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OCTOBER COVER ILLUSTRATION

(J. ANLIKER)

Loropetalum chinense . . . a highly desirable 1900 plant introduction from Europe, although very rarely seen in nurseries or private plantings . . . a Chinese native . . . but are the ten specimens in Japan forgotten introductions? . . . See Page 236



G. HAMPFLER

An "infra-red" view of the Gotelli Arboretum

*A lively contrast in color is shown
between the new growth and old foliage during May and June*

The Gotelli Arboretum of Dwarf and Slow Growing Conifers

WILLIAM T. GOTELLI*

Gardening has been my hobby since 1941. As I read about conifers, gradually my interests turned to growing the dwarf and slow growing kinds. Searching for these little conifers has led me to the four corners of the globe. I have done business with over two hundred and fifty nurseries and met a host of people, many of whom I cherish as friends. I have been well repaid, I feel, for these efforts, especially so when a rare little gem is found.

In my arboretum I concentrate only in growing those kinds that are naturally slow growing and the true dwarfs, in preference to artificially produced dwarfs, such as bonsai. The term "dwarf" is relative, and as used more broadly refers also to kinds that are not truly dwarf. Gotelli's Weeping Blue Spruce, *Picea pungens* Gotelli's Weeping, Weeping Japanese Red Pine; *Pinus densiflora* Pendula, and the Dwarf Hinoki Cypress, *Chamaecyparis obtusa* Nana Gracilis, attain after some years a height or spread beyond that expected of true dwarfs, and these kinds usually produce more growth per year than the true dwarfs. The true dwarf conifers, such as the Spreading Hemlock, *Tsuga canadensis* Minuta, Cole's Prostrate Hemlock, *Tsuga cana-*

densis Cole's Prostrate, and the Pygmy Deodar Cedar, *Cedrus deodara* Pygmaea, grow not more than a few inches, sometimes not more than one-quarter inch per year. In the acre and a half I devote to these plants, space is an important factor. I have, however, brought together nearly six hundred kinds, all hardy in my garden.

Dwarf and slow-growing conifers may arise naturally in several ways. Most of the dwarf kinds of Norway Spruce, some of the pines and junipers originate from a "witches broom," a kind of natural monstrosity commonly found on isolated branches of conifers. In trees with witches broom, the affected branch develops abnormally and appears twisted, contorted and otherwise grotesque with very dense growth. Cuttings taken from this abnormal growth usually produce a dwarf plant. Weeping forms in spruces and some other conifers arise as bud sports on isolated branches of the mother plant. True dwarfs sometimes arise as seedlings, such as the Pygmy Deodar Cedar, *Cedrus deodara* Pygmaea, Dwarf Douglas Fir, *Pseudotsuga menziesi* Compacta, and the Spreading Omorika Spruce, *Picea omorika* Expansa; others also are known to arise as seedlings.

Propagation: Dwarf conifers to be perpetuated are best propagated by cuttings or by grafting. Reproduction from cuttings is by far the best method, since the plant will always maintain its true character as a dwarf. Grafting should be discouraged, since the stronger understock will frequently force more vigorous growth from the dwarf scion to nullify the desired dwarf character.

Culture: The dwarf and slow growing conifers have been easy to grow, a reason perhaps for my continued interest in these plants. Generally speaking, all kinds I have grown respond equally to the same cultural treatments. I have

*At his home at 66 Crest Drive, South Orange, N. J., Mr. Gotelli has assembled perhaps the most remarkable collection of dwarf and slow growing conifers in the United States. The site of the garden as it stands on the crest of a ridge, within sight of the Manhattan skyline, is a point favoring the growth of his conifers, as Mr. Gotelli points out. Not only is he an indefatigable collector, but the skill used in growing these plants is such as to bring every plant into its full beauty as a garden ornament and as a choice specimen. Mr. Gotelli demonstrates beyond all reasonable doubt the singular effectiveness of dwarf conifers in a landscape planting.

The matter of obtaining dwarf and slow growing conifers in this country is the major deterrent at this time of these plants becoming popular. Mr. Gotelli is unable to recommend any particular nursery in this country that specializes in dwarf conifers; as a matter of fact, most nurseries have none to sell and some stock a few kinds. To buy named varieties without seeing them first is sometimes very dangerous, for you never know exactly what to expect. The names are frequently incorrect which brings this aspect often into a state of confusion.



***Tsuga
canadensis
'Hussi'***

*This specimen of the
Huss Twiggy Hemlock
is about five feet
high and well over
fifty years old.
It is a very slow
grower, but not truly
dwarf, with short
twiggy branchlets and
very crowded leaves.*

G. HAMPEL

provided perfectly drained soil, which is a *must* in growing conifers. The soil in my garden is slightly acid, a condition to the liking of these plants. I find also that some of these gems revel in a stony, sterile soil. I mulch many of my plants with "blue stone" chips produced from the native rock of my area, perhaps an unusual technique, but, nevertheless, very effective for the well-being of small specimens. The stone mulch offers insulation and a place for moisture condensation during the warm months, thus cooling the soil surface. When the soil does not become excessively hot, the roots of conifers are more tolerant of severe drought. Practically all conifers prefer sunlight, although the hemlock will thrive in half shade, particularly on north slopes. Transplanting is best accomplished in early autumn through late winter well before spring growth begins.

Nutrition: My plants are grown in good top soil, which in my experience produces completely satisfactory results, hence I do very little fertilizing. I have seen instances where a greatly enriched soil has so encouraged rank vegetative growth in dwarf conifers the plants develop quite out of character.

Pests: Insect pests are sometimes quite a problem, especially in dry, hot weather,

especially spider mites. The dwarf spruces with their closely packed needles seem most susceptible to mite infestation. I have found that sulfur dust very effectively controls mite and none of the other commercial preparations is any better. Fortunately, I have no other serious insect problem in my conifers.

It has been gratifying to see how quickly and surely plants respond to ordinary attention—watering, spraying, weeding. Probably the most important point to remember about culture is that conifers rarely succeed in *poorly drained soil*. Other than these basic considerations, there are no "secrets of success." It is a bit surprising, nonetheless, to find so few dwarf conifers in gardens, since these splendid plants demand even less care than many well-known trees and shrubs, and, of course, they require practically no pruning. In the ordinary "home landscape" with flattened houses and confined living space, the dwarf conifers are recommended above many of the outsized shrubs commonly planted. The slowness of growth perhaps discourages nurserymen from stocking these plants, but I am confident as the supply increases, a tremendous demand will appear for these interesting and beautiful miniature trees.



Tsuga canadensis
'Cole's Prostrate'

Cole's Prostrate Hemlock is one of the real gems among the dwarf conifers. Old specimens grow to a height of about ten inches, unless trained as an upright specimen, and will attain a spread of about four feet. The original plant found by Mr. Cole, of the Gray and Cole Nursery, Ward Hill, Massachusetts, reached a very old age before it died, but it did not exceed the dimensions of the plant illustrated.



Sequoia sempervirens
'Adpressa'

The young shoots are conspicuously creamy-white, a character which brings praise for the Shortleaf Redwood, in contrast with the dark green leaves on the older branches. The plant illustrated, resembling the 'Albo-spica' variety, is quite prostrate but in time may develop into a broad form, yet retain its flatness. It is available in European nurseries.

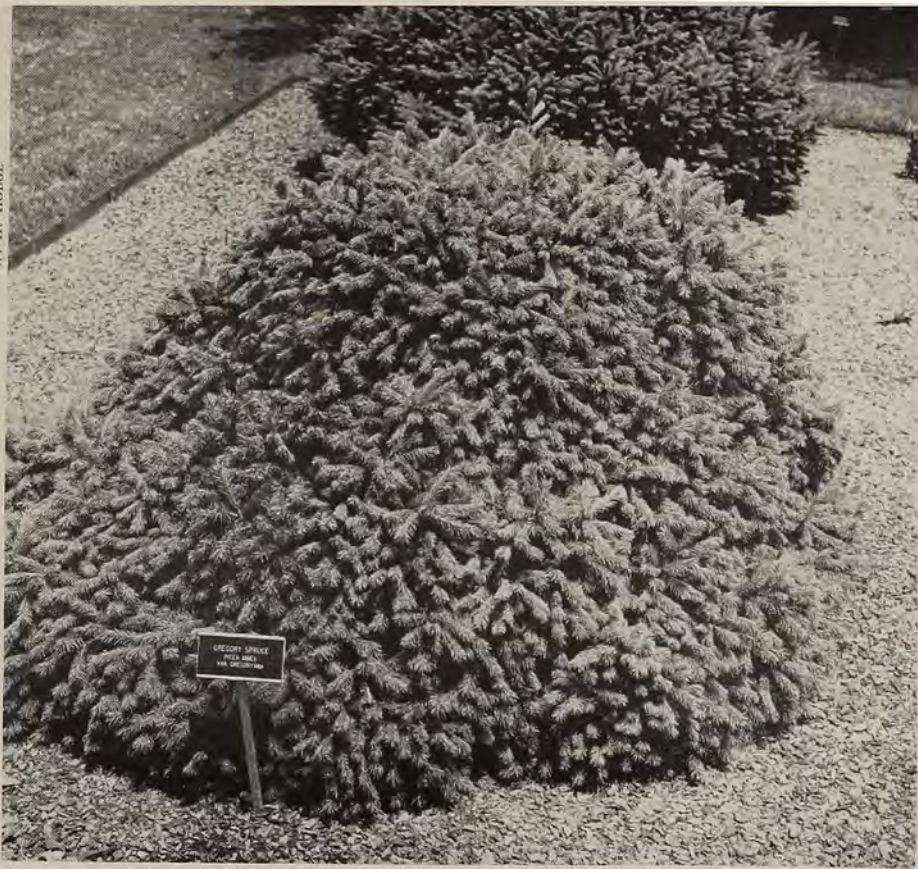


Picea abies 'Maxwelli,' illustrated above, is the largest of many specimens of the Maxwell Spruce grown in the Gotelli Arboretum. It measures about three feet high and eight wide, and it is about fifty years old. This is a distinct and true dwarf conifer, very easily recognized once the authentic plant is seen—the leaves should be provided with long and fine hair-like points. It was originated in the Maxwell Nurseries, Geneva, New York, about ninety years ago and is available from many nurseries today.

Picea pungens 'Prostrata,' the Prostrate Blue Spruce, foreground, is an old plant, possibly seventy-five years old. It has good blue glaucous leaves. Plants are not available in the nurseries.



W. H. HODGE



*Picea
abies*
'Gregoryana'

The Gregory Spruce forms a compact plant with a growth rate of about an inch each year. The plant shown is about thirty inches high and four feet wide, at an age of about twenty-five years. It was introduced in England about 1860 and is still much grown in Europe. Plants are not readily available in this country.

Pinus densiflora 'Pendula,' the Weeping Japanese Red Pine, is slow growing, of various habits, but not a true dwarf. Branches are usually pendulous or prostrate and effective drooping over a wall. Specimen illustrated is about two feet high with a spread of five feet, and twenty-five years old. It is of Japanese origin and not readily available in this country.



G. HAMPELER



G. HAMPEL

Pinus mugo var. mughus, the Swiss Mountain Pine, is a naturally dwarf growing pine of the Swiss Alps. It is very adaptable to espaliering as is illustrated on the wall of the Gotelli house.

Juniperus squamata 'Prostrata,' the Singleseed Juniper, is one of the most useful of all the prostrate junipers. It forms a dense creeping mat hardly more than fifteen inches high, admirably adapting it for use in rock gardens or on flat surfaces. It is available from many nurseries.

Pseudotsuga menziesii 'Compacta,' illustrated specimen about two feet tall and a little wider, being twenty-five years old. The Dwarf Douglas Fir is an exceedingly slow grower—about a half inch a year. --



W. H. HODGE



G. HAMPTER



*Cedrus
deodara*
'Pygmaea'

The Pygmy Deodar Cedar, one of the truly dwarf conifers in the Gotelli collection, is a seedling mutation found in a little nursery in California and planted in 1943. It has now attained a height of one foot and a spread of fifteen inches, growing less than one-fourth of an inch each year. This has not been propagated for the market.

Picea abies 'Repens,' the Creeping Norway Spruce is available from many nurseries, and it is a particularly fine form of the Norway Spruce. Plants spread laterally, very flat on the ground initially, and later develop a kind of headdress or turks cap over the first layer of branches. The largest specimen in the Gotelli Arboretum is hardly twenty-five inches high and has a spread of eight feet. Very old specimens may spread fifteen feet. In the background is shown *Picea abies* 'Pendula,' the Weeping Norway Spruce.





Sequoia sempervirens 'Nana Pendula,' the Dwarf Weeping Redwood, originated in an Irish garden. The specimen shown is about fifteen years old and has a spread of about thirty inches, the branches being very pendulous with no indication that a leader will develop. Industrial fumes of the metropolitan areas easily damage this variety. It is available from most English nurseries.

The Gotelli's Weeping Blue Spruce is a slow-growing conifer rather than a true dwarf. The specimen shown here is a very rare form, now four or five feet high and as wide at the base, with pendulous branches which have developed a witches broom at the top.

*Picea
pungens*
'Gotelli's
Weeping'





G. HAMPELER

Chamaecyparis obtusa 'Nana Gracilis'

The Dwarf Hinoki Cypress is a very fine conifer, although not truly dwarf, since old specimens attain a height of about six feet. The habit, which is invariably dense, and the blackish green foliage recommend this as one of the most distinctive of slow-growing conifers. Plants are available from many nurseries.



G. HAMPEL

***Cedrus atlantica* 'Glauca Pendula'**

Although not a dwarf, the most bizarre and unusual conifer in the Gotelli Arboretum is this eighteen year old specimen of the Weeping Atlas Cedar. The trunk is supported by a pipe eight feet high and the branches are trained horizontally from this point. The horizontal growth is now about twelve feet long and has branches drooping all the way to the ground, from a distance giving an illusion of a blue curtain or waterfall. Yearly growth has been about a foot. It is occasionally offered by a few nurseries on the West Coast.

W. H. HODGE

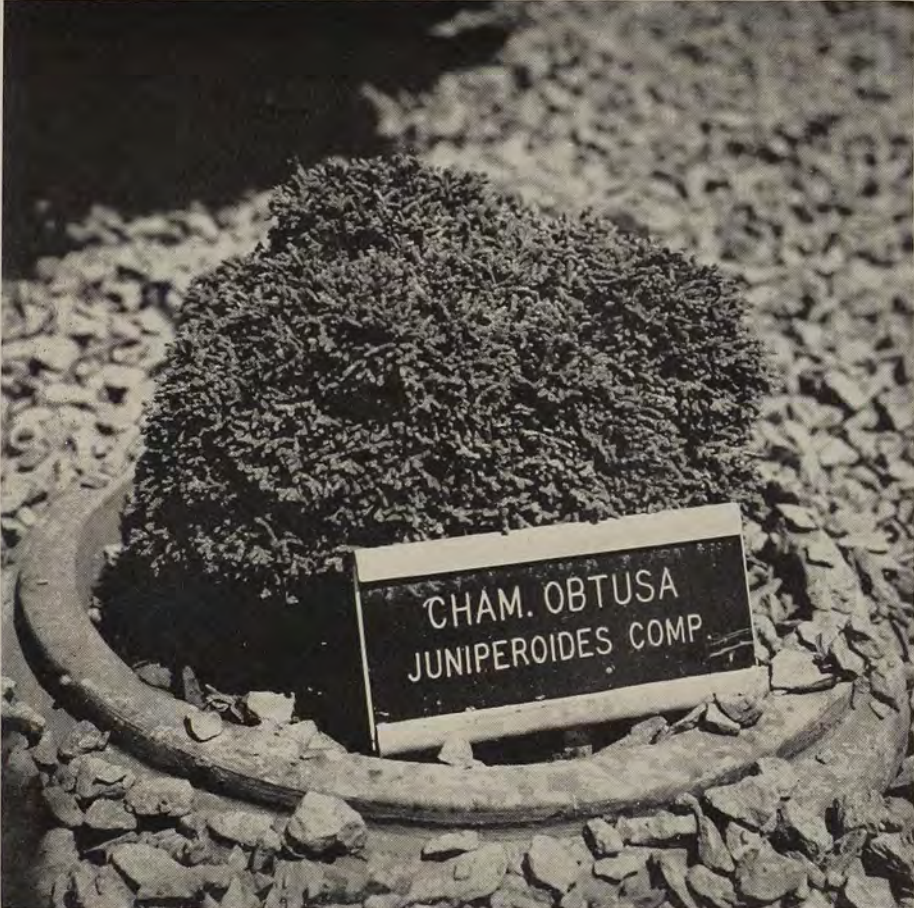


Cedrus deodara 'Aurea Pendula,' the Golden Weeping Deodar Cedar, exists in at least two forms, neither being truly dwarf. The plant illustrated is a slow growing prostrate form about a foot high with a five foot spread. The tips of the branches are golden yellow and are very beautiful when well grown.



G. HAMPEL

W. H. HODGE



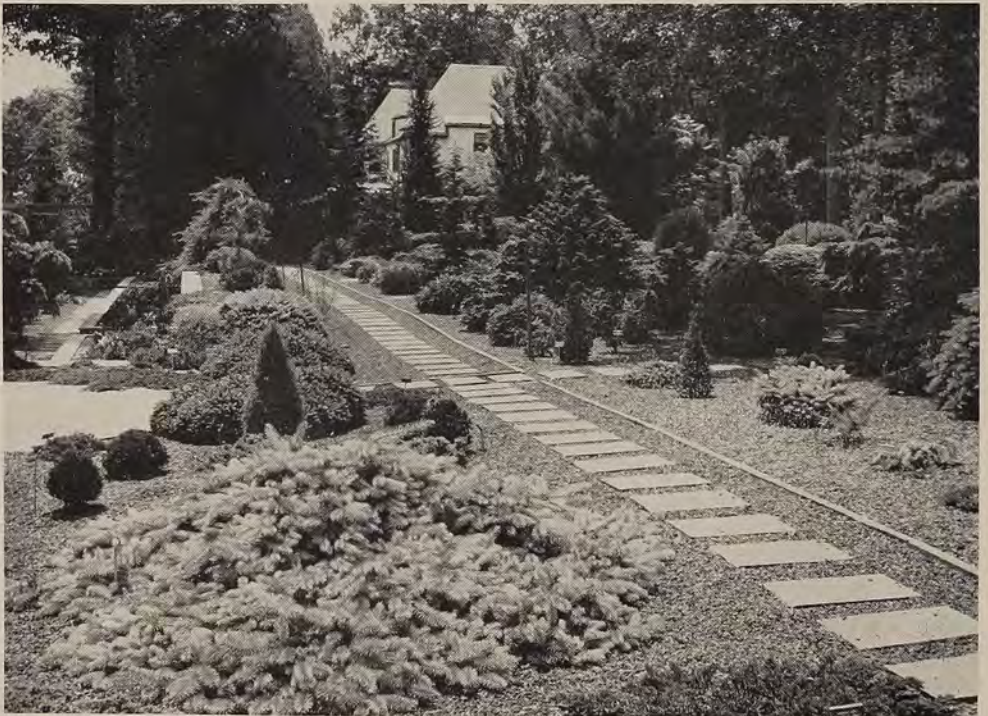
Chamaecyparis obtusa 'Juniperoides Compacta,' the Pygmy Hinoki Cypress, is a minute form of the Hinoki Cypress. It is probably one of the dwarfest of all conifers. A plant four inches high and about four inches wide may be over twenty-five years old. The largest specimen in the Gotelli Arboretum is almost ten inches high. Several other little "bun" type Dwarf Hinoki Cypress exist in cultivation but none are generally available in nurseries.

Specimen conifers mulched with blue stone chips, a method found to be very effective in maintaining lower surface temperatures of the soil during the hot summer months.



G. HAMPELER

Plants throughout the garden are named with laminated plastic labels in aluminum holders.



W. H. HOUGE

A view to show the extensive use of blue stone chips as a mulch around all the dwarf conifers in the Gotelli Arboretum.

Adventures with Hardy, Herbaceous Hibiscus

C. S. KENNEDY

Hybridizing, an adventure? Yes, surely adventure is the word for it but the devious processes of nature are by no means so sure. That is where the adventurous gamble comes in. When the pollen and ovules of two plants are mated almost anything can happen. The new plant if you are fortunate—perhaps never in existence before—with its beautiful bloom, its exquisite appeal, its entrancing form, and marvelous blending of colors, offers many reasons for us to continue with this life of ours, and it also supplies means for increasing and disseminating its interest and enjoyment.

As for Hibiscus, have you not often wondered why our northern hardy hibiscus does not possess the fine form and scintillating colors of its tropical sort?

The answer to this question may lie with the hybridizer and that is where we hope to begin. Writing as an amateur, I am convinced that our northern hibiscus has most of the potentials possessed by the tropics. The search for these hidden traits, and the same could be said for any flower, will probably bring to the searcher more unalloyed happiness than he could find elsewhere.

We began with the seed of some of the better plants that had been growing in our garden since 1952, trying particularly for a yellow. No luck—not for years, that is. Then—suddenly—last summer, there it was: a white with a one-inch lemon yellow band around the outer edge of each petal. Now how did that come about? In all probability three factors determined its origin: 1) Colchicine, 2) A sport or mutation, 3) A Hybrid

Colchicine was used in an effort to disrupt the normal cell division and create a pattern different from the normal separation of the chromosomes in the reproductive cells and in the hope of matching genes, too, in a different pattern. We began scientifically but nature scored one against us—very simply. We

discovered that the coverings of our seeds varied considerably in thickness, toughness and imperviousness to moisture. This means that we cannot accurately gauge the effectiveness of a given strength of colchicine solution. What will kill one seed and prevent its germination may not affect another seed in any manner. We had to chance it and work on averages, using three different strength solutions and soaking 5, 10, and 20 days. Before this we had tried several other methods—viz., Brushing solution on growing tips; dipping the tip of the plant four to six inches; injecting with hypodermic needle and cutting off the upper one-fifth of a green seed capsule (almost mature) and filling it with the solution. In most of these tests (thousands of them) we found that a solution sufficiently strong to affect the reproductive cell layer was too strong for the other cells and the seed capsule failed to mature. This is partially true of mature seeds but not to such a great extent. So in recent years seeds have been soaked in the colchicine solution. The experimenter will meet many disappointments but the one in a thousand which comes through can be truly wonderful.

The second item mentioned, a sport, was a pure gift from nature. A plant with a bell-shaped scarlet bloom mutated and produced a creamy white crescent on each scarlet petal. A really beautiful novelty. By root division we have been able to multiply it and these plants have proven quite stable. The bloom, however, was small and the plant rangy and up to six feet tall. These deficiencies had to be overcome.

This brought us to item three—crossing. This we did with a score or more of our choicest plants. The seeds from these we planted, one lot with no treatment; the other after immersion in colchicine solution. From the latter (one of the better than twenty-five thousand growing in our garden at that time) came our

yellow band specimen. From it we hope to develop a complete yellow in time.

In the same group of plants a rose purple bloom made its appearance. This should prove the progenitor of a family of purples and crosses could give us some beautiful blends. The new blooms with blendings, however, are very unstable and quite frequently the second year's blooming may vary considerably from the first. This may be an improvement or it may be a deterioration. In contradistinction to this we had last year (1959) a silver lavender bloom which was quite uniform in each of its several bloomings. This procedure should repeat in 1960.

We have used, in addition to colchicine, digitalin and gibberellic acid with unsatisfactory results. The latter particularly is not adaptable to the Hibiscus, for the plant is already rank and high enough. Indeed some of our hybrids have reached a height of nine feet with blooms eight to nine inches in diameter. They are really quite an inspiration, particularly cerise against a clear blue sky. They are too large, however, for the average garden.

While some of our blooms reach eleven inches in diameter and could be forced to 12 inches, our main efforts have been directed toward developing plants with blooms that average eight inches in diameter and reach a height of about four feet. These will be well rounded, with a spread of four to six feet, with many blooms of clear, brilliant and vibrant colors; no hazy or muddy effects.

As to form of bloom: In the petals we want and are getting, three particular variations: 1) Flared petals which do not lie flat but have a decided angular twist at the base of attachment, or are twirled farther out. 2) Waved or ruffled—a given petal may wave in one big roll or ruffle in a series of smaller rolls. 3) Frilled edges. These are just developing in our stock and seem to be a progression from the deckle edge which in turn followed the scalloped edge.

The form of the bloom as a whole could be distinguished by classifying as follows: Bell-funnel or angular—cup, bowl, salad plate, dinner plate. These descriptions are inadequate, for with the variations in the petals the form becomes almost infinite. One such variation we found took the general form of

a flat salad plate with the exceptions that the petals of the outer one-half to three-fourths inch were turned up almost vertical and took a triangular form rather than oval. This gave the flower a tensided outline, unique and attractive. Another outstanding type assumed the form of a shallow bowl with a rolled edge curving in on a white petal accented with a touch of scarlet on a deckled edge and spiraling in to the center. We feel further refinements are definitely possible and will be realized.

Doubles? Yes—one true double in 1959 and five twins which, while seeming to double, were really two blooms grown together. The true double develop a ten-celled seed pod but did not mature it. 1960 may be the year of realization for this seed.

As for the leaf shape, we have better than twenty-five distinct forms and these again vary as to thickness, texture, size and shades of green. Some are larger than a good-sized hand, others not one-eighth that. Judging from appearance, many were tetraploid or polyploid. Shapes take the pattern of ash, poplar, maple or oak leaves, Halberd (two, five and seven lobed) and the many odd, twisted, spiraling and deformed leaves of the colchicine treatments. Many of these are sectored as to pigmentation, coloring, and texture. Occasionally a portion of a plant may show this sectoring and the remainder be normal. We have confirmed to our satisfaction that no relationship exists between form of leaf and type of bloom.

Color patterns and blendings have shown some very unusual and pleasing designs. First to appear were the concentric circle type: typical of these was a scarlet eye with a white or cream halo blending into a light pink which darkened perceptibly at the edges.

Some of these reveal as many as five separate color bands. Next came the radial rays proceeding out from the central eye. If a white eye the radials are white on a pink, crimson, or scarlet background; if a scarlet, crimson or ruby eye, the radials were similar in color on a white or pink background. Some line markings do not radiate to the center but appear to lie parallel in the petal. Almost any form seems possible. Blendings are frequent, some uniformly out-

ward from the center, others as irregular splotches—generally at the edge of the petals; still others follow a pattern. Vision a warm vibrant pink with a white spot in the center of each petal in a bloom of excellent form.

It takes about four years to stabilize a bloom of this type of blends, during which time it may change color pattern completely. The other color patterns generally "fix" themselves in two years, three at most. Two of our most intriguing breaks of 1957-1958 had by 1959 rounded this cycle of change. To illustrate, one of these had an interesting crimson design resembling a lip at the center of the outer edge of each pure white petal. Naturally we named it "I've Been Kissed," yet in one short year the evidence was erased and now, while we have a beautiful uniform blending of peach pink, it lacks the intriguing character it once had. As with most plants, soil conditions, water supply and temperature influence the color, its pattern and to an extent the form of the flower. Needless to say, these conditions are particularly effective in their action on a new hybrid in its early formative stage.

Color tones range through all shades of pinks and red; some of these are very vibrant and seem almost ready to burst into flame. In recent years a tendency toward orange is manifest. Three or four years more should produce a true orange. Reds range through the following: cerise, crimson, scarlet, carmine, ruby, cardinal, rose and cherry. Some of the crimsons approach so deep a shade as to easily be mistaken, at a distance, for black. The pink range covers the following: cameo, coral, cosmos, rose, peach, shell, lilac and vermilion. Some blooms give evidence now of iridescence but considerable line breeding will be necessary before this trait is brought to a point where it is worthy of presentation.

Previously in this paper reference has been made to the nine-foot Giants. For a back border on the edge of shrubbery they would be particularly effective, but for the average city garden they are possibly too large, considering the space available. Stalks are strong, very large, no drooping, and frequently resemble two to four stalks grown together

In contrast to the giants are the miniatures which offer very pleasant contrasts

in bloom and plant proportions. They range in height from thirty to forty inches, but the blooms vary from three to eight inches or more in diameter. Ten to twenty eight-inch blooms out in a given day on a dwarf plant with a spread of four feet is indeed quite a picture.

The miniatures have an attraction for many and, of course, the smaller blooms come in much greater numbers. This is due in part to their branching habit, which in many instances spaces the lateral branches as close together as one and a half inches on the main stalk, projecting outward at right angles and curving gracefully upward. The net result of this branching habit is a greater concentration of bloom on a given plant and with less stalk in both main and branches, more of the plant's energy can be used in production of bloom.

Normal blooming period in Ohio is August to frost. We have a number of plants, however, that came into bloom in mid-July and a few which will bloom the first week in July. We expect within a few years to have Hibiscus blooming in June. Our efforts to secure a bloom which will remain open all night so far have resulted in disappointment. We have lengthened the number of hours which a bloom will remain open and have a few which will remain open a portion of the night and one in particular which had blooms remaining open into the third day, but to some extent that was due to cool weather and must be discounted.

One who aspires to the role of amateur hybridizer should take into consideration at least four main items and the extent to which they determine the results. These items involve: 1) The stock with which you will work, 2) Time element, 3) The available ground, 4) The labor involved.

1. The plant with which you work should preferably be one which has not been developed to any great extent. It is difficult to exceed the record of the professionals and one may develop what seems to him like new plants for many years, only to find that others have been over the same ground before him and have the market with superior plants.
2. The time element is a variable item depending on the plant with

which he chooses to work, whether it is an annual or perennial, its rate of growing to maturity, and the type of experiments which he plans to conduct. Another item which probably should be left to the more experienced breeder is that of line breeding before crossing. For *Hibiscus moscheutos* the time table figures somewhat as follows: Field grown from seed to first bloom (you will get a few blooms the first year under very favorable conditions), two years. Greenhouse seeding and transplanting before buds form (even here there will be many plants not blooming until the second year), one year. Add to this stabilizing proving, three years. For blends, add a fourth year—four years. Total time: Four to six years.

With chemicals, such as colchicine, the time increases since the first generation produces largely the type of the dominant parent traits, deformed by chemicals.

Then to blooming of second generation, four years; stabilizing, four years; better results in a third generation, two years; total time, eight to ten years.

This may be exceeded in time as this following experience will illustrate: (Colchicine treated) To end of second year's growth a height of six inches had been attained. To first bloom it took four years. The blooms were abominable. Only three blooms developed seed. From this seed four germinated. What will come of these is a question. We still have five years to go for a marketable plant. More likely it will prove to be seven years, which would make a total of eleven years. But we will see it through just to discover what is the final development on a colchicine soaked plant. There is more than an even chance we will never get a marketable plant. Yet it could be an entirely different type of hibiscus.

3. The available ground. Almost any kind is satisfactory for hibiscus. One word of caution: your plants will need ample water but if water stands on them in the winter they will be killed as it freezes. For other plants judge your soil type carefully. A mature hibiscus plant

needs at least nine square feet of space. In the nursery row we plant six inches apart in rows three feet between. We can carry twenty-five thousand plants on three acres of ground. Some of these are pulled or plowed out at the end of the second year. Others will be kept four or five years. Of course the first quality stock will be kept until it proves or disproves itself. Then transferred to a permanent location and increased by cuttings and root division. This of course means additional space as our stock builds up.

4. The item of labor speaks for itself. The plowing, planting, fertilizing, and watering are substantial but greater than any of these come the weeds, in the second year particularly, when the cultivator and hoe will not reach many of them in the clump and it becomes a hand pulling process.

Smaller plants than hibiscus, of course, take less space and a great deal of progress can be made with certain plants on the back end of a liberal-sized city lot.

As to the ratio of success, mine has been (during the past two years) about one choice bloom in four hundred of first quality. You will wish to keep others but time and space forbid. Even of these you will eliminate fifty per cent because they fail to show vitality, have a poor stalk, change character or freeze out. Having come this far two obstacles remain:

- 1) Will it be popular with the public?
- 2) Can the nurseryman propagate it profitably?

Time has the answer to the first. For the second, your own observation and trials tell you whether or not the nurseryman will want it.

Ask yourself these questions: Does the number of stalks increase rapidly season to season? Can you take many cuttings in the spring and have them grow? Do the seeds germinate well?

If the answers are all yes—you have it. One of my most wonderful blooms is a poor multiplier. I doubt if it ever gets by a nurseryman. Yet its true picture in colors would sell it by the thousands.

The future, so far as our work with hibiscus is concerned, is laid out as follows: The yellow band must be bred to

a complete yellow. That means line breeding but at the same time we will start a series of crosses in which our peach pink and near orange shades will be crossed to deepen the yellow. This on the theory that these latter carry a recessive trait of yellow in the genes. The rose with the purple overlay will be inbred for a pure purple and crossed with a very deep crimson (almost black) to deepen the purple. This same deep crimson will be crossed also with the silver lavender for some deeper shades. We may line breed it for a black. But if we get it we won't know what to do with it.

The giants will be line bred for larger flowers but mainly to satisfy our curiosity as to their ultimate potentialities in size and hardiness.

We have a white (pentagon outline) angular cup of a wonderful substance and form which we will cross with some of our lighter shades with a more frail petal.

The miniatures we shall further reduce in plant and bloom size. Perhaps twenty-four inches ought to be the minimum height and three inches the bloom diameter. In doing this we will attempt to hold the same number of branches and quantity of bloom in a plant four to five feet in width.

In doing this we will work only with those plants of high vitality and excellent reproductive powers.

The foregoing operations will also give us new blendings and configurations and by using only our very top stock we shall arrive at improved and refined forms and scintillating color combinations.

There are hundreds of plants awaiting the hand that will bring them to the maximum of their development. The number far exceeds the time and resources available for the present number of professional hybridizers to realize the full development of the existing potential. Therefore, the amateur hybridizer can perform a very noteworthy service by hastening the accomplishment of this very desirable goal. For him, are the following rewards:

1. The supreme happiness of working in his garden and of sleeping soundly and peacefully at night.

2. Punctuated at times by the sudden realization that he has produced in that garden an improved flower, vegetable, or fruit.

3. A gamble at a jackpot of remuneration when he sells his new creation.

4. A service to humanity rendered in developing his new production—a better one than previously existed.

5. The certainty that what he has developed will benefit his fellowman for years after his own passing.

What more could any man ask?

Mr. Kennedy, 4338 Bright Road, Dublin, Ohio, reports on his 1960 developments:

Purple—Deteriorated, but now have three new plants

Lavender—Stabilized, blooming well

Yellow Band—Color dispersed, but still evident

Miniature—Very fine and consistent

Doubles—10, 11, 12, and 16 petals. Only one flower matured a true double seed pod with 12 compartments.

Ed.

A New Plant Hardiness Map For the United States and Southern Canada

HENRY T. SKINNER*

The *New Plant Hardiness Map* which has been sponsored by the American Horticultural Society came off the press in late May, which was a little too late for mention of it in the July magazine. Due to final appearance as a government rather than a Society publication, single copies are available free of charge from the Office of Information, U. S. Department of Agriculture, Washington 25, D. C., while quantity requests can be filled by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at a charge of 15 cents each.

This new uncopyrighted nineteen by twenty-eight inch color map shows ten minimum temperature plant hardiness zones for the United States and southern Canada (exclusive of Alaska and Hawaii) in an up-to-date and more detailed pattern than in any previous studies of its particular kind.

The coldest zone shown on the map is in parts of Canada where winter temperatures average lower than fifty degrees Fahrenheit below zero, while the warmest zone of thirty to forty degrees cuts across the southern tip of Florida, the southern tip of Texas, parts of southern California and the San Francisco Bay area. Each differently colored primary zone of ten degree temperature change is divided into five degree sub zones of lighter and darker color shades for still greater detail of interpretation, while the single sheet reverse carries use and descriptive information, examples of six persistent plants typical of each zone and zone classifications for a hundred and twenty-five or so woody or persistent plants, as well as a simplified black and white version of the color map for small-scale reproduction in books, nursery catalogs, etc.

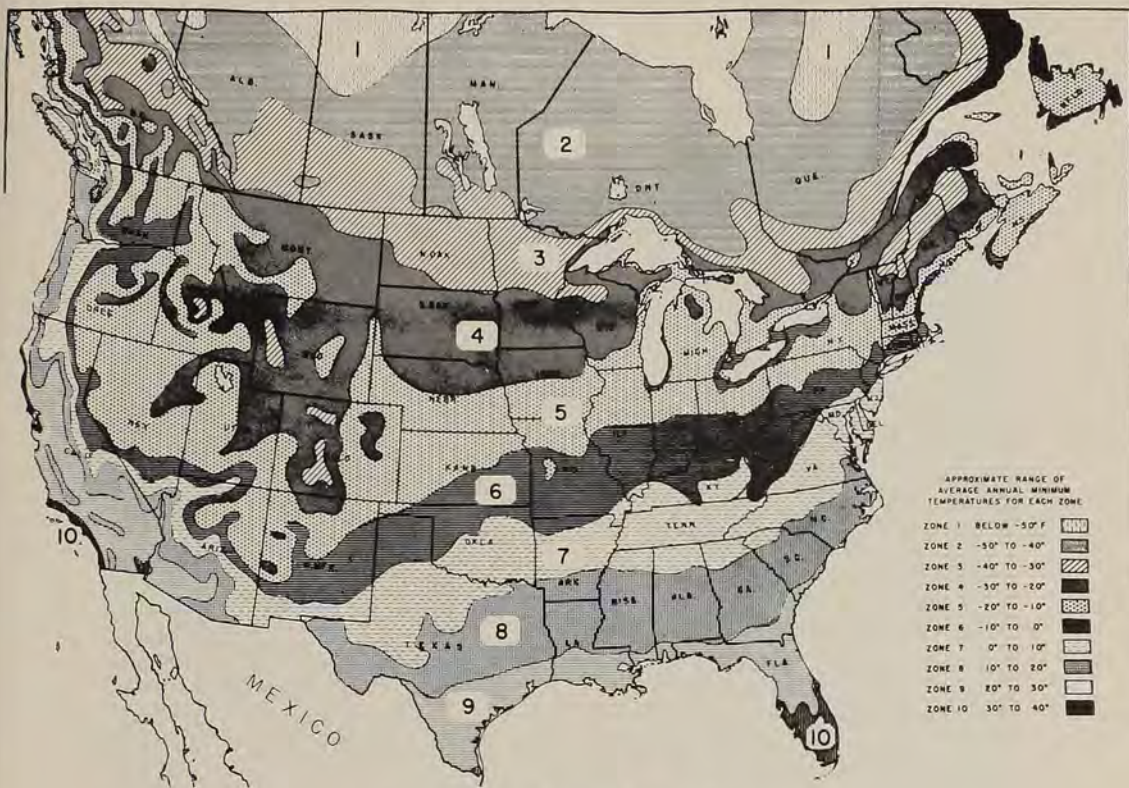
Previous approaches to the charting or assessing the geographic or climatic

adaptability of cultivated plants have followed two general patterns—the designation of geographic growth areas or the rating of individual plants according to their apparent tolerance of specific climatic situations. Among the best examples of the first type are the several studies of the 1936 U. S. Department of Agriculture *Atlas of American Agriculture*, which includes a delineation of twenty-eight growth regions, each region representing an area of comparative climatic and vegetational homogeneity. Other kinds of maps have been based separately upon rainfall, temperature, etc.

In the other kind of classification, individual plants have been rated according to their hardiness or temperature tolerance either comparatively as in the "A" to "E" British rating system for rhododendron where "A" represents maximum hardiness and "E" comparative tenderness (in the British Isles) or by the more specific system of the American Rhododendron Society, where H-1 denotes hardiness to twenty-five degrees below zero, down to H-7 representing a plant which withstands no freezing. Ratings of this kind are helpful to anyone who knows his own local, climatic situation but may mean little to a person prescribing for another area—without a climatic map of some kind. And the question arises at this point whether the direct reference to a temperature map might not entail less confusion.

Origin of the present study dates from March 1953 when, upon recommendation of the American Association of Nurserymen, the former American Horticultural Council appointed a Commission to investigate the several plant hardiness maps of then-current horticultural circulation with a view to the possible selection of one of them for adoption by the Council as a standard. Membership of this Commission comprised R. Milton Carleton, J. W. Neill, Richard P. White, Maunsell Van Rensselaer,

*Director, U. S. National Arboretum, Washington 25, D. C.



The Zones of Plant Hardiness

From an adapted version (black and white) for small scale reproduction

and the present writer as chairman. On report that none of the available sixteen or more maps met requirements in all respects, the same Commission was delegated the task of producing a new one within the framework of these requirements.

From preliminary analysis of the broad problems of plant adaptability and hardiness on a geographic, nationwide basis it was determined that average or mean (the terms are essentially the same in Weather Bureau parlance) winter temperature still, in spite of its limitations, provided the most effective and usable key to the plant adaptability problem. Minimum winter temperatures have served as a basis for the excellent Rehder and Wyman maps of the Arnold Arboretum and this new version differs from the widely used Arnold map only in the incorporation of greater detail, in minor modification of the zone intervals and in use of additional more recently available weather data, horticulturally reprocessed and scrutinized.

Using facilities of the U. S. National Arboretum and with assistance of the U. S. Weather Bureau and the Canadian Meteorological Division, the map was

completed in about four years. Many horticulturists provided information on problem areas of which the Canadian Northwest, as analyzed by Dr. Neill, was among the largest and most intricate.

Difficulties of publication by the American Horticultural Council were more recently resolved by the fortunate circumstance that the assistance of the U. S. National Arboretum entitled it to consideration for printing and distribution through the U. S. Department of Agriculture.

The detail of this map is necessarily geared to its coverage on a continent-wide basis, so that although several state-wide hardiness studies were referred to in its preparation, and keyed as closely as possible to it, the need for the greater detail of many more smaller area studies remains as great as ever, and it is hoped that these will be undertaken by individuals or by the state experiment stations.

Comments or suggestions from the users of this map will always be appreciated in that no production of this kind can ever be as infallible as its compilers would wish. They hope, nonetheless, that it will serve a useful purpose.



CLAUDE HOPE

Moraea papilionacea

This very dwarf cormous Moraea, although not included in Dr. Peery's notes, is worthy of trial in a hot, sheltered bank of the rock garden. Flowers are red or lilac with yellow on the claws.

Some *Moraea*s for Southwest Gardens

L. T. PEERY¹

The genus *Moraea* contains some of the most beautiful as well as some of the most drought-resistant flowers for Southwestern gardens, yet since the article in this Magazine, by Sarah V. Coombs in the April 1948 issue I have been able to find only six notes on the genus, and only one of these, in the *Journal of the Royal Horticultural Society* for 1950 is of any length. Four of these notes were in English magazines, and one each in *Sunset* and in the *Journal of the California Horticultural Society*. Most of them were notes on or descriptions of a single species. It appears to me a genus containing so many plants as attractive in the open in the Southwest and in cool greenhouses in other parts of the country as this one deserves to be brought more often to the attention of gardeners.

This will be a much more informal presentation than that by Mrs. Coombs, and I will be concerned mainly with a few members of the genus that I have grown myself.

But first let me put one matter straight, the spelling of the name of the genus. Mrs. Coombs uses the spelling *Morea* in her article and also in her book "South African Plants For American Gardens." My personal copy of *Hortus II*, printed in 1946 and I believe

not revised later than 1941, mentions the fact that the spelling *Moraea* has been "conserved." Since that time *Moraea*, though not the first published spelling of the genus, has been the only acceptable one. Mrs. Coombs' statement as to the originally published name having been *Morea* is quite correct. This ordinarily would mean that we should return to that spelling, but the process of "conservation" prevents changes due to long standing errors which have prevailed over the world for many years, and thus cut down the number of the changes in botanic names that is so disconcerting, especially to the nurseryman and horticulturist. Would that the International Botanic Congresses, who alone are privileged to do so, would exercise their discretion more freely. Unfortunately the names of plant species are not covered by the rule.

Mixups of this kind always serve to remind me of some words on this subject by the late Lord Aberconway in accepting re-election as President of the Royal Horticultural Society. He remarked that just before the last war a book had been discovered in a Berlin library which would have necessitated the changing of the names of several hundred plants in wide and common cultivation, "But fortunately the R.A.F. took care of the matter." A jest, but one that some of us think had a real point.

In the case of the *Morea-Moraea* mix-up, to me the funniest part of the whole thing is the fact that after Linne changed Miller's original and quite correct spelling of the genus, apparently under the idea that the genus had been named for his wife, rather than for the English botanist R. More, in later articles, Miller, who originally published the name, changes his own spelling to *Moraea*, evidently being convinced that the famous Linne was a more practical latinist than himself. I understand that some, though certainly not all, of the South African botanists adopted a some-

¹Dr. Peery writes: Born 1899 at Portland, Oregon. Retired physician. Practiced in Berkeley, California. Retired early as a result of coronary heart disease while in the army, in 1943. Stuck it out in an army hospital in this country until after the end of the war, then retired. Gave up my practice in 1948 as the nervous strain brought on too many angina attacks, and moved close to Hayward in a locality selected for the soil rather than its beauty. Have a bit over a half acre of 'Yolo' silt loam here. Most of the soil around is an adobe clay, which I knew I would not be able to fight. Place is flat as a floor, but soil has soaked up to three inches of rain in 24 hours without run-off. Since anyone who retires after an active life without developing some sort of hobby is soon a dead duck, I became interested in plants, and particularly in growing same from seed. A secondary interest has always been in what the Dutch refer to as "minor bulbs." I grow something over a hundred flats of these each year. About half the size of a nursery flat, but either four or six inches deep. Most of them do well under such conditions. Have not published much. The notes in *The Gardeners' Pocket-book*, and a few in the *Journal of the California Hort. Society*, and the *Gesneriad Journal* would pretty well cover the lot. Also do a lot of reading on gardening as well as on many other subjects.

²Some *Morreas*, *The National Horticultural Magazine*, Volume 27, No. 2, April 1948. Copies available from the Society's Headquarters, \$1, postpaid.



J. HORACE MC FARLAND COMPANY

Moraea iridioides

what intransigent attitude in the matter and continued to use the spelling *Morea* for some years, but I think *Moraea* is the accepted spelling for the genus now, even there.

One other point in regard to botany. I do not know just what the present standing is of the name *Dietes* as applied to the few members of the genus which have rhizomes rather than corms. Here, I intend to follow Mrs. Coombs and ignore it. I know I have good backing for doing so as late as 1956. How *Hortus III* will list them remains to be seen, but whatever the final decision of the botanists may be, I'm afraid they will all remain *Moraea* to me. It is as though all rhizomatous *Iris* were placed in a new genus, leaving only the bulbous ones in the genus *Iris*.

I will first take up this rhizomatous part of the genus, referred to by the not-too-recent Bailey's *Cyclopedia of Horticulture* as the subgenus *Dietes*, a position which makes more sense to me than a complete split into two genera.

The writer has not grown *Moraea bicolor* to date, so lacks personal experience with it. It looks well worth growing. The flowers are yellow with a very dark brown blotch at the base of the outer segments. The habit of the plant is similar to the next, though little less tall.

Moraea iridioides is the one which has at times been suspected of blooming in accord with phases of the moon. If so, the moon over this part of California must go through some very peculiar antics. The blooming of the species, however, does follow a very peculiar pattern. I have had plants growing in the quite heavy shade of overhanging trees, and others growing in full sun. In each case some of the plants are deeply watered during our dry period at about weekly intervals, while others are growing in a row in my orchard and have not been artificially watered since they were about three years old from seed.

One end of this row is under considerable shade from a pear tree with low hanging branches. The other end of the row is in full sun. Yet, when warned by the appearance of narrow, elongated white buds on a chance seedling near the door of my workshop, where it gets water and full afternoon sun, reflected back on it by a white stucco wall, I

know that when I inspect the other plants I will find them also in bud. A couple of days later they are all in flower.

The flowers are about four inches in diameter. The three outer petals are broader than the three inner ones, and have a large yellow spot near the base of each, with a few small yellow markings still closer to the base. The somewhat narrower inner petals are without yellow markings, but toward their bases show small dashes of dark brown. The styles, which resemble those of a Japanese *Iris* in form, are very distinctly tinged with violet. The flowers usually stay open about four days here, then fade all at once, and until the next flush bloom you will not find a flower on any of your plants. There are minor and major flushes of bloom, the latter showing three to four times the number of flowers on each plant. These major and minor flushes of bloom do not seem to follow each other in any regular order.

To give an example of the drought resistance of the plant, the row of seedlings in my orchard has had no artificial water for six or eight years, and last year we had only a bit over nine inches of rain here, about half of our usual supply. But these drought-stricken plants show no sign of wilting, and flower with the others. Of course, there are limits to all things made, and I must admit that the bloom flushes of those in full sun have been mostly of the minor type. Those in the shade have bloomed quite freely. The leaves are much like those of an iris, upright and pointed, but somewhat narrower. The flower stems are perennial, so if one simply MUST cut a few it is well to leave at least two nodes at the base of the stem, or you will have to wait some years while the plant forms new ones.

The above is a description of *M. iridioides* var. *johnsoni*. I have seen plantings of the type species, and it is considerably inferior. In fact I'm inclined to agree with Mr. J. N. Giridlian of the Oakhurst Gardens, who, in offering it for sale as a rarity intimated that it was of mere botanic interest as compared with the variety.

This same Mr. Giridlian, sometime during the thirties made crosses between *M. iridioides johnsoni* and *M. bicolor*. From these crosses he introduced several

named varieties of which I grow 'Orange Drop' and 'Lemon Drop.' The flowers on these Oakhurst hybrids are rounder and of smoother nicer shape than the one just described, though somewhat smaller. The leaf structure is much like *M. iridioides johnsoni*, but the cross seems to have lost the complete unanimity of flowering periods possessed by *M. iridioides*. Flowers still come in flushes, but there will be occasional flowers in bloom during the 'silent periods.'

Extending from the end of the row of *M. iridioides* in my orchard is a row some twenty feet long of unnamed seedlings of this Oakhurst Hybrid strain. They seem little more discouraged than the *M. iridioides* by the prolonged period in dry soil, but do not bloom as freely as the latter. In fact I have seen only a few blooms this year on those plants at the end of the row and in full sun. Those which receive partial shade from a crab apple tree have bloomed fairly well, though much less freely than those in the border where they are watered.

Between these two groups in the row in my orchard there are two or three feet devoted to what Mrs. Coombs described as *M. iridioides* var. *catenulata*. I am going to follow *Hortus II* and call it *M. catenula*, as in effect the two plants are not very similar, though *Hortus III* may slap my wrist for doing so. This is a much less interesting plant to me than those just described, at least in the site that I have it. It has not flowered this year, but does not appear to be otherwise suffering from the prolonged dry spell. Our last rain was in March, and I write this in mid-September. This is a low growing variety with fan-like foliage and a prostrate habit of growth. I have seen the suggestion made that this plant is best grown in hanging baskets, and from the way mine grows in the open ground, I suspect that the suggestion is a good one. The flowers are somewhat similar to those of *M. iridioides johnsoni* but considerably smaller.

Moraea robinsoniana, the other well known member of the rhizomatous group, I have never attempted to grow. It is the largest of the *Moraea*s, but has the reputation of being difficult, and also quite tender to frost. Its native home is a long way from that of the others, which are from South Africa, as it is native to a small island between

Australia and New Zealand.

Of the cormous *Moraea*s I have grown a small proportion of the much more numerous species.

Moraea polystachya is perhaps my favorite among them, though by no means the most spectacular in bloom. I have seen it stated that this is the most commonly grown species in this country. By holding the corms dormant at 40 degrees they can be brought into bloom at almost any period of the year. By the less laborious method of spotting corms at places where the amount of sun and water differs, in most winters I am seldom without a few dancing violet butterflies at the top of stems some two and a half to three feet tall. The corms break their dormancy at irregular intervals from October through January or even later, and make a shifting spot of color in the border when few other things are in bloom. Of course my system will not work during the winter that we have one of our occasional 'freeze-ups'. In fact I suspect that it is going to break down this winter, but for the opposite reason. Too many of them are showing above ground as I write. But it works quite well with our usual winter here. The stems are slender, with small and inconspicuous leaves. The flowers are violet, about one and a half inches long, and here too the outer petals have an orange-yellow eye in their center. The stems have a number of wiry branches, and while the individual flower does not last long there is quite a long succession of bloom from each corm.

Moraea tristis I grew from South African seed some years ago, and lacking knowledge of its requirements, I planted it in a bed close to a sprinkler, so it got full Summer water. Despite this handicap it stayed with me for four or five years before the last of the corms rotted away. This is a rather inconspicuous little plant, with stems about one foot high. The flowers were of a peculiar brownish mauve for me, but must vary considerably, as I have not seen them described as the same color by any two authors. There is a yellow spot, and rather vague violet markings around it at the base of each outer segment. When given the conditions it likes in well drained and very sandy loam, it should be as tough as well as a quite odd and



CLAUDE HOPE

Moraea glaucopsis

attractive little plant. The flowers, however, do not last very long. New seedlings may flower for me in 1960, and will be better placed.

Moraea ramosa has almost opposite requirements. Its native habitat is along streams, and it likes plenty of water and a very short resting period in Summer. Unfortunately that is a rather difficult matter for me. Its blooming period is in May and June, and I can flower corms the first year without trouble. After that it becomes somewhat of a problem child. Were I more energetic I could dig the corms, and replant them in the border

after a short rest of a month or so. As it is I always seem to forget about them, and they do not enjoy the constant watering during the Summer months. It is such an attractive thing that I have tried it a number of times. The flowers are over two inches across, pure yellow, with a yellow oval surrounded by dark blue at the base of each outer segment. It grows three to four feet high, and has a number of branches, and the effect of a plant in bloom is, at a little distance, very similar to that of a lily of the Martagon type, in full bloom. On closer inspection though the flowers will be

found to have the 'Japanese Iris' form of most of the genus.

The last three of the genus that I have grown are sometimes all lumped together under the term Peacock Iris, or Peacock *Moraea*. The flowers of all of them are very variable in color in the wild, and they hybridize readily, both in the wild and under cultivation. The term 'Peacock Iris' really is applied to *Moraea glaucopsis*, but *M. gigandra* and *M. villosa* equally well deserve the name. All of these I have grown only from corms, and corms from separate sources are seldom identical, owing probably to the before mentioned variability.

A group of corms from Holland grown last Spring included a very superior form of *M. gigandra*, the individual flowers of which I consider among the most beautiful flowers I have ever seen, well rounded, wide petaled, a fine soft lilac blue, with dark blue flakes in the center of the petals, and other symmetric blue markings.

Moraea villosa was almost as good, violet with a blue basal flake with a darker rim around it.

Moraea glaucopsis in the form I had it at that time was somewhat smaller, with narrower petals, giving a somewhat more star-like effect. At the base of the outer petals was a very conspicuous dark blue spot. While it would be my own third choice among the three, it was still a very beautiful and worth-while flower.

Mr. T. T. Barnard in his article on this group in the *Journal of the Royal Horticultural Society* for 1950 gives his experiences with the three over a number of years, and emphasizes the great variability of the species in the wild, as well as the ease of cross fertilization. This group, at least all the members of it that I have seen, cannot be too highly recommended for cool house cultivation. The resemblance to the beautiful spots on a peacock's tail justifies the common name. All of them grow some twelve to eighteen inches tall, and the flowers of all of them are upfacing.

A few of the *Moraeas* are true alpiners. Ray Williams of Watsonville, California,

who specializes in alpiners describes *Moraea tripetala*, with grassy and decumbent foliage, as growing three to four inches high and producing during most of the spring small mauve flowers of typical *Moraea* form, with faint markings of white and yellow. Each flower lasts only one day, and the species has the peculiar habit of blooming every other day. As a result a patch is well in flower one day, and not a flower on it the next, with a unanimity reminiscent of *Moraea iridioides*. Native to mountain screes, it wants full sun and very sharp drainage. My own soil being a rather heavy silty loam, which drains well, but not sharply, I have lacked the ambition to construct a raised bed and try it out.

I am going to close this rather rambling discussion by mentioning a flower, which, while not a *moraea* is a member of the Iridaceae belongs to an entirely different genus. That is *Diplarrhena moraea*. This comes from Australia and Tasmania, rather than from South Africa, and botanists put it closer to *Sisyrinchium* than to *Iris* and *Moraea*, but to the casual eye of the non-botanist the flower looks like a small whitish *Moraea*. Hence I suppose the specific name. It has a short rhizome, upright foliage, and perennial flower stems like the rhizomatous *Moraeas*. These latter tend to droop if not staked. I have had best luck with this one growing it on the edge of a table outdoors in cans. Like *M. cantenulata* I think it might do well in hanging baskets. After some years growth in a so-called 'gallon' can the flower stems will droop as much as three and a half to four feet. It too is a "toughy" as far as drought resistance is concerned. I have not seen nor grown the somewhat larger but otherwise very similar *D. latifolia*.

As in a lot of other genera, the naming of the species seems to be in a state of some confusion. *Moraea glaucopsis* is often referred to as a sub-species of *M. villosa*, and I think that *M. gigandra* has also been so described at times. Perhaps by the time we land the first expedition on Mars the botanists will have all agreed on the names of species—but somehow I rather doubt it.

Snapdragons for Gardens, Greenhouses, and Research

W. J. HANEY¹

The familiar snapdragon that beautifies our gardens and homes has also contributed to our understanding of the fundamentals of genetics and plant physiology. The details known in these areas have value and add interest to the culture of snapdragons on either the amateur or professional level.

Antirrhinum majus of our gardens represents one of approximately one hundred and eighty genera in the SCROPHULARIACEAE, and one of the eleven species listed in Bailey's *Hortus II*, or twenty distinguished in Engler and Prantl.

Out of this wide range of genetic material this species was selected for cultivation before the time when historical records were preserved for our use. Description of different types indicative of prior cultivation, or at least selection, has persisted since 1578. Additional variant types, usually propagated by cutting, added to the utility of the crop until the snapdragon rust, endemic on the west coast of the United States, in 1913 burst out of that environment to invade, first the Eastern United States, and later Europe. This challenge was met in two ways. Propagation shifted from cuttings that carried the disease, to seed that did not. And this stimulated the production of true breeding lines that produced a uniform type. Secondly, Mains, Emsweller and White found and utilized genetic immunity conditioned by a single dominant factor to produce immune races. Recently in California new rust strains have appeared that are capable of infecting plants resistant to the old races.

When, at the turn of the century, Gregor Mendel's original ideas on the mechanism of inheritance became available to scientists, suitable test plants were sought for experimental use. None seemed better adapted by ease of emas-

culatation, pollination, fertility, and annual habit, than the snapdragon. The same advantages are available to amateur and professional breeders today. To emasculate and isolate, it is necessary only to remove the corolla and attached anthers from the unopened flower bud. To pollinate, the anthers of the male plant may be brought into contact with the stigmatic surface of the mature pistil. The large number of flowers per plant make many different crosses practicable, and as many as five hundred seeds are produced by a single pollination. Last, but perhaps most important, the annual habit and fairly small size make the culture of numerous progeny relatively easy and inexpensive.

One of the first investigators to choose the snapdragon as a research subject was Professor E. Baur. He and his colleagues have described and determined the inheritance of over two hundred natural and induced mutant types. In any highly organized system, such as a living organism, most random changes will be detrimental. For this reason few of the variations described by this group appear other than accidentally by new mutation in modern improved snapdragon strains.

Commercial growers, interested in economically valuable variation, have isolated several habit types in true breeding form. Size, being one factor in commercial determination of quality, has been emphasized. The *Majus*, *Maximum*, and *Colossal* strains represent successive steps in this direction. But since snapdragons are important bedding plant subjects, equally important progress has been made in obtaining true lines in each color of half dwarf and dwarf strains. The extreme dwarf is the *Magic Carpet* strain which creeps widely in the horizontal plane but seldom exceeds six inches in height.

At the same time that significant progress was being made in outdoor snapdragons, new lines of different characteristics were isolated for greenhouse use. This was and still is an American devel-

¹Dr. W. J. Haney is an Associate Professor in the Department of Horticulture at Michigan State University, East Lansing, Michigan. His major field of research has been the genetics of several floricultural crops, with a special emphasis on the snapdragon. From these studies he has developed several commercial F_1 varieties for greenhouse forcing.

opment. First, a few clones that would flower early in the spring were isolated, then, gradually, true breeding lines were isolated from these. Evidently different genetic variations were involved in some of the first early blooming isolates because even better adaptation to winter bloom came out of segregations of crosses between lines.

Necessarily there is a physiologic mechanism between the factor that determines a trait and its expression. It is perhaps in this area that we are less informed and can expect most progress in the near future. We know that the ancestral forms of our snapdragons were semi-perennial plants, adapted to a Mediterranean climate of favorable springs and hot summers. Stimuli to bloom were the longer days and warmer temperatures of spring. The same stimuli affect even the most modern winter blooming snapdragons. The genetic modification has been a lowering of the threshold so that short December days and temperatures over fifty degrees are sufficient to trigger the flowering mechanism. It is still true that any strain will bloom earlier and at smaller size under long day-warm temperatures, however, than under short day-cool temperatures.

The early variation is strongly dominant. Hybrids usually bloom as early as the earlier parent and frequently earlier than either. Numerous factors appear to be concerned and no one has yet made genetic sense of the blooming sequence of segregating populations.

Associated with this are a series of factors determining spike length through effects on apical dominance. For show or sale, long spikes are required. Ancestrally wild snapdragons were liable to browsing by goats and other animals. Consequently, no survival advantage accrued to plants producing fewer, longer spikes. Season also affected optimum spike length for survival. Consequently, the wild type, and the genetically dominant type today, produce short spikes on each of many branches and especially short spikes under minimum daylength conditions. This genetic trait is recurrently demonstrated whenever an unwary florist uses garden snapdragon seed for out of season bloom under glass. Magnificently vigorous plants are crowned with insignificant spikes of two to six flowers each.

Understanding of this mechanism can aid a grower to attain the size that is for him optimum. Final size is a function of the size the vegetative plant attained before flower buds were differentiated. Young plants kept vegetative by short day length and cool temperatures rosette, produce basal branches, and stems of large diameter. Such plants will produce long stems and spikes when conditions become favorable for flowering.

In 1947, Robert Kalinas and Frank Frisch at Sykora's Greenhouse, Batavia, Illinois, made a useful demonstration of this principle. With the regular crop in the fall a short section of bench was planted to the hybrid of two late flowering greenhouse snapdragons. These plants continued to rosette while the earlier hybrids bloomed in midwinter. Then, when the longer days and warmth of spring triggered the flowering mechanism, the late hybrid produced stems and spikes ten feet tall that bloomed with the second crop from the genetically earlier hybrids.

While most breeders were still intent on earlier snapdragons F. W. Snyder of Rockwood, Pennsylvania, perceived utility in an opposite course that has since yielded a new race of summer snapdragons adapted to the long days and high temperatures encountered in summer under glass. The Rockwood snapdragons and the summer hybrids bred from them have higher than ordinary thresholds for flower induction. This trait is quite recessive, but like the variations toward earliness, has never been genetically elucidated.

Genetic variation in season or vigor yield fairly continuous variation in segregating populations which makes identification and classification of individual factors or genes difficult. In contrast to this, color inheritance is qualitative, with clearly distinguishable classes and the genetic effect has been identified in the pigment molecules of the flowers. In addition the interactions of the various factors have been identified so that it is possible to specify segregation to identify the genotypes of the parents. The same proportions hold for any part of this total segregation. Back-crosses to the recessive parent yield 1:1 ratios reducing dominance effects to equality but epistatic interactions will be expressed.

Vigor has extreme importance for commercial growers whose profit margin may well be less than the vigor differences between varieties. Experience with inbred lines has often shown a decline of vigor with successive generations of self pollination. It is now a commonplace experience that greater vigor may be had in first generation hybrids than their inbred parents for many crops. In 1928 when the first F_1 snapdragon, Christmas Cheer, was marketed by Windmill Florist of Columbus, Ohio, important news was made for professional growers. Since that time more than a hundred F_1 snapdragons have been marketed and more than ninety per cent of the florist trade has turned to hybrids. Excellent hybrids have been introduced for garden use also.

Measurements of vigor are complicated by the equally dominant inheritance of earliness. Size comparisons of mature spikes are not valid unless they were produced in equal lengths of time and in similar environments.

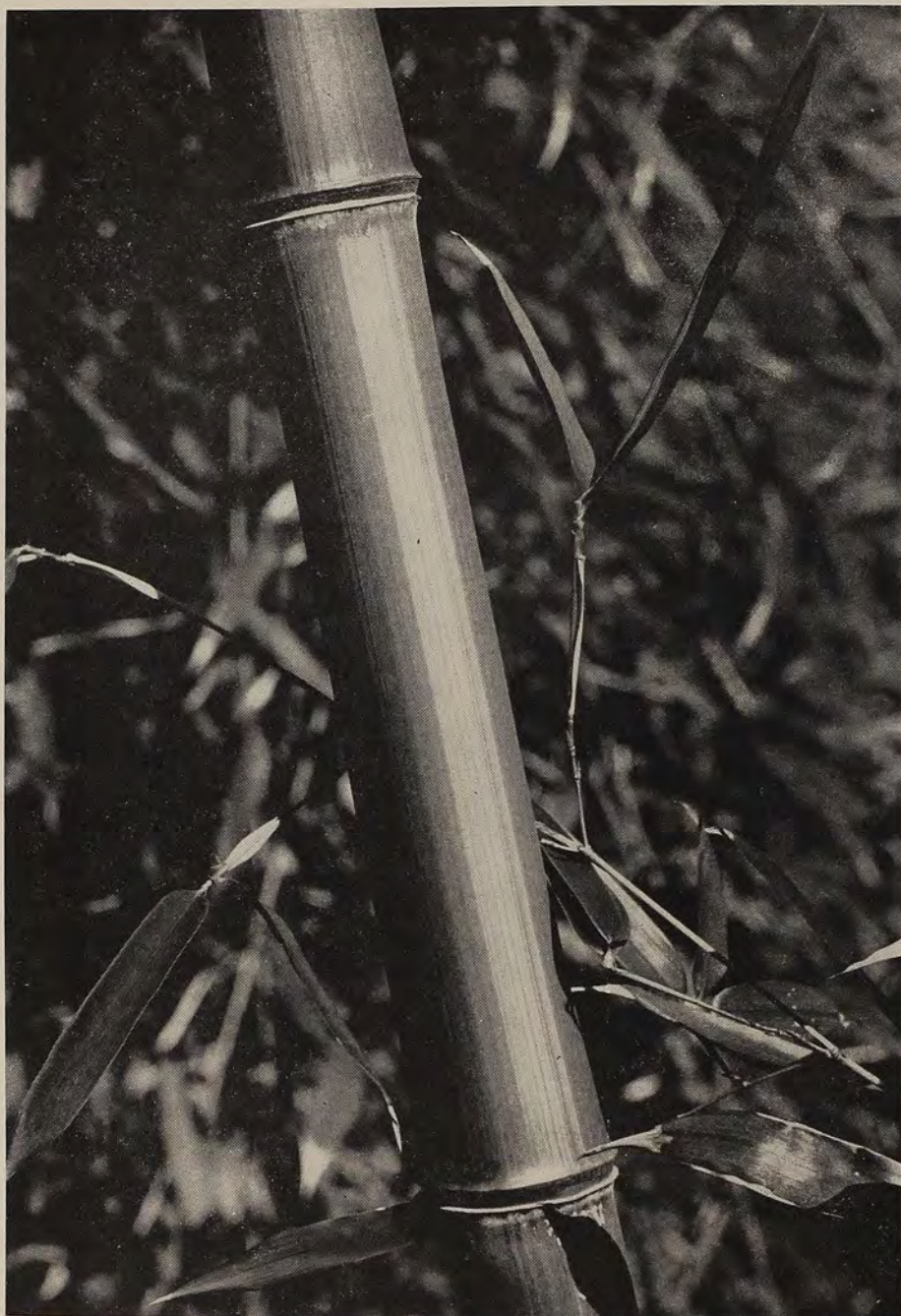
Double flowered mutations have appeared in snapdragon as in many other crops. C. H. Lothrop of Lexington, Massachusetts, has cultivated a series of cutting-propagated sterile clones since the 1920's. Fertile doubles have been originated in Colorado, Pennsylvania, and by the W. Atlee Burpee Company. One of the virtues of the double strains has been the better attachment of corolla although there is variation within the double for this characteristic.

The tendency to shed florets prematurely has long troubled growers and users of snapdragons. C. W. Fischer demonstrated that volatiles produced by

snapdragons induced premature abscission of corollas. Since the early inbred lines of greenhouse snapdragons were originated, attention has been paid to genetic variation in this characteristic. Certain lines were called shatterproof. Study of this variation by exposure of cut stems or flowers to apple emanations or known concentrations of ethylene gas has shown that a series of recessive factors determine tolerance of these conditions. Sufficient exposure will cause abscission of any flowers except certain sterile doubles so the shatterproof designation should be moderated to tolerance. The comparatively low ethylene tolerance of Spartan White has won commercial acceptance particularly in areas where smog affects plants in bud and bloom.

Although ethylene tolerance is desirable for man's uses of snapdragon, it is not advantageous to the reproduction of the plant. Ethylene tolerant snapdragons retain their flowers after pollination and fertilization. Flowers are more liable to Botrytis infection than green tissue and conduct the infection into the developing seed pod and spike. Retention is, however, a necessary first step to improvement of keeping quality.

With all the above listed and much additional variation available, snapdragons present a challenge to all who are interested. If any desirable factors can be combined into a type having new or additional utility then progress of a permanent nature will have been made. And our snapdragons still retain the admirable characteristics that caused them to be chosen by early plant breeders and geneticists.



G. HAMPFLER

Single mature culm of Phyllostachys aureosulcata showing foliage and characteristic lighter yellow panel.

The Yellowgroove Bamboo

W. H. HODGE*

Those temperate bamboos which most closely approach the size (height and diameter of stem) of strictly tropical species belong to the Oriental genus *Phyllostachys*. These are native to China, where since time immemorial their stems (culms) have been important sources of such economic products as paper, building material, handicrafts and food. Of the hundred or more species of this genus known, about one-third have been introduced into North American horticulture. Most of these do best in the southeastern, Gulf and Pacific coast states, but a few (including *Phyllostachys aurea*, *P. aureosulcata*, and *P. nuda*) are considerably hardier than their confrères and will grow satisfactorily on the Atlantic coast as far north as Philadelphia or perhaps even New York City.

Of these hardier species perhaps the most satisfactory is the Yellowgroove Bamboo, *Phyllostachys aureosulcata*, introduced into the United States (as P. I. No. 55713) from Tang-si, Chekiang Province, China, in 1907 by Frank N. Meyer, distinguished plant explorer of the United States Department of Agriculture. Since it was rather widely distributed to collaborators for testing in the mid-western (under the incorrect name *Phyllostachys nevini*) it is well established in a number of locations in this country and may be easier to obtain than some of the other species which have never been widely distributed.

Because they rarely produce the flowers needed for exact identification, most bamboos are generally difficult for all but the botanical specialist to identify. In over fifty years of culture in the United States, *Phyllostachys aureosulcata* has yet to be reported in flower. This bamboo is one of the very few that can be easily recognized, however, even by the average gardener once several of its vegetative

characteristics are known. Both its common name, "yellowgroove," and its specific name, "*aureosulcata*," refer to a characteristic though sometimes obscure, narrow, yellowish, or green-and-yellow striped panel to be seen running the length of the internodes of the otherwise green culms. This colored panel is especially noticeable in spring on the new culms after the sheaths (which cover the developing culms) have fallen; but it may tend to fade out as the culms become older, after two or three years. The internodes of younger culms also reveal a roughness (scabrosity) like the feel of an unshaven beard when fingers are passed lightly upward over the stem. A third characteristic is the occasional occurrence of sinuate or zig-zag sections in a portion of the culms. Such sections are limited to the lowermost nodes of any culm. Although *Phyllostachys aureosulcata* appears to be the only one of the hardier species of the genus to produce such so-called "crookstems," it should be pointed out that this characteristic is also known from other less hardy species of the genus and is especially common in forms of the Giant Timber Bamboo, *Phyllostachys bambusoides*.

The Yellowgroove Bamboo is especially noteworthy because of its proven cold tolerance, though it may well be that *P. nuda*, a species little known in culture, may be even superior in this characteristic. *P. aureosulcata* is usually said to withstand a temperature of zero without serious damage, but there is a fine acre-sized grove of this species near Marshallton (Chester County), Pennsylvania, estimated to be a quarter-century old, which still flourishes after having apparently experienced temperatures as low as fifteen degrees below zero, Fahrenheit. During such cold snaps, the aerial portions (stems and foliage) may well have been killed back to the ground, but the underground portions certainly were untouched. Heavy wet snow can occasionally cause serious damage to established groves by breaking culms and causing

*Dr. Hodge's interest in the hardy bamboos began a decade ago while he was associated with a bamboo program of the U. S. Department of Agriculture. Interest in these plants as ornamentals has continued in his present position at Longwood Gardens, Kennett Square, Pa., where he heads the Department of Education and Research.



W. H. HODGE

Young shoots of the Yellowgroove Bamboo as they appear in early May showing imbricated culm sheaths with characteristic white stripes.



W. H. HODGE

Culm bases of Yellowgroove Bamboo showing occasional "crookstem" condition of this species.

injuries which cause the death of the culms and the leaves on these stems.

Plants of this species, like others in the genus, actively spread from year to year to form eventually thickets or small groves which, in time and under favorable conditions of growth, may come to occupy an area of an acre or more. Thus, an unrestrained planting of this so-called "running" bamboo will need ample room in which to spread. The possibility of such growth must be anticipated by the person interested in planting a bamboo of this type. On the spaciousness of farm or estate such growth is very desirable and should be encouraged, for a mature, well-tended bamboo grove can be a beautiful and unusual horticultural feature. Such groves are especially attractive when established along streams or on the borders of ponds or lakes, provided the soil or site is well-drained.

Generally speaking a species like *P. aureosulcata* is not recommended for smaller suburban properties where it may become invasive, particularly if its spreading proclivities are not appreciated. If the growth potential of this species is understood, however, and certain precautions are taken with respect to selection of a planting site, the Yellowgroove Bamboo can be considered for small suburban lots. The secret is to keep the plant contained within the limits previously determined. In order to produce full-sized culms in grove form, an area at least twenty-five feet across must be allocated for ultimate growth. A planting area surrounded by wide concrete walks or bounded completely by regularly mown lawns will usually serve as suitable barriers. The simple action of keeping a lawn cut will effectively limit the spreading of a grove abutting on such a lawn area.

Most running bamboos produce seed only at rare or infrequent intervals after which the plants may die. These species are invariably propagated by one- to two-foot long sections of the thickened underground stems or rhizomes. These are usually lifted and planted during the dormant season. Clumps of rhizomes together with their aerial shoots (which should be cut back to two or three feet high) may also be dug intact with soil from the margins of established groves. Planting is most successful if done in the

spring a month before new shoots first appear above the ground. In southeastern Pennsylvania new shoots of the Yellowgroove Bamboo usually appear during the first week in May, which means that transplanting of this species in this general area would be best in March and April. There has been good success in moving plants with good balls of earth, however, during their active May growth.

The Yellowgroove Bamboo thrives best on good, well-drained soil. The old grove of the species at Marshallton, Pennsylvania, mentioned above, regularly produces some culms up to one and a half inches in diameter and thirty feet tall, or as large as has been recorded for this species farther south. Bamboos in general need abundant moisture, especially in the first season of establishment. On the other hand, they are not swamp plants and do not thrive where they constantly have wet feet. One might say that the bamboo species typified by the Yellowgroove are woodland grasses and so do their best in partial shade and protection from strong winds. In this respect their habitat demand may be compared to that of azaleas and rhododendrons and it is in such sites that you usually see them best featured in the gardens of Japan.

The growth habits of bamboo differ from most other familiar garden plants. Instead of rather continual activity during most of the growing season, bamboos reduce most of their aerial growth to a brief few weeks in the spring. During this short growing season all new culms of that year make their appearance. The rest of the year the plant is developing new ramifications to its extensively creeping underground rhizome system. The first few years the culms produced from recently set rhizomes or transplanted clumps will be rather diminutive and of small diameter. Only after five or six years will mature maximum-sized stems be produced and then only provided the plants have had abundant space and fertile soil in which to run. Thus, older culms in the grove (with smaller diameter) are easily distinguished from the younger ones (with large diameter).

The young shoots or "bamboo sprouts," which appear in the spring, are cloaked with imbricated sheaths (culm



W. H. HODGE

Portion of an established grove of the Yellowgroove Bamboo at Marshallton, Pennsylvania. Culms are too close and should be thinned.



G. HAMPFLER

Effect of severe snow damage (March 1, 1957) on a grove of Yellowgroove Bamboo at Marshallton, Pennsylvania. Heavy wet snow completely bent down grove resulting in damage to practically all mature culms.

sheaths) which carry morphological details of use to the bamboo taxonomist. For example, the culm sheaths of the Yellowgroove Bamboo are light green with many slender whitish stripes which are characteristic only of this species. Once they appear above ground, the young culms shoot up to their full stature, often increasing as much as a foot or more a day. The full diameter of the new stem will have been reached soon after the shoot has broken ground. Few other plants grow so rapidly. During the springtime period of active growth bamboo shoots look superficially like giant asparagus stems. Like asparagus, they are at first tender and fragile. Later, after full size has been attained, they form their grasslike foliage on short lateral branches. Barring accidents, each culm will live for many years. Though the leaves are evergreen, like most other broadleaved evergreens (e.g., holly), all leaves are replaced each year inconspicuously in the spring with the old leaves dropping off gradually as new ones appear. The mulch formed by this annual leaf-fall is valuable to the good growth of bamboo groves and should not be removed.

At the moment that the young bamboo shoots are just pushing from beneath the ground into the light, they are at a stage when they may be dug and harvested as edible bamboo sprouts. Those of the Yellowgroove Bamboo are not particularly large, but are among those especially recommended for use in homemade Chinese dishes for they are mild and without the bitter taste often found in certain closely related species. The culm sheaths which completely cover the young shoots must be removed and can be taken off as one might husk an ear of

corn. Once done the shoot can be prepared for cooking. The tender central core is generally cut into fine slices which are usually parboiled and then sauteed, scalloped or used in mixed dishes of one kind or another to add unusual texture and flavor.

Besides being edible, culms of the Yellowgroove Bamboo may be used by the home gardener for other utilitarian purposes. Mature culms produce uniform-sized poles or plant stakes which are always useful in various ways in the garden. For maximum strength only culms which have reached three or more years in age should be cut (at soil level and preferably with a hacksaw). Through such annual utilization, a bamboo clump becomes less crowded and far more attractive. As a matter of course bamboo clumps or groves should be judiciously thinned annually. This is basic procedure in the Orient where bamboo groves are appreciated not only for utilitarian purposes but also for their beauty as garden subjects. Such pruning not only favors the well-being of the plant but also makes it possible for the owner to establish informal garden paths within the grove. Only by entering such a grove can one appreciate the words of David Fairchild, famed plant explorer and lover of bamboo, who once said:

"The charm of a bamboo grove lies in the friendly mystery of its shade with the green sunlight flickering through the thin plumes of leaves onto the soft mat of yellow dead leaves below. You wander through such a grove, feeling that you have never seen anything like it before, and the quiet, fairy-like charm of it remains with you long after you have gone away."

A Book or Two

New Illustrated Encyclopedia of Gardening, Unabridged

T. H. Everett, Editor; with contributions from twenty horticulturists and authorities in the United States and Canada. The Greystone Press, 100 Sixth Avenue, New York 13, New York. 1960. 6 volumes, about 3,000 pages. Illustrated. \$51.00. Special AHS Members' Price \$43.35.

Assisted by a corps of persons, distinguished in their several lines, Mr. Everett, of the Staff of the New York Botanical Garden, has prepared an encyclopedia which is immediately distinguished by the emphasis that is laid on gardening, and has succeeded amazingly well. Not only is the text written with clarity and direction toward the gardeners, whether amateur, professional or even beginners, but the texts are supplemented by a great wealth of photographic material that is not only instructive toward identification but instructive in the current 'how-to-do-it' sense.

The illustrations are printed in half tone on the ordinary pages, and while they do not always have all the clarity and brilliance that they might have had on glossier paper, show perfectly well all that is needed. This paper, however, keeps the books from excessive weight. There are many additional sheets of illustrations in color, most of them well above the ordinary standards, though in some cases there seems to have been the usual printing difficulties, chiefly in the red pigments.

The first volume outlines clearly the scope and intent of the work and is to be applauded for it, and congratulated on the success. The last volume contains the "clinical" material, arranged first as a notation, plant by plant of what troubles may be expected, an alarming list, but followed by discussions of the troubles and their presumptive cures or treatments.

The Special Garden Club and Library Edition, each volume measuring about eight by eleven inches and almost two inches thick, is bound in hardwearing library buckram, lettered in gold and boxed. The six volumes contain over 3,000 illustrations, 600 in full color, and have over 16,000 subjects and bold-face subdivisions.

For the gardener who is alarmed by the technical appearances of encyclopedias that are schemed from the taxonomic point of view, this set will be more than welcomed.

Desert Plants—Cacti and Succulents in the wild and in cultivation

Oliver and Margaret Leese. W. H. and L. Collingridge, Limited, London, England; distributed by Transatlantic Arts, Incorporated,

Hollywood By The Sea, Florida. 1959. 220 pages. Illustrated. \$7.50. (Library).

Desert Plants describes the fascination of the cacti and succulent plants as they are found in their native habitats, in America, in Africa, or as found under forest or other growing conditions throughout the world. Travelers will find the chapter on the "Famous Succulent Gardens of the World" of interest. Even if their own garden interests do not include these plants, when traveling a visit to such places as the Huntington Gardens in California, the Royal Botanic Gardens in Kew, the Jardin Exotique, Worcester, South Africa or others in Italy, Sicily or Spain should be included on the itinerary. A second portion of the book is devoted to the care and culture of this group of plants. The authors have had much experience with the growing and selling of these kinds of plants and give very practical information as to their culture. The section on the "Selection of Cacti and Succulents" gives a brief description of each genus, and the important species of horticultural interest.

C. B. L.

Decorative Trees and Shrubs

Hans Schwarzenbach. (Text by Hans Zaugg and Hans Coaz, translated from *Unsere Gartenpflanzen* by Herbert L. Edlin). The Viking Press, Incorporated, 625 Madison Avenue, New York 22, New York. 1960. No pagination. 60 colored plates. \$20.00. (Library).

This is essentially a picture book, and the pictures with the notes on their reproduction are more than interesting. The drawings were made in line, and the color added by a lithographic process. The drawings themselves, are decorative and so arranged on the pages; they are accurate in detail, and charming rather than factual, in colorations, but they are not all done at the same scale so that the reader must look to the very brief notes on the facing pages for any data. These notes are so very scanty that no one will turn to this book for cultural information, but only to seek for a reminder of what may be the one striking tree or shrub he may want for his small garden space. This last is a point emphasized.

In spite of this, there are a few inclusions, such as the common tulip tree, Liriodendron, or the sweet gum, Liquidambar, that are anything but small, and are notoriously greedy so that a small garden might be ravaged by the voracious root system. Many of the choices would certainly not be those of the reviewer nor of any garden friends with whom he might consult. This might happen in any group selected by any one, but the group as a whole has a very European flavor in our opinion.

(Books available for loan to the Membership are designated: (Library). Those not so designated are in private collections and are not available for loan. Books available for sale to the Membership are designated with the special reduced price and are subject to the usual change of price without notice. Orders must be sent through the American Horticultural Society accompanied by the proper payment. Please allow two to three weeks for delivery. Those not designated for sale to the Membership at reduced prices can be purchased through the Society, however, at the retail prices given. In these instances the full profit is received by the Society to be used for increased services and benefits of the Membership.)

How to Grow House Plants

Millicent E. Selsam. William Morrow and Company, 425 Fourth Avenue, New York 16, New York, 1960. 96 pages. Illustrated (by Kathleen Elgin). \$2.50. (Library).

The brief but lucid explanation of plant physiology in the first chapter is evidence of the author's understanding of plants and their requirements. The book is elementary in content and the experienced house plant grower may consider it too much a primer. The author has made it a completely practical manual by suggesting the use of only very simple tools and equipment and has suggested plants for all types of home conditions. She has skillfully avoided the use of many technical and scientific terms in the text but has included at the end a most helpful list of possible house plants with both their common and scientific names and concise statements of their cultural requirements. Techniques and plant forms are clearly illustrated with well-executed drawings.

The book can be most helpful to the individual who wishes to grow one or a few house plants under average home conditions as well as to the person who wishes to pursue house plants as a hobby.

VIOLET K. THOMAS

Budget Landscaping

Carlton B. Lees. Holt, Rinehart and Winston, Incorporated (Formerly Henry Holt and Company), 383 Madison Avenue, New York 17, New York, 1960. 152 pages. Illustrated. \$3.95. (Library).

This is not a large or fat book, and it is not filled with glowing pictures of modern gardens of the kind that require holding in several directions to make sure which side is "up." Instead it strikes this reviewer as a modest and singularly attractive discussion of exactly what its title suggests—a down-to-earth analysis of the landscape problems of an average homeowner, so presented that he will readily recognize them; will come to understand them, and no doubt will be led to resolve many of them for himself.

The title stems from a class of the same name given for several years at Kingwood Center, Mansfield, Ohio, before the author became Director of the Pennsylvania Horticultural Society. Such subject headings as: The Front Yard, The Back Yard, The Dooryard Revived, Logic in a Small Lot, Split-Level Problem, A 1900 House Brought Down to Earth and Up to Date, Out of the Woods, and Overcoming the Bulldozer, doubtlessly echo the Kingwood problems, and they are certain to echo the similar ones of suburban gardeners the country over. Other subjects are reviewed before the reader is led by non-frightening stages to analyze and to plan his garden on paper.

Helpful to the last, the book includes a reference listing for those who would go further in terms of more elaborate planning or in selection of a wider range of plants.

H. T. S.

Palms and Cycads

Their Culture in Southern California as Observed Chiefly in the Huntington Botanical Gardens

William Hertrich. Henry E. Huntington Library and Art Gallery, San Marino, California, 1960 (Second Printing). 142 pages. Illustrated. \$5.00. (Library).

Interest in growing both palms and cycads has expanded with astonishing rapidity in recent years, which very likely accounts at least in part for this second printing of Mr. Hertrich's book. Chiefly, however, the demand for the new edition has arisen from the excellence of Mr. Hertrich's presentation of his subject—the culture of palms and cycads. The author does not go beyond his own firsthand experience with these plants, but his familiarity with them goes back to the very beginnings of the Huntington Gardens over half a century ago. This fact lends authority to what he says, for few men indeed have lived in daily association with the same palms and cycads over so great a span of years. Although most of these plants live a long time, centuries even, some of the palms planted by Mr. Hertrich as diminutive juveniles have long since reached mighty proportions in maturity, have passed it and are now declining, seemingly, from old age. In this connection, Mr. Hertrich himself has wondered at times if the curse of smog might not have been a contributing factor to the decline. The smog had not yet been invented when the palms were still young and vigorous.

The location of the Huntington Gardens (of which Mr. Hertrich first was Head Gardener, then Superintendent, then Curator, and now at 82, Curator Emeritus) is at San Marino in the eastern part of Los Angeles, south of Pasadena and nearly thirty miles from the moderating influence of the immediate Pacific littoral. Outbreaks of cold occur more frequently and with greater severity in San Marino than in the areas near the ocean. Hence the winter temperatures are often critical for many kinds of palms. Those now cultivated have been proved tolerant of the winter climate, or more accurately, tolerant enough to withstand it. Many others were grown at one time or another before finally being killed by freezes of varying severity, and these were eliminated as garden subjects thereafter. The tenderer cycads are removed indoors in winter, but not so the palms.

We have in this account a record extending over several decades of those palms hardy enough to endure the cool winters and the occasional hard freezes at San Marino, plus a further record of those other palms tried and found not adaptable to the climate. The author stresses in his subtitle that he is dealing with culture in southern California, which of course significantly includes the consideration of winter temperatures in that region. In this respect the value of the book is certainly not confined to southern Californians with their special "Mediterranean climate." Though not exactly a yardstick, it should be of good use to everyone working outdoors with palms anywhere in the continental United States, for, as thousands who have spent a frozen vacation in Miami can testify, Florida is not in the tropics despite all the gaudy literature. Some of the tenderer

palms are lost at times to cold attacks west of Miami and also south of it, and still others cannot be grown anywhere on the mainland. Every last one of us who tries to grow many tropicals outside of the tropics is concerned to greater or lesser extent with the possibility of damage from cold. The threat is not so acute in Southern Florida as in parts of southern California, but, because the threat is there, the gardener should have practical knowledge of the cold tolerances of palms. He can get them from Mr. Hertrich's book. It provides, if not precise meteorological observations, more than mere clues to the hardiness of many kinds of palms. The gardener in Orlando, New Orleans, Brownsville, or Santa Barbara—all different climates but all subject to outbreaks of cold—can relate his conditions to those obtaining at the Huntington Gardens and draw a sensible conclusion about the cold tolerance of each palm discussed in the Hertrich book.

The nomenclature applied to the palms in this work is not quite up to the minute in every case, but manifestly it was carefully applied when first set down, in 1951, and is still essentially correct and reliable. The descriptions of the palms grown, and any comments, are made with care and intelligent restraint. The restraint is commendable in dealing with a plant family in which not all the genera and species are yet thoroughly understood botanically.

Evidently the author is a modest man and not given to making assertions that might seem a mite wide of the mark. His matter is lucid and the many photographic illustrations good. Though the palms included are only the hardier kinds, such palms are grown in the tropics as well as in subtropical temperate zones, and hence it would be unfortunate if the implication that the work is for southern California alone were to be believed. Though not big or pretentious it is a first-rate book in its field, and an admirable one.

DENT SMITH

Treasures of the Garden

Translated and adapted from *Belles Fleurs de nos Jardins* by Anthony J. Huxley. Hanover House, Doubleday and Company, Incorporated, 575 Madison Avenue, New York 22, New York.* 1959. 96 pages. Illustrated. \$4.95. (Library).

*Printed in Italy.

Mr. Huxley, in his introduction, says of this work. "It does not instruct; it aims to please." This is accomplished through a philosophical approach to the science of horticulture and some interesting plant histories combined with superb photography both in color and black-and-white. While somewhat modified in translation, the text is indicative of the poetic feeling of the French for the phenomena of nature.

Many of the close-up photographs, particularly those of flowers in cross-section, are highly instructive in spite of the author's purpose to the contrary.

VIOLET K. THOMAS

Trees and Shrubs—Where to Buy Them

Prepared by Franz Eitel; Guest Editor, Henry Teuscher. Brooklyn Botanic Garden, Brooklyn 25, New York. 64 pages, 1960, being a special handbook of Volume 16, No. 1. Illustrated. \$1.00.

Everyone who knows the handbooks printed from the Garden will welcome this one, and every one who has had experience in hunting for plant sources, will welcome any additional listings.

The scheme used is not unlike that of other similar publications, but the organization is more like that of a selective bibliography, with groupings of the materials in sections, dwarf conifers, evergreen trees, dwarf shrubs, flowering trees and shrubs, trees and shrubs for foliage and fruit, list of nurseries.

As there was no intent of making the lists complete, no one can argue about that and although there is no statement about the area to be served, and zone notations are included, the areas that need help most will not find much.

There are a few entries, which alas, do not include any source, whether this was for lack of material in the nurseries listed or not, one can only guess. The reviewer, who has several hobbies, looked for his sources and did not find them. There are a few entries that may be open to some discussion, but that would be true in any publication, from any source, by any hand!

Personally, the reviewer, who is an opinionated old hand, regrets that he has to look through all the separate sections to find all of one genus, but that is a minor gripe for a good contribution.

B. Y. M. Pass Christian

The Iris

N. Leslie Cave, St. Martin's Press, Incorporated, 175 Fifth Avenue, New York 10, New York. 1959. (Revised Edition). 249 pages. Illustrated. \$7.50. (Library).

A well written complete book on the genus *Iris*. It considers not only the tall bearded types that are well known but also the other rhizomatous kinds and the bulbous types. The author writes of these many kinds giving information on their culture and use as garden plants. He gives a suggested list of varieties to grow in Great Britain. Several chapters consider the less widely grown and less well known species and their varieties. Pests and their control, the showing of iris and indoor use of the flowers are a part of the book.

The breeder of iris will find much of interest as several chapters are devoted to the hybridization and selection of seedlings. A list of the chromosome number of certain varieties is included as well as the family trees of 4 present day varieties showing the parentage for 3 or 4 generations.

A table of the species is most helpful in giving a quick summary of their relationship and cultural requirements. Three maps show the approximate distribution of the species in Europe, Asia and North America.

CONRAD B. LINK

Diseases and Pests of Ornamental Plants

Pascal P. Pirone, Bernard O. Dodge, and Harold W. Rickett. The Ronald Press Company, 15 East 26th Street, New York 10, New York. 1960 (Third Edition). 775 pages. Illustrated. \$10.00. (Library).

Dr. Pirone, of the New York Botanical Garden, with the assistance of Dr. Rickett, has assumed chief responsibility for the many revisions which bring up to date this third edition of one of our most valuable standard references to pest and disease problems of garden plants, both herbaceous and woody.

Four introductory chapters which provide a wealth of understandable information on the nature of diseases and pests and means of their control, leave Part II, or most of the book, for discussion of these problems in relation to the affected plants alphabetically listed by name. The treatment is semi-popular and the easy explanation combined with common as well as scientific names make it of maximum help to both gardeners and specialists in such matters.

While one may wonder how rhododendrons can continue to exist when they seem to be attacked by fourteen major diseases, seventeen pests, and twenty-five or more minor ailments, the discussion of these troubles provides an example of the detailed coverage per genus.

The plant-finding system is simple and the individual pests and diseases are effectively cross-indexed.

H. T. S.

The Illustrated Reference on Cacti and Other Succulents, Volume Two

Edgar Lamb. Blandford Press, Limited, 16 West Central Street, London, W.C. 1, England; distributed by Pitman Publishing Corporation, 2 West 45th Street, New York 36, New York. 1959. 580 pages. Illustrated. \$12.50. (Library).

This volume is a supplement to the first one in 1955 covering other species and genera not yet studied at that time. Mr. Lamb has done a wonderful job with his concise notes on each plant and his unusually good photography. He has included a black and white photograph for nearly every description plus several good color plates.

One paragraph in the preface (Vol. 1) covers the intent of the book very well: "The information in this book is intended to be non-technical, readily understood by the average collector who enjoys the hobby for pleasure, yet wishes to know a little more on the subject." Mr. Lamb's information would also be helpful to the professional grower since he has studied and kept notes on these types of plants for over 25 years.

It would be advisable to get both volumes as there are many references made to plants in the first volume.

PAUL W. SHAW

Floral Decorations for your Church

Fern Bowers Hunt. Chilton Company, Book Division, 56th and Chestnut Streets, Philadelphia 39, Pennsylvania. 1960. 223 pages. Illustrated. \$6.95. (Library).

The title of this volume is slightly misleading. The book contains 20 pictures of flower arrangements on altars in various churches. The photographs, however, are taken from quite a distance (I believe to include some of the architecture of the altar and church) which pictures the arrangements in most cases so distant as to render them less valuable had the photographs been taken closer to the subject matter of the book. A few of these are in color. In addition there are about six arrangements in black and white described as appropriate for church decoration.

The vast and interesting subject of church architecture is briefly touched upon in 15 pages; four of these pages have photographs.

The various periods in flower arrangement are very briefly discussed, but not documented.

Elements and principles of design are covered but not always related to the type of designs recommended for church arrangements. Types of plant materials, with an eye toward arrangements, are discussed and listed (common names) and includes all types of materials not necessarily materials most suitable for arrangements for the altar or other parts of the place of worship. Containers and accessories are given a little space. No photographs.

A scattering of related and unrelated subjects are discussed, such as Christmas decorations for home and church, arrangements for church and other social affairs, a few corsages for weddings, one wedding bouquet, suggestions for teaching children church decorations, special feast days of the church.

An Appendix lists materials needed for The Work Shop. Also a list of Symbolisms of Plant Materials and Symbolism of Objects and other Attributes in Church Decorations—Examples: "Darkness—the devil; Ear—Word of Christ; Heart—Guides the mind for good."

There is a color connotation for Christian Churches, Christmas Customs of Other Lands (in very brief paragraphs), a list of plant materials with common names only, a Liturgical Church Calendar, and a Flower Church Calendar make up the last three pages of the book.

VICTORIA K. ANGEL

Useful Trees and Shrubs

Florence Bell Robinson. The Garrard Press, Publishers, 510 North Hickory Street, Champaign, Illinois. 1960. 500, more or less, 4 x 6 inch cards. \$6.00. (Library).

Here is a book that is not a book! Instead it is a box full of cards, for ready reference, prepared by Miss Florence B. Robinson, Prof. Emerita of the University of Illinois, in the Department of Landscape Architecture.

The first four white cards, represent title page and preface. The preface is carefully written and states exactly what is included and what methods were used. Reference bibliography.

The cards that follow are on colored stock: canary for deciduous shrubs, white for deciduous trees, green for conifers, salmon for broad leaved evergreens, and cherry for vines. The whole set is devised for students, and particularly for those in the mid-central states. Hardiness is defined for the area considered, and longevity, as well. Space is left for the student owner to enter drawings.

Some of the species included seemed astonishing, but when the full card was read, the necessary provisos were all there.

This is a colossal piece of work, and for persons who like to use cards, is an enormous job done in advance. Since the reverse of each card is blank, the owner can add his or her own ideas pro and con.

Palms of the World

James C. McCurrach. Harper and Brothers, 49 East 33rd Street, New York 16, New York. 1960. 290 pages. Illustrated. \$17.50. (Library).

This is a book that is somewhat difficult to classify without appearing to be unreasonably critical. To say that it is a picture book is to tell only part of the story and the pictures for the most part are superb; to say that it is a compilation of available data sounds condescending, and that is wrong.

The author is convinced that palms are the most beautiful plants in the world, and he set himself the task of assembling the then available data on their names, habitats, culture as far as available, including some data on seed germination, and their pictures. He states with commendable frankness that some things included are open to revision when the taxonomists have finished their labors. The only thing that is not included is a discussion of what constitutes their claims to beauty, a field in which any advocate trembles for fear he will come short of what he hopes to offer as convincing.

Many of the genera, which are listed in alphabetical order, are not discussed or illustrated, but included for the record. Many genera that are of most dubious future value to any place in continental United States are there, too. Some of the suggestions are open to doubt in reference to possible introductions of value, but no one would cavil over that, as again and again unlikely things have succeeded.

As a provisional study, the book is priceless; what may follow remains to be seen.

B. Y. M.

The Soil and Its Fertility

H. Teuscher and R. Adler, with the collaboration of Jerome P. Seaton. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, New York. 1960. 446 pages. \$12.00. (Library).

This book deals with widely diverse subject matter. It is apparently intended for the home

gardener, the lay reader, and the technologist who wishes to review subjects with which he is more or less familiar. The 47 chapters deal with soils, fertilizers, plant physiology, and related topics.

The authors state that they have endeavored to develop the text in logical sequence, from the simple to the complex. The book is written at such a level as to interest a large number of gardeners and other readers who want a better understanding of nature around them. It is difficult to discuss topics such as "properties of mineral soil colloids," "organic contents of the soil," and "acidity and alkalinity of the soil" without technical terms and a somewhat technical development of the essential information. The presentation is well made, however, and should be intelligible to many readers.

Several errors appear. For example, the authors write, "Imported European peat moss usually is neutral in reaction, whereas American, and especially Canadian, peat mosses usually are more or less acid." As a matter of fact, the Northern European peat mosses available in the United States, like the Canadian, are usually more strongly acidic than those produced in this country.

In the discussion of soil groups one wonders why such important groups as Prairie, or Brunzem, and the Gray Brown Podzolic great groups are not mentioned.

A number of chapters, such as "The Story of Iron," "The Story of Carbon," and "The Story of Potassium" are excellent.

M. S. ANDERSON

The Care and Cultivation of Indoor Plants

Violet Stevenson. Philosophical Library, 15 East Fortieth Street, New York 16, New York. 1958. 159 pages. Illustrated. \$4.75. (Library).

This book on house plants is different. The author writes in an informal manner about different kinds and their use in the home as decorative items. She writes interestingly about her plants, their care and experiences with them. She tells of other persons and how they grow house plants under their conditions in England. It is a pleasant book to read but not one to turn to for specific information on the culture or care of a specific kind.

C. B. L.

Grow Cacti. A Practical Handbook

C (yril) Marsden. Saint Martin's Press, Incorporated, 175 Fifth Avenue, New York 10, New York. 1958 (Second Edition, Enlarged). 178 pages. Illustrated. \$4.50. (Library).

This is the second edition of a practical type of handbook on the growing of Cacti. The author begins with a simple understandable discussion of the family Cactaceae, the features of cacti and their geographical distribution. Following this, the culture of the plant is consid-

ered beginning with where they may be grown, as indoors, outdoors, or in a greenhouse. Propagation, soils and fertilizers and pest control are considered in order. A separate chapter is included on the grafting of cacti. This is an interesting practice and helpful information is given on the techniques to use and a chart suggesting graft combinations of different genera and the type of graft to use. While the book was written for conditions in England they are adaptable to those found in the United States.

C. B. L.

The Camellia

Beryl Leslie Urquhart, Editor. The Leslie Urquhart Press, Limited, Plaw Hatch Hall, Sharpthorne, East Grinstead, Sussex, England. Volume II. 1960. 78 (Unnumbered) pages. 16 plates. \$16.50.

Volume II of *The Camellia* represents Editor Urquhart's third major "Flower Book" contribution to the revival of the art of botanical illustrations in the classical fashion of the days of Redouté. It is the second installment in the proposed series of camellia monographs to be released at regular intervals; the first of the proposed series on the rhododendron appeared in 1958.

The Camellia, Volume I, was released in 1956. It contained twenty life-size color plates: 18 of *Camellia japonica* clones, 1 of *Camellia* × *williamsi* 'J. C. Williams,' and 1 of *Camellia sinensis*. Three of the plates were produced from the original paintings of Raymond Booth and seventeen from those of Paul Jones. (Reviewed in the April 1958 issue of this Magazine.)

The Camellia, Volume II, just released, continues with Plate XXI and contains sixteen plates: 6 plates of *Camellia reticulata* (forma *reticulata* and clones: Robert Fortune, Liuyehyinhung, Tzepao, Tayinhung, and Shihtzetou); 1 of *Camellia* × *williamsi* 'Donation'; and 9 of *Camellia japonica* (clones: Lanarth, Polar Bear, Mrs. D. W. Davis, Dian Hartman, Guest of Honor, Saudade de Martins Branco, Lady Vansittart, Mathotiana Alba, and Adelina Patti). The original paintings of *Camellia reticulata* 'Robert Fortune' and *Camellia japonica* 'Saudade de Martins Branco' were executed by Raymond Booth while the remaining fourteen were done by Paul Jones, both outstanding botanical artists and commissioned for the camellia monographs. The volume is of particular importance as it features the first fine artist's paintings of the "Yunnan Reticulatas," which apparently were being grown by gardeners in China before the Norman conquest of Britain and 500 years be-

fore the discovery of America! The origin and introduction of these to western horticulture is fully discussed in the introduction and in the botanical and historical notes which accompany each plate.

The life-size, exquisitely reproduced original paintings in both volumes are in full facsimile color, having been reproduced in 8 color litho-offset on specially hand-made paper of the finest wood-free cartridge. Mr. K. G. Lohse, Frankfurt am Main, Germany, who is responsible for making the engravings for both volumes and overseeing their printing, developed a process in producing the printing for the last volume, of adding an application of lacquer in the finished product—giving an added depth to the brilliance of color and a gorgeous life-like sheen to the foliage and petal textures. The format, size, binding, etc., of both volumes are the same. Volume I has an introductory text of 36 pages; Volume 2, 24. The botanical and historical text for each plate consumes the right hand page of a sheet while the color plate itself has the next right hand page; both left hand pages being blank; the whole plate and descriptions taking four pages. Each volume measures a generous 18 by 13 inches and is bound in decorative boards with linen covers.

The Rhododendron, Volume I, was released in 1958 and was produced from the original paintings executed in life size by Carlos Von Riefel of Vienna, one of the leading botanical painters of the world, who was commissioned for the work. Most of the specimens illustrated were painted in H. M. Queen Elizabeth's famous woodland gardens in Windsor Great Park under the personal supervision of the Chief Ranger, Sir Eric Savill, who gave Baron Riefel a room in one of the administrative buildings for use as a studio. The text includes botanical and ecological commentaries on each of the plates; an historical survey of the introduction of rhododendrons into cultivation from Sir Joseph Hooker's Himalayan expedition in 1849-1850, the discoveries of the French missionary-collectors in the late 19th century and the collections of Wilson, Forrest and Kingdon-Ward to the work of other botanical explorers of the present generation. Included also is a hitherto unpublished article by the late Frank Kingdon-Ward on the search for new species, written for this book shortly before his death in April, 1958. This volume measures sixteen by twelve inches, has eighteen color plates reproduced in 8-color litho-offset and bound in linen.

Additional volumes are planned for both the camellias and the rhododendrons.

The three volumes are priced at \$16.50 each, postpaid. Unbound plates from each volume (the same number as is in the bound copies) are available for \$12.00 a set, postpaid.

JOHN MARSHALL



G. HAMPFLER

Hoya lacunosa with single flower cluster (below) and a flowering spur (above, right).

The Gardeners' Pocketbook

Two Unusual Hoyas

The species of *Hoya* are tropical climbing relatives of the common milkweeds in the family ASCLEPIADACEAE. Perhaps a hundred or more are native to the Old World tropics ranging from southeastern Asia to Australia. Of these only a few are cultivated, the best known being the common Wax-plant, *Hoya carnososa*, an old favorite of the window garden. Two species, little known in horticulture, have recently been introduced into the conservatory collection at Longwood Gardens. They should be of interest to the plant connoisseur. One of these, *Hoya lacunosa*, is attractive both in leaf and flower; the other, *Hoya imbricata*, is mainly "a curiosity plant," interesting because of the unusual form of its paired leaves.

Hoya lacunosa, a native of Indonesia, appears to have first received conservatory culture at Kew over a century ago when it served as the basis of an illustration (t. 4826) in *Curtis's Botanical Magazine* under the common name "Furrowed Hoya." The Longwood plants originated from cuttings collected by the writer in 1958 at the Botanic Garden, Singapore. In habit and foliage this woody climber is much prettier than the familiar Wax-Plant which, however, has perhaps more striking flowers. Those of *Hoya lacunosa* are none-the-less attractive, the umbels having greenish-yellow petals whose inner surfaces sport a corona of velvety hairs. When first open the flowers are delicately fragrant. A nice characteristic of this species is that it flowers rather continuously, at least under our moist, warm conservatory conditions. As in the common Wax-Plant, flower clusters are produced successively at intervals from the tips of the old inflorescence stalks or spurs, so care should be taken not to cut off or injure these structures. The culture of this species is similar to that of *Hoya carnososa*. Like most hoyas, the species is best propagated by cuttings or layers. Our specimens thrive trained on two-foot-long "totems" made of tree-fern trunk.

Hoya imbricata Decaisne of the East Indies and southeastern Asia, is a recent (1959) plant introduction of the U. S. Department of Agriculture (P.I. 257019) from the Philippines where it was originally described from mountain forests on the island of "Calawan" (? Palawan). Apparently this is the first time that this strange Hoya has been cultivated in this country. It is grown in some gardens in the Old World tropics for I have seen it at the Botanic Garden at Bogor, Indonesia (plants originally having been collected in Amboina) and at Bangkok, Thailand, where living specimens of this species, collected in the wild, are regularly offered for sale along with other native plants in the outdoor flower markets near the center of the city.

As stated above, *Hoya imbricata* is strictly a plant curiosity of interest more for the botanical garden than for the individual collector. The flowers of this species are tiny and of no horticultural interest. On the other hand the mature leaves are quite unusual being appressed tightly to the substrate looking for all the world like the opened shells of some large green marine bivalve. The leaves are more or less flat and separate in youth but the pairs gradually become closely imbricate assuming their convex form at maturity. This form is apparently associated with the formation of adventitious holding and feeding roots at the nodes beneath the leaves. The latter serve as protective shields for these roots against dessication or injury and also permit the accumulation of detritus which acts as soil. One might say that these leaves are evolving towards the kind of modification represented by the curious leaf pouches of the well-known *Dischidia rafflesiana* (a close relative in the same family) whose leaf pairs have become completely fused.

Hoya imbricata is easily propagated. It thrives best under warm humid conditions and at Longwood it is being successfully grown on an artificial pole, filled with sphagnum and osmunda fibre, which can be kept reasonably moist.—W. H. HODGE, *Longwood Gardens, Kennett Square, Pennsylvania.*



G. HAMPFLER

Hoya imbricata growing on an artificial pole and showing curious older leaf-pairs.

***Nymphaea* 'Bob Trickett'**

This attractive hybrid tropical water-lily was produced at the Missouri Botanical Garden in 1948 and resulted from a cross made by the writer of *Nymphaea stellata* var. *coerulea* × *N.* 'Mrs. Edwards Whitaker.' A day blooming hybrid, it is an improved 'Mrs. Whitaker' with flowers much more strongly supported than in the parent. The pale blue flowers are also more cup shaped and carry more petals and stamens. 'Bob Trickett' may also be distinguished by its green buds, circular leaves, which are green above and red with green venation below. The hybrid has excellent growth response and is a good propagator. The plant honors Mr. Bob Trickett of London, England.

A more detailed description follows:—flowers 10-14 inches across; bud ovoid, green; peduncle green; sepals four, about 5½ inches long and 1½ inches wide, ovate, hooded at the apex, green on the outside, pale Campanula Blue within, flushed with pink; petals 35-40, Campanula Blue merging into pale yellow

towards the base, outermost row about 5½ inches long and 1¼ inches wide, hooded at the apex; peduncle Copper Brown; stamens 230-235, Light Cadmium Yellow tipped with pale Campanula Blue; carpels 30-35, Cadmium Yellow. Leaves suborbicular, up to 14 inches long, and 13 inches wide, margins undulated, light green above, red with green veins beneath; lobes overlapping, with age becoming vertical, young leaves sparsely spotted red; petioles Copper Brown.—GEORGE H. PRING, *Missouri Botanical Garden, St. Louis, Missouri.*

My Experience With *Gloriosa*

Central Kentucky has such a long growing season that when I moved there it seemed worth while to try *gloriosa* in the garden. As I understand the literature then available the tubers should live over winter outdoors. I planted a half dozen tubers of *G. rothschildiana*

Nymphaea 'Bob Trickett'

LAMPFLER



with that in mind. They did send up growth each spring for several years but never attained a height of more than a few inches and never bloomed. When they finally disappeared I wrote gloriosa off as not worth bothering with.

Years later I saw the vine blooming beautifully in Florida and in southern Georgia, and decided to try it again. Not in my own garden because I do not stay home enough to care for anything that requires winter protection. Luckily I have a neighbor who does stay home and who can grow almost anything. She agreed to try gloriosa in a container that could be kept outdoors during the growing season and in her dirt floored cellar during the winter. I ordered one tuber of *G. rothschildiana* for her. It was half gone with dry rot when it arrived. Its replacement came too late to make more than token growth before being taken indoors. The next spring I ordered a second tuber and a packet of mixed gloriosa seed. She planted the second tuber in the same container as the first. Both made a few inches of growth that summer. I planted the few seeds of the packet in a shallow tin can kept on a kitchen window sill with an eastern exposure. Germination was surprisingly good and by fall I had a half dozen healthy seedling plants. I turned the can over to my neighbor who kept it with her house plants over winter. Eventually she established both tubers and seedlings in a wooden box that she could take to the cellar over winter. During the growing season she kept it under the south edge of her grape arbor—a structure with the advantages of a lath house plus the bonus of an annual crop of grapes. Five years after the first tuber was planted there were two flowers but there was no way of telling by that time whether they were from the first tuber or the second. Last year, the sixth, there were twenty-five flowers and two of the enchanting gloriosa seedpods. The seedlings varied somewhat in color and form, but bloomed about as freely as tubers. If the experience proved anything it is that the impatient might well think twice before planting gloriosa. Also that the gardener does not necessarily lose much by starting with seed instead of tubers.—MAUD R. JACOBS, *South Carrollton, Kentucky.*

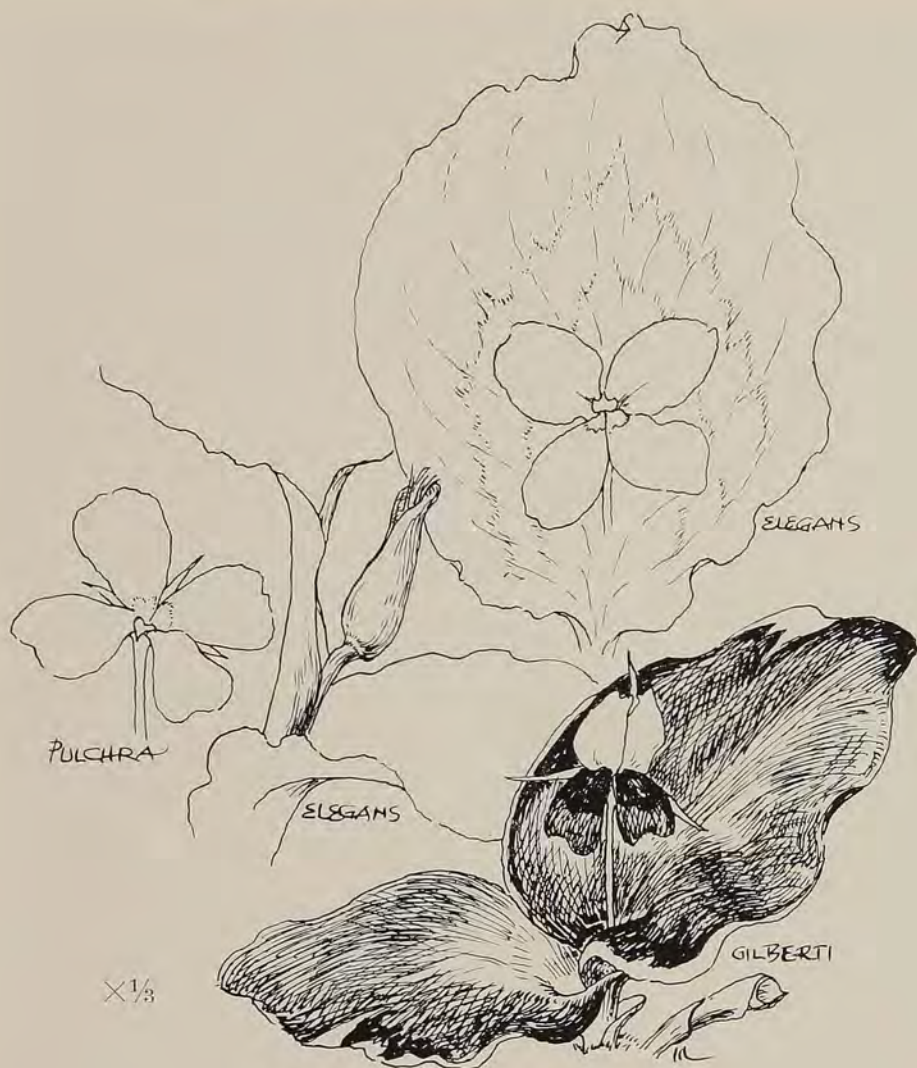
Kaempferia, Again

When the opportunity arose to buy three more species of this member of the Ginger Family, curiosity determined the purchase. Since all are presumably tropical, the curious roots, like strange rhizomes, were all potted and started under glass but with no heat.

Leaves first appeared on *Kaempferia gilberti* and the plants had the appearance of a small *Hosta* Thomas Hogg, with deep green blades edged with white, several to each growing point. In time the flowers appeared from the center of the leaf group, and on a very small scale resembled those of *K. rotunda*, with the upper segments pure white and the lower deep purple marked with a darker purple. As growth has continued, new leaf groups have developed, so presumably, the rootstock or rhizome is spreading underground, but it is too soon to know if each growing point will flower this season, in this climate.

As growth appeared from the roots of *K. elegans* and *K. pulchra* they first appeared rather similar, but *K. pulchra* is the more robust of the two with larger leaves and slightly larger flowers. The leaves in both species are slightly two ranked, clasping bases, broader than long, but not quite rounded, green on the under surfaces, but marked above with moire-like patterns in bronze and dull silver. The markings in *K. pulchra* are wave like, contrasting with the bronze, those in *K. elegans* are broken into tiny dots. The flowers are flat, four-lobed, about like those of an African violet except for the pattern of four, with a small white eye, and a pale pinkish violet color. Several appear from each blooming point, and those of *K. elegans* are borne on a stalk that barely overtops the leaf bases. Each flower lasts but one day.

As soon as all the data have been collected, the plants will be transferred to an open bed that is regularly watered to see if the spread of root stocks will be better than would be possible in a pot, and whether or not the flowering season will extend for the summer. Then, as cold approaches, it is planned to lift and dry the roots for storage such as is given caladiums in most of this region. The species grown before, and left in pots over winter in the frost free, but not well



heated greenhouse, were so slow to appear that it was first suspected they had died of "chill," but they have now appeared and seem to have multiplied though not with enough vigor to provide flowers.

If this method of growth and storage is successful, all the species grown will make for a colorful ground cover in areas where one might want a more tropical show than one could get from any of the ground covers commonly used here.

Although these last roots came from Florida no one there made any comment to the former note in the magazine, so one cannot guess if they are a rarity

there too, or if not used as ground covers.

The note in Bailey's Standard Cyclo-pedia under *K. gilberti* quoting Reasoner Brothers, indicates the appearance of a different type of flowering, with the flowers "borne on ornamental crimson heads rising from the ground on separate stalks, and resembling in outline small pineapple frs. These heads retain their beauty all summer." One can only wonder if the present *K. gilberti* is correctly named and it appears to be in all other matters, or if the plant the note describes might not have been a *Curcuma* instead. This last is another family that needs study and reporting—
B. Y. M., *Pass Christian, Mississippi*.

On the Distribution of *Loropetalum chinense*

Loropetalum chinense is an ornamental shrub, related to witch-hazel, sometimes growing into a small tree with small elliptical, evergreen leaves and fringed, white flowers that normally appear in March and April. Although cultivated in Europe since about 1880, *Loropetalum* has achieved only minor importance in the United States despite the fact that its introduction dates back to about the beginning of the century. Only a few nurseries have recognized the value of this species. A brief note recommending *Loropetalum* for the South appeared in *The National Horticultural Magazine* (October 1958) and prompted this additional comment.

In the wild, this shrub occurs in all the Chinese provinces from Shantung to Yunnan. One introduction, P. I. 22982, came from Kiangsu, where it was collected by Frank N. Meyer in 1908. He noted that it was rarely cultivated and that wild specimens transplanted poorly. The Chinese name is "Chuck mei."

I was surprised to find that *Loropetalum chinense* is said by the Japanese to occur wild in the Ise Grand Shrine Forest, Honshu Island, Japan. When I visited this forest in 1956, there remained a group of ten specimens of *Loropetalum* growing as multiple-trunked trees, ranging from 4-10 meters in height. Since this species is not found elsewhere in Japan, there is some question whether the existence of this plant may be an instance of a forgotten introduction from China. As is well known, travel by the Japanese to the mainland up until the 17th Century was considerable, and some Chinese plants, such as the peony, were introduced into Japan at this time. It should be noted, however, that the Japanese have introduced but few Chinese plants. For example, one rarely sees *Ilex cornuta* or the fabulous lacebark pine (*Pinus bungeana*) widely grown for centuries around Chinese temples visited by Japanese travelers. It would be unusual for a plant rarely cultivated by the Chinese themselves to be among the few chosen for introduction into Japan. *Loropetalum* is not cultivated by the Japanese today and since collecting in the Ise Forest is re-

stricted, few Japanese have ever seen the trees. In Japan, *Loropetalum chinense*, called "Tokiwa mansaku," formerly was used as a source of charcoal, a fact which might explain the disappearance of the species from Japan.

As a cultivated plant in the United States, *Loropetalum* can be grown along the Pacific Coast, through the Gulf region, and as far north along the Atlantic Coast as Philadelphia and Long Island. It loses its evergreen habits, however, in the vicinity of Washington and Baltimore. Usually, it makes a broad, compact plant reaching head high and can be expected to bloom in both fall and spring. In northern Florida, it is reported to flower all summer. The planting site may be either full sun or partial shade, preferably a sandy, acid soil. Judging from reports received over a period of twenty years, we believe that *Loropetalum* has a useful place in southern gardens both as an evergreen and for the fragrant witchhazel-like blossoms. Because of the precocious aspect of flowering, *Loropetalum chinense* might be tried for forcing in spring flower shows.—JOHN L. CREECH, U. S. Department of Agriculture, Agricultural Service, Crops Research Division, Beltsville, Maryland.

Allegheny *Pachysandra* as a Groundcover

With the wide popularity enjoyed by Japanese pachysandra as a groundcover, the native *Pachysandra procumbens*, found in the southeastern United States, deserves some consideration. In contrast to its more widely-known relative, it is only semi-evergreen and the leaves are non-glossy and interestingly textured. The small white-to-pinkish flower-spikes are borne concurrently with daffodils and early enough to add interest to a shady location when interest is needed. The illustration prepared from a picture taken in early April at Longwood Gardens and showing flowers and last year's leaves, proves that at this latitude the plant is almost completely evergreen.

Culture is the same as for Japanese pachysandra.—D. G. HUTTLESTON, Longwood Gardens, Kennett Square, Pa.



G. HAMPFLER

Pachysandra procumbens

Habranthus robustus

Although this plant was introduced by the old Office of Foreign Plants, under that era, it has not been much spread in this country save through the enthusiastic efforts of amateurs, many of them in Florida. This is unfortunate as it is an easy plant to grow and increase at home by seed that is abundantly produced.

In southern Mississippi, its normal flowering is in June, though some years a few flowers may appear earlier and often there will be straggling bloom much later. If the bulbs are planted where there is abundant moisture, but no stagnation, and in semi-shade, the rather succulent leaves are more persistent than when planted in drier or sunnier positions, and the flower scapes will be longer. In addition, plants in situations that are relatively dry, are likely to produce all their bloom in one fine mass, whereas in the preferred locations the blooming season is more prolonged.

The scapes are usually about ten inches tall, the flowers borne singly, funnel-shaped, with white throats and lavender pink tinted margins, a color that lightens with age.

Every bloom is immediately followed by the rounded seed capsule, filled with myriads of black papery seeds, and these if sown almost at once will germinate with equal speed and make pea-sized bulbs by autumn. Depending on care, the time to flowering may be two years or more.

Here it is much more floriferous than the other commonly available species, *M. brachyandrus* which either does not like our soil or climate, or we have not found the proper place or treatment. It rarely flowers more than once, but the flowers, although not opening as widely, are darker in color, deep rose with an almost purple throat. It seeds but less freely. The seedlings that have come, so far, are no more rapid than those of *robustus* in making growth, possibly a little slower.

This season, thanks to Mr. Korsakoff, bulbs of *H. tauberti*, were represented in the blooming, coming at the same time as those of *robustus*, and resembling that species, except that there is less white in the throat and the rose color is a little less touched with laven-

der. The two bulbs are still in the original pot, and while the impulse to plant them outside is almost irresistible, they will continue one more year inside, and then, one will go out and the other stay in, just for luck.—B. Y. M., *Pass Christian, Mississippi*.

Two Zephyranthes New Here

Thanks to the kindness of Alex Korsakoff, who knows the editor's interest in Zephyranthes, a small gift of single bulbs of several species arrived this spring, a fine addition to the earlier sendings.

Two have flowered. *Z. bifolia* potted, with bonemeal added to make certain that some lime was available, flowered without foliage and sent up a stalk about seven inches high with a flower of medium size as zephyranthes go, that did not open fully, to its greatest width until it was well along in age! The color is a fine orange scarlet and the appearance is almost pure orange if one has the bloom in the light so that it appears translucent. It did not set seed. Leaves have since appeared and in this case are actually two. An unnamed species under the label, "Clint M-618," bloomed a little later in the spring, sending up a stalk about ten inches tall with a slightly smaller flower about the shape of that of the clone Ajax. The color is a fine pale yellow (paler than Ridgway's Sulphur Yellow) tinted from the edges with pale pink (Deep Rose Pink). In this case seed was set, and has been sown. The style is very short and was well below the level of the anthers, but no attempt was made to pollinate the flower. If either or both of these will multiply and find the growing conditions here to their liking, although lime supplies may be difficult to furnish in borders where most plants demand acid soils, they will be a most welcome addition to the growing collection.

It is fine to know that Professor Flory of Blandy Experimental Farm, Boyce, Virginia, and his colleagues are making studies of this genus and in time will probably lead us to further sources and certainly wider knowledge of the requirements.—B. Y. M., *Pass Christian, Mississippi*.

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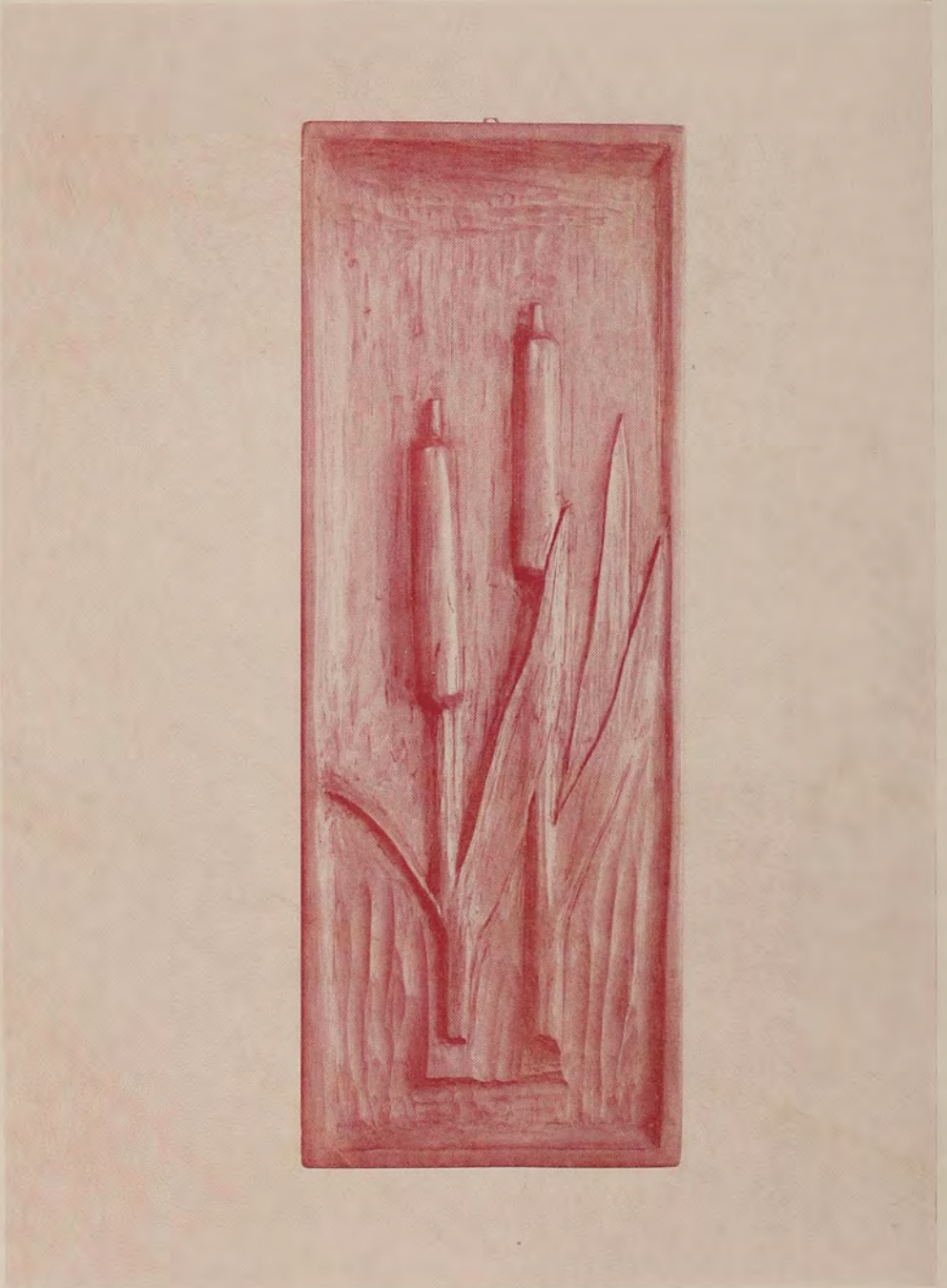
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Typha latifolia

Wood carving, white pine, five by fifteen inches, by Curtis May