870, under the management of C. W. Reicks, the number of guests during the year was upwards of 10,000.

* * * * *

Flora

The wild Flora of this region is particularly rich and beautiful; beginning with the Anemones—the wild flower of the early Spring and the Cowslips standing half in water in the meadows, continuing with the Trilliums, the pure white Trinity flower, carpeting the woodlands in one sheet of white, the red and yellow Columbines on the rock ledges, the pink Lady’s-Slipper in the Moraines,* the Wild Rose and the Forget-me-not, making little islands in the midst of the rushing waters of the streams in July, and the Mauves and Yellows and Purples of the Golden-rods and Asters in the Autumn, all make a picture which never fails to charm.

The snows that lie all winter and keep the garden warm, make it possible to grow many things here which further south

*A local name for a moist woodland.

cannot withstand the constant freezing and thawing and give a freshness to the garden store.

Lilacs and Hollyhocks, the Bleeding Heart, the Fraxinella of our grandmothers, beloved of the bees and humming birds, Larkspurs, Madonna Lilies and Red June Roses, Canterbury Bells and Poppies planted in among the currants, Sweet Briars, old fashioned yellow Roses, pink and blue Lupines, Meadow rue (*Thalictrum aquilegifolium*), Foam-flower (*Tiarella*), White Rocket, and many another Old World flower that seems to be forgotten in our more sophisticated gardens, bloom in cottage gardens along the country roads. They are flowers set in a landscape of rolling pastureland and woodland which shows Nature in her sweetest moods and provides the atmosphere which in England has created the scholarship of which she can be so proud.



LOWER FALLS
LETCIOWORTH PARK ARBORETUM

The Letchworth Park Forest Arboretum

By Caroline Bishop



N AREA and in population the town of Genesee Falls ranks lowest among the townships of Wyoming County, New York; but lying largely within its borders is a spot of scenic beauty which, in the opinion of many nature-lovers, is not surpassed in our eastern states.

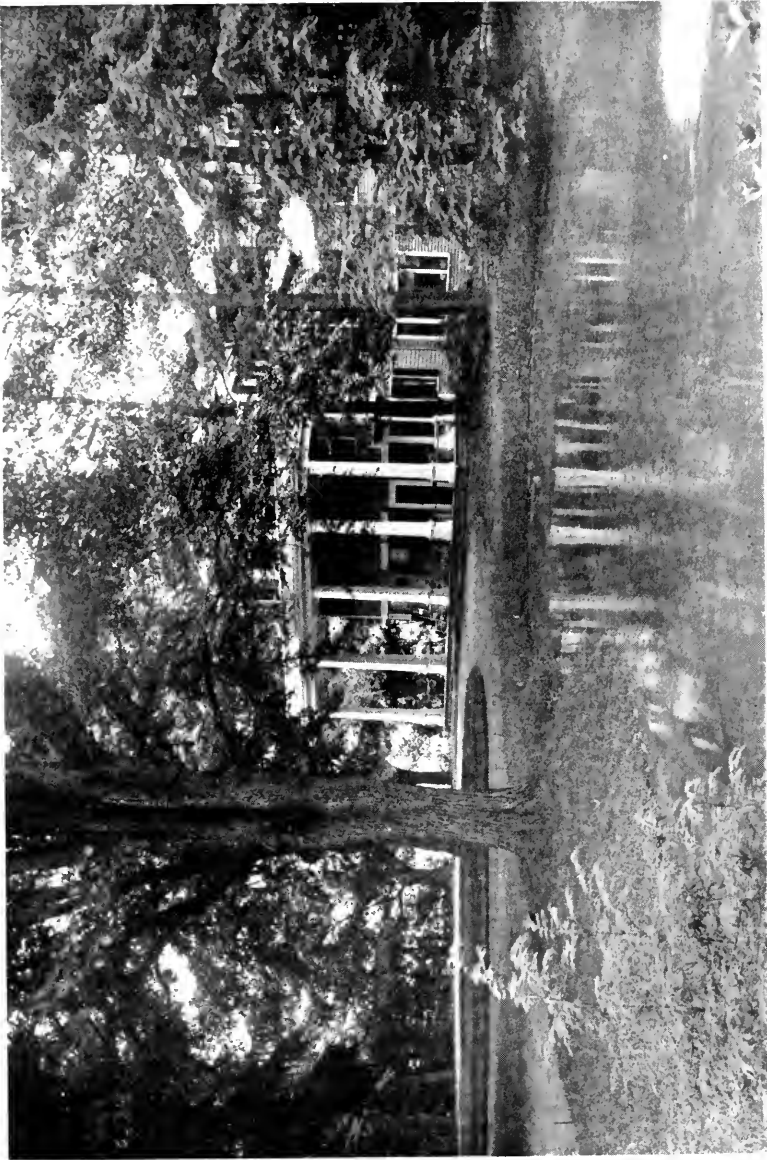
The Genesee River, forming the boundary on the eastern side, here displays itself in its loveliest forms. In its northward course from the southern boundary of the township it flows peacefully for several miles through an alluvial valley; but having cut its way through the high hill that bounds the valley on the north, it suddenly plunges a little more than seventy feet over a rocky precipice which extends diagonally from bank to bank. Within a distance of less than half a mile it falls again more than one hundred feet in a beautiful broad sheet over a face of terraced rock. It then flows on in a sinuous course between high walls, the summits of which are bordered with beautiful shrubs and majestic trees. About a mile and a half below the second fall, in the solitude of the forest, it drops ninety feet in rapids and a series of falls, into a narrow flume from which it soon emerges and sweeps in a great semi-circle through the deepest gorge in its course from Northern Pennsylvania to Lake Ontario. The trees and shrubs on the sloping banks, on the cliffs and the bordering plateaus, the delicate ferns and mosses and flowering plants that spring from crevices in the rock walls, add beauty to the varying river scene. Foresters tell us there are few places in our country where so great

a variety of beautiful forest trees can be found on an equal area as along the left bank of the Genesee River between the Upper and the Lower Falls.

That the living trees are now standing is owing to the protecting care of a lover of nature and of humanity. As early as 1824, perhaps a little earlier, a sawmill was put in operation at the Middle Fall. This and a more pretentious lumbering plant established in its stead, were fed with trees from the banks of the Genesee; and in the early fifties of the nineteenth century the lofty pines from more than two hundred acres in this vicinity went to the building of the massive railway bridge which connected the banks two hundred and thirty-four feet high just above the Upper Fall. Unfortunately, the lumbermen, unlike wise foresters, did not plant where they had cut down, and the scene was one of desolation.

But only a few years passed before the work of restoration was begun. Although living in Buffalo, near the wondrous Falls of Niagara, the late William Pryor Letchworth sought a country home on the banks of the Genesee. Looking down the valley from the railway bridge, he saw what had been done, and he also saw what could be done to compensate nature for her lost treasures. After negotiations not easily consummated, Dr. Letchworth succeeded in purchasing, early in 1859, the land which lies in hillside, plateau and meadow on the left bank of the river and commanding a view of the Upper and Middle Falls. He adapted the dwelling which stood on the plateau overlooking the Middle Fall to his immediate needs, and began clearing away the debris from the mills, and the trees that had been felled. From the rainbow seen in the mists above the falls on every sunlit day he gave his home the fitting name of Glen Iris. As he could make opportunities to do so, he added to his estate until it included one thousand acres lying on both sides of the river and embracing the Upper, Middle and Lower Falls, or Portage Falls, as they are more widely known.

One of the chief features in the development of the estate was the planting of trees, a practice which Dr. Letchworth



GLEN IRIS MANSION
HOME OF THE FOUNDER, AT
LETCHWORTH PARK ARBORETUM

continued almost or quite annually to the last year of his life, when, according to his own estimate, ten thousand trees had been planted under his direction. Addressing at Glen Iris in 1875 a company of representatives of the press of Western New York, Dr. Letchworth said:

In what little I have done here, my object has been to aid nature in her struggling efforts, and in doing so, humor her as it were, in all her fanciful moods. The eight or nine thousand forest trees which I have planted up and down the river in this locality, are nearly all indigenous to this soil, and have been planted just as the winds of heaven might have cast the seed. In the disposition of them I have endeavored to bring out pleasing contrasts of color, and throw lines of grace about lines otherwise hard.

This estate, where beauty and grandeur are harmoniously united, has been a pleasure ground for the people for more than fifty years, and it was an inspiration to Dr. Letchworth while doing the great work for humanity to which he earnestly devoted thirty-seven years of his life. Desiring that it should be forever preserved as a public park for the benefit of the people, a little less than four years before his death in 1910, Dr. Letchworth presented it to the State of New York, specifying in the deed of gift that the American Scenic and Historic Preservation Society should be the custodian of the estate, which, by a concurrent resolution of the Senate and the Assembly, was named Letchworth Park. This Society was organized in 1895 "for the protection of natural scenery and the preservation of historic landmarks in the United States." The work which it has accomplished along these lines has gained for it not only a national but an international reputation. In conference with officers of the Society respecting the further development of the Park, Dr. Letchworth indicated on a map of the estate certain tracts which he desired should be re-forested.

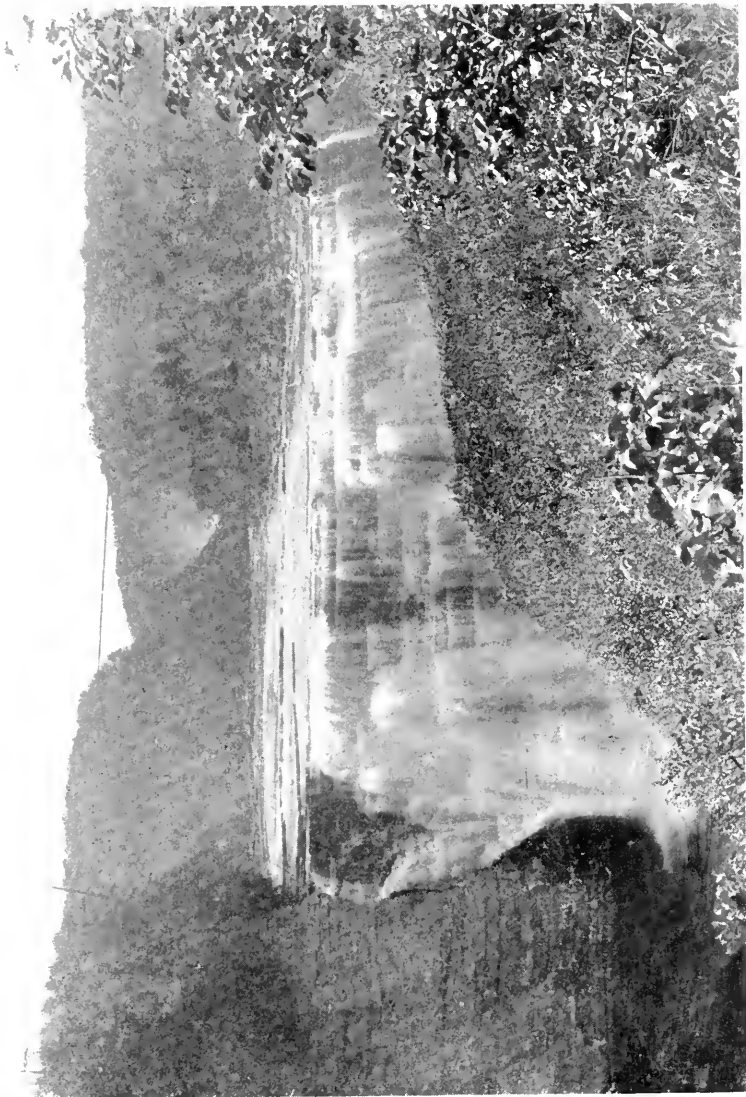
In 1909, the Hon. Charles M. Dow, one of the trustees of the American Scenic and Historic Preservation Society and now Director of the Park, visited the Orient. In the garden of the Emperor of Korea, which is in striking contrast to that

tree-denuded country, the re-forestation of the farm lands and open spaces in Letchworth Park began to assume in Dr. Dow's mind the form of an arboretum, and partially in that interest he journeyed to the island of Java, to visit the Botanic Gardens of Buitenzorg. These gardens, which have been described as of "princely dimensions and inconceivably magnificent," were established with a view to developing latent resources of the Dutch East Indies by affording an opportunity to study with facility their food and medicinal trees and plant life. The method of administration, which is the result of a century and a half of experience, was carefully observed, and lessons which have been practically applied in establishing the Letchworth Park Arboretum were furnished in the beautiful, useful and scientifically administered Buitenzorg Gardens. The botanical gardens and arboretums of other foreign countries that were visited also supplied valuable hints and suggestions. From extended observation and careful consideration there grew the idea of an arboretum unique—an arboretum of forest trees. Different soils and elevations and exposures of land surfaces in Letchworth Park offered encouragement to the materialization of the idea.

In the great arboretums of the world the trees and shrubs, arranged in accordance with a natural likeness, or with reference to their uses, or upon some other principle, have been planted singly or in small groups, facilitating their study and producing charming effects; but such grouping and distribution of trees do not solve the problems which confront the practical forester, for the development of trees in the open or in small groups is entirely different from their growth in the forest. With the increasing interest in recent years in the conservation of our natural resources and the re-forestation of denuded areas, has come the need of practical demonstrations in the growing of forest trees. Such object lessons the Letchworth Park Arboretum will furnish; and the forest student, the farmer without a wood-lot or whose land includes unproductive hillsides, the man, woman, or association interested in the growing of forest trees under natural conditions, will here find a rare field for observation and study.



VIEW FROM INSPIRATION POINT
FETCHWORTH PARK ARBORETUM



MIDDLE FALLS
LETCWORTH PARK ARBORETUM

Respecting the function of the Letchworth Park Arboretum, I quote from the Director of the Park:

The principle upon which the Letchworth Park Arboretum is established is that it shall consist of a permanent collection of the various species of the world's timber trees likely to thrive in this northern climate, planted scientifically, to test their value and illustrate the processes of development, so supplying not only knowledge for knowledge's sake, but also knowledge for practical use.

It is intended that the value to the State and the Nation of the arboretum will not consist merely in a demonstration, clear to every eye, of the results which may be expected from forest plantations of many different kinds of trees. The possibilities of the arboretum for extending exact knowledge of tree growth will also be fully developed. . . . The growth of the trees will be measured periodically, their liability to disease will be noted, and their capacity for seed-bearing; their behavior in pure stands and in mixture, their influence upon the forest floor, and other practical considerations bearing upon their value for commercial tree-planting, will be carefully observed and recorded. By this means the Letchworth Park Arboretum will aid materially in laying an exact scientific basis for the successful extension of practical forestry in the United States. Every step will be taken, not only to insure results of the highest scientific value from forest work at Letchworth Park, but also to develop its usefulness as an object lesson to all Park visitors.

In the selection of a forester the American Scenic and Historic Preservation Society considered itself fortunate in securing the services of the late Overton W. Price, of Washington, D. C., who was a graduate of the Forest School at Munich, Bavaria, and who had been for nearly ten years Assistant Forester of the United States. Mr. George B. Sudworth, Dendrologist of the United States Forest Service, accompanied Mr. Price on visits to the Park and rendered valuable assistance by his advice. Upon the death of Mr. Price in 1914 Mr. Sudworth was appointed Forester.

The first tree of the Arboretum was planted May 9, 1912. Planting was continued until June third, when upwards of 100,000 trees had been set out on fifty acres of land. The number of species represented was fifty-five, of which thirty

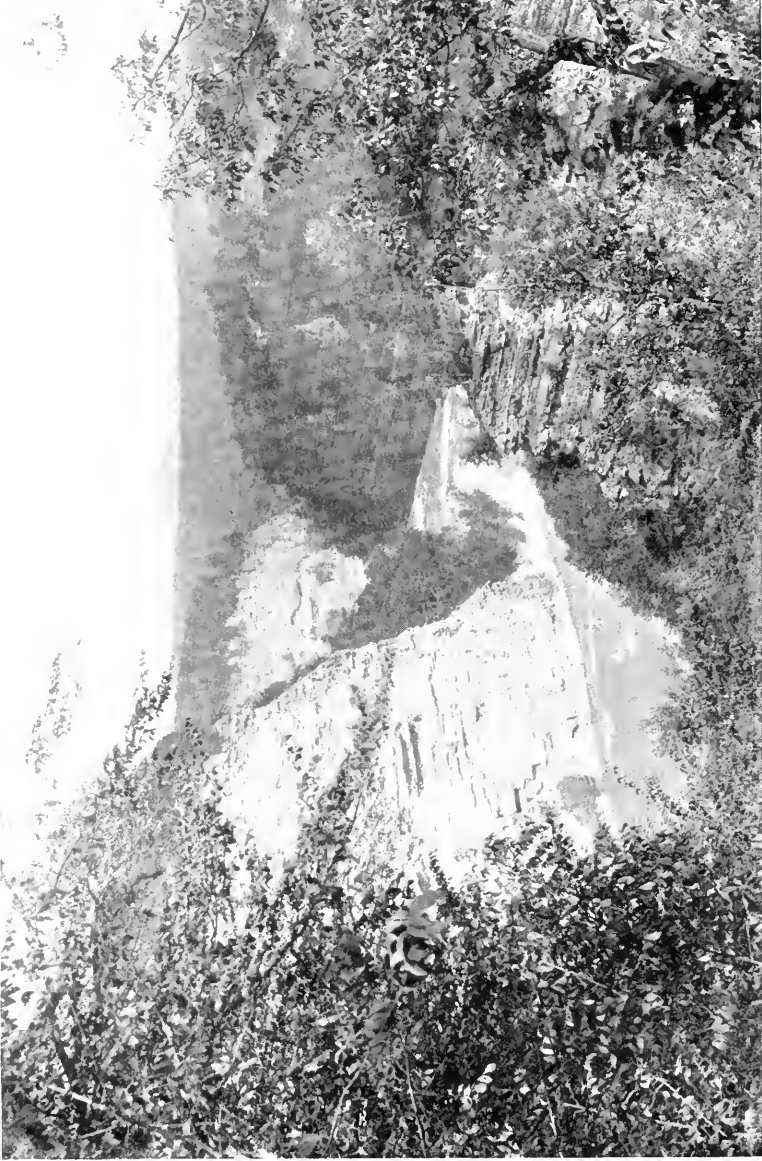
were broad leaved and twenty-five were conifers. The trees, obtained from leading nurseries in this country and in Europe, were planted in blocks varying in size from less than an acre to several acres in extent.

After the first season's planting it was decided to raise from seeds the trees necessary to carry on the re-forestation of the Park. The nursery, where the seeds are sown, is an interesting and educational feature of the arboretum work, for here the earliest stages in the development of native and foreign trees may be observed—from the germination of the seeds to the removal of the plants to the Arboretum. Many seeds have been sown since 1912, ever increasing the variety of tree species; and a large number, something over six hundred thousand, of seedlings have been transferred from nursery rows to the field. Here they are grouped with a view, so far as possible, of showing color effects.

As time goes on, improvement thinnings will be made in the Arboretum, in order that inferior trees may not interfere with the growth of those that promise the greatest results. Roads and paths are being made to wind through the forest to the different plantations and tablets placed giving the scientific and common names of the specimens. All the important native and foreign trees that will thrive in this locality will be made conveniently accessible for purposes of observation and study to visitors to Letchworth Park. Without in the least interfering with the forest feature of the Arboretum, trees and shrubs will be planted singly and in groups along the roads and paths of the Park, for ornamental effects.

An incentive to the planting of forest trees lies in the fact that they serve many generations, for they become not only the largest but the oldest of living things. Writing only a few years ago of the giant sequoias, which attain a height of more than three hundred feet and a diameter of more than thirty feet, the late John Muir said:

Thousands of them still living had already counted their years by tens of centuries when Columbus set sail from Spain and were in the vigor of youth or middle age when the star led the Chaldean sages to the infant Saviour's cradle.



VIEW BETWEEN MIDDLE AND
LOWER FALLS.
LETCHWORTH PARK ARBORETUM



INDIAN COUNCIL HOUSE
AND MARY JEMISON STATUE



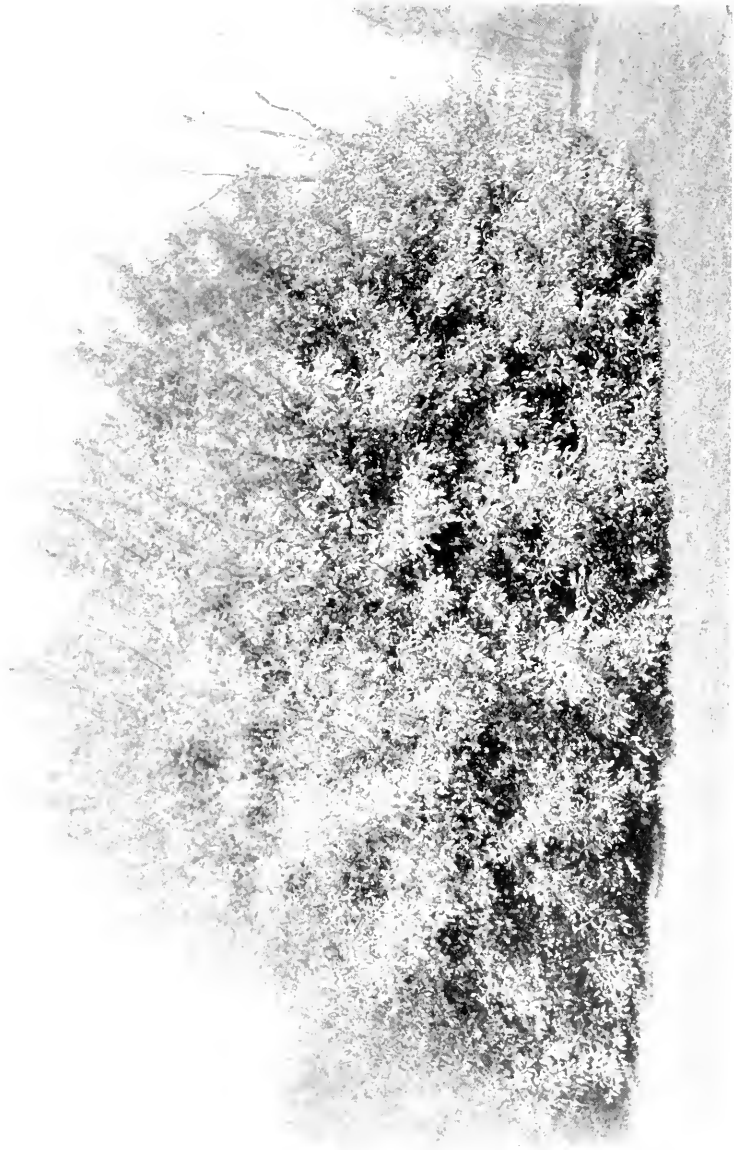
MARY JEMISON STATUE
LETCHWORTH PARK ARBORETUM

It is the intention to provide at Letchworth Park increased opportunities to study individually and relatively not only trees, but various subjects in the book of nature, including animal life as related to the plant life of the forest. The Arboretum will afford many attractions to the native birds, bees, and arboreal mammals. The squirrels here find an abundance of walnuts, butternuts, chestnuts, and acorns to store up for winter use. The honey bees, whose marvellous ways are not yet fully understood, and who still prefer the trees of the forest for their homes to any of the convenient apartments provided for them by man, will find in the numerous linden trees their choicest food. Hundreds of Russian mulberry trees have been planted, the fruit of which ripens continuously throughout four months of the year and is greatly liked by the birds.

It is at the expense of a good deal of watchfulness and anxiety that the wild life of a public park is preserved, but there is encouragement for the future in a recent statement of one of our foremost conservationists, which I quote:

We are fast learning that trees must not be cut down more rapidly than they are replaced; we have taken forward steps in learning that wild beasts and birds are by right not the property merely of the people alive to-day, but the property of unborn generations, whose belongings we have no right to squander; and there are even faint signs of our growing to understand that wild flowers should be enjoyed unplucked where they grow, and that it is barbarism to ravage the woods and fields, rooting out the may-flower and breaking branches of dogwood as ornaments for automobiles filled with jovial but ignorant picnickers.

For thousands of years the Genesee River has been wearing its way through glacial deposits and cutting the wonderful gorge through the Devonian rocks which are so beautifully exposed in Letchworth Park; for more than half a century art has been working in harmony with Nature's plans perfecting a scene of mingled grandeur and beauty. It is the hope and the expectation of those establishing the Arboretum that fifty years hence, and a hundred years hence, it will have been and will continue to be of great benefit to mankind.



RUSSIAN MAY DAY TREE
PRUNUS PADUS COMUTATA

The Russian May Day Tree:
Prunus padus var.
commutata

By *W. C. Egan*



OME twenty or more years ago seedlings were raised at the Arnold Arboretum and also at the Iowa Agricultural College under the false name of *Prunus Maakii*.

In both instances the seed was obtained from Russia under that name, and at the Iowa College the plants bore the common name of "The Russian May-day tree," as it is generally in full bloom on May 1.

How soon the error in its nomenclature was discovered at the Arboretum I cannot say, but in the middle west it sailed under its false name until recently when Professor Sargent saw it at Egandale and immediately gave me its true name—viz. *Prunus padus var. commutata*.

As is well known, the type (European Bird Cherry) is an upright grower with short lateral branches and suckers profusely at the base, the suckers growing up closely to the main trunk. A tree twenty-five feet tall is seldom over eight to ten feet broad. This habit allows it to be used in screen planting in narrow places, the suckers carrying the foliage close to the ground.

In the variety *commutata*, the form is almost globular and in matured specimens is about thirty feet high and as broad, the lower branches hugging the ground.

From what I have seen I judge that it requires a more open soil than the type in order to thrive. I have seen it in full

bloom April 27 and also as late as May 10, but as a rule it is in its prime generally about May 1 and fully one week earlier than the European type. You can detect the perfume of a matured plant a block away. It is only when nearing its maturity and afterwards, that it exhibits its full value as a blooming tree. Prior to that time, if growing well, the vigorous growth hides most of the flower, as is the case in the one illustrated, but when age checks its growth the white flowering pedicels cover the outer boundary of foliage like a lace-work of snow.. Its foliage starts very early in the spring, getting caught once in a while by late frosts, but the tree is reliably hardy in all situations.

The specimen illustrated is one I raised from seed. At the time of its planting, January 21, 1907, it was about three feet high.

On May 11, 1918, when photographed it measured eighteen and one half feet tall and twenty-five in diameter. Being planted in filled-in soil it has had what it likes—*viz.* a free open soil for its roots.

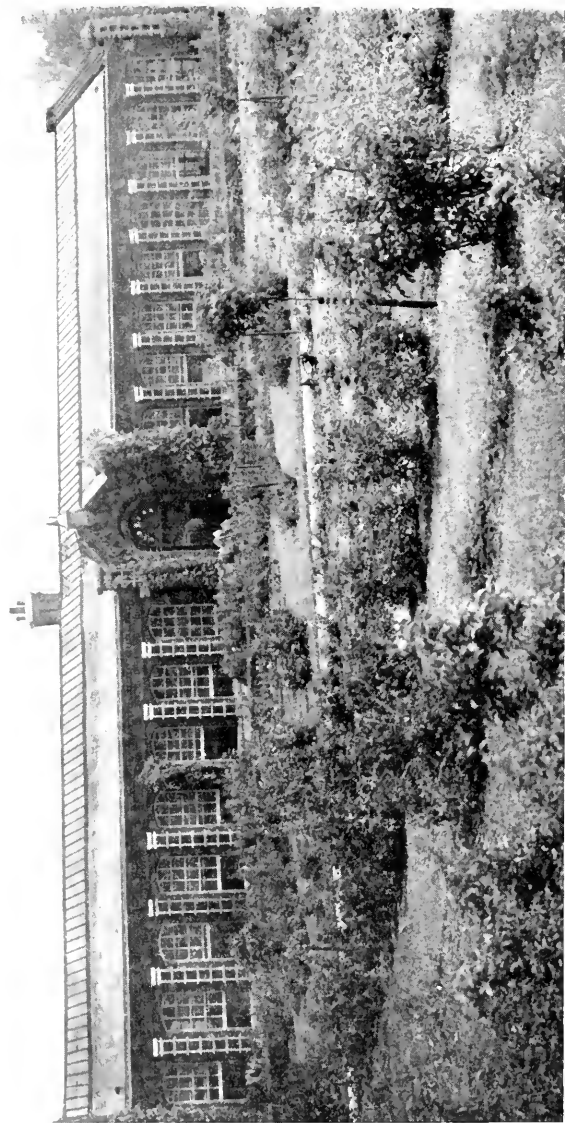
Why not plant more birthday trees, of which, as it happens, the specimen illustrated is one? They certainly are of a more lasting nature than are most presents, and are especially suitable for children who can watch them grow and eventually enjoy their shade. The winter's cold or summer's heat need not interfere. The one pictured was planted in a soap box early in the fall and stood out doors, the soil freezing quite hard. At the approach of winter a load of strawy manure was placed over the hole. On January 21 the manure was removed, the box broken and the frozen lump of soil planted. The manure was then replaced but removed in the spring.

For mid-summer birthdays plant in a large pot or tub early in the spring and turn out at the appropriate time.

In the case of a child's birthday tree a photo of the child standing along side the tree when the planting is completed would be an interesting memento to look at in after years.

Laying out grounds, as it is called, may be considered as a liberal art, in some sort like poetry and painting; and its object, like that of all the liberal arts, is, or ought to be, to move the affections under the control of good sense. If this be so when we are merely putting together words or colours, how much more ought the feeling to prevail when we are in the midst of the realities of things; of the beauty and hamony, of the joy and happiness of living creatures; of men and children, of birds and beasts, of hills and streams, and trees and flowers, with the changes of night and day, evening and morning, summer and winter, and all their unwearied actions and energies.

WORDSWORTH.



ROSE GARDEN, WITH LINNAEAN HOUSE
IN THE BACKGROUND
MISSOURI BOTANICAL GARDEN

The Missouri Botanical Garden

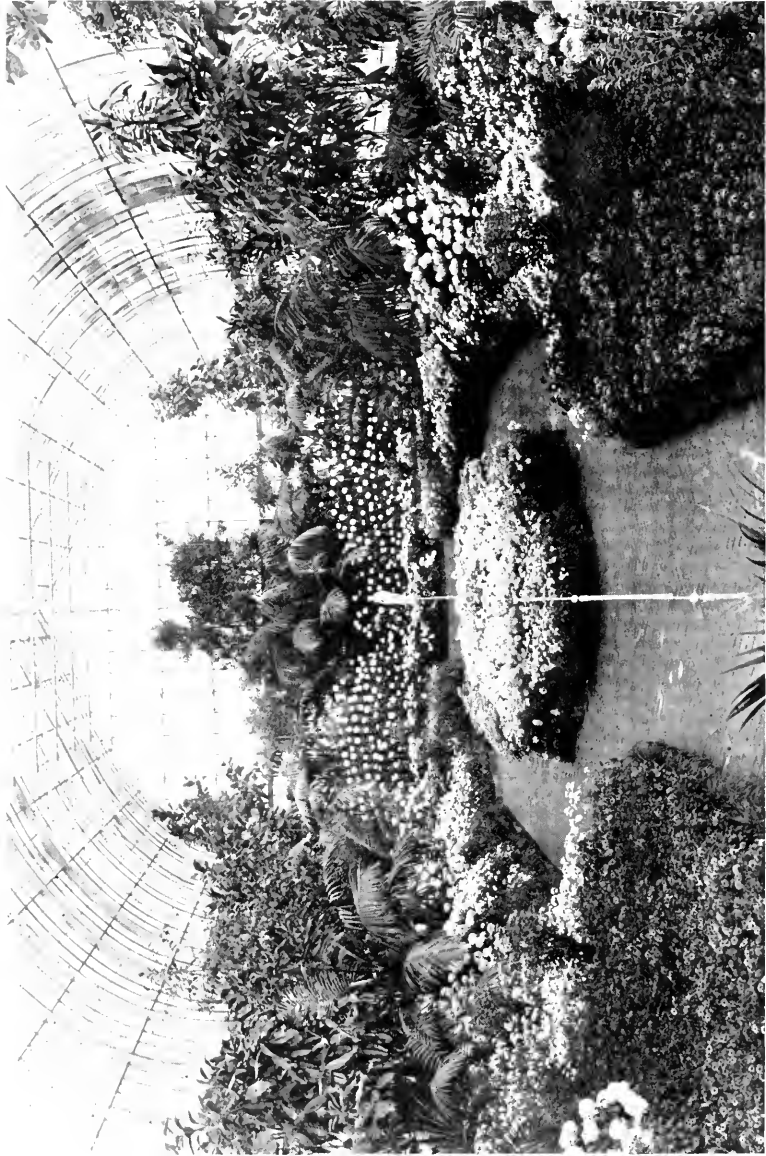
By George T. Moore, Director



BOTANICAL gardens are definitely known to have existed as far back as the year 1000 B. C., and there are certain more or less mythical accounts which would seem to indicate that the Chinese at least maintained gardens of a botanical character at a much earlier date. Until modern times, however, practically all such gardens were established for the growing of economic plants, and the necessity for testing the curative properties of herbs may be regarded as the chief incentive for the establishment of living collections of plants throughout the civilized world.

At the present time, although it is customary to find so-called "medicinal gardens" in connection with many botanical institutions, the chief function of a botanical garden is recognized as being educational. In fact, there are few public gardens which are not either directly or indirectly connected with a college or university, and the remainder almost universally support a scientific staff, which, with the aid of an herbarium, a laboratory, and library, are chiefly concerned with making contributions to botanical knowledge. Even where blooming plants are displayed for the pleasure of the public an attempt is frequently made to more or less unconsciously instruct the visitor as to the best methods of arranging and growing the varieties of trees, shrubs, and flowering plants which are likely to flourish in a given vicinity.

Mr. Henry Shaw, the founder of the Missouri Botanical Garden, had most advanced ideas respecting the functions of a



CHRYSANTHEMUM SHOW AT
MISSOURI BOTANICAL GARDEN

botanical garden. In his will, bequeathing his garden and the major portion of his estate to a Board of Trustees, he provided that not only were the ornamental and floricultural features of the Garden to be kept up, but that scientific investigations in botany were to be promoted. He considered that the usefulness of the Garden could best be augmented and perpetuated by connecting it with a school of botany, and accordingly set aside a separate endowment for such a school in Washington University. Thus it happens that while the Missouri Botanical Garden is, in its organization and management, quite independent of any educational institution, through the Shaw School of Botany of Washington University there is provided a most desirable means of contact which is mutually beneficial. By decree of Mr. Shaw's will the Director of the Garden is required to be a professor in the School of Botany, and it so happens at the present time that a majority of the scientific staff at the Garden likewise hold professorships in Washington University.

In order that the necessary tools be provided with which to conduct botanical investigations, Mr. Shaw began, long before his death, the acquisition of a suitable library and herbarium. These have been added to almost continually until now they take first rank with the leading herbaria and botanical libraries of the country. A laboratory building added in 1909 makes it possible to carry on all the graduate work at the Garden, so that only the undergraduate students in botany have to be provided for at the University. The Missouri Botanical Garden thus practically supports the graduate work in botany at Washington University, not only putting all its facilities at the disposal of the graduate students, but furnishing most of the funds needed to carry on such work.

In spite of the desirability and absolute necessity of having a scientific and research department in an institution like the Garden, it must be confessed that the general public is much more interested in the trees and shrubs and the contents of the greenhouses and outdoor special gardens than in the library or herbarium or laboratories. Consequently a proper balance



FERN HOUSE
MISSOURI BOTANICAL GARDEN

must always be struck between what may be regarded as purely scientific and that which is merely informational or for purposes of recreation. From the very first Mr. Shaw attempted to do this, and the Missouri Botanical Garden has always been noted for its collections of plants. Of late years, because of the construction of the large ranges of greenhouses and the addition of various out-of-door gardens and plantations, the number of visitors who would naturally be attracted by such things has trebled that of a decade ago. Perhaps the one feature which has contributed more than anything else to this increase of popular interest has been a monthly flower show, which, arranged in a special house 200 x 50 feet constructed for this purpose, provides an unusual opportunity for displaying blooming plants at their best. Furnished with a permanent border of green foliage plants which serves to accent the color of the flowers, and with a brick floor which permits changing the design every time a new display is staged, this house provides something beautiful and different nearly every time a visitor comes to it—no matter what the conditions out of doors.

Leading from this floral display house is a range which has the rather novel feature of being divided down the center by a high concrete wall. This is intended as a support for the rarer tropical climbers which ordinarily cannot be well displayed. Opposite to this vine-covered wall is a series of alcoves in which, during the winter months, are to be seen large numbers of blooming orchids. The orchids are grown in connecting houses not open to the public, since their chief interest is in the flower and they are only displayed when in bloom. Through the acquisition recently of the noted D. S. Brown collection of these plants, the Garden is now in possession of one of the finest and most complete lot of orchids in the country. More than 1200 species are represented, comprising nearly 6000 plants, and at certain times thousands of blossoms may be seen. Between the tropical vines and the orchid alcoves is a natural plantation chiefly of aroids, with a small stream and a succession of pools running through the middle.



AQUATIC GARDEN
MISSOURI BOTANICAL GARDEN

On the opposite side of the wall is a collection of Philippine and Australian plants, including a number of trees and shrubs used in various industries, and a vestibule at the end is designed for the display of insectivorous plants. In the bromeliad house, adjoining this range are to be found the pineapples and their relatives, including Spanish moss and other interesting epiphytes. A fine vanilla plant which fruits nearly every year is a feature in this house. Beyond the bromeliads is a cool conservatory with special peat soil for the successful growing of representatives of the Ericaceae family. Selected rhododendrons, azaleas, and cricas constitute the chief display here, although camellias and leptospermums add much to the general appearance.

Another large conservatory divided into various houses is devoted to the display of palms, cycads, ferns, cacti, etc. All of the planting in these houses is directly in the ground, eliminating the usual array of benches and tubs and pots, which permits a much more natural effect as well as producing a more satisfactory growth. The palms embrace some 150 species, including all the important commercial forms, such as date, cocoanut, sugar, panama-hat, and the rattans. The bamboos, traveler's tree, screw pine, and other more or less palm-like plants are likewise to be found here.

The cycad house, which is laid out in Japanese style, contains a representative of all the known genera in this group. In order to give the desired diversity, araucarias, taxodiums, and the eucalyptus are also planted here.

The ferns are in an adjoining house which, with its grotto, ravine, and winding stream, provides an admirable setting for these plants. In sharp contrast is the succulent house where desert conditions are maintained in order that the agaves, aloes, yuccas, cacti, euphorbias, and similar drought-resistant types of vegetation may grow to perfection. The luxuriant green of the cycad and fern house is replaced here by the yellow gravel and sand of the arid southwestern country and Mexico, into which a varied collection of the plants common to these regions fits most naturally.

To provide for a collection of tropical and subtropical plants of special economic importance, another house in this range is devoted to specimens from which commercial oils, spices, drugs, dyes, fibers, and perfumes are derived. Other plants of interest growing here are coffee, tea, peppers, ginger, mango, mangosteen, guava, chicle, together with a collection of citrus fruits.



ITALIAN GARDEN IN
SUMMER, MISSOURI
BOTANICAL GARDEN

Out of doors, in addition to the usual plantations of trees and shrubs ordinarily found in a botanical garden, there are special gardens devoted to roses, iris, herbaceous perennials, and annuals. Because the climate of St. Louis is especially favorable to water-lilies, three large pools are reserved for night- and day-bloomers, and some particularly fine hybrids originated at the Missouri Botanical Garden attract much atten-

tion in these water gardens during the summer months. A formal garden laid out in the best Italian style is located in a quadrangle bounded by the palm house, the cycad house, the succulent house, and a pergola. In the spring large numbers of pansies or tulips are shown here, followed by pattern bedding of foliage plants. The garden is bordered with a mass of lilies and poppies. A large tract of land known as "the knolls," is planted with the more attractive blooming shrubs and other perennials, through which runs a series of pools surrounded or filled with numerous water-loving plants. A rock garden is in process of construction and in the same vicinity is to be developed a bog, and native wild flowers will also find a place close by.

No mere enumeration of gardens and collections can give any adequate idea of the institution as a whole. To say that about 11,000 species are growing within the confines of the Missouri Botanical Garden means much or little according to the arrangement and the selection of the plants included in such a list. It would be a comparatively simple matter to more than double the number of varieties now grown at the Garden, but no benefit would be derived from this increase unless the plants were added for some specific purpose other than merely to swell the number of inventory cards. There should be no place in any botanical garden for any plant which, because of its beauty or unusualness or usefulness or scientific value, did not justify its presence. Assuming that all public gardens are designed to serve a definite purpose combining the educational, the scientific, and the recreative functions, their various collections both indoors and out should be carefully chosen to best serve such ends.

One feature which makes the Missouri Botanical Garden unique is the fact that although it is freely open to the public, it has in reality no constituency to which it is directly responsible, other than the Board of Trustees. This Board, originally designated by Mr. Shaw in his will, is with the exception of five ex-officio members self-perpetuating. The high standing and unusual ability of those who from time to time have



PATH IN THE FERN HOUSE
MISSOURI BOTANICAL GARDEN

been trustees is evidenced by the remarkably successful way in which the estate has been managed without there ever having been the slightest criticism of methods. No revenue is derived from either the city or state, all funds for whatsoever purpose being derived from the original endowment of Mr. Shaw. In fact taxes are paid on all the property with the exception of the Garden itself, which is, of course, regarded as being devoted primarily to public use. Even the water is paid for at regular rates to the city of St. Louis.

It has frequently been remarked by those visiting the Garden from other places, that the manner in which the wishes of its founder have been carried out, and the satisfactory way in which his memory has been perpetuated, make the Missouri Botanical Garden one of the most remarkable examples of semi-public bequests anywhere in the world. Certainly it is true that this country knows of no single individual who so deserved to stand as the wisest and most generous patron of the science of botany, with all its ramifying branches, as Henry Shaw of St. Louis, the founder of the Missouri Botanical Garden.



DIANTHUS NEGLECTUS
CLEAR ROSE PINK

Plants and Their Arrangement in an Amateur's Rock Garden

*By Richard Rothe**



IN SOME of the books on rock gardens the chapters relating to soil and soil preparation are overburdened with technicalities and formulas of mixtures for the various foreign Alpines unsuitable or difficult to grow in our climate. On the other hand some authors try to make us believe that rock garden plants being for the greater part natives of our northern hemisphere, thrive under almost any condition. According to my experience the beginner is more likely to succeed if he leaves both extremes unheeded. If we rely on average garden soil well enriched by old barnyard manure most of our plant material will grow well in it. Some mountain shrubs and herbaceous plants require a more or less liberal addition of leaf-mould, humus or peat in the soil as for instance rhododendrons, kalmias and daphnes. Stone-crops, hardy cacti and sempervivums we plant on sunny arid slopes where they nestle and establish themselves between rocks strewn over the ground. All those directions the novice finds in leading American nursery catalogues. The rockery built on a slope has ample drainage; on the level or when sunk into the ground proper drainage must be provided for.

With everything in readiness for early spring planting we shall find the work of the arrangement of rock garden plantations fully as interesting and enjoyable as the stone construc-

* Photographs by the author.



AUBRIETIA HYBRIDA
LAVENDER.

tion. For the background and eventual flanking sideways use evergreen trees, dogwoods, hawthorns, rhododendrons, and, of the conventional shrubs, some magnolias and forsythias. The two latter, being early spring-flowering, are apt to enhance the vernal glory of the total effect. The trees and shrubs employed in planting of the rock garden itself should be more or less dwarf, partly of spreading habit of growth and partly pyramidal, or compact bushy forms. In placing this material aim for a composition of a vegetation resembling the sunny ledgy slope or plateau of our northern mountains. The absence of direct overhead shade is essential for perfect development of the herbaceous plants and their subsequent color display. For the purpose in view our leading nurseries carry abundant variety of conifers particularly in junipers, pines and retinosporas. Of the most desirable shrubs for rockeries I mention andromedas, hardy azaleas, *Cotoneaster horizontalis*, *Daphne*, mountain laurels, rhododendrons and a few Japanese maples preferably the finely cut-leaved varieties. The effective distribution of the tree and shrub material in rock gardens offers problems frequently taxing our ingenuity.

Turning to the flowering herbaceous material for filling rock pockets, covering the endless little nooks, slopes, crevices and odd ground vacancies we find ourselves face to face with a bewildering number of very different species and varieties. Readers well acquainted with our native wild flora, no doubt have very beautiful things in their minds and starting out on explorations of woods, glades, bogs and meadows may return with such exquisite treasures as the pitcher plant, *Sarracenia purpurea*; or the moccasin flower, *Cypripedium*; both very difficult to domesticate in rockeries. Far less capricious prove our wild wood anemones, the liver-leaf, *Hepatica triloba*; the blood root, *Sanguinaria canadensis*; the wake robin, *Trillium grandiflorum*; bird's-foot-violet, hare-bells, saxifragas and above all the wild ferns, when taken up and moved into the rockery. If however we should desire to have a good effect from the start the necessity will arise to draw on the trade. Fortunately quite a number of American hardy plant dealers



HYBRIDS OF
HELIANTHEMUM MUTABILE

now carry assortments of the most effective mountain denizens for rock garden use. Of these our native spring flowering phloxes represent one of the most important items. *Phlox amoena*, *ovata*, and *pilosa splendens* are the best bright reddish-rose and carmine-pink flowering species. The beautiful lavender shades of *Phlox divaricata* we will find simply indispensable and we certainly cannot do without the dense masses of blossoms of *Phlox subulata* for carpeting our ground spaces with sheets of pure white, lavender and rose pink hues. For brilliant yellow I rely chiefly on *Alyssum saxatile compactum* and *Viola cornuta lutea* for May, to be succeeded by *Oenothera missouriensis* and *Inula ensifolia* in June and July. Clear vivid blue are the blossoms of *Lithospermum prostratum*, *Ceratostigma Larpentae*, *Veronica rupestris* and for perpetual flowering those of the blue varieties of *Viola cornuta*. The hardy candy tufts, *Iberis sempervirens*: the rockcress, *Arabis alpina*, and snow-in-summer, *Cerastium tomentosum* produce waves of glistening white blossoms while the lavender and purple hues of Alpine asters and Aubrietias vie with the bright rose-pink shades of the sea-pink *Armeria Lauchiana*. In partial shade we may enjoy *Asperula odorata* and the charming harbingers of spring among the hardy primroses. Adding to the above some spring flowering bulbs of the miscellaneous class preferably *Crocus*, scillas, *Iris*, grape-hyacinth, snow drops and leucojums by naturalizing them in clumps from 12 to 25 bulbs of each color together, our rock garden is sure to present a highly enjoyable floral display during April, May and June. To overcome any apparent flatness there is quite a variety of taller growing rock garden inmates available. In small rockeries we can augment the beauty of the total effect by interspersing a few specimen plants of foxgloves, columbines, *Eryngium*, summer and fall flowering hardy asters of the *Amellus*, *cordifolius* and *Novae-Angliae* types, peach-leaved bellflowers, *Dictamnus fraxinella*, *Salvia Greggii* and *Statice latifolia*. In large rock gardens with ample space we plant them in groups of from 3 to 6 plants of each species together and add some clumps of *Yucca filamentosa* *Polygonum affine*



IBERIS SEMPERVIRENS

and *P. Sieboldii* to it. *Sedum acre*, *lydium*, *glaucum* and *Stahli* represent the best material for ground covering between stepping stones, as lining along paths and for filling up crevices in the rockwork of rustic stairways. The taller and robust *Sedum spectabile* and *spectabile* "Brilliant" can be easily made a conspicuously decorative feature of a rockery during August and September.

The rock garden as a studio of the plant lover soon becomes a veritable treasury of floral gems. Here we behold the picture of the vernal breeze gently playing with the light-winged blossoms of *Saxifraga Cotyledon pyramidalis*. As one of the prettiest of the rosette type with narrow silvery crusted foliage this Alpine species should not be exposed to the hot midday and early afternoon sun of the Middle Atlantic States. For winter protection it requires careful leaf-covering. The much hardier hybrids of the *Saxifraga cordifolia* and *crassifolia* species with large leathery evergreen foliage and white pink and red flowers do equally well in the full sunlight and partial shade, but are moisture loving plants. Among the mountain pinks *Dianthus deltoides* is the most resistant; *Dianthus montanus* the best for midsummer effect; *Dianthus caesius* the most valuable for color massing, and the rather large flowering *Dianthus neglectus*, on account of its clear rose-pink color, the darling of many rockery owners. We learn to appreciate the aromatic odor of *Thymus serpyllum* and the true lavender *Lavendula vera*; we admire the grace of a flowering clump of *Gypsophila repens* and we certainly enjoy the slender spikes of little coral red bell-shaped blossoms of *Heuchera sanguinea* as well as the charming daintiness of the silky petals of the sun-rose, *Helianthemum mutabile*.

A well arranged and well kept rockery is an enchanting feature of a home ground. We behold it with pride when in festive spring attire; it appears clean and attractive in its less conspicuous color array of midsummer and fall and it is still beautiful in its rugged outlines under cover of a white mantle of snow in winter.



ROCK GARDEN OF
MRS. CHARLES J. RAINEAR
GERMANTOWN



CERASTIUM TOMENTOSUM
WHITE

Rock garden arrangement and planting brings us back close to nature. It is an occupation where success depends on our ability to follow her teachings in regard to the beautiful in miniature detail and composition work. To many of our advanced garden amateurs it is going to open a new avenue leading to the solution of rich and tempting problems, with opportunities for most enjoyable results.

Curiosities of Plant Life

By Alexander Lurie, Horticulturist, G. H. Pring,
Floriculturist

Missouri Botanical Garden

(Continued from March Journal)



MYRMECOPHILOUS or ant loving plants present one of these peculiar combinations which Nature has provided for the mutual benefit of certain plants and insects. Tropical plants like *Acacia cornigera*, *Cecropia peltata*, *Clerodendron fistulosum*, *Rosa Banksiae*, *Diacrium bicornutum*, *Schomburgkia tibicinis*, etc. have shown the remarkable property of living symbiotically with certain ants. The plants afford a lodging for the ants and some food derived from the sugary and albuminoid secretions; the ants reciprocate by protecting the foliage against the attacks of leaf eating enemies. Upon the detection of approaching foe, the ants crawl out and frighten the invader away by biting and squirting formic acid.

A somewhat different phase of relation of plants to insects exists in the case of the Himalayan Balsam (*Impatiens tricornis*). At the base of each leaf are located two stipules modified into honey secreting glands. At the time of flowering the visiting ants are tempted away from the flowers by the globules of honey excreted from the glands, thus reducing the chances of the ants reaching the flower and extracting its nectar without accompanying fertilization. It has also been suggested that the presence of these ants upon the plants protects their foliage from the ravages of leaf eating insects.

Bull-Horn or Ant Tree

*Acacia cornigera**Leguminosae*

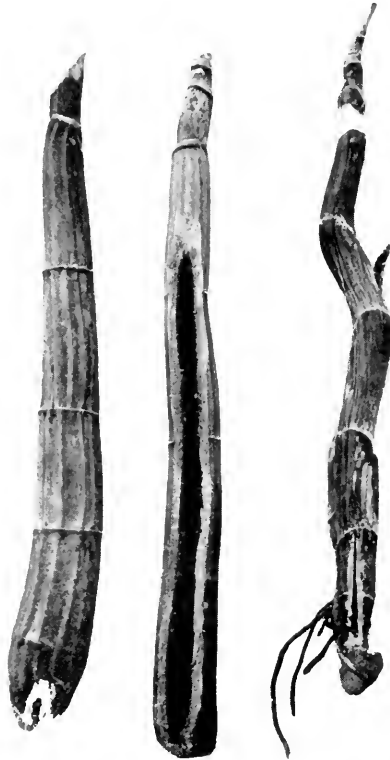
A shrub or small tree of Mexico bearing pinnate leaves upon the centers of horn-like appendages. The individual pinnae of the leaves are provided with wax-like food bodies rich in oil and protoplasm. At the base of each secondary and primary leaf stalk is situated a nectar gland, the one at the primary leaf stalk being the larger. The function of this is to attract the ants. Periodically the leaf stalks drop off the horn, leaving a soft tissue which is later readily penetrated by the insects. The flowers appear in dense spikes, similar to the spadix of the Jack-in-the-Pulpit. The seeds are surrounded by an orange or yellow sweet pulp similar to that of St. John's Bread, which attracts pigs and other animals. This fruit distinguishes the type from the other Acacias the seeds of which are devoid of pulp and split open. The horns are used by certain stinging ants of the genus *Pseudomyrma* as breeding shelters. The entrance into these horny thorns is effected through the only penetrable spot, the depression left by the dropping off of the leaf stalks. The food for the insects is furnished by the oily wax-like bodies (Beltian bodies). In return for the home and sustenance provided by the plant, the ants act as guardians in protecting the tree and its foliage from animals. In addition the storage and subsequent decay of vegetable matter left in the horns may provide nutriment for the plant. Hernandez (1570) and Jacquin (1763) in describing their experiences, speak of the intense pain caused by the ants rushing out of their dwelling places and inflicting numerous burning stings upon the unwary intruder.

Cow-Horn Orchid

*Schomburgkia tibicinis**Orchidaceae*

Epiphytic plant of Honduras. The pseudobulb is 1 to 1½ feet long tapering upwards and terminating in two to three

leathery ovate leaves. The flowering spike 4 to 8 feet long terminates the pseudobulb bearing numerous flowers $3\frac{1}{2}$ inches wide with crisp undulate sepals and petals, and a hooded lip. The color is pink speckled with white, rich red within, the lip



PSEUDOBULBS OF SCHOMBURGKIA
TIBICINIS AND DIACRIUM BICORNUTUM
SHOWING PROVISION FOR INSECT
ENTRANCE

being white and rose with a chocolate-red middle portion. At the base of the pseudobulb is located an opening for the use of ants which inhabit the interior and perform functions similar to the following.

Diacrium bicornutum

Orchidaceae

This orchid is closely related to the genus *Epidendrum*, a native epiphyte of tropical America. The pseudobulbs are 2 feet long, hollow, cylindrical bearing several dry sheaths. The leaves are leathery, short, oblong to lanceolate. The spikes of flowers appear at the top of the pseudobulb, bearing 3 to 12 flowers. They are fragrant, white, with small crimson spots on the three-lobed lip. The specific name *bicornutum* is derived from the two horn-like appendages appearing from the center of the lip. An opening is provided at the base of the horn-like pseudobulb for entrance of the stinging ants that make their home within. The plant is rarely seen under cultivation owing to the absence of the symbiotic ants, which are essential for proper growth. At the Missouri Botanical Garden, however, one plant of *Diacrium* has been thriving for the last ten years which fact is ascribed to the repeated appearance of common black ants in the interior of the pseudobulb, presumably aiding in some manner in the maintenance of vigor.

SENSITIVE PLANTS

Sensitive Plants are particularly attractive to people because of their power of motion which is generally supposed to be an attainment characteristic of the animal kingdom only. The phenomenon occurs chiefly among plants belonging to the Leguminosae. Certain species of *Oxalis* are extremely sensitive to changes of temperature, folding down their leaves even in the daytime if a storm threatens, while a sudden shock will cause shrinkage with great abruptness. The tropical *Oxalis sensitiva* is so sensitive that a disturbance of air by approach of animals is sufficient to produce a complete relaxation of the leaflets.

The movements of sensitive plants are probably due to the modification of certain leaf cells, which are so constructed that the threads of protoplasm form connecting links between the different cells of the leaves as well as the stem. Thus, a stim-

ulus exerted upon one portion of the plant may be transmitted through this protoplasmic connection from one part to another causing the readily perceptible movements. The stimulus may be produced not merely by actual forcible contact but by anesthetics like ether and chloroform, by application of heat, and other means.

Bearded Orchid

Bulbophyllum Dayanum

Orchidaceae

Native of East Indies, epiphytic upon trees, producing small pear-shaped pseudobulbs with a single oblong leathery leaf, dark purple below and green above. The plants grow in chains upon the trunks of trees. The flowers are produced in clusters, purplish in color, with the three outer sepals provided with long hairs while two of the petals are fringed with a fine pubescence. The lip is tongue shaped, grooved with two sentinel horns acting as guides for insect entrance. It is resilient, bending down with the weight of the visiting insect and springing up again as the insect nears the pollen masses, thus forcing it to come in touch with the pollinia.

Bearded Lip Orchid

Bulbophyllum barbigerum

Orchidaceae

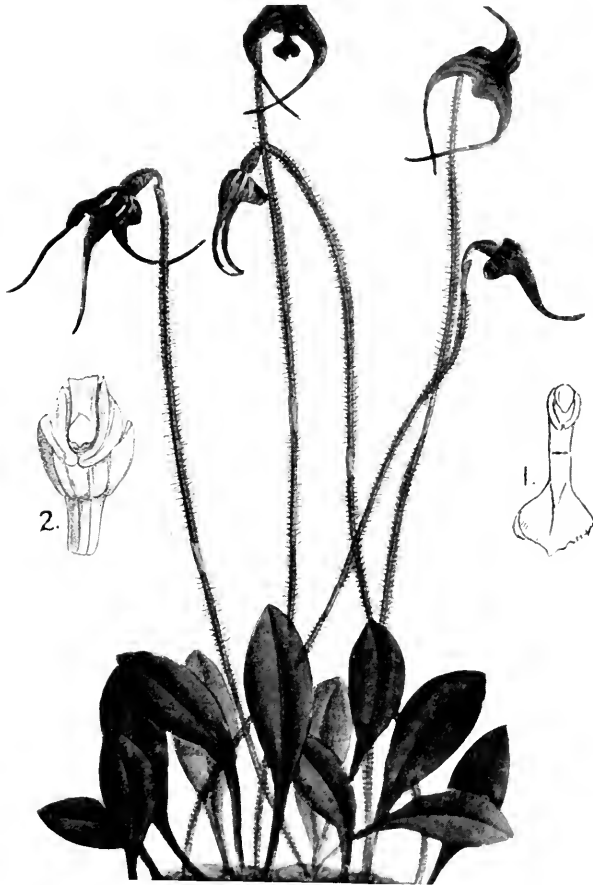
Native of west coast of Africa where it is epiphytic upon trees. It was first introduced into England in 1836. The pseudobulbs are small with a single leaf. The flower spikes contain 7 to 12 brush like flowers, brown in color, the sepals being oblong tapering to a point, while the petals are miniature scales. The lip is covered with long purple thread-like hairs terminating in a brush. It is hinged to the column at its basal portion. The entire structure is so sensitive to disturbances of the atmosphere, and its rocking motion so conspicuous as to give the impression of animal agency at work or a perfect mechanical contrivance.



BEARDED ORCHID
BULBOPHYLLUM DAYANUM

Sensitive Orchid
Masdevallia muscosa
Orchidaceae

An epiphytic plant of Colombia and Ecuador. The short, ovate, thick leaves act in the same capacity as pseudobulbs of the orchids, storing food to last through the dry period. The flowers are yellow, produced singly on hairy spikes well above the leaves. The sepals are narrow and elongated into tail-like appendages. The petals are narrow and minute, running



MASDEVALLIA MUSCOSA

parallel with the column so as to form an arch, leaving a two-sided opening between it and the anther. The most important feature of the plant is the third petal, the sensitive labellum which is somewhat ladle-shaped, bearing tufts of maroon-colored hairs. Normally the lip remains open, but upon contact with the sensitive cushion of hairs it rises slowly and then springs quickly into place, fitting closely to the confluent sepals and the curve of the petals and leaving an opening below the anther. This peculiarity of the plant is an aid in insect pollination. Upon alighting on the sensitive cushion of hairs with the object of collecting the nectar from the base, the insect causes the closing of the lip with its consequent imprisonment within. The light which is admitted through the small opening at the top acts as a guide for his exit. During the passage outward the insect is forced to come in contact with the pollen masses, acting as a pollinating agent. In addition to mere contact with the hairs, the movement of the lip may be induced by sudden reduction of temperature, by application of heat or electricity and by moving the lip upon its hinge. It is diurnal in habit closing habitually at approach of night and opening again in the morning. The mechanism of the hinges depends for its operation upon the capacity of the thin-walled tissues of releasing their watery contents with subsequent contraction of the elastic membranes.

The Nodding Orchid

Pleurothallis villosa

Orchidaceae

A very small epiphytic orchid native of tropical America and bearing elongated stems with a solitary reddish leaf. At the back of the leaf are produced the small spikes of flowers, resembling the leaf in coloration and covered with minute hairs. The lip is very sensitive to the slightest movement of the atmosphere, springing up with a sudden jerk. The sensitiveness is well illustrated by bending close to the flowers, the breathing causing them to move their lips, thus appearing to nod to the observer.



NODDING ORCHID
PLEUROTHALLIS VILLOSA

Sensitive Plant

Mimosa pudica

Leguminosae

A shrubby plant native of Brazil, naturalized in the Gulf States, and in many other warm regions.

The leaves are doubly compound, the four secondary leaf-stalks bearing opposite leaflets articulated by elbow-like appendages which are also found upon the central axis and the junction of petiole and main stem. All these parts are capable of independent and combined movements. Along the main stem many short, rigid spines are located. Upon contact the leaflets close and move forward, the secondary leaf-stalks come together, while the primary stalks drop. The leaves thus affected and left undisturbed will resume their upright position in five to ten minutes. Toward night the contact with the terminal leaflets demonstrates the independent movement, causing the closing of these in consecutive pairs. The continuation of this stimulation causes further action upon other leaflets in the opposite direction. This stimulus may travel back to the primary petioles as well as the main stem, causing a total collapse of the entire compound leaf.

These movements are induced by variation in the intensity of light, shock or friction, variations in temperature and the anesthetic action of ether and chloroform. The action of the pulvini is due to difference in turgidity. It was first supposed that a sudden transfer of water was induced from the cells of the irritated side of the pulvinus into the intercellular spaces. At present, however, it is thought that the movement is not caused by water transfer but by mucilaginous content of sacs which are situated in the vascular bundles and are easily affected by variations in hydrostatic pressure. The nocturnal position is similar to that of the irritated leaf. Several theories have been suggested for the unusual sensitiveness of these plants. Damage by wind and rain storms may be avoided by the dropping of the foliage. Excessive transpiration during the heat of the day may be overcome by the assumption of the

sleeping position, with the broad side of the leaflets placed vertically. At approach of animals plants collapse through contact and expose the rigid spines, which, together with the movement, may frighten the animal sufficiently to cause it to abstain from eating the plant.

The main stem and petioles are hairy. The flowers appear at the axils of the petioles in the form of purple, bristly globules.

Swinging Lip Orchid

Bulbophyllum Lobbii

Orchidaceae

An epiphyte of Java similar in growth to the Bearded Orchid. The flowers are yellow, the upper portion being spotted with purple. The grooved lip is composed of two sections, the outer balanced on the inner. Upon landing on the lip the visiting insect is forced toward the back of the flower by the tipping of the sensitive lip. A continued pathway is made by the groove of the lip and the bent column along which the insect is induced to travel. Its work accomplished, the lip springs back.

Telegraph Plant

Desmodium gyrans

Leguminosae

A native shrubby plant of Ceylon, Himalaya, and the Philippines. It is naturalized in California. The leaves are rounded, with two linear, stipule-like leaves below, which are capable of movement. The flowers are purple or violet on terminal spikes. The name telegraph plant has been bestowed because of the semaphore-like action of the lateral leaves. Under favorable conditions of moisture, heat, and light the circling movement is plainly evident by the periodic jerks, the complete circle being made in one to three minutes. The direct cause of the movement is the firm cushion of tissue called the pulvinus which consists of a strongly turgid set of



SENSITIVE LIP ORCHID
BULBOPHYLLUM LOBBIAI



DESMODIUM GYRANS

cells with elastic cell walls. The vascular bundles unite in the pulvinus in the form of a single flexible strand, the parenchyma forming a thick layer enveloping it. By these means through the pressure arising from the difference of turgor of the opposite side the movement of the leaf is produced similar to that of the outspread hand by the motion of the wrist.

(To be continued)

Interallied Educational Centre, Villebon, near Paris, France

By Claude Remusat

The school of which M. Remusat spoke so inspiringly at the Spring Meeting of the Club at Bartow has been under the direction of Captain H. H. B. Hawkins. The great need for the continuance and enlargement of such institutions in France has prompted M. Remusat to interest America in a system of education long understood in England and which it is planned to maintain in France. Captain Remusat was one of five graduates of the School who were captured by the Germans and escaped.—Ed.



CALLING the attention of the readers of the JOURNAL of the International Garden Club to a college organization which certainly cannot be called anything but a home like Garden Club, or country school, we feel we are acting in conformity with the aims of the International Garden Club's educational purposes.

We have had the good fortune for the last twenty years, to arrange the ordinary school life of young boys and students, on the plan of a Garden Club, or School where masters, parents and old boys collaborated in complete harmony together for the welfare of the younger generation.

As far as we know, no such effort has been attempted before, and this is all the more surprising when we hear of the remarkable success obtained. All the objections which would naturally present themselves, proved to be entirely unfounded, and the solution to more than one difficult educational problem, was actually discovered by the application of the fundamental principle adopted.

More so than at any other time, owing to the dreadful experiences of this world war, must we realize the fact that hap-

piness is the privilege of the young, and a preparation for the hopeful outlook on life, and a support in time of trouble.

Beauty in nature, beauty in what this barbarous conflict has allowed to survive, beauty of culture and perfection in art, such as our forefathers understood,—that is what we need to make us forget the horrors of war.



PARC DE VILLEBON
ALLÉE SOUS BOIS

Our younger brothers, our sons, are to benefit by our experience, learned at such a cost. We must safeguard them their happiness, and teach them this love of the beautiful;—beautiful trees, beautiful gardens, beautiful flowers, beautiful old buildings, where the spirit of the past is so strongly portrayed. Let a young boy or girl live in such surroundings,

and neither will pardon a spirit of destruction. In schools each should have a share of the park and garden to love and cherish; those pots of flowers which French peasants so proudly



CHATEAU DE VILLEBON
VIEW TAKEN FROM THE SOUTH



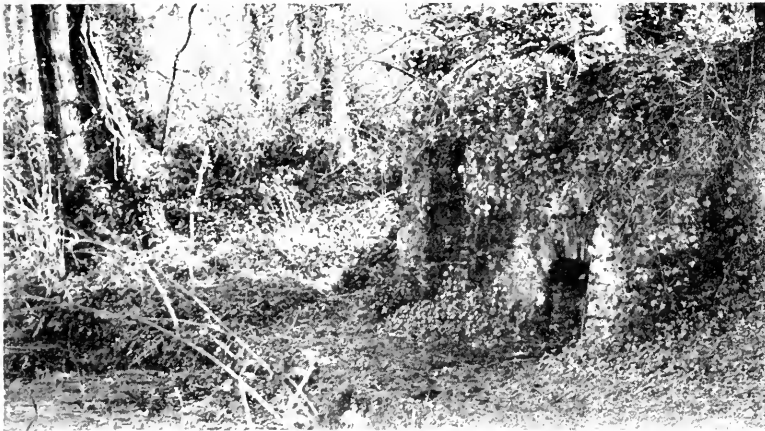
VIEW FROM THE CHATEAU
WITH FARM AND OUTBUILDINGS

keep on their window-sills, help to enliven the dark old-fashioned living rooms, in which generation has followed generation for centuries. Any boy to whom love of art is a hobby and a

pastime, should be helped in this line. Let him decorate his men over the Atlantic. Those who were cultured realized bedroom and his classroom. This will give pleasure both to



PARC DE VILLEBON
THE CHAPEL. A. D. 1547



PARC DE VILLEBON

him and to his comrades. Let this be a diversion from the routine of studies. Games are a recreation undoubtedly, but the change in our work is certainly equally necessary.

It is this love of beauty, this search after a great ideal which brought America into the war. Destruction of right, of justice,



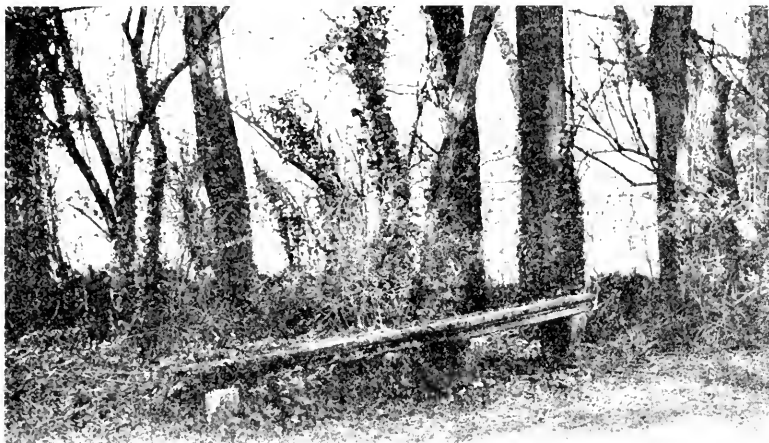
CHATEAU DE VILLEBON AND ALLÉE FRANCOIS I
VIEW TAKEN FROM THE EAST



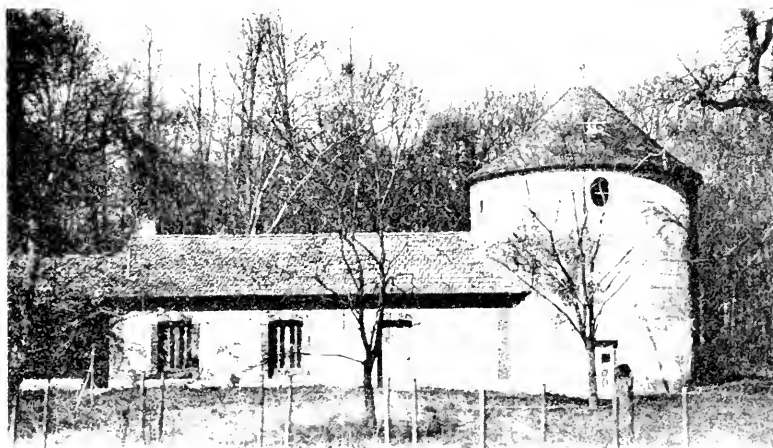
PARC DE VILLEBON
RIVER YVETTE

—therefore of beauty, sent division after division of khaki-clad how fine is the old world, and there are many who will wish to return and see England and France when Peace and normal

conditions have succeeded the crisis from which the nations have not yet recovered.



PARC DE VILLEBON
BANC DE GABRIELLE D'ESTRIES



CHATEAU DE VILLEBON
THE WATER-TOWER. XVIIth CENTURY

Americans will want to send their children over to Europe or will visit with them the battlefields of France. As soon as

the American Government will issue passports in greater numbers, families will have to decide what to do with their children.

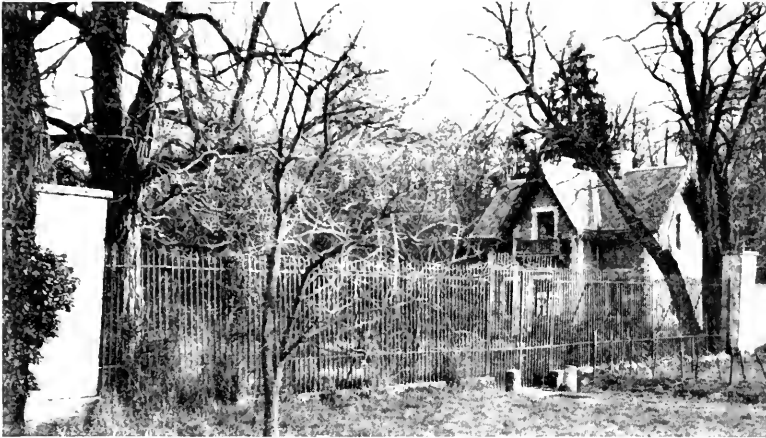
If parents take their boys across to France, they will not wish to put them in a Lycee where the life is even more unsuited to Americans than to present generations of French boys, and the coming in contact with hotel porters and interpreters is not likely to benefit their stay. They would return to their country without having learned a word of French except probably that which would be best avoided, nor would they have opportunities of seeing the best side of French life. French masters in general, the French schemes of study in particular are unrivalled. No other country has yet reached such a high level of perfection, or succeeded in imparting an instruction in general subjects, to so large a percentage of the population, while other countries such as America and England if they are not prepared to be left behind, might with advantage study the French system of instruction. France will do well, however, to make a serious effort to improve her educational methods, for her schools are organized essentially for day boys and uniquely for the training of the mind.

A school near Paris, the home life colony in the country, where groups of twenty-five English, French and American boys would live under the affectionate care of the house master and house mistress, is what they need, in order to learn French and to profit by the French atmosphere of the house.

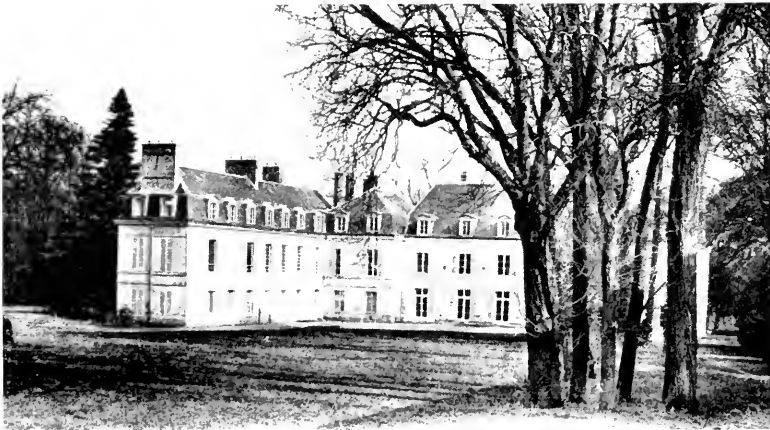
A young boy staying here a year or eighteen months would come back to America after his period of study in France, on equal terms with those he had left before going to Europe, knowing a new language easily learned when young, and obtaining such a favorable impression of his stay, that in after years, he would become a champion of other countries' causes.

Older boys could live at the school's Old Boys Club on the same premises. Situated near Paris a very few minutes travelling would bring them to the Sorbonne and the Latin Quarter where the intellectual activity of the whole nation is centered. This is far better for them than the doubtful advantages of rooming in this part of the city.

This home life colony gives every advantage for sport and outdoor life as both are offered, and Americans and English

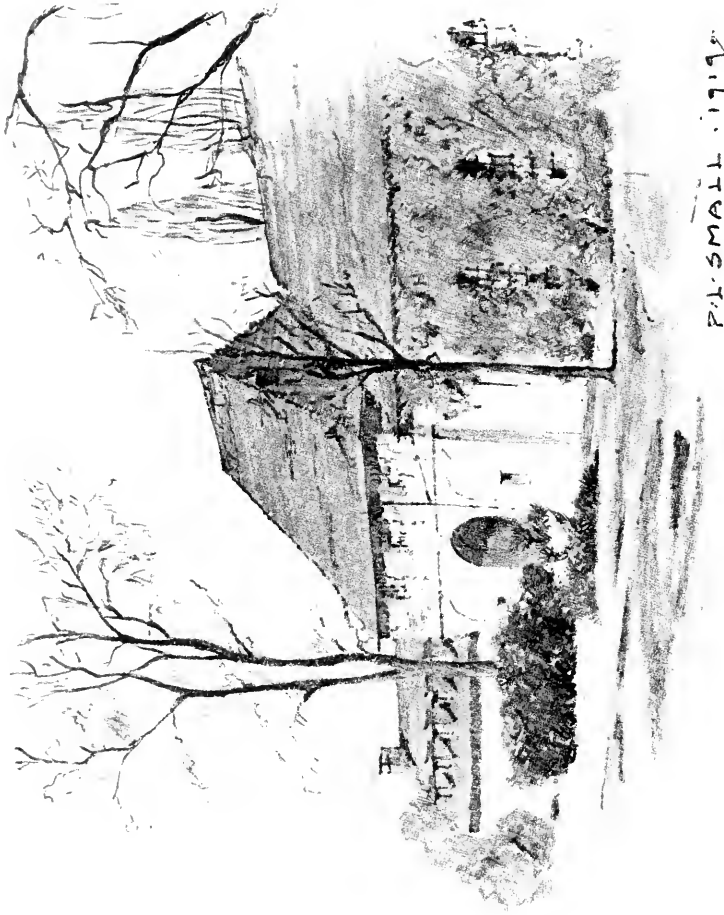


PARC DE VILLEBON
ENTRANCE LODGE



CHATEAU DE VILLEBON
FROM THE WEST
(MAISON HENRI IV AND MAISON ST. GENEVIEVE)

will have lost nothing of this prominent feature of their own school life.

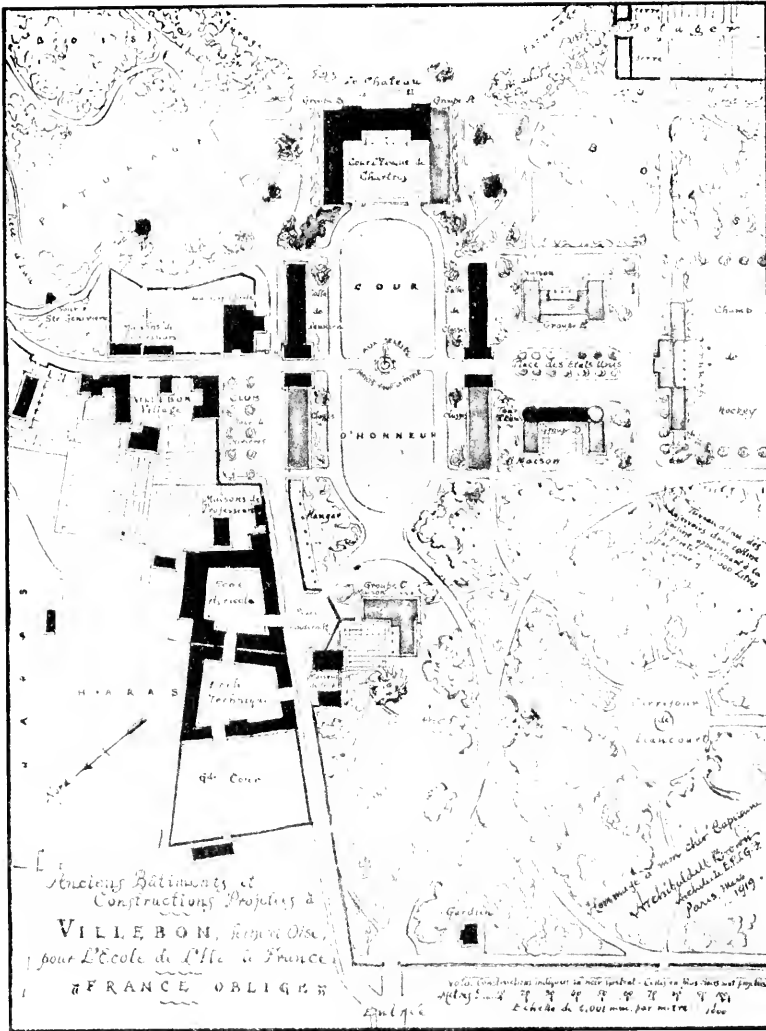


ANCIENT BUILDING TO BE ADAPTED
AS AN INTERALLIED SCHOOL AT
VILLEBON



PL 107.042.19.9

ONE OF THE BUILDINGS
AT VILLEBON TO BE ADAPTED
AS AN INTERALLIED SCHOOL



PLAN OF THE INTERALLIED SCHOOL.
AT VILLEBON



ANCIEN BÂTIMENT Â VILLEBON

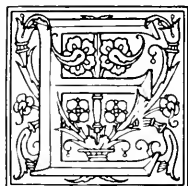
This group center being near Paris, parents can come down and see their boys whenever they please, as often as they want to or can. Education is impossible for masters without the help of parents and *vice-versa*. Nothing can replace a mother's love or a father's affectionate advice, and it is very doubtful if it is wise to separate children from their parents, or to maintain that no child can be brought up "if parents come meddling in."

This scheme of giving boys a chance to know the countries of their allies of the great war is a triangular one, and would be commenced between America, France, and England.

An interchange of staff and scholars would do a great deal towards suppressing any ill feeling that might arise, or of misunderstanding. An American in France is an Ambassador of his country, just as is a Frenchman when he comes to America. Few indeed are the boys who do not love travel, few also who when quite young did not have a hobby of some sort, engineering, gardening, painting and the like. It is well when they are of an age to derive greater benefit from a stay abroad than at any other time, to give them this opportunity; it is well not to deny them what they seek as an amusement or a pastime when it may help them to decide on their career. A school should have a workshop, a technical school, a garden, a model farm, a studio, and every possible activity to help boys to discover what their life should be. They can see after a time whether they are satisfied or whether something else suits them better. Decision upon a career is not to be taken as late as twenty years of age, and we have lost time when everything urges us on to rapid production and specialization. This scheme equally adapted to America, Britain and France, should, needless to say, find equal support from these three nations. Endowments for scholarships should be founded for those who owing to moderate fortunes, could not come abroad when their work and future promise should be helped in every possible way.

This is Captain H. H. B. Hawkins' work and mission to America. He had the pleasure a year ago of speaking to the International Garden Club, and we feel sure that this greatest of after-war problems will find many supporters among the members of the club.

Quarantine No. 37 and What it Means to American Gardening



EARLIER issues of the JOURNAL have recorded the different steps in the inauguration of the plant exclusion act and what has been the International Garden Club's attitude towards it. By the time this issue reaches its readers the act will have become effective and it now remains to set forth what one can and cannot do. As a permanent record we give the act complete, as reprinted from the official document issued by the Federal Horticultural Board.

UNITED STATES DEPARTMENT OF AGRICULTURE
FEDERAL HORTICULTURAL BOARD

NOTICE OF QUARANTINE NO. 37

NURSERY STOCK, PLANT, AND SEED QUARANTINE

[Effective on and after June 1, 1919, and superseding the rules and regulations governing the importation of nursery stock into the United States which were promulgated to take effect on and after July 1, 1916.]

The fact has been determined by the Secretary of Agriculture, and notice is hereby given, that there exist in Europe, Asia, Africa, Mexico, Central and South America, and other foreign countries and localities, certain injurious insects and fungous diseases new to and not heretofore widely distributed within and throughout the United States, which affect and are carried by nursery stock and other plants and seeds, the words "nursery stock and other plants and seeds" including, wherever used in this notice and the rules and regulations supplemental hereto, field-grown florists' stock, trees, shrubs, vines, cuttings, grafts, scions, buds, fruit pits and other seeds of fruit and ornamental trees or shrubs, also field, vegetable, and flower seeds, bedding plants, and other herbaceous plants, bulbs, and roots, and other plants and plant products for, or capable of, propagation.

Now, therefore, I, D. F. Houston, Secretary of Agriculture, under the authority conferred by the act of Congress approved August 20, 1912 (37 Stat., 315), do hereby declare that it is necessary, in order to prevent the further introduction into the United States of injurious insect pests and fungous diseases, to forbid, except as provided in the rules and regulations supplemental hereto, the importation into the United States of nursery stock and other plants and seeds from the foreign countries and localities named and from any other foreign locality or country.

On and after June 1, 1919, and until further notice, by virtue of said act of Congress approved August 20, 1912, the importation of nursery stock and other plants and seeds from the above named and all other foreign countries and localities, except as provided in the rules and regulations supplemental hereto, is prohibited.

This quarantine shall not apply to nursery stock and other plants and seeds covered by special quarantines and other restrictive orders now in force, a list of which is given in Appendix A of the rules and regulations supplemental hereto, nor to the importation by the United States Department of Agriculture of nursery stock and other plants and seeds for experimental or scientific purposes.

Done in the District of Columbia this 18th day of November, 1918.

[SEAL.] Witness my hand and the seal of the United States Department of Agriculture.

D. F. HOUSTON,
Secretary of Agriculture.

The final issuance of this act marks a step in American Gardening History of almost limitless significance. The practical exclusion of all that class of nursery stock that comes normally packed in balls of earth done up in gunny sacking, means that all Azaleas, Rhododendrons, Evergreens, Box, etc., are forbidden entry into the country. Ninety per cent of such stock found now in American gardens came from abroad in the young state. Its loss for future new work will limit us to those easily propagated shrubs and trees which may be grown here. While it is perhaps a confession of incompetence on the part of American nurserymen to say that they cannot propagate this stock in this country, it is the fact that generally speaking they have not done so. They have from the days of Prince and Parsons at Flushing, sent to Holland, Belgium, England and France for their young plants. The stoppage of this trade, which, more than anything else has been the means of carrying over the heritage of the older civilizations and concepts of gardening to the New World, can only result in a plethora of uninteresting landscapes, stocked with the conventional and the easily obtained.

Under this new régime no such plantings as are to be found at the older and finer private estates, the botanic gardens, or in the Moravian Cemetery at Staten Island, will be possible ten years hence. The plants simply will not be found in America in commercial quantities and a Board that sits at Washington and now has been granted immensely increased powers, says we must import no more. As to the merits of their case there are several opinions possible, as to the blighting effect of their action upon future ornamental planting in America there seems to be pretty general agreement.

Not only are the plants noted above excluded, but many others such as Peony, Dahlia etc., and much material imported for propagating purposes by American nurserymen. The contention of the Board that forbidden plants may still be imported through the Bureau of Plant Industry is of little horticultural significance. Beyond a few institutions no one is likely to use this doubtful privilege, which in any case applies "only to limited quantities."

The act as it now stands, (there is of course much agitation to have it repealed and the powers of the Federal Horticultural Board curtailed or withdrawn), appears as if it had been framed with deliberate intent to cripple the normal development of American gardening. The irony of the situation is that the Board has insisted from the first that on the contrary it was framed to protect our gardening and crops from destruction. Whether the truth lies on this side or on that, there is little likelihood of their assumptions going unchallenged. In fact the storm of abuse to which the Board seems relatively impervious may react so that 1920 may see the end not only of Plant Quarantine No. 37 but of the somewhat overzealous régime that created it.

Practical Horticultural Notes

SALVIAS FOR THE GARDEN



VERY few groups of plants are so little known and appreciated for their use in the garden as the *Salvias*. These belong to that well known family of plants, *Labiatae*, from which we are supplied with so many gems of the garden.

The four *Salvias* I wish to speak of as of special value for their utility and easiness of culture are:—*Salvia farinacea*; *S. uliginosa*; *S. azurea grandiflora* and *S. patens*. All are herbaceous perennials but shall be treated as annuals with the exception of *Salvia azurea grandiflora* which although a native of Mexico is perfectly hardy.

Salvia farinacea. The seeds should be sown in the hot bed or in the warm greenhouse about the end of March, and as soon as the seedlings are large enough to handle should be pricked off into boxes about 3 inches apart, these seedlings should be kept growing in a warm temperature and gradually hardened off till they are ready to be planted in the open ground in May; when they should be planted in a good soil with a sunny location, about 18 inches each way apart. In July they will be one mass of lavender blue flowers.

The great beauty of this plant is in the flowers, as the corolla and the calyx are of the same color and when the former drops the calyx remains and gives the appearance of a sprig of the English Lavender (but lacks its perfume). *Salvia farinacea* is of importance as a cut flower, it lasts a long time when cut and placed in water; but it should always be planted for effect in bold masses.

Salvia uliginosa. The seeds and seedlings should have the same treatment as *S. farinacea*, but with this difference; the plants should always be allowed two feet each way when planting and should have a well manured soil, they also like a dry location.

This *Salvia* is the last of the *Salvias* to come into flower but it continues to flower till late fall; it will grow to a height of 4 to 5 feet and therefore should not be planted in front of the border but at the back. It is a most profuse bloomer and the flower tresses are from eight to ten inches in length and are of a pretty cornflower blue with a little white in the throat, a most distinct color in *Salvias*. No *Salvia* is so useful for massed effect in the border, and while it is a good cut flower it does not equal *S. farinacea* in that respect.

Salvia azurea grandiflora. In the seedling stage this plant requires the same treatment as the above mentioned, but once you have a good supply it will remain with you as the roots are perfectly hardy and the plants will increase in strength from year to year. The habit of this plant is not so free as the two already mentioned, the stems are more woody and stiffer and the flowers are not borne with such profusion, but still it is a very worthy subject for the garden and vase as a single stem of flowers forms quite a show of blooms. It is its color that appeals, it has a blue that is lighter than any other blue in the garden with the exception of a few *Delphiniums*. It should be planted not for massed effect, but rather to increase the color scheme of the border and therefore six or twelve plants, planted in clumps every little distance in the border has a very pleasing effect.

Salvia patens. This plant requires a little more heat in the seedling stage and when possible should be worked into pots before planting out, so to form strong individual plants as the habit of this plant is to send shoots or stems from the crown, and does not branch like *S. uliginosa* and *S. farinacea*, so therefore the stronger the crowns the more flowers will be produced. The plant produces herbaceous roots and where possible it should be taken up in the fall, potted and kept in a cool

greenhouse all winter; in this way other strong plants are formed and the true character comes out the following season.

It should be used more as a bedding plant than as a cut flower plant as the flowers do not stay long when cut, but when left on the plant the flower stems continue to grow in length and as soon as one flower falls another is formed, thus keeping up a continuous mass of blooms the major part of the summer months. To be effective it must be massed and if used with *Hunnemannia fumariaefolia* it makes a good combination.

The flowers are of a good dark blue and have a very large lip, also blue in the throat and are borne sparingly on a long stem.

The *Salvias* mentioned above are types that can be raised in any garden where there is a hot bed and cold frames, they are simple in culture but rich in effect and utility and are worthy of a place in the garden of all plant-lovers.

S. R. CANDLER.

CIMICIFUGA

These most wonderfully attractive plants deserve greater popularity than they now possess. They are admirably decorative and so unlike other flowers that they command instant attention when seen for the first time. In rich soil some grow 5 and 6 feet tall, as the variety *dahurica*, a native of Asia and the first to come into bloom, in July. The wiry stems branch near the top into 5 or 6 loose and somewhat drooping feathery racemes of closely set small creamy white flowers. The leaves are decomposed and large, all arising from the base and about 2 feet long.

C. racemosa the American snake-root, flowering in August, is of coarser growth. The many branched wiry flowering stems are all quite upright. In September and during October frosts we are delighted with the variety *simplex*. Spikes are freely produced, of purest white and gracefully curved, 3½ inches tall. All are splendid cut flowers, fine for naturalizing in masses, perfectly hardy and transplant with ease even in well advanced stages of growth.—A. MARTINI.

GROWING OF MUSHROOMS

It is not as difficult to grow mushrooms successfully as many people seem to think. A cellar or tight shed under the barn is a good place to grow mushrooms during the summer months; whereas for winter and cold weather it will be necessary to have a place either provided with some means of heating or so constructed that the place will be frostproof. For summer use the beds should be made up from March to May and for winter crops from September to December. Good material for beds is best obtained from livery stables. In gathering up the manure take all the saturated straw with the droppings, pile this into a rather deep compost and have on hand some good moist friable soil about one-third in bulk to the manure. As soon as the manure pile shows signs of fermentation turn the mass over thoroughly, mix and see that the manure on the outside gets in the center and *vice versa*. After the compost has been turned, cover over with a layer of soil, incorporating this with the manure and repeat the operation morning and evening until in about a week's time the rank heat has subsided and the whole mass presents a dark brown spongy color. With the addition of soil each time of turning, as mentioned above, there is little danger of the compost overheating and burning. Should the mass show signs of dryness, however, use the watering can until sufficient moisture is obtained.

In laying the beds have two men do the operation, one to shake up and throw in the manure, and the other to pack in the material firmly and even. Lay the beds firmly, about 14 to 16 inches thick and then pound or tramp down to about 10 to 12 inches. Place a thermometer in the bed and when after a few days the temperature has subsided to 85° or 80° spawn the bed. Fresh American pure culture spawn is always reliable and will produce a good crop of solid fine flavored mushrooms. Break up the bricks of spawn into pieces about 3 to 4 inches square, place over the bed 12 to 14 inches apart. Take a trowel and plant in the bed so that each piece will be covered with about 1 inch of manure. Firm the bed down,

smooth and level. In about ten days or two weeks cover the bed over with some good garden soil passed through a rather coarse sieve, spread out level and firm down to an inch thickness. The ideal temperature in a mushroom house is 55°. In the summer months it is sometimes hard to keep the temperature down below 60° to 65°, but by keeping the floor well sprinkled and the place tight and dark in the day time and by opening the door or ventilator wide by night or even having a large cake of ice on the floor, the temperature may be kept below 70°. most of the time. If the room stays around 70° for any length of time the whole crop is liable to be ruined as maggots will be sure to develop. As soon as the beds show signs of dryness, they should be given a sprinkling of tepid water in which a handfull of nitrate of soda has been dissolved to each two gallons of water. Pick the mushrooms by twisting them up from the bed. After each picking go over the beds, pick up all rotted dead heads or withered small specimens and fill in all holes with soil. After the beds have been in bearing for some time and the crop shows signs of weakening, sieve a layer of good moist soil over the whole bed. Water this, using tepid water and nitrate of soda as mentioned above and the beds will soon show new life. This operation may be repeated from time to time. If proper temperature and a good growing atmosphere is maintained a bed of good material should continue to bear for about three months time. Be sure to procure the spawn from a reliable firm and keep the same in a dry airy place some time before it is needed. The writer has been growing Mushrooms for sixteen years and rarely has been unable to pick good specimens any month during the year.—S. W. CARLQUIST.

DELPHINIUM BELLADONNA

This charming and useful plant should be seen in every garden and its easy culture permits this and offers no difficulty. A few years ago all Delphiniums hybrids and types were raised from either division or cuttings and very rarely from seed, i.e., when

a true strain was needed. Even now most of the named varieties must be propagated from cuttings or division, as seedlings cannot be depended upon to come true; but with *D. Belladonna* it is different. This plant comes very true from a good strain of seed and is therefore brought within the reach of all garden-lovers.

The best way to treat it is as a biennial as it is better treated that way with a few plants raised each year. If it is treated as a herbaceous perennial, it cannot be relied upon as sometimes after a first heavy crop of flowers it dies away.

Seeds should be sown in the cool greenhouse in the last week of March or in the hot bed about the same time, and as soon as large enough should be picked off into shallow boxes, about 3 inches apart each way. They should be kept growing in a cool place until May when they should be large enough to plant in the open ground, and should be planted in rows one foot six inches apart, and twelve inches in the rows. The plant must have good cultivation all summer and sprayed with Bordeaux mixture or Pyrox once or twice during the hot weather; in early July they will begin to flower and continue till frost. These flowers should be cut and used as cut flowers, as this cutting tends to strengthen the crowns by the formation of more flower stems.

In the fall a good mulching of stable manure between the rows is very beneficial and as soon as hard frost arrives a good covering of salt-hay or leaves should be applied over the crowns.

In the spring the plants in the rows will be too close and every other plant can be taken out and transferred to the flower border, those crowns will be found to be very strong and many shoots on them, and will transplant readily, and at the flowering period will prove superior in every way over the late summer or fall sown seed.

Staking is very necessary as the stems have a great tendency to bend and break off at the surface.—S. R. CANDLER.

ROOT PRUNING OF FRUIT TREES

One of the most important operations in the orchard and fruit garden is root-pruning, particularly with dwarf or trained trees.

If a tree of fruit-bearing age is making very strong growth, yet shows no signs of bearing fruit; a check to growth, by judicious root pruning in October, will cause the formation of fruiting buds the following year, and in all probability change the tree into a fruitful condition. Dig a circular trench $2\frac{1}{2}$ to 5 feet from the stem, according to size of tree, and about 2 to 3 feet deep, carefully preserving all fibrous or feeding roots, cut back the strong coarse roots with a sharp knife or pruning shears. A skilled workman can judge if any tap roots go down into the subsoil, if so, dig well under the tree and sever roots with mattock or axe. Fill in trench with good soil, spreading out roots at same level as before, firming soil as work progresses.—GEORGE W. WYATT.

COAL ASHES AND PLANT DISEASES

Interesting observation has been made by the writer of the value of coal ashes for growing plants free from disease. On old ash heaps were found growing in perfect state Dahlias for instance, when in our garden plantings Dahlias were a complete failure. The same was noticed of Asters and Cucurbitae, that simply died under culture from blight diseases but were found on dumping ground ash heaps free from disease. It would seem that a very liberal use of sifted coal ashes to disease bacteria infected ground should prove very beneficial. The roots of pot bound plants will roam much more in ashes if that material is used on greenhouse benches.—A. MARTINI.

GROWING PERENNIALS FROM SEED

Everyone who loves flowers has a tender place in his heart for the flowers of Hardy Herbaceous plants, especially of the older types that are more common, such as Aquilegias, Sweet

William, Foxglove, etc., plants that almost everyone is acquainted with, as they can be grown as easily in the cottage garden as on the largest estate. They can be readily grown from seed, at least a great many of them, with but little trouble. The method I have found very satisfactory is as follows: Late in July or early in August, prepare a cold frame by spading it up, and working in some leaf mould, smooth off with a rake, making the bed moderately firm. After this we are ready to make shallow drills three inches apart, when the seed may be sown. Seeds vary considerably in size and the larger will require a little deeper drills than the finer and a little more space in the drill. After the seed is all covered and smoothed over, give a good watering. Instead of using sash on the frame, make a light wood frame same size as sash and tack on cheese cloth, which will give enough air and shade and help to retain moisture until the seedlings show through the ground, when they can be removed. In about six weeks most of the seedlings will be ready to transplant into another prepared frame, spaced four inches each way. They should be shaded for a few days with the cheese cloth, when they may have all light and air possible till frost. As a winter protection fill frame with dry leaves and place on sash. Early in April or as soon as weather conditions are favorable, the plants may be planted in their permanent quarters and will flower the same season.—FREDERIC CARTER.

GLOBE OR FRENCH ARTICHOKE

This very desirable vegetable is not so extensively grown as it should be. In fact it is seemingly but very little known. The larger and best kinds are not hardy, that is, they will not readily winter over if left outside during winter, even with the most careful protection. To raise the plants from seeds every year is not very satisfactory as the seedling plants seldom come to maturity the first year and in a batch of seedlings there will always be a number of inferior and useless plants. The best way to produce fine large heads is to grow

new plants every year from suckers, or sideshoot cuttings. If young plants of the large variety can not be obtained to start with the first year one must of course start with seedling plants and select from these the best plants for further propagation. Sow the seeds early in January, pot up the small plants singly in 2 inch pots and grow on near to the glass in a temperature of 60° to 65°, giving the plants a shift into larger pots as required. Towards spring they will occupy 7 to 9 inch pots and the plants should then be thoroughly hardened off. They should be planted out in a deep rich soil as soon as danger from severe frost is past. Give the plants at least 3 feet of room each way. As the plants come to maturity select such of those as produce the largest and finest heads and mark for further propagation. In the fall, before heavy frost sets in, dig up these selected plants, cutting back the foliage and some of the larger roots and pot up into large pots, tubs or boxes. Keep the plants during winter in a cool but frost-free place. In February take up as many of the plants as will be needed for the first batch of cuttings, shake out all the soil from the roots when it will be found that a number of suckers or shoots have formed at the base of previous year's flowerstalk. Pull off these shoots, leaving on any small roots which may be formed on them. Pot up these shoots or cuttings into small pots, using a sandy soil, water well and place in a warm house, keeping the plants shaded and free from draft for a few days or until rooted. Repot into larger pots as will be required and handle the plants as described for seedlings.

By taking two or more batches of cuttings at different times, one may have a continuous crop of this vegetable from July until late fall. It will be found that every plant grown from a cutting will bear the first season and if one has selected a good strain to propagate from and the plants are given a good rich deep and well prepared ground to grow in, some extraordinarily fine large Artichokes will be produced. The heads should be cut for use as soon as they are well formed, but before they begin to open in the center. If not used at once they will keep a long time after being cut, by keeping them in an icebox or

other cool and dark place. If left too long on the plants they will become stringy and lose much of their fine flavor.—S. W. CARLQUIST.

CEDRUS ATLANTICA GLAUCA.

This beautiful Conifer deserves more recognition than it seems to get at present. Some erroneous ideas as to its hardihood, I believe, are partly responsible for its not being used in ornamental plantings more than it is. It has stood 14° below zero here in Rhode Island, which would lead one to assume it may be classed as a fairly hardy tree. Although that was a little severe, browning the foliage some, yet, in the Spring it broke out in its natural steel blue as beautiful as ever. Given a good open position this Cedar will make a handsome specimen well worth seeing any month in the year. It is of vigorous upright growth when well established, the branches are low and of a compact habit. It is apt to make a tap root, and should there be occasion to move it to another location, great care would have to be used in the operation, that is if the tree has grown to a fair sized specimen.—FREDERIC CARTER.

Journal of the
**INTERNATIONAL
GARDEN CLUB**

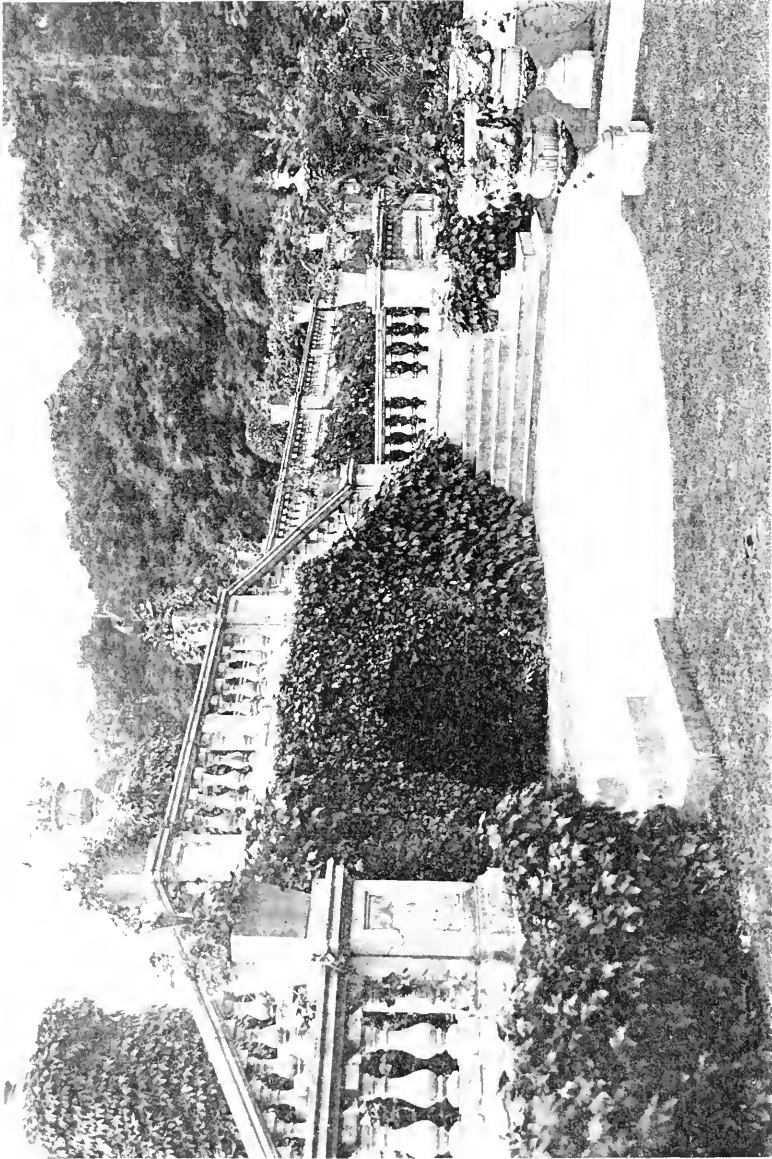
Vol. III

SEPTEMBER, 1919

No. 3

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CORAL PINK GERANIUMS ON THE POSTS,
OLD IVY AND PINK ROSES ON THE WALLS
ESTATE OF MOSES TAYLOR PYNE, ESQ.
PRINCETON.



JAPANESE PRIMULAS
SEE FOOTNOTE ON OPPOSITE
PAGE FOR EXPLANATION

Journal of the

INTERNATIONAL GARDEN CLUB

VOL. III

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No. 3

Japanese Primulas

By *Harry A. Day, F.R.H.S.**

PRIMULA CORTUSOIDES



ALTHOUGH there are a dozen or more species of *Primula* native to Japan, it seems that only one, *P. cortusoides*, has received extensive cultural attention from Japanese gardeners, and this (so I am assured by Mr. S. Iida, the genial manager of the Yokohama Nursery Co.) has been grown and developed upon scientific lines for a great number of years, long before Japan was opened up to foreign intercourse in the middle of the nineteenth century. Unfortunately, the enthusiasm has dwindled, until there are hardly half a dozen devotees of the plant left. One of these is Mr. Ito

* This article is part of a book on Flower-gardening which Mr. Day completed during the war. He has kindly consented to the publication of this chapter, before the book is issued. The text and pictures are copyrighted by the International Garden Club and permission to use them here or in England can only be granted by the Editor of the *Journal* or Mr. Day.—ED.

The illustrations of Japanese *Primulas* on the colored plate facing this page are as follows: 1. *Primula modesta* (*P. farinosa modesta* Pax); 2. *P. farinosa Fauria* (? *P. Miyabeana*); 3. *P. mistassinica* (*P. macrocarpa*); 4. *P. Reinii*; 5. *P. tosaensis*; 6. *P. nipponica*; 7. *P. cuneifolia*; 8. *P. cortusoides*; 9. *P. hakusanensis* (*P. cuneifolia hakusanensis*); 10. *P. jesoana*; 11. *P. heterodonta* (*P. cuneifolia heterodonta*); 12. *P. kisoana*.

Jubei, of Tokyo, an expert who grows over 300 distinct varieties of *P. cortusoides*! He has been a large exhibitor of these charming plants since 1888. He gives some interesting details of his methods of culture in the *Journal* of the Japanese Horticultural Society for February 15, 1915. This account has been translated, with evident care and kind-hearted labour, from the Japanese for me by Mr. Iida, and I herewith give the gist of Mr. Jubei's remarks.

First, he emphasises the fact that cultural methods differ in the several districts of Japan, but the general object seems to be the production of a plant possessing large leaves as well as large flowers. This is called the "Giant Creation." There are both early and late blooming varieties of *P. cortusoides*, the season of flowering coming between the second week in April and the middle of May. In order to obtain strong crowns (called "buds") for next year's flowering, rich soil is added to that in the pots containing the old plants until level with the rim; then the pots are placed in rows outside, and kept well moistened all the summer. Primulas, says Mr. Jubei, are quite hardy in *cold* weather, but cannot stand *heat*. After the flower-stems and leaves have withered, straw or other material is placed over the pots, to retain moisture during the remainder of summer weather; but the plants need no such provision for moisture during the ensuing winter.

About the middle of February, the pots are brought under glass, which must be well exposed to sunshine. When the soil becomes warmed, the contents of the pots are turned out, the soil being completely shaken from the crowns or "buds."

Here Mr. Jubei gives some information concerning the selection of "buds," which I suggest might be applied to many another species of *Primula*, or, indeed, to any plant which annually produces a crop of "crowns" that can be divided and replanted. He advises the separation of the small and large "buds," and says that the strongest of the smaller crowns should be preferred to the larger, as the latter are usually over-matured and *are likely to produce crooked stems and small flowers*. At the same time, the larger "buds" are not to be thrown

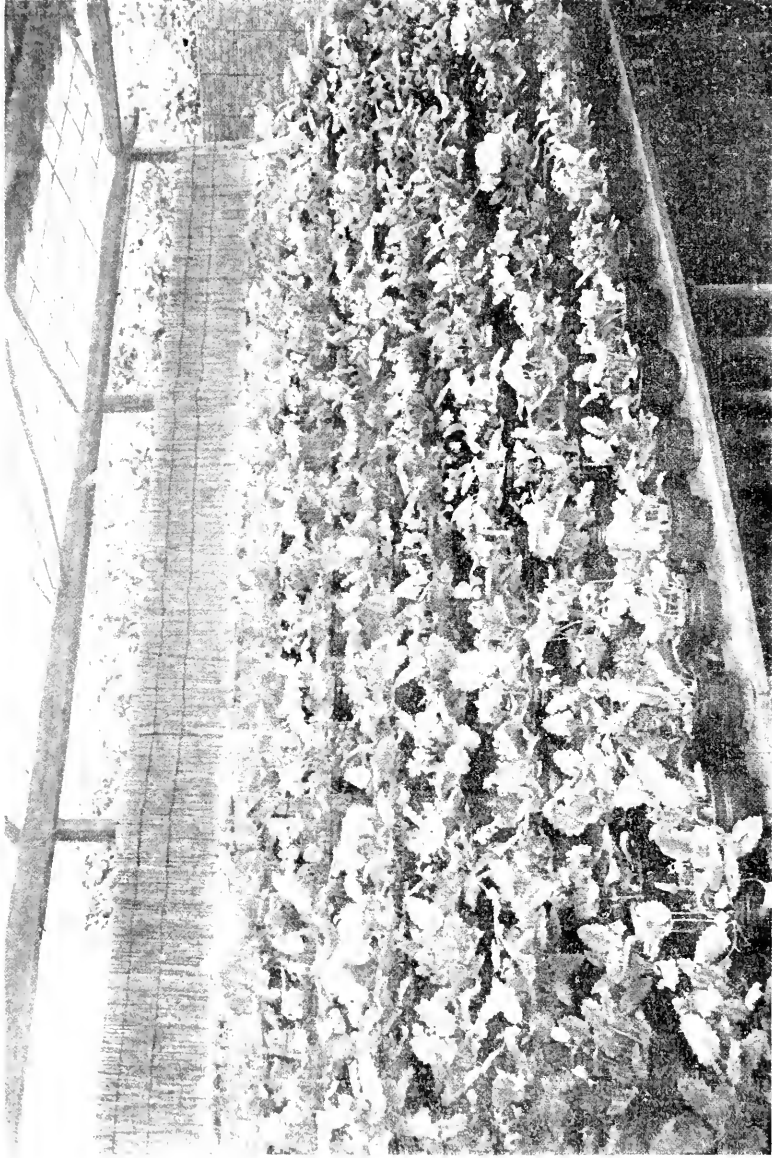
away, but potted up to form a sort of separate item as reserve material. The writer adds, quaintly, that these large but often unsatisfactory specimens are "vulgarly called 'Bouncers'."

The compost used for planting consists of well-decayed leaves only. This is treated as follows, according to the exact translation of Mr. Iida: "Put the leaf-mould into a receptacle of about 2 yards square, pour over 60 gallons liquid ordure, cut up fine, mix well, and after 3 or 4 weeks sprinkle over 40 gallons of the ice washed white water; cover with some boards or matting against rains. . . . Dry this in sunshine at transplanting time, manipulate well, sieve the compost in $\frac{3}{8}$ inch meshes; thus it is ready." An unclean, but evidently profitable procedure!

When planting, the ends of the roots are cut off, leaving them one or two inches long, and the "buds" are covered by about an inch of soil, lightly pressed upon them. After transplanting, the pots are again placed outside and water given the next day by spraying. If weather is dry, further sprayings are given; light rains being beneficial. During heavy rains, snow, or frost, however, and also every night, the plants are covered with matting, etc. No further manure is given; and the pots are placed in their flowering quarters under glass some time before the flowering season arrives. A special pot, called the "Magohando," a hard, thin, clay vessel, glazed outside and inside, is used in Japan; this maintains a better moisture than unglazed pots.

I think, after a study of the accompanying illustrations of the Japanese *P. cortusoides*, it will be admitted that most excellent results are obtained by Mr. Jubei's methods, and that they are worthy of imitation.

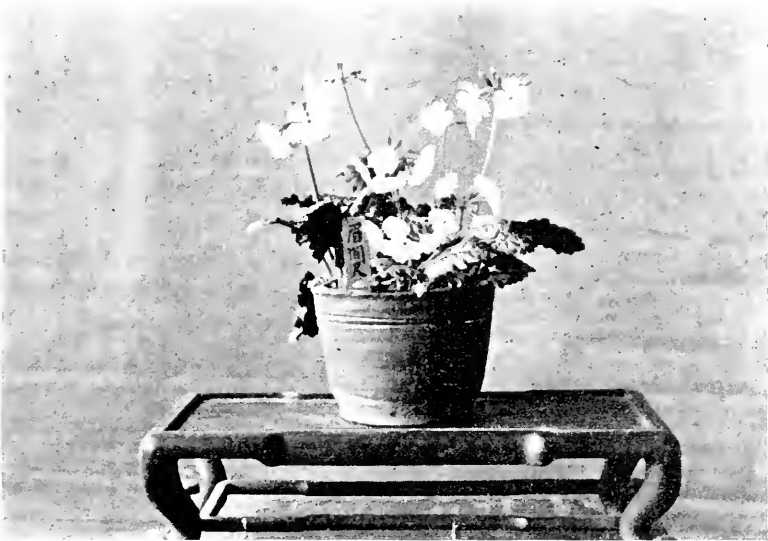
His interesting article closes with some "Primulas Cultural Recipes" found in an old Japanese manuscript. There it is advised (1) to give a thin solution of manure in October to produce a larger "bud;" (2) to put lumpy soil at bottom of pot, then *fertilized* soil, then *unfertilized* soil, in which to place the plant; (3) to "soak dry fishes in water before the summer dog days, exposing to sunshine for 2 weeks! sieve and manipu-



PRIMULA CORTUSOIDES AT SOMEI, TOKYO
EXHIBITED BY ITO JUBEI

late with hoe and keep dry, after which add 40 per cent of soil, which produce extremely corpulent plants;" (4) to mix soil and decomposed ordure and store it; and (5) to "cut up fine dried sardines," and mix with a small quantity of bran—to be used as bottom soil in the pot, top soil unfertilized.

All the foregoing points to patient, careful culture, an essential which Primulas, of any species, demand. The Japanese horticulturist evidently believes in manure of the strongest order; and the object in placing layers of manured



PRIMULA CORTUSOIDES

and unmanured soil in the pots is to have the crown of the plants surrounded by soil that does not create excessive but weakly growth, and at the same time to supply to the roots below a strong and lasting supply of fertilized soil. "This," says Mr. Jubei, "is a secret recipe to have the perfect blooming flowers." And he is right!

P. cortusoides provides varieties in shades of colour from pure white to the deepest purple. The plant so often sold as *P. cortusoides* is really *P. saxatilis*, quite a different species, although similar in leaf and flower.

PRIMULA SIEBOLDII

This plant was first introduced to cultivation by the English firm of Messrs. Veitch in 1861; it was collected in Japan, (Yezo, Honto, and Kyushu districts) by Mr. J. G. Veitch, who brought it to England. The present-day representative is a somewhat composite plant, being evolved from several species by enterprising florists; and its near relationship and resemblance to *P. cortusoides* suggests a preponderance of that species in its make-up. *P. Sieboldii* possesses the synonymous names of *P. gracilis* and *P. amœna*. It is a hardy and accommodating plant, and easily grown and flowered outdoors, also under glass without heat. Indeed, I would suggest that the cultural procedure indicated in the case of *P. cortusoides* be followed, for the two plants are so similar in habit, appearance, time of blooming, and varied colourings; but the usual compost is made up of fibrous loam, leaf-mould, old cow-manure, coarse sand or road grit, the sand or grit being of great importance. This Primula may be forced if not kept in too close a temperature.

PRIMULA JAPONICA

This well-known plant is undoubtedly *the* Primula for outdoor culture, so far as Japan is concerned. For accommodating usefulness it is one of that country's best contributions to Western gardens, it being not at all particular as to soil or aspect, although the best results are obtained by planting alongside or near the water-side or stream, and in the bog-garden in a rich, moist, peaty loam. A shady position should be selected. *P. japonica* is also quite at home in the border, especially in a part which is somewhat below the general level, as this plant loves moisture. Grown in masses (the plants are cheap enough and self-sown youngsters multiply fast), they are splendid and very showy. To emphasise the necessity for copious supplies of moisture, it may be pointed out that a dry summer without attention as to provision of liquid sustenance will often prove fatal to the plants. As a pot plant

under glass *P. japonica* behaves itself well, blooming thus at any time from January to May. The pots should be stood in saucers of water if hot sunshine obtains. Seeds are the best means of increase, although germination is most erratic—the plantlets may appear in a few weeks, or months; sometimes not at all; and the period of germination will be found to coincide with the freshness or staleness of the seeds. But when up, the seedlings grow very fast and strongly. The plant is worth any amount of trouble. The flowers are produced in tiers, or whorls, on stems 18 inches in height, and the colours range from white to deepest crimson.

PRIMULA MODESTA

This is a nice plant, hardy and easy to grow with large, flattish, primrose-like leaves, and producing in June umbels of fair-size flowers upon long, somewhat strangling stems. It may be advantageously compared with *P. frondosa* of the Balkans, to which a distinct resemblance will be seen. *P. modesta* forms a fine addition to the various forms of *P. farinosa* found all over the world in great variety of growth, but all showing close relationship; another cultural group which deserves to be organised and freely grown. It has a fair distribution in Japan, occurring principally in the Yezo district. Although under cultivation, little is known of this perennial Primula outside Japan; it was introduced in 1911. *P. Matsumuræ* is a synonym.

Primula Fauriæ may best be recognised as a form, or subspecies, of the foregoing Primula, in reality, a variety of *P. farinosa*. It occurs chiefly in the shrubby districts of Northern Japan, (Hokkaido and Mount Iwate). The flowering period is the month of July.

PRIMULA CUNEIFOLIA

This Primula, besides being found in Japan, is also an inhabitant of the Arctic Islands off the coast of Siberia and Alaska—the Kurile and Aleutian Islands principally, so that it is as much Siberian or American as it is Japanese. In Japan,

it is best represented by the two sub-species, *P. hakusanensis* and *P. heterodonta*. The plant has toothed leaves and short stems bearing trusses or umbels of lilac-purple flowers during July and August. It is a perennial, affecting grass lands more than any other.

Primula hakusanensis (August flowering) and *Primula heterodonta* (June flowering) are true Japanese species, closely allied to or identical with the above plant, and are distributed over the greater part of Japan, being especially in evidence in the Northern and Central districts (Mount Hakusan, Mount Shirouma, Mount Iide). The flower-trusses are of exceptional merit.

PRIMULA NIPPONICA

Here is another perennial species native to Japan which would make a good garden plant, found chiefly in the grassy regions in Central and Northern Japan (Mount Chokai, Kuri-koma). The flowers, produced in July and August, are white in colour.

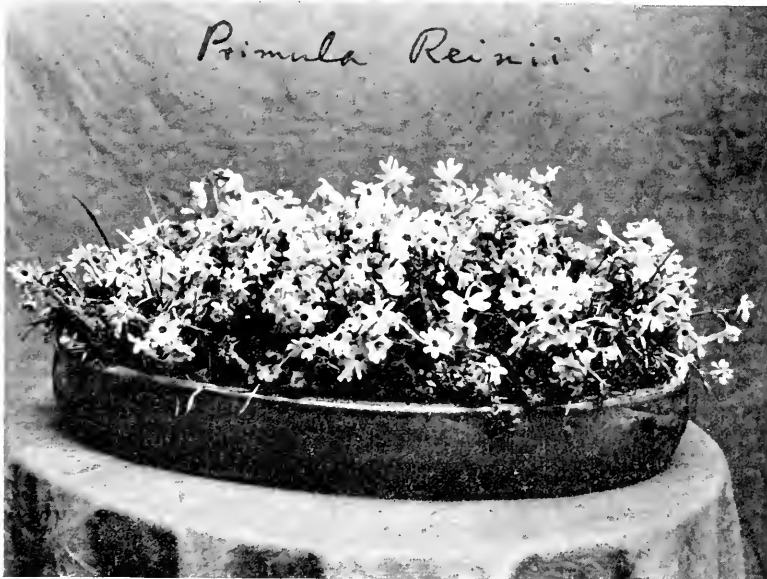
PRIMULA KISOANA

For over two hundred years, it seems, has this plant been under common cultivation in Japan, but, strange to say, has apparently not yet found its way to the West. Why that is so it is difficult to say. It has also been named *P. hirsuta*. A native of the Central and Northern portions of Japan, it is a hardy, perennial plant, with flowers of a deep rose colour, and seems to be a subject of excellent garden value, although its general culture is a negligent quantity, and its behaviour thereunder consequently unknown. The flowering period lies between April and May.

PRIMULA REINII

This is an easy perennial subject, so far as cultural needs are concerned; but its hardiness in moist atmospheres is very doubtful—its hairiness being against it in this respect. This *Primula* is of peculiar growth—indeed, very *Chinese* in appear-

ance, with its thick, hairy leaf-stalks and rounded foliage; but the flowers are excellent, of good size, and starry in shape. The date of its introduction is said to be 1909; but the plant is by no means common, and is difficult to procure. *P. Reinii* is a native of Central Japan (Mount Hakone, Mount Myogi), where it affects grass lands principally, and flowers during May and June.



PRIMULA REINII

It is doubtful whether the following Japanese Primulas will ever enter general cultivation in their present forms, being either rare, unattractive, or possessing little record of cultural merits.

P. jesoana (or *yesoana*) is a perennial plant of grassy woods, with geranium-like foliage and dwarf stature, and a native of Central and Northern Japan (Shirouma, Shinano, Hokkaido, and Mount Ontake). Its occurrence in the province of Yezo has given it the synonymous name of *P. Yedoensis*. It has

not come under cultivation, and is not very beautiful. The flowers open during August.

P. tosaensis, found in the Shikoku, Nanokawa, Yasui, and Tosa districts of Southern Japan, is a nice little plant, with rounded, hairy leaves, fleshy stalks, and fairly large blossoms, but is not suitable for outdoor cultivation. This plant has not been introduced to English gardens, nor, probably, to those of any other country. In its native habitat, *P. tosaensis* haunts deep, shady places on rocky mountains, where it flowers during April and May. It is of perennial duration.

P. eximia is the same plant which occurs in Alaska, North America.

P. (mistassinica) macrocarpa is an extremely rare species of small merit found on Mount Hayaschine, North Japan, and therefore sometimes called *P. Hayaschinei*. It partakes of the character of *P. farinosa*, with mealy leaves, producing one to three flowers on the stem in July. This is the smallest Japanese Primula, and a pasture-land subject.

PRIMULA MIYABEANA

A native of Formosa, this species is one which will help to swell the growing army of tiered or whorled Primulas, when introduced to cultivation. It has purple flowers. This plant seems to occur also in Japan, in the shrub-covered regions of Hokkaido and Mount Iwate, according to Japanese authority; but the Japanese plant partakes of the character of *P. farinosa* or *P. modesta*, and is locally named *P. farinosa*, L. *Var. Fauriae Miyabe. (? Miyabeana)*. The two plants may be identical species. It is difficult to say, as is evidenced by the doubtful Japanese description.

KILDARE, SIDCUP
KENT.

Flower-Names

By Esther Singleton



MY APOLOGY for responding to the compliment extended to me—that I should say a few words about flower-names—is that I am a passionate lover of flowers, although I know nothing about the art of gardening. I can only endeavor to write,

In the language wherewith Spring
Letters cowslips on the hill

talking of the flowers themselves.

Many of the happiest hours of my childhood were spent in the beautiful Colonial gardens in the South. I know the perfume of the great white magnolia in the moonlight; I know the gleam of the scarlet pomegranate blossom amid the dark green and glistening leaves; I know the music of the little bells of the yellow jessamine waving in the balmy breeze. And I may say here that the flowers of the South have a deeper pile of velvet on their petals, a more lustrous sheen on their silk and satin cups, more brilliant colors in their lips and folds and “falls,” and more intense and delicious odors than those of our colder States. The beauty of our flowers and their subtle perfume intoxicate the children of the Sunny South, who play in the Colonial gardens care free like the butterflies that are so numerous there, and make us look at them and feel towards them romantically.

Flowers are, therefore, to me living, sentient beings; and because they are so, I am emboldened to say a few words on the question of their names.

It is perfectly proper, of course, for flowers to have botanical names: they have to be catalogued and classified and identified for scientific and practical purposes; but I think that in common

parlance it is far more sympathetic with flowers to call them by their sweet, familiar names. It seems to me that it is much more graceful and gracious for a hostess to say to a guest: "Do come into the garden and see my lovely Larkspurs" than "Do come into my garden and see my lovely Delphiniums."

It is true that Delphinium had a meaning for the ancients, for they imagined the buds to resemble a dolphin; but we do not associate dolphins with our stately blue flower, cousin to the graceful Columbine. When we say Larkspur, we picture in some half dreamy way the lark soaring far into heaven's gate, and bringing back a little of the blue of the morning sky as a gift for the flower, on which it also bestows its spurs of conquest.

When we use the word Snapdragon, the vision arises of a fascinating blossom with hanging and ferocious lip, and its savage jaws splashed with carmine, as if it had just finished a bloody meal upon some unwary insect, a flower in some mysterious way kin to wyverns and dragons and laidly worms that lurk around castle walls and in enchanted forests. If we call this romantic flower *Antirrhinum majus* none of these ideas come into our minds. And the name Wall-flower! Does not that suggest a simple yet rich flower of garnet, or orange-tawny velvet, growing in some tiny corner in the castle walls, half unobserved, unintrusive, yet making a tiny spot of rich beauty in the old gray crevice, the one witness to the whispered vows of lovers, throwing upon them the benediction of one of the most subtle and delicious of scents?

It seems to me a little cruel to call a lovely blossom *Odontoglossom Hartvegense*, or *Chamaepericlynenum canadense*.

Imagine Shelley's verse in the *Sensitive Plant*:

The naiad-like lily of the vale,
Whom youth made so fair and passion so pale,
That the light of its tremulous bells is seen
Through their pavilions of tender green,

reading as

Convallaria majalis of the vale
Whom youth made so fair and passion so pale

We all love the old fashioned Lady's Slipper better under that name than as a *Cypripedium*; and, by the way, I think the reason that the delicate, fantastic and glorious orchids stand somewhat aloof from our affections is because we have made their acquaintance through names of Latin terminology. It is something like reading a Russian novel. Try as we may, we cannot get as near in sympathy to a heroine named Petronia Povoloffskoffska as we can to one named Ethel Newcome or Becky Sharp. Therefore *Lilium bloomeranium magnificentum splendidis grandiosa* with all its pomposity does not touch us as plain Lily. Oh! that word Lily, what does it not express—from the splendors of Persia and Babylon to the “tremulous bells in pavilions of tender green” and the pure and regal Madonna Lily? Then again, many *Peoplia Upsidedownia* is not so dear to us as the sweet, sorrowful Bleeding Heart.

The Latin names are bad enough; but what shall we say to the practise of giving to lovely new flowers names of individuals entirely unassociated with aesthetic ideas, or the dignity of horticulture? There is some excuse for the Dahlia from Dahl, the Fuchsia from Fuchs and the Wistaria from Wistar; and in Elizabethan times, when wealthy London merchants and horticulturists were beginning to develop new species, there was legitimate reason for Master Tuggie his Princess, Master Tuggie his Rose Gilliflower, John Tredecant's Great Rose Daffodil, Gerard's Double Daffodil, Master Bradshaw's Dainty Lady, Master Hesketh's Double Primrose, and so on. Does it not hurt one's sense of fitness to-day to hear of the Mrs. Hezekiah Stubbs as the name for an exquisite Tea-rose? And does it not distress one when visiting a flower-show to look at the label of a new, spicy-fringed Carnation and read the Julia O'Rafferty?

Bring hither the pink and purple Columbine
And Gilliflowers
Bring Coronations and Sops-in-wine
Worn of paramours.

Ah! far rather call the sweet flower by its original name, Coronations, because worn in coronals and garlands, and by its

pet name Sops-in-Wine, because its blossoms were used to flavor wine in the days when Spenser sang.

Another name that I should like to hear on the lips of garden lovers is that of Gilliflower, which seems to me a kind of pet name. It comes from the Latin *caryophyllum*, descriptive of the spicy clove-like perfume of this variety of Carnation. But the name lost all pedantry in its softened corruption and it got so far away from the learned men that it was often written and spoken of as July-flower.

Then the Pansy! "Pansies for thoughts" as Ophelia says, coming from the French *pensée*, trampled *Viola tricolor* under foot, as it were. The name is charming, but even that was not affectionate enough, nor descriptive enough, for this darling flower. Monks and saints saw in it, as they saw in the Clover-leaf, or Trefoil, an illustration of the Three-in-One, and so they called it Herb Trinity. Because it has a coquettish air it was called Three Faces Under a Hood. Because lovers gave it to one another, it had the pet names of Meet Me at the Garden Gate; Kiss Me at the Garden Gate; Kiss Me Quick; Jump Up and Kiss Me; Call Me to You; Pink of My John; Kiss Me Ere I Rise; Heartsease; Cupid's Flower and Love-in-Idleness; and a more modern name suggested by the thousands of new varieties with their feline markings and quaint expression—Pussy faces. This was the flower that Oberon bade Puck gather and which he squeezed upon the sleeping Titania's eyes in *Midsummer Night's Dream*.

How charming are the old names Daffodil, for instance, coming from the Asphodel, flower of the Elysian Fields, down to the country wench

Daffy-down-dilly came up to town
In yellow petticoat and a green gown.

and Columbine, Poppy, Morning-glory, Cowslip, Mourning-bride, Hyacinth, Tulip from the Persian *thoulyban*, turban; Blue-bells, Bachelors buttons, Canterbury bells, Heliotrope, "Sweet William with his homely cottage smell," Periwinkle, Primrose, Love-in-a-mist, Forget-me-not, Mignonette, Candy-

tuft, Daisy, Verbena, Marigold and many others. Do you not love the old roses, the "Cloth of Gold," the "Maiden's Blush," the Gold of Ophir," "Marshal Niel" "Hundred Leaf," "Sweetbriar," "Eglantine," "Baltimore Belle" and "Jaqueminot?" Does not a bower where

Honeysuckles ripened by the sun
 Forbid the sun to enter,

suggest the clusters of nankin and white cornucopias with their splayed and pearly horns full of honey better than would a bower where

Lonicera ripened by the sun?

Moreover, the old garden flowers have whole histories and beautiful associations locked up in their names. Take for instance the numerous flowers named for the Virgin—mostly white ones. We have Our Lady's Comb, Our Lady's Bedstraw (*Galium verum*), Our Lady's Cushion (Thrift), Our Lady's Tears (Lily of the Valley), Lady's Bower (*Clematis*), Lady's Mantle (*Alchemilla vulgaris*), Lady's Looking-glass (*Campanula hybrida*), Lady's Fingers (*Digitalis purpurea*), Lady's Tresses (*Neottia spiralis*), Lady's Laces (*Cuscuta*), Lady's Garters (*Phalaris arundinacea*), Lady's Nightcap (*Convolvulus sepium*), Lady's Slipper (*Cypripedium*), Lady's Smocks—Shakespeare's Lady smocks all silver white—(*Cardamine pratensis*), Lady's Seal (Black Briony), Lady's Thistle (*Carduus Marianus*), Our Lady's Bunch of Keys (Cowslip), Maiden-hair fern and Marigold. The latter flower was originally the Gold or the Gold flower, the "Spouse of the Sun," who always woke with him and followed him lovingly throughout the entire day—as Perdita says,

The Marigold that goes to bed with the sun
 And with him rises weeping.

And to this "Gold," so often spoken of by Chaucer and other poets, the Mediaeval monks prefixed the name of the Virgin and created the legend that she loved to wear the marigold

in her bosom. Hence Shakespeare in his aubade, beginning "Hark, hark the lark" shows the freshness of the morning by

And winking Marybuds begin
To ope their golden eyes.

And how beautifully the old monks painted and illuminated their Books of Hours and Missals with exquisite designs of leaf and bud, berry and blossom, copying the flowers and plants in the tiny walled garden of the monastery that they tended, or in the pleasance of the castle that they visited. To them we are indebted for the preservation of many beautiful legends in connection with flowers. Many were the flowers consecrated to St. John, many were the flowers consecrated to St. Catherine, many were the flowers consecrated to St. Margaret! To the Aconite was given the name of Monkshood, because its blue blossoms suggested the cowl of a monk. It would seem the old monks had a sense of humor! Flowers meant a great deal in those days when the hand of the sculptor was carving lessons in stone on the capitals of the columns and porches of the cathedrals, when the wood-carver created stories beneath his knife in the choir-stalls, and when the jewelled windows flashed Bible pictures that the simplest minds could understand. The English Cathedrals had a regular Calendar of Flowers. Here it is:

The Snowdrop, in purest white array,
First rears her head on Candlemas Day;
While the Crocus hastens to the shrine
Of Primrose lone on St. Valentine;
Then comes the Daffodil, beside
Our Lady's Smock at Our Ladytide;
About St. George, when blue is worn,
The blue Harebells the fields adorn;
Against the day of the Holy Cross
The Crowfoot gilds the flow'ry grass;
When St. Barnabie bright smiles night and day
Poor Ragged Robin blooms in the hay;
The scarlet Lychnis, the garden's pride,

Flames at St. John the Baptist's tide;
 From Visitation to St. Swithin's showers
 The Lily white reigns queen of the flowers;
 And Poppies a sanguine mantle spread
 For the blood of the dragon St. Margaret shed.
 Then under the wanton Rose agen,
 That blushes for penitent Magdalen,
 Till Lammas Day called August's wheel,
 When the long corn smells of Camomile,
 When Marie left us here below,
 The Virgin's Bower is full in blow;
 And yet anon the full Sunflower blew
 And became a star for Bartholomew;
 The Passion Flower long has blowed
 To betoken us signs of the Holy Rood;
 The Michaelmas Daisy among dead weeds
 Blooms for St Michael's valorous deeds,
 And seems the last of the flowers that stood
 Till the feast of St. Simon and St. Jude,
 Save Mushrooms and the fungus race
 That grow till All Hallowtide takes place;
 Soon the evergreen Laurel alone is green
 When Catherine crowns all learned men;
 Then Ivy and Holly Berries are seen
 And Yule Log and Wassail come round again.

And then the fairy flowers—the Cowslip in the bell of which Ariel was wont to hide, the Fox-glove (folks-glove) beloved of elves, the Tulips, in which fairies rock their tiny babies; and the plants that are associated with birds—the Cuckoo flower, Cuckoo buds, Crowfoot, etc.; and the plants that are associated with animals—Wolfs-bane, Horehound, Catnip, etc.—all these have interesting legends that their names call to mind. And those quaint names Johnny-Jump-Up, Kiss-Me-Twice, Jack-by-the-Hedge, Jack-in-the-Pulpit, London-Pride, Yellow-Lark's Heels (*Nasturtium*), Wake-Robin, Go-to-Bed-at-Noon,—are they not all and each delightful?

The old name February Fair Maid for the Snowdrop appealed to Tennyson, who wrote

Many, many welcomes
 February Fair Maid,
 Ever as of old time,
 Solitary firstling,
 Coming in the cold time
 Prophet of the gay time,
 Prophet of the May time,
 Prophet of the roses,
 Many, many welcomes
 February Fair Maid!

These sweet old-fashioned flowers are endeared to us by our English poets from Chaucer and Spenser and Shakespeare to Tennyson and Swinburne. No poet has done more to make flowers beloved than Tennyson, whose poem of *The City Child* comes to mind and quotes itself:

Dainty little maiden, whither would you wander
 Whither from this pretty home, the home where mother dwells?
 "Far and far away," said the dainty little maiden,
 "All among the gardens, auriculas, anemones,
 Roses and lilies and Canterbury-bells."

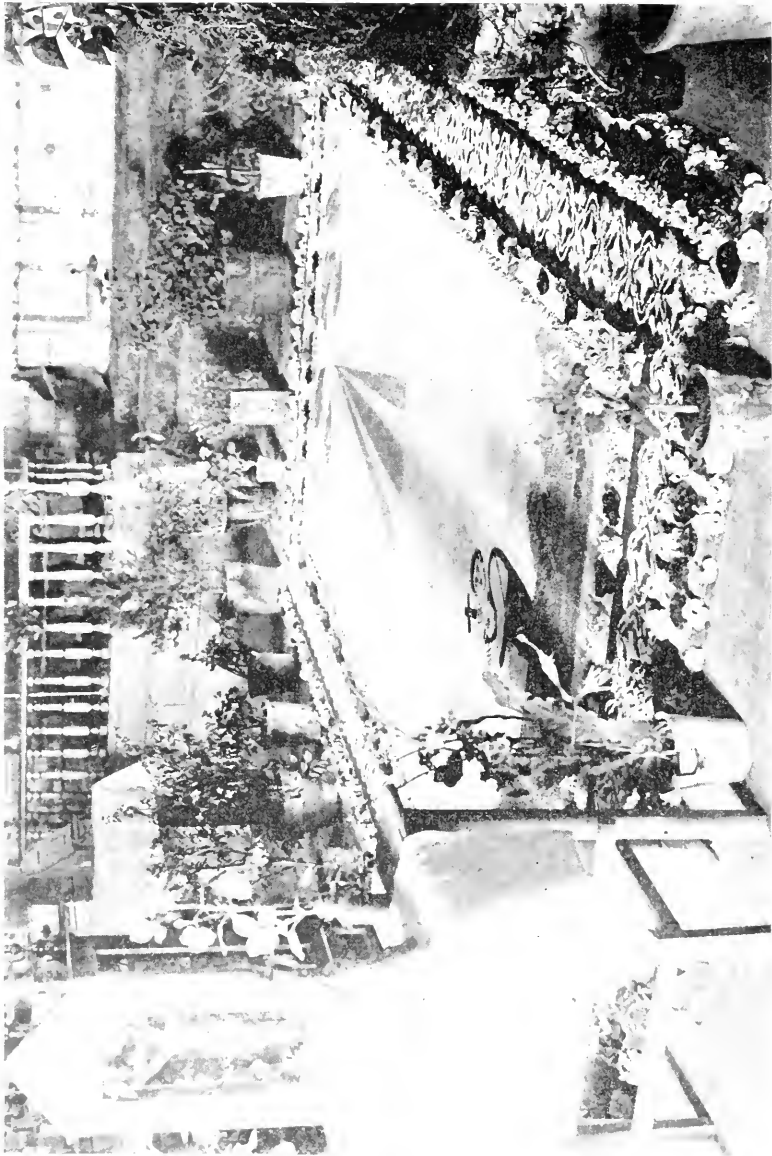
Dainty little maiden, whither would you wander
 Whither from this pretty house, this city house of ours?
 "Far and far away," said the dainty little maiden,
 "All among the meadows, the clover and the clematis,
 Daisies and kingcups and honeysuckle flowers."

These simple, sweet old-fashioned names take us back into old romance while their beauty and perfume suggest the joys of a paradise to come; for we may say of flowers, as we say of little children, "Of such is the kingdom of Heaven." Even to think of them is to become a child again and to wander far and far away and into a dream world:

All among the gardens, auriculas, anemones,
 Roses and lilies and Canterbury-bells.



IRIS GARDEN AT
EASTHAMPTON
L. S. CUMMINS, ESQ.



SO-CALLED CARPET OF FLOWERS AND COLORED SAND
SPREAD IN FRONT OF COYOACAN CHURCH BY
INDIAN GARDENERS, COYOACAN, MEXICO

The Flower Lovers and Gardeners of Ancient Mexico

By Zelia Nuttall

I



FROM time immemorial a great love of flowers, an intense delight in their beauties of form and perfume, combined with a profound knowledge of their useful or medicinal properties and a passion for collecting and growing rare and strange plants have been characteristic of the Mexicans. Commenting on this, the most pleasing trait of the native character, the Spanish Friar, Acosta, wrote in the 16th century: "The Indians are great lovers of flowers and in New Spain more than in any other part of the world."

There is certainly no portion of our globe which can boast of a more rich and varied flora. The great diversity of altitude and climate that can be reached within easy distances from the Valley of Mexico has moreover always rendered it possible for fresh tropical and semi-tropical fruits and plants to be carried to the markets of the capital. In sheltered positions moreover many trees, shrubs and plants from the "terra caliente" or "hot lands" can be cultivated in the City of Mexico and its surroundings.

Considering that the diet of the ancient Mexicans was mainly vegetarian and that they had a marvelous wealth of useful plants to draw upon for food, medicines and their industrial arts, it is not surprising to find what a great rôle the vegetable kingdom filled in their lives. During the countless centuries in which the maize gradually developed from a lowly cereal to the stately priceless food-plant under the fostering

care of the women and priests who practiced seed selection as a religious rite, the ancient Mexicans had time also to evolve the unique and ingenious botanical nomenclature which is contained in their language.

In the Nahuatl or Mexican tongue certain words used as prefixes or suffixes to plant-names convey information as to their qualities, characteristics, and habitat. The system is an eminently practical one for, as a rule, the name of each plant enlightens the ignorant as to its qualities. The majority of edible plants which can "be eaten" either raw or cooked are, for instance, designated as *quilites* and this word enters into the composition of each name, which also incorporates special descriptive terms. An interesting example of a plant name is *tonalchichicaquilitl* which, in a single word, conveys the information that it grows in summer (*tonal*), is a bitter (*chichic*) edible plant (*quilitl*) which grows near the water (*a* = abbreviation of *atl* = water). Other abbreviations are used to indicate that a plant grows on rocks, mountains, or in sand, etc. The word *patli* = remedy, is found in names of beneficial medicinal plants. In those of plants prized for their blossoms, the word *Xochitl* = flower, always occurs, accompanied by some indication which identifies it.

The foregoing summary conveys an inadequate idea of the ingenious native system of botanical nomenclature which embodies so much observation, knowledge and experience, and in so original a way deals with the relation of the plants to the human race. Like the marvelous Calendar system of the ancient Mexicans it seems to be a legacy from an extremely old civilization. It appears to indicate that a Nahuatl-speaking race must have shared the habitat of the native flora during countless centuries. It is a deeply significant fact, moreover, that in the great botanical work of Doctor Hernandez who was sent to Mexico in 1570 by Philip II to study its flora, there are 3000 Nahuatl plant-names as compared with 250 in the Tarascan, 18 in the Huastecan, 3 in the Mixtecan and 1 in the Otomi languages. Another interesting fact is that, scattered all over Mexico and as far south as Guatemala are numerous

ancient Nahuatl names of localities which designate these as "the place" or "land of" different valued trees or plants.

The ancient Mexicans had thus, in course of formation, a fascinating botanical geography which I recommend to the notice of modern botanists as furnishing reliable information concerning the distribution of the native flora in pre-historic times.

The high value and importance placed on rare plants by the Mexicans is exemplified by the following curious historical episode recorded in the native chronicles.

In the second year of his reign Montezuma sent his ambassadors laden with gifts to Malinal the lord of a province near Oaxaca, to deliver the following message: "Montezuma, our lord and your kinsman sends us to thee to say that his uncle, the lord Ahuizotl, left him word that in thy gardens thou hast a tree named Tlapalizquixochitl which bears beautiful and fragrant flowers. He desires to have this tree for his garden and begs you as a relative and friend to give it to him. He will give you, in return, all you ask for." Malinal, who seems to have been as enthusiastic a lover of flowers as Montezuma, refused to part with his tree and dismissed the messengers with a defiant message.

Greatly angered, Montezuma dispatched an armed force against Malinal who was vanquished and killed, the victors returning to the capital with the coveted tree and a number of captives. From the descriptions preserved it seems that Malinal's tree was a sport or rare variety with flowers striped red, of a more common kind which bore an abundance of white fragrant and highly prized blossoms. Dr. Hernandez saw a cultivated specimen of the tree with flowers which looked as though they were dyed red in the State of Morelos. Mexican botanists have named it *Morelosia Huanita* (*Bourreria Huanita*) a genus belonging to the Ebenaceae.

The Spanish Conquerors were amazed at the enormous quantities of fresh flowers that were brought daily to the capital for the decoration of the temples, for use in the native dances and for the personal use of the upper classes. The greater

part was brought in payment of tribute imposed by the Mexican rulers on the conquered tribes inhabiting the tropical regions. Friar Duran's native informants related that the daily tribute from the hot lands consisted of great cargoes of floral pieces composed of a thousand different kinds of tropical fragrant flowers, some surpassing all others by the delicacy of their aroma. They also brought living plants for the gardens of the lords "who had imposed this tribute to demonstrate their authority and greatness and because they wished to be regarded as the lords of all creation, on land and water."

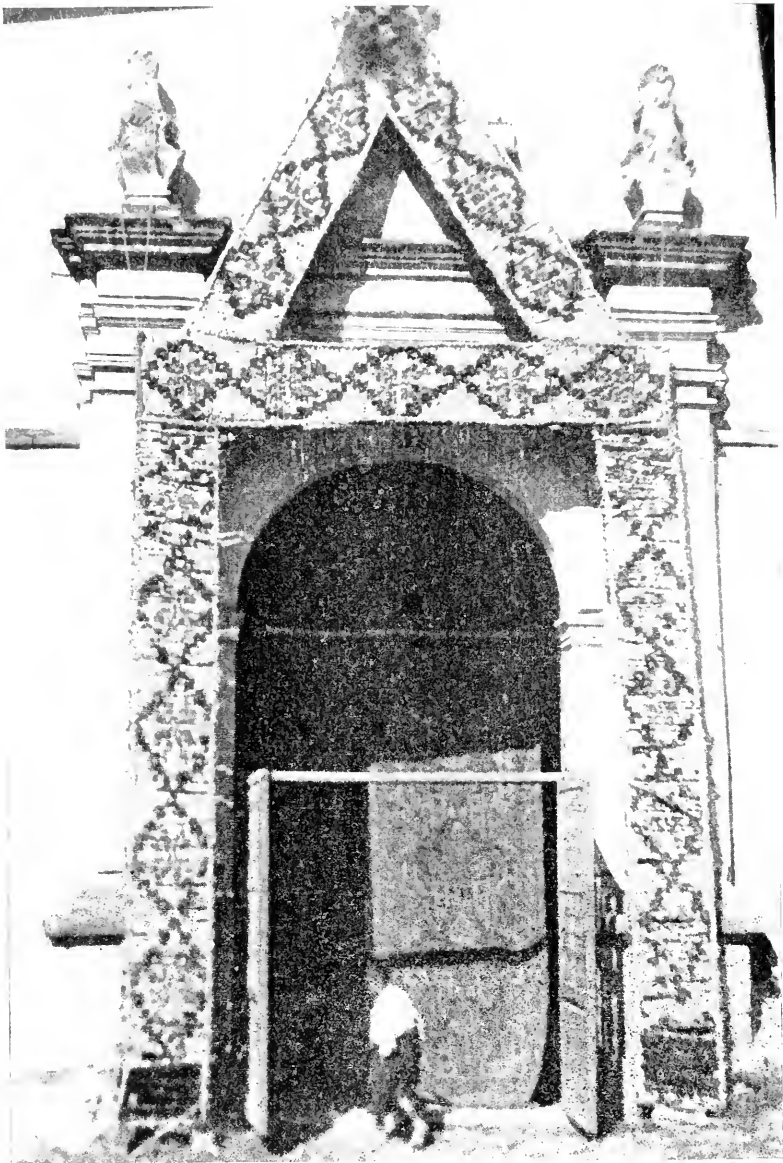
The ancient Mexican rulers, lords and war-chiefs never appeared in public without carrying bouquets composed of fragrant flowers in their hands "as a mark of grandeur." The most exquisite and rare blossoms were reserved for their exclusive enjoyment, amongst them the Magnolias, certain Arums, the beautiful Orchid (*Stanhopia tigrina*) and others of the same family, and the flowers of the Cacao-tree, which were of intrinsic value as the cacao bean was employed as currency. As a mark of respect it was customary to offer bouquets, chaplets and necklaces of flowers to those in authority. No one entered Montezuma's audience-chamber without bringing him an offering of exotic flowers. Torquemada relates a story which demonstrates how rigidly this etiquette was enforced. Certain caciques journeyed to Tenochtitlan and on arriving had forwarded a request to be allowed to present their homages to Montezuma in the following forenoon. It was after sun-set, on the evening of their arrival, that they suddenly realized that they had no flowers or bouquets to offer the Mexican ruler. Without them they would not be allowed to enter his palace. As it was imperative that they should keep their appointment they were overcome with confusion and mortification, for no choice blossoms were procurable in the capitol. The nearest point where such were obtainable was Cuernavaca, situated at the other side of the Ajusco mountain range, at a distance of about twelve leagues. At a venture they summoned a youth named Nemaulyan, who had won fame as a runner and messenger, and implored him to help them out of their predicament

and to set out at once for Cuernavaca to fetch the much needed flowers. He agreed to do so and without going to his house to eat or change clothing started from the Tecpan or palace where the caciques were lodging and, running all the way, reached Cuernavaca at midnight. There he gave those in charge of the flower gardens the gift he brought them and obtained the flowers. Without resting or sleeping he started back and reached the Tecpan at sunrise. When the caciques came into its courtyard after an anxious night, they saw the youth heating himself by the fire which the guards kept burning. They had not dared to expect him until mid-day and when they saw him calmly sitting there they concluded that he had not fulfilled his mission. However the young athlete arose and gaily fetched the flowers and gave them to the caciques who were filled with amazement and admiration and, as a reward for his wonderful feat, presented him with the mantle and insignia of a captain and made him a member of their military order.

Although, as Father Acosta states, the Indians "made many kinds of noseгаies with such pretty variety and art as nothing could be more pleasing," there were two conventional forms which seem to have been in fashion at the court of Montezuma. The first was the "Quauhxoçhitl" or single choice flower mounted on what was presumably a more or less ornamental stick which was carried in the hand. This mode, which will commend itself to all true flower-lovers as an exquisite refinement of taste, ministered to the aesthetic enjoyment of the individual perfume and beauties of each blossom.

The second favorite form was the "Chimalxoçhitl" or "shield bouquet" which was made to resemble a warrior's shield, its round flat top being a compact mass of flowers of different colours disposed so as to form a variety of designs.

Associated with this form of bouquet were superstitions and a ceremonial observance which will be described later. The flowers in the center of the bouquet were dedicated to the supreme invisible god Tezcatlipoca and it was forbidden for anyone to touch them or inhale their perfume. The wayside



ARCH MADE OF WHITE, RED
AND ROSE COLORED CARNATIONS, LOOKING
LIKE HEAVILY RIBBED SILK FABRIC
MADE BY XOCHINILCO INDIANS

shrines dedicated to this god, his temples and images (and indeed those of all the principal gods and goddesses) were always profusely decorated with garlands and fresh flowers.

The picturesque dances in which all the dancers wore wreaths and necklaces of flowers and sustained a massive garland; the pretty floral game in which the women pelted each other with balls entirely made of the Pachtli or Florida moss or the orange *Tagetes* and the profusion of fragrant blossoms with which the victims were adorned, were in striking contrast to the hideous human sacrifices which were performed by the Aztec priesthood during the festivals of their gods. It was as though these cruel rites had been introduced, for the purpose of terrorising conquered tribes into the more ancient ritual which was in contrast, with the teachings of Quetzalcoatl the culture hero, who recommended offerings of flowers and butterflies only. His temples were always adorned with these; but the first fragrant flowers that blossomed in the grounds of the temple Yopico, in April, were consecrated and offered to the rain-god Tlaloc, and until this ceremony was performed no one dared enjoy the perfume of spring flowers.

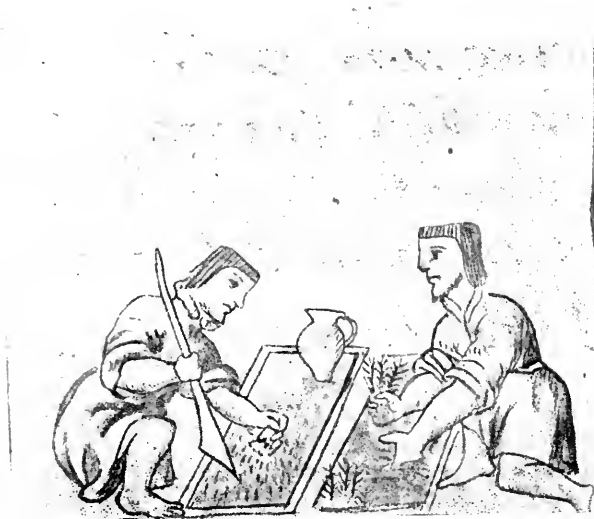
It was also at the beginning of the rainy season that the corporation of Xochimanque, the horticulturalists and florists, celebrated the festival of their patron-goddess, the Earth-mother, with corresponding floral magnificence. At a period of the year corresponding to August another "flower festival" was held and for two days previously everybody went into the country and corn fields to gather the many kinds of wild flowers growing at that season. They then assembled in the courtyard of the temple of Huitzilopochtli where they spent the night, arising at dawn to string the flowers on numbers of long cords which were twisted together until they formed a long thick cord. This was stretched across the great courtyard on the ground as an offering to the god whose idols in this temple and elsewhere, were freshly adorned on that day with the most elaborate floral decorations.

Another "Flower Festival," Xochilhuitl, was held at intervals of two hundred days. When it fell in October, towards

the end of the wet season it was termed: "The Farewell to Flowers," and was preceded by a rigid fast lasting four days. At the "Flower Festivals" a goddess named "Precious Flower" and two gods, "Five Flowers" and "Noble Flower Youth" were specially honored.

The demand for flowers and the handiwork of the florist that the religious and social observances entailed explains why, in Ancient Mexico, the horticulturists and florists constituted so important and active a corporation. In the original MS. of his great work Friar Sahagun dedicates a chapter to a description of their handiwork which is illustrated by the four quaint drawings reproduced for the first time herewith, on pages 373, 374, 375. These drawings are in Friar Bernardino De Sahagun's *Historia General De Nueva España*, preserved in the Laurentian Library, at Florence.

In the first two gardeners are depicted at work, one with his wooden pointed hoe making holes in the enclosed bed into which he is scattering seedlings, a water jug close by recalling that during these early stages constant watering is necessary. In the second drawing a gardener is gathering flowers while his companion executes an elaborate design by means of flowers—an art which is still practised with enthusiasm by the Indians in the Valley of Mexico who also employ coloured sands and seeds to enhance the effect. Once a year, on Holy Thursday, the gardeners of Coyoacan make an "alfombra" or "carpet" of flowers on the floor of the parish church in front of the high altar. Its design is different every year and has, unfortunately, now taken the form of a framed picture which is usually a crude copy of some religious painting, skillfully executed by means of coloured sands. (Facing page 365.) The frame in one case was entirely composed of yellow flowers shaded so as to simulate a massive gold frame. The Coyoacan gardeners also excel in making elaborate decorations and floral arches (facing page 371) on foundations made of the native reed-grass which resembles a bamboo. This is covered with what resembles a mosaic of flowers and often with designs similar to the "carpet" represented in the old drawing from the Sahagun MS.



ANCIENT MEXICAN GARDENERS SOWING SEEDS
AND TRANSPLANTING SEEDLINGS



PICKING FLOWERS AND MAKING DESIGN
OF FLOWERS ON GROUND

In the descriptions of Montezuma's garden given further on, mention is made of "images of a number of personages skillfully made of flowers and leaves" which were, presumably, flower mosaic pictures of which the present day "carpets" are survivals.

Returning to the old drawings we find in the third (below) an Ancient Mexican florist, in front of whom samples of his art are spread. They consist of two long necklaces made of strung flowers, recalling the Hawaiian "lies"; three chaplets or wreaths; seven



ANCIENT MEXICAN FLORIST DISPLAYING
CHAPLETS, GARLANDS, BOUQUETS,
AND THE SINGLE FLOWER STICK

"shield-bouquets" with fringed handles; two "fan-bouquets" in the shape of small banners, and, finally, a number of the single mounted blossoms, the "flower-sticks" or "hand-flowers." The lower ends of the sticks are pointed, a feature which facilitated their being stuck into the ground or some stand when not carried.

The fourth drawing (page 375) illustrates the ceremonial offering and wearing of the above floral decorations. A seated personage wears a wreath with appendages which fall behind his head,

and necklaces which pass over his right shoulder and under the left arm. The latter are evidently composed of the blossoms of the *Plumieria alba* or *rubra*, being similar to a necklace in the coloured, carefully executed representation of the god Tezcatlipoca, contained in a native Codex and to the strings of the same flowers still in use by the Indians on festive occasions. In front of the seated man are two "shield-bouquets" set on edge and a few single blossoms are scattered on the ground. In his hands he holds what appear to be bouquets



CEREMONIAL OFFERING OF FLORAL DECORATIONS TO GUEST OF HONOR

and a number of "flower-sticks." The figure advancing towards him offers a wreath, a necklace and a bouquet, these constituting evidently the customary gifts of which Father Acosta wrote as follows towards the end of the 16th century: "They have a custom amongst them that the chiefest men offer their nosegays in honour to noblemen and to their guests and they presented us with such an abundance as we passed through that country that we knew not what to do with them."

In the Codices are found several representations of Monte-

zuma, the lord of Texcoco and other notables carrying beside a "shield-bouquet" the poquitl or smoke-reed, the upper half of which was covered with a composition made of charcoal, the finely ground dried leaves of the tobacco and other aromatic plants and copal gum. This end was lit and the smoker drew in the fragrant smoke through the hollow mouth piece.

It is interesting to learn through the hitherto unpublished chapter of Friar Sahagun's great history dated 1570, which I copied from the original MS., how his native informants gave him the following detailed account of the quaint ceremonial that was observed when bouquets and smoke-reeds were presented to guests at festivals. The youths who distributed them on such occasions were carefully selected for their qualities of nobility and courtesy. When they presented the lighted smoke-reeds they "held it in their right hand, not by the mouth-piece but by the part covered with charcoal. In his left hand he carried the small terra-cotta dish, named *icaxitl* on which the smoke-reed was laid when not in use. Firstly he presented the reed saying: 'My lord, see here is the perfumed smoke-reed.' The guest seized it and placing it between his fingers began to smoke it." This act of courtesy and observance simulated the mode of throwing and catching the darts or spears that were used in war-fare, and the smoke-reed was cast and caught with the same martial air and gesture that were employed in throwing spears in battle, the round dish being held in the youth's left hand as though it were a shield. This ceremonial usage was observed whether the guests were military chiefs or not.

Then the flowers were distributed in the following way. In his right hand the youth held the "shield-bouquet;" in his left the "flower-stick" or "hand-flower;" therefore the guest was able to conveniently receive the first in his left hand as though it were a real shield and the "flower-stick" in his right hand as though it were a weapon of war.

The quaint little illustration (page 377) of this text by a native artist under Spanish art influence, clearly depicts the curious ceremonial. One guest is about to catch the lighted smoke-reed;

the other has set his "shield-bouquet" on an edge on the ground in front of him and is inhaling the fragrance of the single choice flower mounted on a stick, holding his smoke-reed between the first and second fingers of his right hand. A proof that the "shield-bouquets" and smoke-reeds were also presented to women is furnished by a native drawing in the same MS. which represents a lady of high degree seated with her "shield-bouquet" resting on edge on the ground in front of her. With her right elbow resting on her knee she is leaning forward comfortably enjoying her smoking perfume reed.



ANCIENT MEXICAN CEREMONIAL OFFERING OF
BOUQUET, FLOWER STICK, AND LIGHTED
PERFUME REED TO GUESTS OF HONOR

In Friar Sahagun's original Nahuatl text, written under the dictation of his native informants are a number of words relating to flowers which afford further picturesque glimpses of the unknown social life of Ancient Mexico. Amongst them are a number of verbs describing actions associated with flowers, such as: "to adorn a person with flowers; to crown him with flowers; to hang a string of flowers around his neck; to cover or weigh him down with flowers; to hide him completely under

flowers; to kill or smother him with flowers; to caress him by striking him gently with flowers and to awaken a person at dawn with a flower-song."

Among the few specimens of Nahuatl poetry that have been preserved are several of the "Flower-songs" and others which were chanted at social gatherings by the flower-bedecked hosts and guests. The following brief excerpts from several of these rendered in prose will convey an idea of the tenor of these songs and their inherent beauty and charm.

With hearts intoxicated by the aroma of flowers our songs will unfold (like flower-buds) and with the hymns we know we will glorify the Supreme God. . . .

Such is my wish, oh friends, therefore gather around me and imitating me in my old age take the perfumed smoke-reed, gather choice flowers to crown your heads and let us reverently chant songs to please the Supreme God. . . .

I, a singer, having penetrated into the pleasant flowery gardens where all is recreation and enjoyment, where the dew is perennial and where can be heard the cooing of amorous birds and one can listen to the melodious song of the "bell-bird;" where all of these with sonorous voices glorify the Supreme God, there I, a singer gained an understanding of the origin of all songs. . . .

My heart blossoms when the perfume of the fragrant flower mingles with my song. . . .

On passing by the rocks I seemed to hear how they were responding to the sweet melodies of the flowers and the shining, murmuring waters. The blue fountain sings, then breaks into rain-drops and sings again; the mocking-bird answers, accompanied by the bell-bird and many other birds also scatter sweet notes around, making music. . . .

To the above must be added an extract from the well-known song and its sad refrain, by Nezahualcoyotl, the enlightened lord of Texcoco, and a philosopher and poet, who forbade human sacrifices, worshipped the "Unknown God" and created the most beautiful gardens of Ancient Mexico.

. . . . Enjoy for the present the luxuriance and the beauty of the flowery spring, with its melodious twitter of birds, while butterflies suck sweet honey from fragrant flowers all in this world is like bouquets of flowers that pass from hand to hand, wither and finally come to an end, even in the present life.

Imbued with the same spirit a fellow-poet addressed the following lines in a "flower-song" to the Texcocan lord:

Oh, Nezahualcoyotl, rejoice in what the present offers; crown thyself with flowers from thy gardens and listen to my song and music which aim at pleasing thee!

The truth of Father Acosta's statement quoted at the beginning of this article is confirmed by the data which has been presented in the foregoing pages, to be followed by the descriptions which have been preserved of the famous gardens of Ancient Mexico.

CASA ALVARADO
COYOACAN
MEXICO

New or Noteworthy Fruits

By U. P. Hedrick

Horticulturist at the New York Agricultural Experiment Station, Geneva, New York



WITHOUT new fruits there could be little progress in fruitgrowing. The history of the apple, the pear, the peach, the plum or of any domesticated fruit is largely that of discarded varieties. No fruit is perfect and nothing is more certain than that old varieties are not improved. The introduction of a good new variety is a landmark in the development of any fruit. Happily, the divine curiosity that leads men to invent, discover and originate is possessed in full measure by some fruit-growers, and there is a never ending procession of new fruits. It is the duty of fruit-growers to test such of these new varieties as opportunity offers and so take part in the march of progress.

Occasionally old varieties take on a profitable new life. These may be sorts that for one reason or another were lost, or varieties that have remained for years in the limbo of the nurseryman's catalog. Some varieties are born to blush unseen in places or times such that their good qualities have never been advertised. Many of these lost varieties, when again brought under cultivation, prove most worthy. Again, the defective or unmanageable varieties of a generation ago, under modern methods of care often prove tractable and profitable. These are the "notworthies" of the title.

All of the varieties discussed have been under probation at the New York Agricultural Experiment Station where an attempt is made to test every hardy fruit offered in this country. Most readers will be surprised at the number of fruits thus tested for few realize how great the number of varieties. It should be said that as soon as a variety is tested it is cut down,



FRENCH DAMSON A
NEW FRENCH PLUM

so that the 2,067 varieties and 179 species in the list given, is but a part, probably less than half, the number grown on the Station grounds in the last ten years. The following were the numbers of varieties under test in 1918:

Apples.....	368	Currants.....	35
Pears.....	175	Blackberries.....	40
Quinces.....	19	Red Raspberries.....	29
Plums.....	279	Black Raspberries.....	23
Cherries.....	110	Purple Raspberries.....	5
Peaches.....	373	Yellow Raspberries.....	1
Apricots.....	40	Dewberries.....	8
Nectarines.....	33	Grapes.....	390
Gooseberries.....	74	Strawberries.....	69

DELICIOUS APPLE

Delicious carries off the palm of merit among novelties in apples. No other new apple of the times has been more generally planted or better received by consumers and growers alike. Delicious was introduced in 1895, since which time its culture has spread throughout all the apple districts of the United States. In the orchards of the West and Northwest, it has been extensively planted and has proved a great commercial success. As grown in the East, it is smaller and not as handsomely colored as when grown in the West but is even better in quality. The chief asset of Delicious is its rich, distinctive flavor, though it is handsomely colored and quite large enough for a dessert fruit, and with its five-crowned apex is unique and attractive in appearance. Contrary to the usual behavior of apples, the fruits of this variety increase in size and color as the trees grow older. Its faults, in the East at least, are susceptibility to water-core and to apple-scab. Delicious is worth trying in commercial plantings wherever apples are grown in the United States, and every land-owner should plant a few trees in the home orchard. This variety was found in 1881 by Jesse Hiatt, Peru, Iowa, and the original tree is still in productive bearing. The variety was introduced by Stark Brothers, Louisiana, Missouri.

Tree large, vigorous, hardy, productive. Fruit large, uniform, roundish-conic, ribbed, light yellow, nearly to almost entirely overspread with dark, attractive red, splashed and mottled with carmine; flesh yellowish, firm, a little coarse, tender, juicy, aromatic, pleasantly subacid, good to very good; season December to last of February.

OPALESCENT APPLE

Opalescent is the most attractive of the new apples, perfection in appearance being so nearly reached that a handsomer apple is scarcely to be expected. The fruits are large, shapely and covered with a brilliant red on a yellow background. In quality, also, it is good, but it is not the feast to the palate that it is to the eye. The trees are hardy, vigorous, productive and come in bearing early—all characters thus marking it as a promising new fruit. Its season is rather short for a commercial variety, ending in January, but in cold storage it keeps longer; yet it should prove most profitable for late fall and early winter. So far, it is grown commercially only in the East where it is growing in esteem as an apple to compete with the showy fruit from the West. Opalescent was found about 1889 by the nursery company of McNary & Gaines, Xenia, Ohio, among a number of apple seedlings grown in an old orchard and was soon after introduced.

Tree vigorous, productive. Fruit large to very large, roundish-conic, symmetrical, obscurely ribbed; color bright pale yellow nearly or quite overspread with dark, deep red with faint splashes of purplish-carmine; flesh yellowish, firm, crisp, tender, juicy, pleasant mild subacid, aromatic, good to very good; season November to January.

THE J. H. HALE PEACH

Elberta, long the most popular commercial peach, now has a rival in the J. H. Hale, a chance seedling found by J. H. Hale, South Glastonbury, Connecticut. The new variety is described best by comparing it with Elberta of which it is probably

a seedling. The fruit of the newcomer is larger and rounder than that of the supposed parent, the peach being almost a perfect sphere and so more attractive in shape than the oblong Elberta. Because of this rotundity the peaches can be packed to better advantage than those of the older variety. In color, there is no choice between the two peaches, both are voluptuously handsome. The skin of the new fruit is less pubescent and a little firmer, qualities, which, with greater firmness in flesh, make it better fitted for shipping and keeping than the fruit of Elberta. In the characters that make up quality, (flavor, aroma, texture and juiciness) there is no choice, neither being of extra good quality. J. H. Hale ripens a few days earlier than Elberta, although in the markets the two will compete. In tree characters, the differences are trifling, although it remains to be seen whether the J. H. Hale is equally adaptable to the various conditions of peach-growing under which Elberta has become famous.

Tree vigorous, productive. Fruit matures in mid-season; large, regular, round, with equal halves; color lemon-yellow overspread with dark red and with mottlings and splashes of carmine; flesh yellow, red around the pit, juicy, fine-grained, sweet or somewhat sprightly; good in quality; stone free.

THE ROCHESTER PEACH

Peach-growers have long wanted an early, yellow, free-stone peach suitable for commercial plantations. One of the latest candidates is Rochester, of the Crawford group, which in several respects is an improvement on the well-known Early Crawford. Rochester precedes Early Crawford several days, ripening in New York soon after the middle of August. The peaches are large, yellow, with a handsome over-color of mottled red and are more rotund than those of Early Crawford. The flesh meets all the requirements of a good peach. It is thick, firm, handsomely marbled with yellow, tinted with red at the pit, juicy, rich, sweet, and is in all respects up to the high standard of palatability possessed by the Crawfords. The variety is

classed as a free-stone yet under some conditions the flesh clings slightly. The tree is sufficiently productive for a good commercial peach, but it remains to be seen how well it is adapted to different soils and climates. Should its range of adaptability be great, Rochester will take a high place in commercial peach-growing. This new variety came from a seed planted about 1900 near Rochester, New York. It was introduced by the Heberle Brothers Nurseries, Brighton, New York, in 1912.

Tree productive. Fruit matures late in August; round, slightly oblate, somewhat compressed; color lemon-yellow becoming orange-yellow, mottled with red, often merging into a blush of deep, dark red; pubescence heavy; flesh yellow, tinged red at the pit, very juicy; very good in quality; stone nearly free.

IMPERIAL EPINEUSE PLUM

Imperial Epineuse is not surpassed in quality by any other plum on the Station grounds. Moreover, it is one of the largest in the prune group and one of the most attractive by reason of its well-molded form and its handsome reddish-purple color which is lighter or darker according to the exposure of the plums to the sun. The tree characters, also, are exceptionally good, the trees being large, vigorous and hardy. A striking character of the variety is its strong, upright growth. Imperial Epineuse was found as a chance seedling about 1870 in an abandoned monastery near Clairac in the Valley of Lot, the great prune district of France. It was brought to California in 1883 and offered for sale under the name "Clairac Mammoth" in 1893.

Tree large, vigorous, spreading, productive. Fruit late, large, obovate, purplish-red, darker on the sunny side, mottled, overspread with thick bloom; flesh greenish-yellow, tender, sweet, very agreeable in flavor; very good; stone clinging.

MIRABELLE PLUMS

Mirabelle plums are hardly known in America, but there are many distinct varieties in Europe, especially in France, where they are highly esteemed as dessert and culinary fruits. These Mirabelles may be best described as golden-yellow, sweet-flavored Damsons. This type of plum is represented by four varieties on the Station grounds, all of which are worthy the attention of fruit-growers. These are; Drap d'Or, Reine Mirabelle, Late Mirabelle and Mirabelle. The small, round, yellow fruit are most attractive in appearance and the sweet, pleasant flavor commends them to all lovers of good fruits. The trees are small, compact, vigorous, hardy, healthy and thrive wherever Damsons grow. The varieties come nearly true to seed and plantations may be established by planting the seed. The following description is of Drap d'Or though this variety is no better than the other Mirabelles. Drap d'Or is an old European plum cultivated at least for 250 years.

Tree small, hardy, productive. Fruit matures in mid-season; small, round-oval, compressed; color greenish-yellow changing to golden-yellow, mottled and blotched, occasionally with a faint bronze blush on the exposed cheek, overspread with thin bloom; flesh light golden-yellow, juicy, firm but tender, sweet, mild; of good quality; stone small, free.

THE FRENCH DAMSON

Damson plums, like the Mirabelles, are not appreciated in America. They have several valuable characters to recommend them: thus, they are not equalled by any other type of plum in vigor, hardiness and productiveness of tree, and the plums are choicely good for all culinary purposes. Commercial plantations of Damsons are usually small, but their owners find them profitable. There should be a tree or two of Damson in every fruit-garden. Shropshire is the most commonly grown Damson, but French is a better variety. Compared with the well-known Shropshire, the fruits of French are larger, handsomer and come in season a week or two later; the trees are

larger, more productive and carry their fruits and foliage rather better. In some seasons the stone clings in French and in others it is free, while the Shropshire is always a clingstone. French is probably an old European sort re-named.

Tree large, vigorous, hardy, productive. Fruit late; large, ovate, dull black, overspread with thick bloom; skin thin, separating readily; flesh greenish, juicy, fibrous, tender, sweet, pleasant and sprightly; good to very good; semi-clinging or free.

REINE HORTENSE CHERRY

Reine Hortense is an old French cherry introduced in America nearly a century ago when amateur fruit-growing was at its height, and high quality took precedence over all other characters. It is one of the very best cherries for home plantations, several qualities preeminently fitting it for this use. To begin with, the trees are small, almost dwarf, and take up little room in the garden, or, they can be trained on walls or buildings. The cherries are excellent in quality, the flavor being a commingling of the refreshing acidity of the sour cherry and the richness of the sweet cherry. The fruits are large, round, bright, glossy, red, very uniform in shape, size and color. To add to the desirability of the variety for the home plantation, the trees are attractive in leaf, flower and fruit, making it one of the most ornamental of fruit trees. The cherries hang long on the trees but are too soft for distant shipment.

Tree of medium size, productive. Fruit matures in mid-season; nearly one inch in diameter, oblong-conic to obtuse-conic, compressed; cavity somewhat shallow, often lipped; color amber-red; flesh pale yellow, with colorless juice, tender and melting, sprightly subacid; of very good quality; stone free.

ECLIPSE GRAPE

In a collection of over four hundred varieties of grapes, several new kinds show great promise but before recommending them they must be kept on probation in other fruit regions.

Eclipse, however, may be unqualifiedly recommended at once. It has been fruiting on the Station grounds since 1896, and has been tried in nearly every vineyard region east of the Rockies and each year it finds greater favor with those who are trying it. Eclipse is a seedling of Niagara and therefore a grandchild of Concord which it resembles, differing chiefly in being earlier and of much better quality. Unfortunately, the bunches and berries are a little smaller than those of Concord. The vines are hardly surpassed by those of any other variety in vineyard characters, being hardy, healthy and productive. The ripe fruit hangs for some time without deterioration and the grapes do not crack in wet weather. Eclipse should make a splendid forerunner to the Concord. It was originated by E. A. Riehl, Alton, Illinois, from seed planted about 1890.

Vine vigorous, hardy, productive. Fruit ripens a little earlier than Concord; clusters intermediate in size and length, frequently single-shouldered, compact; berries large to medium, oval, dull black, covered with abundant bloom; flesh tender, juicy, sweet next to the skin, tart at the center; resembles Concord closely in flavor; good in quality; seeds separate very easily from the pulp.

JUNE RASPBERRY

June is a new red raspberry worthy of extensive planting on account of several remarkable characters of plant and fruit. Thus, the plants are exceedingly hardy, healthy and vigorous; produce but few suckers and these little crowded; are well able to mature their crop; the yield is heavy and is well distributed over a long season which begins the earliest of any of the 70 varieties growing at this Station, ripening as no other raspberry does in June. The fruit is a bright, handsome red, large and spherical, and holds up in size unusually well throughout the season. The new variety gives promise of becoming one of the most profitable red raspberries grown. June originated on the Station grounds in 1897 and was disseminated in 1909.

Plants vigorous, upright, few suckers, hardy, very productive, healthy. Fruit matures very early, season long, keeps and ships well, berries very large, and holding their size unusually well until the close of the fruiting season, firm, bright, handsome red, mild subacid; of good flavor.

EMPIRE RASPBERRY

Empire is another promising new red raspberry having hardiness, productiveness, vigor of bush, good health and large, handsome, firm and well-flavored fruits as its chief assets. The canes are hardy, productive, unusually vigorous and freer from disease than most other red raspberries. The berries are very large, ripen in mid-season and have a long picking season; they are mild, rich and sweet, ranking among the best in quality. The texture of the fruit is firm and the berries stand shipment well and may be kept long. With such an array of good characters, Empire must take high standing among commercial red raspberries. The variety originated with L. E. Wardell, Marlboro, New York, and was introduced by its originator in 1916.

Plants vigorous, upright, hardy, very productive. Fruit matures in early mid-season; large, uniform, retains its size well to the close of the season, roundish-conical; medium to dark red, glossy; flesh juicy, firm, mild, high-flavored; very good in quality.

PROLIFIC STRAWBERRY

Prolific is a new strawberry from the grounds of the New York Experiment Station which was disseminated in the spring of 1908. Characters to recommend it are: vigor and productiveness of plant; attractiveness of the large, uniform and well colored berries; perfect blossoms; and well-shaped fruits, produced in great numbers which hold up in size unusually well throughout the season. The fruit is a handsome bright scarlet in color, is pleasantly acid and rich in flavor, and matures in mid-season, as many as 14,502 quarts having been produced

per acre in one season. The greatest fault of the variety is susceptibility to leaf-spot in unfavorable weather.

Plants vigorous, very productive. Fruit matures in mid-season, ripening period long; berries very large, roundish-conic to blunt wedge, with blunt apex, handsome bright scarlet; flesh firm, well colored at the center, juicy, pleasantly acid, aromatic; of good quality.

A History of Gardening in England

By *The Hon. Alicia Amherst**

MONASTIC GARDENING

“Forsitan, et pingues hortos quae cura colendi
Ornaret, canerem,”

—VIRGIL, *Geor.*, iv. 118.



THE history of the Gardens of England follows step by step the history of the people. In times of peace and plenty they increased and flourished, and during years of war and disturbance they suffered. The various races that have predominated, and rulers that have governed this country influenced the gardens in a marked degree. Therefore, as we trace their history, we must not lose sight of the people whose national characteristics or whose foreign alliances left a stamp upon the gardens they made.

Nothing worthy of the name of a garden existed in Britain before the Roman Conquest. The Britons, we know, revered the oak, and held the mistle-toe sacred, and stained their bodies with woad, but of any efforts they may have made for the cultivation of these or any other plants we know nothing. The history of Horticulture in this country cannot fairly be said to begin before the coming of the Romans. In this, as in other sciences, the Romans were so far advanced that it was centuries before they were surpassed, or even equalled by any other nation.

They cultivated most of the vegetables with which we are still familiar. At Rome, said Pliny the Elder, “the garden

* Reprinted from the book of this title, published by Quaritele, in London, 1896.—ED.

constituted of itself the poor man's field, and it was from the garden that the lower classes procured their daily food." The rich indulged in luxury and extravagance in the garden, and vegetables and fruits were raised at great cost for their use, which were not enjoyed by the community at large. But most of the vegetables which are still in general use were common to all classes, and many of these plants were brought by the Romans to this country. Some of them took so kindly to this soil, and were so firmly established, that they survived the downfall of the Roman civilization. A curious example of this is one species of stinging-nettle, which tradition says was introduced by the Romans as an esteemed potherb.

Tacitus, writing in the first century, says that the climate of Britain was suitable for the cultivation of all vegetables and fruits, except the olive and the vine. Before long, even the vine was grown, apparently with some success. It is generally believed that the Emperor Probus, about the year 280 A.D., encouraged the planting of vineyards in Britain. Pliny tells us that the cherry was brought in before the middle of the first century. Perhaps this was some improved variety as this fruit is indigenous to this country.

We cannot suppose that the Roman gardens in Britain were as fine as those on the Continent. Gardens on such an elaborate scale as that at Pliny's Villa, or at the Imperial Villas near Rome, with their terraces, fountains, and statues, could scarcely have been made in this country. But the remains of Roman houses and villas which have been found in various places in England, so closely resemble those found in other parts of the Empire, that doubtless the gardens belonging to them were laid out as nearly as possible on the same lines as those of Italy and Gaul. The South of England could afford many a sheltered spot, where figs and mulberries, box and rosemary, would grow as well as at "Villa Laurentina," seventeen miles from Rome. A "terrace fragrant with the scent of violets," trailing vines and ivy; or enclosures of quaintly-cut trees in the forms of animals or letters filled with roses, would not there seem out of place. If the Roman gardens in Britain were like

this—and why should it be doubted when we see the remains of villas, mosaic pavements, baths, roads, and bridges left by that nation?—it was fully a thousand years before anything as beautiful was again seen in our Island.

The fall of the Roman Empire, and the subsequent invasions of barbarians, struck a death-blow to gardening as well as to all other peaceful arts. During the stormy years which succeeded the Roman rule in Britain, nearly all knowledge of horticulture must have died out. Only such plants as were thoroughly naturalized and acclimatized would be strong enough to continue to grow when not properly cultivated.

The few Saxon names of plants which can be traced to the Latin seem to identify these hardy survivors, or at any rate show that the Anglo-Saxons were well acquainted with many of the Roman plant-names.

It may be that some plants, such as the cherry, cabbage, lettuce, leek, onion, radish, rose, and parsley, continued in this country; although many species which were in cultivation in Britain, in Roman times, had to be reintroduced into England at a later date, having been entirely lost during the years of Teutonic invasion. On the Continent, the same state of things followed the dissolution of the Roman Empire, and horticulture only revived with the spread of Christianity and the establishment of monasteries after a lapse of centuries.

In this country the revival was due to the same cause, and in the early years of England's history undoubtedly the monks were better skilled in horticulture than any other class of the community. The lines in which their lives were cast tended to maintain this superiority. They were left quiet, and, to a great extent, undisturbed by wars; and when other property was destroyed and plundered, that of the monks was respected. Many of them were men of skill and intelligence, and they were able to learn, not only from books, but from their intercourse with the Continent, both what plants to grow and how to grow them.

The earliest records of gardens on the Continent (after Roman times) date from the ninth century. In the list of

Manors of the Abbey of Saint Germain des Pres, Saint Armand and Saint Remy, in the time of Kark the Great, mention is made of various gardens. At other places, as at Corbie, in Picardy, and at St. Gall, near the Lake of Constance, there remains more than a mere mention of the existence of a garden. At Corbie the garden was very large; either divided into four, or else four distinct gardens, and ploughs, which had to be contributed annually by certain tenants, were used to keep it in order; while other tenants had to send men from April to October, to assist the monks in weeding and planting. At St. Gall, the "hortus" is a rectangular enclosure, with a central path leading from the gardener's house and a shed for tools and seeds situated at one end, with nine long and narrow beds of equal size on either side. The "herbularis," or physic garden, is smaller, with a border of plants all round the wall, and four beds on either side of the central walk; and the plants contained in each of these beds are carefully noted.

In England we have no such exact description of any garden, and it is only by carefully examining the records of the various monasteries that the existence of gardens or orchards in the eleventh and twelfth centuries, and a few of even earlier date can be proved.

A garden was a most essential adjunct to a monastery, as vegetables formed so large a proportion of the daily food of the inmates. Therefore, as soon as monasteries were founded, gardens must have been made around them, and these were probably almost the only gardens, worthy of the name, in the kingdom at that time. Still, the number of plants they contained was very limited, and probably many of those grown on the Continent had not found their way into this country. The monks may have received plants from abroad, as some connexion with religious houses on the Continent was kept up; and in bringing back treasures for their monasteries or churches the garden would not be forgotten. But plants were chiefly brought for medicine, and we may infer that they were imported in a dry state, as our word "drug" is simply part of the Anglo-Saxon verb "drigan," to dry.

Soon after monasteries had been established in this country, missionary monks set forth to convert their Teutonic kinsfolk on the Continent. It has been suggested by Mr. Earle that some of the German names of plants which resemble old English, are not cognates, but were derived from words used by the Saxon missionaries, who first brought with them the knowledge of the virtues of those plants.

The old word for garden was "wyrτζerd," a plant yard, or "wyrттun," a plant enclosure. Also the form "ortჯerd" or "orceard," which is the same as our word orchard, though the meaning is now confined to an enclosure planted with fruit trees. "Wyrт" or "wurt" was used for any sort of vegetable or herb, and is the same as the modern word "wort," suffixed to so many names of plants, as "St. John's Wort," or "herb John." Sometimes a special plant filled most of the enclosure, thus the kitchen garden was occasionally called the "leac tun," or leek enclosure. We still speak of an appleyard, the old "appultun," or "appulჯerd," but we say a cherry orchard while the old word was equally simply "cherryჯerd." A part of the monastery garden laid down in grass, where no flowers were grown, was called the "grasჯerd", and in like manner the space surrounded by the cloisters was the "cloysterჯerd." The modern word garden is another form of this word "ჯerd," garth or yard, all are derived from an Aryan root meaning an enclosure.

At this early period, and for many centuries later, gardens were planted chiefly for their practical use, and vegetables and herbs were grown for physic or ordinary diet. Flowering plants were but rarely admitted solely on account of their beauty. But it does not necessarily follow that bright and pretty flowers found no place within the garden walls. Roses, lilies, violets, peonies, poppies, and such like, all had medicinal uses, and therefore would not be excluded.

The beauty of flowers appeals to nearly every one, and even in the most disorderly periods of our early history they may have exercised some softening influence. A pretty story is told of William Rufus, which shows that monarch, as it were

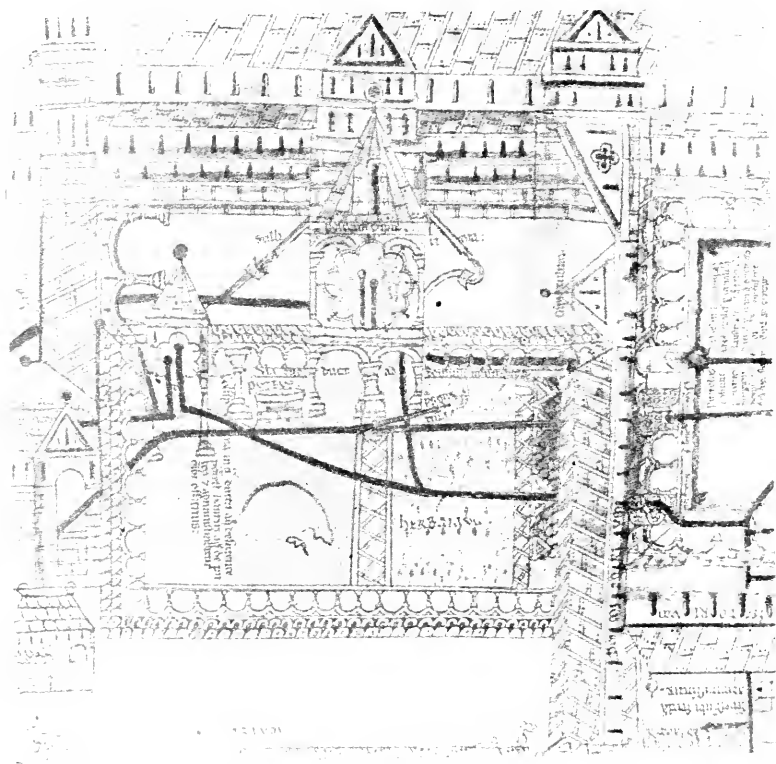
for a moment, in a more gentle light than perhaps any other incident during his turbulent reign. Eadgyth, or Matilda, afterwards the wife of Henry I., was being educated at the convent of Romsey, where her aunt Christina was Abbess. When the child was twelve years old, the Red King wished to see her, and one day the Abbess was distressed to hear him and his knights demanding admission at the convent gate. The good lady, fearing some evil purpose towards the child, made her wear a nun's veil; then she opened to the king, who entered, "as if to look at the roses and other flowering herbs." While the rough king thus inspected her flowers, the Abbess made the nuns pass through the garden. Eadgyth appearing veiled among the rest the king suffered her to go by, and quietly took his leave. The story was told by the Abbess to Anselm, who narrated it to Eadmer, in whose history this most picturesque scene is recorded.

While the Abbess Christina was adorning her cloister gardens with roses and flowering herbs, other monasteries were being beautified in like manner. The first Abbot of Ely, Brithnodus, was famed for his skill in planting and grafting, and improved the Abbey by making orchards and gardens around it.

It seems as if there were gardens at Ely earlier than his time (twelfth century), as the following quaint story implies the existence of some sort of garden in the neighbourhood of Ely. It is related among various miracles wrought at the tomb of St. Etheldrada how the hand of a girl was cured. She was servant to a certain priest, and "was gathering herbs in the garden on the Lord's Day, when the wood which she held in her hand, and with which she desired to pluck the herbs unlawfully, so firmly adhered (to her hand) that no man could pluck it out for the space of five years by the merits of St. Etheldred (she) was cured." The Saint died in 679, and, although of no historical value, surely such a curious legend is worth relating.

The earliest view of a monastery garden in this country appears to be that in the plans or bird's-eye views of the monastic buildings at Canterbury, made about 1165, and bound

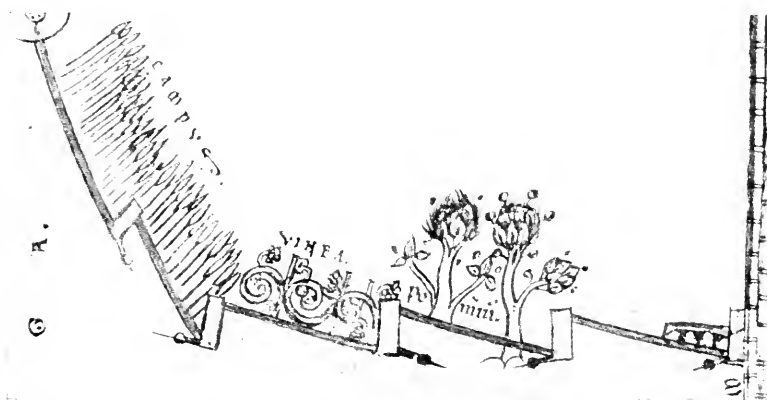
up with the Great Psalter of Eadwin, now preserved in the library of Trinity College, Cambridge. These drawings seem to have been made (probably by the engineer Wibert or his assistants) to record the system of waterworks and drainage of the monastery. One of them shows the Herbarium which occupies half the space between the Dormitory and the Infir-



CANTERBURY MONASTERY SHOWING THE "HERBARIUM"
(GARDEN) FROM A MS. ABOUT 1165 A.D.

ary, surrounded by cloisters; the other the orchard and vineyard which were situated beyond the walls. The first plan records also trees within the wall near the fish-pond. In later times a further wall was built beyond the fish-pond, including what was afterwards known as the old convent garden, the site of which was obtained in parcels between the years 1287 and 1368.

There must have been another orchard on the west of the great cloister and a garden into which the palace of the Archbishop looked, but these were beyond the limits of the plans, although contemporary with them, as they are associated with the closing scenes in the life of Thomas Becket (1170). The knights who were soon after his murderers "Threw off their cloaks and gowns under a large sycamore in the garden, appeared in their armour and girt on their swords," and armed men were collected in the orchard so that Becket and his attendant monks flying to the church had to pass through a small door at the



PLAN OF ORCHARD AND VINEYARD AT CANTERBURY ABOUT
1175 A.D.

back of the cloister, instead of going by the usual passage through the orchard to the west end of the church.

Few records of such an early date have come down to us, but monastic life did not quickly change, and probably the gardens of the fourteenth century differed little from those of the twelfth. To gain a fuller knowledge of these gardens, we must pass over two centuries to the time when written accounts begin. As we get into the fourteenth century there is more material on which to work. The outlines of the management of these gardens is clear, although the details can only be filled in by imagination.

Each department within the monastery was directed in a

regularly and orderly way, and was presided over by an officer, with set duties to perform; who had to keep the accounts of his office, and was responsible for its management. There was a Gardener, or Hortulanus or Gardinarius, or Garden Warder, just as much as there was an Almoner, Sacristan, Precentor, or any other officer.

In some instances the accounts of the Hortulanus have been preserved, and further references to gardening matters are scattered throughout various chartularies. Two very perfect series are those of Norwich Priory and Abingdon Abbey, and they are doubtless fair examples of the Gardener's accounts in the majority of monasteries. There are four accounts at Abingdon, the earliest for the year 1369–1370. The Norwich series is far more numerous, there being some thirty rolls, the earliest 1340, the last 1529; the first years of the fifteenth century being well represented.

These accounts show the receipts and expenses of the office, the cost of repairs, the money received from the few products sold, but they throw no light on the processes of cultivation, nor do they particularize the plants which were grown.

Like the other officers, or obedientiars, the Hortulanus had his "famulus" to assist in the work, and was also allowed to employ labourers, and money was forthcoming for their payment from the rent of some small piece of land, or some tenements which belonged to the office. At Ramsey Abbey there were two "famuli" in the garden, and their payment (circ. 1170 A.D.) was "to each of them fourteen loaves," and two acres of land. But in spite of various small rents and money received from the surplus garden produce, or grain grown on the lands belonging to the garden office, the accounts do not always show a balance on the right side, and the receipts not infrequently failed to cover the expenses.

In early times the monks seem to have worked better, or at any rate managed more carefully, for the garden paid its expenses; but at Norwich as the years went on, the office got more and more into debt. In 1429 "the expenses exceed the receipts £8.2s.8½d.;" in 1431 there is a deficit of £13.16s.8¾d.

Some items occur without variation every year, such as the payments to the servants; and their tunics, boots and gloves. The gloves are not uncommon entries; they appear among the accounts of Bicester, Bury, Holy Island, and other places. They were probably thick gloves for weeding.

The O of the gardener is also of regular occurrence, as it was expenses at a yearly feast, and the O refers to the Psalm sung on the occasion by the Hortulanus, commencing "O Radix Jesse." In the Abingdon Accounts it is entered, "To O Radix, 6s. 10d.," and another time (A.D. 1388) still more at length "In expensis factis pro mittent-exennia ad O Radix XVIIId." This "O Radix Jesse" was the third of the seven Roman or Gregorian Great Os. The first, O Sapientia, was sung on December 16th, and the day is still marked in the Kalendar of the Book of Common Prayer. The well-known Advent hymn, "O come, O come, Emmanuel," is a translation by John Mason Neale (1818-1866) of a Latin versification of five of the Great Os written about the thirteenth century; the second verse of this hymn being a paraphrase of the O of the gardener.

It will be noticed also that in these and other accounts the tithe is deducted. The year in which it first was enacted that tithe should be paid "of fruit trees and every seed and herb of the garden," was A.D. 1305, the decree insisting on the payment, being issued by the Council at Merton, in Surrey.

The chief variations as a rule are in the tools bought, and in the repairs. "For a saw," "knives for herbs," "mending a hatchet," "repairs of the garden wall," "lock and keys for the gates," etc.; and sometimes fruit, apples, cherries, beans, onions, or such like, had to be bought when the garden supply fell short. But this "great garden" under the care of the Hortulanus was not by any means the only garden. Many other office holders had gardens too.

In a plan compiled from the remains and the records of Bicester Priory the relative positions of the various gardens, the Prior's, Canon's, Infirmarian's, and the Sacrists's, as well as the great garden, kitchen-garden, and orchard is shown, and this quantity of distinct gardens is not in excess of the

usual number. As a rule the Prior had an enclosure of his own. At Melsa there was both "the garden which is called the Prior's," and "the garden of the Abbot's chamber." At the Abbey of Haghmon, in Shropshire, the Prior was allotted "for his recreations a certain chamber under the dormitory, . . . with the garden of old called 'Longenores gardine,' annexed to the chamber before-mentioned, together with the dovecote in the same."

At Norwich, payments occur to the gardener from the Lord Prior for a "parcel of the garden," or small piece reserved for his special use. The "little garden," or "garden within the gates," at Norwich, was let to the cellarer. The Sacristan, the Treasurer, the Precentor, and the "Custos operum," all had separate gardens at Abingdon, and paid rent for them to the *gardinarius*. At Winchester, the payment to the gardener, "Roberto Basyng, custodi gardini conventus," occurs in the Receiver's account (A.D. 1334) as well as charges for mowing the Almoner's garden, and besides these the "custos operum" defrayed the expenses of a garden called "Le Joyc." The Infirmarian's garden was usually an important one, as in it he grew healing herbs for the sick of the monastery, and for convenience this plot was, as a rule, placed near the infirmary or hospital.

In all countries, heathen and Christian, and in all ages, flowers have played an important part in ceremonies, such as funeral rites and marriage feasts. England in the Middle Ages was no exception; and the use of flowers in the services of the Church, in crowning the priests, wreathing candles, or adorning shrines, was very general.

The gardens within the monastery walls for providing these flowers were under the care of the Sacristan. At Abingdon, he paid the *gardinarius* four bushels of corn for the rent of his garden. At Norwich, the Sacristan seems to have had more than one garden, as a very cursory glance at the MS. accounts of that office shows the names of both "St. Mary's" and the "green garden." There was a "*gardinum Sacristae*" at Winchester as early as the ninth century, and to this day

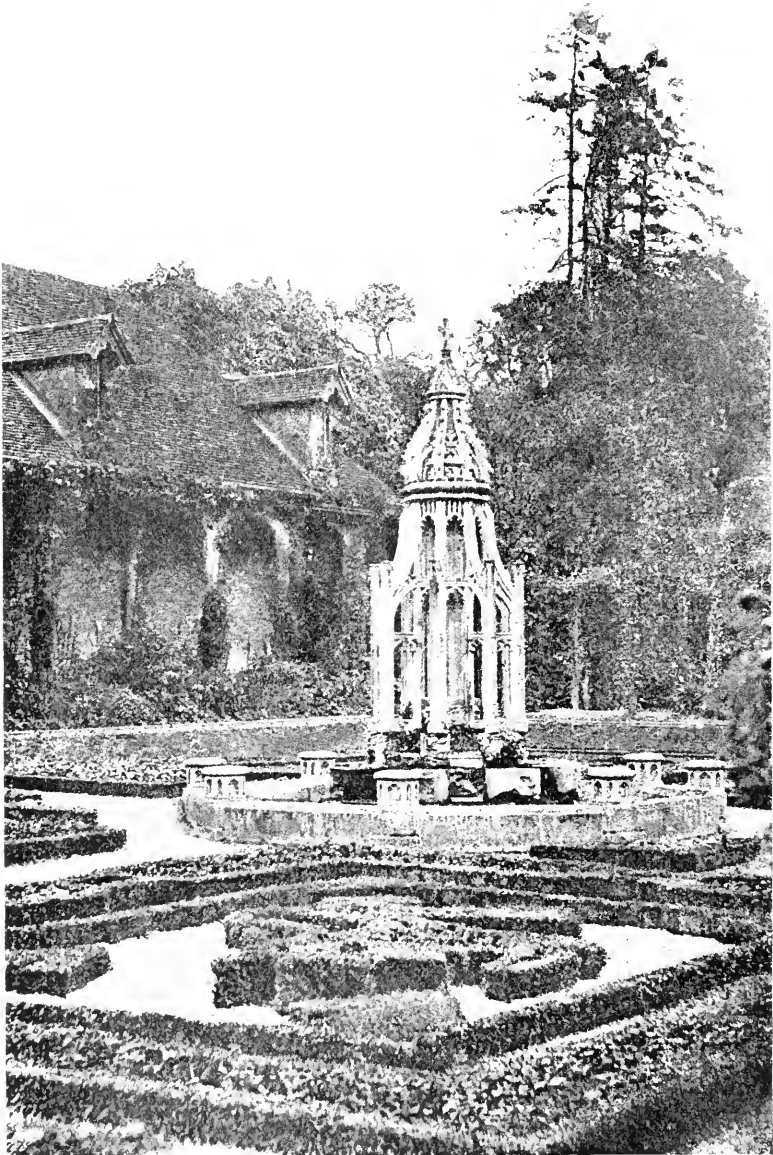
a piece of ground on the east side of the north transept of the cathedral bears the name of "Paradise," and marks the site of the Sacrist's garden. The fifteenth century doorway, which was the entrance to the enclosure, is still standing.

Such a garden as this is referred to when the Abbot of Ramsey, between 1114–1130, had to come to some agreement about certain pieces of land in London which adjoined the property of the Priory of the Holy Trinity; and the Prior consented "to give up his claim which he had upon the chapel of the Abbot, and the garden which is before the chapel." These "gardini Sacristae" were not only found within monastic precincts, but were attached to many churches and chapels. The Hortulanus of Abingdon let out a garden "next to St. Nicholas' Church," to the Rector, for a term of years. There is an interesting record of the chapel garden in the Manor of Wookey, in Somersetshire, which belonged to the Bishops of Bath and Wells, in the account of the Reeve of that place for the year 1461–2. Three men were employed for four and a half days at two pence a day, "digging and cleaning the chapel garden."

Henry VI. left such a garden to the church of Eton College. The clause in his will runs thus: "The space between the wall of the church and the wall of the cloister shall conteyne 38 feet, which is left for to sett in certaine trees and flowers, behovalbe and convenient for the service of the same church," and it was to be surrounded by "a good high wall with towers convenient thereto." Many other such examples of gardens connected with churches could be enumerated.

At all great functions, both during the processions or while performing the services, the priests were crowned with flowers. This was specially the custom at St. Paul's in London; and when on June 30th, 1405, Bishop Roger de Walde was installed there, he and the Canons of the Cathedral walked in solemn procession, wearing garlands of red roses.

The use of these "coronae sacerdotales," or wreaths worn by the priests on feast days, continued for many centuries, and their prevalence up to the time of the Reformation is



ASHRIDGE

apparent from various churchwardens' accounts. These entries however, are not frequent, as the gardens attached to the churches were evidently, as a rule, able to supply sufficient flowers for ordinary use, and it was *only* for great occasions, or on special feast days, when larger quantities were required, that they had to be bought.

When such decorating of churches was considered unlawful after the Reformation, these gardens would naturally fall into disuse, even where the lands they covered were not at once appropriated for other purposes.

In 1618, James I. set forth a declaration permitting certain "lawfull recreations . . . after divine service, and allowed that women should have leave to carry rushes to the church for the decoring of it according to their old custome." These rushes may have been simply for the floor, and not for the altar or walls, as, for example, we find in 1580, churchwardens at Wing, in Buckinghamshire, spent 1d. for "one burden of roshes to strewe the church howse agaynst the comyssyoners sate there." In the vestry book of the Parish of St. Nicholas, Durham, 1665-1703, there are several entries of the purchase of rushes for the floor as well as for birch for decorating. "For Birkes for the church at Whitsontide, 1s.8d. To Lancelot Dunn for the pewes of the church dressing, and for rashes laying in every pew the 21st of July 1670. 8s."

Coles, writing as late as 1656, says: "It is not very long since the custome of seting up garlands in churches hath been left off with us: and in some places setting up of holly, ivy, rosemary, bayes, yew, &c., in churches at Christmas, is still in use." This, however, is looking too far ahead and at the time we are considering, the monks within the quiet cloister, week by week and year by year, supplied the best flowers their skill and knowledge could produce, to adorn their churches and chapels.

But to return to the consideration of the department of the *gardinarius*. He had more than the garden under his care, for his jurisdiction extended over both the orchard and vineyard.

The orchard, or "*pomerium*," supplied not only apples and

pears for eating and cooking, but apples for cider also. Large quantities of cider were made each year, except when in an unusually bad season the apple crop failed. This was the case in 1352, when the Almoner at Winchester made the following note in his accounts, "Et de ciserat nihil quia non fuerunt poma hoc anno." 1412 was another bad apple year, and no cider was made at Abingdon, and the not unfrequent purchase of apples and pears for the use of some of the monasteries, shows they did not always grow sufficient for their consumption, although in some years there was enough and to spare. The Wardon pear, which was such a favourite for many centuries, originated at the Cistercian monastery of that name in Bedfordshire, and they bore three Wardon pears for the arms of the house. It was a kind of cooking pear, and every early cookery-book contains recipes for "Wardon pies," or pasties. They are usually mentioned quite as a distinct fruit, as "apples, pears, Wardons, and quinces," because they were the best known variety.

Some of the orchards must have been of considerable size. In the time of King John the grant of land to Llanthony Priory included twelve acres of orchard. An oft-quoted example to prove the early existence of orchards is a Bull of Pope Alexander III., dated 1175, confiscating the property of the monks of Winchenley, in Gloucestershire, with the town of Swiring and all its orchards."

The cherry was, from the date of its introduction by the Romans, a popular fruit in this country. The "ciris beam," or cherry-tree, continued to be grown in early Saxon times. In the twelfth century it was one of the fruit trees praised by Necham, Abbot of Cirencester, in his poem, "De laudibus divinae Sapientiae," and this fruit was not forgotten in any monastic garden.

At Norwich, besides the "pomerium," the appleyard or orchard, there was a "cherry erd," or, as it is called in another place, "orto cersor," or cherry-garden, and in spite of this we find cherries had to be bought "for the convent" from time to time, so great was the demand for this fruit. Perhaps it

was the too frequent use of it that suggested to Necham the advisability of warning his readers that "cherries, mulberries, and grapes should be eaten fasting, and not after a meal."

The third department, of the "garden Warder," must now be considered. It has been already pointed out that vines were grown by the Romans in Britain, and, with the exception of the gap immediately following Roman rule, their history is continuous. Tradition points to a place valled Vine, in Hampshire, as having taken its name from the vines planted there during the time of the Emperor Probus. Vines, the "Winstreow," are noticed as boundaries or landmarks at several places in Saxon charters of the tenth century, and these might have been survivals of Roman vineyards.

Bede, writing early in the eighth century, says that Britain "excels for grain and trees . . . it also produces vines in some places." In the laws of Alfred, which were chiefly compilations of existing ones, it was notified that anyone who "damaged the vineyard or field of another, should give compensation." In the tenth century King Edwy confirmed the grant of a vineyard at Pathenesburgh, in Somerset, to the Abbey of Glastonbury. The grapes were gathered in October, and that month was called "Winter filling moneth," or "Wyn moneth," another proof of the extent to which vines were cultivated. The pruning of the vine took place in February. The picture of vine pruners taken from an Anglo-Saxon MS. in the British Museum, illustrates that month in the calendar.

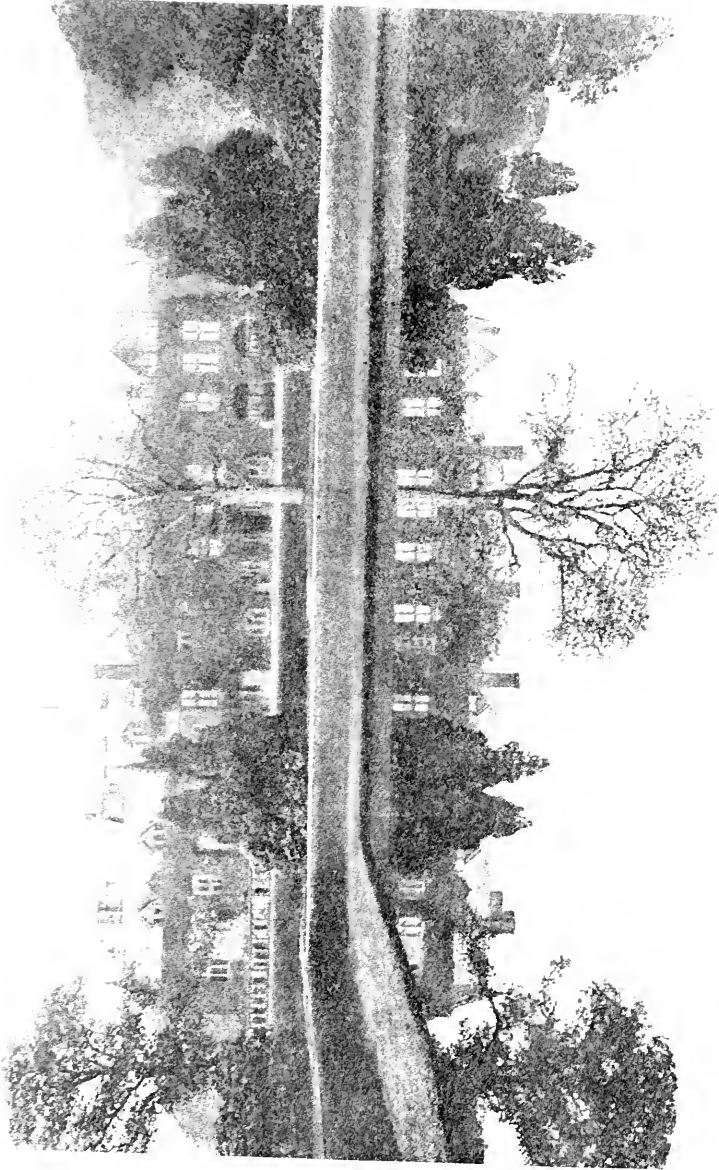
Necham devotes a chapter of his *De Naturis Rerum*, to the vine, but he chiefly moralizes, and does not treat his subject in its practical sense. He tells us that in gathering grapes, having reached the final row, the workers in the vineyard break into a song of rejoicing, but unfortunately, he does not satisfy our curiosity by handing down the words of their chant.

In Domesday Book, the "vinitor," or vine-dresser, is only once mentioned, but some idea of the size of the vineyards may be gathered from the survey, as about thirty-eight in many different counties are described. They are usually

measured by "arpendi," the arpends being equal to about an acre, or less. The largest was at Bitesham, in Berkshire, on the land of Henry de Ferrieres, and covered twelve arpends. Some vineyards were old, others but newly-planted, as at Westminster four arpends are described as "vineae noviter plantatae," and at Ware another vineyard as "nuperrime plantatae." Some of the vineyards bore grapes, while others did not, and these are distinguished as "vineae portantes," or vineae non portantes." The quantity of wine yielded by a vineyard of six arpends in Essex was as much as twenty "modii," or about forty gallons, if the season was favourable.

If England could boast of so many vineyards before the Norman conquest, it was only natural that the influx of foreigners from a grape-growing country should infuse fresh ardour into vine-culture, and monasteries, with Abbots or Priors from the Continent, lost no time in improving the old and making new vineyards on their lands. The name "vineyard" was often retained long after the monks who planted it had passed away. Thus "Vineyard," near Gloucester, described in *Camden's Britannia* as the seat of the Bridgemans, "on a hillet" to the west of the town, was once the vineyard belonging to the Abbots of Gloucester. Gloucestershire was famous for its vines, which, wrote William of Malmesbury in the twelfth century, are "more plentiful in crops, and more pleasant in flavour than any in England;" for the wines do not "offend the mouth with sharpness, since they do not yield to the French in sweetness." Again, we find in towns a "vine Stree," as in Lond, Grantham, Peterborough, and many others. Perhaps, at the latter place, the name marks the site of the vineyards planted by Abbot Martin, early in the twelfth century.

At Hereford, sloping to the South-west, is the spot known as the "Vinefields," where the terraces, laid out for the vines, can still be distinguished. The accounts of the Diocese of Hereford, when the See was vacant by the death of Louis de Chorlton, in 1369, and the lands were in the hands of the King (Edward III.) until the next appointment, show the existence of a vineyard within the Manor of Ledesbury; while in a similar



THE MIRROR POND
NEWSTEAD ABBEY

account for the year 1536-7, although the costs of the garden are entered, there is no mention of a vineyard; and at another Manor on the same roll (Prestbury), the "herbage of the pasture called Vyneyarde" was sold, thus proving the former existence of vines on the spot, and showing how gradually they died out. But with our climate, what strikes one as more wonderful than their passing away, is that they were, at one time, so numerous throughout England. Even as far north as Cheshire, in the twelfth century, although there does not appear to have been any actual vineyard, the vine was not unknown, for Reginald of Durham notices, at Lixtune in Cheshire, a little church built of timber with vines climbing over it.

It is difficult to realize the appearance of Ely in the eleventh century in the days "when Cnut the King came sailing by" as it rose from out the dreary and undrained fen land. Then the sunny slopes around its cloisters were so thickly planted with vineyards, tended by those monks who sang so merrily, that the Normans gave it the name of the "Isle des Vignes."

Another old rhyme thus celebrates these vines:

Quatuor sunt Eliae: Lanterna, Capella Mariae,
Et Molendinum, nec non claus Vinea vinum.

"Englished" thus by Austin, in 1653:

Foure things of Elie towne, much spoken are.
The Leaden Lanthorn, Marie's chappell rare
The mighty Milhill in the Minster field,
And fruitful vineyards which sweet wine do yeeld.

Ely long continued to be famous for its grapes. From time to time, when the manors were in the king's hands, during some interregnum caused by the death of the Bishop; the papers relative to the administration of the lands give evidence of the vineyards as well as of the orchards and gardens belonging to the See, from which a profit was derived. The chief entries refer to the "herbage of the garden," "apples," "pears" and nuts sold, also hemp and reeds. The farm of the "rosery" often occurs, but the word is disappointing; and it stands for

“roseria,” “rosar,” or bed for reeds or rushes, at places in the Fens.

In the “Bailiwick of Cambridge, except the island,” and at Somersham Manor, there were vineyards which yielded grapes, but the principal one was at Ely itself. In 1298 as much as twenty-seven gallons of verjuice, “veridi succo,” from the grapes, were sold; and the next year, twenty-one gallons.

The entry runs thus:

“And of 109s. 8d. of pasture and herbage sold in the vineyard and elsewhere in divers places in the summer. And of 25s. 3d. of fruit in two gardens and the vineyard, “besides the grapes, with 21 gallons of verjuice sold. And of £10 for 9½ butts of wine sold, of the remainder of the preceding year.”

From another passage in 1302 it appears that cherries were the other fruit, besides the grapes, which grew in the vineyard, and also we find in the same year the charges for the livery of the vine-dresser and the labourer under him, which was paid for in corn.

The Bishops of Ely also had a vineyard attached to the garden of “Ely Place,” their house in Holborn, the site of which the present “Vine Street” commemorates. The earliest records of these gardens date from the reign of Edward III., and they are preserved at Ely. They are most interesting from the names of streets and houses in London mentioned in them, some with gardens attached, for which rent was paid to the Bishop. But it is only in a few of the earliest ones that we find any details of the garden or vineyard, for from the year 1379–80 to 1480–81, they were let at the yearly sum of 60s. The rent of the garden alone was 20s. The accounts until the year 1419 are preserved at Ely; the continuation from 1423 to 1483 are in the Record Office. Among the latter in the time of Bishop John Morton, 20 to 21 Edward IV., we find the garden is at last again in the Bishop’s hands; the entry states that there is no rent, “quod occupatur ad vsum domini proprium hoc anno.”

The Bishop of Ely’s Holbourne vineyard did not stand alone in that locality. Hard by was another belonging to the Earl

of Lincoln, from which about fifty gallons of verjuice were sold in one year (1295-6). A little further on, in Smithfield, a vineyard was planted by Geoffrey, Earl of Essex, on the land belonging to the "Canons of Trinity Church, London," which was restored to that body in 1137.

It would be tedious to enumerate all the vineyards belonging to monastic houses which are known to have existed, and of which there is merely the name or some slight record surviving, as at Canterbury, Beaulieu, Ramsey, Abingdon, Spalding, Bury St. Edmunds, and many others. Enough has been told to show how important an item the vineyard was in the gardener's department. His cares, however, did not quite end there; as the moat and the ponds were also under his charge. At Norwich the gardener's office bore the expense of cleaning the ditches which divided the various gardens, the Prior's from the chief garden, and so on. At Abingdon we find also he defrayed the cost of cleaning out the moat, and both there and at Ramsey the gardener purchased nets and baskets for catching the fish in the moat and ponds.

To get at the details of the management of monastic gardens, we have to go so constantly to the accounts of the office, and to look so entirely at the business side of the question, that one is apt to forget the other aspect, namely, the pleasure they afforded. But, alas! there are few gardens in existence which can give any idea of what these were really like. A thick hedge or a fish pond is generally the only survival. The wall enclosing a corner of the garden at Ashridge is part of the old cloister, and near it there is also a thick yew hedge surrounding another small piece of garden. These, if not actually the same as in the days when the place was a monastery, are on the same lines, and have been kept as gardens ever since the days when the monks enjoyed the solitude of the cloister. In like manner the garden at Newstead Abbey still retains many pleasing traces of the Black Friars who for many years lived there. The times we have been considering were periods of constant strife, when the cloister was the only place in which quiet and retirement could be found, and to

those who sought refuge within its walls, how dear must those peaceful hours in their gardens have been. Perhaps some inmate of Sopwell (a cell of St. Albans) was too fond of early morning or late evening strolls in the garden, for Abbot Michael (about 1338) made the rule that in winter "the garden-door be not opened (for walking) before the hour of prime, or first hour of devotion:—and in summer that the garden and the parlour doors be not opened until the hour of none (? nine) in the morning:—and to be always shut when the corfue rings."

Even the warlike Hospitaller Orders, the Templars and Knights of St. John, contributed something towards the improvement of Horticulture. In their wanderings in the East during the Crusades, they may have remembered some garden in England, and brought back plants for it, as, for example, the splendid Oriental plane at Ribston, the planting of which tradition attributes to the Templars. The surveys of the manors all over the kingdom belonging to these Orders show the large number of gardens of which they were possessed. At the Chancery of the Order of St. John of Jerusalem in England, in Clerkenwell, there was a garden in the time of Prior Philip de Thame (in 1338) which was still existing in the reign of Henry VII., and the Hospitallers had also a house with gardens attached at Hampton, on the site of the present gardens of Hampton Court. In many ways through those troublous times the monastic orders kept alive the science of Horticulture, and spread the knowledge of it to those around them. Thus by practising, as well as by preaching, they showed by their useful lives that "to labour was to pray."

THIRTEENTH CENTURY

The rose rayleth hire rode
The leues on *the* lyhte wode
 Waxen al *with* wille
The mone mandeth hire bleo
The lilie is lossom to seo
The fenyl and the fille.

—*Springtime*, MS., c. 1300.

During the years which succeeded the Norman Conquest, the country was constantly plunged in wars abroad and troubles at home. There could be little thought of the quiet pleasures of a garden while William I. and his sons ruled the conquered English with a rod of iron; while Stephen was fighting for the crown against "the Empress Maud;" while men's minds were occupied by Crusades to the Holy Land; or while the Constitution of England was being slowly built up, and her liberties gradually secured by bloodshed and ceaseless struggles.

It was necessary, in these troublous times, for security of life and property, to live in as inaccessible a position as possible. Castles were built on the tops of hills, or protection was sought by placing the dwelling behind some river or marsh, when no high ground or escarpments of steep rocks afforded a suitable defence. This was the opposite course from that pursued by the monks, who, as a rule, chose a fertile valley in which to place their cloister, and plant their orchards, gardens and vineyards. There was no room for much garden within the glaciis of a feudal castle, and as it was not safe for any of the inmates to venture beyond, it was scarcely worth while making any garden or orchard outside, merely to see it plundered by some turbulent neighbour. But, in spite of all these disadvantages, some attempt at cultivation of fruit was not unfrequently made.

At Carlisle there must have been gardens round the town, and outside the castle walls, if the old rhyming Chronicle of the Wars in 1173 and 1174, between Henry II. and William the Lion, of Scotland, is to be believed. The supposed author, Jordan Fantosme, describes the siege of the Castle of Carlisle. The translation of one verse runs thus:

They did not lose within, I assure you I do not lie,
As much as amounted to a silver denier.
But they lost their fields, with all their corn
(And) their gardens (were) ravaged by those bad people,
And he who could not do any more injury took it into his head
To bark the apple trees;—it was bad vengeance.

Scattered throughout the Pipe rolls and Exchequer rolls and Liberate rolls, there are to be found a few entries which indicate some of the royal gardens in the twelfth and thirteenth centuries. In 1158-9 occur payments to the king's orchardman, "Henricus Arborarii," in London, and to the vine dressers at Windsor and elsewhere. In 1259, Henry III. made extensive alterations at the Palace of Westminster, and among payments to workmen and carpenters and others, occur several to labourers for "levelling the area of the garden with a roller."

In the reign of Edward I. further entries occur for keeping the garden, and for dressing the vines in the vineyard at Westminster, and of payment of the daily wage of 2½d. to "Roger le Herberur," "formerly servant to the Lord the King Henry, the king's father." In 1276-7, we find the king paying as much as £97.17s.7½d. to Master Robert de Beverley, keeper of the king's woods, "for divers necessary things . . . to make mews at Charing, and likewise to make the king's kitchen-garden there." Henry III.'s chief garden was at Woodstock, but he was not the originator of it, as there had been a garden there in the time of the second Henry. In it was the labyrinth which concealed the "Bower," made famous by the tragic fate of the "Fair Rosamond." A halo of romance and mystery hangs round this hiding place, but in reality labyrinths were by no means uncommon. There is evidence of the existence of labyrinths in very early times, and they, presumably, suggested the maze of more modern date. The first labyrinths were winding paths cut in the ground, and the survival of these is still traceable in several places in England. Of these, Saffron Walden, with its encircling ditch, is a most striking example. Camden describes one existing in his time in Dorsetshire, which went by the name of Troy Town or Julian's Bower.

In 1250, Henry III. improved the gardens at Woodstock for his queen. Among certain works which he commanded the Bailiff of Woodstock to perform, were the following:—"To make round about the garden of our Queen two walls, good and high, so that no one may be able to enter, with a

becoming and honourable herbary near our fish pond, in which the same Queen may be able to amuse herself;—and with a certain gate from the herbary which is next the chapel of Edward our son, into the aforesaid garden.” Again, on August 19th, 1252, the order was given to turf the “great herbarium.” The word herbarium may simply mean a place where herbs were grown, but in this case it seems as if it were used for “herber,” the old English word for arbour, which only means a shelter, or “harbour.”

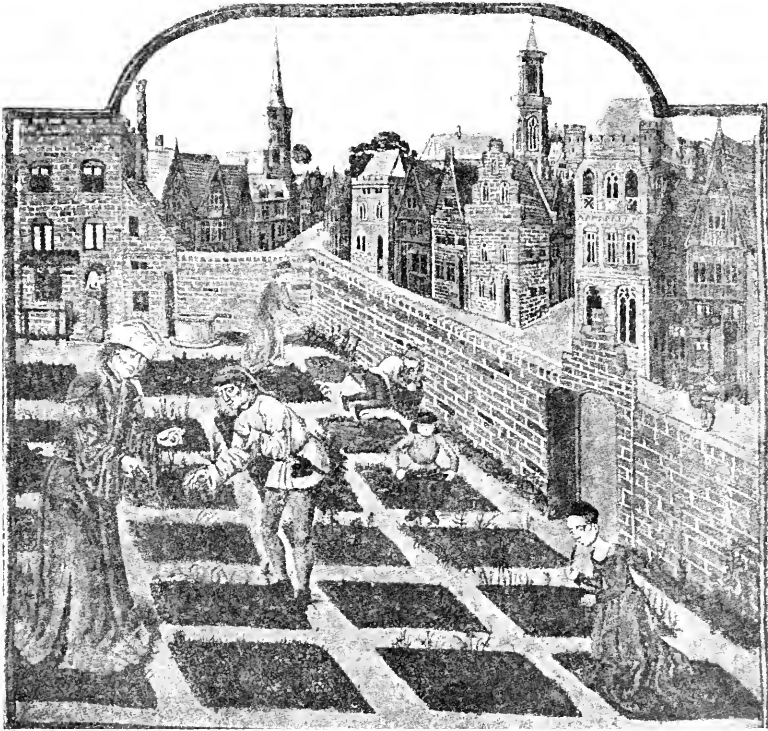
The same year, among other works at Clarendon the queen’s “herbarium” was to be “remade and amended.” This looks as if it was what is usually understood by an arbour, a covered-in place. There are many descriptions of such arbours in the fourteenth century, and it was the custom to turf them. The herbarium may, however, have been a small private garden, planted with herbs, with high thick hedges. The garden at Clarendon was enclosed by a paling, while those of Windsor and Kington were enclosed by a ditch. In 1260 more alterations were carried out in the garden outside Windsor Castle; the gardener’s house was moved, and a further wall built. During many successive reigns this garden at Windsor was kept up, and from time to time improved, and the orchard or vineyard was extended. Entries of the wages paid to the gardener and the vine dresser occur in many of the household accounts preserved in the Record Office. The gardener received 100s. a year, the labourers 2½d. a day. It is curious to note that the produce of these gardens was sold, and it seems to have been the exception when all the fruit was consumed by the king’s household. In 1332 there is the following entry among the receipts—“6s. 6d. received for the fruits and herbage of the king’s garden outside the Castle,” and other like entries occur. In “the account of Walter Hungerford, Knight, Steward of the Household of King Henry V. and Constable of the Castle of Wyndsore” (1419–22), “for any issues arising from fruits of the garden and vines of the king there in the two second years (*sic*) in the time of this account, he does not answer, for that the fruits of the said garden were delivered

to the Household of the Lord the King there, and the grapes of the vines there were eaten by the Ladies and others of the King's Household then being there, so that the same Constable had not and could not have any profit thereof, as he says upon his oath."

Besides the royal gardens at Westminster, Charing, and the Tower, there were others around London. We get a glimpse of the smaller gardens belonging to the citizens, from a description of the town by Fitz Stephen in his life of Thomas à Becket, whose contemporary he was. The passage (translated) runs thus:—"On all sides outside the houses of the citizens who dwell in the suburbs, there are adjoining gardens planted with trees both spacious and pleasing to the sight." The only other large garden near London, not belonging to a religious house, of which there is any record, is that of Henry de Lacy, Earl of Lincoln, in Holbourne. There is an account of all the manors held by the Earl in the year 1295-6. At all the places, lists occur of the produce sold, such as hemp, corn, beans, pulse, &c., but Holbourne appears to be the only garden of sufficient size to allow of the sale of any of its produce. At "Grante sete Manor," 7s.4d. was paid for cutting and cultivating the vines, but at most of the other large manors, such as Thoresby and Pontefract, there is no mention of a garden at all. The Holbourne accounts are most interesting, and show the wages paid to the gardener and labourers, the number of gallons of verjuice made from the vines, and the large quantities of pears and apples sold. Other varieties, probably more choice than those grown in the garden, were purchased and sent to the Earl, and slips of apples and pears were bought to replenish the garden.

Many of the pears mentioned in this and other accounts appear to be of French origin. The "caloel" occurs in other places as "cailloel" for "caillou," a pebble, so called, let us hope, from its shape and not from its hardness. The "pesse," or "passe pucelle" is also evidently French. The "S. Rule" pear was probably named after St. Regolo, or Rule, who was Bishop of Arles, and first Bishop of Senlis. Rochelle, in France,

was celebrated for its pears, and one year the Sheriffs of London imported some from thence to present to Henry III. Further information regarding these varieties of pears, and the prices paid for them, is to be gained from some other most interesting documents preserved in the Record Office. These papers are bills for the fruit bought for Henry III. and Edward I. at



A GARDEN IN TOWN FROM A FRENCH 15TH CENTURY MS.

different times. The earliest is probably for the year 1223; the beginning of the document is missing, but it is dated in the seventh year of some king unnamed. From the internal evidence afforded by the names of places and dates, it appears that Henry III. is the king. He was still a minor, and his movements during the seventh year of his reign are uncertain,

but the itineraries of all the other possible kings in their seventh year are known, and do not correspond with the dates in this document. The first entry is for April 20th, at "Pois," when six hundred apples, costing 12s., one hundred pears of "S. Rule," for 10s., and five hundred nuts for 2s., were brought from Paris. Henry was journeying towards England, and at each place, "Arenes," "Aberville," "Gart," and "Bolone," he was supplied with large quantities of fruit from Paris daily. On April 27th he was at Dover, and the apples, pears and nuts were still supplied daily until he reached London. The fruit was supplied to Edward I. at Newcastle, York, Pontefract, Berwick and various places in the North. This date was the commencement of the war with Scotland, at the time of Bruce and Baliol, when Edward held his parliament at Newcastle, and then at Berwick. It is curious to think that such great events should be the means of revealing the names of the best known pears of the period. We still find most of the S. Rule or "Regul pears," as they are written in this account, and they are bought in quantities, as in the earlier bills, the cost being usually 3s. per hundred, but sometimes only 10d. for the same amount. The pears which come next after the "Regul," in the frequency of the entries and quantities, are the "Calluwel" or "Calwell," and the "pas pucell" or "pase pucell," and we also find "Martins;" all these four sorts being also found in the Earl of Lincoln's accounts, the prices varying from 4s. to 8d. per hundred. Besides these, there occur "Dieyes" (or dreyes), "sorell," "chyrfull," and "gold knopes" pears—also apples, quinces, called "coynes," chestnuts, "chasteynes," and "great nuts." The only kind of apple specially noticed is the Costard. The name of this variety, which was the most popular of apples for many centuries, has been preserved in the word "coster-monger," originally a seller of this fruit. At Oxford, in 1296, the Costard apple was sold for 1s. per hundred, and the price of twenty-nine Costard apple-trees, in 1325, was 3s. It is spoken of by early writers as a distinct fruit, in the same way as Wardons and pears. Grosseteste mentions them as "apples and Costards." Another popular variety of apple was the

Pearmain. At an early date we find it being used for cider. In the sixth year of King John a certain Robert de Evermere held the lordship of Runham in the Hundred of East Flegg, in Norfolk, by petty serjeanty, by the payment of two hundred Pearmains and four hogsheads (modios) of wine, made of Pearmains, into the Exchequer, on the feast of St. Michael yearly. These were still being paid annually in the ninth year of Edward II. One other kind of pear, the "Janettar," is noted in one of the Wardrobe accounts in the thirty-sixth year of the reign of Henry III., as being bought with "sorells" and "cailloels" from "John the Fruiterer of London."

Besides these fruits, which appear to have been common there were a few choicer sorts, such as cherries, mulberries, medlars, and even peaches. If proof were needed that this latter fruit was to be had in England, we have it in the fact that King John, at Newark, in the midst of his despair and disappointment, hastened his end by a surfeit of peaches and ale.

The various accounts which have been quoted, although tedious from their sameness, are nearly the only trustworthy source of information about the fruits and gardens of this period. To supply such large quantities of fruit, there must have been extensive orchards. It is impossible to imagine that the fruiterer to the king procured the thousands of apples and pears required for his royal master, from France, although a few may have come from abroad. By the early part of the fourteenth century, many fine and old-established gardens and orchards must have existed in this country, and were being cultivated, not by the religious orders only, but under many secular owners of land. Gardens were being made around the various colleges at Oxford and Cambridge then coming into existence. Trinity Hall, Cambridge, had a good garden, with vines and "herbaria," within a short time of its foundation, and Peterhouse, a few years earlier. The gardens round London have already been noticed; something further about them might be gained by searching old leases. The following sample gives some idea of the number of gardens in one part

of London. It is a lease, dated 1375, for "A garden situate in Tower Ward, near the city wall, which John Seoh lately held; being between the garden which Geoffery Puppe holds on the North side, and the garden which William Lambourne holds on the South." There is no better proof of the great increase in the culture of fruits and vegetables than a discussion which took place between the gardeners in and near London and the Lord Mayor with regard to the locality in which they were allowed to sell the produce of their gardens.

It appears that for many years previous to 1345 the gardeners of the earls, barons, bishops, and citizens of London were accustomed to sell their "pulse, cherries, vegetables, and other wares to their trade pertaining, "on a piece of ground" opposite to the church of S. Austin near the gate of S. Paul's churchyard." By 1345, however, this fruit and vegetable market had grown to such an extent, and had become so crowded as to hinder "persons passing both on foot and on horseback," and the "scurrility, clamour, and nuisance of the gardeners and their servants" had become so obnoxious "to the people dwelling in the houses of reputable persons there," and "such a nuisance to the priests who are singing matins and mass in the church of S. Austin, and to others, both clerks and laymen, in prayers and orisons there serving God," that the mayor and aldermen were petitioned to interfere, and to remove the market to some more suitable place. The result of this petition was a meeting of the mayor and aldermen, and an order "given to the said gardeners and their servants, that they should no longer expose their wares. But the gardeners were not to be so easily defeated. They, in their turn, petitioned the mayor to reverse his sentence, and their petition runs thus:—"Unto the Mayor of London, shew and pray the gardeners of the earls, barons, and bishops, and of the citizens of the same city, may it please you, sire, seeing that you are the chief guardian of the said city, and of the ancient usages therein established, to suffer and to maintain that the said gardeners may stand in peace in the same place where they have been wont in times of old, in front of the church of S. Austin, at the side of the

gate of S. Paul's churchyard, in London, there to sell the garden produce of their said masters, and make their profits as heretofore they have been wont to do, seeing that they have heretofore been in the said place unmolested, and that as they assert they cannot serve the commonalty, nor yet their masters, as they were wont to do. As to which they pray for redress." But the mayor would not give way at first, though it appears that he afterwards held "a conference between his aldermen," at which it was agreed that "all the gardeners of the city, as well aliens as freemen, who sell their pulse, cherries, vegetables, and other wares aforesaid in the city, should have as their place the space between the south gate of the churchyard of S. Austin's, and the garden wall of the Friars Preachers at Baynard's Castle, in the same city, that so they should sell their wares aforesaid in the place by the said mayor and aldermen thus appointed for them, and nowhere else."

The National Park of the Abruzzi^{**}

By Luigi Parpagliolo
Of the Fine Arts Directorate of Italy

I



PROFESSOR PIROTTA, of the University of Rome, has launched through the instrumentality of the Federation Pro Montibus a plan for a national park in the Abruzzi, and has done it in a simple yet eloquent form worthy of a man of science of the good old time when it was a matter of pride to clothe a scientific conception in a literary form and to animate it with artistic sentiment. To many, to most perhaps, in Italy the words "national park" will sound new; to many, also, will appear strange in the unhappy days that we are traversing—and during the hard trials especially to which ancient woods and sylvan shades and smiling parklands have been subjected these last years—the eloquent and poetic words in which Professor Pirotta tells of the beauties of nature, and the noble idealism of his plan for preserving them from further destruction. To me it seems, however, that the proposal for this national park has come at a

* Reprinted from the *Nuova Antologia*, May 16, 1918, by the Federation Pro Montibus, an association for the establishment of national parks and for the protection of the Italian flora and fauna.

It is a pleasure to print this as a record of the first Italian effort to set aside for the people a tract of land for the enjoyment of all and which, as custodians of the beauty of nature, we have no right to allow to degenerate through private caprice or greed. Readers of the JOURNAL will remember Mr. George B. Dorr's account of the Sieur de Monts National Monument near Bar Harbor, Me., the establishment of which was due to his efforts. His interest in this work has led him to kindly translate for the JOURNAL this account of a similar attempt in Italy.—ED.

truly opportune moment, when the discussion of an object of such kind was needed to raise up our national spirit, too much embittered and cast down by unmerited disasters; and because it is a work of wisdom in the midst of vast destruction, be it wrought by an enemy or imposed by necessity, to save what one still can of natural treasures "that are truly," as writes Professor Pirotta, "the artistic and scientific patrimony of our nation."

The idea of a national park in Italy is not new. Publicity was given it some years ago by the Swiss commission for the protection of natural beauty and our own Government in connection with a plan for the establishment of a park to the north of the Valtellina, and east of the Bernina Mountains, in extension of that splendid and recent park creation made by Switzerland in the Lower Engadine. But nothing came of it finally. And this perhaps was well; for, placed there, alongside of a greater park of similar character beyond our border, such a park would have added little of independent value, the aim of the Swiss commission in proposing it being one rather of practical advantage, to protect their park against Italian poachers.

The idea of a national park, however, was not abandoned. It remained in the minds of a number of our leading men of science as a germ in good earth, awaiting favorable conditions to sprout and grow. Early in the year 1913 a national league for the protection of nature monuments, similar to that in Switzerland, sprang from the initiative of the Italian Botanical Society, and although it also led to no result it kept the idea alive. Nor, indeed, could Italy remain passive in the presence of the world movement for the protection of the flora, the fauna, the geological documents, the beautiful and significant aspects of the earth, threatened with inexorable destruction—a movement spreading through all the civilized nations of the world from Europe to America, which the war has suspended but has not suppressed and that once peace is made will retake its course with added vigor. One of the pioneers of the movement, the leading one perhaps, certainly the one who speaks

with the greatest authority and has taken the most active part in it in Europe, is the eminent Swiss naturalist, Paul Sarrasin: "Upon the heels of the geographic exploration of the earth," said he at the International Congress of Geologists at Graz in August, 1910, "which may be looked upon as ended, has followed with gigantic strides the impoverishment of its riches, and the destruction of its living beings, attacked in their happy and obscure existence. Industrial vandalism, sweeping the world, has disturbed everywhere the natural associations of living things, sacrificing to the greed of men and temporary gain the exquisite and splendid beauties of our hospitable earth." And in the name of posterity, who will one day anathematize us for having left them desolation for an inheritance, he invited the naturalists of the whole world to abandon books and laboratories and run to the defense of nature, in ever greater danger: "Awake!" he exclaimed, "The world is conquered; let us provide for its preservation."

The proofs he brought to this congress of the wasteful and systematic ferocity with which greedy speculators pursue, year after year with ever greater fury, the destruction of precious animals to obtain from them oil, skins, ivory, feathers—objects, in general, not of need but of luxury—were indeed appalling; and it was in reference to these, and others scarce less tragic relating to the destruction of the flora—the Alpine flora especially—by florists, by collectors, by conscienceless botanists, that the congress voted to establish an international conference on the subject in which all civilized states should be invited to participate officially. This conference took place, on the invitation of the Swiss Government, at Berne in November, 1913, Italy participating through the medium of her diplomatic minister. An international congress for the protection of nature resulted from it, and engagements were entered into by the states most deeply interested.

Among the various representatives who attended it was Professor Hugo Conwentz, Director of the Museum of Danzig, who described the truly splendid organization that he—first on his own initiative and then as head of an official commission

established by the government to make a study of the natural beauties of Germany—created for the protection of nature, distributing the work in various branches; geology, water courses, botany, zoology, and prehistoric antiquities. He founded associations which extended beyond the Empire into all countries where German was spoken; distributed questionnaires by thousands; promoted regional and general congresses; published illustrated documents rich in plant topography—created, in fact, such a movement of ideas, activities, and provision for the future, such an atmosphere of living interest in the protection of nature, or rather of the “Native-land” (Heimath), from which one of the most powerful associations took its name—as to set in motion an undertaking for the establishment of three great national parks, similar to those already long since established in the United States of America. According to this plan, three great tracts were to be set aside, one in the south, among the Alps, the second in central Germany, a third in the north, in the heathlands of Luneburg, with the intention of preserving, or reintroducing, in them the native animals of Germany, such as the beaver and the wild ox.

II

This idea of national parks showed itself, at once, to be the most practical and efficacious way of rescuing from total destruction a number of races of animals and species of plants, of preserving intact characteristic geological features, of preventing the destruction of certain unique aspects of nature which have claimed, and will always claim, the attention of men in an almost religious sense.

The more widely this idea has spread, the more clear it has become that legal enactments alone are not enough. The Canton of Soleure in Switzerland established in 1894 a fine of ten lire (\$2) for the benefit of the schools of Oltingen, against the gathering of *Daphne Cneorum*, *Daphne alpina*, and *Linaria rediviva*; similar provision was made in 1903 by the Communal Council of Schwytz to prevent the extirpation of *Rhododendron ferrugineum* on the Righi, and by the Councils of Andelfingen

and of Bex to prevent that of *Pyrola umbellata*. In Bavaria severe penalties were established against picking Edelweiss. In the Island of Borneo, in certain districts, it is forbidden by a law passed in 1895 to gather orchids under penalty of a fine of \$500. And similarly, for certain species of animals that are continually becoming more rare to the point of extinction, penalties against hunting, of more or less severity, have been widely established. But none of these have proved sufficient. The Proclamation of 21st September, 1821, by the Government of Sardo to secure the conservation of the wild goat did indeed result in protecting that precious ruminant of the Alps in the Val d'Aosta, but we do not know how large a part in this was due to the fact that this animal was always held to be game reserved for the Princes of the House of Savoy, and whether the Royal Preserve of the Gran Paradiso did not give more protection than the law.

In England they have laws that prohibit the destruction of wild birds, but these not proving sufficient, various organizations have united to acquire island shelters where the safe nesting and reproduction of the migratory birds may be secured.

In its colonies, more especially in central Africa, the English government has had recourse to an indirect means to save from destruction animals whose species are threatened with extinction: it has imposed a very high tax on hunting permits, which limit moreover to but very few the animals that may be hunted. And in the United States, where special reserves were established many years ago at the expense of the government to preserve the last remaining bison, a proclamation by President Roosevelt in 1903 created the Federal Reserve of the Pelicans along the Indian River on the eastern coast of Florida, to preserve the existence of the black and white pelicans. Individual species, it is true, may be protected now and again by legal enactments but the primitive aspect of nature produced in the course of centuries by the reciprocal action of indigenous plants and animals can only be safe-guarded, even approximately, in regions as yet undisturbed by man or but slightly altered, by the establishment of absolute protection

in a complete reserve, a sanctuary for every living form created by nature that belongs to it and has been saved to our time; thus only can we hope that native life threatened by the intervention of man can be preserved and continued on to future generations.

From such reflections sprang the conception of the Swiss National Park of the Lower Engadine, which became a fact in 1913. It had however antecedents—in America especially, where the so-called “practical” people have not launched, as with us, their bolts against the sentimentality of those who believe it necessary that the interests of art and science should once in a while be preferred to those of material advantage. In the United States it was sufficient that certain travellers like Doane, Langdorf, and Hayden should send to the Federal Government enthusiastic reports on what they had seen in the regions bathed by the springs of the Yellowstone and the Missouri for a law to be passed—approved by Congress on the first of March, 1872—proclaiming a national park a stretch of territory 55 miles by 65 miles, “which,” it was stated, “during a relatively recent geologic epoch has been the seat of the most tremendous phenomena recorded in our country.” This Region of Wonders, as it was called, would speedily have been taken possession of by speculators—so the account goes on to tell—if by this admirable act of legislative foresight it had not been consecrated to the benefit of science and the enjoyment of the people.

But America did not stop here. After the institution of the Yellowstone Park, Lord Dufferin, the Governor-General of Canada, interested himself in the threatened impoverishment by industrial use of the Falls of Niagara, and suggested to his colleague of the State of New York the acquisition by the two governments of the lands along the river, on both sides; and to this the sum of 300,000 pounds sterling was devoted. More recently, these same United States, again to prevent industrial exploitation, acquired the wonderful Petrified Forest of Arizona, making it also public property. In sequence to this yet other acquisitions were made, till today

the Federation counts twelve national parks, besides those created at their own expense by individual states, as New York, Pennsylvania, Colorado, California, and Michigan, in their regions of greatest interest.

III

This proposal then of a national park in Italy—and of one especially in the Abruzzi Mountains “where,” as Professor Pirotta says, “the beautiful name of our country first appeared; where all is Italian and all proclaims the greatness, the energy, the art of our ancestors; where the highest mountains of the noble Apennine range raise their summits, to descend in lesser peaks and mountain ranges toward one and the other of the two Italian seas”—is but the expression of a great world movement and must be carried out if Italy is not to fall behind other lands in culture and civilization. But now comes the practical question: How can we preserve this territory? How can we institute this park of the Italian people? Let us see what others have done; what, to take a concrete example, was done in our own neighborhood and under similar conditions by the Swiss commission for the protection of natural beauty.

One of its members drew the attention of his colleagues to that portion of the Lower Engadine traversed by the River Inn which includes on the one side the Scarl Valley with its wild lateral branches and on the other the great mass of the Quatorvals, and the commission, led by Sarrasin, took a daring step; it leased, on the 31st of December, 1909, from the Commune of Sornez for the duration of twenty-five years, the wild valley of Cluoza, for a stretch of 25 kilometers, and so laid the cornerstone of the future national park. Following this, it commenced negotiations with five other communes with the object of enlargement and nine months later, in September, 1910, Sarrasin was able to announce that the work would be complete within the following year.
“You may ask me,” he said to the Congress of Graz, “with what courage do we commence such an undertaking, one which

will exact without doubt many and large resources." My answer is: "Not with courage, but with the faith that conquers every obstacle."

To procure the necessary means he instituted a Swiss "League for the Protection of Nature," with dues of one lira a year for each associate. Faith worked its miracle; the associates increased to 9000 in 1910, to 26,000 in 1913, to 35,000 ultimately. The moral influence alone of a league so numerous, including people of every sort and condition, scientific, literary, artistic, and political, could not fail to incline the government favorably toward its project. Speedily the interest of members of the Federal Council was secured for the establishment of a great Swiss reserve in the Grisons, the canton of the Engadine, and when in June, 1912, it was decided to ask of the government a subsidy of 18,200 lire to pay the stipulated rental to the commune of Zernez the cause was already won before the federal council, which hastened to make the project of the national park its own. The legislative chambers did the rest.

Is it then best to follow the same course in Italy? It has already been entered on, but the coming of the European War arrested the propaganda which was a necessary preliminary. Let us recommence it; we are still in time.

Paul Sarrasin has stated that the Swiss league succeeded in raising 35,000 lire a year—or, better, in obtaining 35,000 associates paying each a lira annually; Italy with its far greater population should be able to enroll ten times that number. Numbers apart, however, there are in Italy certain associations that have become most powerful—the Alpine Club, the Touring Club, and others, whose associates pay dues far greater than a single lira, and, without seeking to infuse more active life into the national league for the protection of nature monuments, the Federation Pro Montibus that has now taken the lead with regard to the national park should be able with the aid of these to carry on the noble work and secure the necessary financial means, first from the government, then from the communes, the provinces, the institutions of credit, the chambers of commerce, the art associations, all in a word who have

at heart the welfare of the nation. The sum required is not great, for the plan is to follow for the present the Swiss system of long leases of the communal and provincial domains and private woodlands included within the intended bounds.

Does this seem visionary? But is it visionary to think that a nation of thirty-six million inhabitants can find within itself the resources to accomplish a work of high civilization at the center of its territory?

I have not sought to lay out a mathematically exact scheme but rather to set forth an idea that can be discussed, corrected, dropped perhaps in favor of other and better ideas—more practical, better fitted to the end. The problem of the National Park in the Abruzzi lies before us; in some way it must be solved if we are not to remain alone among the nations in not adopting this new form of conservation—the conservation of natural beauty and of opportunity for scientific study.

Such an undertaking, too, must promote a new development in the Abruzzi country, in that part of it at least which has the good fortune to find itself within the boundaries of its national park. It will become the goal of men of science, of tourists, of nature and landscape lovers; and summer resorts of the first order will spring up in it. Moreover, one of the duties of whoever is called to direct and administer the park will be precisely this, to arouse in all who visit it the eager desire to bring to it the greatest possible number of persons who now go elsewhere to seek green spaces, silence, health-giving air, the restful and consoling view of natural beauty. Thus will cease to be unknown one of the most beautiful regions in Italy, and the strangers who after the war—in greater numbers than before—will come in pilgrimage to enjoy our sun and admire our art will not pass directly, as they do today and have for centuries, from Rome to Naples, but will turn aside toward the center to behold the wonders enclosed in our national park, and pass from it upon their southward way.

Onward then! The undertaking is worthy of an association such as the *Pro Montibus* which includes within itself men of the highest standing in the political and administrative life

of the nation, and whose executive council has given so many proofs of active energy in recent years and is presided over by a man of the highest organizing ability, tenacious and cultivated, the Hon. Miliani, Minister of Agriculture—the man who went in 1907 to see with his own eyes the Yellowstone Park and published an enthusiastic and most instructive description of it in the *Nuova Antologia*, where it may be found in the May 1st issue of 1909.

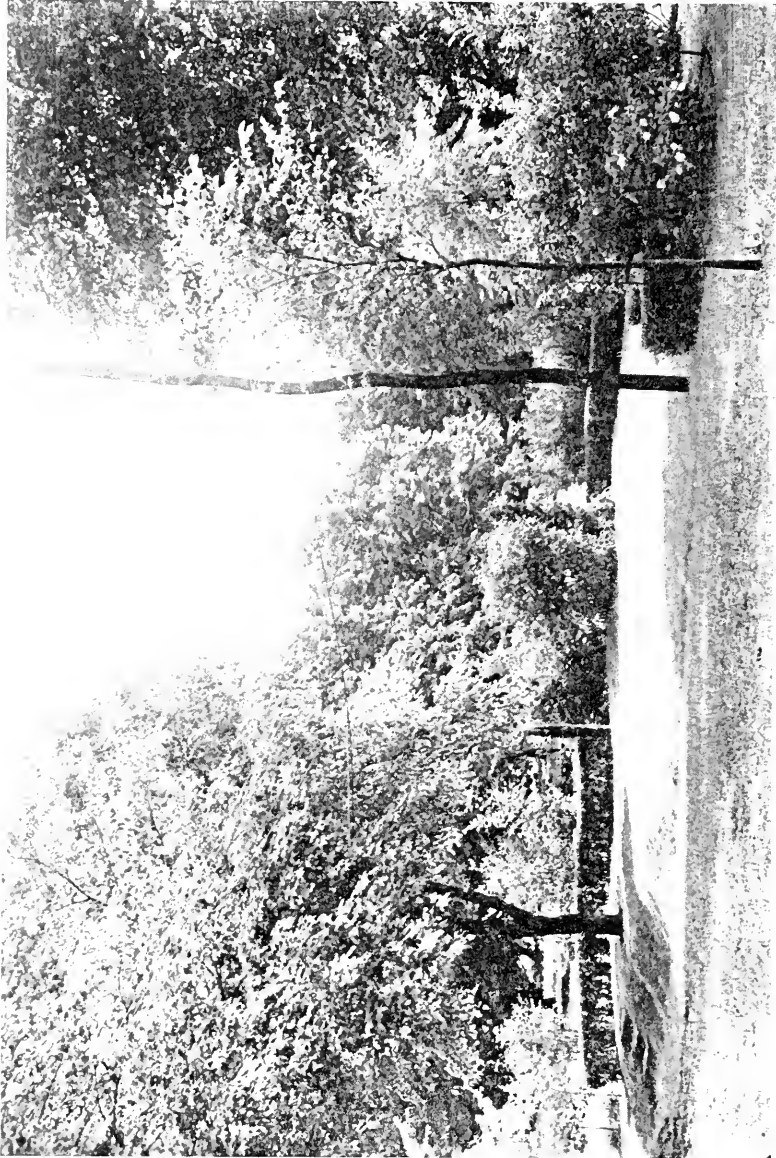
Outdoor Theatres

By Arthur Westcott Cowell



THE open air theatre was well presented in the June, 1918, JOURNAL from two contrasting points of view as regards design: the classic Greek theatre which by its stern regularity and architectural feeling may be classified among other refined formal landscape treatment and the typical sylvan theatre so rustic as to be undefined by line of stage or wings. These are two extremes, both excellent, and entirely correct in ideal and design. There is a possibility, however, that the one might not serve the purposes and needs of the other from the mere fact of the strong character of the theatres themselves—which would in the one case prove too classic for many a pageant or rustic scene and the other entirely too “woodsy” for an act portrayed as upon a village common or in city yard or park. It is exceedingly difficult for many of an audience to forget the external surroundings of a character portrayed upon the stage in interpretation of a scene or act. Properly, a park should boast of two garden theatres, the one for classic plays and conventional kind of scenes, the other for Indian plays and woodland scenes, and it might be that an enthusiastic audience would follow the play if necessary from one stage to the other as the play might demand a change of arboreal setting.

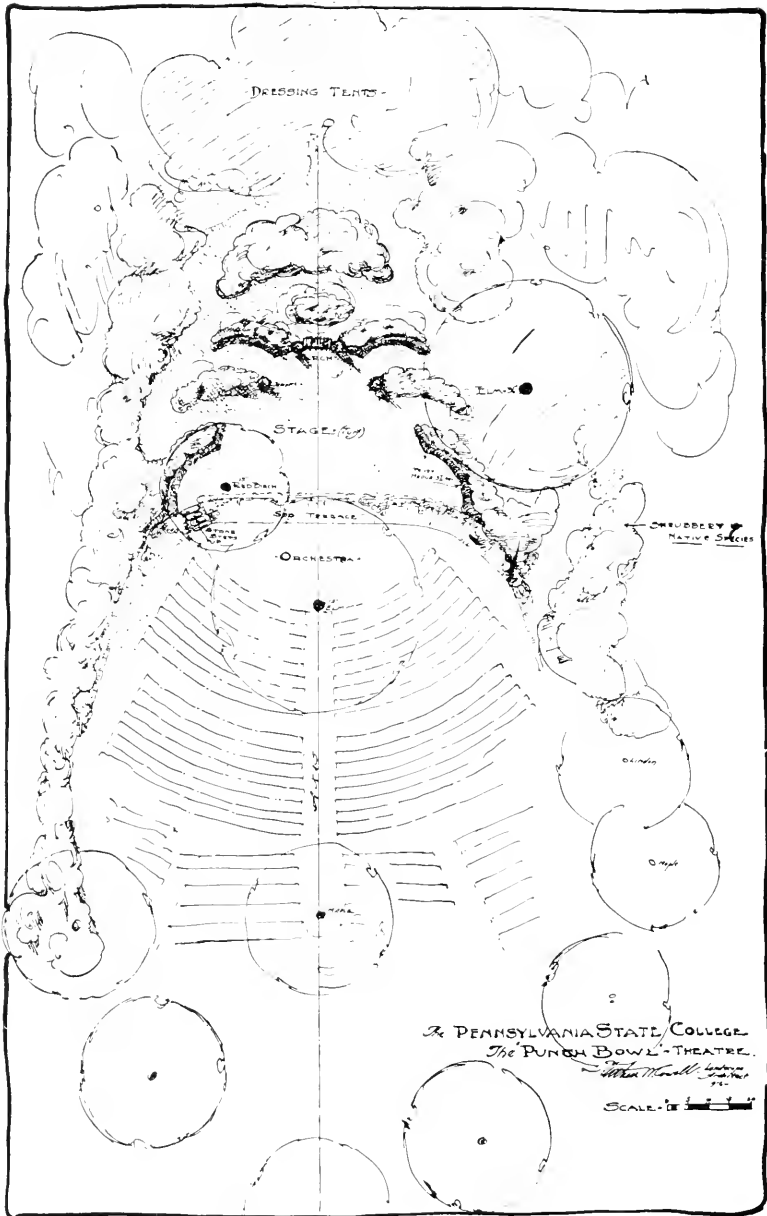
If, however, we are proposing a single out-of-door space for presentation of plays, and that is as many as most places will ever possess, it would seem quite possible that a theatre laid out in the extreme correctness of either school of design—formal or informal—might upon occasions be quite unsuited and that one designed with less emphasis either one way or the other would err less and prove the most useful and adaptable. Its



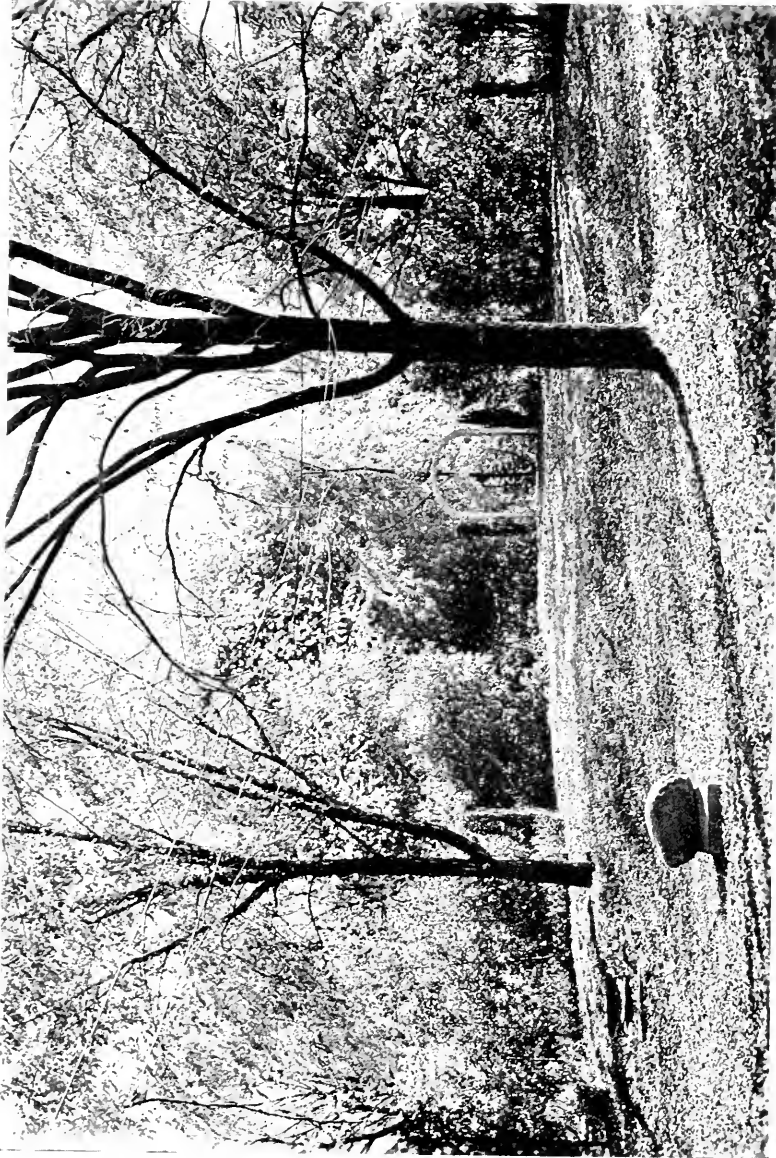
THE STAGE DEFINED BY SHEARED HEDGE—
THE MOST FORMAL LINE IN THE PLANTING

very lack of strong character would assist the imagination of the audience. Such a theatre would partake of the atmosphere and the delightful repose and refreshing spirit one finds in an English landscape—not the severity of the formal garden nor the wild rusticity of the woods. A refined use of foliage *en masse*, regular lines of foregrounds and ground lines, or a recognition of the necessity of the players—and the comfort of the audience—these would be the consideration for a players green.

Herewith is a plan and a picture of a transformed quarry hole upon the Campus of the Pennsylvania State College. It has been used for a multitude of out-of-door meetings of various sorts—amateur theatricals and professional Shakespeare, childrens folk dances, and religious gatherings, class day orations, and band concerts—and thus far not one has seemed out of place or presented amidst incongruous scenes. There are no limits to its practical uses—except weather! In my design it was intended to secure an effective background and side inclosure. This background immediately affords by its screen a place for dressing rooms “behind the scenes” which might be a permanent structure but we use tents. The players are accommodated with stage entrances so laid out by beds of shrubbery as to secure a waiting actor against premature view by the audience. These wings are successful practically, and aesthetically they lend perspective and depth—or apparent extent—to the open green turf of the terrace stage which they flank regularly upon both sides. They are balanced in formal fashion but that is all. They are integral parts of an inclosing mass of verdure and their formal arrangement is not severe. Neither is the informal character of the material noticeable. Rather does it melt into and belong with the refined campus lawn of which in reality it is a part. The gray green foliage of *Lonicera* and *Rhus*, silver-maple and willow predominate, with a brightening of red cornel bark and dullness of alder foliage. Piquancy is afforded by a border of sharp leaved *Yuccas*—and a touch of stage refinement and design given by a line of sheared privet hedge and a white rose arch. The foot lights are concealed



THE PUNCH BOWL THEATRE
PENNSYLVANIA STATE COLLEGE



THE STAGE A YEAR LATER.
A CHARMING BIT OF LANDSCAPE
ONLY SLIGHTLY CONVENTIONALIZED

by leaves at top of the grassy terrace slope—and top lighting frankly strung from nearby large trees. The audience is shaded by tall branching elms and the view to the rear screened off by low branching maples, horsechestnuts and spruces.

This theatre is therefore neither classic nor rustic—it is an informal-formal lawn arranged for a particular use. It is always reposeful in the landscape, always charming and interesting with or without the player folk. It suggests a most practical device for a college campus or a public recreation park; it should be provided in every high school yard and in rural village greens, which is possible because it is not costly—in construction or maintenance. It comprises good turf, a little terrace for the players and grading to seat the audience, a massing of native shrubs, trees and evergreens, and a bit of wiring. It requires some planning—very little construction, and only the care bestowed upon any ordinary shrub-bordered lawn. *That* is a simple auditorium in the out of doors.

STATE COLLEGE
PENNSYLVANIA

*A Sussex Rock-Garden**

By F. J. Hanbury, F.L.S.



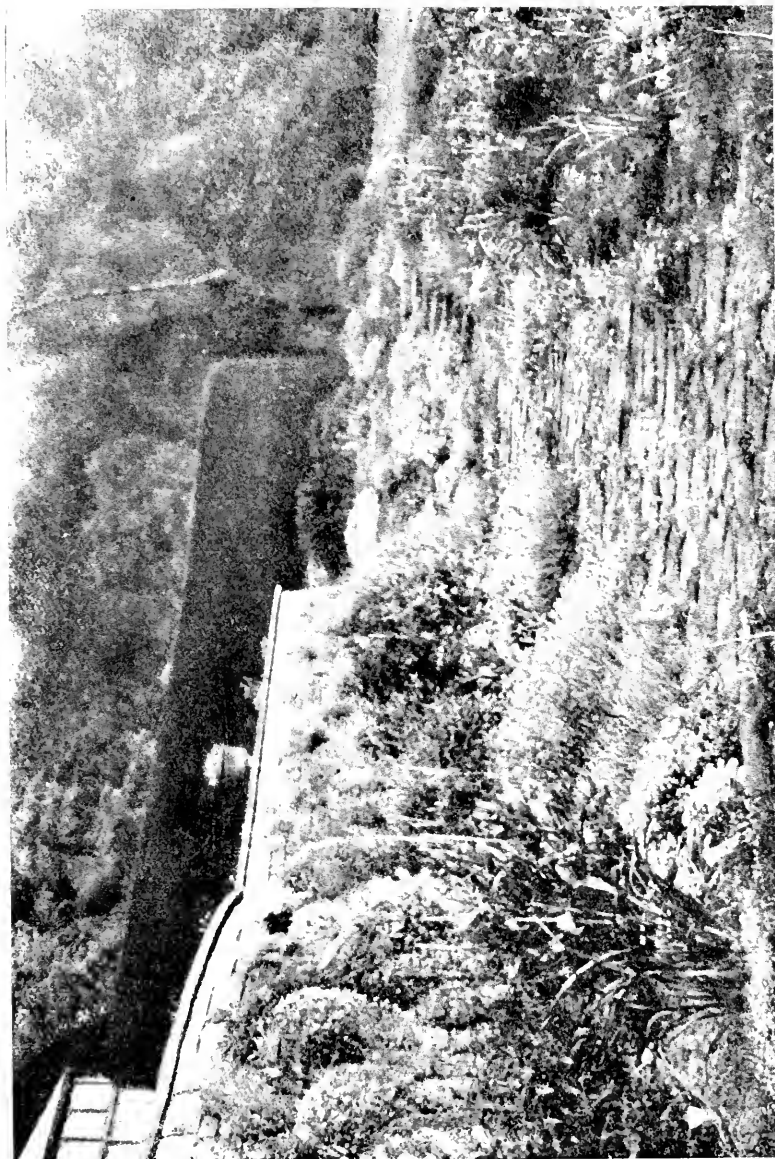
DO not propose to take up much of your time with preliminary remarks. It is necessary, however, to say a little about the locality, altitude, geology, and climate of our district, in order that you may the better understand the conditions under which we have constructed and carried out the planting of the Rock-garden.

East Grinstead is in Sussex, about two miles from the Surrey border. The town is situated on a hill about 460 feet above sea-level. It is on the London, Brighton, and South Coast Railway, about thirty miles from London, and the journey takes an hour, East Grinstead Station being a junction from which trains run in four directions. I mention these points merely to show that we are easily accessible from the South-Eastern Counties.

Brockhurst is the name of my small estate, and it is situated nearly a mile south-east of the town, on the Lewes road. This road forms the north-eastern boundary of my land, from which the naturally undulating ground slopes by a fairly steep gradient to the south-west.

The range of hills on which we are situated stretches in a more or less broken line from the neighbourhood of Tunbridge Wells in the east to beyond East Grinstead in the west. The ridge runs parallel to the great chalk ranges which form the North and South Downs respectively, and is almost equidistant from each. The rock of which this ridge is mainly composed, and which shows itself in imposing outcrops at various points, is of a porous nature, and is geologically known as Lower

* From a lecture before the Royal Horticultural Society, and reprinted, with permission, from their *Journal*.



WALL AND PLANTED PATH
BROCKHURST, EAST GRINSTEAD, SUSSEX

Tunbridge Wells sandstone, a rock which has proved admirably adapted to rock-garden purposes.

The site of the Rock-garden is a rounded hill with a steep escarpment towards the north-west. When we went to Brockhurst eight years ago, we had no idea that within a few feet of the surface of what we called the "Banky Meadow," in which our cows grazed, there was a mass of solid rock some 30 feet thick. In fact, we had just previously bought many tons of very similar stone from a quarry four miles away, when making our first Rock-garden. This was situated on a wet grassy slope below the lawn, and descended to the upper of a succession of four ponds that flow from one to the other down a small natural glen. We soon discovered that the wetness of the bank was due to a large spring rising from the natural rock below, and as soon as the spring was enclosed in cement walls we had a fine flow of beautiful clear drinking water, which, at its source, appears to have a uniform temperature of about 51°F. throughout the year. This stream was conducted in a winding channel through this first Rock-garden, so as to form miniature waterfalls and pools, and ultimately descend into the head of the pond. The flow is sufficient to keep all the ponds fresh, so that trout breed and flourish in them, and attain to a considerable size. We are fortunate in having five or six natural springs, and there is a large one in our Wilderness on the other side of the new Rock-garden that is sufficient to work a ram, which pumps water to our reservoir a quarter of a mile away in sufficient quantity to supply all our needs both for house, garden, laundry, etc. I hope to make good use of the two or three smaller springs later on.

But to return to the Rock-garden. It was not until we were planting some new Rhododendrons at the edge of the "Banky Meadow" that my gardener discovered that he had come on to a piece of rock. After getting this out, we found that there was more underneath. This discovery suggested the idea of making a small Rock-garden close at hand by taking a small piece off the field; but I must shorten a rather long story. As we proceeded our ideas grew as more and more rock was found,

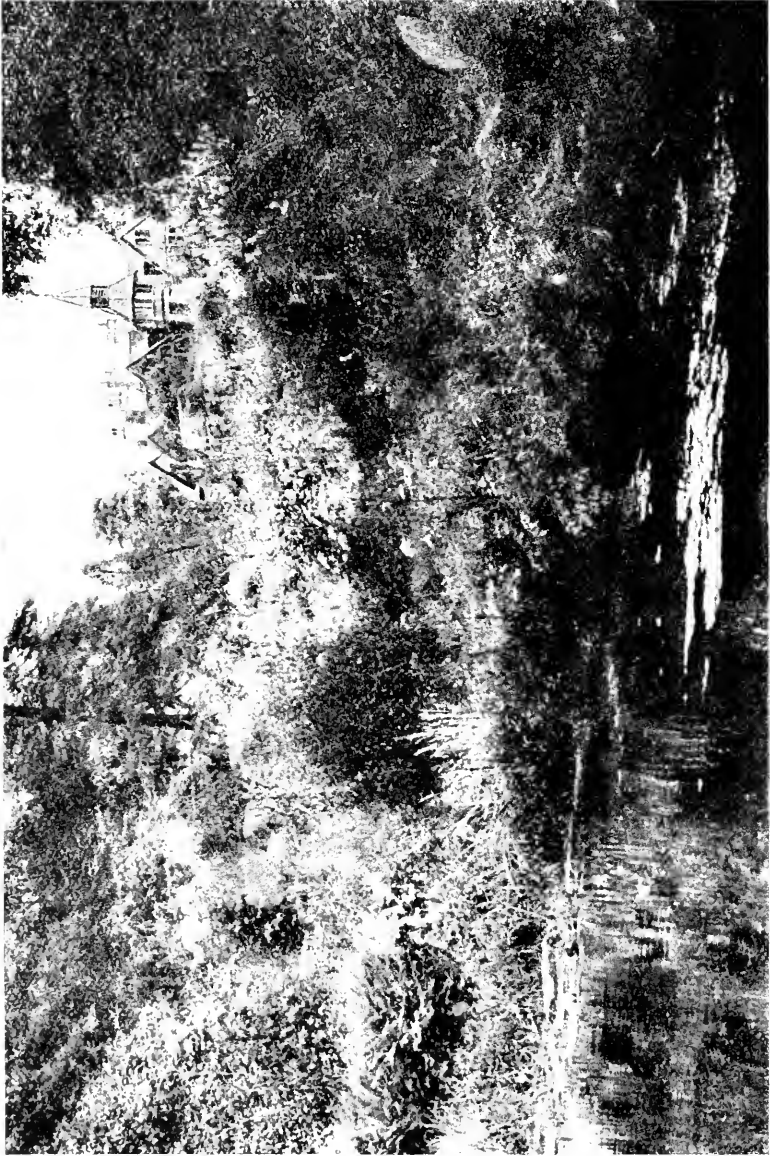


LAWN AND UPPER POOL FROM
WEST SIDE OF HOUSE

but before we were able satisfactorily to complete our increasingly ambitious designs we ran short of rock at the spot where we were working. This led to making boreholes towards the top of the hill to ascertain if there were rock there also, and it was the discovery of an almost limitless supply of rock here that led to our gradually making a deep pit or quarry into the hill, from which we raised great masses of stone to the surface, at first with Jim poles and a pulley, but later with a large crane. The stones, when brought to the surface, were guided down the hill on wooden rollers, which ran over a track made with boards. As the Rock-garden below the hill grew, and in doing so gradually approached nearer to the quarry, so the size of our excavations grew. It was then that the idea occurred to us of cutting right through the intervening ground, and making a winding ravine leading from the Rock-garden we were constructing to the quarry itself, and incorporating the latter into our scheme. I have entered into these details to show you that, although begun with very modest ideas, the general plan developed as we went on. The work of construction took four years.

Before passing on, I must mention my indebtedness to Mr. Bowles for the valuable hints and suggestions he was good enough to make, both at the commencement of our work and later, when he and Mr. Reginald Farrer helped with their advice in making the moraine-garden, of which I shall say more directly.

It is superfluous to occupy time with much detail as to the general principles on which a Rock-garden is built. These can be obtained from the many excellent books on the subject. The more novel features in the Brockhurst Rock-garden are the natural cliffs of solid rock and vents that abound, both in the ravine and the quarry. The first and lower portions were made in the usual way, and on the general principle of cutting wide sunken paths in the ground, and throwing up the earth thus dug out to form banks on either side. The poorer soil forms the core of the bank, the better soil being retained for the surface, which is then rocked upwards from



VIEW FROM THE UPPER POOL
LOOKING TOWARDS THE HOUSE

the bottom, care being taken that each stone placed is firmly supported by one or more below it. The rocks are also slightly tilted towards the bank, so that rain falling runs towards the banks and among the roots of the plants, and not away from them leaving the plants to perish from drought.

These introductory remarks would be incomplete without a brief reference to our climate. I will not burden you now with much detail, but my astronomical assistant, Mr. W. S. Franks, F.R.A.S., has prepared a careful account of the meteorology of our neighbourhood. We are in the habit of sending our records weekly to the local paper, and annually to Dr. H. R. Mills for his "British Rainfall."

The Brockhurst Observatory is equipped with the usual six thermometers, the sunshine recorder, and the rainfall gauge.

Owing to the topographical configuration of Brockhurst, with its downward slope towards the south and south-west, and through being protected by rising ground to the east and north-east, it is more sheltered than many other places in the immediate neighbourhood. It has frequently escaped the effect of frosts which have done serious damage at East Grinstead and Forest Row, on either side of it, and it also escapes some of the heavy rainfalls which sweep along the line of the valley, especially during thunderstorms.

As regards temperature, our observations prove that, as compared with Greenwich, we are a few degrees warmer in the winter months and cooler in the summer months, and compared with the Greenwich records we have over 12 per cent more hours of bright sunshine registered at Brockhurst.

Now as to rainfall. The drainage area is that of the river Medway, which includes some of the wettest districts in Ash-down Forest. East Grinstead fortunately possesses a rainfall record of its own for the last twenty-six years, the mean annual value of the local rainfall being 31.99 inches—which may seem a large amount when compared with the Greenwich average of about $24\frac{1}{2}$ inches.

From the above facts it will, I think, be obvious that our local meteorological conditions should prove very suitable for



A ROCK ROSE AT HOME
CISTUS PURPUREUS

growing many tender plants which cannot be grown in less favoured districts. There is little doubt, however, that we shall sometimes have a winter that will either cut down or totally destroy many plants that we have succeeded in growing during the last few years.

Close to the Observatory is the Heath-garden, which runs round the summit of the hill from which one sees in the distance Ashdown Forest. There is a large number of varieties of heaths in this collection, whilst the carriage drive is bordered by Cornish heath, which I understand was brought to Brockhurst about forty years ago by a former owner. It now forms a dense bank, and is a striking feature of the place in the autumn.

The portion of our house facing west has a terrace and small Rock-garden below it. The stone for this little Rock-garden was derived from the excavation we had to make into the hill when space was cleared for building the new dining-room and terrace, and below the terrace wall is a rocked path in which a number of plants are growing.

The terrace wall itself is the home of many plants we put in while building it seven years ago, and they have thriven well ever since. On the steps is a fine growth of *Erinus alpinus*, in three colours, pink, mauve, and white.

The view down the lawn from the top of the steps just referred to includes the upper pond, and a fine spring rising from here, flowing through the Rock-garden below the lawn, keeps the water in the ponds thoroughly changed. The slope of the lawn has groups of Rhododendrons upon it, and out of the northern slope of this hill the new Rock-garden has been made. On the lawn, our British *Spiranthes autumnalis*, the sweet-scented Lady's Tresses Orchis, grows abundantly, being a native here. Five or six other species of Orchis are to be found wild on our ground.

At the upper end of the top pond many water plants grow behind the stepping-stones, among them *Sonchus palustris*, a fine British plant that used to be found in the reed-beds of the Thames about Plumstead, and also up the Medway. It



POOL NEAR MIDDLE OF ROCK GARDEN
CARDUUS HETEROPHYLLUS IN FOREGROUND

is now nearly extinct. It attains to a height of ten or eleven feet. Near the stepping-stones also grow water-lilies and Richardias. The latter have been in the pond for several years, and are never taken up in the winter. The clumps have increased and flower freely.

Among the trees in the Wilderness is the large spring, from which there is a fall of twenty-five feet to the ravine we have already mentioned. A little valley running into the Wilderness has a small spring of its own, in which some interesting Carices, Cotton-grass, etc., have been planted, whilst moisture-loving plants, such as *Primula japonica*, thrive higher up the banks. In this part of the wood I have introduced the beautiful *Myosotis sylvatica* collected in Teesdale. May I recommend this as a woodland plant well worth growing? It is of a very attractive light-blue colour with a yellow eye, and does not require the same amount of moisture as some of the Forget-me-nots.

We now turn to the Rock-garden proper, but must mention a rather serious set-back that occurred shortly after we had begun the building of its upper part. After very heavy rain-falls, we found that the large stones at the base of the artificial mound which we had constructed were slowly moving towards the edge of the quarry, and after watching this movement for some time with considerable anxiety we saw that the position was hopeless, and after another heavy rain a vast quantity of stone slipped right over the edge of the quarry and crashed down below, breaking all the fine rocks to pieces. This necessitated digging out a quantity of soft layers of clay and rock, and rebuilding this portion with reinforced concrete, and facing it with stone. The accident retarded the work for two or three months. It is extremely fortunate, however, that it happened when it did, and not later on, when all our tackle had been removed and the site covered with plants.

A fine thorn marks the commencement of our work of planting, and it is from under the far side of this thorn that the Rock-garden is entered from the bottom. Beneath its shade a group of the true British Oxlip, *Primula elatior*, grows. This, as probably many of you know, only occurs in the neighbour-



STEPS TO THE MORaine AND
PATH THROUGH RAVINE TO CHIASHI

hood of Saffron Walden and Bardfield over a small area, partly in Essex and partly in Suffolk. The plant that is found in many places throughout the country, and commonly called the Oxlip, is a hybrid that occurs very frequently between the Cowslip and Primrose, and is quite distinct from the true Oxlip, which is a good species. The heads of Oxlips always grow to one side, and the species has a much less inflated calyx than either the Primrose or Cowslip.

A small side-path leading from under the May Tree passes out to the edge of the Rock-garden, and a group of *Sparaxis* flowers just above this path.

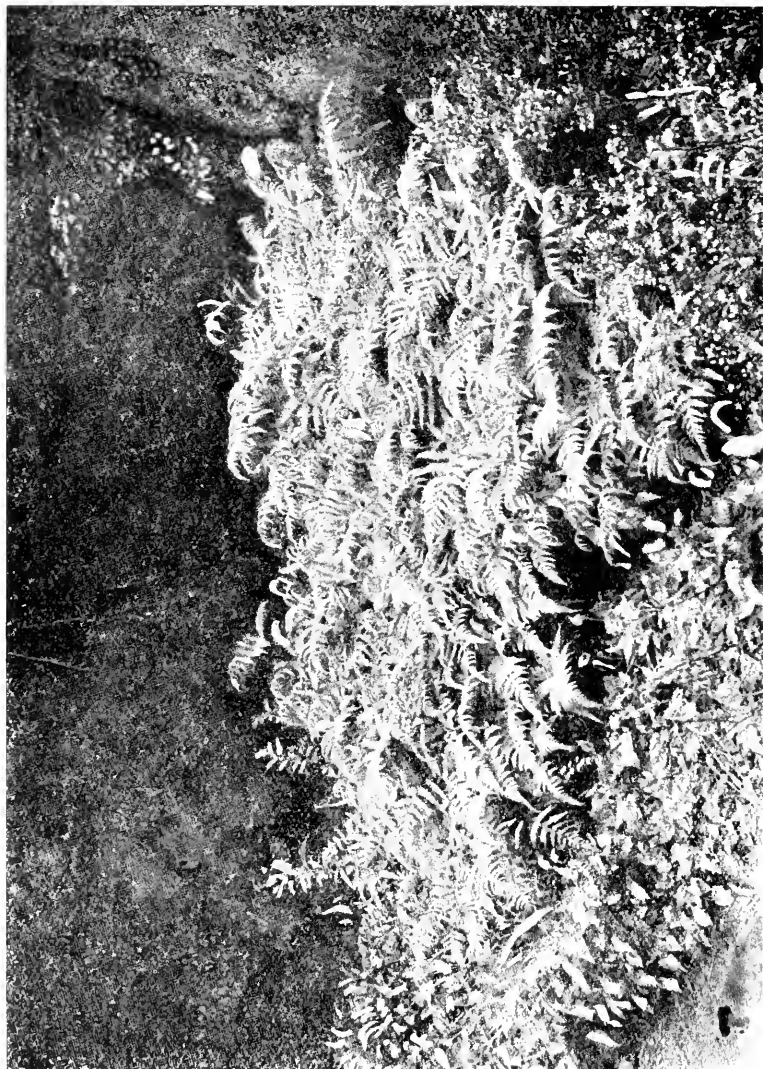
Walking up the main path, on the left, we see a fine clump of *Nierembergia frutescens*, which has proved more or less hardy with us. It is a beautiful plant, with flowers like a large pale *Linum*.

At the foot of the bank on the right, *Waldsteinia geoides* scrambles down into the path, while a few paces further along clumps of *Helichrysum angustifolium*, and a silver-leaved Thyme which is sold as *Thymus Serpyllum splendens*, are seen. I cannot, however, believe that this silver-leaved Thyme with a perfume almost identical with the scented Verbena, can be any form of our common wild Thyme. On the right is a clump of *Hieracium villosum*, with its beautiful white shaggy foliage and brilliant yellow flowers, too well known to need any comment.

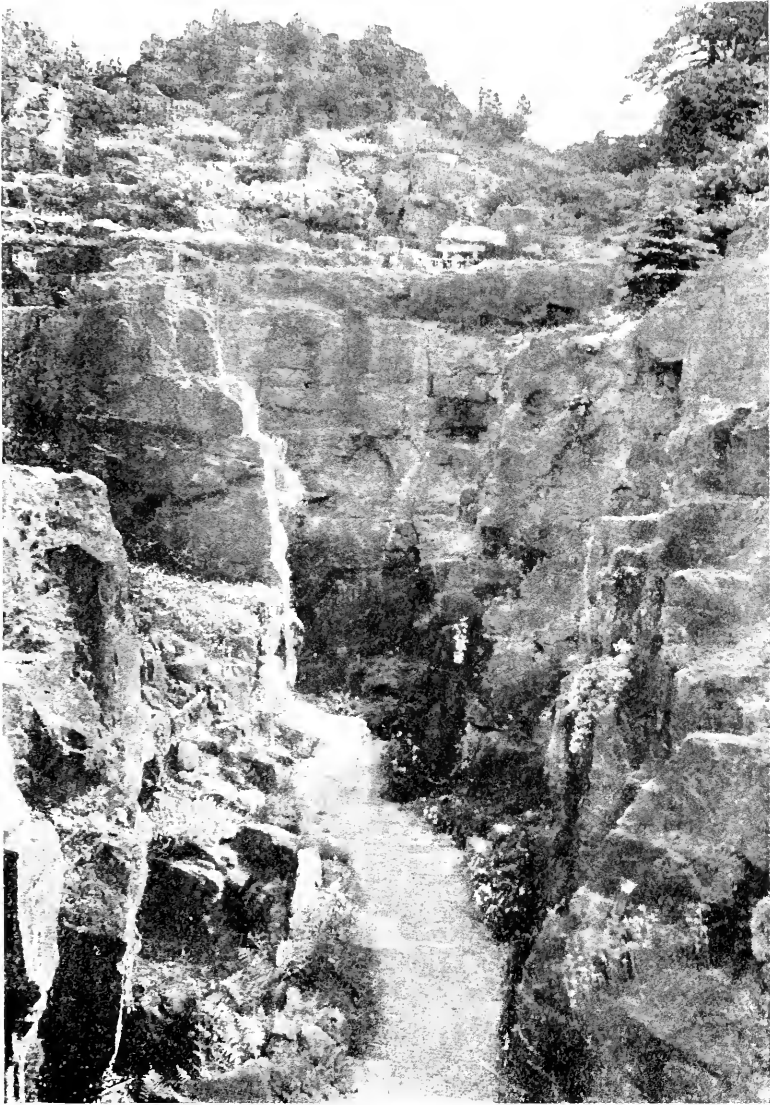
Two or three paces beyond the *Hieracium villosum* is a fine plant of *Coronilla cappadocica*, whilst immediately below grows a much less showy plant, *Astragalus monspessulanus*.

Another side entrance to the Rock-garden from a little further up the hill, leads to the same point that we have just left, and a short distance along it on the right-hand side is a nice plant of *Agave Hanburyana*, a species named after my late cousin, Sir Thomas Hanbury. This plant has stood in the open for the last four years, and has much increased in size.

I may here mention my indebtedness to the La Mortola garden for a large number of semi-hardy plants that we have been able to grow, though we have lost some of those tried.



BEECH FERN
PHEGOPTERIS POLYPODIOIDES



RAVINE THROUGH THE
NATURAL ROCK

Here, too, is a group of the beautiful double Wood Anemone, which is pure white.

Where these two paths join is a small pool, from which water flows from the central rock when turned on. Our rocks become entirely covered with *Arenaria balearica* when situated in a moist and semi-shaded position. The plant is one of great beauty and one that no one would like to be without, but at times it is very troublesome in creeping over and killing many small plants in its neighbourhood. A gardening friend told me that his only remedy for it was a scrubbing-brush.

Opposite this pool is an albino variety of our British Musk Mallow (*Malva moschata*). The white form is well worth growing. This particular plant was found wild in our own neighbourhood; it seeds freely, some of the seedlings coming true white, others reverting to the typical pink form.

Leaving the pool behind us, we pass up the next bend of the main path, where the rock is now completely covered with *Cotoneaster adpressa*, and the white flower above it, a form of Candytuft, known as Snow-flake. Whilst speaking of Candytuft the planting of *Iberis gibraltaria* may be strongly recommended. It is a beautiful and showy biennial, which, when once established, propagates itself by shedding its seed all round.

On the left of the path is a bank with a medley of plants, including *Genista hispanica*, *Carpenteria*, *Erica lusitanica*, *Cistus* and *Helianthemum*.

Immediately beyond it, on the left of the path, is a very fine mass of *Lithospermum prostratum*, with its gentian-blue flowers. This plant is scarcely ever without some flower throughout the year. The rock below it is clothed with the inevitable *Arenaria balearica*, with double Daisies on the pathway below that. The rocks at this corner are among the largest that we were able to move with the tackle at our disposal. Several of them weigh nearly five tons each, having been brought to this spot from the top of the hill on rollers.

Facing the rock with the *Lithospermum* is a small corrie containing several plants of interest, including *Salix reticulata*

from Perthshire. A plant of the large silvery-leaved *Salvia argentea* grows on the bank at the right. The path up the steps on the left leads to another side exit from the rock-garden. At the foot of the rocks is a good bed of *Rubus arcticus*, which spreads, and flowers freely here, and by this same corrie is a fine mass of *Semprevivum arachnoideum*, the pretty pink flowers forming a pleasing contrast to the white cottony foliage.

Pursuing the main path, and leaving the large masses of rock, previously alluded to, on our left, we pass to an irregular-shaped pool on the right in the centre of the rock-garden. In the foreground of this picture (page 446) is a fine clump of the Melancholy Thistle (*Carduus heterophyllus*), brought from Killin, in Scotland. In the little marsh round the pool are such plants as Grass of Parnassus (*Parnassia palustris*), *Hypericum elodes*, *Soldanella*, and several interesting rushes and sedges, including *Carex Buxbaumii* from Lough Neagh in Ireland, and *Carex aquatilis* from Loch Tummel in Perthshire. A rock by the path to the right of the picture is covered by a clump of *Polygonum vacciniifolium*, which is a plant that can be highly recommended for decorating prominent rocks with its bright pink flowers, which last throughout the autumn, and near by is a group of the bright yellow *Ranunculus montanus*, a compact and very attractive species.

A few paces further along the path, and looking back, one sees the bank on the opposite side of the path to the pool we have just passed, on which *Anchusa myosotidiflora*, like a giant Forget-me-not, and *Lavatera Olbia* and many other plants grow well.

Below the *Lavatera* are steps leading to the upper path of the rock-garden, where, among other things, is a fine clump of our beautiful native *Campanula patula*, found on a few sandy commons in the South of England. It is an annual of great beauty, and sows itself freely wherever introduced, if the soil be sufficiently light to suit it.

Passing the rock with the *Lavatera* on our left, and another side entrance on the right, we see in the distance the highest peaks of the rock-garden. To the left of the steps is a plant



POOL AND DRIPPING WELL
IN CHASM

of *Erica ciliaris alba*, whilst on a sunny rock above is *Othonnopsis cheirifolia*, a plant admirably adapted to covering hot, dry, exposed rocks.

On the right of the path, a little further along, is a clump of *Primula* 'Mountain Ruby,' whilst on the left is a clump of *Helleborus corsicus*. This plant flowers from January onwards during the spring, and is a species well worth growing.

On the next shoulder to the right is a fine clump of *Saxifraga lingulata superba*.

Leaving the *Saxifraga* on the right, the main path passes into the ravine. This passage is cut through the solid rock. Above the rock is a bed of very soft sandstone, which was soon taken possession of by a large colony of sand-martins, which have nested there every year since. The steps on the left lead to the moraine, the sheet of white flowers being a rock covered with *Helichrysum bellidioides*, while to the left of this, and just outside the picture, is a fine plant of *Aethionema iberideum*. Ascending the steps¹, we reach the bottom of the moraine garden, the structure of which I will endeavour to explain to you; one may see from here the hole through which the water flows from the moraine after passing the whole length through it. On the left of this winding path are sunken beds largely composed of moraine material, which are mainly devoted to *Gentiana verna* and *G. acaulis*; but besides these I have a collection of some of our rarest Chickweeds and *Arenarias*, which thrive splendidly in the small limestone, of which the *Gentiana verna* bed is largely composed. Among these I may mention *Cerastium Edmondstonii*, found only on Unst, the most northern island of the Shetlands; and *Arenaria norvegica*, from the same island.

Viola arenaria, a plant that probably few of you have seen, is there too. It grows only on the top of Widdy Bank Fell, in Teesdale, where it was discovered by the late James Backhouse many years ago. It is our rarest British violet, and is remarkable for having a downy capsule. The plant attains finer proportions in my moraine than it does where I found it in Teesdale, where it is only found on what is geologically



SAXIFRAGA LINGULATA AT LEFT,
S. COTYLEDON AT RIGHT, IN CLEFTS
OF THE ROCK

known as sugar-limestone, so named because it is of the consistence of loaf-sugar, and can be readily crushed by the fingers. *Saxifraga decipiens*, at the edge of the moraine, sows itself in the moraine material.

In making the moraine we first constructed a succession of cement tanks, the side walls of which go uphill, the tanks being full at the front, and only half full at the back. A small square brick building in the lower corner of each tank has a valve, which is closed in the summer, but left open in the winter. By this means the water can be entirely drained from underneath, the plants being kept sufficiently moist by the rain which falls and soaks through the moraine material during the winter months.

The next thing to do was to build stepping-stones in the moraine, so as to be able to walk about it for planting purposes. The stones being of different thickness, they were all brought to approximately the same level by the different heights of the brick piers supporting them.

The moraine was then filled up with the proper material between the stepping-stones. The natural rock as it lay in the hill, after having had all the super-soil removed, lies to the right of the moraine, and is utilized for growing a considerable collection of *Sempervivums* and *Saxifrages*, which are thriving exceedingly well and spreading. The upper edge of this mass of rock is immediately above the ravine, which leads to the chasm. *Draba imbricata* grows in a little crevice with overhanging rock above, and there is a little ledge close by with *Hutchinsia alpina* growing on it, and another close by with our native *H. petraea* upon it.

We now leave the moraine, and return to the entrance to the ravine. In the bottom left-hand corner a clump of *Mesembryanthemum edule* will be seen, *Primula Juliae*, *Commelina*, and close by *Euphorbia Myrsinites*, a very attractive plant, of compact habit and very glaucous, which has proved quite hardy for three or four seasons. At the foot of the rocks in the next bend is a good clump of Beech-fern brought by us from Scotland, and in chinks in the rock above it *Asplenium*

viride thrives, whilst opposite grow *Asplenium Trichomanes* and *Asplenium Adiantum-nigrum*.

Matthiola rupestris, a fine species of Stock found round the coast of the Mediterranean, is also in the ravine. It is very sweet-scented, and attains to a large size; with us it appears to be biennial.

The ravine is very beautiful when *Saxifraga Cotyledon* is in flower. It forms enormous rosettes in the wide natural vents in the rock. When planting, it is of course necessary to fill the vents up with suitable material for the plants to grow in. Immediately beyond this Saxifrage is the entrance to some long caves formed by our tunnelling into the hill for more stone required for completing the upper portions of the Rock-garden.

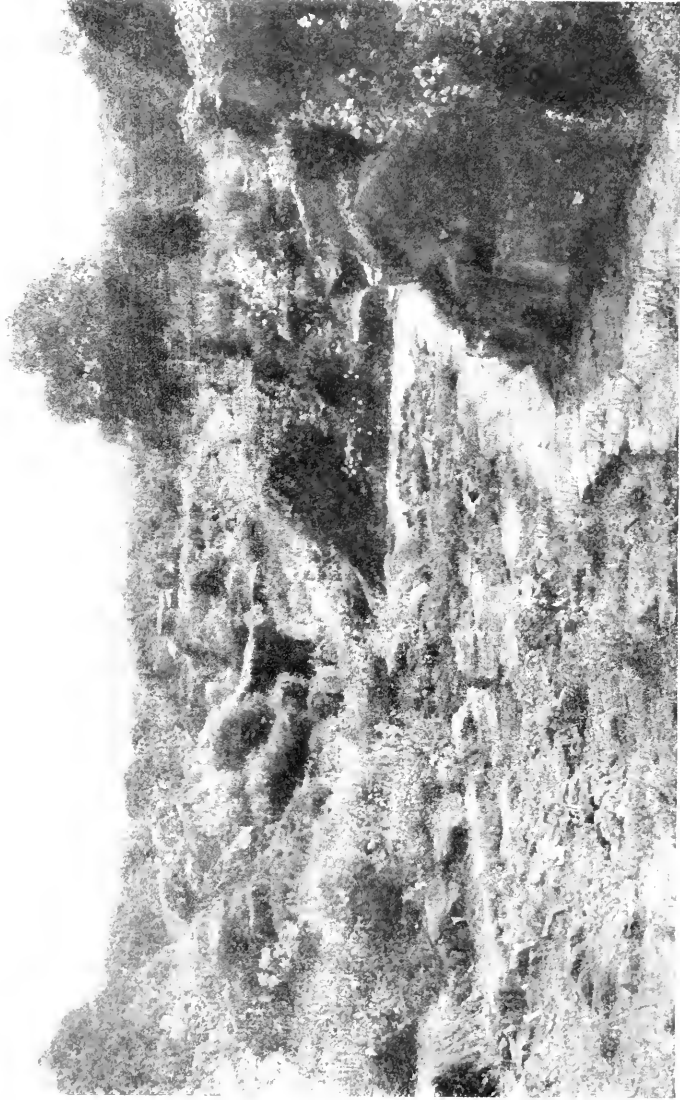
In several of the vents *Primula Forrestii* thrives wonderfully. The large-leaved *Magyaris tomentosa* grows just below. Passing round the bend in the ravine, we come on a vent planted with *Primula* 'J. H. Wilson,' a very handsome plant, and one that is easily grown in such a situation.

We have now turned the last corner in the ravine, and come in sight of the great chasm, or quarry, that we made in the hill. A beautiful plant of *Saxifraga nepalensis* hangs from the rocks on the right. Just below this will be seen three steps which are the beginning of a flight of fifty-three steps, which lead up between the rocks to the level of the ground before we made the excavations. If the description of 'Banky Meadow' with the cows be recalled to mind, it will be seen how great a transformation has been wrought in a piece of ground which, when we came to Brockhurst, we did not know to contain any rock at all. Opposite the flight of steps on the right is a still higher flight of steps passing up the left bank and behind the bold rock, which was purposely left standing, and which for convenience we designate the "Pulpit" rock.

Before passing to these steps, we may notice the planting on the right side of the ravine. Here is *Saxifraga nepalensis*, whilst to the right is a crevice filled with *S. Burseriana gloria*, which, this year, was in full flower before the end of January



STEPS FROM RAVINE
BEFORE REACHING CHASM



THE MORaine

and during the month of February. To the right of this again is *Gypsophila repens rosea*, and below this native plants of *Myosotis alpestris*, brought home with us from Scotland from the Ben Lawers range in Perthshire.

Our native Vetch, *Vicia sylvatica*, which we collected from the northern side of the Malvern Hills, also grows well here. Last year we saw this plant growing in great beauty and profusion on the cliffs at Melvich, in Sutherlandshire, whence we could see the Orkney Islands. It is a plant well worthy of cultivation in our gardens.

Pursuing the main path to the large chasm, and turning the corner abruptly to the left, brings us to the deep pool which we excavated; the dripping well will be seen and to the right of it a natural vent in the cliff with fine plants of *Saxifraga lingulata superba* growing in it and to the right again a few plants of *S. Cotyledon*. One of the Alpine willows grows on a ledge below and to the left of the dripping well.

A group of our rare native Fern *Cystopteris montana*, brought from Ben Laoigh, in Perthshire, after a very long day's excursion to obtain it, thrives well at the base of the cliffs, and a natural vent is planted with the much commoner *Cystopteris fragilis*, brought from the neighbourhood of Killin. The plant of *Saxifraga oppositifolia* growing with it is from the same locality. We also grow in quantity a larger-flowered form of this species, sold as *S. oppositifolia splendens*.

Near by are two more interesting native plants, both brought from the neighbourhood of Killin—namely, the Holly Fern (*Polystichum Lonchitis*) and *Poa alpina*, which is nearly always found in a viviparous state as it grows here.

The Green Spleenwort grows very luxuriantly in a naturally damp crevice of the rock, where it never gets direct sunshine. The leaves produced here are larger than any I have found in the wild state.

In a sheltered nook in the natural rock at the base of the steps that go up to the right, I planted *Primula Winteri*, not knowing how it would succeed in the open, but my confidence was not misplaced. The plant faces north-east, and is more

or less sheltered from above by slightly overhanging rocks, and it formed a beautiful picture last January. *P. Bulleyana* grows at the foot of the cliffs just by.

The steps ascend from the ravine towards the north-east, and pass immediately below and against the "Pulpit" rock, and near them specimens of *Saxifraga longifolia* form a beautiful feature. *Echium plantagineum*, a rare plant found in the Channel Islands, and a fine specimen of one of the New Zealand *Celmisias*, *C. Munroi*, and *Saxifraga Kolenatiana* also grow here. Above the last is the graceful and rather rare English grass, *Melica nutans*. This we brought from a wood near High Force, Teesdale. A great mass of our common *Echium vulgare* grows on one of the outer sandy banks of the Rock-garden; although a common British plant, it is very beautiful, and is extremely attractive to bees and other insects.

Having ascended the steps, the top of the chasm with the upper portions of the Rock-garden comes into view. The steps are continued to the left, and when they reach the stage by the tunnel they again go off to the left and then to the right, the upper path passing along just below the peaks, and commanding a fine view into the chasm and over a large part of the Rock-garden and the country beyond.

Standing at the level of the tunnel, and looking back, we see at the bottom of the ravine the path which brought us to the chasm—the steps leading out of the Rock-garden to the south, and the commencement of the upper path which extends the whole way back through the Rock-garden to the point from which we started. An almost entirely fresh set of plants is found along this path, and the views, looking down, are quite different from those obtained when walking up the lower path. *Diascia Barberae*, growing here, is interesting as having a flower with two spurs.

Tulip Droppers

By A. B. Stout



URING a single season of growth a tulip plant may burrow downward in the soil and thus bury its main bulb to a depth of several inches. Such a plant is shown in figure 1 of the accompanying plate. The cluster of roots, the portion of the stem from which they arose and the remnants of the old scale leaves at *c* indicate the level at which the base of the bulb sat during the preceding summer. Above this level a leaf extends upward into the air; below this level a hollow cylindrical column of tissue extends downward enclosing the bulb at its lower extremity.

The terms "dropper" and "sinker" have been applied by tulip growers to the part which thus carries the bulb to lower levels. It appears that the habit of forming droppers is common in wild species of tulips and especially during the growth of seedlings. Under ordinary methods of growing bulbs of garden varieties for display the formation of droppers appears to be somewhat infrequent. When droppers are observed for the first time by a gardener his interest is usually aroused which has led to occasional reports in various publications of the "discovery" of droppers in tulips.

Descriptions of the true nature of the droppers in *Tulipa* (and in other genera also) have appeared from time to time, but it has seemed desirable to describe in this journal some unusually fine droppers which the writer has found at the New York Botanical Garden.

The true nature of the dropper is revealed by a study of the stages in its development, and by an examination of its gross anatomy, and most especially of the distribution of the fibrovascular bundles or veins.

EXPLANATION OF PLATE

Figures 3*a* to 3*e* are magnified 3 diameters; Figure 3*f*, 1½ times; Figures 14 to 20 are purely schematic; all other figures are one-half the natural size.

Fig. 1. Tulip plant with dropper, and two daughter lateral bulbs at old level without droppers. Blade of leaf removed. Surface of soil indicated.

Fig. 2. Entire plant with dropper slit vertically showing bulb enclosed at base of the dropper.

Fig. 3. View showing surface of stem portion of dropper. Upper part of leaf removed.

Figures 3*a* to 3*f*. Cross sections of dropper shown in figure 3, taken at points indicated. Shows distribution of fibrovascular bundles.

Fig. 4. Longitudinal section of a part of a dropper extending above and below old level.

Fig. 5. Longitudinal section of base of dropper and the enclosed bulb.

Fig. 6 and 7. View of a plant collected on March 22, showing a dropper in the early stages of downward growth, and also a small offset.

Fig. 8. Same with old bulb sectioned.

Fig. 9. Same with dropper also sectioned.

Fig. 10. Longitudinal section of a vegetative bulb early in spring. Upper part of vegetative leaf removed. Base of new bulb beginning to extend beyond the upper portion of the old bulb. Shows the normal eccentric radial growth of stem and the position of the bulb in the soil.

Fig. 11. Plant with dropper growing nearly horizontal to the surface of the soil.

Fig. 12. Diagram of a median vertical section of a vegetative bulb at the beginning of a season of growth.

Fig. 13. Same as figure 12 but at end of the season of growth. Shows relation of base of new bulb to stem of old bulb. Scales of old bulb are not shown.

Fig. 14. Representing condition of concentric radial growth and with uniform elongation of nodes (*A*, *B* and *C*) and internodes (*a* and *b*) most common in plants.

Fig. 15. Representing an increase in concentric radial growth of a node (*B*) and of the adjoining parts of internodes (*a* and *b*) over that of other nodes.

Fig. 16. Illustrating eccentric and downward radial growth of a node (*B*) and the correlated growth of the internode below.

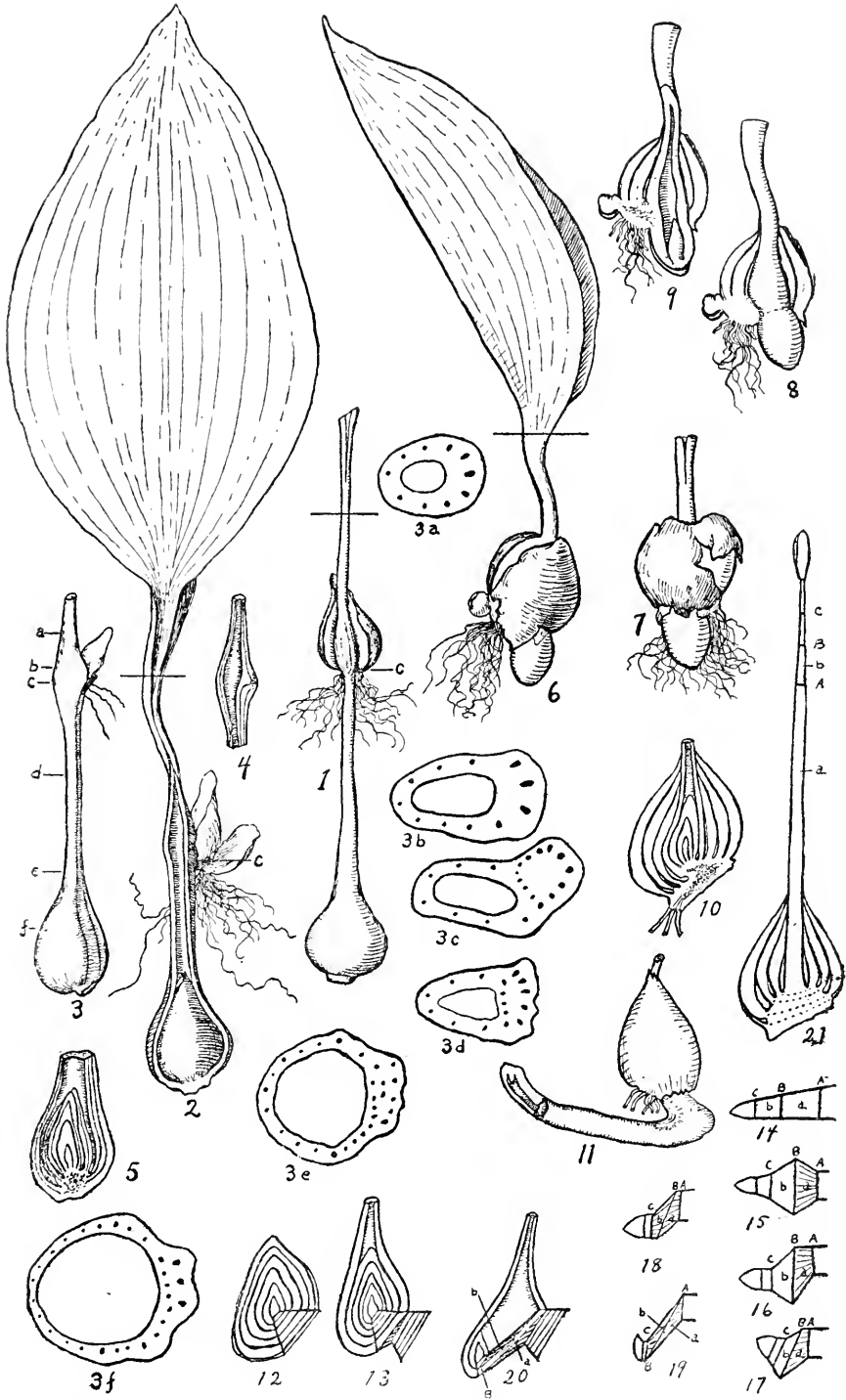
Fig. 17. As in figure 16, but with unequal elongation of internode below (*a*) which is greatest on the side of greatest eccentricity. This is the condition which regularly develops in the base of the new bulbs of vegetative tulip plants. Compare with figures 10 and 13.

Fig. 18. Same as in Figure 17, with also eccentric and unequal elongation of the internode (*b*) above.

Fig. 19. Same as above but more pronounced.

Fig. 20. Diagram of a young dropper of the tulip. Same as Figure 19 with also a coördinated growth of the leaf attached to node *B*. Region of active growth indicated by shading.

Fig. 21. Flowering bulb of tulip below, scale leaves attached to closely compacted nodes. Flower stem arising by marked symmetrical elongation of a few internodes (*a*, *b* and *c*). Green leaves attached to the nodes (*A*, *B* and *C*) not shown.



TULIP DROPPERS
 FOR EXPLANATION, SEE PAGE 464

A longitudinal slit through a dropper (see fig. 2) shows that it is hollow throughout. The hollow within the leaf above the old level (*c*) is continued to the lower level and the bulb enclosed by the leaf is at the lower extremity. This condition is in marked contrast to that in a plant which has not buried its bulb. In the latter, as is shown in the longitudinal section of figure 10, the roots and stem mark the level of the old bulb, the base of the one green leaf encloses the main bud and this bud and the scales immediately surrounding it arise almost vertically from the stem of the bulb.

In the case of the plant shown in figure 2, there was but one main or stem bud; all the buds lateral to it and which were in the axils of the surrounding scales failed to develop. The plant kept its main growing bud but placed it at a lower level in the soil.

A series of cross sections of a dropper and of the part of the leaf immediately above shows the distribution of the fibrovascular bundles and thereby reveals the composition of the dropper and the mechanism which produces the burrowing bulb. The cross sections drawn for figures 3*a* to 3*f* were taken from the plant shown in figure 3 at the points indicated by the lettering. Immediately above the level of the old stem, the leaf forms a hollow cylinder containing a single ring of bundles. (See 3*a* and 3*b*.) At the level of the juncture of the leaf with the old stem the cross section appears as in figure 3*c*; four of the bundles from the leaf connect directly with the stem. In the stem itself the bundles tend to form a ring in a solid core of tissue. The other bundles of the leaf continue on down in a direct course. Sections below this point, as at *d*, *e* and *f*, show that the arrangement of the bundles continues to be quite the same as at *c*.

The dropper is therefore part stem and part leaf. A segment is stem and a segment is leaf and the two are united to form the hollow cylindrical column. A part of the basal circumference of the leaf is attached to the stem of the plant at the upper level (*c*) and a part of the basal circumference of the same leaf is attached to the stem of the bulb at the lower level.

Between these two extremes the stem and the leaf join as contiguous parts of the entire cylinder. The stem part is characterized internally by its double row or ring of vascular bundles and it is noticeably thicker than the leaf portion. The general relation of the bundles is also well shown in such longitudinal sections as are given in figures 4 and 5. On the exterior the stem segment of the dropper is somewhat ridged throughout its entire length as is indicated in figure 3 and in the drawings of the cross-sections at *c*, *d*, *e* and *f*.

The entire bulb of the ordinary non-burrowing plant of the tulip is somewhat radially asymmetrical and its basal and stem end stands usually at an angle of about 45° from the horizontal as is shown in figure 10. The roots arise in a crescent shaped area whose center is at the lowest point. The bases of the leaves and scales are hollow cylinders and are attached on a slant that corresponds to the inclination of the nodes. If a plant is to remain vegetative for a season and is not to produce a flower, one of its leaves develops as a green aerial leaf and the scales outside of this together with their nodes die. The stem segment from which the green leaf arises increases in diameter and forms the base of the new bulb which thus becomes of greater width than the old stem segments immediately below in which growth had ceased. But the radial growth of scales and stem segments of the new bulb is eccentric and is greatest toward the lower side. The new bulb, therefore, protrudes beyond and slightly below the part of the old stem of which it is an extension. This condition is readily revealed by a longitudinal section through a bulb (see fig. 10). The condition is shown diagrammatically in figures 13, 16, and 17. In this ordinary growth of vegetative tulips, however, there is scarcely any elongation of the segments between the leaves (the internodes) and the entire stem is composed almost entirely of nodes to which the leaves are attached.

The method of growth by which a bulb burrows to lower depths is a further development or modification of the processes which give the new bulb its eccentrically expanded base.

It should be noted that in the development of the dropper the relative positions of the old scales and their nodes are not disturbed. Neither are the relative positions of the scales and nodes within the new bulb changed in the least. The immediate contact of the green leaf to the bud which it encloses is unchanged at the lowest side, and the relation of this same leaf to the scales outside of it is unchanged at the outside at the upper level. In the development of the dropper of the tulip plant, therefore, the shape of the basal portion of the green leaf, the shape of its node, the shape of the internode immediately above, and that of the internode immediately below have become greatly distorted. No other parts are directly involved in the growth of the dropper.

The methods of growth here concerned may be compared to the more usual methods of growth seen in stems. Stems increase in diameter and also in length. When the radial growth is uniformly concentric and the elongation is quite the same for all nodes and internodes there is produced a symmetrical and gradually tapering cone-shaped stem, as is the rule in most shrubs and trees. This condition can be illustrated by the diagram of figure 14. When a tulip plant sends up a flowering stalk there is a marked elongation of internodes and the radial and longitudinal growth is decidedly uniform as is shown in figure 21. When a series of nodes and internodes grows to a diameter greater than that of the internodes behind them, as is represented in figure 15, such swollen stems as the tubers of the potato may result. When the radial growth of an internode is concentric but the elongation is not uniform the direction of the apex is changed; a result very commonly attained in plants of all sorts.

If there is a decided eccentric radial growth in a single node and in the parts of the internode below it, but a rather uniform elongation throughout, the result would be as represented in figure 16. But if at the same time there is unequal elongation of the internode below and its greatest elongation is on the side of the greatest radial growth of the node above, some such figure as is shown in 17 will result.

It is precisely this last mentioned method of growth that regularly occurs in the formation of a new bulb in a vegetative plant of the tulip (see figs. 10 and 13). The radial growth of all nodes and internodes is eccentric; the increase in diameter of the node of the green leaf is much greater than that which the node immediately below made. None of the internodes elongate much except the one directly below the green leaf and in this one the elongation is unequal and is coördinated with the eccentric growth of the node above. Viewed from below the surface of this, the internode is crescent shaped in outline and the form of the entire internode is that of an asymmetrically truncated cone. It is from its crescent shaped surface that the new crop of roots emerge.

If now the internode immediately above the leaf node also makes an unequal elongation coördinated with the growth of the leaf node, then the conditions which make a dropper are realized (see diagrams 18, 19 and 20). The excessive unequal elongation of the two internodes is on opposite sides of the same stem and these come to lie parallel to each other along the node which has made the extremely asymmetrically radial growth. The node and the internodes thus become drawn out into a long ribbon-like structure of stem tissue. The base of the green leaf remains attached at all points of the periphery of the node and its growth is so coördinated that no lesions result. The region of greatest active growth in the stem portion of the dropper lies just behind the bulb in the region indicated by the dotting in figure 20.

During the earlier part of the spring season of growth, about March 20 to 30 at the New York Botanical Garden, a plant which is burying its bulb appears as shown in figures 6, 7, 8 and 9. The apex of the dropper with the main bud enclosed protudes through an opening that it has forced through the surrounding scales which at this stage are still fleshy. In every instance thus far observed by the writer the dropper broke through the fleshy scales along the line of their juncture with the stem and emerged at the lowest point of position (see figs. 1, 2, 3, 6, 7, 8, 9 and 11).

The dropper is anchored at the old level by the roots of the plant and the pressure of the soil above on the old bulb. Its own downward growth exerts sufficient force to rupture the scales and to burrow down into the soil. At first the dropper is somewhat conical at its lower end. Most of the enlargement of the new bulb occurs after it reaches a lower level when it also assumes the shape and position characteristic of tulip bulbs.

As far as the writer's observations go, flowering bulbs and the bulbs immediately lateral to the main bud have not burrowed to lower levels. The burrowing bud has always been the main bud in a vegetative plant and it has been directly enclosed in the vegetative leaf whose base became a part of the dropper. Frequently small lateral bulbs form in the axils of the old scales as is shown in figure 1 at *c*. Cases where the lateral buds also developed into droppers have, however, been reported in certain species of tulips.

Droppers of the tulip are to be distinguished from the so-called offsets, a small one of which is shown in figures 6, 7 and 9. These offsets are lateral branches which develop from the stem at points outside of the living scales. They are evidently developed from adventitious buds or from axillary buds that have remained dormant for a time.

Occasionally a dropper does not grow vertically downward but grows somewhat horizontally or even upward. A drawing of such a plant is shown in figure 11. At the end of a season of growth the bulbs of such droppers may lie on one side or even be placed upside down. In such droppers the relative growth of the leaf and stem portions is irregular and not well coordinated.

Plantings have been made to study the occurrence of droppers and to test the influence of depth of planting on their development. Bulbs weighing from 2 to over 40 grams were sorted into grades by weight. A set of each grade was planted at depths of 2, 3, 4, and 6 inches. Nearly all of the larger bulbs bloomed and produced new lateral bulbs of several sizes while the bulbs of smaller sizes were, as a rule, vegetative only.

Not one of the bulbs of these special plantings developed a dropper.

In other plantings of tulips, of the smaller bulbs planted in autumn at a depth of two inches there has been an occasional dropper but usually its length was short. It is clear that vegetative bulbs planted at shallow depths in autumn do not regularly develop droppers at least in the first year of their growth. The ability to form droppers, which it seems is characteristic of seedling tulips, appears to be lost in the small bulbs of cultivated races propagated by vegetative multiplication.

At the New York Botanical Garden the best cases of droppers in the tulip have been found in beds whose bulbs have remained undisturbed for several years and in which the proportion of flowering plants was greatly decreased. They have been found in beds planted with bulbs of small size, but by far the greater number of such bulbs did not produce droppers.

The formation of droppers is also known for species of *Gagea*, a genus of bulbous plants indigenous to the old world, and for *Erythronium* of which the yellow adder's tongue is a well known species of the eastern United States.

The droppers of the *Erythroniums* have been described and figured in American botanical journals. They differ from the droppers of the tulip in that the vegetative leaf does not contribute to the structure. The dropper is formed from the part of the stem and from the scale next inside the vegetative leaf. Droppers also develop from lateral buds and the stem and leaf portions of these are more or less fused with the main dropper which thus appears to be branched.

The number of species whose seedlings or vegetative bulbs have the ability to burrow to lower levels by the formation of droppers is few. Most bulbous plants burrow to lower depths by means of contractile roots. The dropper is a highly specialized structure produced by the extremely asymmetrical but coördinated growth of a node and the two internodes adjacent to it.

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NEW YORK BOTANICAL GARDEN

Notes from the Arnold Arboretum

WITH SOME ILLUSTRATIONS OF ARBORETUM SPECIMENS

By Charles Sprague Sargent*

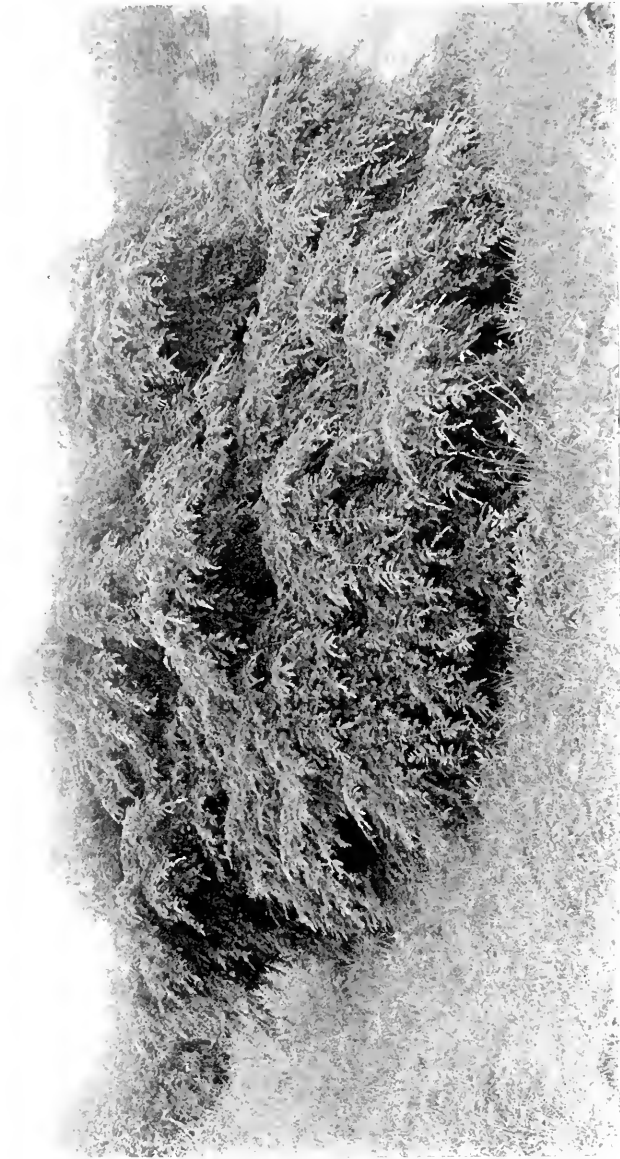


FRUITS in the Arboretum. The ripening and ripe fruits of many hardy trees and shrubs are as beautiful and often more beautiful than their flowers; and such plants have a double value for the decoration of northern gardens, especially the gardens of the northern United States. For the climate of this part of the world is suited for the abundant production and high coloring of the fruits of our native trees and shrubs and of those of northeastern Asia; and European plant lovers who come to the Arboretum in summer and autumn are always astonished and delighted with the abundance and beauty of the fruits they find here. The list of trees and shrubs with handsome fruits which can be grown in New England contains many species of Holly, Ribes, Viburnum, Cotoneaster, Cornus, Malus, Sorbus, Amelanchier, Aronia, Rosa, Prunus, Rhus, Crataegus, Ampelopsis, Berberis, Magnolia, Acer, Acanthopanax and Lonicera. On the Red and White Maples the fruit ripens early in May, and until the first of November there will be a succession here of ripening fruits. The fruits of a few trees and shrubs will remain on the branches and keep much of their brilliancy until early April, and there is therefore only a few weeks during the year when one cannot find showy fruits in the Arboretum.

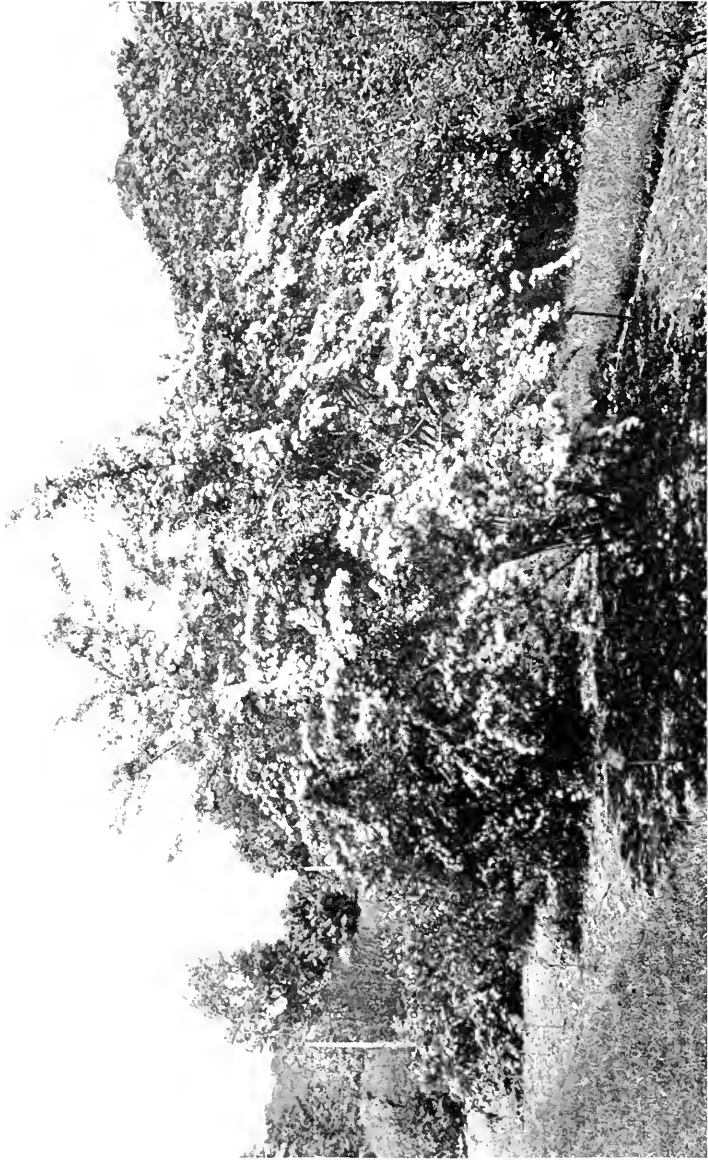
Honeysuckles as fruit plants. It is not perhaps generally realized that the fruit of several Honeysuckles is more beautiful

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than their flowers, and that among the species which are bushes and not vines are plants perfectly suited to this northern climate which are not surpassed in the abundance and brilliancy of their fruits by any plants which ripen their fruit in summer. The Honeysuckles which produce the earliest and the showiest fruit are *Lonicera tatarica* and some of its hybrids. The Tartarian Honeysuckle, which is a native of western Siberia and central Asia, is an old inhabitant of gardens and one of the best shrubs for cold countries, for it can support without injury the excessive cold of the long winter and the burning sun of the short summer of the north, fatal to all but a few of the plants which decorate the gardens of more temperate regions. It cannot be too often repeated that the Tartarian Honeysuckle and its hybrids are large, fast-growing plants, that they only thrive in rich, well-drained soil, and that they can only show their real beauty when allowed sufficient space for free development of their branches. Twenty-five feet between the plants does not give them too much room. There are many varieties of the Tartarian Honeysuckle in the Arboretum collection varying in the color of their flowers and in the color of their fruits. The varieties of *L. tatarica* which have this year the handsomest fruit are the var. *rosea* with scarlet fruit and var. *lutea* with bright yellow fruit. The fruits, however, of some of the hybrids are more beautiful than those of any of the varieties of the species. As fruiting plants, the best of these hybrids which are in the Arboretum are *Lonicera bella*, *L. muendeniense*, *L. notha*, and *L. amoena*. *L. bella* was raised in the Botanic Garden at Petrograd and is believed to be the product of a cross between *L. tatarica* and the Japanese *L. Morrowii*. There are several varieties of this hybrid differing in the color of their flowers. They are large, free-flowering plants with large, lustrous red fruit. *L. muendeniense*, which originated in the Botanic Garden at Munden, is probably of the same parentage as *L. bella* altered by a cross with another species. It is a very vigorous plant with large, lustrous, orange-red fruit. *L. notha*, which is believed to be a hybrid of *L. tatarica* and *L. Ruprechtiana*, is another large, vigorous,



THE CREEPING HEMLOCK, A FORM OF
TSUGA CANADENSIS



SPIRAEA NIPPONICA

fast-growing plant with lustrous orange-red fruit. *L. notha* and *L. muendeniensis* as fruit plants are the handsomest of the large-growing Bush Honeysuckles with dark green leaves and orange-red fruits. More beautiful when in flower is the hybrid of *L. tatarica* with the Persian *L. Korolkovii* which is called *L. amoena*. This is a smaller plant than the other hybrids of the Tartarian Honeysuckle with pale gray-green leaves, small pink flowers and small red fruits. When it is in bloom this plant is considered by many persons the most beautiful *Lonicera* in the collection. The Japanese *L. Morrowii* is more beautiful when it is covered with its large orange-red fruits than it is when the yellow and white flowers are open in early spring. This is a round-topped shrub, much broader than high, with gray-green foliage, and long lower branches which cling close to the ground. When it can have sufficient room in which to grow this is one of the handsomest of the Honeysuckles and one of the best shrubs introduced into the United States by the Arboretum. There are two hybrids of this species in the collection, *L. minutiflora* with small, translucent, yellow fruit, and *L. muscaviensis* with large bright scarlet fruit. They are large, hardy and fast-growing plants. Very different are the bright blue fruits of the different geographical forms of the widely distributed *Lonicera coerulea*. These fruits are beautiful but they are a good deal covered by the leaves, and the plants are not as conspicuous at this season of the year as the Tartarian and several of the other Bush Honeysuckles. The bright red fruit of *Lonicera trichosantha* is conspicuous in the last weeks of July. This is a shrub now three or four feet tall in the Arboretum, with erect stems, large yellow and white flowers, and fruits rather larger than those of the Tartarian Honeysuckle. It is a native of northern and central China and promises to be a useful addition to summer fruiting shrubs. The fruits of two western American Bush Honeysuckles, *L. involucrata* and its varieties and *L. Ledebourii* ripen in July and are handsome and peculiar, for the large, lustrous black berries rise from the much enlarged bractlets of the flowers which are bright red and

much reflexed. One of the most interesting of these plants is the variety *serotina* of *Lonicera involucrata*. This has bright yellow flowers flushed with scarlet which do not open until July; the enlarged bractlets of this Colorado plant are spreading, not reflexed.

The tree with the showiest fruits in the Arboretum in July is the Tartarian Maple (*Acer tataricum*) which is an early-flowering, very hardy small tree from southeastern Europe and western Asia. The wings of the fruit are bright red, and their beauty is heightened by the contrast of the dark green leaves. The female plants of the so-called Mountain Holly (*Nemopanthus mucronata*) are handsome in July when their rose-red berrylike fruits are ripe. *Nemopanthus*, which belongs to the Holly Family, consists of a single species which is common in cool moist woods in the northeastern United States and eastern Canada, and is a wide round-topped shrub with erect stems covered with gray bark, thin pale green leaves and inconspicuous flowers. It has taken kindly to cultivation in the Arboretum where there are a number of plants in the Holly Collection in the rear of the Horsechestnut Collection. The snow-white fruits of the red and yellow-flowered forms of the North American *Cornus stolonifera* ripen in July. Very beautiful in winter from the bright coloring of its stems and branches, this Cornel is equally beautiful in July and August when it is covered with its large and abundant clusters of fruit. A garden form of the Old World *Cornus alba* (var. *Rosenthalii*) is fruiting abundantly this year and promises to be a valuable addition to July and August fruiting shrubs.

Indigofera. Five species of this genus of the Pea family bloom in the Arboretum during July. They are small plants with handsome flowers in terminal racemes, well suited to decorate a garden border. The three species with pink flowers, *I. Kirilowii*, a native of northern China, Manchuria and Korea, *I. Potaninii* and *I. amblyantha* are perfectly hardy and the last will continue to open its small flowers on the lengthening racemes until October. The other species, *I. Gerardiana* and *I. decora*, are killed to the ground every winter, but like herba-



THE HANDSOMEST OF ALL THE FORSYTHIAS
F. INTERMEDIA SPECTABILIS

ceous plants produce new stems in the spring which never fail to flower during the summer. *I. decora* is a native of southern China, and in the Arboretum the flowers are pure white. *I. Gerardiana*, which is a native of the northwestern Himalayas, has gray-green foliage and rose-purple flowers. This is the least beautiful of the five species now growing in the Arboretum. The collection still needs *I. hebeptala*, another Himalayan plant which is rarely seen in English gardens. It has red flowers, in elongated racemes, and, judging by the picture of it which has been published, is a handsome plant. This and another red-flowered Himalayan species, *I. atropurpurea*, are desired by the Arboretum.

Rubus laciniatus. This European plant, which produces long red stems and deeply divided leaflets, is one of the handsomest of the Brambles and is well suited to cover banks or to train over fences and arbors. In England it is valued for its fruit which is described as "one of the finest blackberries in size and flavor." In competition with some of the American blackberries it will not probably find much favor in this country. There are two double-flowered Brambles in the collection which bloom in July and which are also important ornamental plants, very well suited to cover arbors and fences. They produce in a season stems from ten to twenty feet long and their white or pink flowers in long, many-flowered crowded clusters resemble miniature Roses. These plants are called *Rubus ulmifolius* var. *bellidiflorus* and *R. thyrsoides flore pleno*, and seem to be little known in the United States.

Schizophragma hydrangeoides must be included among the shrubs which flower in July. This beautiful climbing plant has not had a successful career in the Arboretum. Seeds were first sent here in December, 1876, from Sapporo in northern Japan with those of *Hydrangea petiolaris*, *Syringa japonica*, *Phellodendron sachalinense* and other interesting plants. A large number of *Schizophragma* plants were raised and sent to other American and European gardens. Those planted in the Arboretum never flourished, and soon disappeared, probably because the right place was not found for them. Plants



DEUTZIA LEMOINEI
BOULE DE NEIGE

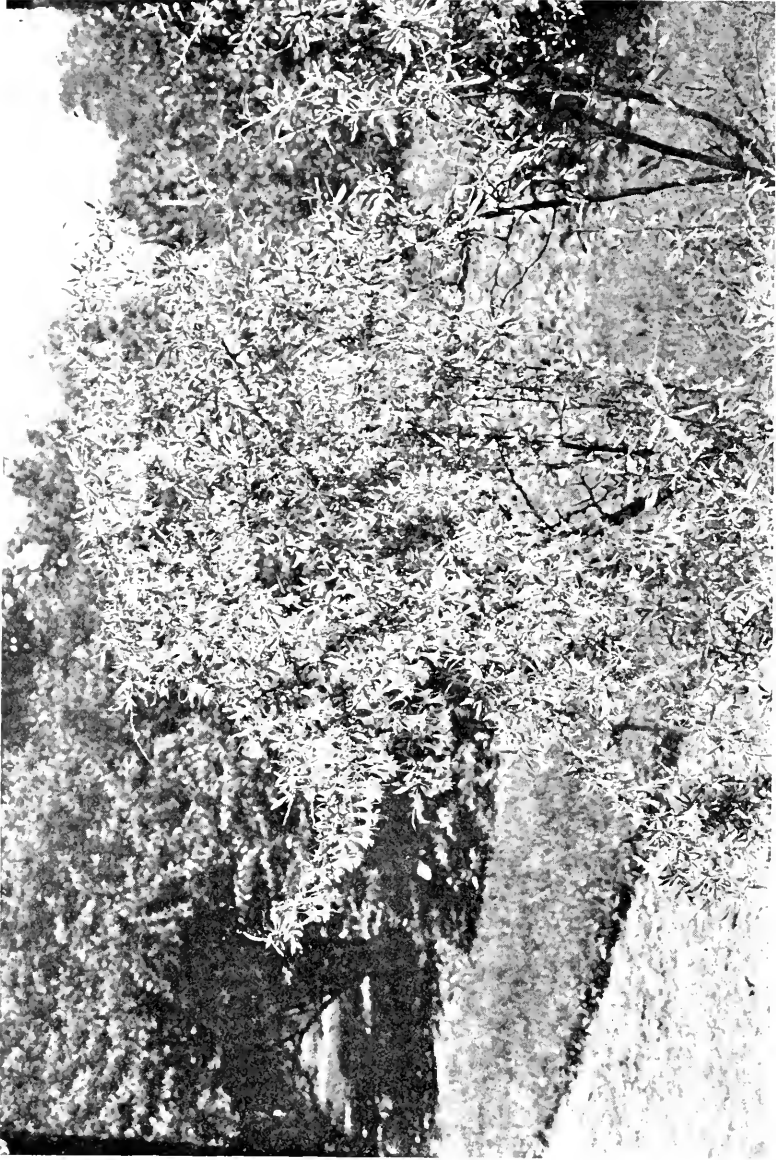
raised later also disappeared; and it is a matter of some satisfaction at the Arboretum that this beautiful plant, after forty-three years of failure, is at last established on the Administration Building where it has flowered this year for the first time. It clings as firmly to the brick wall as *Hydrangea petiolaris*; the leaves are smaller, more circular in shape, more coarsely toothed and of a darker color. When in flower *Schizophragma* is more interesting, although not as showy as the *Hydrangea*, for instead of the surrounding ring of neutral flowers there are only two neutral flowers to each of the divisions of the large compound inflorescence; these neutral flowers are white, ovate, often an inch or more long, and hang on long slender stems an inch in length. *Schizophragma* appears to be an exceedingly rare plant in American gardens in which *Hydrangea petiolaris* often passes for it.

Summer Flowering Trees. Several trees with handsome or interesting flowers bloom in the Arboretum in July and August. All these and many summer flowering shrubs should find a place in gardens which are chiefly used during July, August and September, that is in many northern seashore gardens. The most important of summer flowering trees here are the Lindens. Some of the species begin to flower about the middle of June, but in the Arboretum collection are Linden trees which are covered until the end of July with their beautiful fragrant flowers, beloved of bees. In the meadow on the righthand side of the Meadow Road there is a large collection of these trees with many species, hybrids and varieties. Among them are trees of great beauty of habit, and trees which can be successfully used in New England to shade streets and roads and to decorate parks. A careful study of the Linden collection in the Arboretum during June and July will repay lovers and planters of trees.

Koelreuteria paniculata. This Chinese tree blooms during July. It can be seen on the right-hand side of the Meadow Road beyond the *Evonymus* Collection. *Koelreuteria* is a medium-sized tree with large, dark green compound leaves and large erect clusters of bright yellow flowers which are followed

by conspicuous bladder-like fruits. This tree is now often planted in this country, especially in the middle states. In nursery catalogues it often appears as "The Japanese Lacquer-Tree," an absurd name, for it is not a Japanese tree and it does not produce lacquer.

The *Aralia Family* furnishes the Arboretum with three handsome trees which flower in late summer and early autumn. They are *Acanthopanax ricinifolium*, *Aralia spinosa* and *A. chinensis* and its varieties. The *Acanthopanax* is a tree which is common in the forests of northern Japan, Korea and China where it is often seventy or eighty feet high with a massive trunk and great wide-spreading branches armed, like the stems of young trees, with many stout prickles. The leaves hang down on long stalks and are nearly circular, five- or seven-lobed and often fifteen or sixteen inches in diameter. The small white flowers are produced in compact, long-stalked clusters which form a flat compound, terminal panicle from twelve to eighteen inches across and are followed late in the autumn by shining black fruits which do not fall until after the beginning of winter. This tree is perfectly hardy in the Arboretum where it has been growing for twenty-four years and where it has flowered and ripened its seeds now for several seasons. It is one of the most interesting trees in the collection and, because it is so unlike other trees of the northern hemisphere, it is often said to resemble a tree of the tropics. *Aralia spinosa*, the so-called Hercules' Club of the southern states where it is a common inhabitant of the borders of woods and the banks of streams, is a tree often thirty feet high with a tall trunk and wide-spreading branches covered with stout orange-colored prickles. The leaves, which are borne at the ends of the branches, are long-stalked, twice pinnate, and from three to four feet long and two and one-half feet wide. The small white flowers are arranged in compound clusters which rise singly or two or three together above the leaves and are three or four feet long. The fruit is black, rather less than a quarter of an inch in diameter, and ripens in early autumn. It is now well established on the slope at the northern base of



LYCIUM PALLIDUM
FROM NEW MEXICO

Hemlock Hill in the rear of the Laurel plantation and is now spreading rapidly there over a considerable area by shoots from underground stems. The Asiatic tree-Aralia resembles in habit and general appearance the American Hercules' Club, but is distinct from that tree in the absence of stalks to the leaflets. There are a number of geographical forms of this tree; the one which is most commonly cultivated in this country is a native of Manchuria and eastern Siberia (var. *mandshurica*) which is sometimes found in nurseries under the name of *Dimorphanthus mandshuricus*. The Japanese form (var. *glabrescens*) is chiefly distinguished from it by the pale color of the under surface of the leaflets; it is less hardy than the Manchurian form and is not often seen in this country.

Sophora japonica, sometimes called the Pagoda-tree, is in spite of its name a Chinese tree which has been cultivated in Japan for more than a thousand years, and as it first reached Europe from that country was long considered a native of Japan. It is a round-headed tree which in Peking, where it has been much planted, has grown to a large size and looks from a distance like an Oak-tree. The leaves and branchlets are dark green, and the small, creamy white, pea-shaped flowers, which open here in August, are produced in great numbers in narrow, erect, terminal clusters. There are also in the collection the form with long pendent branches (var. *pendula*) which rarely flowers, and a young plant of the form with erect branches (var. *pyramidalis*).

Oxydendrum arboreum, the Sour Wood or Sorrel-tree, so-called from the acrid taste of the leaves, is the only American tree in the Arboretum which flowers in August. It is a native of the Appalachian forests from southwestern Pennsylvania and is most common on mountain slopes, but reaches the coast of Virginia and North Carolina. The Sorrel-tree, which is perfectly hardy in New England, is a beautiful tree with bright green shining leaves which turn bright scarlet in the autumn, white Andromeda-like flowers erect on the branches of spreading or slightly drooping terminal clusters, and pale capsular fruits which in the autumn are conspicuous among

the brilliant leaves. There is a group of these trees among the Laurels at the base of Hemlock Hill.

Summer Flowering Shrubs. Many shrubs with conspicuous flowers bloom in the Arboretum during the summer months. The list includes the Heathers (*Calluna vulgaris*), and several species of *Genista* and *Cytisus*. Of this European group the handsomest which can be grown here is the bright yellow-flowered *Cytisus nigricans*, the yellow-flowered *C. capitatus*, the white-flowered *C. leucanthus* and the yellow-flowered Woad Wax and its varieties (*Genista tinctoria*), too well known in Essex County, Massachusetts, where, escaped from cultivation, it has ruined many hundred acres of hillside pastures. The *Lespedezas* with their abundant purple, pea-shaped flowers, and the handsomest of the Chinese *Buddleias* bloom late, as do the very hardy *Acanthopanax sessiliflorum*, a vigorous shrub of eastern Siberia, most conspicuous in winter when the compact round clusters of the shining black fruits are on the ends of the branches. The Japanese *Hydrangea paniculata* and its varieties, and the *Hydrangeas* of North America produce here the showiest July and August flowers. The early-flowered forms of *Hydrangea paniculata* (var. *praecox*) which are the handsomest of the group, flower in early July. The most popular of these American plants is the form of *H. arborescens* (var. *grandiflora*) with snow-ball-like heads of white sterile flowers. There is a similar abnormal form of another of the American species, *H. cinerea*. More beautiful, and one of the handsomest of the genus, *H. quercifolia* flowers in July. This is an unusual event for this shrub, which is a native of the southern states, and is frequently killed to the ground here. In the middle and southern states it is an important and valued garden ornament. Of the American *Hydrangeas* which are perfectly hardy in the north the handsomest is *H. radiata*, a native of mountain slopes in North and South Carolina, once a popular garden plant but now rarely cultivated. It is a broad, round-topped shrub with leaves of ample size, dark green above and silvery white below, and broad flat heads of flowers surrounded by a ring of white neutral flowers.



DAPHNE MEZEREUM ALBA

Amorpha canescens, the Lead Plant, is beginning to open its small, violet-colored flowers arranged in long, narrow clustered spikes, which are conspicuous by the contrast with the color of the leaves and branches and are thickly covered with gray down. This plant is a native of the Mississippi valley where it grows on low prairies from Indiana and Minnesota to Texas.

Aesculus parviflora occupies an important place among summer flowering shrubs. This native of the southeastern states is hardy in the north, and with abundant space and in good soil will spread into great thickets with stems seven or eight feet high. Toward the end of July it is covered with its tall, narrow, erect spikes of small white flowers which stand up well above the foliage.

Cornus paucinervis suffered somewhat in the cold winter of 1917-18, as was to have been expected, as it grows naturally at low levels in central China where the Orange flourishes and rarely ascends to altitudes of three thousand feet. It has recovered, however, and flowered in July. If it were a little hardier it would be one of the best summer flowering shrubs introduced by Wilson from China. It is a shrub five or six feet tall with erect stems, small, narrow, pointed leaves with only two or three pairs of prominent veins, small clusters of white flowers and black fruits.

Practical Horticultural Notes

RINGING FRUIT TREES



RINGING luxuriant branches of fruit trees which produce few or no blossom buds is a fairly common practice. This applies to the pippin fruits, apples and pears; not to plums and other stone fruits, as with these it is apt to cause gumming. When applied to the luxuriant branches of apple or pear trees that produce large leaves but few or no blossom buds, ringing, if properly done at the right time, is almost certain to change their entire character. The right time to operate is early in June, and the correct method is to remove a ring of bark about a quarter of an inch wide, not more, toward the lower part of the branch. This arrests the upward rush of crude sap, and the downward elaborated current changes the buds from barren wood into profitable fruit producers. An important point to remember is that the strong young branches should be a sufficient distance apart for the sun to shine between them and directly on the leaves. The overcrowding of the branches of young fruit trees is a serious error.—S. M. BEER.

THE HONEY BEE AND THE GARDEN

A few hives of honey bees ought to be kept and cared for in every garden. Besides the pleasure and profit there is in producing ones own honey supply, there is the larger and more important work done by these most useful and interesting little insects in the pollination of all fruit and berry blossoms and thereby securing for the owner a larger crop of well developed fruit. There is always to be found a suitable spot in the garden where a few hives of bees can be placed in such

a way that the bees will have a free flight in front of the hives for a space of ten to fifteen feet and if possible a little shade from the midday sun. There is no danger of the bees going out of their way to sting anyone, but they will resent interference with their free passage directly in front of their hives. A novice bee-keeper should procure a good book on the subject such as the "A, B, C, and X, Y, Z, of Bee Culture" by Root. Bee-keeping is one of the most interesting pastimes and as one becomes more acquainted with their wonderful organization and housekeeping order, one will very soon develop a great affection for those little busybodies, even though one may receive an occasional sting through carelessness in handling the frames or in taking away some of their surplus stores of honey.—S. W. CARLQUIST.

SUMMER NOTES

Buddleyas are making a wonderful growth this season and were never seen better. They wintered splendidly, which I ascribe to two reasons: a mild winter and not cutting them down at the time winter covering was put on, as formerly we lost by this practice three quarters of our plantings.

Hollyhocks which also wintered well are making a stately show with no disease to disfigure and weaken them, which however, cannot be said of the January sown stock which is throwing up flower stalks now, and which are already becoming blighted.—A. MARTINI.

DISCOVERY OF POTATO WART IN THE UNITED STATES*

The dreaded wart disease of the Irish potato has been discovered in the United States. A letter accompanied by specimens of the disease was sent from Highland, Pa., to Prof. J. G. Sanders, of the Pennsylvania Department of Agriculture at Harrisburg, about the middle of last September. Highland is a small village located near Freeland, in Luzerne County,

* From a recent warning sent out by the Department of Agriculture at Washington.

in the anthracite coal-mining region of Pennsylvania. A hasty survey of this region has shown the presence of the disease in 27 cities and villages in Luzerne, Schuylkill, and Carbon Counties. All except three of these points of infection lie within a rather small area, about 18 miles in length and 12 miles in breadth. The three points outside of this area are not very distant from each other or from the region of general infection.

In some villages the disease was found in only a few gardens, while in others 50 or more gardens showed its presence. Its severity varied greatly in different places. In a few gardens the infection was so severe as practically to destroy the crop, and it was learned that in most of these places the wart had been present for at least four years.

The wart is believed to have come into the United States on potatoes imported from European countries. This disease has been gradually spreading over Europe, and in recent years has done considerable damage, especially in England and Ireland. The United States Department of Agriculture gave warning of the danger of importing this wart in Circular No. 52, issued in 1910 and in Farmers' Bulletin 489. In the hope of keeping it out of America, the Federal Horticultural Board in 1912 placed an embargo on potatoes coming from countries where the disease was known to exist. This embargo became effective on September 20, 1912. Before it took effect, however, several million bushels of the crop of 1911 had been shipped into this country from Europe. Twelve carloads of these potatoes are known to have been distributed in the district where the disease now occurs. Whether or not the wart has established itself in other parts of the country where European potatoes were shipped is not at present known. It will not be surprising, however, if other points of infection are found, and *potato growers, potato buyers, market inspectors, and especially county agents, should be on the lookout for it in all parts of the country.* Like many other diseases, the wart is easier to prevent than to control. It is highly important that all localities where it occurs be discovered as soon as possible, in order that proper measures may be taken to prevent its further spread.

As the name indicates, the disease is characterized by warty outgrowths on the underground portions of the plant. The warts vary greatly in size, but are frequently as large as a walnut. Infections usually start at the eyes, but may take place at other points on the surface of the tuber. Sometimes entire tubers are converted into a spongy, warty mass. Badly warted tubers are unsalable and for the most part unfit for food. The oversucculent tissues of the warts are highly susceptible to attack by parasitic fungi and bacteria. Many of the warts rot in the ground before the crop is harvested, while others rot soon after the potatoes are put into storage. Frequently, however, especially in the case of small warts, the tissues dry down before being attacked by secondary rot-producing organisms. In such cases the diseased tubers keep through the winter. Young warts are usually light brown in color. After decay begins they turn black, and this has led English authors to refer to the disease as "black scab" or "black wart." Some of the warts left on the field at digging time may remain alive under suitable conditions for months. Young warts when exposed to light become green. Sound warts frequently send up sprouts. New warts may arise from the tender portions of such young sprouts. In this way the disease may continue to vegetate long after the potato crop has been harvested.

The warts occur abundantly on the tubers, stolons, and underground portions of the main stem. They occur sparingly on the roots and have been reported on potato leaves that came in contact with infested soil. So far as known, the disease never seriously affects the growth of the potato vines. It does not kill the host plant. With the exception of the nightshade (*Solanum nigrum* L.) and the bittersweet (*S. Dulcamara* L.), two closely related solanaceous plants, the potato is the only plant known to be attacked by the wart disease.

The wart is caused by a parasitic fungus, one of the lowest members of the Chytridiaceæ, a group of parasites that attack the stems, leaves, and especially the roots of many wild and cultivated plants. Although it belongs in the same great group

of fungi as the common bread mold, it produces no mold growth and is so small that it can hardly be seen with the naked eye.

Wart is usually considered to be one of the most serious of potato diseases. It has done considerable damage in certain districts of England and in Ireland. Most English authorities hold that it is a very serious disease but others seem to consider it of little economic importance.

The disease has frequently been very severe in small gardens where potatoes are grown year after year on the same plats. It has not been so severe in fields where crop rotation is practiced. One writer says: "The disease has caused most damage in gardens or allotments where potatoes are grown every year, but in a few cases there has also been serious loss in potatoes grown in a 4-year rotation." The writer observed the disease in gardens in Pennsylvania during the past autumn. In some gardens the infection was so severe that the crop was practically a total loss. Three short rows taken at random in one badly infested garden were dug at harvest time. These rows gave approximately 150 hills, but not a single sound potato was obtained. All of the tubers were more or less warted, and many of them were entirely converted into warty overgrowths. Apparently the severity of the disease depends on the degree of infestation of the soil. This, in turn, depends on the number of diseased potato plants that have been grown per unit of area in previous years and on the thoroughness with which the spores have been distributed throughout the soil. Each infected crop, by liberating millions of spores, adds momentum to the disease. If potatoes are grown year after year on the same field, a point is finally reached where the soil is so filled with viable resting sporangia that not a single plant or even a single tuber can escape infection. In such a soil it is no longer possible to grow sound tubers, and under such conditions the disease is one of the most destructive of all those that attack the potato. On the other hand, it may prove that where a proper rotation of crops is maintained there is little to fear from the wart disease.

—L. O. KUNKEL.

We regret to record the death on August 28 at Newport of Charles Frederick Hoffman. He was one of the founders of the Club, helped in its incorporation, and served on its Board of Governors. His death has removed one of the Club's staunchest supporters who strove constantly to further the work for which he helped to organize it.

Journal of the
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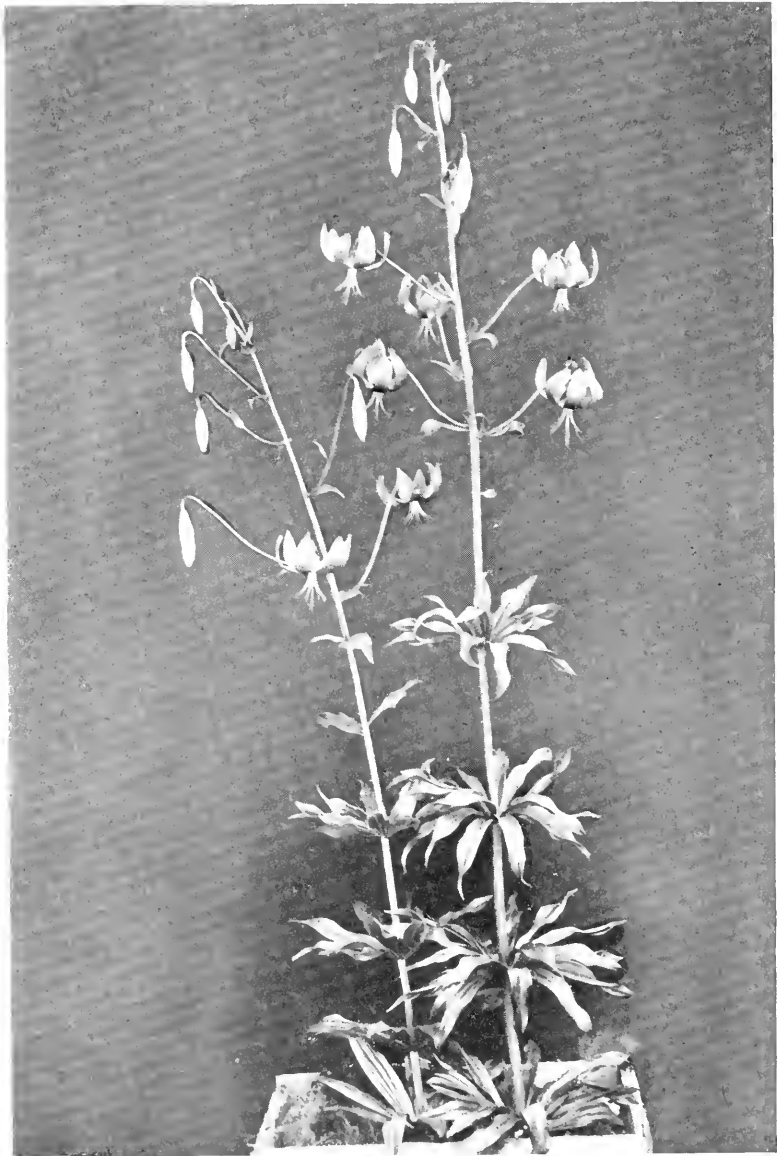
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CAMPAULA HUMBOLDTI

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*Pacific Coast Lilies and their
Culture*

By Carl Purdy



IN an article in the June number of the JOURNAL I gave some notes on general conditions on this coast as bearing on acclimatization of plants in the Eastern United States. In this number I treat the Western Liliums in detail.

Some species of the Western Lilies and notably *L. Pardalinum*, *L. Washingtonianum* type and *L. Humboldtii* were sent to the Eastern United States and to Europe at an early date and for the last thirty years good collected bulbs of nearly all of the species are available for culture. In Europe and especially in England they have been well tried out and many of them quite as successfully as the generality of world Liliums.

It is difficult to generalize on lily culture. Each species has some individuality as to likes and dislikes and some are very decidedly difficult until the exact equation is discovered. Then there are matters never explained, as for instance why the common Madonna Lily luxuriates in English cottage gardens yet is often the despair of the highest trained gardeners. I

feel that no matter how skilled the grower or easy the species there is an element of experiment in the culture of all lilies and that the lily grower always has something new to learn. But against an element of uncertainty as to lilies in general rests the comforting fact that nearly every grower can succeed with a number of fine species.

At the Lily Conference held in London July 1901, a paper on "Western American Lilies" written by the writer was read. Lately Mr. A. Grove, an Englishman, has written a valuable monograph on the world's lilies which is the latest authority. As Mr. Grove's data on Western Lilies was, I think, entirely secured through coöperation with the writer I take it that, unless perhaps in nomenclature, our conclusions vary but little.

All of the Western American Lilies would fall under Baker's *Eulirion* or funnel shaped flowers, or Martagon with the segments revolute, but for the purposes of this article I shall disregard this division and group them as to their affinities in bulb and habitat. This because the article is designed rather to give data on culture than as a key to species.

I will therefore divide them into three groups.

GROUP I. *Lilium Humboldtii* typifies these. They have ovoid or ovate bulbs composed of long closely overlapping scales not usually jointed. The flowers are of the Revolute type.

GROUP II. Lilies with ovate or ovoid bulbs of long overlapping scales not usually jointed and with funnel-form flowers excepting *Kellogii* in which they are revolute.

GROUP III. Lilies with rhizomatous running bulbs having a central core densely covered with small overlapping scales which are nearly always jointed. The flowers may be revolute, broadly, or narrowly funnel form. *Lilium Pardalinum*, *L. Parryii*, *L. parvum*, and *L. maritimum* respectively typify these which for convenience will be treated separately, with some notes on related forms. All of these are usually called *Bog Lilies*. All of them are found within the boundaries of the great state of California. Seven of them extend into Southern Oregon and three throughout Western Oregon, while but one crossed the Columbia River and extend to British Columbia.

One only is certainly found in Arizona and possibly New Mexico while one possibly grows in Lower California. Neither the first nor the second group have any close affinities either east of the Rocky Mountains in America or in the Old World. Mr. Burbank was unable to cross any of them with Old World lilies in a cross which showed any signs of interbreeding. All of them can be and have been intercrossed.

The third group has in *Lilium superbum* a near relative of *L. Pardalinum* and in *L. canadense* a first cousin of *L. parvum*.

GROUP I

L. HUMBOLDTII

The bulbs are large, often measuring 8 inches in circumference and not infrequently up to 15 inches, are nearly ovate and very compact and of thick unjointed scales. They are very easily handled either dry or in barely moist packing.

The stems are very stout and self supporting and rather rough as is the foliage. The larger portion of the leaves are disposed in many whorls, while the large flowers are from six or eight in small plants, to twenty to thirty very commonly, and up to eighty in exceptionally fine specimens. As the lower pedicels are quite long and as they reduce as they ascend the inflorescence of a fine plant is almost a perfect pyramid. The perianth is 3 to 4 inches long and closely revolute, nodding, and of a rich orange color. Many claret colored dots are on the central portion. In size of flowers it averages about as in *L. speciosum*.

It is found only in the Sierra Nevada range of Central California and usually at an altitude of from 2500 to 4000 feet. There is an exception however in a large colony on the Sacramento River at little over 300 feet above sea level. It is a woodland lily found associated with Yellow Pine (*P. ponderosa*) and deciduous oaks, but is more likely to be found in an open forest where the trees are scattered in a park-like manner. There it is not confined to any exposure but is scattered widely and usually in a rather clayey soil. Still I have seen it in an

alluvial deposit in open canyons and on the Sacramento River it is in a sticky black clay (adobe).

It might well be supposed that it is strictly a woodland lily and it is so naturally, but where, as often occurs, the land is cleared and orchards or grain fields succeed the forests, this lily can be seen larger and finer than is the rule in woodlands and the bulbs are wonderfully fine. Undoubtedly the cultivation tends to keep the moisture up. But on the other hand the California summer in that region is very hot and the sun baking very severe.

I think that without question its natural distribution in woodlands is only due to the fact that its seeds need the moisture nearer the surface and the protection, but that when they are once well started it is immaterial. A year ago I saw hundreds in a vineyard flowering finely among the grapes.

To diverge a little from the subject, I think that practically all lilies which flower freely the first season after planting have a liberal supply of roots above the bulbs, and that the best forcing lilies are those in which this tendency is most marked. These upper roots feed the flowering stem but do little to develop the bulb. The basal roots which are the mainstay of the plant are much slower in developing and we often find this conspicuous in *Lilium auratum*. We have a glorious bloom the first year with heavy roots above the bulb, but in the fall we find that the bulb has decreased in size or even disappeared altogether. It is easy to flower *Lilium auratum* well, hard to establish it.

Lilium Humboldtii has no roots above the bulb and is a little slow in forming roots at the base, and so the grower need look for no flowers the first year or even find that the bulb lies dormant with no stem at all. But when once established it is a strong grower and very persistent. I am sure that wild bulbs are often twenty or thirty years old and I would not doubt a century.

In California the decay of the old scales proceeds very slowly, each year a scar is left by the growing stem and I have often counted fifteen or twenty scars, each recording a year of lily



LILIUM HUMBOLDTII
MAGNIFICUM

life, while even then a mass of leaf mold shows where still older growth preceded the earliest of these scars.

In cultivation at The Terraces I find *L. Humboldtii* most easy and this whether in a reddish soil rather clayey, in gravelly soil rich with humus, in silty soil with much lime, or in an alluvium. Elsewhere it takes well to heavy clays. I cannot see but that in any of the aforementioned soils it does as well as in its native home.

LILIUM HUMBOLDTHI MAGNIFICUM

A large strong growing lily with stem and foliage much like the type. The foliage is rather darker and smoother. In form, size of flower and manner of inflorescence it is also similar, but in color very different. The basic color is rich orange but there are many purple-maroon dots each encircled with crimson, and often almost covering the entire orange base. It is a most striking coloration.

In bulb the two are quite dissimilar. *Magnificum* has an ovoid or elongated bulb of thick scales some of which are always jointed and often several jointed. With slight exposure the bulb colors a deep purple.

Also most distinct is the fact that a very liberal supply of roots are formed above the bulb, that even small bulbs flower and that any fair bulb is sure to give a good bloom the first year as well as to root well at the base for permanent establishment. This makes this variety a most excellent garden lily. I know of few better.

A native of Southern California, it is found in the range facing the ocean beginning at Santa Barbara and on down to Los Angeles and in the mountains east of that city. Within this region its distribution is only in the canyons and a hundred feet or so from the bottom. This is due without doubt to the need of its upper root system for surface moisture, which in that rather arid region would not be found elsewhere.

It is often very deep seated. In some of the Southern Californian mountains there are peculiar canyons with flat bottoms



LILIUM HUMBOLDTII
MAGNIFICUM

from 50 to 100 feet wide built up of round boulders and alluvial soil. In these bottoms I saw this lily as much as 12 feet high with unbelievably heavy stems.

Robert Kessler saw a wild specimen about 12 feet high and had 85 flowers. At Sierra Madre in the valley east of Los Angeles a garden specimen was seen two years ago that produced two stems with 100 flowers and last year three stems and 85 flowers. The first year the stems were 11 feet high and last year 8 feet.

Some of the bulbs were fully 3 feet down and many 2 feet. I take it however that this was rather from debris being washed over established bulbs than through the bulbs seeking that level, but it demonstrates that lilies can be planted very deep if the soil is sweet and well drained.

Early botanical writers described a *Lilium Humboldtii ocellatum* and their figures and descriptions cover both this lily and the next. For garden use however I prefer the name given above as it is now well established.

LILIUM HUMBOLDTII BLOOMERIANUM OR LILIUM BLOOMERIANUM

This lily is exactly like the preceding excepting that it is a minor form. It is a handsome slender lily growing from 2½ to 4 feet in height with from a few to twenty fine flowers colored as in *magnificum*.

Its bulbs are conspicuously jointed with two or three joints which easily detach so that unless handled very carefully the bulb becomes truncated. It is easily grown and a sure, free bloomer.

In the two southern counties of California adjoining the line of Lower California striking, separate short mountain ranges rise from a comparatively low country and to quite a height. I have not the data at hand but I think as high as 10,000 feet. While very arid at their base the upper reaches are clothed with beautiful forests of pine and deciduous trees and it is here that *Lilium Humboldtii Bloomerianum* finds its home.

LILIUM COLUMBIANUM

This beautiful lily has a small bulb seldom weighing over an ounce and composed like that of *Humboldtii* of closely appressed lanceolate scales which are not jointed. Its foliage is a light pleasing green, smooth and mostly in whorls, the few to perhaps a dozen flowers are a light orange perhaps well described as golden, with some small dottings. The segments are closely revolute. It is hardy, graceful and adaptable—a nice lily to do with.

Its extremely wide and varied habitat well demonstrates its adaptability. In California it first occurs close to the ocean near Humboldt Bay well to the northwest corner of the state. There it is in sandy soils on raised ocean beaches and in the open among scattered shrubs. The ocean is near at hand and the climate is very rainy in winter and foggy in summer. A little further north in Southern Oregon it is scattered through open woodland in the moister reaches. In the Willamette Valley, the great Valley of Oregon, in the Puget Sound region and north in coastal British Columbia it is very widely distributed in open woodlands and usually associated with the Brake ferns. I have seen it among ferns 5 or 6 feet high only slightly overtopping them. Throughout these regions the soil varies greatly, now rather clayey, then decidedly sandy, but always with an abundance of leaf mold at the surface. East of the great Cascade range in northeast Oregon and on up into British Columbia it is widely scattered as a woodland lily associated with ferns. In this region it meets a decided winter not far from that of New York in cold, but drier.

I find no difficulty with its cultivation in any type of garden loam, while it is happy in a sandy loam. The bulbs are very easily handled but being small there is much danger of their losing vitality by being handled too dry. I think it better to keep in barely moist peat from the first until planted.

LILIUM BOLANDERII

This is quite different from the other lilies of this group and indeed from all other lilies. The bulbs are like those of *L. Columbianum* but composed of fewer and thicker scales. They are small. The leaves are smooth, the foliage rather dark and the few flowers half erect, funnel-formed with spreading tips and of a peculiar red rather approaching a brick red. The inner base is faintly dotted and the lily at large rather suggests a *Fritillaria*.

It is one of the most local of Lilies, and is found only near the border of California and Oregon and probably a square of 20 miles would include every wild specimen. It is found mostly at an altitude of from 3000 to 5000 feet.

It was mistakenly ascribed to Humboldt County, California by Sereno Watson who named it, but that was due to the confusion of herbarium specimens with *Lilium Kellogii*. Through this odd confusion Professor Bolander an eminent early botanist after whom it was named as its discoverer never saw it until years later.

In its native home it is either found in very open woods or associated with low growing shrubs and in a reddish mineralized soil which is rather clayey than otherwise.

In cultivation a well drained soil either clayey or gravelly meets its needs and I cannot say that it is a particularly difficult lily if—There is always an “if.”

In this case it is that it is rather difficult to handle the bulbs without overdrying unless they are collected late, say past mid October on. If then never allowed to dry but packed in moist leaf mold or peat they can be kept in good order. Overdrying is not so dangerous in a large lily bulb but in the case of a bulb an ounce or so in weight it is decidedly devitalizing.

GROUP II

LILIUM WASHINGTONIANUM

The typical *Lilium Washingtonianum* is a large strong-growing lily with a bulb composed of long and slender rather thin, overlapping scales and in the wild bulbs the bulb is much elongated laterally. This is not true in cultivation.

Both stem and leaves are smooth and of a pleasing light green, and the leaves are disposed in many-leaved whorls. The large funnel-formed flowers vary from a few to thirty but exceptional plants bear far more and even fifty may be found. Many years ago I visited a mountain side where thousands were from 4 to 7 feet high and had borne from twenty to thirty blossoms. If in the shade the stems tend to be slender but in the open they are often quite stout.

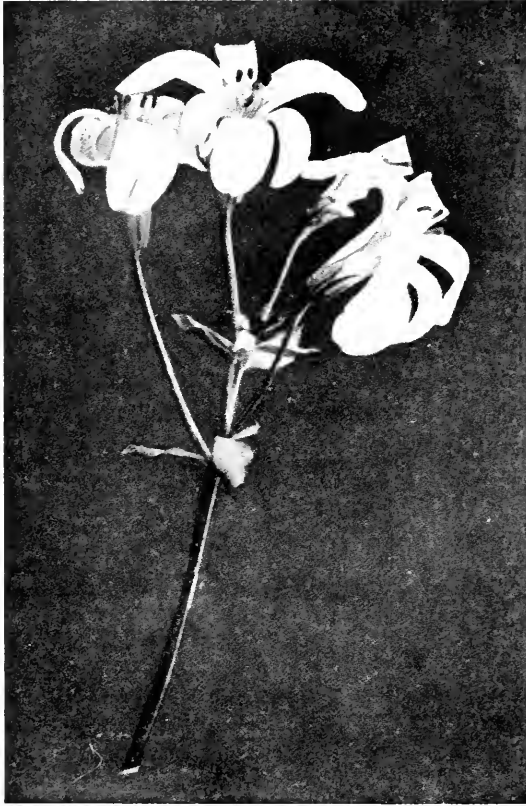
The petals are $2\frac{1}{2}$ to 3 inches long and the tips merely broadly spreading—not recurved. This makes quite a large flower. The color is uniformly white in the type and there may be small purple dots at the center.

It is a gloriously lovely lily in every way but I think that its greatest charm is in the exquisite spicy fragrance unexcelled by any flower. In its flowering season it perfumes the mountain sides, yet has not the overpowering sweetness of some of the Japanese lilies.

As the traveler ascends the long westerly slope of the Sierras of Central California he finds *Lilium Washingtonianum* shortly after he leaves *Lilium Humboldtii* and from 4000 to 7000 feet altitude. It is widely distributed from the Yosemite Valley northward to where the Sierras end southeast of Mount Shasta.

Seldom really in woodlands, it is usually found in copses of shrubbery through which it grows. If the copses are burned it simply luxuriates for about three years and numbers of seedlings grow. As the shrubbery grows up it dies out excepting where the shrubbery is least dense. I have seen it wonderfully happy just below where a melting snow bank watered it in late July.

The native soils in these regions are always open and rather loose. While often of volcanic origin they are usually in appearance a sandy loam well mixed with mold. Perfect drainage is ever present.



LILIUM
WASHINGTONIANUM

I wish that I could recommend this grand lily for general culture but after well toward forty years acquaintance with it I can point to few successes. Perhaps others will grasp the point which I have missed.

It has no roots above the bulbs and roots at the base rather slowly. While strong flowering stems are usually pushed up

the first year there is not the root system to support them and they develop poorly.

One great trouble in its culture is the strong tendency of collected bulbs to go quickly into a soft rot. While I have handled some lots of it successfully I have never found a way in which there is any assurance of doing so. The reader will note that these remarks apply only to the Sierran typical form.

LILIUM WASHINGTONIANUM MINOR

This handsome lily is found about the base of Mount Shasta in California and more rarely northwest for about 50 miles. It has a small compact bulb about one quarter the size of the type and bulbs weighing 4 ounces are extremely large for it.

The stems are slender and seldom over 4 feet high and a dozen flowers to the stem are to be seen in well developed plants. The segments of the flower are rather broader than in the type but in fragrance and other points it is the same. The bulb is more easily handled and grown.

In very open woods and among brushy copses it is to be found in a reddish volcanic soil. The altitude is from 3500 to 6000 feet and the winters quite severe. To Californians this is the Shasta Lily.

There is a point in the Siskiyou Range where the following lilies may be found within ten miles. *L. Columbianum*, *L. Washingtonianum minor*, *L. Washingtonianum purpureum*, *L. Bolanderii*, *L. Roeslii* and *L. Kellogii*. I doubt if at any other point in the world as many lily species are found.

LILIUM WASHINGTONIANUM PURPUREUM

With a stout stem, and leaves as in the type but it is fuller foliaged, from ten to fifteen flowers, and a large rather solid bulb with heavier scales than in the type and the scales con-

spicuously jointed. While in some bulbs only a few of the scales are two or three jointed I have had lots where they were so much so that in handling them the joints would break off and leave only a truncated base consisting of the lowermost joints.

This interesting feature shows an approachment to the rhizomatous bulbs of the *Pardalinum* group. I may say in passing that these scales readily make little bulbs. In sawdust used in packing one may, the succeeding spring, find hundreds of perfect little bulbs formed by scales.

It is in the flower that it is most distinct. The segments of the perianth are shorter than in *L. Washingtonianum* and overlap in the tube to form a short funnel with broad lips. The fragrance is as with the type.

The name is to a degree a misnomer. In some localities it is locally known as the White Lily yet perhaps 90 per cent of the flowers taken at large, open either white tinted purple and soon becoming purplish wine color or open of that color.

As to soils it has wide adaptability. In clayey soils, in volcanic soils or in the good clay loams it is alike at home. Drainage it always has and moisture during its growing season.

About Klamath Lake it meets a climate not very different from New York while in places it is much milder. It is however safely hardy.

From the practical garden point of view it is perhaps notable for the fact that its bulbs are very easy to handle. With any care they are little harder to pack and ship than potatoes. As an extreme instance take this. A collector shipped a thousand to me loosely packed in a large case with only straw packing. This in the heat of a California September. Very few were in any way injured by this rough treatment.

An incident that occurred some years ago may be of interest. In the grain fields of a section of the upper Willamette Valley in Oregon, a land of hop fields too, this lily was quite widely scattered. The plowing for the grain was not deep and only occasionally did a plow cut the top of the deep seated lily bulbs. They thrived wonderfully with this culture and flowered before

the grain was cut. The bulbs were truly enormous. One measured 28 inches in circumference and weighed 4 pounds. The farmers were however so annoyed by people walking through the fields to gather the lovely flowers that the lilies were dug out by them. The same stimulation occurs at intervals where woodlands or brushy lands are brought into cultivation and always to the benefit of the lilies.

In cultivation it can hardly be said that this is a very easy lily yet I usually succeed and it is well grown in many regions in England. A well drained deep soil either gravelly, loamy or even open clay. Shelter from harsh winds, light shade where the summer heat is great, and moderate moisture are the indicated treatment. Not a lily for the careless nor a lily for any one to despair of who takes care.

LILIUM RUBESCENS

This was long confused with *Lilium Washingtonianum* and was even called *L. Washingtonianum purpureum* by some. It is very distinct.

The bulb is always solid and ovoid, the foliage similar but with more, and more perfect whorls, the flowers are narrowly tubular with recurving tips. When few they are borne in umbels while if many are in racemes. At first opening they are almost white but thickly dotted with purple. The purplish dottings quickly spread till the flower is all wine purple and on one stem may be seen all of the colorations from the opening white to purple. It is a delightful and striking lily.

Almost all notes as to the size of the lilies or the number of flowers are apt to be misleading. It is oftener a matter of soil and situation. For instance I have seen a group of *L. rubescens* 11 feet high with thirty or forty flowers while it is often seen with two or three flowers on an erect stem 2 to 3 feet high. Plants 6 to 7 feet with 20 flowers are common in nature.

Like *L. Washingtonianum* this lily has a delightful fragrance which persists in pressed flowers for months. I often trace wild plants by the fragrance.



LILIUM RUBESCENS

It is only found in the Coast Ranges north of San Francisco Bay for about 150 miles but within that limit meets most varied conditions. In the Redwood forest it is known as the Redwood Lily and is found on open ridges in underbrush in a clay soil. At one point it is on a ridge within 1000 feet of the ocean. Farther east it is on the north or northeast exposure of high peaks in a vast region of close shrubberies locally called Chapparal. There it is the Chapparal Lily. Still further from the ocean it grows in rocky debris among the Golden Oaks. So with clayey soil, gravelly soil or broken down rocks mingled with leaf mold, its soil needs sum up with good drainage, protection from harsh winds, moisture during its growing season.

Lilium rubescens is a much better garden lily than either form of *Lilium Washingtonianum*. I was rather surprised to be told by a San Franciscan that he grew it very well in the almost pure ocean sand of that city. Unless collected rather late, say mid October, its bulb also is rather hard to handle.

LILIUM KELLOGII

This is very similar to the others in bulbs and foliage but very distinct in flower. It is a true Martagon with segments closely revolute. The bulbs are of about the size of those of *Lilium Columbianum*, the stems often $2\frac{1}{2}$ to $3\frac{1}{2}$ feet in height, slender and often three to eight flowered, although I have grown them with twenty flowers. The color is a pinkish purple lightly dotted; and with a pleasing fragrance unlike that of any other lily.

Like *Lilium Bolanderii* its habitat is a very small area and probably 50 miles of a very narrow belt reaching from Humboldt County north would cover its extremes.

It is found either in very open Redwood forest or in open pine woods, and in soils always rather clayey.

I have found it quite easy to grow and flower. A very good percentage of mature bulbs will flower the first year and I have never known of wild bulbs producing as fine a bloom as I averaged.



LILIUM KELLOGII

GROUP III. THE BOG LILIES

As this article is designed more to aid in culture than as a botanic treatise it will be well to digress somewhat to remark as to bulbs of this group.

In all of this group the rhizomatous bulbs are not deep seated in the ground nor do they grow where the soil becomes quite dry. In handling out of the ground they should never be allowed to dry out in the least. The trained collector digs and washes his bulbs and packs at once in the field in moist spagnum or green moss. He sees that the stored bulbs never get dry at all. He knows that too much moisture may stimulate root growth in the packing but realizes that this can do little hurt as compared with loss of vitality through any drying. In successful culture with Bog Lilies the first essential is good bulbs full of vitality and fresh.

The purchaser of such bulbs should use like care to keep unplanted bulbs either in moist leaf mold, damp moss or best of all in damp powdered peat. There is no danger of rot unless bulbs have overdried at some time after being dug.

In this group we have lilies with creeping rhizomatous bulbs formed by a narrow core-like substance very densely covered with overlapping scales which are usually jointed. The flowers may be either closely revolute as with *L. Pardalinum*, broadly funnel-form as with *L. Parryii* or narrowly funnel form as with *L. parvum*. All are so called Bog Lilies. They are seldom really so, and no one of them does its best in boggy soil.

L. PARDALINUM

Of the bog lilies this is distinguished by a rhizome with one or two jointed scales which increases by the growing bulb which may be called an eye of one year forming from one to five new eyes, each of which may produce a flowering stalk and in turn multiply in like ratio. The rate of multiplication of the more prolific strains of this lily when in fine soil is startling. I have seen five hundred closely interlocked bulbs which had come from a single original. No other Western Lily has



LILIUM PARDALINUM

this mode of reproduction and no other produces more than one eye excepting in rare instances.

The smooth light green leaves may be broadly or very narrowly lanceolate, may be scattered thickly on the stem or in part disposed in whorls.

The large closely revolute perianth is orange red on the lower third and some shade of red or crimson on the upper two-thirds and spotted at the center.

There are innumerable variations in the wild plants so that the lily is hardly the same in any two localities of the very extensive region over which it is spread. Some of these variations have been named but the names have not been consistently kept by dealers and signify little, although there are variations well worth keeping separate.

The form from Mendocino County, California is often put out as *californicum* and a most brilliantly colored form was called *Johnsonii*.

In Southern California there is the very rare form *fragrans*. The type is not in the least fragrant while this very light colored form is. I am satisfied however that it is either a hybrid of *L. Pardalinum* \times *Parryii* or a connecting species, as its bulb character approximates that of *L. Parryii*.

As a garden lily *L. Pardalinum* is unexcelled. It will succeed in any garden loam with moderate watering; it thrives either in sun or shade and flowers freely. In an alluvial soil it thrives wonderfully.

Botanists have little to say of bulbs but the lily dealer or collector is forced to pay much attention to that side of the matter for bulbs differ immensely as to behavior when out of the ground. Many lily bulbs which are quite healthy when left alone are simply hopeless when dug and kept for long out of the ground. Fungi and bacteria seem to have an especial affinity for them. They go into a soft rot or a dry rot in spite of all known precautions.

The bulb of *L. Pardalinum* is one of the easiest to handle out of the ground. Of course it should never be allowed to get dry, but if packed in moist moss, spagnum, or peat it carries



LILIUM PARDALINUM
CALIFORNICUM

and keeps perfectly for a long period. This insures its reaching the grower in good order and that fact alone might perhaps account for the difference between success and failure. A few years ago an English gardening paper published a series of reports from lily growers of their experience with different lilies and I think that no other lily had been a success in so many places.

As I have said it is very widely distributed on this coast and is found from the Mexican line near San Diego to Northern California. It is found in both the Coast Ranges and the higher interior ranges from sea level to about 5000 feet altitude.

In the Northern Coast Ranges it is more likely to be along the banks of some small living stream well up in the mountains where, rooted in a sandy sedimentary deposit, its roots run down to the water for a sure supply. Shrubbery lightly shades it or it overtops a strong growth of perennials. If the banks are lined with alders its growth is more slender and graceful but its flowering poorer.

Again in the same region some spring bursts out of the brushy hill slopes and moistens quite an area of soil which is loose and rich with mold. In these little meadow-like expanses *Pardalinum* is most happy and often forms dense colonies.

Almost as happy and much taller, it grows where a spring seeps under a deposit of gravelly soil or the debris of a shaly cliff. Here where apparently the soil is quite dry but where abundant moisture is to be found a foot to two down the very finest specimens grow.

In the Sierras they are not nearly as widely distributed but at times are far more abundant for in the Sierras the best moisture conditions are to be found in open meadows of black soil, a sand rich with humus. In one such meadow-like valley I once saw tens of thousands scattered all over its expanse. Later it became a hay field (timothy) and the lilies were even happier.

I have said that there were no varieties of *L. Pardalinum* distinct enough for botanical notice although many are well

worth while propagating for garden color. I should however make an exception for *Lilium Wareii* or *L. Pardalinum Wareii* which might well be called the Lost Lily. *L. Wareii* has a bulb between *L. Pardalinum* and *L. Parryii*. Its perianth is closely revolute and of about the size of *L. Pardalinum* and the flower is very fragrant. The color is a clear solid rich yellow, a most desirable shade. It is a really one of the finest of world's lilies and its history is most interesting.

F. A. Miller of San Francisco had it from a collector who found it somewhere in the back country of San Diego County thinking that he was collecting nothing but *L. Pardalinum*. Mr. Miller sent it to T. S. Ware of London, one of England's great horticultural growers of the day, and when Ware flowered it he found that he had a most unique lily. It was named *Lilium Wareii*, was described in the *Garden* of London, was the subject of one of the *Garden's* superb chromo lithographs and in that way its identity is perfectly fixed.

Ware wrote to me for further supply and gave me his data which I followed up, and used the original collector, then an old man. Not another bulb of this fine lily has ever since been found. I am of the opinion that research in the peninsula of Lower California will bring it back, for near the Mexican Line I have found *Lilium Pardalinum fragrans* which is *L. Wareii* in all excepting that there is quite a little red suffused through its yellow base color. When *L. Wareii* was to be had \$10 each was the price for its bulbs.

LILIUM PARVIFLORUM

Might be and has been called *L. Pardalinum minor*.

It is a distinct species, and a much smaller lily than the other. The bulb differs in having more than two jointed scales and very rarely producing more than two eyes, never more. It is therefore a solitary lily and propagates by seeds only.

Its stem is slender and the light green leaves are rather narrowly lanceolate and either scattered thickly or somewhat in whorls, according to the size of the plant. It is often 2 to 3

feet high with a few flowers but at its best it is 6 feet with as many as twenty blossoms.

Its color varies very greatly, just as does *L. Pardalinum* but nearly always with an orange center and outer sections of some shade of red and most usually of crimson. The inner third is lightly dotted, and it is always fairly fragrant.

I have seen one form in the Southern Sierras in which the flower is orange yellow throughout but dotted. This form was confused by botanists with *L. Columbianum* which is a far different lily. This confusion has led botanists to attribute the latter to the Sierras where it never occurs.

As I have said *L. parviflorum* is an extremely variable lily and there are forms which are very strikingly colored and desirable. None have been named or distributed horticulturally.

The habitat is well marked. Beginning in the Kings River country of the Southern Sierras (California) it is to be found at from 3000 to 5000 feet altitude as far north as the base of Mount Shasta and in the granitic ranges west of Mount Shasta. It is not found in Oregon or in the Coast Ranges proper. It is to be found along small streams in alluvial soil or in small meadows where the soil is alluvial and moist. More often it is associated with tall perennials or low shrubs which it overtops. I have never seen it in soil which could be called boggy.

It is a good lily, not quite as adaptable as *L. Pardalinum*, but its fragrance and earlier flowering give it a place. There are no difficulties in its garden culture in any good loamy soil where ordinary garden moisture is maintained. It could not help thriving in a well prepared lily bed.

LILIUM ROEZZII

Has a bulb almost identical in formation with that of *L. Parryii* with scales often three jointed. A perfect bulb is a very beautiful thing, pearly white and almost lace like with the innumerable fine jointed scales. The stem is slender and graceful with very long slender leaves scattered

thickly on the stem. The closely revolute flowers are oftener few in number and probably twelve would be an extreme. Its color is a clear orange very close to golden with no trace of red, and finely dotted on the inner third. This in the type. To the west they are orange in the center and deep crimson on the outer two thirds. I doubt if a well grown specimen is excelled in graceful loveliness by any lily.

It was discovered at an early date and then lost. Its early discoverer attributed it to Utah which was very misleading to later botanists although correct, for the early territory of Utah extended to the Sierras and boundaries were very vague in the popular mind. Its real home is in the Siskiyou Range, a distinct range running east and west on the line of California and Oregon in the gap between where the Sierras end and the Cascades begin. The Siskiyou Range is one of the richest botanical regions of America and there is a large number of very fine species entirely confined to this area one of which is the superb Weeping Spruce, *Picea Breweriana*.

L. Roezlii grows at an altitude of from 3000 to 5000 feet in, as a rule, exactly such soil as would suit *L. Pardalinum* or *parviflorum* with this exception. I have at times found it in bogs of an almost true peat, and often in an alluvial soil so rich in humus and so wet as to be well called mucky.

It is well to say a word as to hardiness in general at this point. The Siskiyoues lie far enough north to have quite cold winter weather even about their bases. Early in the winter it may freeze quite deeply before there is much snowfall, while later the higher elevations are covered rather heavily. These conditions do not vary much from those we will say in New York excepting that the air is probably much drier early in the winter.

L. Roezlii experiences all of these variations as do *L. Kelloggii*, *L. Bolanderii*, *L. purpureum* and a number of species of *Calochortus*, and Brodiaeas. In my garden *L. Roezlii* does well in a sandy loam. I do not think that there is any doubt that the well prepared lily bed fitted for Asiatic lilies will meet its needs perfectly.

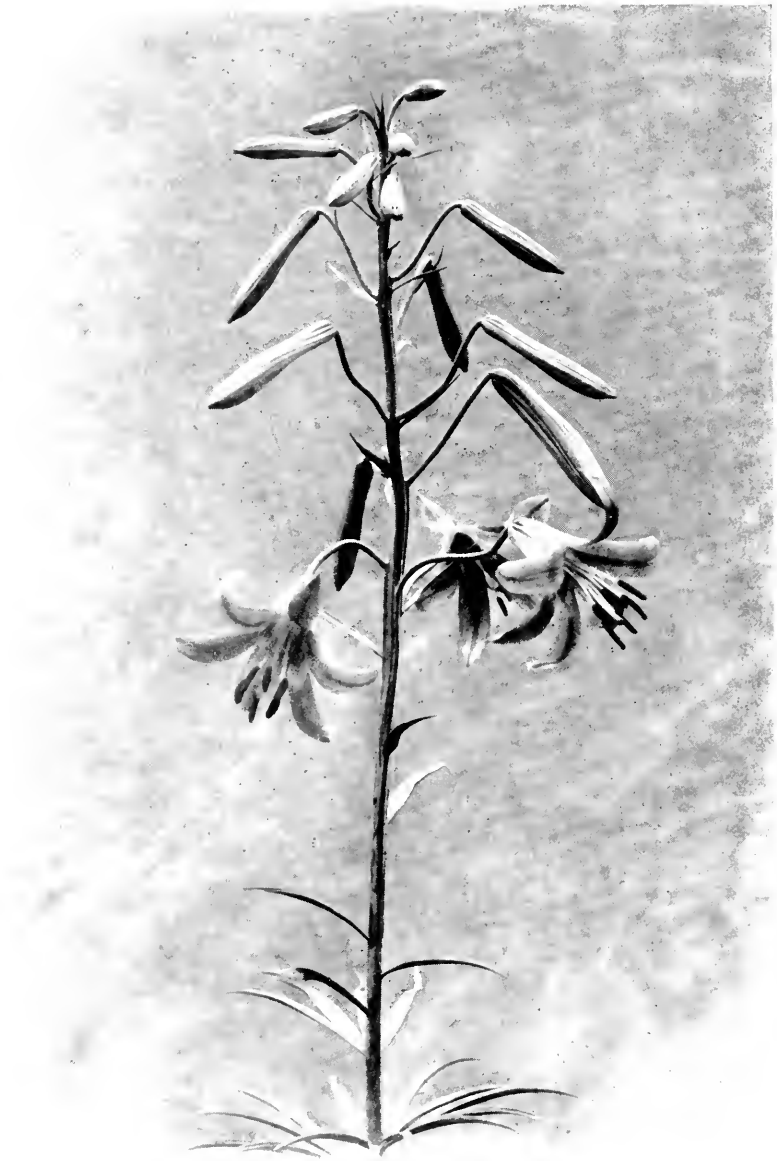
L. PARRYII

In this the bulb has three or more joints and never produces more than a single new eye. It is therefore solitary. The stem is slender and graceful and from $2\frac{1}{2}$ to 5 feet high with many light green lanceolate leaves either scattered or with a whorl at base. The segments of the perianth are 3 to $3\frac{1}{2}$ inches long and form a broadly open funnel-formed flower with slightly recurving tips. In color *L. Parryii* is a clear solid pale lemon yellow, with some deeper and approaching golden. The dotting is not uniform, for some flowers are clear and others slightly purplish-dotted at base. The flowers are borne in racemes of from a few to perhaps fifteen at the most and are delightfully fragrant.

Eulogy cannot be well overdone with this fine subject and lily growers are willing to take endless pains to grow it well. In my own gardens I have always flowered it easily the first year yet for some time failed too often to establish it permanently but I am now doing so very successfully. They are in a sandy loam soil in the full sun but in a fairly cool situation. The soil is never wet and in the summer the first 2 inches are quite dry but below that line it is always moist with just about the degree of moisture that I prefer for Perennial Phlox or Delphiniums,—that should tell the story to a gardener. Still it would be well to prepare a bed as follows. Take two to three parts of sand, one to three parts of either peat or leaf mold, and a liberal addition of charcoal or grit. See that drainage is perfect and give a fairly cool situation either with shifting shade, or in cooler climates in the full sun. Get good bulbs and plant early. They begin rooting at once even in August.

Robert Kessler of Los Angeles, a lily enthusiast, grew the flowers from which the accompanying photographs were made and narrates his methods as follows.

A man who had been at Kew Gardens, London, gave me the method. I took Japanese flower tubs and burned the insides so that the wood was well charred and into these I first put seven to eight $\frac{3}{4}$ -inch drain holes, then a lot of sphagnum moss, then about 4 inches of granite chips. Over



LILIUM PARRYI

this I put some fine humus mixed with sandy silt, then a good sprinkle of coarse charcoal, then about 2 inches of fine river sand. On this the bulbs were planted and after being sprinkled with fine charcoal they were covered with 2 inches of sharp river sand.

The tub was then filled with humus and the top dusted with fine soot. The tallest were $5\frac{1}{2}$ feet with fifteen flowers.

The above I think well worth reproducing as it at once gives a most successful method of growing this particular lily and the methods used, by very successful experts with many other difficult lily species. It is well to call attention to the very careful guarding against those molds which kill some subjects, to the perfect drainage, the sharp sand about the bulbs and to the top humus which is most excellent to keep moisture well to the top. While innumerable lilies can be grown wonderfully well without any such care I do not doubt that the above described method would produce show specimens that would be surprisingly fine. In application it is not so very different from my conditions of perfect drainage, constant moisture a little below the surface and a soil rich with lime to insure sweetness. And let me again emphasize the necessity of careful handling of the bulbs themselves.

L. PARVUM

In this lily the bulbs are small with three or more jointed scales. The stems are slender and in most instances few flowered and a foot or two high, but this is not a specific point, for in the deeper meadow soil I have seen them growing with *Aconitum Fischerii* 5 to 6 feet high and many flowered. In small plants the lanceolate leaves are all scattered while in fine plants they are in part densely whorled. The small funnel-formed flowers ascend or are semi-erect and have recurving tips. The color scheme is of a dotted central orange with red tips. The true *L. parvum* is of one type and varies little. It is a near relative of *L. canadense* of the East and with us is almost an alpine. I think that it is never found below 6000 feet altitude and may reach an extreme of close to 10,000 feet

in a region of very deep snows. Not infrequently its snow covering has not melted in mid July.

It is found from a little north of the Central Pacific Railroad to the Yosemite Region in California, a region not over a hundred miles in length and very narrow. All of this is where glacial action was the great factor in making the soils and shaping the country and it is in the little glacial meadows bordering glacial lakes that this lily is oftenest encountered. The soil is a granitic sand mixed liberally with humus. Melting snows supply moisture liberally after the mountain spring comes but toward fall this is gone and the bulbs may become quite dry although never dry enough to wither them. The drainage is always good, the soil sweet and moisture at growing time plentiful. A multitude of alpine plants accompany them, none of which are in the least bog plants. They are oftener in the full sun but at 6000 feet this does not imply the same in cultivation.

It is neither easy nor hard to cultivate this lily. It is not a lily for popular culture nor is it a lily in the least to baffle the trained gardener. The treatment and soil recommended for *Parryi* or *parviflorum* meets its needs.

Lilium parvum luteum. This can be described as a major form of the last described species, with clear orange flowers dotted on inner third. It is a good lily.

A striking feature of the distribution of lilies in the Californian Sierras is the fact that they lie in strata if we may so call them at different altitudes. Thus at the summits and high up on the peaks we have the alpine *L. parvum*. Where that ends going down and following stream courses we have the *luteum*. This would be found in the Central Sierras at from 4500 to 6000 feet altitude. At its lower edge it would approach but not mingle with *L. Pardalinum* while *Lilium Washingtonianum* would be almost coterminous with it.

Below this line would be *Lilium Pardalinum* and *Humboldtii* in the Mid Sierras, *L. parviflorum* and *L. Humboldtii* in the Northern Sierras while *L. parviflorum* would go on south and partially replace *luteum* farther South.



LILIUM PARVUM, A MOUNTAIN
LILY FROM CALIFORNIA

As far as I have been able to trace it *Lilium parvum luteum* varies but little and does not extend farther either north or south than does *L. parvum*. They do not however intermingle.

L. MARITIMUM AND L. OCCIDENTALE

All of the Bog Lilies that I have so far described are mountain lilies but the two species that I now come to are strictly seaside. None are found at an elevation greater than 300 feet above the sea nor at a distance greater than a few miles from salt water.

The rhizomatous bulbs are densely covered with single jointed scales (articulated only where they join the core of the rhizome.) They would differ from the ovate bulb in that in the latter the scales are not articulated. The stems are well furnished with dark green lanceolate leaves which are often scattered. The stems are also dark green. Ordinary plants are from 1 to 3 feet in height and from one to three flowered but exceptional plants approach 6 feet with perhaps a dozen flowers at the most. It is rather a dangerous thing to say just how tall or floriferous a lily may become for under exceptional conditions they may surprise one.

The open funnel-like or campanulate flowers of *Lilium maritimum* have recurving tips while in *Lilium occidentale* the flower is distinctly of the *Pardalinum* type and closely revolute. In both lilies the prevailing color is a deep crimson with the narrow throat reddish orange and somewhat spotted. Neither is fragrant. *L. occidentale* occasionally runs to more yellow at center and a lighter red at outer section.

Along the Californian Coast at intervals there are raised sea beaches at an altitude of from 50 to perhaps 400 feet above tidewater. These areas face the ocean and have a soil either with a sticky clay subsoil and a peaty top or the same with a deeper soil of ocean sand mixed with humus. Not infrequently there are bogs with quite a depth of peat.

The frequent and heavy fogs and the consequent cool and equable climate, and the soils have made a fit home for dense

growths of maritime pines and ericaceous shrubs. The Western Rhododendrons (*R. Californicum*) are there in endless numbers while such heathy plants as *Arctostaphylos*, *Vaccinums*, and *Ledums* form dense growths in the barrens. The bogs are full of *Ledums* and on hummocks among their interlacing roots *L. maritimum* is largest. The soil would be a pure vegetable peat, the drainage although in a bog, perfect, and the roots would go to perpetual moisture. But far more frequently it is found in ocean sand in the barrens away from bogs. To be sure the poor soil makes poor plants but they are quite happy unless the endless shrubs rob them, and, after a brush fire gives them more room when they are very fine indeed. *L. maritimum* is found from a little south of San Francisco to Northern Mendocino. Doubtless it grew on the site of San Francisco.

L. occidentale replaces it in exactly the same class of maritime country from the Eel River north to the Oregon Line near Crescent City. I would suspect its presence farther north along the Oregon Coast but botanical material has not been available from that region.

In my own garden I have given *Lilium maritimum* a boggy soil but claim no success. It ought to be grown well in the Rhododendron Lily bed and I think has been so grown in England. Climatic conditions in Southern England should be very favorable. In the eastern United States experience will have to be bought.

L. maritimum Var.—In Western Sonoma County in California an interesting variation of this lily is to be found in a series of little bogs with very sandy surrounding country. This is about fifteen miles from the ocean and is rather foggy. It is the region so commercially successful with the Gravenstein apple. These forms are rather reddish in color and unnamed.

RÉSUMÉ OF NATIVE CONDITIONS OF WESTERN LILIUMS

It will be noted that all of the lilies of the *Humboldtii* and *Washingtonianum* groups are either from woodlands or grow amongst shrubs at higher elevations. That is in woodlands, they are always in the open woods where the lights are shifting and that if the woods thicken the lilies languish or disappear altogether. Where a fire goes through this open timber and kills the brush and some of the trees the lilies grow much finer and where areas of timber land have been cleared and the soil brought into not too deep culture the lilies have done better than they ever do in the natural state.

Again it is to be noted that in western forests the soil is almost always of fair depth with, we will say, 18 inches as the shallowest. Underlying this soil there is in much of the western forests a clay which is often impervious to tree root growth. In the Sierras and Cascades however the soils may be very deep.

Inasmuch as the same species thrive both in the shallower and the deep mountain soils it is certain that great soil depth is not a necessity or even particularly desirable. The indications in nature are unmistakable that the rhizomatous lilies which are rather shallow growing like a cool surface. The fact that they grow so well through shrubs and that a coat mold is often present rather indicates a love of cool surface.

The indications that such lilies as *L. Humboldtii*, *Bolanderii*, *Washingtonianum* or *rubescens* care at all for a cool surface are lacking. Surely a lily which will thrive in Californian sun with a shade temperature up to 110° above zero and not a drop of moisture from April till October does not have any particular objection to surface baking. I think that the same facts obtain with the lilies of the Chinese highlands. But with this surface baking we have well established bulbs very deep seated where the soil retains considerable moisture throughout the summer. As to why in nature lilies are seldom in the open see page 500 in writing of *L. Humboldtii*.

A résumé shows that our lilies thrive in a great variety of soils but that drainage is an essential. In clays and gravels, in sandy loams and in broken down masses of rocks, and even in sticky black clays (*L. Humboldtii*) they are to be found growing to perfection.

In some of these soils there is a moderate amount of humus but that cannot be considered a characteristic of our lily soils for these two groups, for as a rule Californian soils are deficient in humus and the constantly recurring forest and brush fires which date back to time immemorial prevent any material accumulation of leaf mold in any but our coastal woods. But these same fires insure an abundance of potash. Western soils are all well supplied with phosphates and I think that without question the use of bone meal with lilies is always desirable.

Eliminating what appears unessential and averaging conditions it would appear that the lily bed for these two groups should have a sweet soil and be made at least 18 inches in depth; shelter from harsh winds; a fair supply of potash and an addition of phosphates; either a well cultivated surface or that the moisture level below 3 inches should insure moderate dampness.

While full sun may be all right yet a shifting shade rather light at that, would be more likely to be a safe general rule. Beyond this take into consideration the fact that few lilies are able to reestablish a full system of basal roots the first year after being moved and it will be apparent that more care as to moisture is necessary in the newly planted lily bed than afterwards.

CULTURE OF GROUP III

To a degree the remarks in regard to the first two sections apply to these as well. For instance forest fires are common where *L. Parryii*, *L. Pardalinum* and *L. parviflorum* live and are unknown in the homes of the others. They are always followed by unusually fine growth in the lilies affected. Also by

unusually large and healthy bulb growth. This would rather indicate that the leaf mold cover is not so essential as we might have supposed and that in well established lilies the protection of low shrubs through which they grow is rather a hindrance than a help. A rather revolutionary sequence yet it seems to be consistent with facts observed in countless instances.

It will be noted:

1. That they are either at fairly high altitudes or in a cool coastal climate.

2. That the soils are far more frequently a sandy alluvium and that as the mountain slopes are usually steep there is almost sure to be an addition of silt and charcoal as well as ashes to these alluvial deposits.

3. That they are shallow growers with 3 to 5 inches the usual rooting depth.

4. That while the surface soil may be even quite dry, moisture is always present within easy reach of the roots and that the very finest specimens of each species are found where the bulbs are in well drained soil, and the roots reach living moisture.

5. That while they are often very fine when growing amongst low shrubs they are better when a fire has burned those hosts and that while growing in open timbered canyons they languish when the timber becomes dense.

There is nothing to indicate that the natural soils are always rich in phosphates yet their use is safe. Climatically their hardiness throughout the East is to be supposed from their native habitats and has been abundantly proved in trials.

Summing up all indicates that the usual preparation of the lily beds approximate their needs. A soil rather loose and workable, composed of sandy or open soils either loam or light gravels with a good component of humus and of a depth of at least a foot and better 18 inches. Perfect drainage yet abundant moisture, a drainage layer of gravel, grit or broken stone leading into tiles would give this result in a well prepared lily bed. The bed might be in full sun in a cool climate yet ordinarily should be lightly shaded at least in the afternoon.

A mulch of leaf mold will keep the soil cool and equalize moisture yet the lilies will thrive better if its situation makes this unnecessary and the surface is kept mellow.

The bulbs should be planted from 3 to 4 inches deep and with the exception of *Lilium Pardalinum*, which in time becomes too dense, it is better to leave the plants undisturbed for a long time. At the most a protection of leaves should be given for the winter. Those who wish to try for the finest flowers would do well to follow the methods of culture given for *L. Parryii*.

Winter Work with Roses*

By Alfred W. Greeley



TO THE amateur rosarian the dead winter months have their fascination only in degree less pleasurable than the cultural joys of spring and summer. Winter is the time for reviewing and planning; for the analysis of last year's mistakes and the synthesis of this year's successes. It is under the study lamp, while the snow piles deep over the rose-beds and the thermometer flirts with the nether ranges of the scale, that the strategy of the drive for the coming season's rhythm of rose bloom is perfected, if the rosarian is wise.

Success with roses demands knowledge, experiment and patience—patient, tireless experience that adds ever to the determined desire to know the whys and hows of the never-ceasing miracle of rose bloom. It is an instance of appetite growing by what it feeds upon. He who has watched a rose through its transformation cycle from swelling bud and pulsing green leaf to the burst of beauty in the opening petals of the crowning bloom, and feels no fierce spur to know the why and how of this wonder-work of nature, may be a grower of roses, but a rosarian, never! To the rosarian worthy of the name, the opening rose is an invocation and a benediction, a lyric prayer that springs attuned in beauty from the very heart of nature itself.

As a matter of fact, not one rose-grower in a hundred knows, except in a vague way, whether the roses in his garden, whether his Ophelia, Lady Alice Stanley, or Radiance, are true to type and standard in the unit characters of size, color, substance, number of blooms, and so on, which under average cultural conditions distinguish these varieties. He does not know

* Reprinted from the 1919 *American Rose Annual* through the courtesy of the editor and the author.

whether his Mme. Jules Bouche, or Harry Kirk should give him twenty-five or seventy-five flowers during the season, and generally is content if he gets "right smart" of bloom. Lack of knowledge of the standards for bloom is responsible for the fact that the great majority of rose-gardens contain plants that, through inherent inferiority of stock or lack of proper culture, fail to produce either the quality or the average number of blooms characteristic of the variety. Such plants are simply parasites, "free boarders," of the rose-garden. They take as much care and fertilizer as an honest rose, and return only a beggar's dole. The small rose-garden of the average amateur is of too limited space to be cluttered up with under-average plants. They should be scraped relentlessly.

Profusion of bloom and quality of flowers are the two things which primarily interest the average amateur in rose-growing. Not so long ago, June alone was the month of roses, with only scattering blooms for the rest of the season. The advent of the Hybrid Tea has revolutionized the rose calendar, leaving no excuse for months barren of bloom in the rose-garden.

That which is now true of the dwarfs will soon, let us hope, be likewise true of the climbers. The experts are feeling their way toward this much-desired end. Last year, in my little back-yard garden, the first killing frost of November caught *Le Mexique* rich in hundreds of blossoms, while *Ghislaine de Feligonde* was not far behind. Growing briars for five-sixths of the season must soon pass out of fashion. For the small garden of the average lover of roses, profusion of quality bloom is the main consideration.

The mere rose-grower plants his roses with more or less careful preparation—sometimes by the signs of the moon—and lets nature do the rest, oftentimes its worst. The enlightened amateur makes almost a religious ceremony of the planting of his roses, which generally occurs late in the fall when the wood is thoroughly ripened and dormant, at which time it feels the minimum of shock from transplanting.

But the chief distinguishing difference between the mere rose-grower and the amateur rosarian is in the matter of keep-

ing intelligent record of the performance of his roses. The small daybook which slips conveniently into the pocket of the old garden coat is the rosarian's *alter ego*. It is the basis of such success as may come to him, for it means recorded observation which later may be analyzed and combined into working rose facts.

Into the rose day-book should go such matters as dates of bloom, number of blooms cut from disbudded plants, peculiarities of behavior, growth, bloom, etc.; appearance and course of insect and fungus attacks, dates of cultural care; amounts and dates of application of liquid manure, lime and other fertilizers; and temperature readings which should include number of days of sunshine, rainy days, and other data that go to make up the climatic environment. Temperature data, however, generally can be obtained from the local weather observation bureau at the end of the season.

This, in the main, includes the essential facts out of which knowledge of rose habits and behavior is built up and by which local standards of rose-bloom and perfection can be established. Only by this method can the amateur rosarian identify for a certainty those roses which are doing their bloom-duty for him, and, at the same time, discover the lazy, defective plants that are to be weeded out.

A daily bloom-count at the time of cutting in the morning, is about all that is necessary for this purpose, and it is generally as far as the average amateur gets the first season in recorded observation. Afterward his enthusiasm for recorded facts grows. Every addition to rose knowledge brings to us new vistas.

It takes only a few moments each day to transfer the facts from the garden day-book to a set of indexed cards arranged alphabetically under the name of each rose. This card carries the name of the rose, date of purchase and transplanting, age, nursery from which obtained, type, stock, budding and grafting information, and the like. It is a condensed life history of each rose from year to year, with all the facts grouped ready for quick comparison. Another convenient method of permanent

record is an indexed loose-leaved book of the right size. It has some advantages over the card system. Other recording methods will suggest themselves to the enthusiast, growing out of individual needs and experiences.

The material for observation and record is virtually limitless, but it is well for the beginner to confine his data to a few relatively simple things at first, such as the discovery of "boarders;" effects of mulching in hot weather; bloom-production of Hybrid Perpetuals, Hybrid Teas, Teas, and Pernetianas; comparisons of various budding stocks; the response to fertilizers of various kinds; special beds; own-root plants compared with budded or grafted stocks; immunity to insect and fungus attacks, etc.

It is only by persistent observations, sturdy questioning and insatiable curiosity that one can attain that almost intuitive understanding of rose character, temperament, and habit that constitutes the rosarian's chief satisfaction.

After the completion of the card-index work comes the tabulation for purposes of comparison, without which the work is relatively valueless. Here comes the test of the year's work in the summation of rose performance. A standard of comparison is necessary, and for Philadelphia and districts of similar climatic conditions, the only available standard is that established by Capt. George C. Thomas, Jr., in his large test-gardens and published in the latest edition of his "Practical Book of Outdoor Rose-Growing." For this pioneering test-garden work and invaluable results American rosarians are under deep obligations to Captain Thomas. The method of comparison is indicated in the following extract from the tabulation of rose performance in my own garden during 1918:

FIRST CLASS: Fifty blooms or more.

No.	Name	1918	1917	Thomas
1.	Mrs. A. R. Waddell, H. T.....	84	54	57
2.	Mme. Jules Bouche, H. T.....	81	—	71
3.	La Tosca, H. T.....	80	—	57
4.	Gruss an Teplitz, H. T.....	79	64	107
5.	Harry Kirk, T.....	76	31	32
6.	Frau Karl Druschki (No. 1), H. P.....	71	64	65

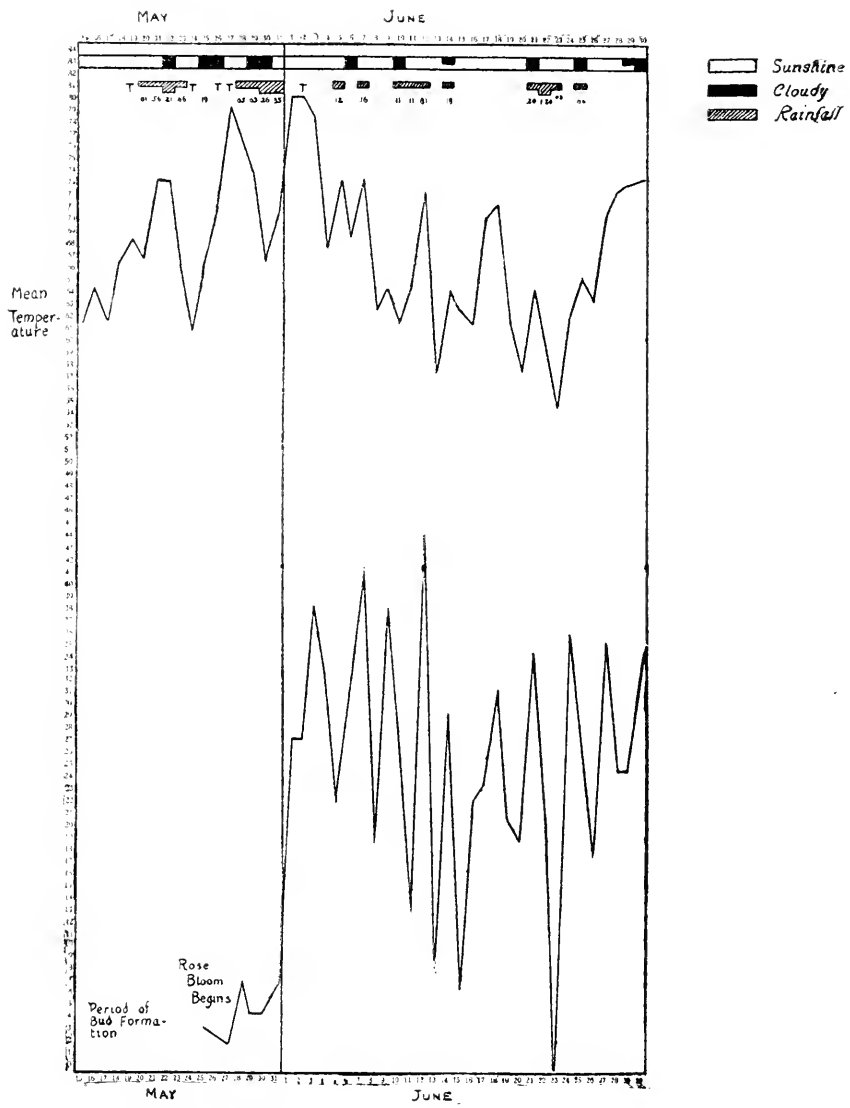
No.	Name	1918	1917	Thomas
6.	Betty, H. T.....	71	21	54
7.	Radiance (No. 4), H. T.....	65	—	51
8.	Radiance (No. 2), H. T.....	64	—	51
9.	Mme. Segond Weber, H. T.....	57	—	49
10.	Lady Pirrie, H. T.....	52	—	56
10.	Frau Karl Druschki (No. 2), H. P.....	52	45	65
11.	Mrs. Aaron Ward, H. T.....	50	20	38
11.	Radiance (No. 3), H. T.....	50	—	51

SECOND CLASS: Forty to forty-nine blooms.

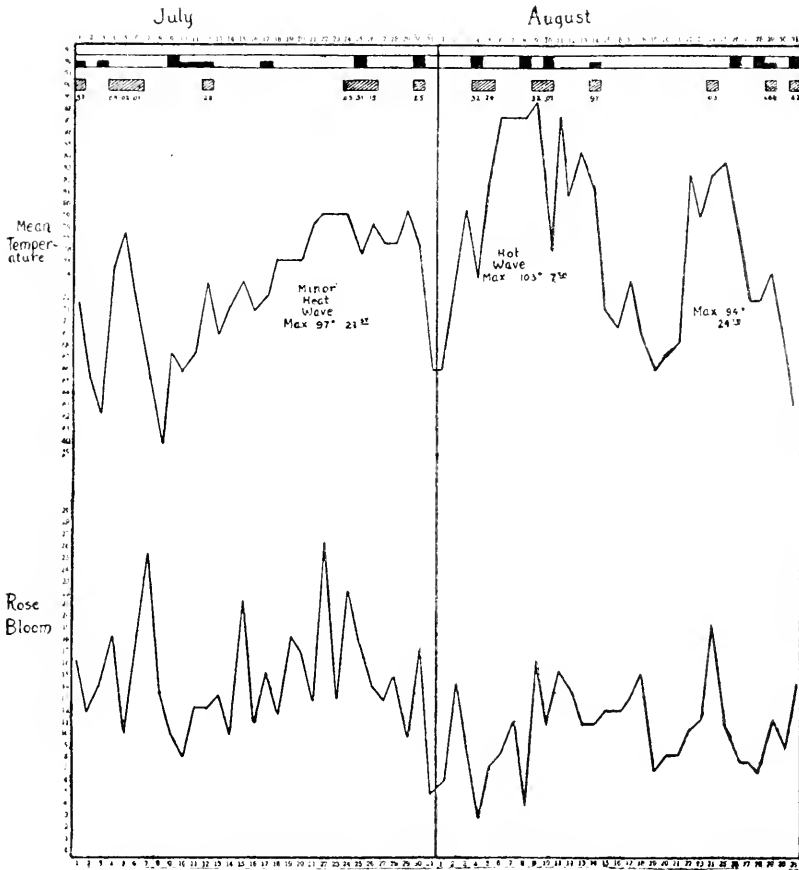
No.	Name	1918	1917	Thomas
12.	Wm. R. Smith, T.....	49	—	14
13.	Mrs. B. R. Cant, T.....	47	—	50
13.	Gen. MacArthur, H. T.....	47	23	35
14.	Mme. Edouard Herriot, Per.....	46	—	32
15.	Radiance (No. 1), H. T.....	45	25	51
16.	Baron de Bonstetten, H. P.....	44	13	—
17.	Killarney, H. T.....	42	15	—

The third class contains all those producing from 25 to 39 blooms, and all under 25 are put in a class of "shy bloomers," from which the weeding-out process takes place after all other expedients of first aid to rose slackers have been tried in vain. This comparison shows at a glance the roses which are able to meet the requirements of a discriminating grower, and it grows in value with the years.

The card-index record also furnishes material for other interesting studies, as, for instance: What are the local weather conditions under which roses thrive best? With the data on the cards, together with the reports of the local weather station, the question is easily answered, as shown in the charts on pages 538-539 and 540. Here we have revealed not only the somewhat startling correspondence between rose-bloom and temperature changes, but also the effect of rainfall, sunshine, heat-waves, and frost, which in various combinations are written plainly on the chart. We all know in a general way the dependence of rose-bloom upon a certain range of temperature combined with a definite degree of moisture and sunshine, but few, save the experts, suspect the immediate and sensitive relationship indicated in the quick response the chart shows. Notice how closely the



ROSE BLOOM AND TEMPERATURE IN MAY AND JUNE

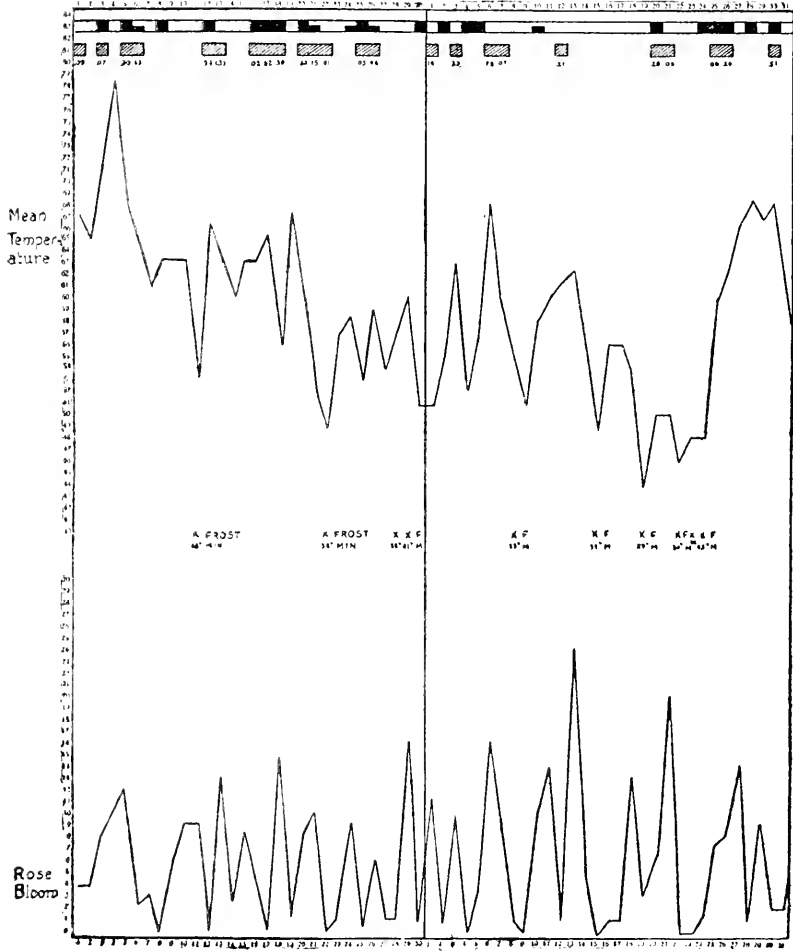


SAME IN JULY
AND AUGUST

☐ Sunshine ☐ Cloudy ☐ Rainfall

SEPTEMBER

OCTOBER



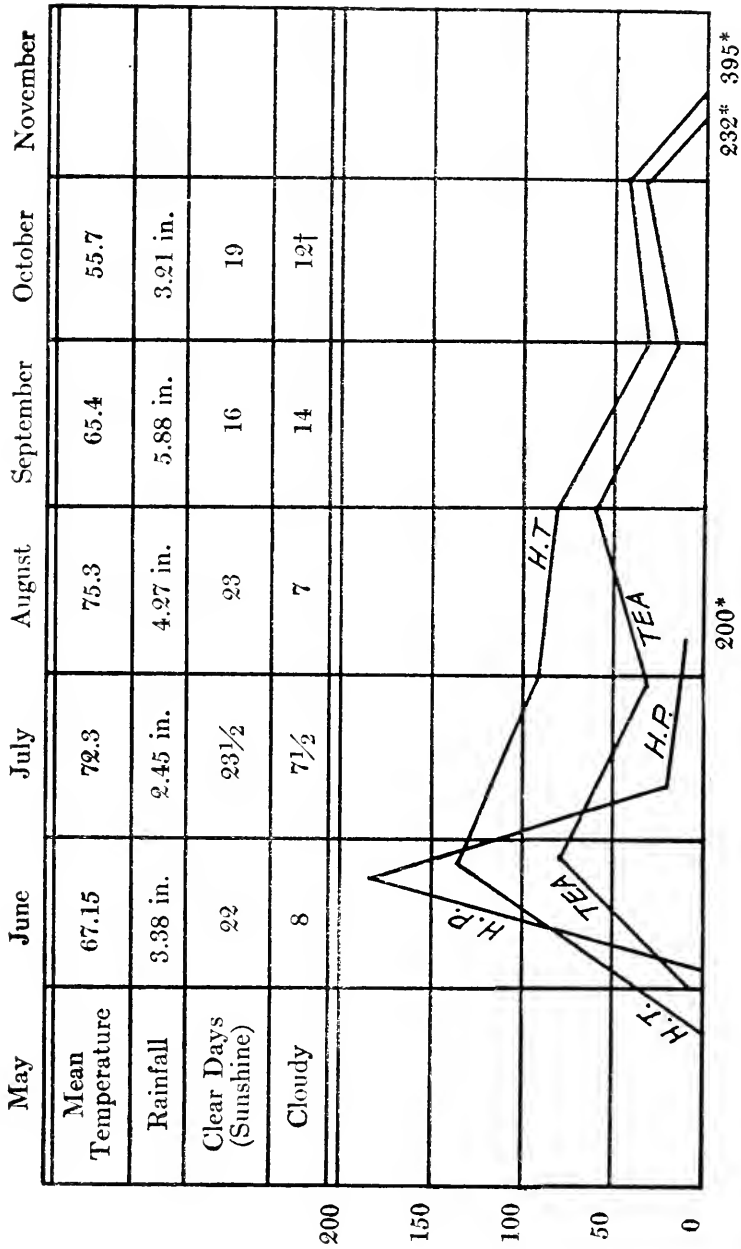
SEPTEMBER AND OCTOBER ROSE BLOOM AND TEMPERATURE

various peaks of rose bloom fit into the peaks of mean temperature for virtually the entire garden period. The chart likewise emphasizes the optimum bloom-conditions of heat, moisture, and sunshine in June, and the depressing effects caused by the two heat-waves. The discouraging September conditions, an environment of cold, rainy, cloudy days, with a minimum of sunshine, are reflected in the September section of the chart, while the comparatively more favorable conditions which October presented, resulting in an average higher level of rose-bloom, are shown in the section for that month. Throughout the temperature-rhythm and the bloom-rhythm are found in intimate and sensitive correspondence.

The study of a chart of this character enables the rosarian to discover just what local climatic conditions are most favorable to the roses he has under cultivation and development, and it further enables him to approximate, by mulching, culture, shading, watering, and the like, these favorable conditions when he may normally expect unfavorable weather environment.

A further analysis of rose-bloom is presented in the chart on page 541. Here a comparison by months is made of the blooming qualities of the five most prolific Hybrid Perpetuals, Hybrid Teas, and Teas, as established by the tabulation taken from the card-index record. The chart graphically indicates the short period of blooming glory of the Hybrid Perpetuals, so-called, contrasted with the real perpetual character of the Hybrid Teas and the Teas, and it likewise demonstrates, so far as the plants under consideration are concerned, the superiority of both the Hybrid Teas and the Teas over the Hybrid Perpetuals in total bloom and period of efflorescence. The comparison is defective in that the Hybrid Perpetuals were on Brier and Manetti stock, while the Hybrid Teas, and the Teas, with one exception, were budded on selected *multiflora* stock, from which I have never yet detected a sucker.

But, perhaps, the most significant feature of this chart is found in the performance of the Teas. August, with its recurrent heat-waves, hot, scorching days, and deficient rainfall, is the month the American rose-grower fears. The August sec-



*Total bloom of season. †Eight mornings of dense fog.

COMPARISON OF BLOOM
RECORDS. SEE NEXT PAGE
FOR VARIETIES USED AND DETAILS

Comparison of bloom records of five each most prolific Hybrid Perpetuals, Hybrid Teas and Teas, in relation to season, temperature, rainfall and sunshine. (Figures at left indicate number of blooms; below are varieties used with detailed record.)

HYBRID PERPETUALS		TEAS	
Frau Karl Druschki (No. 1).....	71	Harry Kirk	76
Frau Karl Druschki (No. 2).....	52	Wm. R. Smith.....	49
Baron de Bonstetten	44	Mrs. B. R. Cant.....	47
Margaret Dickson.....	19	Lady Hillingdon	30
Mrs. John Laing.....	14	Maman Cochet.....	30
	200		232
Average bloom.....	40	Average bloom.....	46
(Brier and Manetti stock)		(Selected Multiflora stock).	
HYBRID TEAS		PER CENT OF TOTAL BLOOM	
Mrs. A. R. Waddell	84	Hybrid Teas.....	48
Mme. Jules Bouche.....	81	Hybrid Perpetuals	24
La Tosca	80	Teas.....	28
Gruss an Teplitz (Manetti).....	79		100
Betty.....	71		
	395		
Average bloom.....	79		
(Selected Multiflora stock).			

Count made at time of cutting. All roses except Gruss an Teplitz, disbudded to assure perfection of bloom.

tion of the chart shows the havoc it brings in its trail. But the chart on page 539 indicates that August presents a combination of weather conditions of which the Teas highly approve, for in August they nearly equaled their June burst of bloom. Possibly we may find in a development of the hardy Teas a solution of the problem of the August rose-garden!

The latter chart also is interesting in indicating in another way the superiority of the Hybrid Teas. It shows that the average bloom of the Hybrid Perpetuals was 40 for the season; for the five Teas it was 46; while for the Hybrid Teas the average was 79. This gives a bloom percentage of 24 for the Hybrid Perpetuals, 28 for the Teas, and 48 for the Hybrid Teas. In the development or reconstruction of a rose-garden, it is necessary to establish facts of this character before one can work intelligently and successfully toward rose-perfection.

If America is to become the promised land of roses—a consummation devoutly to be wished—every little rose-garden must become in a way a test-garden, a rose laboratory for the perfection of types and standards suitable to American conditions. Without detracting in the least from the splendid work of American hybridizers and growers, there is yet a big field for the amateur rosarian who brings to the work of rose perfection a point of view quite different from that taken by the rose-expert, the professional grower, and the technical hybridizer. The standards of rose-perfection are in the hands of the amateur, for he forms the majority of buyers in America. The more exacting his demands upon the rose sellers, the harder will they work to meet them and the higher will the standards of American rose-production become. Probably 50 per cent of the roses in American gardens today, through lack of proper culture, budding on inferior stock, or for many other reasons, fall far below the type average of bloom and are inferior both in quantity and quality. It is only through the self-education of American amateur rosarians, the rose-consumers of the country, that the standards of rose-excellence can be permanently raised to higher levels and the ideals of rose-perfection approximated.

The Shakespeare Garden

By Esther Singleton

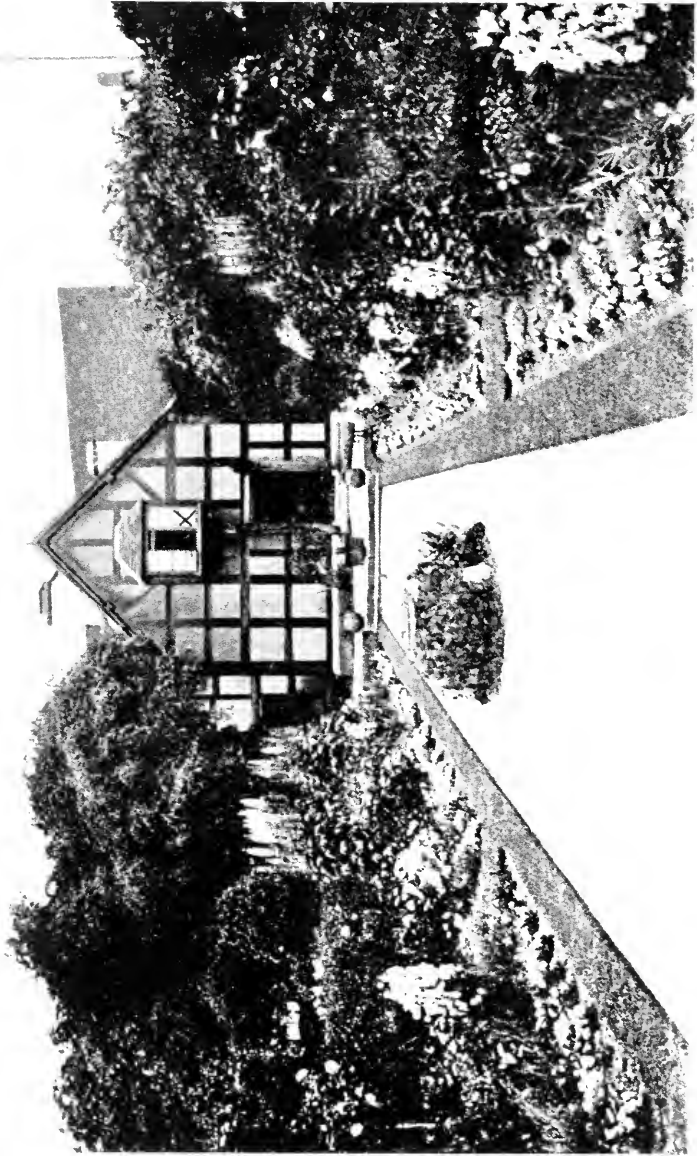
I. THE GARDEN OF DELIGHT: EVOLUTION OF THE SHAKESPEARE GARDEN



SHAKESPEARE was familiar with two kinds of gardens: the stately and magnificent garden that embellished the castles and manor-houses of the nobility and gentry; and the small and simple garden such as he had himself at Stratford-on-Avon and such as he walked through when he visited Ann Hathaway in her cottage at Shottery.

The latter is the kind that is now associated with Shakespeare's name; and when garden lovers devote a section of their grounds to a "Shakespeare Garden," it is the small, enclosed garden, such as Perdita must have had, that they endeavor to reproduce.

The small garden of Shakespeare's day, which we so lovingly call by his name, was a little pleasure garden—a garden to stroll in and to sit in. The garden, moreover, had another purpose: it was intended to supply flowers for "nosegays," and herbs for "strewings." The Shakespeare Garden was a continuation, or development, of the mediaeval "Pleasance," where quiet ladies retired with their embroidery frames to work and dream of their Crusader lovers, husbands, fathers, sons and brothers lying in the trenches before Acre and Ascalon, or storming the walls of Jerusalem and Jericho; where lovers sat hand-in-hand listening to the songs of birds and to the still sweeter songs from their own palpitating hearts; where men of affairs frequently repaired for a quiet chat, or refreshment of spirit; and where gay groups of lords and ladies



SHAKESPEARE'S BIRTHPLACE
STRATFORD-UPON-AVON

gathered to tell stories, to enjoy the recitation of a wandering *trouvère*, or to sing to their lutes and viols, while jesters in doublets and hose of bright colors and cap and bells, lounged nonchalantly on the grass to mock at all things—even Love!

In the illuminated manuscripts of old *romans*, such as *Huon of Bordeaux*, the *Romaunt of the Rose*, *Blonde of Oxford*, *Flore et Blancheflore*, *Amadis de Gaul*, etc., there are many charming miniatures to illustrate the word-pictures. From them we learn that the garden was actually within the castle-walls and *very* small. The walls of the garden were broken by turrets and pierced with a little door, usually opposite the chief entrance; the walks were paved with brick or stone, or they were sanded, or gravelled; and at the intersection of these walks a graceful fountain usually tossed its spray upon the buds and blossoms. The little beds were laid out formally and were bright with flowers, growing singly and not in masses. Often, too, pots or vases, were placed here and there, at regular intervals, containing orange, lemon, bay, or cypress trees, their foliage beautifully trimmed in pyramids, or globes, that rose high above the tall stems. Not infrequently the garden rejoiced in a fruit-tree, or several fruit-trees. Stone or marble seats invitingly awaited visitors.

The note here was *charming intimacy*. It was a spot where gentleness and sweetness reigned, and where, perforce, every flower enjoyed the air it breathed. It was a Garden of Delight for flowers, birds and men.

To trace the formal garden to its origin would take us far afield. We should have to go back to the ancient Egyptians, whose symmetrical and magnificent gardens were luxurious in the extreme; to Babylon, whose superb "Hanging Gardens" were among the Seven Wonders of the World; and to the Romans, who are still our teachers in the matter of beautiful gardening. The Roman villas that made Albion beautiful, as the great estates of the nobility and gentry make her beautiful today, lacked nothing in the way of ornamental gardens. Doubtless Pliny's garden was repeated again and again in the outposts of the Roman Empire. From these splendid Roman gardens tradition has been handed down.

There never has been a time in the history of England where the cultivation of the garden held pause. There is every reason to believe that the Anglo-Saxons were devoted to flowers. A poem in the *Exeter Book* has the lines:

“Of odors sweetest
such as in summer’s tide
fragrance send forth in places,
fast in their stations,
joyously o’er the plains,
blown plants,
honey-flowing.”

No one could write “blown-plants, honey-flowing” without a deep and sophisticated love of flowers.

Every Anglo-Saxon gentleman had a *garth*, or garden, for pleasure, and an *ort-garth* for vegetables. In the *garth* the best loved flower was the lily, which blossomed beside the rose, sunflower, marigold, gilliflower, violet, periwinkle, honeysuckle, daisy, peony and bay-tree.

Under the Norman kings, particularly Henry II, when the French and English courts were practically the same, the citizens of London had gardens “large, beautiful, and planted with various kinds of trees.” Possibly even older scribes wrote accounts of some of these, but the earliest description of an English garden is contained in *De Naturis Rerum* by Alexander Neckan, who lived in the second half of the Twelfth Century. “A garden,” he says, “should be adorned on this side with roses, lilies, the marigold, *molis* and mandrakes; on that side with parsley, cort, fennel, southernwood, coriander, sage, savory, hyssop, mint, rue, dittany, smallage, pellitory, lettuce, cresses, *ortulano* and the peony. Let there also be beds enriched with onions, leeks, garlic, melons and scallions. The garden is also enriched by the cucumber, which creeps on its belly, and by the soporiferous poppy, as well as by the daffodil and the acanthus. Nor let pot-herbs be wanting, if you can help it, such as beets, herb mercury, orache and the mallow. It is useful also to the gardener to have anise, mustard, white pepper and wormwood.” And then Neckan goes on to the fruit-trees and medic-

inal plants. The gardener's tools at this time were merely a knife for grafting, an axe, a pruning-hook and a spade. A hundred years later the gardens of France and England were still about the same. When John de Garlande (an appropriate name for an amateur horticulturist) was studying at the University of Paris (Thirteenth Century) he had a garden, which he described in his *Dictionarius*, quaintly speaking of himself in the third person: "In Master John's garden are these plants: sage, parsley, dittany, hyssop, celandine, fennel, pelltory, the rose, the lily, the violet; and at the side (in the hedge), the nettle, the thistle and fox-gloves. His garden also contains medicinal herbs, namely, mercury and the mallows, agrimony with nightshade and the marigold." Master John had also a special garden for pot-herbs and "other herbs good for men's bodies," i.e., medicinal herbs, and a fruit-garden, or orchard, of cherries, pears, nuts, apples, quinces, figs, plums and grapes. About the same time Guillaume de Lorris wrote his *Roman de la Rose*; and in this famous work of the Thirteenth Century there is a most beautiful description of the garden of the period. L'Amant (the Lover) while strolling on the banks of a river discovered this enchanting spot, "full long and broad behind high walls." It was the Garden of Delight, or Pleasure, whose wife was Liesse, or Joy; and here they dwelt with the sweetest of companions. L'Amant wandered about until he found a small wicket door in the wall, at which he knocked and gained admittance. When he entered he was charmed. Everything was so beautiful that it seemed to him a spiritual place, better even than Paradise could be. Now, walking down a little path, *bordered with mint and fennel*, he reached the spot where Delight and his companions were dancing a carole to the song of Joy. L'Amant was invited to join the dance; and after it was finished he made a tour of the Garden to see it all. And through his eyes we see it, too.

The Garden of Delight was even and square, "as long as it was large." It contained every known fruit-tree—peaches, plums, cherries, apples and quinces as well as figs, pomegranates, dates, almonds, chestnuts and nutmegs. Tall pines, cypresses and laurels formed screens and walls of greenery; and many

a "pair" of elms, maples, ashes, oaks, aspens, yews and poplars kept out the sun by their interwoven branches and protected the green grass. And here deer browsed fearlessly and squirrels "in great plenty" were seen leaping from bough to bough. Conduits of water ran through the garden and the moisture made the grass as thick and rich as velvet and "the earth was as soft as a feather bed." And, moreover, the "earth was of such a grace" that it produced plenty of flowers, both winter and summer:

"There sprang the violet all new
And fresh periwinkle rich of hue
And flowers yellow, white and red,
Such plenty grew there, never in mead.
Full joy was all the ground and quaint
And powdered as men had it paint
With many a fresh and sundry flower
That casteth up full good savor."

Myriads of birds were singing, too—larks, nightingales, finches, thrushes, doves and canaries. L'Amant wandered on until he came to a marvellous fountain—the Fountain of Love—under a pine-tree.

Presently he was attracted to a beautiful rose-bush, full of buds and full-blown roses. One bud, sweeter and fresher than all the rest and set so proudly on its spray, fascinated him. As he approached this flower, L'Amour discharged five arrows into his heart. The bud, of course, was the woman he was destined to love and which, after many adventures and trials, he was eventually to pluck and cherish.

This fanciful old allegory made a strong appeal to the illustrators of the Thirteenth and later centuries and many beautiful editions are prized by libraries and preserved in glass cases. The edition from which the accompanying illustration (Fifteenth Century) is taken from the Harleian Ms. owned by the British Museum. Page 552.

II. GARDEN OF DELIGHT: ROMAN DE LA ROSE

The old *trouvères* did not hesitate to stop the flow of their stories to describe the delights and beauties of the gardens. Many romantic scenes are staged in the "Pleasance," to which lovers stole quietly through the tiny postern gate in the walls. When we remember what the feudal castle was, with its high, dark walls, its gloomy towers and loop-holes for windows, its cold floors, its secret hiding-places, and its general gloom, it is not surprising that the lords and ladies liked to escape into the garden. After the long, dreary winter what joy to see the trees burst into bloom and the tender flowers push their way through the sweet grass! Like the birds, the poets broke out into rapturous song, as, for instance, in *Richard Cœur de Lion*:

"Merry is in the time of May,
Whenne fowlis synge in her lay;
Flowers on appyl trees and perye,*
Small fowlis** synge merye;
Ladyes strew their bowers
With red roses and lily flowers;
Great joy is in grove and lake."

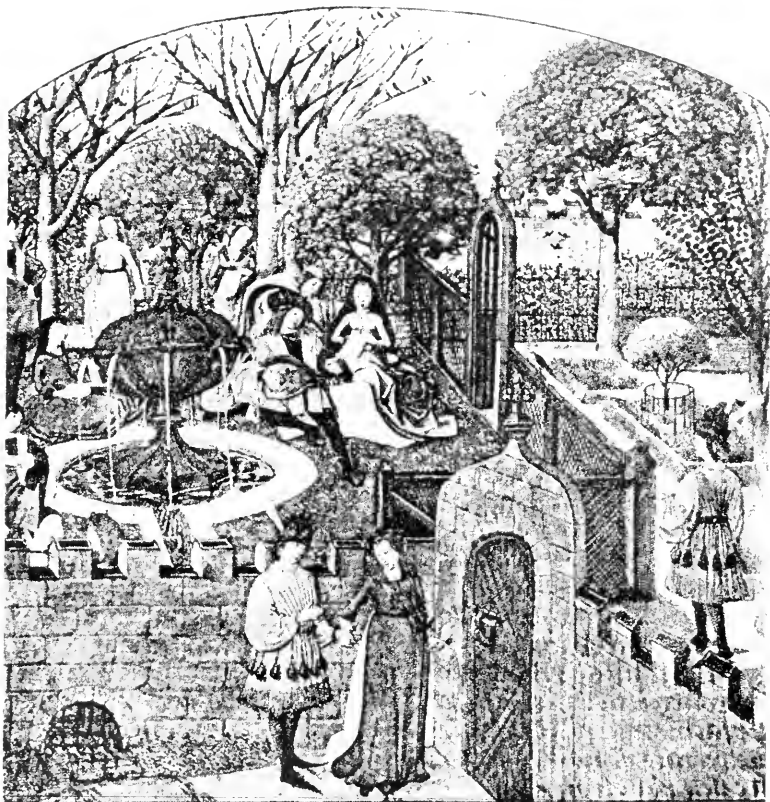
*Specar.

**Birds.

In Chaucer's *Franklyn's Tale* Dorigen goes into her garden to try to divert herself in the absence of her husband:

"And this was on the sixte morne of May,
Which May had painted with his softe shoures.
This gardeyn full of leves and of flowers:
And craft of mannes hand so curiously
Airayed had this gardeyn of such pris,
As if it were the verray paradis."

In the *Roman de Berte* Charles Martel dines in the garden, when the rose is in bloom—"que la rose est fleurie"—and in *La Mort de Garin* a big dinner-party is given in the garden. Naturally the garden was the place of all places for lovers. In *Blonde of Oxford* Blonde and Jean meet in the garden under a blossoming pear-tree, silvery in the blue moonlight, and in



GARDEN OF DELIGHT
ROMAN DE LA ROSE
FIFTEENTH CENTURY

the *Roman of Maugis et la Belle Oriande* the hero and heroine "met in a garden to make merry and amuse themselves after they had dined; and it was the time for taking a little repose. It was in the month of May, the season when the birds sing and when all true lovers are thinking of their love."

In many of the illuminated manuscripts of these delightful *Romans* there are pictures of ladies gathering flowers in the garden, sitting on the sward, or on stone seats weaving chaplets and garlands; and these little pictures are drawn and painted with such skill and beauty that we have no difficulty in visualizing what life was like in a garden six hundred years ago.

So valued were these gardens—not only for their flowers but even more for the potential drugs, salves, unguents, perfumes and ointments they held in leaf and petal, seed and root, in those days when every castle had to be its own apothecary storehouse—that the owner always kept it locked and guarded the key. Song, story and legend are full of incidents of the heroine's trouble in gaining possession of the key of the postern gate in order to meet at midnight her lover who adventurously scaled the high garden wall. The garden was indeed the happiest and the most romantic spot in the precincts of the feudal castle and the baronial manor-house.

We do not have to depend entirely upon the *trouvères* and poets for a knowledge of mediaeval flowers. A manuscript of the Fifteenth Century (British Museum) contains a list of plants considered necessary for a garden. Here it is: violets, mallows, dandelions, mint, sage, parsley golds,* marjoram, fennel, carraway, red nettle, daisy, thyme, columbine, basil, rosemary, gyllofre,† rue, chives, endive, red rose, poppy, cowslips of Jerusalem, saffron, lilies and Roman peony.

Herbs and flowers were classed together. Many were valued for culinary purposes and for medicinal purposes. The ladies of the castle and manor-house were learned in cookery and in the preparation of "simples;" and they guarded, tended and gathered the herbs, with perhaps even more care than they gave to the flowers. Mediaeval pictures of ladies, in tall

* Marigolds.

† Gilliflower.

peaked head dresses, fluttering veils and graceful, flowing robes, gathering herbs in their gardens, are abundant in the old illustrated manuscripts.

It is but a step from this mediaeval "Pleasance" to the Shakespeare Garden. But before we try to picture what the Tudor gardens were like it will be worth our while to pause for a moment to consider the Renaissance garden of Italy on which the gardens that Shakespeare knew and loved were modelled. No one is better qualified to speak of these than Vernon Lee:

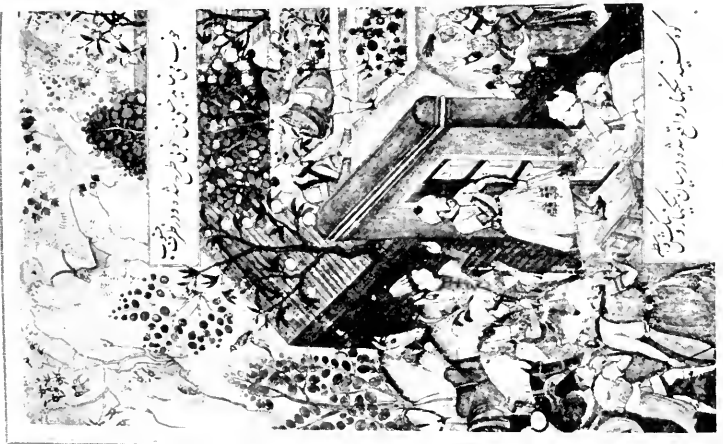
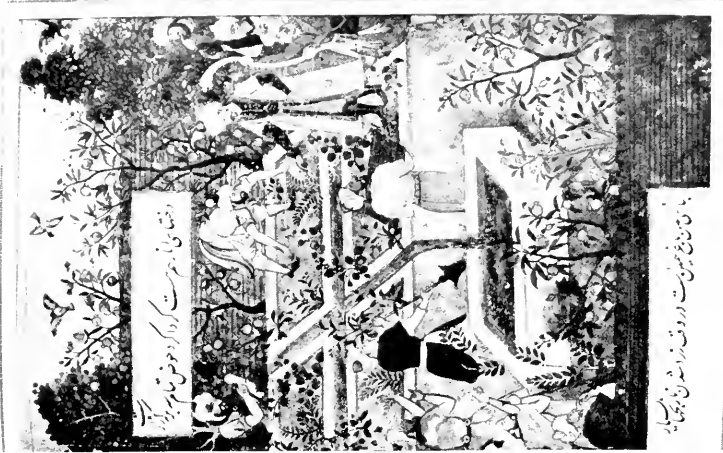
"One great charm of Renaissance gardens was the skillful manner which Nature and Art were blended together. The formal design of the *Giardino segreto* agreed with the straight lines of the house and the walls with their clipped hedges, led on to the wilder freer growth of woodland and meadow, while the dense shade of the *bosco* supplied an effective contrast to the sunny spaces of lawn and flower-bed. The ancient practice of cutting box-trees into fantastic shapes, known to the Romans as the topiary art, was largely restored in the Fifteenth Century and became an essential part of Italian gardens. In that strange romance printed at the Aldine Press in 1499, the *Hypernotomachia* of Francesco Colonna, Polyphilus and his beloved are led through an enchanted garden where banquet-houses, temples and statues stand in the midst of myrtle groves and labyrinths on the banks of a shining stream. The pages of this curious book are adorned with a profusion of wood-cuts by some Venetian engraver, representing pergolas, fountains, sunk parterres, pillared *loggie*, clipped box and ilex-trees of every variety, which gives a good idea of the garden artist then in vogue.

"Boccaccio and the Italians more usually employ the word *orto*, which has lost its Latin signification, and is a place, as we learn from the context, planted with fruit-trees and pot-herbs, the sage which brought misfortune on poor Simona and the sweet basil which Lisabetta watered, as it grew out of Lorenzo's head, only with rosewater, or that of orange-flowers, or with her own tears. A friend of mine has painted a picture of another of Boccaccio's ladies, Madonna Dianora, visiting

the garden which the enamored Ansaldo has made to bloom in January by magic arts; a little picture full of the quaint lovely details of Dello's wedding-chests, the charm of roses and lilies, the flashing fountains and birds singing against a background of wintry trees, and snow-shrouded fields, dainty youths and damsels treading their way among the flowers, looking like tulips and ranunculus themselves in their fur and brocade. But although in this story Boccaccio employs the word *giardino* instead of *orto*, I think we must imagine that magic flower garden rather as a corner of orchard connected with fields of wheat and olive below by the long tunnels of vine-trellis and dying away into them with the great tufts of lavender and rosemary and fennel on the grassy bank under the cherry trees. This piece of terraced ground along which the water spurted from the dolphin's mouth, or the Siren's breasts—runs through walled channels refreshing impartially violets and salads, lilies and tall, flowering onions under the branches of the peach-tree and the pomegranate, to where, in the shade of the great pink oleander tufts, it pours out below into the big tank for the maids to rinse their linen in the evening and the peasants to fill their cans to water the bedded out tomatoes and the potted clove-pinks in the shadow of the house.

“The Blessed Virgin's garden is like that where, as she prays in the cool of the evening, the gracious Gabriel flutters on to one knee (hushing the sound of his wings lest he startle her) through the pale green sky, the deep blue-green valley; and you may still see in the Tuscan fields clumps of cypress, clipped wheel shape, which might mark the very spot.”

We may recall here that the early Italian and Flemish painters were fond of representing the Madonna and the Infant Jesus in a garden; and the garden that they pictured was always the familiar little enclosed garden of the period. The flowers that grew there were limited by the Church. Each flower had its significance: the rose and the pink both expressed divine love; the lily, purity; the violet, humility; the strawberry, fruit and blossom, for the fruit of the spirit and the good works of the righteous; the clover, or trefoil, for the Trinity; and the



1508. BAHAR SHAH-NAMA. FOLIO 100. V. 1. P. 100.

BAGH-I-YAFA: GARDEN OF FIDELITY. MADE BY THE MUGHAL EMPEROR BABAR IN 1508.

columbine for the Seven Gifts of the Holy Spirit, because of its dove-shaped petals.

The enclosed garden is ancient indeed.

“O garden enclosed—a garden of living waters
And flowing streams from Lebanon;
Awake O North Wind; and come thou South;
Blow upon my garden that the spices may thereof flow out!”

So sang the aesthetic Solomon.

A garden enclosed, a garden of living waters, a garden of perfumes—these are the motives of the Indian gardens of the luxurious Mughal Emperors, whose reigns coincide with Tudor times.

Symbolism played an important part in Indian gardens. The beautiful garden of Babar (near Kabul) was called the Bagh-i-vafa—“The Garden of Fidelity.” This has many points in common with the illustration of the Romaunt of the Rose, particularly the high walls.

There is also great similarity with the gardens of Elizabethan days. The “pleached allies” and “knots” of the English gardens of Shakespeare’s time find equivalents in the vine pergolas and geometrical parterres of the Mughal Emperors; and the central platform of the Mughal gardens answered the same purpose as the banqueting-hall on the mound, which decorated nearly every English nobleman’s garden.

III. BAGH-I-VAFA

Babar’s “Garden of Fidelity,” shown here, was made in the year 1508. We see Babar personally superintending the laying out of the “four-field plot.” Two gardeners hold the measuring line and the architect stands by with his plan. The square enclosure at the bottom of the garden (right) is the tank. The whole is bordered with orange and pomegranate trees. An embassy knocks at the gate, but Babar is too absorbed in his gardening to pay any attention to him.

Fifteen years later Babar stole three days away from his campaign against the Afghans and visited his beautiful garden. “Next morning,” he wrote in his *Memoirs*, “I reached Bagh-

i-Nafa. It was the season when the garden was in all its glory. Its grass-plots were all covered with clover; its pomegranate trees were entirely of a beautiful yellow color. It was then the pomegranate season and pomegranates were hanging red on the trees. The orange trees were green and cheerful, loaded with innumerable oranges; but the best oranges were not yet ripe. I never was so much pleased with the "Garden of Fidelity" as on this occasion."

Several new ideas were introduced into English gardens in the first quarter of the Sixteenth Century. About 1525 the geometrical beds called "knots" came into fashion, also rails for beds, also mounds, or "mounts," and also arbors. Cardinal Wolsey had all these novelties in his garden at Hampton Court Palace. It was a marvellous garden, as any one who will read Cavendish may see for himself; but Henry VIII was not satisfied with it when he seized the haughty Cardinal's home in 1529. So four years later the King had an entirely new garden made at Hampton Court (the Privy Garden is on the site now) with gravel paths, beds cut in the grass and railed and raised mounds decorated with sun-dials. Over the rails roses clambered and bloomed and the centre of each bed was adorned with a yew, juniper, or cypress tree. Along the walls fruit-trees were planted—apples, pears and damsons—and beneath them blossomed violets, primroses, sweet williams, gilliflowers and other old favorites.

Towards the end of his reign Henry VIII turned his attention to beautifying the grounds of Nonsuch Palace near Ewell in Surrey. These gardens were worthy of the magnificent buildings. A contemporary wrote: "The Palace itself is so encompassed with parks full of deer, delicious gardens, groves ornamented with trellis-work, cabinets of verdure and walks so embowered with trees that it seems to be a place pitched upon by Pleasure herself to dwell in along with health."

IV. TYPICAL ENGLISH ESTATE IN TUDOR TIMES

An example of a typical Tudor estate shown in the accompanying illustration, "Beaufort House," Chelsea, later "Buckingham House," is said to have been built by Sir Thomas

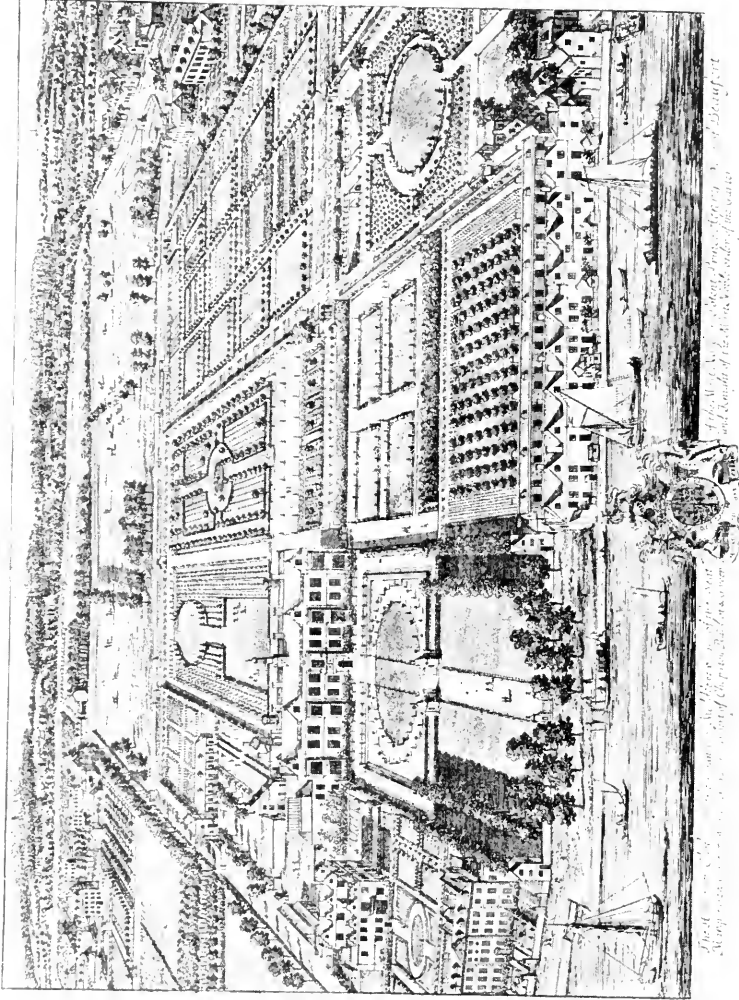
More in 1521, and rebuilt in 1586 by Sir Robert Cecil, Earl of Salisbury, who died in 1615. The flowers at this period were the same for palace and cottage. Tudor gardens bloomed with acanthus, asphodel, auricula, anemone, amaranth, bachelor's buttons, cornflowers or "bottles," cowslips, daffodils, daisies, French broom (genista), gilliflowers (three varieties), hollyhock, iris, jasmine, lavender, lilies, lily of the valley, marigold, narcissus (yellow and white), pansies or heartsease, peony, periwinkle, poppy, primrose, rocket, roses, rosemary, snapdragon, stock gilliflowers, sweet william, wallflowers, winter cherry, violet, mint, marjoram and other sweet-smelling herbs.

During "the great and spacious time" of Queen Elizabeth there was an enormous development in gardens. The Queen was extremely fond of flowers and she loved to wear them. It must have pleased her hugely when Spenser celebrated her as "Eliza, Queen of the Shepherds" and painted her portrait in one of the pretty enclosed gardens, seated among the fruit-trees, where the grass was sprinkled with flowers:

"See where she sits upon the grassy green,
 O seemly sight!
 Yclad in scarlet, like a Maiden Queen,
 And ermines white;
 Upon her head a crimson coronet,
 With daffodils and damask roses set;
 Bay leaves between,
 And primeroses green,
 Embellish the sweet violet."

So fond was the Queen of gardens that Sir Philip Sidney could think of no better way to please her than to arrange his masque of the *May Lady* so that it would surprise her when she was walking in the garden at Wanstead in Essex. Then, too, in 1591, when visiting Cowdry, Elizabeth expressed a desire to dine in the garden. A table forty-eight yards long was accordingly laid.

The Tudor mansions were constantly growing in beauty. Changes and additions were made to some of them and many new palaces and manor-houses were erected. Architects—



BEAUFORT HOUSE
 TYPICAL ENGLISH ESTATE
 IN TUDOR TIMES

among them John Thorpe—and landscape-gardeners now planned the pleasure-grounds to enhance the beauty of the mansion they had created, adapting the ideas of the Italian Renaissance to the English taste. The Elizabethan garden in their hands became a setting for the house and it was laid out according to a plan that harmonized with the architecture and continued the lines of the building. The form of the garden and the lay-out of the beds and walks were deemed of the greatest importance. Flowers also, took a new place in general estimation. Adventurous mariners constantly brought home new plants and bulbs and seeds from the East and lately discovered America; merchants imported strange specimens from Turkey and Poland and Far Cathay; and travellers on the Continent opened their eyes and secured unfamiliar curiosities and novelties. The cultivation of flowers became a regular fad. London merchants and wealthy noblemen considered it the proper thing to have a few “outlandish” flowers in their gardens; and they vied with one another to develop “sports” and new varieties and startling colors.

Listen to what an amateur gardener, William Harrison, wrote in 1593:

“If you look into our gardens annexed to our houses how wonderfully is their beauty increased, not only with flowers and variety of curious and costly workmanship, but also with rare and medicinable herbs sought up in the land within these forty years. How Art also helpeth Nature in the daily coloring, doubling and enlarging the proportion of one’s flowers it is incredible to report, for so curious and cunning are our gardeners now in these days that they presume to do in manner what they list with Nature and moderate her course in things as if they were her superiors. It is a world also to see how many strange herbs, plants and annual fruits are daily brought unto us from the Indies, Americas, Taprobane, Canary Isles and all parts of the world.

“For mine own part, good reader, let me boast a little of my garden, which is but small, and the whole area thereof little above 300 foot of ground, and yet, such hath been my good luck in purchase of the variety of simples, that, notwithstanding-

ing my small ability, there are very near 300 of one sort and another contained therein, no one of them being common or usually to be had. If, therefore, my little plat void of all cost of keeping be so well furnished, what shall we think of those of Hampton Court, Nonsuch, Theobald's, Cobham Garden and sundrie others appertaining to divers citizens of London whom I could particularly name?"

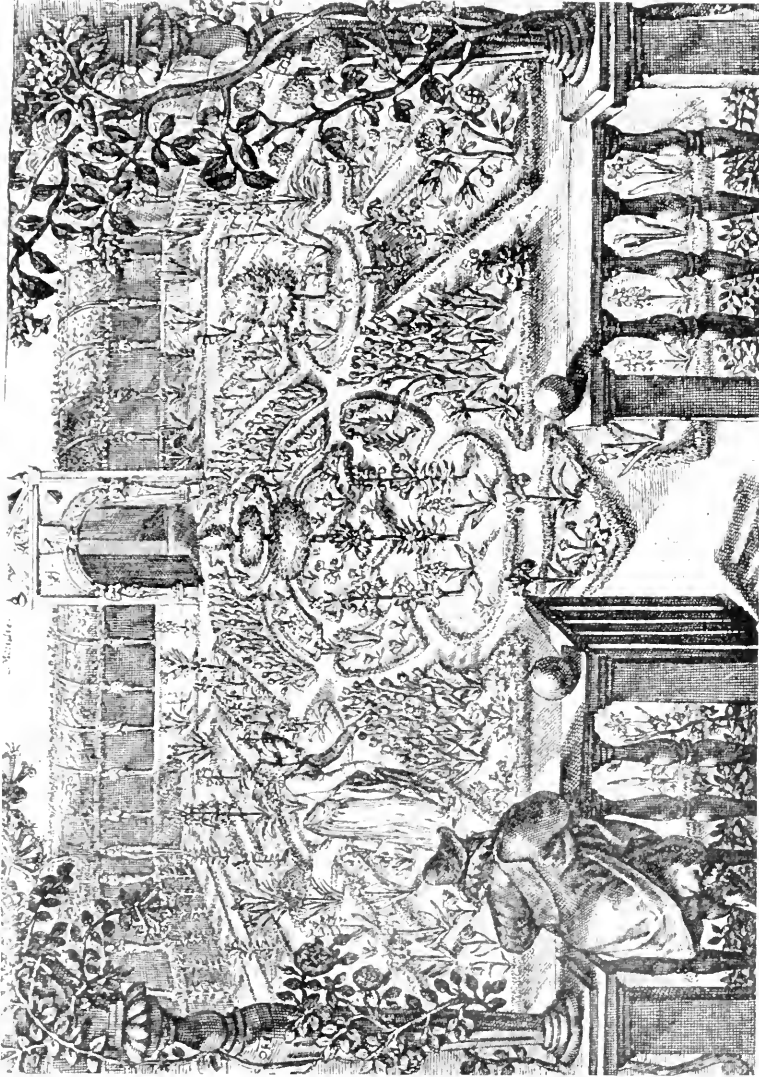
V. CRISPIN DE PASSE

Several men of the New Learning, who, like Shakespeare, lived into the reign of James I, advanced many steps beyond the botanists of the early days of Queen Elizabeth. The old Herbals—the *great Herbal*, from the French (1516) and the *Herbals* published by William Turner, Dean of Wells, who had a garden of his own at Kew, treat of flowers chiefly with regard to their properties and medical uses.

The Renaissance did indeed "paint the lily" and "throw a perfume on the violet;" for the New Age brought recognition of their aesthetic qualities and taught scholastic minds that flowers had beauty and perfume and character as well as utilitarian qualities. Elizabeth as Queen had very different gardens to walk in than the little one in the Tower of London in which she took exercise as a young Princess in 1564.

Let us look at some of them. First, that of Richmond Palace. Here the garden was surrounded by a brick wall and in the centre was "a round knot divided into four quarters," with a yew-tree in the centre. Sixty-two fruit-trees were trained on the wall.

This seems to have been of the old type—the orchard garden, where a few old favorite flowers bloomed under the trees and in the central "knot," or bed. In the Queen's locked garden at Havering-atte-Bower trees, grass and sweet herbs seem to have been more conspicuous than the flowers. The Queen's gardens seem to have been over-shadowed by those of her subjects. One of the most celebrated belonged to Lord Burleigh, and was known as Theobald's. Of this Paul Hentzner, a German traveller who visited England in 1598, went to see the garden the very day that Burleigh was buried.



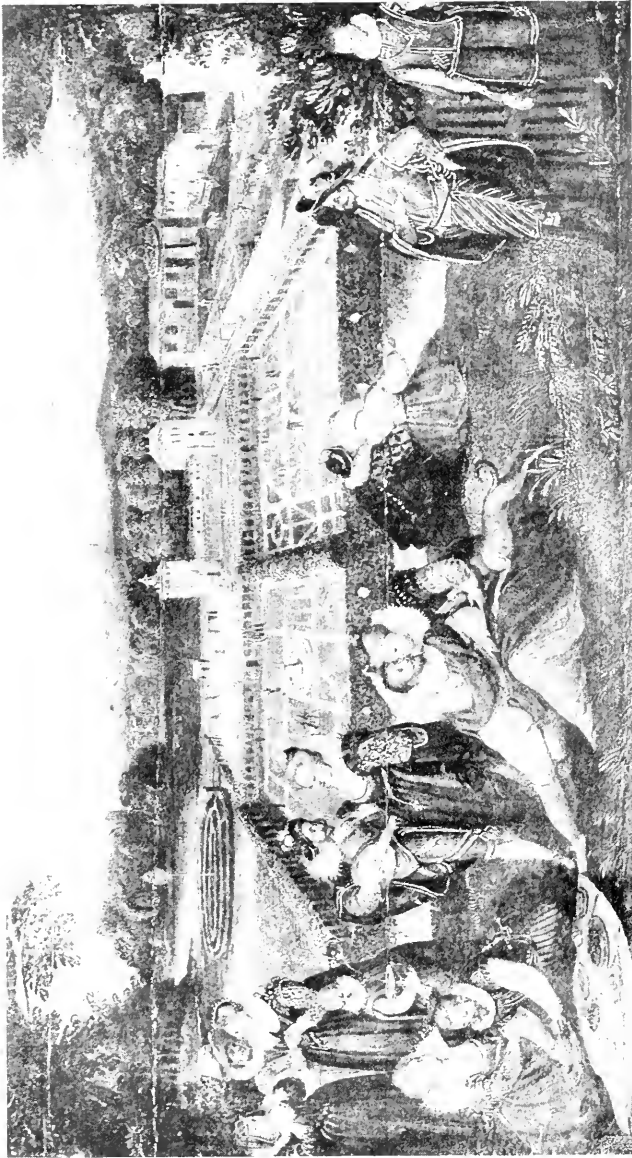
GARDEN: DESIGNED BY
CRISPIN DE PASSE (1614)

He described it as follows:

"We left London in a coach in order to see the remarkable places in its neighborhood. The first was Theobald's, belonging to Lord Burleigh, the Treasurer. In the Gallery was painted the genealogy of the Kings of England. From this place one goes into the garden, encompassed with a ditch full of water, large enough for one to have the pleasure of going in a boat and rowing between the shrubs. Here are great variety of trees and plants, labyrinths made with a great deal of labor, a *jet d'eau* with its basin of white marble and columns and pyramids of wood and other materials up and down the garden. After seeing these, we were led by the gardener into the summer-house, in the lower part of which, built semicircularly, are the twelve Roman Emperors in white marble and a table of touchstone. The upper part of it is set round with cisterns of lead into which the water is conveyed through pipes so that fish may be kept in them and in summer time they are very convenient for bathing. In another room for entertainment near this, and joined to it by a little bridge, was an oval table of red marble."

Another and accurate picture of a stately Elizabethan garden is by a most competent authority, Sir Philip Sidney (1554-1586), who had a superb garden of his own in Kent. In *Arcadia* we read:

"Kalander one afternoon led him abroad to a well-arrayed ground he had behind his house which he thought to show him before his going, as the place himself more than in any other, delighted in. The backside of the house was neither field, garden, nor orchard; or, rather, it was both field, garden and orchard: for as soon as the descending of the stairs had delivered they came into a place curiously set with trees of the most taste-pleasing fruits; but scarcely had they taken that into their consideration but that they were suddenly stepped into a delicate green; on each side of the green a thicket, and behind the thickets again new beds of flowers which being under the trees, the trees were to them a pavilion, and they to the trees a mosaical floor, so that it seemed that Art therein would needs be delightful by counterfeiting his enemy, Error



GARDEN PLEASURES
LATE SIXTEENTH CENTURY

and making order in confusion. In the midst of all the place was a fair pond, whose shaking crystal was a perfect mirror to all the other beauties, so that it bare show of two gardens; one indeed and the other in shadows; and in one of the thickets was a fine fountain."

VI. GARDEN PLEASURES

There were many such splendid gardens. Shakespeare was familiar, of course, with those of Warwickshire, including the superb examples at Kenilworth, and with those in the vicinity of London.

The Elizabethans used their gardens in many ways. They took recreation in them in winter and summer, and enjoyed the perfume and colors of their flowers with an intensity of delight and appreciation rarely found today. In their gardens the serious and the frivolous walked and talked and here they frequently were served with refreshments.

It was also a fashion to use the garden as a setting for masques and surprises, such as those Leicester planned on a grand scale to please Queen Elizabeth at Kenilworth. Several of Ben Jonson's entertainments were arranged for performance on the terrace opening from house to garden.

By looking into that mirror of the period, *Euphues and his England*, by John Lyly (1554-1606), we can see two charming ladies in ruffs and farthingales and a gallant in rich doublet and plumed hat walking in a garden and we gain an idea of the kind of "garden talk" that was *comme il faut*:

"One of the ladies, who delighted much in mirth, seeing Philautus behold Camilla so steadfastly, said unto him: 'Gentleman, what flower do you like best in all this border? Here be fair Roses, sweet Violets, fragrant Primroses; here be Gilliflowers, Carnations, Sops-in-Wine, Sweet Johns, and what may either please you for sight, or delight you with savor. Loth we are you should have a posie of all, yet willing to give you one, not that which shall look best but such a one as you shall like best.'"

What could Philautus do but bow gallantly and say: "Of all flowers, I love a fair woman."

The California Tree Yucca (*Yucca brevifolia Englm.*)

By Ernest Braunton



INSPIRE of its wide range and great numbers, it was predicted in the early '80's that the tree yucca would be extinct within a few years. At that time a sample had been sent to England, to the *London Telegraph*, to test for paper-making and it is said one issue of that journal was printed on yucca paper. A company was formed and a cargo of pulp from the trunks shipped to England, but the material heated on the way and was spoiled. It seemed impossible to prevent the heating and the cost of harvesting was so great that the enterprise was abandoned.

Though called the California tree yucca, and there reaching its greatest size, it ranges through southern Nevada to southwestern Utah. The latter named state reminds one that the early Mormons christened this gigantic plant "Joshua tree," why, we know not, but the name sticks. It extends as far north in California as Kern River Valley, going over a divide 5000 feet above the sea to be able to reach down into this valley; but it is on the Mohave Desert and its arms that it reaches its greatest development. And that development marks it as by far the world's largest yucca, though there are other arborescent species in Mexico. The largest specimen ever found, which is herewith illustrated, is sixty-five feet high and five feet in diameter of trunk, five feet above the ground.

This yucca still is threatened with extinction for as transportation facilities across the desert are improved they will be rapidly destroyed through the relentless demands of commerce unless the Federal Government shall reserve a national park



YUCCA BREVIFOLIA



BASE OF YUCCA BREVIFOLIA



THE MONARCH OF ALL
SIXTY-FIVE FEET HIGH
YUCCA BREVIFOLIA

where the greatest numbers grow. The writer does not know of one in cultivation, though they may easily be started from seeds, for it has been done many times; but the seedlings do not long endure the loving care of man. The writer has brought scores, in varying sizes, from the Mohave Desert, but never succeeded in successfully transplanting a single one, nor does he know of anyone who has. The wood is very light and will not split, enduring all changes of the weather without deterioration. For that reason it is largely used for tree protectors to fasten around the bottom of young trees to guard them from sunburn, rabbits and other animals. It is also the favored material for surgeons' splints, being superior to all others in that if once moistened and bound to a human limb it retains the form thus given it.

This plant is one of the curiosities of the desert and gives the landscape where it grows a weird appearance. The first flower-spike is terminal and the plant then begins to branch. Each year, after flowering, the old leaves die, droop, and in a couple of years drop off. The method of its perpetuation renders it a curiosity for it is incapable of self-pollination, and is dependent for this most necessary work on the acts of a moth, whose antics are such as to lead a novice to suspect it is trained for the job. The female of this nocturnal species collects the pollen from the anthers, rolls it into a little ball, flies to the flower of another plant, deposits her egg in the ovary, climbs up the style and deliberately thrusts the ball of pollen as far down the tube of the stigma as it will go. Of course when the larva hatches it eats a few seeds but as the latter are very numerous there are plenty left to perpetuate the species, though they are often eaten by other pests. No matter how viewed, the tree yucca is an uncanny object and presents, even to those used to travel on other deserts, a singularly weird appearance.



THE BATH AND THRONE
OF NEZAHUACUOTL,
KING OF TEXCOCO

From a Painting by Velasco

The Gardens of Ancient Mexico

By Zelia Nuttall

11



As a preliminary to a description of the gardens of Ancient Mexico it should be mentioned here that in the language of the Nahuas are found names descriptive of different kinds of gardens; a significant fact from which a prolonged familiarity with horticulture may be inferred. The name for a garden in general was *xochitla*, lit. = flower-place; a variant being *xoxochitla* = place of many flowers. A walled garden was *xochitepanyo*. The pleasure gardens of the ruling class were designated as *xochitepancalli*, lit. = the palace of flowers. The humble garden of the Indian was and is a *xochichinancalli*, lit. = flower-place enclosed by a fence made of cane or reeds.

These words reveal that the native conception of a garden was a flowery "*hortus inclusus*," which brings the Ancient Mexican garden-lovers very close to us. For a knowledge of the lordly pleasantries which delighted their owners at the time of the Conquest we have to rely upon the descriptions of Spanish eye-witnesses which, exaggerated as they may seem, are fully corroborated by the native historians and in the case of the Texcocan gardens by archaeological remains. The most detailed description of a native garden is that written by Cortés in his second letter to the Emperor Charles V in 1520, in the portion referring to his arrival at Iztapalapa, a town seven miles distant from Mexico on the shore of the salt lagoon. He writes: "Its lord or chief has some new houses which though still unfinished, are as good as the best in Spain; I mean as large and well constructed, not only in the stone-work but also in the wood-work, and all arrangements for every kind of

household service, all except the relief work and other rich details which are used in Spanish houses but are not found here. There are both upper and lower rooms and very refreshing gardens with many trees and sweet scented flowers, bathing places of fresh water, well constructed and having steps leading down to the bottom. He also has a large orchard near the house, overlooked by a high terrace with many beautiful corridors and rooms. Within the orchard is a great square pool of fresh water, very well constructed, with sides of handsome masonry around which runs a walk with a well laid pavement of tiles, so wide that four persons can walk abreast on it, and four hundred paces square, making in all sixteen hundred paces. On the other side of this promenade towards the wall of the garden are hedges of lattice work made of cane, behind which are all sorts of plantations of trees and aromatic herbs. The pool contains many fish and different kinds of water-fowl. . . ."

The observant Bernal Diaz, who accompanied Cortés wrote enthusiastically about Iztapalapa as follows: "The garden and orchard are most admirable. I saw and walked about in them and could not satiate myself sufficiently looking at the many kinds of trees and enjoying the perfume of each. And there were walks bordered with the roses of this country and flowers and many fruit-trees and flowering shrubs; also a pool of fresh water. There was another thing worth seeing; namely that large canoes could enter into the flower garden from the lagoon through an entrance they had made of many kinds of stone covered with polished stucco and painted, which gave one much to think about. . . . Again I say that I do not believe that in the whole world there are other countries known to compare with this one."

It may well be that the gardens of Iztapalapa were in his mind when, thirty years after the Conquest he wrote how he and his companions "had been filled with wonder at what they saw, and said to each other that all seemed to be like the enchantments written about in Amadis of Gaul . . . for the things they were seeing never had been seen, heard or even dreamed of." It is interesting to learn, through Hernandez.

that "many trees of a kind of cypress had been raised from seed at Iztapalapa by one of its lords who took infinite pains to have them cultivated for his enjoyment."

In a chapter entitled: "Of the gardens in which Montezuma went for recreation," the scholarly Dr. Cervantes de Salazar, who wrote his famous and long lost Chronicle in Mexico in 1565, and derived his information from the most reliable sources, records as follows:

"This great monarch had many pleasancess and spacious gardens with paths and channels for irrigation. These gardens contained only medicinal and aromatic herbs, flowers, native roses and trees with fragrant blossoms, of which there are many kinds. He ordered his physicians to make experiments with the medicinal herbs and to employ those best known and tried as remedies in healing the ills of the lords of his court. These gardens gave great pleasure to all who visited them on account of the flowers and roses they contained and of the fragrance they gave forth, especially in the mornings and evenings. It was well worth seeing with how much art and delicacy a thousand figures of persons were made by means of leaves and flowers, also the seats, chapels and the other constructions which so greatly adorned these places."

"In these flower-gardens Montezuma did not allow any vegetables or fruit to be grown saying that it was not kingly to cultivate plants for utility or profit in his pleasure. He said that vegetable gardens and orchards were for slaves or merchants. At the same time he owned such, but they were at a distance and he seldom visited them."

"Outside the city of Mexico he had houses in extensive groves of trees surrounded by water so that the game could not escape and he could be certain of his quarry. In these woods there were fountains, rivers, tanks with fish, rabbit-warrens, steep high rocks among which were stags, fallow deer, hares, foxes, wolves and other similar animals which the Mexican lords hunted much and very often."

Cervantes de Salazar also gives a description of a hunt that the Mexican ruler watched from his richly adorned litter which rested meanwhile on the shoulders of its bearers. It was no

doubt thus that he was often carried from his summer palace at the base of the hill of Chapultepec, which was surrounded by a grove of beautiful "Ahuehetes" or Swamp Cypress, past the bas-relief portraits of himself and his predecessors, carved on the rocks, up a broad winding flight of steps to its summit. From this he could command a panoramic view of incomparable beauty embracing the whole Valley of Mexico with its lakes and the snow-capped volcanoes beyond. In 1554 Salazar in his "Dialogues" relates that on the top of the hill Montezuma had cultivated trees as though it were a garden and that on its steep sides were terraces with other groves of trees and hanging gardens. He explains the choice of such a site for the cultivation of ornamental trees and flowers with the dictum that "Indians preferred hills to plains;" but an important reason was doubtless that the native gardeners had learnt from long experience that many plants thrive best among rocks which not only preserve moisture but also the heat of the sun which counteracts the chilliness of the night temperature in this high altitude.

The fact, however, that not only Montezuma but, as we shall see, the lord of Texcoco and the Tarascan rulers built their pleasure gardens on high hills commanding admirable views indicates that they had a fine taste and a true love of Nature in all of its manifestations. In this connection it is interesting to recall here that being a high-priest as well as "king" it was one of Montezuma's duties to "arise at midnight to observe the North Star and its wheel" (the revolving circumpolar constellations) also the Pleiades and other constellations. From their hill-gardens the ancient astronomer priests and rulers of Mexico no doubt often contemplated the heavens, watching for the periodical re-appearance of the planets and particularly of the planet Venus which was celebrated by a solemn festival.

There is a deep pathos in the fact that during his captivity Montezuma several times besought Cortés to give him permission to visit those of his pleasantries which were situated within one or two leagues of his capital, which naturally included the hill-garden of Chapultepec. The Conqueror wrote

to his emperor that the permission was never denied; that Montezuma went accompanied by a number of his nobles and lords whom he entertained with banquets and feasting and that he always returned "very gaily and contentedly" to the apartment assigned to him by his captor—an assertion one may be permitted to doubt. Forming a part of Montezuma's city residence was what Cortés describes as "a house less handsome than his palace where he had a very beautiful garden, overlooked by certain balconies or watch-towers, the stone facings and flooring of which were of jasper, very finely worked. . . ."

We also know that in the temple precincts flowers were cultivated and that there were "exquisite flower-gardens of different kinds on the upper as well as on the lower stories" of the houses of those inhabitants whom Cortés describes as "vassal lords" and the "wealthy citizens" of the capital. At the Peñon, a rocky hill north of the city where a hot spring wells up, Montezuma had another pleasure. The orchard he owned near Coyoacan was given later by Cortés to Doña Marina who had acted as interpreter for the Conquerors.

The most wonderful of all Montezuma's gardens was however the tropical one at Huaxtepec which he had inherited from his predecessor and namesake Montezuma the Elder. The native historians relate that the latter, soon after his accession to power in about 1450, was reminded by his brother of the garden of their ancestors at Huaxtepec in the tropical region south of the Valley of Mexico, "where there were rocks with carved effigies of his forefathers, rocks, fountains, gardens, trees with flowers and trees yielding fruit." He thereupon sent thither his principal overseer named Pinotetl with orders to inspect and restore the fountains and springs, the streams, reservoirs and irrigation system. Simultaneously he dispatched messengers to the tropical coast region with a request to the lord of Cuetlaxtla for plants with roots of the vanilla orchid; of the cacao and magnolia trees and other valuable vegetable products. With foresight he also asked that these be brought carefully by native gardeners from the same region, capable of re-planting them at the proper season and tending

them in the customary way. On receiving his message the lord of Cuetlaxtla immediately gave orders to have a number of all kinds of plants dug up with their roots enclosed in earth, and with exquisite courtesy he had these bundles wrapped in beautiful woven mantles and dispatched to Mexico. The ceremonial observed by the gardeners who accompanied them before planting the trees, etc., "around the fountains in the garden" is worth recording here. They fasted for eight days and, drawing blood from the helix of their ears they anointed the plants therewith. Asking Pinotetl for a quantity of incense, rubber and paper, they also made a great sacrifice to the god of flowers offering him many dead quail after having sprinkled the plants and the soil around them with their blood. They assured the people that after observing these ceremonies none of the plants would be lost and that they would soon bear flowers and fruits.

Their prediction was fulfilled and before three years had passed all of their charges blossomed so luxuriantly that the gardeners from Cuetlaxtla were amazed and said that even in their native soil such plants never flowered so soon. They concluded therefore that the Huaxtepec region suited these valuable plants better than their original home. It is interesting to learn that "then Montezuma lifted his hands to heaven and thanked the God of all Creation for these blessings and he and his brothers shed tears of joy at the success of their experiment. For they esteemed as a special mercy and benefit bestowed upon them by the Lord of the Heavens, of the Day and Night, that they could now bequeath to the Mexican people and to all the inhabitants of the province of Huaxtepec the joy of possessing the precious plants they had been obliged to do without until then."

It was of the Huaxtepec garden that in his letter to Charles V, dated May 15, 1522, Cortés wrote that "it was the finest, pleasantest and largest that ever was seen, having a circumference of two leagues." He adds: "a very pretty rivulet with high banks ran through it from one end to the other. For the distance of two shots from a cross-bow there were arbours and refreshing gardens and an infinite number of dif-

ferent kinds of fruit-trees; many herbs and sweet-scented flowers. It certainly filled one with admiration to see the grandeur and exquisite beauty of this entire orchard." Other Conquistadores were equally enthusiastic. In his account of Cortés' second expedition, Bernal Diaz wrote: "We went . . . to Huaxtepec where is the pleasure garden . . . which is the finest I have seen in all my life. When Cortés and the Treasurer Alderete saw it and promenaded in it for awhile they were filled with admiration and said that even in Spain they had never seen a finer kind of pleasure-garden."

Bernal Diaz also records that on his expedition to the hot-lands Captain Gouzalo de Sandoval rested and slept overnight in the Huaxtepec orchard and had pronounced it to be "the most beautiful he had seen in New Spain. It contained a greater number of buildings and many more admirable sights than any other garden. Although he had not finished exploring all of it, as it was more than a quarter of a league in length, he considered it certainly to be a pleasure-garden worthy of a great prince."

The historian Torquemada, quoting from original sources supplements the foregoing descriptions by the information that beside groves of trees, rest-houses and gardens full of flowers, fruit and game there were also plantations and fountains and "several large rocks on which were bowers and oratories and observatories, with the steps leading to them cut in the solid rock."

Dr. Hernandez, the Spanish physician who visited "the royal gardens at Huaxtepec" between 1570 and 1577 mentions two valuable medicinal trees he had seen there, namely the "Brazilwood" (*Caesalpinia echinata*) which had been brought thither from Panuco on the Gulf of Mexico and a tree belonging to the Bombacaceae which was evidently the curious Macpal-xochitlquauitl, or Tree of the flower of the hand (*Cheirostemon platanoides*) which has always been prized by the Mexicans for the uncanny simulacrum of a small red hand produced by the union at the base of its five protruding stamens, and for its tonic effect on the heart.

At the present day it shares the popularity of the Yolloxochitl, or Heart-flower (*Magnolia mexicana*) as a sovereign heart remedy and both figure in the "Farmacopia Mexicana" and can be bought in a dried condition in every market-place. The fruit trees which flourished in the famous tropical orchard were probably different kinds of the Ahuacatl = Avocado (*Persea gratissima*); of the Tzapotl (Sapotaeae); the Texocotl (Mespilus) a species of medlar which makes delicious preserves; the Xalxocotl = Guava; the Macaxocotl (*Spondias Mombin*, the "Hog-plum"); the Capolin (*Prunus capolin*) of which there are three species. Among the ornamental trees and shrubs were doubtless the tree now known to botanists as the "*Montezuma speciosissima*, Bombacaceae, the *Bombax Ceiba* and other species of the genus; the two Poinsettias; the *Cleome speciosissima*; the fragrant *Lacepedea insignis*; several Acacias, to say nothing of Aralias, Yuccas and tree ferns and palms.

Among the showy flowers were the Tigridias, the bulbs of which yield a farinaceous food; Marigolds (*Tagetes*) of many kinds and various species of the Orchid, Zinnia, Cactus, Amaryllis, Bouvardia, Solanum, Lantana, Bromelia, Convolvulus, Salvia and Dahlia families; the *Hibiscus spiralis*, the *Sola dra guttata* with countless creepers; possibly the tall showy Huauhtli = *Amaranthus leucocarpus*, the seeds of which furnished a favorite food.

After reading the authentic evidence that has been presented one can but re-echo the conclusion expressed shortly after the Conquest by Salazar, then residing in Mexico, namely that "few princes and perhaps not one ever possessed pleasure-gardens that equalled those of the great lord Montezuma." From his delightful hill-garden at Chapultepec, commanding one of the most beautiful views of the world, this flower lover could visit the Iztapalapa pleasance as he travelled in his litter, by easy stages to the terrestrial paradise at Huaxtepec containing the choicest products of tropical vegetation in full magnificence and luxuriance, brought together by the unremitting efforts of his forefathers and his own. It is pitiful to relate that at the present day with the exception of some grand old ahuehuetes and the perennial springs of clear water nothing

remains to testify of the former beauty and grandeur of the first tropical botanical garden on the American Continent.

Returning to the Valley of Mexico we will now review what has been written about the gardens at Texcoco, the ancient seat of native culture which has been termed "The Athens of America," and was the residence of the most interesting personality in the history of Ancient Mexico, whose name would be voiced oftener if it were not generally considered as so unpronounceable. Nezahualcoyotl, the law-giver, philosopher and poet-king of Texcoco was born in 1403 and died at the age of seventy-one, after a reign of fifty years. Referring the reader to the works of Prescott and Bancroft for the history of his life and an account of the remarkable code of laws he formulated, attention is drawn here only to the interesting fact that, in order to prevent the destruction of forests and woods he prescribed certain limits to the hewers of trees and severely punished their transgression.

A descendant of his, Ixtlilxochitl, relates that Nezahualcoyotl possessed many kinds of gardens for he had inherited those which pertained to the palaces of his grandfather and father and had also created no less than eight groves and gardens. "These contained sumptuous palaces beside fountains, canals, drains, tanks, baths and other intricate water-works; and were planted with many strange and wonderful varieties of flowers and all sorts of trees, brought thither from remote places. He also had five pieces of land near the lake where food-plants were cultivated and he always personally superintended their harvest. Each garden was under the special care of men from one of eight provinces, whose services were rendered as a tribute." Another tribute consisted of the tropical flowers required for the use of the palace, which were sent daily from Cuernavaca at that time subjected to Texcoco.

Dr. Hernandez, writing between 1570 and 1577 records that Nezahualcoyotl had devoted himself to the study of plants and animals and, being unable to have living specimens of many of the tropical species had pictures of them painted from nature and copied on the walls of his palace. The drawings of exotic plants were so excellent that the Spanish botanist was able to

make use of them. He also mentions seeing the remains of the new palaces, gardens, and groves of trees planted by the poet-king.

Writing in the middle of the sixteenth century, Friar Motilina describes as particularly worth seeing the ruins of Nezahualcoyotl's palace "with its enclosed garden containing more than a thousand very large and very beautiful cedar (cypress) trees;" and a second palace with "many gardens and an immense tank or pool. . . ."

In 1850 the American diplomat Brantz Mayer in his work on Mexico described the same ancient grove of cypresses, standing in the level plain north-west of Texcoco as "one of the most remarkable relics of the princes and people of the Texcocan monarchy" and gave the following details: "The grove is formed by double rows of gigantic cypresses about five hundred in number, arranged in a square corresponding with the points of the compass and enclosing an area of about ten acres. At the North Western point of this quadrangle another double row of lordly cypresses runs westwardly towards a dyke north of which there is a deep oblong tank neatly walled and filled with water. . . . Along the raised banks and beneath the double line of the majestic trees were the walks and orchards in which Nezahualcoyotl and his courtiers amused themselves. . . ."

In his charming book "Anahuac," Professor E. B. Tylor, who visited Mexico in 1856, wrote of the grove (then called the "Bosque del Contador"): "This is a grand square, looking towards the cardinal points and composed of ahuehuetes, grand old deciduous cypresses, many of them forty feet around and older than the discovery of America."

In her book on Mexico, Miss Susan Hale mentions having seen in 1891 "a magnificent grove of lofty ahuehuetes surrounding a large quadrangle." At the present day although their ranks are sadly thinned, many of the superb old historical trees exist, furnishing living proof of the grand scale on which the Texcocan king planned his pleasure-gardens. A sixteenth century map reveals that at that time not far from the above quadrangle there was another grove in a large circular en-

closure. It may have been in imitation of this or in accordance with the native mystical ideas associated with the circle that the king of Atzacapotzalco laid out the beautiful circular grove of ahuehuetes which still exists, marking the site of another bygone pleasure.

The most famous of Nezahualcoyotl's pleasures was that on the high conical hill named Texcotzincó which overlooks a panoramic view of exquisite beauty with the Lake of Texcoco lying between the verdant plains and the distant mountains beyond it. Pomar relates that here the king had "many different kinds of plants of variegated colours and singular odors; not only those that grow on the spot but also others brought from the temperate and tropical zones." Here again archaeological remains corroborate the truth of the native accounts of former splendor, and reveal how, by means of an ingeniously constructed aqueduct and the filling in of an intervening ravine by means of a colossal solid construction, an abundance of water was brought from the neighboring heights, about three leagues distant to a reservoir with walls more than eight feet high, on the top of the hill, whence it was distributed in all directions by means of stuccoed channels. In 1850 Brantz Mayer verified that "the hill of Texcotzincó is connected with another hill on the east by a tall embankment about 200 feet high upon whose level tops, which may be crossed by three persons on horseback abreast, are the remains of an ancient aqueduct hilt of baked clay, the pipes of which are now as perfect as the day they were first laid."

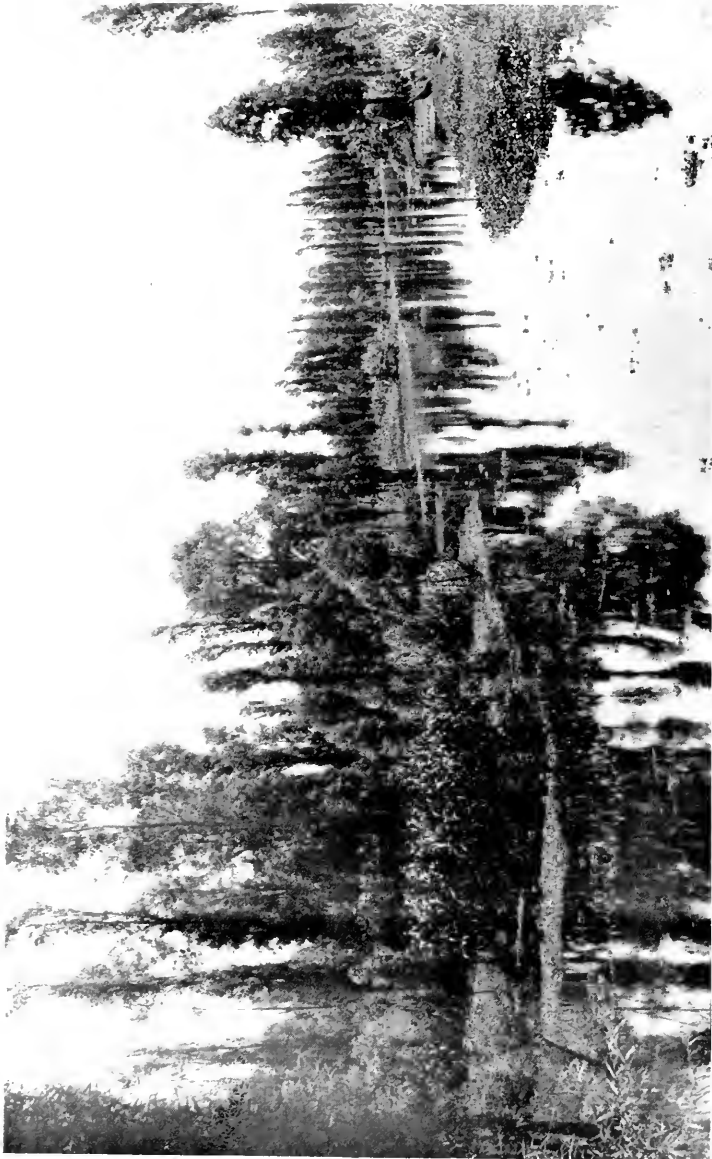
The hill is approached by a gentle slope from the south. Its north side ends abruptly in a precipice which resembles a high wall of rose coloured porphyry. On the crest of the hill are the remains of a small palace and of an edifice with flights of steps which may have led to the famous nine-storied tower described by native historians. There are also vestiges of a building with a well-preserved niche and a platform which may have been an out-door theatre such as those of Tlatelolco and Cholula, described by Spaniards as being of masonry, thirteen feet high and thirty paces square on which arches made of flowers and feathers were erected when performances took place.

As during what has been termed "the Golden Age" of "the Athens of America" the poet-king had constituted a Council of Music whose members held sessions and bestowed prizes on the best songs and poems, it is obvious that some suitable stage for the presentation and audition of these must have been provided.

Extremely well preserved are a large circular bathing tank near a stone seat with a high sloping back and a small circular fountain on a platform at the base of a flight of steps, all most skilfully hewn out of the solid and extremely hard rock.

The most remarkable feature of the ruins consists however, of a circular basin carved in an enormous block of porphyry which projects into space and has been aptly described by the English traveller, W. Bullock, as "standing out like a martin's nest from the side of a house" (picture on page 572). He also goes on to say: "It is not only an extraordinary bath, but still more extraordinarily placed. It is a beautiful basin about twelve feet long by eight wide, having a well five feet by four deep in the centre, surrounded by a parapet or rim two feet six inches high with a throne or chair such as is represented in ancient pictures to have been used by kings. There are steps to descend into the basin or bath, the whole cut out of the living porphyry rock with the most mathematical precision and polished in the most beautiful manner." From the poet-king's throne the view is one of surpassing loveliness and includes a view of the City of Mexico thirty miles distant on the opposite shore of the lake. A descendant of Nezahualcoyotl tells of a similar reservoir on the hill from which a stream of water was projected into space and, forming a fine spray, descended like rain on a garden at the base of the hill filled with all kinds of fragrant tropical flowers. A steep flight of steps, now partly preserved, led from the projecting rock to the base of the hill which was "surrounded by a garden in which were planted a diversity of trees and scented flowers. It also contained a number of different kinds of birds beside those the king had in cages brought from distant places, whose songs were so loud that people could not hear each other talk."

It is recorded that the poet-king, who had the gift of friend-



CANAL AT NOCHIMILCO, MEXICO

ship, not only composed an ode on the death of one of his relatives but had an inscription carved on the breastwork of the stone steps, to commemorate the hour, day, month and year in which the news of the death of the lord of Huexotzinco "whom he loved dearly" was brought to him while he was superintending the engineering work on the hill of Texcotzinco. This inscription in hieroglyphics and a number of notable statues and bas-reliefs representing the most important events of the poet-king's life were entirely destroyed by order of Archbishop Zumarraga. A richly decorated clay spindle, whorl adorned with a swastika, which I found on the hill during my last visit, conjured up visions of the gentle native women who shared the poet's life and his enjoyment of his earthly paradise with its enchanting views, murmuring waters, songs of birds and all pervading beauty of colour and perfume.

In conclusion an account of the history and true nature of the famous Chinampas or "Floating Gardens" must be given in order to dispel some of the erroneous ideas concerning them which were first promulgated by the historian Clavijero and have since flourished with a well-known exuberant vitality of error.

In the "Cronica Mexicana" of the native historian Tezozomoc, it is related how at a remote period, after the migratory Nahuas had left Tula, they went southward and reached Tequixquiac. There they manufactured beds (for cultivating food plants) giving them the name of Chinamitl. This work signifies literally "an enclosed bed surrounded by a fence made of cane or stakes." The name Chinampa is therefore composed of the word for enclosure and the affix pan-pani, which conveys the meaning that the enclosed bed was a raised one, being "on or above the surface." It would seem that these first chinampas were made in a plain, for Tezozomoc makes special mention of the fact that later, when they reached Xaltocan they "made beds *in the lagoon* and planted seeds of maize, beans, huauhtli (*Amaranthus*) squashes, tomatoes and chili peppers."

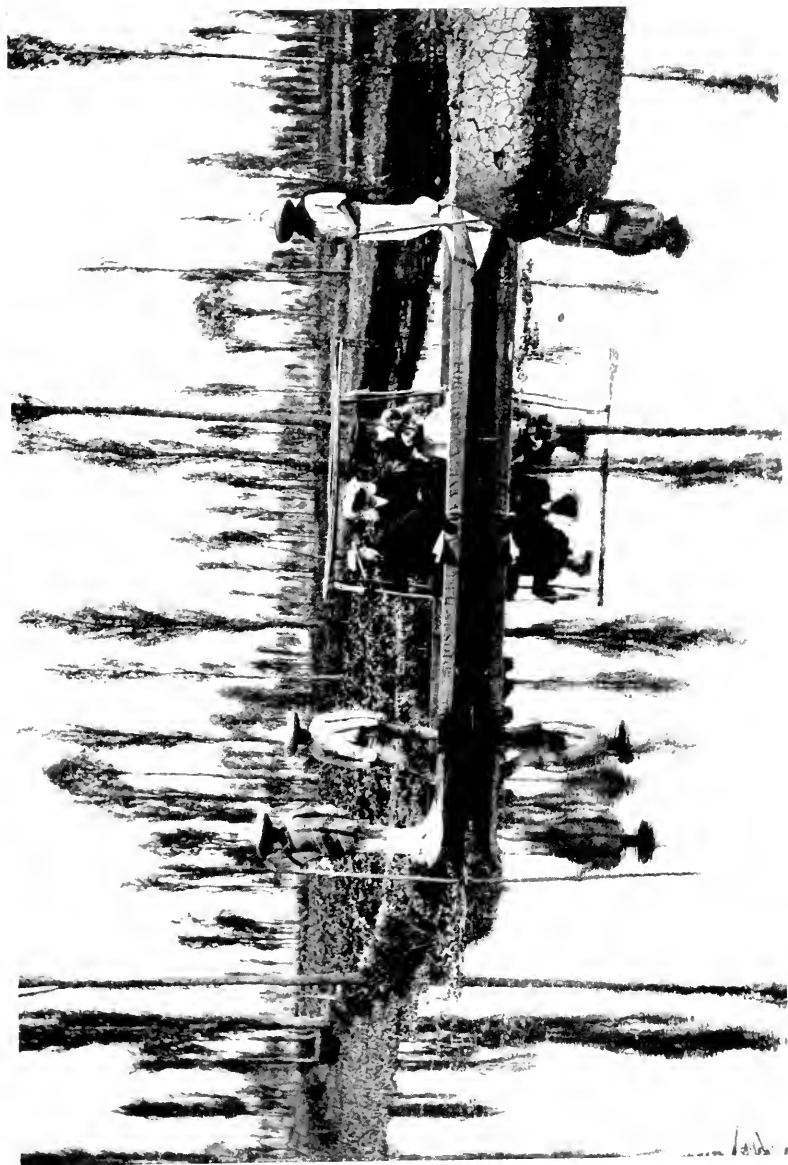
Years later, having reached the Valley of Mexico, they selected a site in the shallow fresh water lagoon and under the

direction of their high priest cut sods of the reeds and other grasses growing in the water and used these to make a foundation for the mud-beds they built up, inside of a staked off enclosure, by means of layer after layer of the muddy sediment at the bottom of the lake. It is exactly in the same way that new chinampas are made nowadays in the lake of Xochimilco by the descendants of the ancient agriculturalists who on account of their use of such beds were and are known as Chinampanecas = "Chinampa people."

From time immemorial however their oblong raised plots, the size of which varies between twenty to one hundred feet in length and seven to forty feet in width, have not only been staked off with the thick native cane, but have been surrounded by rows of a species of willow the growth of which resembles that of a Lombardy poplar. These willows being constantly pruned give little or no shade and their root-growth is phenomenal. With a certain amount of training their interlacing roots form a sort of basket-work which retains the banks of the "chinampas," the age of which can be estimated by their height, which varies between two and eight feet.

Since the water-hyacinth (*Eichhornia crassipes*) has been introduced in comparatively recent times, it has been found very useful in building up the chinampas, being spread in thick layers which are allowed to partly dry and partly decay and are then covered with layers of mud. Every year the process of raising the surface of the bed is repeated in order to counteract the erosion produced by the torrential rains in the wet season. By means of a canvas scoop fastened to the crossed end of a pole, mud is dredged and cast upon the beds from the bottom of the innumerable small canals which lie between the "chinampas" and have also to be kept in a navigable condition. The same scoops are used by the Indians standing in their punts to cast water in the high narrow "chinampas" when irrigation is required. The low "chinampas" need no irrigation but in the wet season run the risk of inundation.

For countless centuries the inhabitants of the capital have been almost entirely supplied with vegetables, maize and flowers by the industrious "chinampa" gardeners who manage



CHINAMPAS AT NOCHIMILCO
CROPS OF VEGETABLES ARE
RAISED ON THESE SO-CALLED
FLOATING GARDENS

generally to raise in a year several different successive crops on their artificial plots of land.*

The foregoing data will suffice to establish that it is erroneous to refer to Chinampas as "Floating Gardens."

Ancient Mexican history furnishes however, instances of true "floating gardens" having actually been made and conveyed from one place to another. The old native accounts of these repeated by Spanish and other historians gave rise to the mistaken idea that it was and is customary for the Mexicans to make and cultivate crops on moveable rafts; a method which the shallowness of the water would render impracticable, all water traffic in the canals being carried on by means of punts and small dug out canoes.

In the native chronicles several versions are given of how, during a period corresponding to A. D. 1350-1400, the king of Atzacapotzalco and his confederates permitted the newly arrived Nahuas, or Mexicans, to establish themselves in the lagoon and to make and cultivate their "chinampas." They exacted from them, however, "as a token of gratitude and subjection a tribute of vegetables, fish, frogs and other products of the lagoon." After some years, angered because the new comers had presumed to elect a ruler of their own, the king of Atzacapotzalco decided to demand an additional tribute, the rendering of which he thought well-nigh impossible.

His messengers informed the settlers that beside the customary tribute they were henceforth to furnish firstly grown willow and juniper trees for planting in his capital as an embellishment. Secondly: they were to manufacture a raft on top of which they were to plant all native vegetables and then bring it by water to Atzacapotzalco. The chronicle records that the Mexicans were filled with consternation and grief at so unheard of a demand, but during the night their tribal god

*An important item of sale is that of young plants of annuals which are raised in a peculiar way. Inside of a raised rim, on a substratum of decayed vegetation a layer of liquid mud, between six and seven inches deep is poured and allowed to partially dry. Seedlings are transplanted and set out at equal distances in this bed. When well rooted and grown the bed is well watered and divided into equal squares by cutting lines in the mud with a knife. When half dry each square, with its single plant, whose roots are securely encased in the mud, is lifted out, the compact neat block being easily handled and packed and buried in the garden beds where the plants flourish rapidly.

appeared to one of their elders and told him to be of good cheer for he would lend aid in making the raft. To the amazement of the king of Atzacapotzalco, who declared the feat "almost supernatural," they actually delivered not only the trees but the floating raft-garden full of flourishing food-plants and flowers.

Summoning the Mexicans to his palace, he addressed them as follows: "Brethren, it appears to me that you are powerful and that all things are easy to you. It is therefore my wish that in future when you pay your tribute you are to bring on the raft, among the growing vegetables which are to be in perfect condition, a duck and a heron, each sitting on her eggs. You are to time it so that on arriving here the eggs will hatch. If these conditions are not fulfilled the penalty will be death."

Again the tribal god came to the rescue and the extraordinary tribute was punctually delivered for fifty years by the end of which time the Mexicans had become powerful enough to cast off their yolk and bondage. From the foregoing it is evident that as another native historian remarks, the making of "floating gardens" was always considered "an almost impossible and most laborious performance" and was entirely exceptional. The memory of the tyrannically exacted tribute and its payment has however been kept alive through the intervening centuries, and a feature of the water-pageants and festivals held on the Viga Canal in vice-regal and modern times has often been a simulacrum of a "floating-garden" which has lent countenance to the popular, absurd, idea that the chinampas were also "floating" and could be towed at will from place to place.

After reading in the preceding pages of the beauty of the vanished gardens of Ancient Mexico, the reader will doubtless share the writer's regret that at the present time there is no botanical garden in Mexico or any other containing a representative collection of the wonderful native flora which furnished so much delight to countless generations of the earliest American flower-garden lovers.

(To be concluded)

CASA ALVARADO
COYOACAN
MEXICO

What Should a Garden be?

By William C. Egan



GARDEN should be a haven of rest for a mind fatigued by business cares or the complications of household duties.

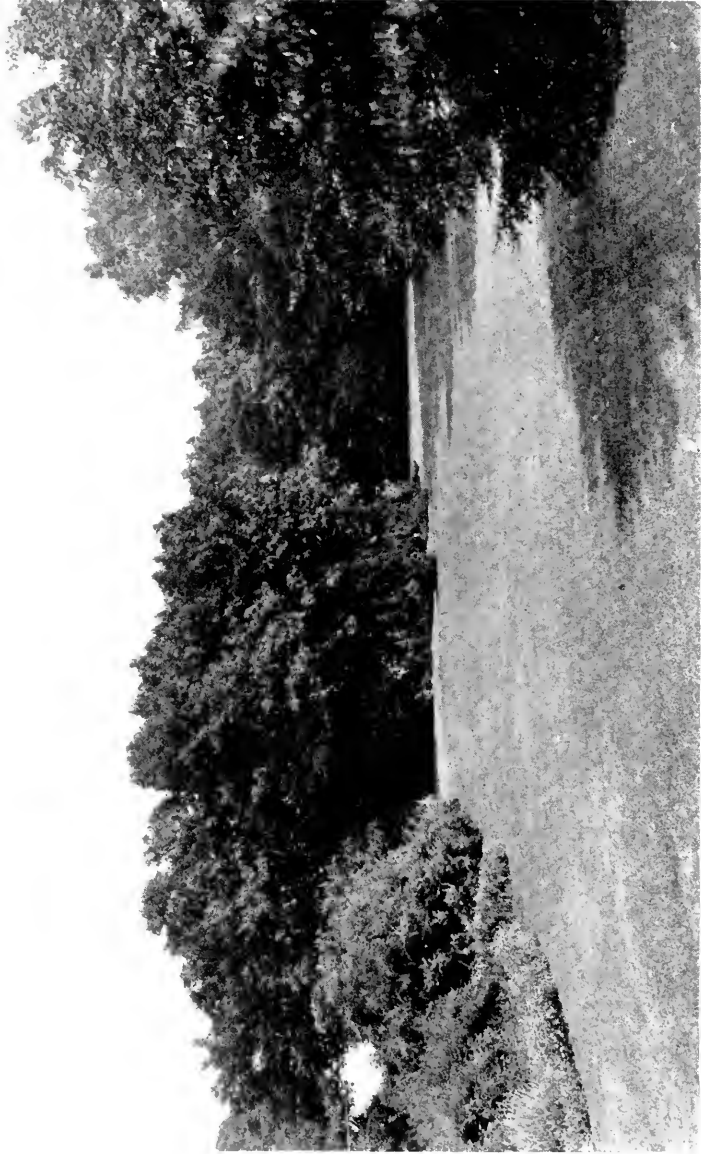
Mrs. J. Willis Martin, President of The Garden Club of America, on taking her first view of a certain garden known of exclaimed "How quietening! How peaceful!" She expressed the very object the owner—for it was an owner's garden, not a gardener's garden—had been driving at.

Her love for and intimacy with gardens had so trained her mind that she appreciated at once the picture before her. Flowers there were galore, still their color effect was subdued yet enhanced by the modifying influence of the surrounding tones of green.

In May, 1897, in *Gardening* I published an article on the landscaping of the Wooded Island at the World's Fair, that masterpiece of Mr. Olmsted, who in a short time converted a dismal swamp into a Fairyland. I then said, "We all saw the beautiful picture the island presented and felt its quietening influence amidst the babble of many tongues. It seemed so natural, so soothing to our tired body that we gave credit to Nature for what was in reality the art of man." In that paper I quoted in full the manuscript of instructions given by Mr. Olmsted to Mr. Ulrich who executed the work. The manuscript is most interesting and shows evidence of the master mind that wrote it.

Here is one paragraph.

"Second, to establish a considerable extent of broad and apparently natural scenery, in contemplation of which a degree of quietening influence will be had, counteractive to the effect



EGANDALE
HIGHLAND PARK, ILLINOIS
ESTATE OF W. C. EGAN, ESQ.

of the artificial grandeur and the crowds, pomp, splendor and bustle of the rest of the exposition."

Regarding the use of flowers he says, "But it is not desired that there should anywhere appear to be a display of flowers demanding attention as such, rather, the flowers to be used for the purpose, should have the effect of flecks and glimmers of bright color imperfectly breaking the general greenery. Anything approaching a gorgeous, garish, or gaudy display of flowers should be avoided." A notable feature of the work was that no colored-leaved trees or shrubs were used to break or disturb the peaceful influences of the many tones of green available in the list of hardy material used.

Flowers we must have but flowers alone do not give us a restful garden. They need the foil of a broad, open lawn and the backing of shrubbery with its varied tones of green. The green should predominate.

One of the greatest blessings the Creator gave to man, was when He decreed that all foliage should be green. It is the bright red flag that excites a bull to pugnacity not the green.

We all bow in appreciative reverence before a well grown tree with its verdant foliage reaching to the ground. The lights and shadows play hide and seek amid its feathery sprays, varying its tones of green, producing an enchanting effect and at the same time calms a weary mind. Nature slips a cog once in a while and produces a purple barbary or a golden elder—disturbers of the peace. If left alone they would die a natural death and nature, seeing her error would not reproduce them but unappreciative man prolongs their existence by propagation.

Miss Jeykel plants her long borders with the lighter tones at one end, gradually intensifying the color until at the center the reds and other strong colors predominate and then recede in the same ratio, ending with the lighter shades again. This method is to rest the eye after the fatigue the reds imposed upon it.

I like to use a group of shrubs as an eye rest and prefer to have a backing of shrub greenery behind the flowers, which

aided by the green of the lawn in front exercise a restful influence over soul and body. A bouquet lacking in foliage is merely a lump of color, not a more attractive spectacle than a spilled pot of paint. The green should predominate and as far as possible each flower should stand alone, surrounded by foliage so as to show its individuality, and at the same time add to the bouquet the charm of "airiness."

So it is in the garden. We need the predominance of the green to bring out the color value of the flowers, modifying their brightness, softening their influence and giving peace and satisfaction to the hearts of those fortunate enough to gaze upon them.

My Garden in Florida

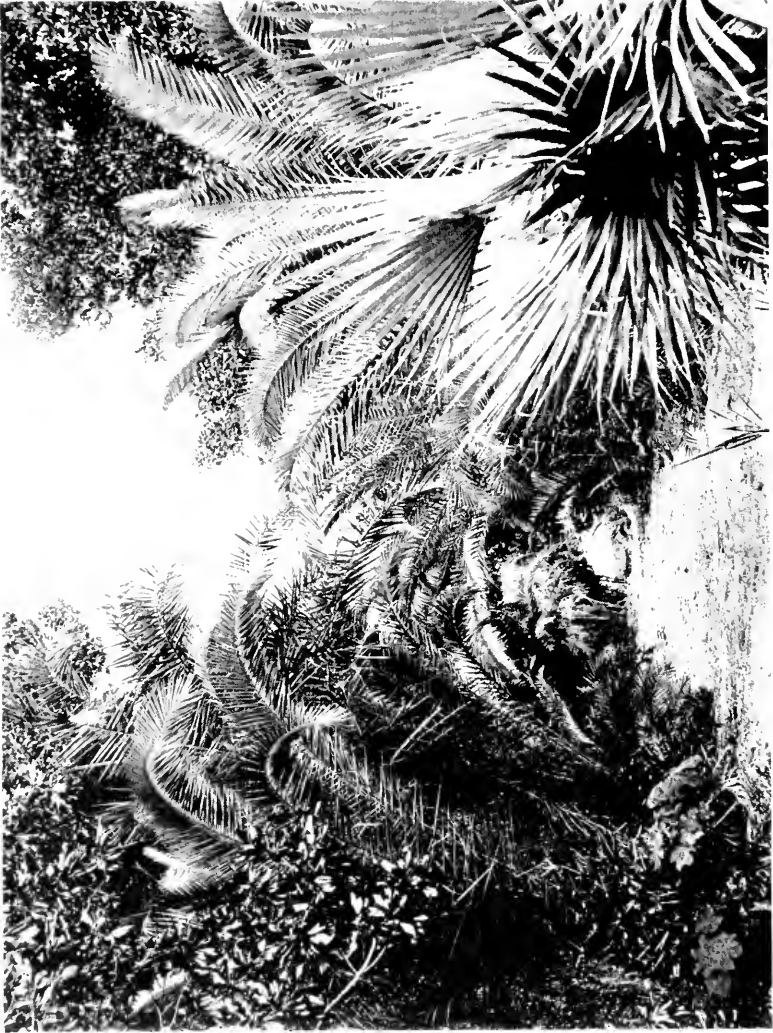
By Henry Nehrling

"A garden that one makes oneself becomes associated with one's personal history and that of one's friends, interwoven with one's tastes, preferences and character, and constitutes a sort of unwritten but withal manifest autobiography. Show me your garden, provided it be your own, and I will tell you what you are like."

—*Alfred Austin.*



HERE is no place in this world that I love so much as I love my garden. There is nothing like it in Florida. It has characteristics entirely its own — features not found anywhere else. Garden and plant lovers from all parts of the country are charmed with it. Thousands come and go each year and enjoy with me its many attractions. Though I had pictures of tropical beauty in my mind when I planted it I never followed strictly the rules of the landscape designer. There are no lawns and broad open spaces. Single specimens, groups and dense masses of trees, shrubs, palms and bamboos are the main features of Palm Cottage Gardens. There are wild portions with narrow paths leading from one place to the other. Native trees and shrubs form the foundation of the garden, Japanese and Chinese evergreens, hardy bamboos and palms closely follow in their wake. The assemblage of plants is a most refined one, beautiful alike in foliage, form and flowers. All the real aristocrats of our native flora, as well as those of the far Orient have found a place in my collection, where they grow side by side with plants from Australia, South Africa, Brazil and Argentina. Hundreds of strictly tropical species were interspersed but almost all of them succumbed to the killing freezes in the course of time. My losses were quite disastrous at times but a larger number of the very best and most ornamental species came out of the struggle for existence without



PALM WALK FROM HOUSE TO THE LAKE
PALM COTTAGE GARDENS
GOTHIA, FLORIDA

much harm. All of the plants set out had to struggle for existence. This is high pineland soil, and it contained originally not even a particle of humus. It had the appearance of pure white sand. In its highest parts the clay stratum lies from twelve to fifteen feet below the surface. During the dry season all the moisture was rapidly absorbed and the soil became as dry as dust. Forest fires frequently raged over the place, not only consuming every leaf and grass-blade but also injuring and killing the plants that had been set out. Sometimes the water in the adjoining little lake rose two and more feet during the rainy season and killed all the plants along its borders. Cattle and hogs breaking through the fences were a constant menace for many years. Lack of means handicapped me from the very beginning, and only by great personal sacrifices was it possible to reach my goal. Great and many were the obstacles placed in my way, but I never lost confidence in the final success.

Early in the winter of 1883, a friend of mine the late Francis von Siller, a kindred spirit, went to Florida to investigate and study the climate and soil of the state. He made excursions all over central Florida and finally found a place in the high rolling pineland, ten miles west of Orlando, which appeared to him a perfectly ideal locality—healthy, picturesque, dotted with numerous lakes, and well adapted for orange culture and winter homes. Mr. H. A. Hempel from Buffalo, N. Y., had settled here several years before, and had named the place Gotha, after his place of birth in Thuringia. Mr. von Siller wrote me about his discovery, and I requested him to select for me a good tract of forty acres. This land is situated only a half a mile north of the village. In April, 1886 I made my first trip to the land of sunshine and flowers to inspect my property and to study its possibilities. I was very much pleased with the results. After having closely examined the many tropical plants in the various gardens, my enthusiasm was aroused and it grew more intense from year to year, though I realized the nature of the poor dry soil and the many obstacles in the way before me. My first start was to have five acres cleared and to plant an orange grove. The ornamental part was vividly in my mind but my means did



COCOS GAERTNERI IN CENTRE
PHOENIX SYLVESTRIS IS THE
PALM ON THE RIGHT

not allow me to follow my inclinations immediately. Not until November 1890 was I able to start my garden. Ten acres were set aside for this purpose, and five acres in the highest and driest part were cleared and ploughed. The last remnants of a once magnificent pine forest, about a dozen tall trees, were left intact, and a number of very small Live Oaks and Willow Oaks were also preserved. Some of these trees, particularly the Live Oaks, are now dense broad specimens about fifty feet in height.

Fortunately I found here another kindred spirit, a man well educated and an ardent lover of nature, Mr. Franz Barthels, who had settled near my place. He understood me and was willing to carry out my ideas and care for my plants, while I was following my occupation as custodian of the Public Museum in Milwaukee. The very first step I took was to search the hammock woods, five miles away, for plant material. Mr. Barthels and I walked this distance repeatedly and carried the plants home on our shoulders. They consisted of small specimens of *Magnolia grandiflora*, *Osmanthus americana* (*American Olive*), *Loblolly Bay*, *Wax Myrtle*, *American Laurel* (*Ocotea Catesbyana*), *Red Bay* (*Persea Borbonia*), *Laurel Smilax* (*Smilax laurifolia*), *Sweet Bay* (*Magnolia glauca*), *Pieris nitida*, *Zenobia pulverulenta*, *Leucothöe racemosa* and several others. The magnolias are now large and stately trees, the pride of the garden, at least fifty feet tall; the Loblolly Bays, though always found near water, have assumed a good size, being about thirty feet high, and the American Olives are dense and broad specimens. The Wax Myrtles have formed round and dense clusters of bright green, and the Smilax clammers high up into the trees. We also collected little plants of the Carolina Jessamine, one of our most beautiful and refined native plants. It covers at present quite a number of trees in my grounds, and when in bloom, the brilliant yellow flower-bells exhale a most delicious perfume which pervades the air of the entire garden. I also planted several Hollies (*Ilex opaca*), the Dahoon (*Ilex Cassine*), Wild Plum trees, the Prickly Ash (*Fagara Clava-Herculis*) and a dense growing Hawthorn (*Crataegus*) with pendent branches. Hollies and Dahoons are at present a feature in the garden, but

the Prickly Ash became a nuisance by spreading over territory not belonging to it, and it had to be removed. The common Wild Plum (*Prunus umbellata*) forms a very dense, reclining, broad and shapely tree, while the Chickasaw Plum (*P. angustifolia*) has formed dense thickets by underground runners. It is almost impossible to keep it in bounds, and it never should be planted where space is limited. Deciduous trees and shrubs form only a very small and inconspicuous part in my garden. They should not be planted unless they are exceptionally beautiful. Such a small tree, one of the very best of leaf-shedding natives, is the Fringe Tree (*Chionanthus virginica*), common in many of our hammocks. Its leaves are large and leathery and almost evergreen, and when in bloom early in March it is a most lovely object, the pure white fringe-like flowers covering it like a sheet. This tree or tall shrub was also collected and carried to the garden.

This first planting was done under considerable hardships. The November sun was still quite hot and the road and the trails through the woods often invisible. Plant collecting in a dense hammock has its unpleasant features. Many of the thickets were almost impenetrable, and the extremely dense masses of Saw Palmettos in places were so tall that I at one time lost my way. This particular hammock had the reputation of being alive with huge diamond rattle-snakes. And there were ticks and red bugs, all with the wild desire to get into your flesh. Such things annoy one at the time, and the carrying home the collected plants seemed like a huge burden. But all my various adventures in the Florida hammocks and swamps were a source of pleasure after I had come home, and I always felt a strong desire of making these excursions again, even if I should have to undergo similar or worse hardships.

In Milwaukee I at once began to build a greenhouse, partly to imbue my sons with a love for tropical plants and to train them in their cultivation, partly for my own pleasure, but mostly for the purpose of growing the plants necessary for my Florida garden. Good friends helped me along whenever they

could. Mr. Henry Pfister, for many years head gardener of the White House, in Washington, sent me many plants which he thought could be grown successfully in Florida. I received seeds from many sources, particularly from Blumenau, Brazil, and from Buenos Aires, from La Mortola, Italy, and from Hong Kong and Darjeeling. The late Mr. C. Werckle of Ocean Springs, Miss., and his enthusiastic son, Carlos Werckle in San José, Costa Rica, presented me with many most beautiful shrubs and bulbs. Carl Sprenger, at that time near Naples, Italy, one of the most enthusiastic and learned gardeners of our time, enriched my collection with all the various *Crinum*s he had brought together, and with all the varieties of *Amaryllis Belladonna* he grew in his own garden in southern Italy. Mr. Erich Wittkugel of San Pedro Sula, Honduras, made excursions into the mountain forests and tropical lowlands and collected for me many bulbs, but especially Bromeliads, Orchids and epiphytic Ferns, which he consigned to me in large dry-goods boxes. I opened with much anticipation and intense interest the packages of plants and seeds that came by parcel post from Trinidad, Jamaica, Caracas (Venezuela), Mexico, Honduras, Costa Rica, Barbados and Australia. The late Mr. James Douglas, one of the best-known English gardeners of his time and a frequent contributor to *The Gardener's Chronicle* and *The Garden* enriched my collection with the finest new *Hippeastrum*s (*Amaryllis*) from his own glass houses. Dr. E. Bonavia sent me a number of his finest hybrids of *Hippeastrum pardinum*, among them the singularly beautiful "Queen of Spots" and "Spotted Orfeo," and Mr. James O'Brien added several tubers of the then new and magnificent *Gloriosa Rothschildiana*, which since has proved such a great success in Palm Cottage Gardens. This climbing Lily, one of the most gorgeous of bulbous plants, is one of the glories of my garden, flowering more or less profusely all the year round. I have raised a number of fine hybrids from this species and *G. superba* and *vice versa*.

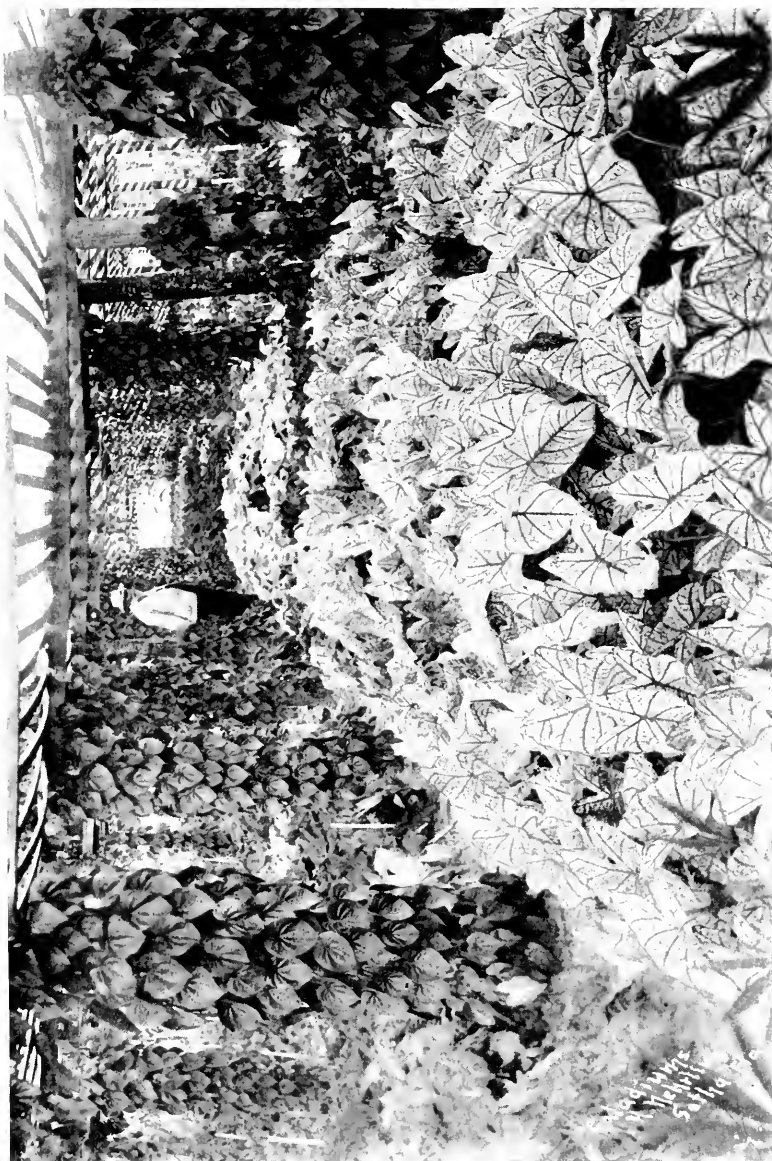
I have two fine specimens of the rare *Talauma Hodgsonii* in my garden. When reading in the Himalayan Journals about this tree and its grand foliage and purplish-red flowers I was

very anxious to obtain seeds from it. I wrote to Mr. Kennedy, Superintendent of the Botanical Station at Darjeeling, Sikkim, India, and at the same time to Sir Joseph D. Hooker, for many years director of the far-famed Kew Gardens, and one of the noblest and most amiable men it ever has been my good fortune to correspond with. The seeds came and I planted them at once. Several germinated, and I was in possession of a few fine small seedlings when Sir Joseph D. Hooker's answer came—quite a lengthy letter and very friendly. He told me that the seeds of *Talauma Hodgsonii*, as well as those of other species of the Magnoliaceae, soon lose their germinating power, and that so far it had been impossible to raise this species from seeds in Europe. The best way would be to obtain young plants from the Himalayas in Wardian cases. Only one specimen of *Talauma Hodgsonii* lived. As I was afraid to lose it I sent it to my friend Dr. William Trelease of the Missouri Botanical Garden, where Mr. August Koch, one of the head gardeners, succeeded in raising a second plant by layering. This is the one now in my collection.

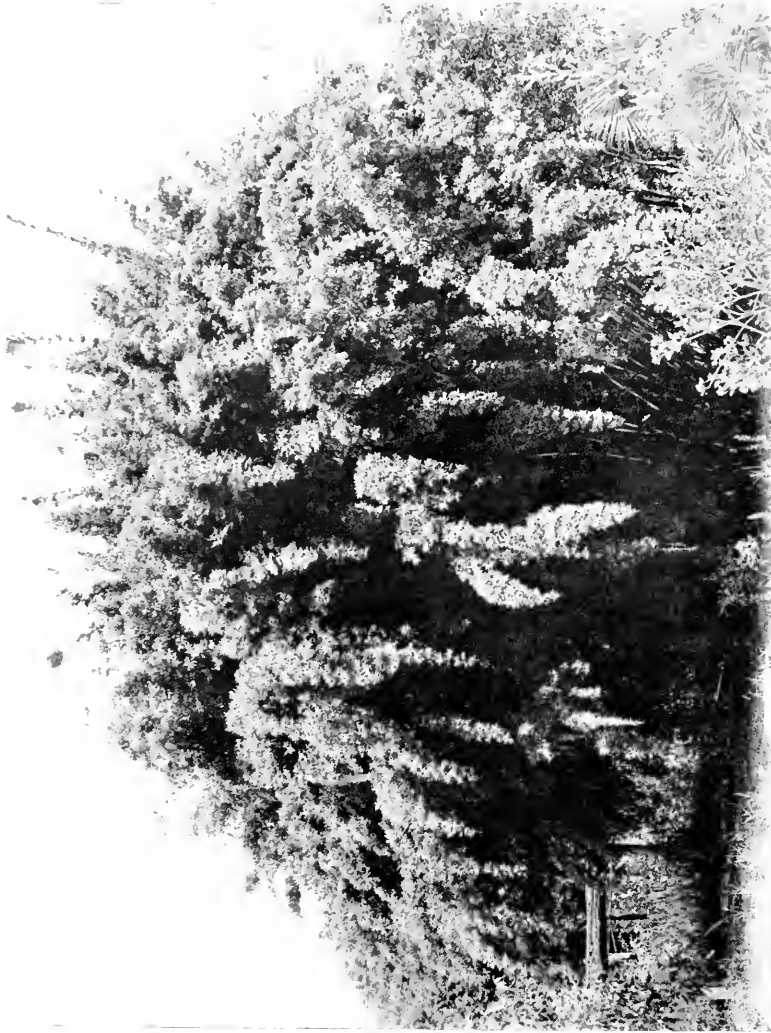
The year 1893 may be properly called a red letter year of my life. It is the year of the World's Columbian Exposition in Chicago. Many a day I spent in the White City. It appeared to me like fairy-land, and the whole is now in my memory like a dream. The impressions of the combined exhibits of rare tropical plants and of the many large single specimens of palms and foliage plants will never fade from my memory. Here I saw, for the first time in my life, masses of new Fancy-leaved Caladiums. They came from the largest hybridizer of these brilliant foliage plants, Adolph Lietze in Rio de Janeiro. When I admired the richness, brilliancy, delicacy of these often translucent colors I was reminded of art, not of nature. In this as in many other cases nature simply surpasses art. Mr. Lietze has raised in succeeding years much finer, much more varied, much more brilliant hybrids, but at that time even connoisseurs, like Dr. L. Wittmack, the editor of *Die Gartenflora* and others were of the opinion that the climax had been reached. Today those on exhibition and most all of Lietze's later hybrids are

in my collection, and the display in my Caladium lathhouses, where hundreds and thousands are grown in dense masses, cannot be compared with anything else, be it flowers or foliage plants. There is nothing like it. They stand incomparably above all other plants in lasting beauty, variety and brilliancy. The thousands of visitors who come and go when the Caladiums are at their best, from June to October, have only an eye for the brilliancy of these foliage masses. They entirely overlook the orchids, bromeliads, marantas, ferns and palms. The latest hybrids of Mr. Richard Hoffmann of London and some of my own even outrival in gorgeous color the Brazilian kinds. For years the Caladiums have been the greatest attraction of my garden.

There were many other plants on exhibition that strongly appealed to me, particularly palms, cycads, gesnerads, marantas, ferns, and stately tropical foliage plants. In front of the Arizona building stood four handsome specimens of *Dasyllirion longissimum*. All four grow now in my garden but they scarcely made any headway in their size, though perfectly healthy. A fine large plant of *Dasyllirion acrotriche* is one of the features of the garden, being admired even by those who do not care much for plants. It is one of the best scenic plants we can grow. *Dasyllirion serrulatum* is represented by a number of medium-sized plants. All were acquired from collections on exhibition. Fine, large, strikingly beautiful specimens of *Doryanthus Palmeri* and *D. excelsa* in large tubs were scattered around on the lawn in front of the Horticultural Building. They attracted the attention of all plant lovers. Unfortunately soil and climatic conditions of Florida were not then well understood. Many mistakes were made by me, many plants were lost, and these two Australian Torch Lilies were among them. They need a rather moist soil and some shade here. The Japanese had many rare and highly ornamental plants on exhibition though their dwarfed trees in small tubs struck me as an abomination. Among palms a dense specimen of the Bamboo Palm (*Rhapis humilis*), about three feet high and a picture of elegance was particularly admired. It finally found a home in my lath-



FANCY LEAVED CALADIUMS IN THE OPEN
AIR AT PALM COTTAGE GARDENS
GOTHIA, FLORIDA



BAMBUSA ARGENTEA VITTATA
A SILVERY BAMBOO 35 FEET HIGH
AND 40 FEET IN DIAMETER

house. Having reached a height of about ten feet by eight feet in diameter it is at present more striking than ever before. Late in October there were many fine plants of *Daphne indica*, of which the Japanese appeared to be especially fond, in full bloom. The perfume exhaled by the flowers was extremely delicious. There were white and pink forms, and one with variegated leaves. Only one small bushy plant on its own roots was established successfully in the deep shade of my lath-house, the grafted ones all died. This *Daphne* is a jewel and should find a place in all choice collections. Scarcely any other plant in the Japanese exhibit attracted so much attention as the Sacred Bamboo (*Nandina domestica*). Its elegant airy foliage and its dense growth commanded admiration. An additional charm are its bunches of rich scarlet berries in late autumn. This plant belongs to the family Berberidaceae, and its common name is misleading, as it is not even distantly related to the Bamboos.

Many other plants were added to my collection after the exposition closed. I remember some fine specimens of *Araucaria Brasiliensis*, *Dammara robusta*, *Dracaenas* and *Cordylines* and many others. None of them could be coaxed into a vigorous growth on the high and dry pineland soil. Even the New Zealand Flax (*Phormium tenax*), of which I succeeded in later years in growing fine tufts in the moist rich soil of my plant-shed, refused to start. I was unable to spend my vacation in Florida during the World's Fair year, but early in November, 1894, I again enjoyed the balmy breezes of the ideal sunny autumn days in my wildwood garden. Many new plants were added and more land was cleared. A lathhouse was built near the border of the lake for moisture and shade loving plants.

The late Mr. Pliny W. Reasoner, whom we must call the real pioneer of ornamental horticulture in Florida, not only brought together large collections of beautiful tropical and subtropical plants for commercial purposes, but was an excellent plantsman, a good cultivator and an enthusiast. He did more for the promotion of ornamental gardening in Florida than anyone else. He loved plants intensely and he told about his favorites in

growing language. His writings would fill a good sized volume. Mr. Walter N. Pike, and later Mr. W. C. Steele, worked along the same line and contributed their share in the columns of *The Florida Agriculturist* to make known the possibilities of tropical gardening to the plant loving world.

Among the many branches of study which nature affords for man's pleasure, it is difficult to find one which is at once so full of marvel and beauty, and at the same time so open to the enjoyment of all as that of ornamental horticulture. The pleasures never cease. There is always something new and beautiful to admire. Every new plant that is added is an object of delight and hope. It is always a great pleasure to me to study the gardens and collections of other plant lovers, and many are the discoveries of beautiful things I never had seen before. Even in the early pioneer days beautiful gardens were planted in this part of the state. In his garden at Federal Point the late Mr. E. H. Hart has erected for himself an everlasting monument. Here we find the largest specimens of the Canary Island Date Palm and the Sugar Date Palm (*Phoenix sylvestris*), of the Chinese Fan Palm (*Livistona Chinensis*) and the Washingtonias, in the state. The large and very dense specimen of *Podocarpus Nageia*, showing a most singular green with a slight violet cast, is the most exquisite coniferous tree I ever have seen. Small groups of rare tropical *Zamia* and extremely interesting clumps of the Australian *Macrozamia spiralis* proclaim, more than anything else, the intense love and enthusiasm of the one who planted and cared for them. I owe much of my knowledge of plants adapted to our soil and climate to his correspondence.

At Lake Charm near Oveido another scholarly enthusiast, Mr. Theodore L. Mead, started in 1885 a most beautiful tropical garden, well laid out and richly stocked with rare plants. His particular hobby was the cross-breeding of Orchids, and in order to get a good start for his seeds he had erected high up in the Magnolias and Live Oaks little lathhouses which he only could use by the aid of very long ladders. In his rich shady hammock he naturalized tropical ferns, gesnerads,

terrestrial orchids and a host of other beautiful and dainty plants. Most all the plants did well but the constant fight against the ravages of the Florida "razor backs" forced him to discontinue his experiments along these lines. His collection of Palms and Bamboos was the most complete and beautiful in the early nineties of the last century. The most interesting garden of Orlando was at that time the one we now know as "Bishopsted." Many of the rare and tender tropical plants I admired there in November 1894, were later wiped out by the heavy freezes, but enough has been left to show the possibilities of what can be accomplished with a little love and care. There were immense clumps of three species of tender tropical Bamboos from India. The most beautiful in aspect and color was *Bambusa nutans*, the most massive and spreading *B. vulgaris* and the most intricately impenetrable *B. arundinacea*. I have all these in my garden but they are always killed to the ground by a heavy freeze. Only *Bambusa nutans* should be grown in this region on account of its grace and singular bluish-green color. In this garden I found a most exquisite rare palm *Diplazium caudescens*, about ten or twelve feet high with beautiful feathery leaves eight to ten feet long. The color of the upper side was a deep glossy olive green, while the under side was silvery white. The trunk was only short but very thick. The leaves curved gracefully to all sides. I scarcely ever saw a more elegant and massive Palm. Its picture has never faded from memory. Many have been the attempts to add it to my collection but I always failed. Near it stood a large clump of the Chinese Paper Plant or Aralia (*Tetrapanax papyrifera*), about fifteen feet high and as much in diameter, richly adorned by an abundance of large palmate leaves, silvery-white on their underside, and by the large dense flower panicles. A gigantic *Dahlia imperialis* with single, pure white, bell-shaped flowers also attracted my attention. Fine dense, well-grown specimens of this plant are very ornamental and ought to find a place in every garden. Unfortunately many tropical plants in this garden and the immense clumps of giant Bamboos were killed to the ground by the unprecedented freeze of the

early February days of 1895, and when I again visited the place a year later only the short stumps of the tall culms were left. In my own garden all the strictly tropical plants were a thing of the past, though many had again sprouted from their roots.

In 1893 Prof. C. S. Sargent published his "Notes on the Forest Flora of Japan" in *Garden and Forest*. These articles were a revelation to me. They outlined a new and most important direction in my horticultural work. Side by side with our native evergreens those from Japan form today a most conspicuous feature in my garden. When I came home from Florida, and after I had again read and re-read these "notes" I sent an order for all the plants that were obtainable to Japan, and in May 1895 I received a large consignment of Bamboos, Camellias and other Japanese evergreens. In November I forwarded all of them to Florida and planted them in the positions which they now occupy. I have scarcely lost a single plant except a few specimens of *Michelia compressa*, *Dammacanthus indicus* and *Podocarpus Nageia*. From early in October to Christmas *Camellia Sasanqua* is in full bloom. Some of the specimens are at present ten to twelve feet high and very dense. Their flowers are large, in form like a single Rose and of a fine rosy-red color. The double white form of this species is more spreading in growth and not so tall. This is a gem. Nothing can outvie it in purity and beauty. *Camellia Japonica* was represented in many forms, among them a number of semi-double varieties, the largest and most elegant flowers imaginable. Though Camellias are slow growers some of the bushes have attained a height of eight and nine feet. They begin to bloom early in December. There are early and late varieties. Professor Sargent found the Broad-leaved Holly (*Ilex latifolia*) particularly striking, and he says that it is perhaps the most beautiful of the Japanese evergreen trees, not only on account of its brilliant red abundant fruit, but also on account of its large fine leaves. I received a dozen small specimens, some of them at present eight to ten feet high. It is a slow grower on high pineland. It bears its dense bunches of vivid red berries for the first time this year. *Ilex integra* is also a very beautiful and

distinct species, being, like the former, often cultivated in temple gardens. Its brilliant red berries are very ornamental. My particular favorite among the evergreens of Japan however, is the fine, tall, dense and somewhat columnar *Ternstroemia japonica*, invaluable as a single specimen and in groups, and indispensable in Florida landscape gardening. At present this first-rate hardy shrub is little known, and I have never seen it outside of my own garden. Some of my specimens are at present 15 to 18 feet high. Its flowers appear in June in drooping short racemes, exhaling a very pleasant, though not strong perfume. The berries ripen in September, bursting open and displaying in their mealy flesh brilliant red seeds. Among the plants forming at present very conspicuous objects either as single specimens or in groups, the Star Anise (*Illicium religiosum*) is very prominent. It is also one of the sacred plants of Japan, with fine, large and very aromatic leaves. It never forms a tree here but grows in bush-form, being very broad near the ground and pointed at the top. Coniferous trees were only represented in two species, both *Podocarpi*. My two specimens of *Podocarpus japonica* have made a splendid growth, being dense and upright with narrow myrtle-like leaves, deep glossy green above and silvery-white beneath. The much more beautiful *P. Nageia* did not thrive so well. Only one specimen among a dozen is alive. It grows in dense shade underneath Magnolias and Oaks. Rich moist soil is what it requires.

The Bamboos were well represented in this consignment. No one should plant species with running rhizomes for ornament in Florida. Arundinarias, and all the members of the genus *Phyllostachys* soon become a nuisance and are extremely difficult to eradicate. Only those growing in tufts or clumps should find a place in the garden. A fine large clump of the hardy tufted species is the embodiment of every grace, elegance and beauty imaginable. There were about twenty-five different Bamboos in this collection, which all came under Japanese names. For quite a while I was unable to identify my plants until Mr. A. B. Freeman-Mitford (Lord Redesdale) sent me a complimentary copy of his classic book "The Bamboo Garden"

early in 1897. One of them labelled Taisan-chiku, appealed to me at once as a strong-growing, distinct species. I have now three very large and beautiful clumps of it. It grows over fifty feet tall with thick blackish culms. This proved to be *Dendrocalamus latiflorus*, and is the only hardy large-growing Bamboo. Its native home is Formosa. A fine little specimen, labelled Suo-chiku, was identified as the most elegant *Bambusa Alphonse-Karri*, while the Taiho-chiku proved to be the silver-variegated *B. argentea vittata*, and the Oroshima-chiku the small growing gem *B. gracilis*. I found all the three in large and stately specimens in the gardens of Orlando. Mr. Theodore L. Mead of Lake Charm imported all of them directly from Japan ten years before I had received mine. They have been grown in the Mikado's empire since times immemorial for ornament, but they seem to have been brought there from India. The hardy *Dendroclamus latiflorus* was not represented in the gardens of Florida before I introduced it.

The members of the Cycas family have always been special favorites of mine. In glasshouses, though of great importance, they neither attain the size, nor the density of growth, nor the luxuriance and beauty they assume when planted out in the open in Florida. *Cycas revoluta* is a common ornament of our gardens. As it is an extremely slow grower I decided to obtain a number of stems in their dry state, ten to forty pounds in weight, directly from Japan. They came with the above mentioned plants, and I sent them immediately to Florida. The largest specimens are now huge plants, pictures of health and beauty, with trunks four to five feet high and with magnificent leaf-crowns. As there are male and female plants in the collection, I am able to gather seeds by the bushel every year.

In the meantime most of the Palm seeds I had received from South Brazil, Argentina and from Haage & Schmidt (Erfurt, Germany) had sprouted. I had hundreds of nice little plants. The most important and beautiful of all Palms for high dry pineland culture are the hardy species of the genus *Cocos*, all natives of southern Brazil, Paraguay and Argentina. All of them are perfectly hardy as far north as Jacksonville.

Usually their foliage is hard and leathery and its color is a beautiful glaucous green. *Cocos Datil* is the largest and most massive of the genus. Its trunk is of an immense size, and its leaves stand in straight perpendicular lines along the stem. The fruit-cluster weighs from 35 to 50 pounds. The fruit, very aromatic, juicy, as large as a plum, is closely packed together on small branches along the stem. *Cocos australis* also ripens four or five bunches of beautiful, edible, sweetly aromatic orange-yellow, juicy fruit each summer. The bunches weigh from 15 to 25 pounds. This is a beautiful silvery-green Palm, with very broad and densely clustered leaves. *C. Blumenavia* is a very distinct Palm in foliage, flowers and fruit. I received the seeds directly from Blumenau, Brazil. My specimen is a strong grower with fine glaucous foliage. The pinnate leaves curve most gracefully and the pinnae are bent downwards at the apex. The flowers appear in dense clusters but they are not creamy-yellow as in the two preceding but violet purple. The fruit clusters weigh about 15 pounds. The fruit has no perfume and has a very distinct color—white with a small red point and a rosy-red color around the stem. *C. eriospatha* is my especial favorite among the hardy *Cocos* species. Its beautiful recurved leaves are usually 6 to 7 feet long, glaucous, faintly suffused with dark green and the leaf-stems show a deep purplish violet tint. The flower spathe distinguishes it from all its congeners. This is covered with a dense soft felt-like wool of a beautiful chestnut-brown color. The fruit is as large as a good-sized cherry, yellowish-green in color, covered with innumerable gray dots, very juicy, not aromatic and of a most delicious plum-like taste. I have also fine bearing specimens of *C. Yatay*, *C. odorata* and *C. Gaertnerii*. The last named species is the most prolific of all, bearing each year usually ten to twelve clusters of highly perfumed creamy yellow fruit, the size of a big cherry, each cluster weighing from 20 to 25 pounds. *C. × Bonnetii* was introduced by Haage & Schmidt. This firm received their seeds from M. Bonnet in the Riviera. The fruits vary a good deal in the different specimens, some being quite small and only a few in a cluster,

others are as large as a cherry and densely packed in the bunch. I have about a dozen specimens of this hybrid. The importance of these Palms and their great economic value is as yet little understood in Florida. Their fruit can be used for preserves, it supplies a good jelly and an excellent wine, or by distillation a highly aromatic liquor. Chickens, turkeys and guineas are exceedingly fond of the fruit, and the oily seeds form an excellent feed for hogs. Their main importance from the standpoint of the plant lover lies in their great beauty and symmetry, their hardiness and easy cultivation. They look best planted in groups of a dozen or more specimens. Not adapted for low moist lands. I have several other distinct species of hardy glaucous-leaved Coconut Palms, beautiful and very ornamental, but not yet determined.

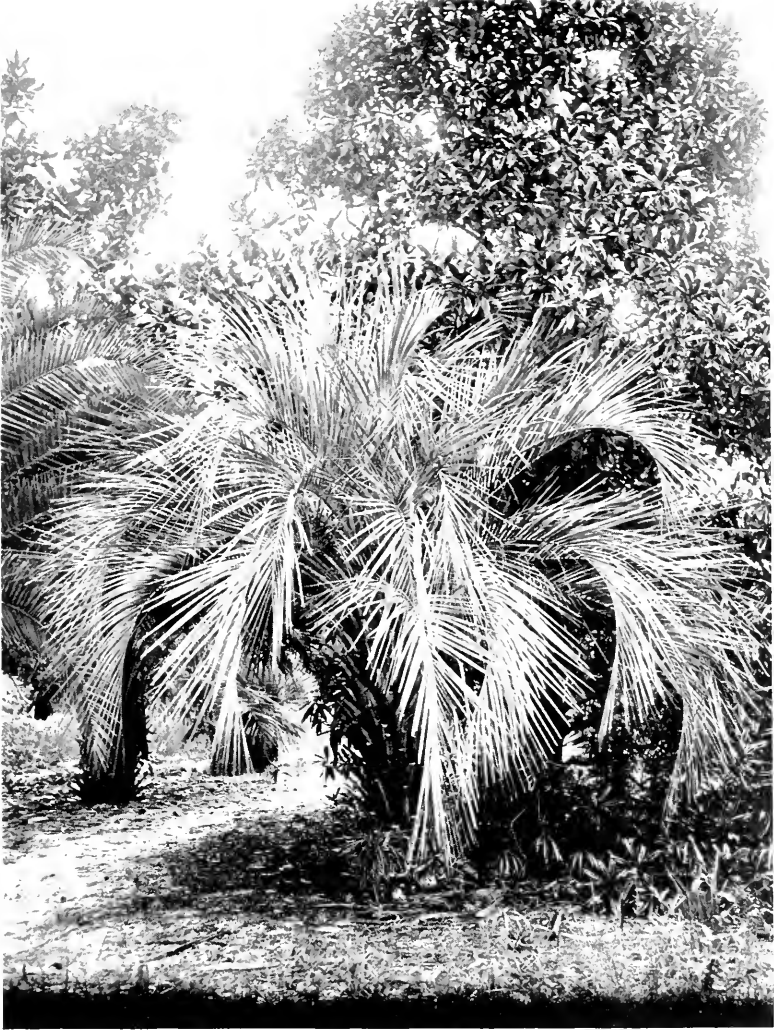
Cocos plumosa, *C. flexuosa*, *C. Romanzoffiana*, *C. coronata*, and the true *C. australis*, all with long feathery, soft, green leaves were planted at the same time, but they are very tender particularly when young. All my plants were killed in the first winter. In later years success crowned my experiments, and I now can point with much satisfaction to a fine *Cocos plumosa* which is thirty-five feet high, though only ten years old. It bears a magnificent crown of leaves with densely-set pinnae which reminds of gigantic ostrich-plumes. *C. flexuosa* has attained fifteen feet in twelve years. All these Coconut Palms are extremely elegant and beautiful, and all are hardy in ordinary winters as far north as Sanford. Young plants must be protected during cold weather.

The *Phoenix* or Date Palm seeds all came from Haage & Schmidt, who obtained their supply from the Riviera. Their nomenclature is in a deplorable condition, and many hybrids came from the same lot of seeds. I planted an avenue of Canary Island Date Palms running from the house to the lake. The plants made a good growth, but scarcely one of them is true to name. They are all hybrids of *Phoenix Canariensis* fertilized with the pollen of *P. sylvestris* and *P. dactylifera*. It was necessary to order the seeds from the Canary Islands directly, and I have now a number of young plants

which show their true nature. The Canary Island Date Palm does not do very well on high pineland, where the Indian Sugar Date Palm (*P. sylvestris*), the elegant *P. rupicola*, the drooping-leaved *P. reclinata* and the sharp-spined *P. spinosa* thrive so well. It is one of the most magnificent Palms in cultivation. Massive specimens of it can be found in all the best gardens of Orlando, Winter Park and Sanford and as far north as Jacksonville. On the south and north sides of the courthouse at Orlando four small plants were set out, one on each side of the walk, about fifteen years ago—at present four immense massive and most beautiful specimens. Their trunks are about twelve feet high and each as thick as a water barrel. They begin to flower early in winter and the great clusters of orange-yellow fruits ripen in April and May. On rich moist hammock and flatwood soil this Palm is a fast grower and attains an immense size. The leaf stems have a decidedly yellowish tint, while the color of the big feathery leaves is a bright green. I have two very fine specimens of *P. sylvestris*. It grows well in my garden, and its massiveness strongly reminds me of *P. Canariensis*. The leaves are over ten feet long and of a fine glaucous-green color. It is a very beautiful and distinct tall growing Palm and excellent for large groups and for avenue planting. *P. zeylanica* grows in tufts, producing numerous suckers around the lower part of the trunk. These must be removed as soon as they appear if a specimen with a single stem is desired. There are a few single stemmed specimens in the Laughlin place at Zellwood which are pictures of elegance and beauty. The color of the foliage is almost as blue as that of the Colorado Blue Spruce. In my garden *P. reclinata* and *P. spinosa* look very much alike at some distance, but a close examination reveals the fact that they are very distinct. Both form immense tufts if the numerous suckers are allowed to grow. Both have reclining leaves. The leaves of *Phoenix reclinata*, however, are soft in texture and the leaflets along the midrib are not sharp at their apex. In tall specimens the trunk is very slender and so small in diameter that we wonder how it can carry the dense leaf-crown without breaking. In *P.*



COCOS PLUMOSA A SPECIMEN
PALM ONLY TEN YEARS OLD



COCOS AUSTRALIS IN FOREGROUND.
BEHIND A TREE OF MAGNOLIA
GRANDIFLORA

spinosa the trunk is always much thicker and much rougher. The leaves are very hard to the touch and each leaflet ends in a very sharp spine. This species and several others, like *P. acaulis* and *P. padulosa*, all having sharp-spined pinnae, should not be planted near walks, as they are liable to inflict painful wounds. One of the most refined and elegant of all the Date Palms is *P. rupicola* from the Sikkim Himalayas. One of the specimens of this Palm is a feature in my garden, being about 15 feet high, with a trunk 8 feet high and with beautiful glossy green leaves each 10 to 12 feet long. Smaller specimens are extremely ornamental as pot plants, if the suckers are removed. No other species has such delightfully soft green glossy leaves, reminding one, especially in small specimens, of some species of *Cycas*. The daintiest of all the *Phoenix* species is *P. Roebelenii*, which is represented in several Florida gardens. It does not thrive in high pineland, but is most successfully grown in lath houses and in the moist soil of rich hammock lands in half-shady places. It excels most other small Palms in grace, elegance and beauty. In the old Abbot garden at Orlando there is a fine specimen about 5 feet high, a picture of loveliness, all its leaves being densely arranged around the slender stem and all recurving elegantly to all sides. On account of this trait it is popularly known as the Fountain Palm.

I have always been a great admirer of our native Cabbage Palmetto (*Sabal Palmetto*), and many were the attempts to carry it to my garden. I usually failed, and the fine, though as yet small, specimens, were all raised from seeds and were grown until large enough for transplanting, in pots in my glass-house in Milwaukee. I gathered the small black shiny seeds as large as a pea, when rambling around in the woods, and received seeds of other Sabals from Bermuda, Cuba, Jamaica, Trinidad, Mexico, and southeastern Texas. As the genus *Sabal* and its different species are not well understood I have been anxious to add all the different kinds of which I could obtain seeds to my collection. As it would lead too far to consider here all the species I grew I shall only mention the most important. All of them grow well on high pineland, but

in order to insure a rapid growth frequent applications of fertilizers, rich in ammonia, are necessary. A most important point in their cultivation is to plant them in very rich soil. A deep hole must be dug, and this must be filled with very rich soil, preferably old cow manure. If carefully planted and watered the growth will be very luxuriant from the beginning. I have several fine specimens of *Sabal texana* (*S. mexicana*). It reminds one much of our native Cabbage Palmetto, but the leaf-stalks are longer and the color of the leaves is more bluish-green. It is altogether a more graceful plant with more slender stems and a quicker grower. Prof. O. F. Cook, our American Palm specialist, discovered not long ago a very fine and highly ornamental new species in a garden of Victoria, Texas. He had the kindness to send me several fine seedlings. This is *S. exul*. I also have a promising specimen of the Porto Rican *S. causiarum*, used so extensively in its native home in the manufacture of hats. It is a beautiful Palm and perfectly hardy here as are all the Sabals. *S. Blackburniana* is represented in my garden by several fine specimens. The large fan-leaves are carried on long petioles. It is a rapid grower if well fertilized, and its leaf-crown attains an immense size. My plants were raised from seeds received from Bermuda. A still more impressive, distinct and very massive species in my garden is *S. umbraculifera*. Many years ago Sir Daniel Morris published a very interesting article about this species in *The Gardener's Chronicle*. This fascinating description of the forests of these Palms in the savannahs of Jamaica created in me the desire to add it to my collection, and Mr. W. Fawcett, Director of Public Gardens and Plantations of Jamaica, was kind enough to send me seeds. The leaves of this species are very large, hard to the touch, not so much plaited as in other species and carried on comparatively short petioles. Nevertheless the crown is immense. Even the inexperienced observer is attracted by its distinctive and massive appearance. I have quite a number of other Sabals which I received as *S. princeps*, *S. Havanensis*, *S. mauritiaeforme*, all apparently very distinct, though all of the Sabals show much family likeness. It must be

said here that I have nowhere else in Florida seen the different species of *Sabal* except in my own garden. Most all of them show their characteristics only when they have acquired a rather large size. All of the *Sabals* retain their old leaf-stalks close to the trunk for many years. They impart character and massiveness to these fine Palms. These leaf-stems, usually called "boot-jacks" by the old inhabitants, should never be removed until they rot away naturally. It is a mistake and a sin against good taste and common sense to scrape them off in order to get a smooth surface. Unfortunately this is done in many gardens, and thus the characteristic beauty of the *Sabals* is destroyed. Of course old dead leaves must be cut off close to the trunk but a remnant of the clasping end part should be left intact. These leaf stems gather humus in their pockets in which the spores of the Golden Polypody find a foothold. In their native wilds most all of the Cabbage Palmettoes bear wreaths of these fine large Ferns just underneath their crown. Several trunks of *Sabals*, many of the hardy Cocconut Palms in my garden are adorned with dense masses of various Ferns. *Polypodium fraxinifolium*, *P. Phymotades*, *P. nigrescens*, *Niphobolus lingua*, a number of *Davalias* and many other tropical epiphytic Ferns add a charm to these rough Palm trunks that must be seen to form a correct idea of this beautiful combination. The Boston Fern (*Nephrolepis exaltata*), the Sword Fern (*N. biserrata*) and the *N. tuberosa* soon cover the entire Palm trunk with a dense mantle of green. This decoration would not be possible if the trunks had smooth surfaces. Only the other day I came across a massive Cabbage Palmetto in a shady hammock whose stem was completely covered with dense dark-green pendent masses of the Grass-Fern (*Vittaria lineata*), and a lovelier picture was scarcely imaginable. In the woods I have sometimes found the Carolina Jessamine (*Gelsemium sempervirens*), the Moonflower (*Ipomoea Bona-nox*) and the Foam Climber (*Decumaria barbara*) covering the tops of these Palmettos, and when these climbers are in full bloom, the sight is most enchanting. The Carolina Aster (*Aster carolinianus*) often clambers over the trunks and decorates them with a most beautiful violet-blue.

The Washingtonias cannot be successfully grown on high pineland. I planted dozens of seedlings of *Washingtonia filifera*, *W. robusta* and *W. Sonorae*, fine robust specimens, but all pined away. In localities where the clay subsoil is near the surface, in hammock and flatwood soil they are the most rapid growers of all our garden Palms. In such soils they soon form fine objects all over the state from Jacksonville to Miami. No other species, not even the glorious Royal Palm, has found so much favor with the real estate men in south Florida as *W. robusta*, and none is so much used for avenue planting. It is a peculiar coincidence that these Washingtonias, known to grow in their native haunts, in California and Sonora, only in very dry regions, should refuse to grow in Florida in dry soil, while they thrive admirably in moist, even mucky localities. The two Erytheas (*Erythea armata* and *E. edulis*), which naturally also grow in the dry regions of California and adjacent localities and which form such wonderful ornaments of the gardens of California, will neither grow in moist nor dry soil in Florida. I have planted several dozen at various times but none ever started into growth.

Among the Livistonas the Chinese Fan Palm (*Livistona Chinensis*) is the most important for central Florida, and thence southward. In the fall of 1896 I set out quite a number of three and four year old seedlings. All soon died. I repeated the experiment and added *L. australis*, *L. humilis*, *L. Mariae*. The result was the same. All these fine fan-leaved species require rich moist soil and shade while young. There are tall specimens of *L. Chinensis* in the late Mr. E. H. Hart's garden at Federal Point, and many young specimens at Sanford, Orlando and many other places. These Palms look particularly beautiful in irregular groups, consisting of a dozen and more specimens.

The European Fan Palm (*Chamaerops humilis*) and its quite distinct varieties are perfectly adapted to our high pineland gardens. They grow in tufts or clusters forming most elegant specimens in the course of time. I received seeds of about four distinct varieties from Haage & Schmidt in 1893 and my

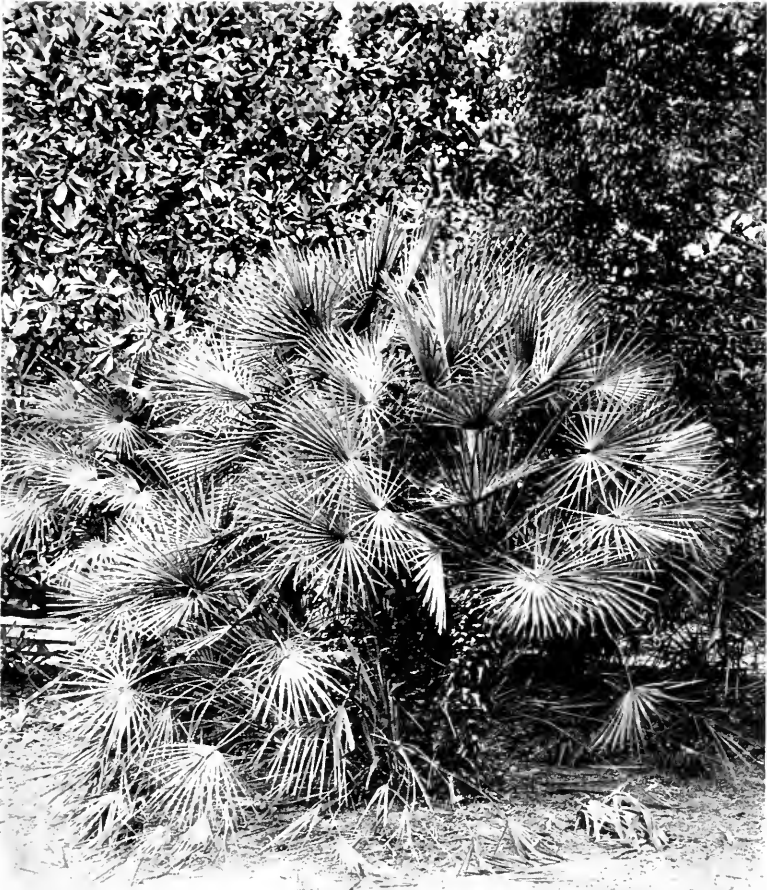
seedlings were set out in 1896. Two of them, *C. humilis* and *C. macrocarpa*, have at present main stems 6 and 7 feet high. They bloom profusely in February, filling the air with a peculiar but pleasant odor. The flowers are densely clustered around the upper part of the trunk in the axils of the leaves, looking like yellow sponges fastened tightly to the trunk. These *Chamaerops* are pigmies compared with the Sabals, Washingtonias and Livistonas, but they are extremely graceful and very elegant. My largest two specimens form the foreground of a few large magnolias. The European Fan Palm deserves to be largely planted in high and low lands. It is especially valuable for small gardens.

The most elegant Chinese Windmill Palm (*Trachycarpus excelsus*), one of the hardiest of all Palms, has not been successful in the sandy soil of Florida. I have a very fine specimen near my study growing among *Camellia Sasanqua*, Hollies and other shrubs. It is about 8 feet high and its trunk is constantly shaded from the sun. It is a most beautiful specimen. I raised it from seed in 1897 and planted it out in 1900. An abundant supply of water, shade and a fertilizer rich in ammonia, is what it requires. This is a fine Palm for the Tallahassee and other regions in northern Florida where the soil consists mostly of clay.

One of the most distinct and stately Palms, and hardy as far north as Federal Point in well protected localities, is *Acrocomia Totai*, a native of Paraguay. Mr. Theodore L. Mead introduced it about thirty-five years ago. There are at present magnificent specimens in many gardens. Near the railroad station at Lake Alfred in Polk Co., there are two fine young specimens, about ten feet high, which fill the heart of any lover of Palms with rapture. They grow on high land in a heavy red clay soil. It does not do well in the elevated sand hills except special care is taken before planting to dig a large hole and fill this partly with clay, partly with old cow manure. I had two fine specimens near my house but lost both in 1907 after I had transplanted them to a more favorable position. Not only the trunk of this species but also the leaf stems are provided



ONE OF THE MOST BEAUTIFUL
BAMBOOS IN FLORIDA
BAMBUSA ALPHONSE KARRI

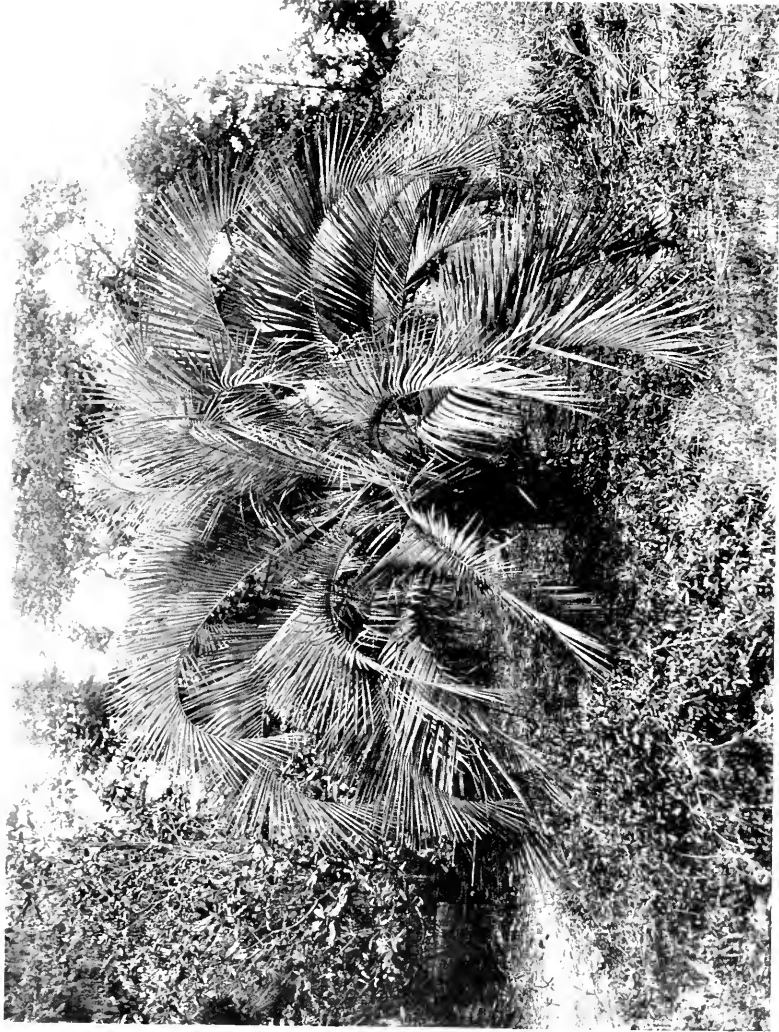


EUROPEAN FAN PALM
CHAMAEROPS HUMILIS

with a dense armor of formidable spines. It is a most beautiful and elegant Palm, almost as graceful as *Cocos plumosa*, but of a deeper green. It looks best in groups of a dozen or more specimens and it should be planted largely where soil and climate favor its growth.

Jubaea spectabilis, the Coquito or Monkey Coconut of Chili, an exceedingly massive and, in its young state, beautiful Palm, was also planted. I had raised several good young plants from seeds. All grew, but only one of them formed a small healthy looking specimen. While my *Cocos Datil*, planted out at the same time, has assumed imposing proportions the *Jubaea* is only $2\frac{1}{2}$ feet high. In California this species ranks among the most massive and beautiful of all garden Palms. As it is very hardy it undoubtedly can be successfully grown in the clay soil of northwestern Florida.

In order to succeed with Palms and the other vigorous growing plants on high pineland a good deal of care is necessary before planting. The soil must be thoroughly worked and fertilized and the plants set out must be watered, shaded and mulched. I have found the following way the best for Palms, especially for the strong growing species, such as Sabals, Washingtonias, Livistonas, Acrocomias, Date Palms and Coconut species: Put stakes in the places where the plants will find a permanent position. Then dig a hole from five to six feet deep and as wide. Fill this up to two-thirds with stable manure, clay, bones, old tin cans, rotten wood, leaves and grass and other rubbish and finally fill the upper one-third with leaf mould and surface soil. After six months another filling up is needed. Surface soil is now advisable, but this must be mixed with one or two water buckets of cotton seed meal, Castor pumace, sheep or cow manure. Stir frequently until the fertilizer is thoroughly decomposed. After five or six weeks have elapsed the soil will be in the condition to receive the plant. Select good, thrifty young specimens from 5 to 6 inch pots and about two to three feet high. Plant in such a way that a saucer-like depression is formed, water thoroughly and mulch with old leaves, weeds, pine needles, stable manure



COCOS ERIOSPATHIA

or rotten wood. Always set out your plants in the rainy season, —or preferably, in November and December—never in the dry season. About eight years ago I transplanted a number of small seedling Cabbage Palmettos. For one specimen I dug a large hole and filled this partly with night soil. All the others were planted in rather small holes and no manure was used, but they received strong applications of commercial fertilizer after they had been set out. The difference in growth is most remarkable. The specimen treated in the proper way is at present a large massive and very beautiful plant and at least ten times larger than most of the others.

The species of the genus *Cocos*, particularly all those with glaucous foliage, have a rather shallow root-system and the holes prepared for them need not be quite so deep. Bamboos are easily planted and cared for. It is not necessary to dig large holes for their reception, but the soil should be good and rich. They should be provided with a mulch of stable manure after they have been set out, and they are very grateful for a few applications of good commercial fertilizer each year. All my plants, Palms and Bamboos included, were only fertilized during the first three or four years after they had been set out. They subsist now entirely on the old leaves and rotten wood that accumulates around them, which at present consists of a heavy layer several inches thick. No leaves, old wood and weeds are burned—everything is used as a mulch for my large specimen plants. The formerly dry, poor, white sand has been transformed into a fine rich hammock soil. All the old Palm leaves which are cut off are thrown on the compost heap and after thoroughly decomposed are used as a mulch. Chickens, guineas and turkeys do the cultivating and keep the soil free from the injurious insects. All the dish water, wash-water, everything that contains plant food, is used for the plants near the house. There is no doubt that all my Palms and other plants would have grown much more rapidly if they could have been supplied with good applications of commercial fertilizer, but this was out of the question.

(*To be continued*)

Curiosities of Plant Life

By *Alexander Lurie, Horticulturist, G. H. Pring,
Floriculturist*

Missouri Botanical Garden

(Continued from June Journal)

Mimicry



MIMICRY or simulation in form, coloration and other characteristics is an interesting and not uncommon occurrence among plants, appearing at its best and in the greatest profusion in Orchids. The resemblance to animate or inanimate objects is often so striking as to produce the impression of artificiality and to cause the query as to the benefits derived from such assumption of unnatural characters.

The phenomenon is apparently of no particular benefit to the plant and occurs incidentally in the process of Nature's construction of plant parts, adapting them to conditions of environment, climate, habitat and correlation with particular insects in the process of pollination and reproduction.

It differs from the protective mimicry of insects, birds, reptiles and mammals, which affords immunity from attack and observation by natural enemies; as when an insect known as a walking stick simulates a dead twig, when a butterfly assimilates in color to that of the flower it habitually visits, or a bird's nest is so constructed as to resemble a bunch of moss on a bough.

In many cases of plant mimicry the popular name suggests the resemblance which however may be far-fetched and requires a strong imagination to recognize the similarity. Only such plants are here described as bear a strong resemblance to the object for which they are named.



BUCKET ORCHID
CORYANTHES MACRANTHA

Bucket Orchid

Coryanthes macrantha
Orchidaceae

This is an epiphytic plant of the West Indies. The sepals of the flower are most delicate in texture, yellow, spotted irregularly with dull purple. The bucket or lip on the contrary, is thick or fleshy and is seated on a deep purple stalk nearly an inch long, forming an obtuse angle with the column composed of stamens and pistils. The stalk terminates in a hemispherical greenish purple cap (hypochile) and, contracting at its front edge, extends forward into a second stalk (mesochile), of vivid blood color. The latter is turned back and conspicuously marked with four or five deep edged plaits. The plaited edges extending from a second cap (epichile) which is yellow streaked and spotted with crimson and seems intended to catch a watery secretion which drops from the two succulent horns originating from the base of the column.

Bees are attracted to the flower by its peculiar odor, however, the purpose of the visit is to feed upon the interior lining of the lip. Coming in large numbers they alight on the rounded portion of the top of the flower, the apical part of which is covered with very fine pubescence while the lower part is slippery. While disputing for a place some are crowded to the lower glabrous portion from which they slip off into the nectar of the bucket receiving an involuntary bath. The wings becoming wet and the inner lining being glabrous, neither flight nor crawling out are possible and thus the insect is forced to follow the pathway at the back of the bucket. His movements are facilitated by a step across the passageway which aids in gaining freedom. During the outbound journey through the passage the pollen cap is opened releasing the pollen masses upon the insects back which are held fast by means of a viscid disk. When the same or other flowers are again visited by this insect the pollen masses become attached to the extremely viscid stigma which is located immediately in front of the pollen sac at the end of the column, causing pollination.



BIRD'S NEST FERN
ASPENIUM NIDUS

Bird of Paradise Flower

Strelitzia Reginae
Musaceae

A south African plant with wide oblong leaves, the petioles of which are three times as long as the blade and imbricated. The flower spike is much longer than the leaves, with a prominent purple spathe out of which appear the orange and blue purple flowers. The brilliant coloration and the shape of the blooms produces the appearance of a Bird of Paradise. The roots of the plant are tuberous resembling a bunch of carrots.

Bird's Nest Fern

Asplenium nidus
Polypodiaceae

Native of the Himalayan region where it is epiphytic upon trees. The leaves are arranged in circular formation producing a nest-like appearance, which is further enhanced by the clump of aerial parts at the base. This natural nest is used as such by birds during the summer. The fern is propagated by means of spores, which are produced horizontally on the backs of leaves forming parallel lines. As an ornamental plant it is a great favorite among florists.

Butterfly Orchid

Oncidium Papilio
Orchidaceae

An epiphytic plant of South America. The flower is produced singly upon a tall spike resembling the native milkweed butterfly on wing. The antennae of the butterfly are the erect linear dorsal sepals, brown with bands of yellow. The wide brown and yellow petals, and the pectinate yellow lip suggest the wings. The column at the base of sepals, well represents the head and the thorax. The flower spike is pro-



BUTTERFLY ORCHID
ONCIDIUM PAPHIO

duced with the young leaves which show the same characteristic mottled coloration. The flowers are of short duration, lasting two or three days and are replaced by others in sequence, numbering as many as a dozen in the course of a season.

Cradle Orchid

Anguloa Clowesii
Orchidaceae

Native epiphyte of Colombia. The foliage is palm-like, the pseudo-bulbs are long pear-shaped with several single flowers produced with the young growth. Before opening the buds resemble short drumsticks. The sepals and petals are thick, fleshy, yellow overlapping to form a cradle. The white lip is fixed at its base by a hinge like appendage, moving at the least jar to the flower and with its adjacent column representing the child in its cradle.

Dove Orchid

Peristeria elata
Orchidaceae

The dove orchid or Holy Ghost orchid, native of Panama, was named by the early Spanish settlers El Spirito Santa (Holy Ghost Orchid).

The flower spike is 3 to 6 feet with flowers in raceme covering about one-third the length of stalk. They are cup-shaped, creamy white, wax-like and fragrant, 2 inches across. The sepals are broadly ovate, petals more delicate, lip fleshy, broad notched and spotted with deep purple. The pure white flower, with its column and beaked anther combined with the ascending side lobes, representing the wings, strikingly resembles a dove.



CRADLE ORCHID
ANGULOA CLOWESII

Dumpling Cactus

*Lophophora Williamsii**Cactaceae*

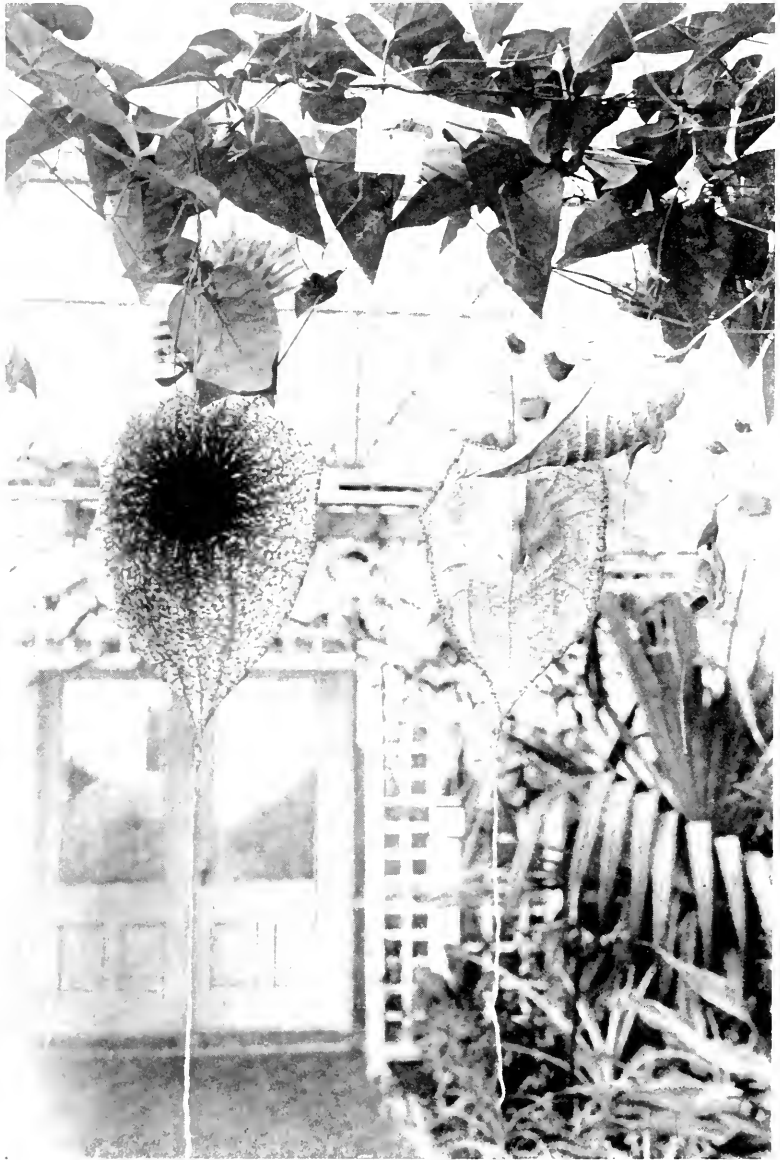
A native of Mexico, where it is found in large round clumps, each grayish head being hemispherical in shape resembling a dumpling. This is also known by the Indians as the mescal button and used in their religious rites. It is highly esteemed and superstitiously revered by these Indians, because of its narcotic properties responsible for imaginative, highly colored visions. The taste is bitter and nauseating, accompanied by loss of sense of time, causing a condition of total content, followed by wakefulness. The medicinal value was first brought to attention of druggists by Mrs. Anna K. Nichols of Laredo, Texas. She called attention to the fact that Indians used the juices for manufacturing intoxicating liquors and for overcoming fevers. The tops are cut off, dried, strung and sold by Mexicans as mescal buttons. The early Spaniards erroneously mistook these dried portions for mushrooms, while the Aztecs apply the name of sacred mushrooms to the plants.

Goose Plant

*Aristolochia gigas Sturtevantii**Aristolochiaceae*

This remarkable climbing plant is a native of South American jungles. It was first discovered through the agency of the peculiar stagnant odor that is emitted from the flowers. It is of perennial habit, easily propagated by well ripened wood cuttings. When cultivated in greenhouses it is better to grow fresh plants yearly, because the flowers are large and more numerous upon younger plants. If cuttings are taken in August or September, they will flower in July or August of the following year.

The plant gets its name from the peculiar goose-like appearance of the flowers, especially in the bud stage, which are produced profusely from the axils of the leaves. The varia-



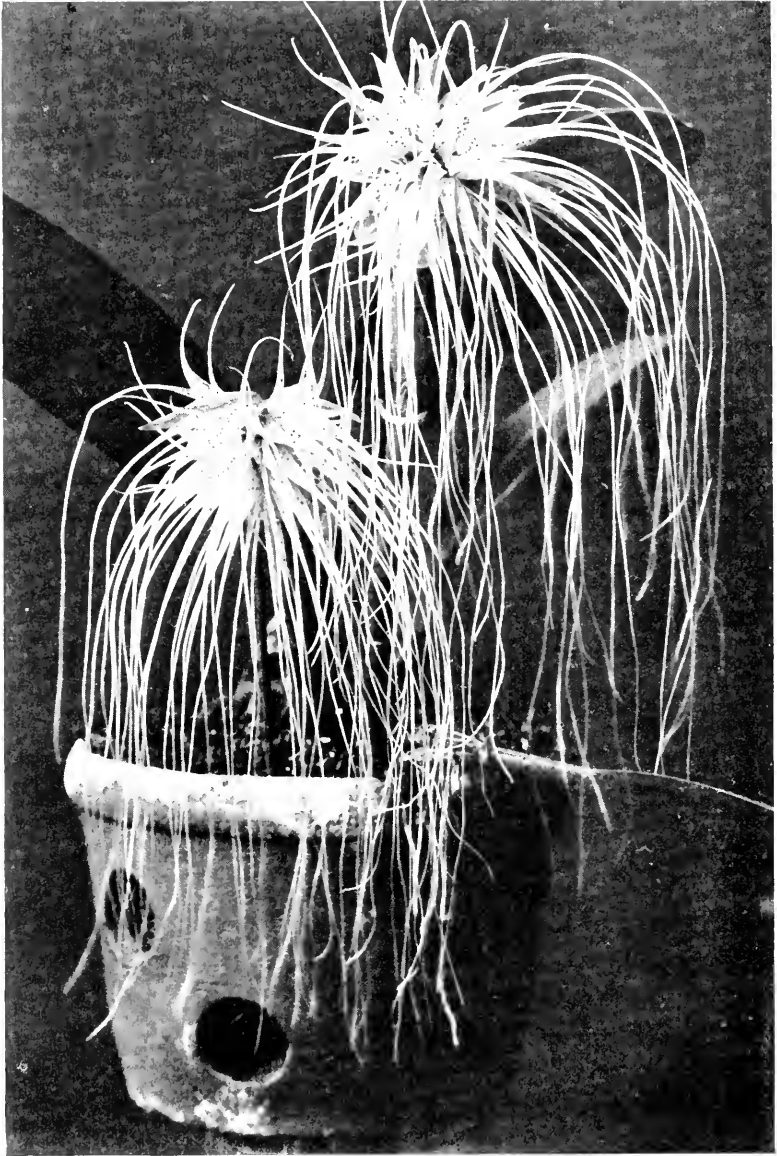
GOOSE PLANT
ARISTOLOCHIA GIGAS STURTEVANTII

tion in size of flowers from the bud stage to maturity suggests the goose surrounded by its young.

When the flower is open it extends 12 to 18 inches in diameter with the attenuated tail measuring 2 to 3 feet. The odor emitted from the brownish purple, spotted opening, is that of decomposed animal matter, being almost overpowering to the visitors of the Missouri Botanical Garden conservatories. However unpleasant for human beings, the odor is very attractive to numerous carrion flies, who act as pollination agents. The insects enter the outer opening and proceed through the darker pubescent chamber into the neck of the flower, being aided by the up-pointing short hairs, provided for the purpose. At the base of the neck is situated a revolute valve-like contrivance which permits insects to get in but not out. Once beyond the loop the insect is drawn upward by the light which is admitted through the window-like apertures at the base of the petiole.

The stamen and pistils are located immediately in front of the windows, so that in trying to escape the insect traverses the club shaped pistil, repeatedly pollinating it with the pollen from the stamens which are arranged along the sides of the ovary. The escape of the insect is almost impossible due to the winged valve along which it travels. Coming to the opening of the valve it is confronted by the dark chamber and its subsequent course is decided by the same light which previously caused the attraction.

The flowers after opening last two days, later presenting a shriveled appearance. As many as 30 insects have been found dead in the neck of the flower with numerous live larvae. The flower is thus as beneficial to the carrion-fly in its reproduction as the insect is to the plant.



MEDUSA'S HEAD ORCHID
CIRRHOPE TALUM MEDUSAE

Medusa's Head

Cirrhopetalum Medusae
Orchidaceae

Native of Malaya, epiphytic upon trees. The pseudo-bulbs are small greenish brown, with lanceolate leaves. The flowers are produced in clusters on old pseudo-bulbs, giving the plant a remarkable resemblance to the Head of the Medusa. The color of the flowers is creamy white, sparsely dotted with purple. The lateral sepals are attenuated to a length of 6 inches, the dorsal sepal being 2 inches. The lip is tongue-shaped and though small is sensitive.

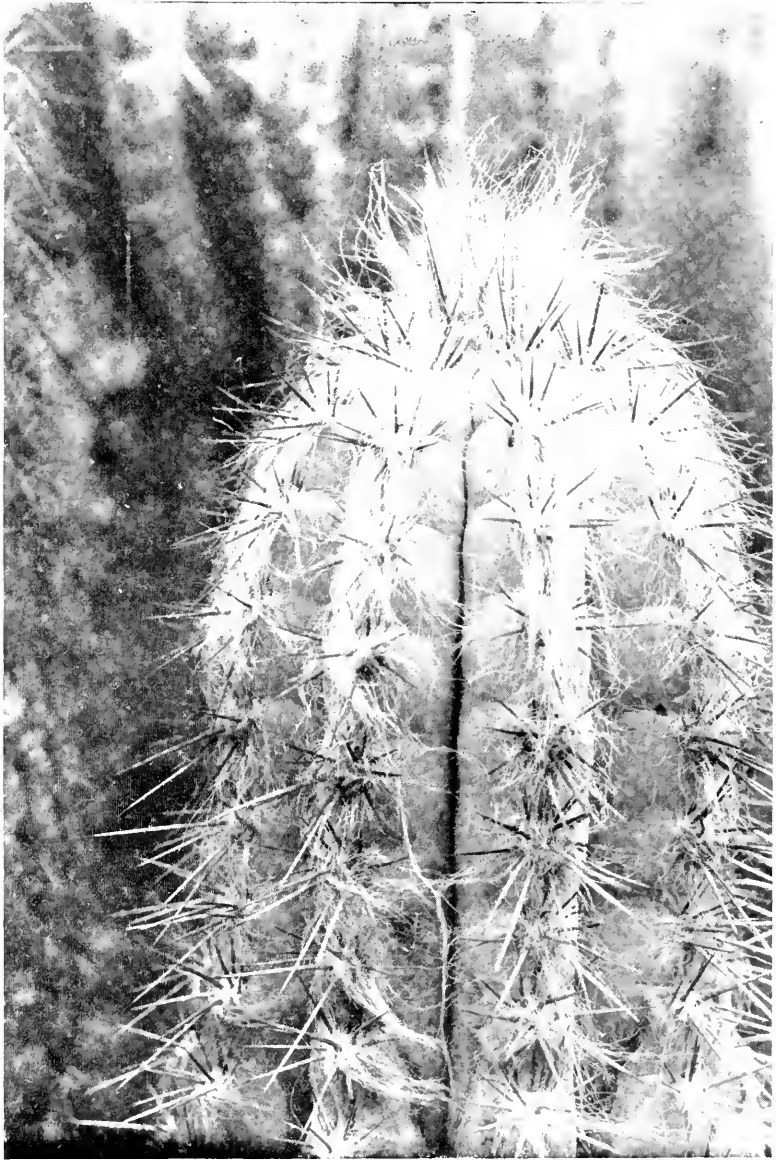
Monkshood Orchid

Catasetum maculatum
Orchidaceae

All species of this genus are monoecious—that is the male and female flowers are produced on separate spikes. Owing to this peculiarity the older botanists assumed that the plants were of different species. The flower stands with the labellum uppermost, that is in a reversed position compared with most orchids. The labellum is helmet shaped, its distal portion being reduced to 3 small points. On account of its position it cannot hold nectar but the walls are thick and having a pleasing nutritious taste attract various insects.

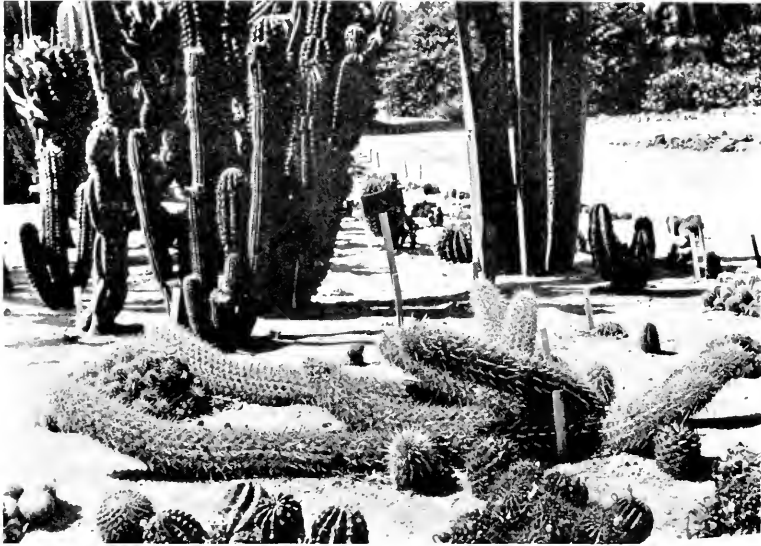
The stigma is functionless, though of large size. The antennae which are similar to the column wings of the Dove Orchid, are the most singular organs of the flower and occur in no other genus. They form rigid, tapering horns, consisting of a narrow membrane, with its edges curled inward so as to touch. The antennae are prolongations of the sides of the anterior face of the rostellum. The direct connection of the antennae and the viscid disc is brought about by a little fringe of membrane on each side.

The insects are attracted to the flower by the strong odor of the interior lining of the labellum. While feeding the antennae



OLD MAN CACTUS
PILOCEREUS SENILIS

are touched by the insect, causing the rupture of the membrane which connects the viscid disc with the pollen masses. This action induces the viscid disc to come foremost in such a manner as to become attached firmly to the body of the insect, carrying with it the two prominent pollen masses.



SNAKE CACTUS
CEREUS ERUCA

Old Man Cactus

Pilocereus senilis

Cactaceae

The plant is a favorite among amateurs, native of Central Mexico, where it attains a height of 35 feet. It is columnar in shape, 1 foot in diameter, often branching at the base, the branches growing parallel to the parent trunk. The ribs are elevated, numbering 20 to 30, each bearing numerous tubercles with 20 to 30 hair-like bristles at the top. The flowers are very numerous, 4 inches long, red on the outside and reddish white within. The fruit is ornamental owing to its violet color.

The white bearded appearance of the plant suggests the name Old Man Cactus.

Snake Cactus

Cereus eruca
Cactaceae

This Mexican cactus, unlike the other members of the genus is procumbent in habit encircling rocks in its course of growth, suggesting strongly the snake at leisure.

Its manner of rooting at places touching the ground produces an undulating appearance, thus still more simulating the snake.

Star of Bethlehem

Angraecum sesquipedale
Orchidaceae

The orchid is epiphytic on trees presenting a half starved straggling appearance. The roots are few in number, frequently extending down the tree on which it grows, 12 to 18 feet and so tough and adhering so tenaciously to the bark that a considerable force is required to break or detach them.

The sepals and petals and lip are waxy white, star like in form. To the back of the lip is attached a nectar tube, attaining a length of $1\frac{1}{2}$ to 2 feet. It is hollow, secreting nectar. As it could be pollinated only by means of a moth with a proboscis equal to the length of the nectar tube, which was unknown in Madagascar, Darwin prophesied that such a moth would one day be found. Years afterward Humboldt discovered such a moth. It alights upon the lip and inserts the proboscis into the nectar tube through a wedge-like appendage. Upon withdrawing the proboscis the insect lifts up the pollen sac causing the pollen masses to adhere. Upon visitation to the next flower the pollen masses easily become attached to the stigma.

(To be concluded)

Book Reviews

The Cactaceae. By N. L. BRITTON AND J. N. ROSE. Vol. I. Pp. 1-236 +303 figures and 36 full page plates, many in color. The Carnegie Institution of Washington. June, 1919. Price \$18.00.

In the March (1919) issue of the JOURNAL Mr. David Griffiths' article on decorative prickly pears showed some of us the garden value of these curious and interesting plants of the desert. The colored picture particularly gave some hint as to the possibilities of grouping them in regions that would not support better known plants. The present sumptuous volume by Dr. N. L. Britton of the New York Botanical Garden and Dr. J. N. Rose of the Carnegie Institution is the first complete account of the prickly pear and its relatives in English and incomparably the best book on the subject in any language. It will come as a surprise to find that there are over 250 kinds known, differing in form from flat-jointed species that hug the ground to the tall branching kinds, almost tree-like in stature. Every variety of condition and habitat may be found in their range which reaches from British Columbia to the Argentine. Various color-forms of green, red and yellow, mostly the latter are found in their flowers and an infinite gradation of color in their fruits. The group, therefore, has horticultural possibilities, for dry-land sections of the country.

The book, the first of four to deal with all the cacti, describes carefully all the species known to the authors as of the Genus *Opuntia* and its near relatives. The distribution of each and a picture of either the whole plant or parts of it, are given; so the gardener or botanist will find this volume a storehouse of facts of unequalled value. The book has, of course, a decided leaning to the botanical side of the study of cacti, but its colored plates, numerous illustrations and notes on hardiness make the book an authoritative one that all succulent fanciers must have and which it would be desirable for most plant lovers to own.—N. T.

The Making of A. Flower Garden. By IDA D. BANNETT. 244pp. Frederick A. Stokes & Co. Price \$1.75.

This is another of those garden books of which the supply seems to be unending, probably in response to an insatiable demand. This is the most stimulating thing about them: not that they should be published, but that

there should be such a perennial interest in their subject. More people are wanting to know about gardening all the time, and those who already know want to learn more.

This book contains a good deal of information about plants and their cultivation and garden matters in general of the kind that is acquired at first hand by actual experience, and is therefore more or less valuable. It is only when the author undertakes to tell her readers how to lay out their lots that she becomes a dangerous guide. The book contains several queer plans, and it would be interesting to know if any of them have been carried out and who were the victims.—H. A. CAPARN.

Manual of American Grape Growing. By U. P. HEDRICK. Pp. 458. The MacMillan Co. New York. Price \$2.50.

The name of the author is sufficient to recommend the book to all lovers of the grape. U. P. Hedrick, Horticulturist of the New York Experiment Station at Geneva, is already known to most grape growers through the volume "Grapes of New York," now out of print. The newer volume tells a more complete story, and should be in the library of every horticulturist and fruit grower.

The grape, unlike most fruits, though it varies somewhat in price and yield, can usually be depended upon year after year to give fair returns. Professor Hedrick gives outlines of its culture in detail which are invaluable to grape growers, and other valuable suggestions that are money-makers to all those who will carefully follow them.

Pollination, or lack of pollination, has been the cause of thousands of dollars of loss, because of non-setting of fruit, or because of very irregular setting of fruit. The chapter dealing with this subject gives the main causes, and lists the self-fertile, semi-fertile and self-sterile varieties.

The closing pages are devoted to illustrations and descriptions that will enable growers and prospective planters to identify suitable varieties.

The book is a very suitable and comprehensive treatise on the culture of the grape in both the East and the West. Unlike most books, it is specific in detail but general in scope.—F. M. CLEMENT.

UNIVERSITY OF BRITISH COLUMBIA,
VANCOUVER, B. C.

The Tree Book. By INEZ N. MCFEE. 234 pp.; 15 plates. New York, Frederick A Stokes Co., 1919. Price \$1.75.

This interesting little book takes up the story of the trees in three parts: (1) The Life and Work of the Trees, (2) The Kinds of Trees, (3) The Forester and His Work. The chapter on "Reading Signs" shows how the

bark and bud-scales tell the life-story of a tree; other chapters deal with the growth of trees, seedlings, flowers, and tree diseases. In the second part groups of trees are taken up, approximately by families, such as locusts and other pod bearers, evergreens, etc. The last part gives a brief popular account of the various lines of work in forestry, particularly in connection with the national Forest Service.—A. GUNDERSEN.

The Garden Record Book. By HARRIET POMEROY THOMPSON. Pp. 366. E. P. Dutton and Co. New York. Price \$3.00.

If any garden or gardener has come to grief from not doing the proper thing at the proper time, and who has *not* fallen from this cause more than enough, this ingenious scheme of Miss Thompson's will make such failure doubly humiliating in the future. It is simplicity itself as the pages of the book are dated throughout the year, and on each page there is space for garden and weather records, for notes and general work. The pages are ruled to make the record last over three years and by a little ingenuity it could last more. For those who know that good gardening means keeping accurate records this is a most convenient method of keeping them.—N. T.

Modern Propagation of Tree Fruits. By B. S. BROWN, M. S., Professor of Horticulture, University of Maine. \$1.35; pp. 174. John Wiley & Sons, Inc., New York.

The subject indicated by the title is interestingly covered. The author has not cumbered his work with descriptions of freakish and little known methods of propagation but deals thoroughly with the approved practices of commercial growers. "It is assumed that the average fruit grower has a general knowledge of the various methods of propagation, hence the many confusing details are here omitted." Among the subjects dealt with are: the source and methods of obtaining seeds used for the production of stocks; the commonly accepted methods of budding, grafting and propagation by cuttings; the cultivation and after treatment of nursery stock, including methods of digging, grading, packing and shipping. There is a table showing the methods adopted in propagating the various fruit trees and a list of stocks used. A valuable chapter is that on "The Nursery" which is full of information for those who contemplate making a business of tree fruit propagation.

The subject as treated by Professor Brown should have a wider appeal than to the orchardist alone. All who are in any way concerned with fruit growing, even though it be in a very small way, will find much of interest in the description of the processes attending the "manufacture" of our fruit trees.—MONTAGUE FREE.

Practical Horticultural Notes

JAPANESE ANEMONES



WHAT is more beautiful in the garden during September and October than the wonderfully chaste Japanese Anemones? At a time when the annuals have all done flowering, its abundant bloom gives a cheerful tone to the passing beauty of the garden, and harmonizes with the highly colored foliage and berried plants which predominate at this time of year. It is a peer among fall flowering plants, and planted in bold masses or in solitary clumps it is equally effective.

As a succession plant to a bed of Delphiniums, its ample foliage covers up the unsightly spaces left by these beautiful perennials, and later gives a period of bloom, exceeded by no other plant, governed it is true by the late or early frosts which sometimes play havoc with the white flowers of *A. japonica alba* and *A. japonica Whirlwind*, but generally is a little kinder to the pink varieties of which Queen Charlotte is the best, having large flowers of good substance and pleasing color.

As cut flowers they do not take kindly to the temperature of a heated room, and soon drop their heads in sorrow on being deprived of the cool, sweet, fresh outside air, but their wonderful beauty more than compensates for this defect, and every garden should have a few of these charming plants, even if not large enough to grow bold masses which are far more effective.

Anemones are easily propagated, and to secure additional plants, proceed as follows. After the season of flowering has passed, dig up a good healthy plant, shake away all the soil, and cut up the roots in small pieces, one to two inches long, spread them evenly in a flat or pan about half filled with any ordinary soil, if too heavy, add a little sand, then cover with

about one inch of soil, and keep moderately moist but not wet. In a short time nodules will form and young growths will show themselves above the soil; when large enough they can be transferred singly to pots, and in spring planted out in permanent quarters, or if preferred they can be profitably grown in pots one year before planting permanently. When planting, the crowns of the plants should not be more than two inches under the surface, too deep planting often results in failure.

When well established, put a few brush between the growths as soon as the flower stalks show, to prevent them falling apart when in bloom.

Care should be taken not to cultivate too deeply around the plants, but a good dressing of manure forked in annually while the plants are dormant, will well repay the expense, and result in flower stalks four to six feet in height.

A winter covering of one foot of leaves in exposed situations protects them from too severe freezing, and also helps in keeping the plants from getting excessively wet. This practice has kept my Anemones in good condition, without loss, for the past fifteen years, and for this reason I give these suggestions to others hoping it may prove of some help in the successful cultivation of these beautiful flowers.—ALFRED J. LOVELESS.

MELONS UNDER GLASS

A well grown and nicely finished melon is a fruit appreciated by most people. In the northern part of the country, owing to the short summer season, it is very hard to grow good flavored melons outdoors, even by starting the seeds inside and planting out in portable or so called melon frames. Even then only a few of the earliest kinds, such as Emerald Gem and Honey Drop, can be depended upon to produce finished fruits of good flavor. On most places with a sizable garden there are one or more greenhouses which for three or four months' time in the summer could be utilized to grow a good crop of melons, with little or no artificial heat. Melon plants thrive best in heat and sunshine, and the best of the forcing or greenhouse

varieties should have a growing temperature of from 65° to 85° to properly finish their fruits. An ideal house in which to grow melons is an 11-foot even span house, with the walk in the center, and benches on either side; with a wire trellis 12 to 14 inches from the glass. There are many and varied methods of growing melons under glass. One of the best ways in which to secure well netted and finished fruits is the single stem system with but one fruit allowed on each plant, as in this system the plants may be grown as close as 12 to 14 inches. Practically the same weight of fruit may be obtained in a given space as would be if the plants had been given more room and two or more fruits allowed on the plants, with the added certainty of a well netted and nicely finished fruit of from 6 to 12 pounds weight, according to variety grown. Varieties differ a good deal as to length of time it takes to ripen the fruits from sowing the seeds. The earliest kinds will ripen in twelve weeks and others take as long as eighteen weeks. It is best to grow but two varieties in one house or compartment, the two differing in time of ripening not more than two weeks, as by having two varieties the crop will not come in all at one time. The plants can be handled and fruits finished better in ripening than by growing varieties which differ more in length of time to finish, as the growing plants require different treatment from plants on which the fruits are ripening.

Sow the seeds singly in 2-inch pots, using rather sandy soil. Water well, cover with newspaper or heavy shading material, and keep the pots in a temperature of not less than 60°. After germination and when rooted, repot into 4-inch pots and keep the plants near the glass in a warm house until rooted and well established but not pot-bound. The best soil for melons is a rich turfy loam or topsoil mixed with but very little manure. Place the soil on the bench in a rather narrow ridge nearest the glass, firm down quite hard, and form a small mound for each plant. Figuring a space of 12 to 14 inches from center to center, dig a hole and plant not deeper than top of soil in pots. The reason for planting on raised mounds is that most varieties are subject to canker or stem rot if water

comes too much in contact with the stem near the soil. In this way the plants may be watered freely and still be kept dry around the stem. As the plant grows train up the vine to trellis or stakes, pinching out lower side shoots to about half of the height the plants are wanted to grow, usually 4 to 5 feet. After the plants have reached this height pinch off the top, this will cause the side shoots to grow out more rapidly, on which are produced the fruitbearing or female flower. When those flowers are fully expanded pollinate by pulling off a well opened male flower, pick off the petals and bring its pollen in contact with the stigma on the fruitbearing flower. Do this operation in the forenoon and when the flowers are dry. If properly set the flower will soon wilt and the fruit begin to swell, after which cut off all other side shoots and pinch off fruiting shoot to one leaf above the fruit. As the fruit develops and increases in weight support it by a small piece of netting. If the roots show through the soil give a good top dressing, using soil as when planting. Keep plants well watered and syringe thoroughly to keep red spider and thrip in check. As the fruit begins to ripen gradually allow the soil to dry out, but not so as to cause the plants to wilt. Keep a more airy and dryer atmosphere in the house until the fruits are ripe and fit to take from the vines. Most varieties will indicate their ripe stage by cracking around the stem, while others will have to be cut from the vines at the proper time.

A few good varieties to grow under glass are: *Green flesh*—Emerald Eminence, Suttons Perfection, Suttons Emerald Gem; *Scarlet flesh*—Superlative, Suttons Scarlet, King George; *White flesh*—Veitch's Eminence, Here of Lockinge, Suttons Royal Favorite.—S. W. CARLQUIST.

REHMANNIA ANGULATA

Here is another little gem. Not a new one by any means; it sometimes goes under the name of *elata*. A plant of Chinese origin; it is an easy grower, a splendid bloomer both outside and under glass in cool temperature. Young plants are freely

produced from the roots in the fall of the year. Even small ones potted up in $2\frac{1}{2}$ inch pots and given a shift into $3\frac{1}{2}$ will surprise you in April with their large flowers that are freely produced on the ever-growing flower stalk, and the first flowers hang on for weeks while new ones will add to the wealth of bloom. Individual flowers remind one much of *Incarvillea* and for lasting qualities they are excelled only by the straw-flowers. For massing out of doors they can be well recommended, for once seen they are always wanted; grow freely from seed and are treated as half hardy perennials. Under glass they are subject to white fly but with present method of eradication of this pest we have only ourselves to blame if we permit them to interfere.—A. MARTINI.

Journal of the



INTERNATIONAL GARDEN CLUB



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John A. Booth, superintendent estate of J. J. Van Alen Newport, R. I.



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