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APRIL COVER ILLUSTRATION

Nymphaea gigantea var. *alba*

(By Courtesy of Longwood Gardens)



VETTERLE & REINELT

Frank Reinelt among his Delphiniums

In 1963, the Royal Horticultural Society awarded Mr. Reinelt the Veitch Gold Memorial Medal for his work with Delphinium, Primula, and Polyanthus Primroses.

Some Garden Narcissus Reappraised

B. Y. Morrison*

Before making a change in residence with radical alterations in climate and soil, one may resolve never to complain about the things he can no longer grow. But this resolve soon crumbles and regrets of various kinds continue to plague the mind and the imagination. The writer is no more firm in his convictions than any other, but his own regret that he could no longer grow narcissus as once, could not be endured, in spite of some early failures and the local traditions.

Whether the arguments that were employed to justify starting once more in a hunt for kinds of narcissus for the coastal garden in Mississippi, are totally specious or not, is no longer of interest. Many narcissus can be grown here in spite of all denials.

The basis of the plan was the realization that many gardens in the area boast an endless array of a relatively small number of true Tazetta narcissus and what was later found to be *N. × intermedius*, thanks to the help of Mrs. George Watrous, Jr., of Washington, D. C. The local gardener often referred to all these not as narcissus or even jonquils, the frequently misused term, but answered my inquiries with an astonished, "Oh, those!"

In addition to the above mentioned, it seemed probable that still others derived from the basic species would succeed equally well. Many of the above had come from countries with long hot summers, some with mild winters, others not. Many make winter foliage that seems proof against such frosts and freezes as we may get, though there have been some losses with extreme low temperatures, as in the winter of 1962-63.

Two avenues of inquiry were open: The usual trade lists and the advertising sheets known through the South as Farm Market Bulletins. In buying from the first group, one had merely to look for

all names designated by the R.H.S. Classification numbers, 8 and 7 to which the writer added 5 and 10 on a hunch that will be noted later on. In reading the Market Bulletins, one could indulge any sporting or gambling sense he might have, remembering that the "farm ladies," as the writer was once sharply reminded, were not professional and could not be expected to know what they had! As far as the writer's experience is concerned, these ladies have provided mostly bulbs that fall into Classes 7 and 8, though they have also given a few in Class 1, that are useful here chiefly because most trumpets do not do well.

As in the case with any sinner who, after reform, begins to falter in his determinations, various representatives of other groups have been sneaked into the orders from growers, the usual excuse being a purely sentimental recall of former garden days. An astonishing number seem to have succeeded, though the pattern, if there is one, suggests that most of the more successful fall into Class II (large cups) in any of its divisions save the one that allows pink in the cup or near trumpet.

The usual plan was to buy in varying numbers, plant all in a bed as carefully prepared as possible, watch through the first year, but draw no conclusions. After an addition of commercial fertilizer in autumn, wait to see what sort of blooming and increase is shown the second year. From these results, many of them sufficiently striking to cause belief, one could go on to order and attempt any other foolhardy additions he might wish.

Triandrus Hybrids, Class 5:

Although Class 5, *Triandrus Hybrids*, has not been mentioned, the success of a colony of *N. triandrus* var. *albus*, of some ten years standing prompted that addition. The original group may have changed in population from year to year, but the total number has not diminished

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Bann

and seeding has been allowed to follow the course of nature.

This "Angel's Tears" is too well known to need any description but it may be remarked here that its nodding pendant flowers, vaguely reminding one of fuchsias, has been a good parent. Its stronger growing form, *N. triandrus* var. *loiseleurii*, is even better and happily grows well here, in such few specimens as we have. The same cannot be said for the color forms of the species here, as rarely more than a bulk or two from a considerable number planted will maintain themselves for years. The infinite number of hybrids that owe their charm to one or the other of these parents is great. Most will succeed here. The chief alteration of the original form and character is one of size and vigor. The shape of the cups will vary in the width of the opening and the flaring



Fermoy

IVAN N. ANDERSON

angle of the sides. Yellow is usually pale but there are several hues well worth having. If the writer is correct, those hybrids that have had pollen from a trumpet form, do not seem as resigned to our conditions here and usually fail after the first year.

The named clones that have passed the test of annual bloom, increase in bulb numbers for two and in some cases for more years are as follows:

Forty-niner	Rosedown
Frosty Morn	Samba
Honey Bells	Shot Silk
Horn-of-plenty	Sidhe
Kings Sutton	Silver Chimes
Lemon Drops	Silver Fleece
Moonshine	Stoke
Niveth	Tresamble
Pearly Queen	Yellow Warbler

Among those who know narcissus, it



IVAN N. ANDERSON

White Nile

will be seen that among these faithful, of more than two years duration in health, are many kinds that would never reach any show bench. There are others that no fiercely competitive exhibition grower would even keep in his garden. Here, where those kinds that will endure and thrive under our conditions, we keep all that allow a mass of color and flowers for picking. From all present indica-

tions, there will be many additions to this list in 1964.

Cyclamineus and Derivatives, Class 6

Purely as an experiment, a number of cyclamineus hybrids were tried, Class 6, in the early planting and while many are happy enough, not all have increased as rapidly or as plentifully as those in



Moonshine



Rippling Waters

the jonquil and triandrus classes. Since most true trumpets do poorly here, the long-nosed cyclamineus hybrids will approximate them, even if the trumpets seem too long and the perianth segments rear back, as they do in *N. cyclamineus* itself. Many show real vigor, but some either are less so, or the best place for them has not yet been found. Among those that do meet our requirements are:

- | | |
|--------------|----------------|
| Auburn | La Beau |
| Bartley | Larkelly |
| Bushtit | Little Witch |
| Chickadee | March Breezes |
| Dove Wings | March Sunshine |
| Estrallita | Peeping Tom |
| Golden Cycle | Snipe |
| Jenny | |

Among the more newly planted are varieties we pray for even greater success and permanence, but which cannot be reported on till 1964. In order to have some critical idea of the growing

conditions here, let it be said that the soil is a very sandy loam difficult to maintain in fertility. There is *always* perfect drainage, even when rain has fallen as a torrent. Locations can always be found that will provide sun-baking all summer with a possible high of over 100° and a low of about 10°. Winters are cold enough to do serious damage on occasion to flower scapes coming up for January bloom, but not on jonquil foliage, or rarely to winter bloom of *N. bulbocodium* and derivatives. Water is always available but has not been given except in periods of genuine drought which comes early, at times. Fertilizing has been with commercial fertilizers and

Sidhe

Ivory Gate

April Tears

Silver Chimes





*Auburn—
Bartley*

the soil has been loaded, and loaded is the word, with peat moss well incorporated in the hope that the soil moisture will hold better.

What has not been successful is a general planting scheme for all kinds instead of the test bed-like arrangements now employed. There are a large areas of what one might call naturalized bulbs, chiefly jonquilla, odorus, tazettas, and best of all, the superb 'Silver Chimes', not mentioned before, either with its triandrus parent, nor with the supposed tazetta. This last mentioned is one of THE narcissus for our area.

Jonquilla and Derivatives, Class 7:

Among the jonquils and jonquil derivatives, Class 7, the most conspicuous failures are those with double flowers. This gardener cannot manage doubles of any

Class, as all need more moisture in the soil than can be maintained, even with peat added to the soil and water given in abundance. One does get an occasional double jonquil, but usually they come more green than their proper colors.

The essential characteristics of *N. jonquilla* which is the usual point of departure are: A splendid pure golden yellow color, a smooth surface to all perianth segments, a fine scent, winter foliage that is not damaged by frosts, and great endurance of summer heat. Such progenies as we have tried show most of these characters, but variations have shown up in several, including increase in size of individual blooms, without losing the number per scape, some other hues, including white, pink tinted cups, red or orange tinted cups, and in some measure an increase in



Sweetness

the length of blooming season. 'Cherie' was probably the first of the color breaks, with almost white segments and pink-tinted cups. Later kinds chiefly from the late Mr. P. D. Williams have been more striking, but none has the pinkish hue. Only the charming 'Waterperry' from Mr. Blom is better in this character, and it has not been in this garden long enough for the present reporting. Among the other color types one may try are 'Bobby Soxer' and 'Kinglet'. At this writing we can commend:

Aurelia	Pixie
Cherie	Prisk
Cora Ann	Ripple
Cuttysark	Shah
Kinglet	Snow Bunting
Kiowa	Solleret
Lanarth	Sugarbush
Nirvana	Sundisc
Parcpat	Sweetness
Piper's Barn	Trewhitan

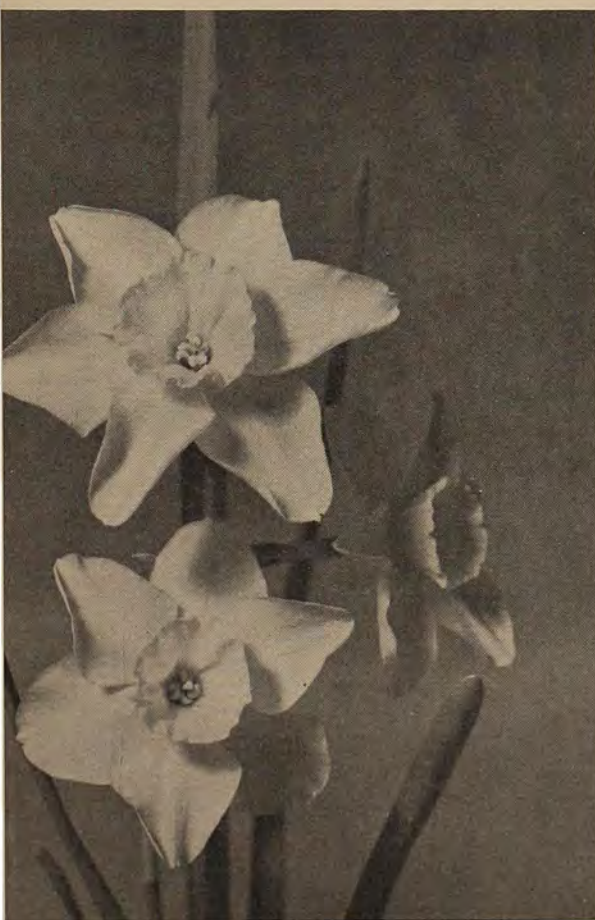
Among the contributions of the "Farm Ladies," using that term in the loosest

sense of the word, the best have been two forms of *N. jonquilla* itself. One from a Louisiana grower is earlier than any other, and one from a Mississippi farm is later, but far better than the commercial form known as *N. jonquilla* 'Simplex' as it has grown here. Each of these Southerners never fails to bloom and each seeds abundantly if one were interested in that. The commercial form does not bloom well the second year, and rarely sets seed.

Tazetta and Species, Class 8 and 10.

When one comes to the Tazettas, the hybrids in Class 8 and the species and presumptive species in Class 10, one is in trouble if he collects from the Farm Market Bulletins and from others as mad as he is in wanting to find all of these oldsters. There are a goodly number of these and no one is absolutely certain as to which really may be mere forms of the species, or the species itself in some cases, though Mr. Hannibal in California is working away at this and

Lanarth



Prisk





Kidling

all hope he may find the answers that may be looked upon as final.

It is among the members of Class 10, that many of the local Tazettas are to be found, and they rather than the hybrids have been collected here. These have been increased by the generous gifts from others who have a similar interest.

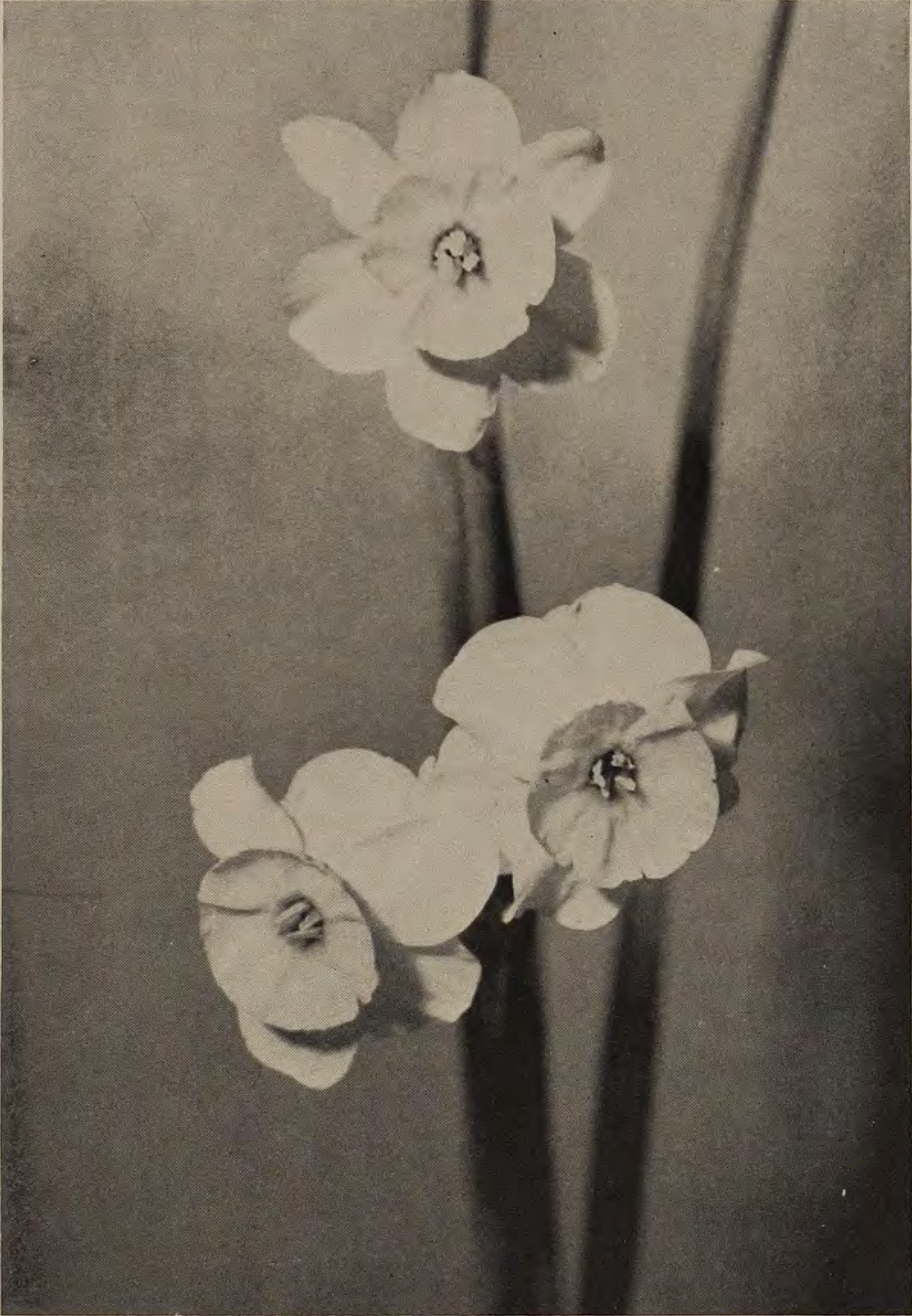
This group might be arranged roughly into two groups according to the season of bloom, and there will be some exceptions in each: (1) The "Winter-blooming sorts" blooming from December through February are the more familiar kinds. 'Paper White', in its best form has long been known as a dependable plant for forcing in the home. In Southern gardens, are plants that are "not quite" as good, though permanent and free flowering. No one really cares if they have a name or not! The early blooming

N. tazetta 'Pannizianus' blooms even earlier here, but never as early as reported from more northern gardens. It is hardy and sure, but the plants here were neglected and gave up! The fault was entirely the writer's.

Blooming at essentially the same time, is the plant we now know as *N. tazetta* 'Italicus' though there are other variations by this name. The flowers are starry, pale yellow on opening, but with the transitory yellow of many others so that by the second day all yellow is faint save in the cup. 'Soliel d'Or' has been in this and in many other local gardens for years, and does well. Not so common locally is the narcissus known commonly as Chinese Sacred Lily, both in its single and double forms. This runs the usual hazard of January frosts. On its heels comes Mr. Alec Grey's *N.*



Snow Bunting



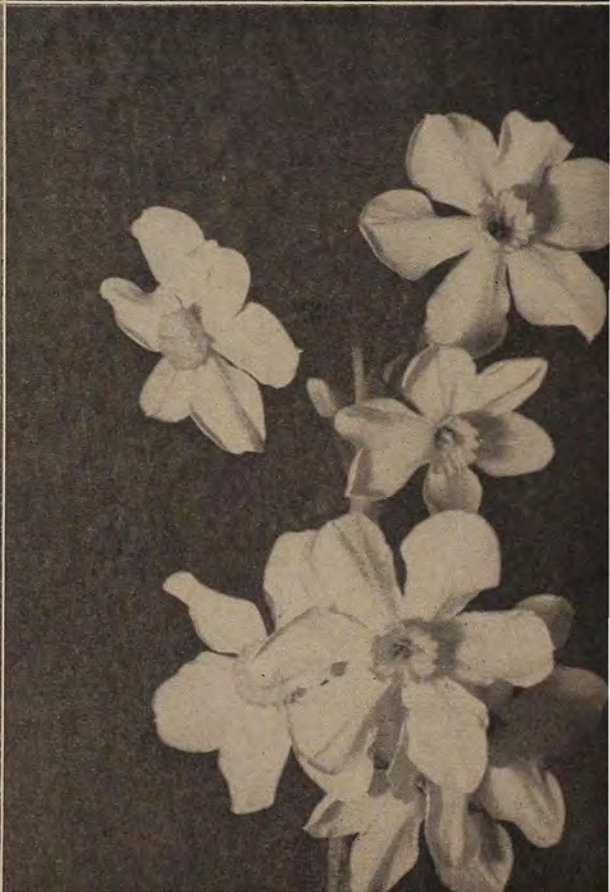
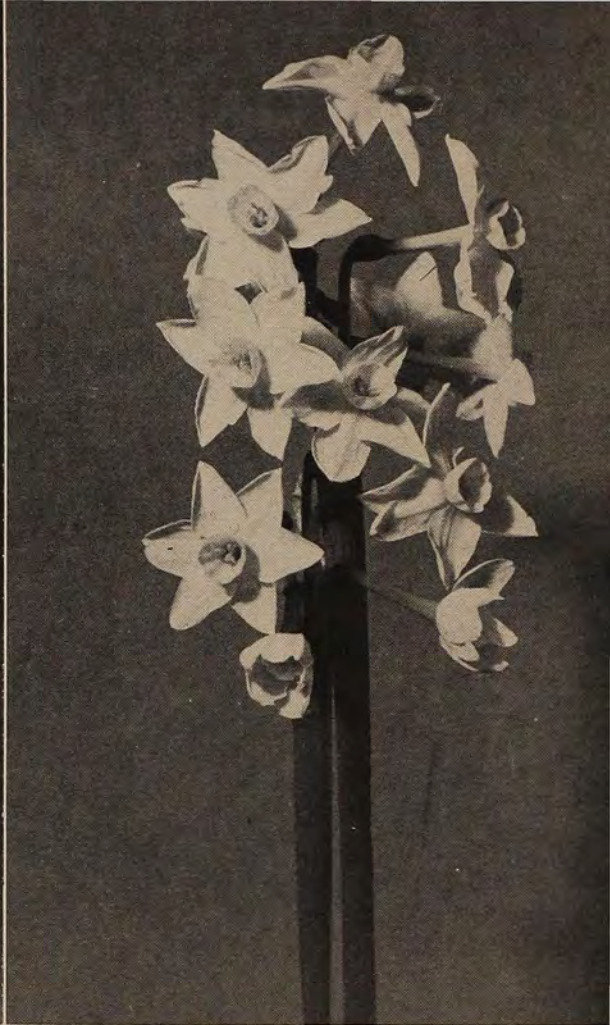
Sundial

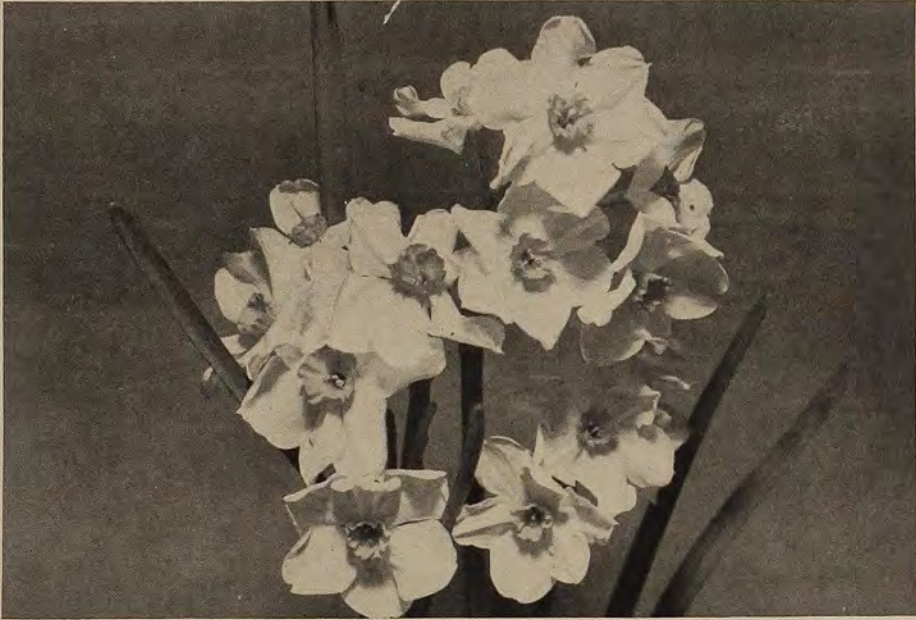
'Odoratus' which has no proper taxonomic baptism but certainly resembles the above mentioned Chinese Sacred Lily, save it has a shorter scape and not quite so large in the individual blooms.

In the garden here are several other

forms reported to bloom in this period, but all were ruined in the frosts of January 1963. Among them some variants, possibly, of 'Soliel d'Or'.

Then in sequence comes a difficult group of whites and near whites which in turn lead on into an even more



**Cragford**

difficult group, of which more later. Without meaning to be dogmatic, the garden here has distinct plants under the names of 'Scilly White' (from England), 'White Pearl' (originally from England and not the bulb as common in the South as 'Pearl'), 'Grand Primo' and a poor form of *N. tazetta* ssp. *papyraceus*. Each of these is well worth a place in the garden save the last.

Growing in on the above group, but not overlapping in bloom time very much is another troublesome lot that Mr. Hannibal has happily dubbed "a swarm." In the arguments, it will center about "what constitutes 'Grand Monarque'." This is a late bloomer and rarely damaged by frosts, but whether the common form in the South and the plant Californians call 'Grand Monarque' is the real 'Grand Monarque', remains to be determined. In blooming time it is some time later than the Louisiana form known as *N. 'Grandi-*

florus', a very good form with a pale yellow cup that does not completely fade to white. This has been matched by a nameless plant from an old garden in Modoc, South Carolina and by a sample from Newsoms, Virginia, where it was known locally as 'Seventeen Sisters'. This last is a name that has been used for another very different plant elsewhere. Next in sequence, comes 'Compressa' a fine form with still more permanent yellow in the cup. It is represented here by an English form and one from Mr. Hannibal that is precisely the same in all respects save in size, the Californian naturally being the larger! It is a fine thing, but whether or not it is the creature to be called 'Grand Monarque', who really knows? Later still, and never frosted is a clone that came to me from Ruby, South Carolina, and Mr. Woodward, who obtained it from Mrs. Davis of Red Spring, North Carolina who has not divulged if it came to her from anywhere else. Its distinction in this group, aside from bearing the name 'Seventeen Sisters' is its lateness and its flowers that open yellow throughout, with the cup holding a deep hue but the perianth fading. All of these narcissus, clones or whatever, look more or less alike in form, with rather rounded blooms and very regularly formed cups. The scents are all of one kind also.

White Pear**Matador****Mrs. Alfred Pearson****Scilly White**

*Cobweb*

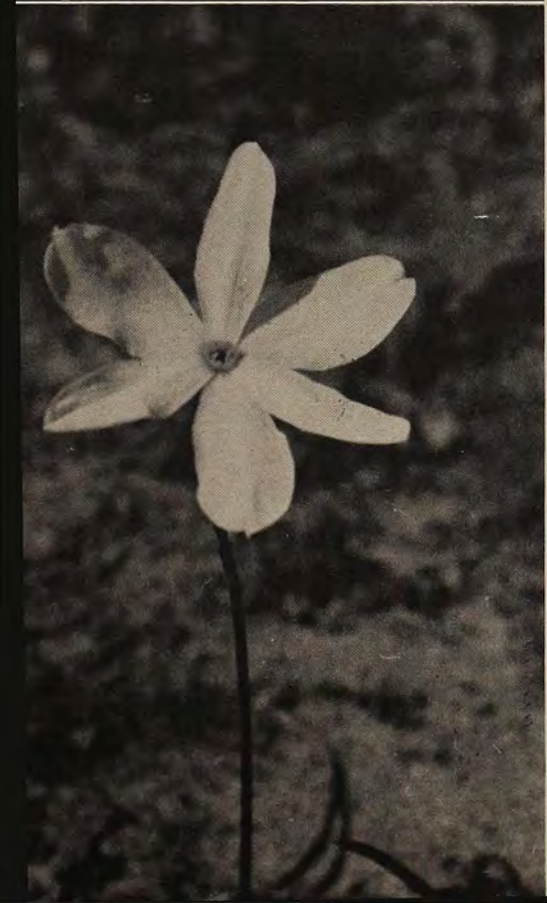
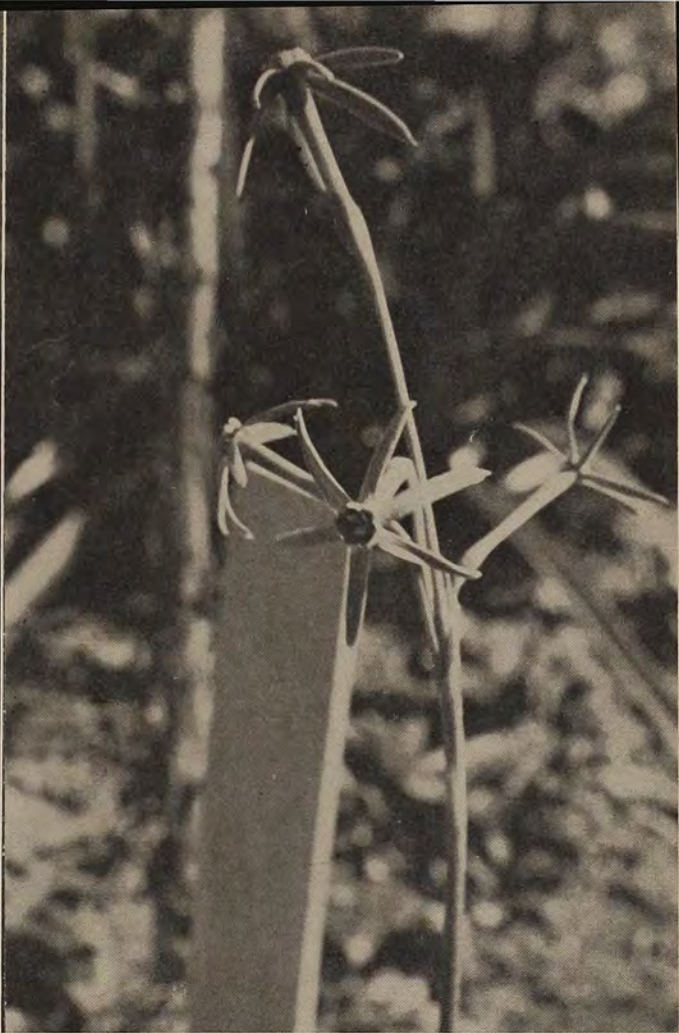
Although no record was kept of the blooming date, it must be reported that the tiny species, *N. dubius* has flowered twice in three years of residence. It is the sort of thing that sends the "miniature lover" into ecstasies. Though no miniature, *N. tazetta* 'Barliae' is a nice thing with almost perfect flowers but, alas, when happy in growth, on a scape too tall for good proportions.

The less common species that do really well here include first *N. viridiflorus*. This usually fails to bloom the first year planted, but after that is regular and the scapes grow a larger number of blooms each as the plants age. The flowers are indeed green, the cup is barely visible, and scent is superb. So far none has been allowed to mature seed, but each year it has bloomed, two years in succession now, seed has formed and been cut off. Next, in permanence, i. e. long residence, is a form of *N. elegans*. The new clump bloomed well the first year and a second is awaited with impatience. *N. serotinus* has not been tried long enough for sure reporting.

Among the proper representatives of Class 8, the tazettas that now are of known garden origin, all do well here, except the late blooming sorts. *N. biflorus* which often figures in Farm Market Bulletins as May-flowering narcissus, does not manage to bloom here, even

with regular watering. It is equally true for old 'Aspasia', for the newer 'Pride-of-Holland', 'Orange Wonder', and 'Red Guard'. 'Cragford' is dependable but not always with as intense a color as it should. 'Matador' is excellent, as are the older 'St. Agnes', 'Geranium', and 'Martha Washington'. Although flowering is ragged at times, 'Mrs. Alfred Pearson' blooms freely with scapes rising in succession. The only yellow that has settled in happily is 'Canary Bird', not a prime favorite, but a little more interesting than the older 'Halvose' that has been here for many years, untouched and uncared for and still blooming. 'Red Guard' has varied from year to year as does 'Laurens Koster', which grows well in other gardens not far from here, but not on this place. 'Laetitia' like 'Mrs. Pearson' is sometimes ragged but again like that kind, free flowering and in succession. 'L'Innocence' has not been early here but is nice, even with competition.

*italicus**viridiflorus**serotinus**triandrus var. albus*



Antoine Nicholas Duchesne—First Strawberry Hybridist

Vivian Lee*

Just two hundred years ago, a French naturalist named Antoine Nicholas Duchesne, predicted that new and valuable kinds of strawberries could be produced by cross-pollinating different kinds and by growing plants from seed. Duchesne was the first man to identify our modern commercial strawberry, *Fragaria* × *ananassa*, as a hybrid between *F. chiloensis*, the Chilean strawberry from coastal Chile, and *F. virginiana*, the Virginia strawberry from eastern North America.

Fragaria × *ananassa* resulted from chance pollination of a female *F. chiloensis*. 'Keens Seedling', a seedling of 'Keens Imperial', resulting from a chance cross of a large white *F. chiloensis* with *F. virginiana*, was an ancestor of all present day commercial strawberries in the northeastern quarter of the United States.

'Keens Seedling' was also an ancestor of 'Wilson', a selection which composed 90% to 95% of the strawberries grown in the U.S.A. in 1879. 'Black Prince', a pistillate plant derived from 'Keens Imperial', the parent stock of 'Keens Seedling', was probably the mother of 'Wilson'. The father was probably 'Ross's Phoenix', a seedling of 'Keens Seedling'. In 1850 Mr. Wilson of Albany, New York, grew 'Black Prince', 'Hovey', and 'Ross's Phoenix' side by side, but 'Ross's Phoenix' was the only selection which produced sufficient pollen, and it was valued for its very dark crimson fruit color. 'Wilson', too, had very dark red flesh. Thus, the strawberry called 'Wilson' seems to have been the product of 'Black Prince' pollinated by 'Ross's Phoenix'. 'Wilson' was replaced largely by 'Crescent', which was mothered by 'Hovey'. The cultivar 'Crescent' is the dominant component of 'Howard 17', which today is found in all the strawberries north of Georgia and east of the Mississippi (5).

Strawberry breeding was in its infancy

when Duchesne recommended experimentation with cross-pollination. Until 1714, the only strawberries cultivated in Europe were the wild diploid *F. vesca* ($2n = 14$), the slightly larger fruited hexaploid, *F. moschata* ($2n = 42$), and the octoploid *F. virginiana* ($2n = 56$). In that year Amédée-François Frézier, a French Spy, introduced *F. chiloensis* from South America, where the fruit, he claimed, generally grew as large as walnuts and sometimes the size of hen's eggs. Since Frézier, unknowingly, had collected only female plants, no berries were produced in Europe unless *F. chiloensis* was pollinated by *F. moschata* or *F. virginiana*. The one region where the Chilean strawberry was cultivated with any success was in northwestern coastal France around Brest. There the gardeners had learned to interplant *F. moschata* and *F. virginiana* with *F. chiloensis* to raise the remarkable large fruit they wanted. Yet even the ablest botanists in Europe could not have explained why this system was necessary until Duchesne conducted his intensive study of *Fragaria*.

Duchesne was nineteen years old in 1766 when he published his *Natural History of Strawberries*, a book which is still the basic study on *Fragaria* and which, if better known, would be regarded as a classic among works of botany.

The boy first became interested in strawberries when he discovered a simple-leaved *F. vesca*, the Wood Strawberry, growing among the seedlings which he had sown the year before. To his amazement, this monophyllous character held constant in repeated plantings from seed. "One can imagine how my surprise grew," he wrote. "I was expecting no such constancy. At first I doubted that it was general because of the small number of plants I had raised, but seeing the experiment repeat itself in our garden as well as at the Trianon,

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A.N. Duchesne delinavit 26 mai 1765. 8c. 15 jura.

Le fraiser de versailles.

Il est de cette race de fraiser à Versailles le premier individu qui fut
 en 1765 dans un pot, et fut de grande dimension. On cultiva que deux
 années. Il fut propagé depuis par les courtes tiges de la même espèce, et
 consistant en feuilles simples, mais le plus grand nombre de fleurs. Les
 courtes tiges de ces courtes tiges de la même espèce à Paris.
 à Strasbourg, à Londres, à Copenhague, et à différents endroits de
 l'étranger de ce genre en fait. Il fut aussi exporté de France
 consistant en feuilles simples, et ce fut quelques années à feuilles profondes
 à l'étranger.

Fragaria monophylla.



Fragaria vesca 'Monophylla'. The simple-leaved phase of the Wood Strawberry of Europe started Duchesne on his study of *Fragaria*. The monophyllous aspect of the plant held constant in plantings from seed, thus disproving the widespread eighteenth-century belief in constancy of the species.

at the Jardin du Roi, at M. de Jussieu's and with several different interested people, it was necessary to give in and recognize the new existence of a Strawberry with simple leaves, which reproduced itself constantly by it's seeds." (4).

Duchesne began collecting other kinds of strawberries. Among them was *F. moschata* which had a reputation as a poor bearer, subject to sterility. On the hint from another strawberry grower,

the boy discovered that *F. moschata* would always give fruit if grown alongside other flowering plants of its own kind, which did not bear fruit themselves, but were necessary to those which did. Examining both kinds of plants, Duchesne found that plants of *F. moschata* were either male or female (dioecious) and that all the staminate, or male plants were the same non-fruiting kind which gardeners tore out of their



Fragaria viridis. In his letters to Duchesne, Linnaeus confounded the green-fruited *F. viridis*, the Wild Field Strawberry of Sweden with *F. moschata* cultivated in Swedish gardens. This green-fruited strawberry was popular in England where it was called the Pineapple Strawberry by Philip Miller for its tangy flavor.

beds so carefully. These were the male pollinators of the pistillate or fruiting strawberry plants. Although a few cases of dioecism in other plants had been recognized, no one had ever suspected strawberries to be unisexual.

Rarely found in cultivation today, the hexaploid *F. moschata* was popular with gardeners in 1766 for its musky-flavored very deep purplish red fruit often with pasty pulp (3). This fruit was double the size of *F. vesca* with the regular shape of an egg sliced across the bottom. The broad, rhombic-shaped leaves were strongly veined with distinctive, ovoid-deltoid teeth and spreading hairs. The long pedicels rising high above the petioles brought it the English name "Hautbois" or "Hautboy" from the French phrase meaning "tall plant." Modern observers find that *F. moschata* is indeed unisexual and dioecious, and as Duchesne observed (3), has the secondary

sex characteristics of male flowers which are larger than the female, with strong stamens and a small receptacle bearing abortive ovaries. The female flower has abortive, rudimentary stamens surrounding a very large receptacle with fertile ovaries. Later hermaphrodites were found and cultivated.

Connoisseurs in England, France, Holland, Germany, and Finland still cultivate *F. moschata* for the lightly musky aroma despite low fertility of the plant (7).

According to G. Staudt (8), *F. moschata* was the strawberry principally cultivated in the Vierlanden near Hamburg, Germany, until the end of the nineteenth century. It was frequently grown in Russia until the 1930's.

After studying *F. moschata*, Duchesne next tried to grow some *F. chiloensis* plants. Since the ones he and his father had in their garden bore no flowers, the

boy begged the gardener of the Jardin du Roi for some flowering ones. Grudgingly, the gardener sent him a single plant in a pot of earth. Alerted by his discovery of single sexes in *F. moschata*, Duchesne examined *F. chiloensis* carefully and discovered that it, too, was unisexual. The plant was clearly a female, which discouraged Duchesne since he had no males, but he decided to experiment anyway. Because the plant was dioecious like *F. moschata*, it was planted first in a bed with male *F. moschata* plants. Next it was removed to a window sill in absolute isolation. The withered flowers that might have been pollinated were cut off. Flowers which bloomed after the plant was removed from the garden, but those flowers which had already been fertilized developed into beautiful big fruits, showing they had been pollinated by *F. moschata*.

Here was the explanation for the interplanting of *F. moschata* with the Chilean Strawberry at Brest. The Royal botanists were so impressed with Duchesne's "Frutiller" (the French name

for *F. chiloensis* adapted from the Spanish "Frutilla") that they arranged for him to present it to King Louis XV in person. It must have been an excited seventeen-year-old who gave the King his strawberry plant on July 6, 1764. King Louis was most impressed. Instead of popping the berries down his royal throat, he had the court artist paint the plant so that its memory would be preserved forever in the botanic library. The King ordered Duchesne to raise the same berries for him in the kitchen garden at the Palace of Versailles, and commissioned him to collect all the different strawberries known for more experiments.

The results of the boy's research led to many original observations, all recorded in the book he published in 1766. Only an exceptional nineteen-year-old could have written such a treatise, which minutely and precisely described the botanical characteristics of each kind of strawberry, its origin and history, and the various methods of strawberry cultivation. As early as 1766, Duchesne raised



Fragaria moschata 'Femina'. Duchesne was the first to discover male and female (dioecious) strawberry plants. Having found that *F. moschata* was unisexual he was able to explain the cure for its "sterility" and to identify *F. chiloensis* grown in Europe as a female plant.



Fragaria chiloensis pollinated by a male *F. moschata*. King Louis XV of France praised Duchesne for the magnificent fruit on this plant which the seventeen year old boy had raised by pollinating the female *F. chiloensis* by another species, a male plant of *F. moschata*. The King authorized Duchesne to collect different kinds of strawberries from all over Europe to study in the royal garden at Versailles.

many penetrating questions on natural history, suggested by his study of the strawberry, questions which were answered only in the last one hundred years by geneticists.

He wondered about variation among plants and the possibility of experiments with multiplication by seed and cross-pollination. The biggest question in his mind was that of the fertility of hybrids. Duchesne had seen a strawberry in the Jardin du Roi called the "Pine-apple Strawberry," "La Fraise Ananas," first described by Philip Miller in England in 1759, who praised its superiority to *F. chiloensis*. It bore big fruits like the Frutillier, but most remarkable—it was a perfect hermaphrodite capable of self-pollination.

This was the first-cited reference to our modern strawberry for which the name *F. ananassa* had been coined by Dutch seed merchants. Duchesne examined it and was persuaded by its resem-

blance to both *F. virginiana* and *F. chiloensis* that it must be an intermediate between them. He described its similarity to *F. chiloensis* as that of a son to a mother, fertilized by a foreign father, which he believed could only be *F. virginiana*. "I suspect it to be a cross of the Scarlet Strawberry and the Frutillier," he wrote of *F. × ananassa* in 1766.

Duchesne's judgment was contested as late as 1897 by Liberty Hyde Bailey in a book entitled "The Survival of the Unlike." Bailey believed that *F. × ananassa* was a direct development of *F. chiloensis*. He said he could not find "either in herbarium specimens of the plants themselves, or in the pictures of plants any distinct evidence of hybridity" (1).

The fruit of the *F. × ananassa*, known to Duchesne, was pale red in color with a brown or yellowish cast. The efforts of breeders in later years would produce strawberries with their modern bright

red color. Duchesne's *F. × ananassa* had very watery but solid flesh with a rather large central cavity and a long, central core which adhered to the calyx when the fruit was picked, since the berry did not drop off naturally. Its perfume resembled a pineapple. Originally the Dutch named this the "Pineapple Strawberry" because they thought the pyramidal shape resembled a pineapple. In size, the fruit was only a little smaller than in *F. chiloensis*, but unlike *F. chiloensis*, the plants were only slightly hairy. Thus, *F. × ananassa* Duchesne resembled *F. chiloensis* in vigor and in its long, large runners, while the leaf color resembled *F. virginiana*.

Although well-known to the sixteenth century New World explorers and colonists, *F. virginiana* did not receive definite recognition of its existence in Europe until 1624, in the *Manuel Abrégé des Plantes*, published by Jean and Vespasien Robin, botanists to King Louis XIII. John Parkinson named the "Virginia Strawberry" in English in his *Paradisi in Sole* of 1629, a date traditionally given for the introduction of *F. virginiana* into England. Duchesne suspected that *F. virginiana* came to Europe even before 1624. The catalog of John Tradescant's plant collection, *Musaeum Tradescantianum*, designates a *Fragaria nova anglia nondum descripta*. Although published in London by John Tradescant, the younger, in 1656 after his father's death, the catalog may have been written some forty years earlier, probably about 1616. If true, this would have been the first reference to the occurrence of *F. virginiana* in Europe.

The elder Tradescant died in 1638, and Duchesne believed his catalog was written about 1616. From the little we know about the lives of the two Tradescants, we can judge that about this time the father was making his famous collecting trips to the European continent. In service as head gardener to several English notables, he was "more famous as an explorer and collector of horticultural novelties," says R. T. Pearl in *The History of the Cultivated Strawberry* (1928), p. 3. Tradescant thus may have brought *F. virginiana* to England from a collecting trip in the first decade of 1600's from continental Europe.

Gaspar Bauhin's *Pinax* of 1623, cites a *Fraga Acque Magna Ac in Anglia in*

Virginea Crescunt (2). However, Duchesne thinks that Bauhin had in mind *F. elatior* of Besler from the *Hortus Eystettensis* (1613) and that he had not actually seen this strawberry, since he did not include it in the enumeration of his species. Yet, his description shows that he knew there were large strawberries in Virginia. This strawberry was twice the size of the European *F. vesca* and its bright red color made it a favorite among the English for jam-making and earned it the name "Scarlet Strawberry" in French and English. Its hardiness and prolific runners also made it popular. Since complaints of infertility are rare, the first European specimens of *F. virginiana* seem to have been perfect hermaphrodites. Most important, it was an octoploid like *F. chiloensis* and was grown at Brest along with the hexaploid *F. moschata* to pollinate *F. chiloensis*.

Duchesne said a daring thing in identifying the hermaphrodite big-fruited strawberry he called *F. × ananassa*, as a hybrid between *F. virginiana* and *F. chiloensis*. The greatest biologists of Europe had announced that no hybrid between two species could produce fertile progeny. Crosses between varieties of the same species, yes, but hybrids of different species, no.

Duchesne not only offered the hybrid strawberry *F. × ananassa* as proof of the fertility of hybrid progeny, but he predicted that many new and valuable fruits and vegetables might come from experiments with cross-pollination and hybridization. How right he was!

According to Duchesne, "The best [method], without doubt, for plants as well as for animals, would be to make the experiment of mating: those which together produce fertile crosses ("métis"), would be pronounced of the same Species [genera, today], and those which refused this, would be regarded as different species [genera]. It is to be hoped that experiments of this nature will increase. Botany could only gain a great deal from them" (4).

This visionary outlook was a prophecy that systems of plant classification could be based on experiments in cross-breeding. If two kinds of plants refused to cross with each other and bear fertile hybrids, they obviously belonged to different "species." According to the evidence from Duchesne's experiments, *F.*

vesca must be a different "species" from *F. chiloensis*.

Using his own natural method of classification, Duchesne designed a genealogical tree of strawberries. He put the everbearing *F. vesca* at the base of the tree; *F. chiloensis* and *F. virginiana* and their hybrid progeny, *F. × ananassa*, at the top. Although he made several mistakes in his chart, he listed the species in correct order in relation to their somatic chromosome numbers, putting the diploid *F. vesca* at the base, the hexaploid *F. moschata* in the middle, and the octoploid *F. chiloensis*, *F. virginiana*, and *F. × ananassa* at the top.

His conclusion from observation and from cross-breeding experiments was the conviction that "species [genera] appear fixed and immutable, but that accidents which make certain individuals vary, procure in others rather considerable changes which are perpetuated in their

posterity, which thus form a Race (species) and to add, with M. de Buffon, that the Crosses ("métis") derived from the mating of two individuals of different Races (species), but of the same species (genera), truly become the heads of new Races (species); but that the Hybrids ("Hybrides") produced by individuals of different Species (genera), are deprived of the faculty of Self-Reproduction." In this passage Duchesne notes that he is substituting the words *Species* and *Race* for those of *Genus* and *Species* used by other contemporary botanists.

Duchesne also raised the question of the effects climatic and soil changes could make on a plant over a long period of separation from its parent species. How could one account for the difference between *F. vesca* of Europe and *F. chiloensis* of South America, he asked.

He also believed it possible to determine a fixed temperature at which a strawberry would flower and set fruit. He suggested that the development of the berry depended on the water the plant received during the fruiting season. Today several of these observations and questions seem elementary to us, but we might remember that in 1766 such questions were little known, when the great preoccupation was in classification and naming of plants. Theories were worked out on paper instead of being empirically demonstrated. Duchesne's insistence on the necessity and value for experimentation was relatively novel.

The boy's book "The Natural History of Strawberries" was praised by the French Royal Academy of Sciences and by great scientists of the period, like Linnaeus and Haller. How had a nineteen-year old boy produced such a work? In the first place, he was gifted with a remarkable intelligence, and, in the second, he was given every advantage possible in his education. His father, as Superintendent of the King's Buildings, was acquainted with famous artists and scientists clustered around the Royal Court, and introduced his son to them. Antoine's mother had died at his birth, leaving the boy as the only child. The father, a painter and architect, well-studied in the fine arts and natural sciences, devoted all of his efforts to educating his son. Every game the child played was especially designed to in-



Fragaria virginiana. Duchesne identified this strawberry from eastern North America as the father of *F. × ananassa*, the name applied by Duchesne to the hybrid *F. chiloensis* × *F. virginiana*. Duchesne was the first person to recognize the wild Chilean Strawberry and the Virginia Strawberry as parents of the modern cultivated strawberry.



Fragaria × *ananassa*. A drawing of one of the earliest examples of our modern, big-fruited strawberry. Duchesne described its fruit as dull red in color and very pale at the base.

struct him in the principles of art and science. He was taught Latin, Greek, Italian, English, and German, history, art, music, and painting. When only four years old, the boy could read, knew four hundred Latin words, and many historical anecdotes. The father took his son with him on long walks to museums,

factories, and farms, and insisted that he record all his observations in a series of notebooks.

But, the boy's favorite subject was natural history, and every spare moment was spent in the Royal garden, the Trianon. There he dogged the heels of Bernard de Jussieu, the Royal Botan-

ist. Under Jussieu's guidance, Duchesne published his *Manuel de Botanique* at the age of seventeen. This little book gave the characters and properties of plants cultivated around Paris and assigned them their common names as well.

Jussieu was the finest teacher of natural science the boy could have picked in all of Europe. He was ranked with his friend Linnaeus, the great Swedish naturalist, as the most respected botanist of the age. Jussieu encouraged young Duchesne to write to Linnaeus about his strawberry studies and their correspondence lasted nearly a decade.

Linnaeus praised Duchesne for his proposal to make a deep study of the plants of one genus. "When you have completed the history of the wild strawberries, you will have accomplished something which I long have hoped that some botanists would do: namely, that they would each choose their plant family and examine it most thoroughly; in this manner would soon be attained the ultimate knowledge of plants which now floods botanists with its abundance," Linnaeus wrote Duchesne from Sweden in September 1765 (6).

The great Linnaeus wasn't much help to Duchesne on the question of strawberries themselves. When the boy wrote him about his discovery of dioecism in *F. moschata*, Linnaeus advised him to look again to be sure he had not mistaken hermaphrodite flowers, whose stamens had been sterilized by frost, for unisexual plants. "Never have I seen a male strawberry," Linnaeus wrote. When Duchesne, trying to track down the original home of *F. moschata*, asked if it grew wild in Sweden, Linnaeus assured him it did. We now know that Linnaeus was wrong. He had confused the wild Swedish Field Strawberry, *F. viridis*, with the cultivated *F. moschata*, in Swedish gardens. Finally, despite Duchesne's evidence to the contrary, Linnaeus refused to alter his earlier classification of the strawberry in which he had placed *F. chiloensis* as a variety of *F. vesca*.

After graduation from law school at his father's insistence, Duchesne imme-

diately went back to natural history, his first love. His strawberry studies continued, and in 1771 he published a later essay, describing several new *F. × ananassa* hybrids (3). He became a professor of natural history, an influential educator in the French school system, secretary of the Society of Agriculture at Versailles, editor and contributor of various agricultural, botanical, and natural history journals. During the French Revolution he was put on the suspect list and only escaped beheading by his record of scientific contribution to his country.

Duchesne died at eighty, a poverty-stricken old man, although revered as one of the most important contributors to the science of natural history of his time. Among the unpublished research he left behind were some seventy original pencil sketches of strawberries he had grown. Intended as illustrations for his *L'Histoire Naturelle des Fraisiers*, the drawings were never published due to lack of funds. Duchesne later sent them to Lamarck to help in editing the article on *Fragaria* in his *Encyclopédie méthodique botanique*, an article mostly written by Duchesne himself. The highly accurate unpublished sketches, were purchased by the Natural History Museum of Paris after the death of Duchesne, and there they lay, unknown to the world for almost a hundred and fifty years. The six sketches included here are the first of these ever to be published.

(The photographs were made by Miss Lee in Paris.)

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Manglietia insignis

G. A. C. Herklots¹

The family Magnoliaceae contains several genera of which *Magnolia*, *Manglietia*, and *Michelia* have much in common. The representatives of all three are trees and shrubs with showy flowers usually highly scented. In *Michelia*, an Asiatic genus, the flowers are axillary; in *Magnolia*, found in N. America and E. Asia, and *Manglietia*, found only in tropical Asia, the solitary flowers are terminal. The main difference is that in *Magnolia* there are but two ovules whereas in *Manglietia* there are six or more in each carpel. The genus *Manglietia*, with about 25 species, is little known in cultivation but certainly deserves attention in

the southern states of U.S.A. Doctors Francis de Vos and John Creech, who were in Nepal in 1962, took back with them seeds of a very fine form of *M. insignis* and it is hoped that one day trees grown from these seeds will grace the arboreta and larger gardens in U.S.A.

The tree is recorded from the Himalayas, including Nepal, at 6,000-10,000 feet, the Khasi Hills, Assam, N.E. India at 3,000-6,000 feet, also Burma and West China. It is a lofty evergreen extremely handsome tree when in full flower in mid-May with its glossy, dark green foliage and large pink flowers.

My knowledge is confined to two trees, the first growing on Sheopuri *circa* 7,600 feet north of the Valley of Nepal, the second at Godavari in the Valley at 5,100 feet. The drawing of the fruits (fig. 6) was made on 21 October from material from the first tree which flowered freely in May. The hundreds of flowers on the second tree, some 50 feet high and across, were of a much better color and it is from this tree that the seeds were collected now being grown in the U.S.A. and in England at the Savill Gardens, Windsor.

The terminal flower bud, $3\frac{1}{2}$ to 4 inches long, is enclosed in a single sheathing bract, dull crimson brown with green veins (fig. 1). This bract becomes detached at 11 a.m. in the morning of the day on which the bud opens. At 6 p.m. the bud commences to open (fig. 2); it then has a strong fruity smell. The state of the flower at 7 p.m. is shown in figure 3. By 8 p.m. the three sepals have opened flat, the petals remaining closed or nearly so (fig. 4). No further change takes place during the

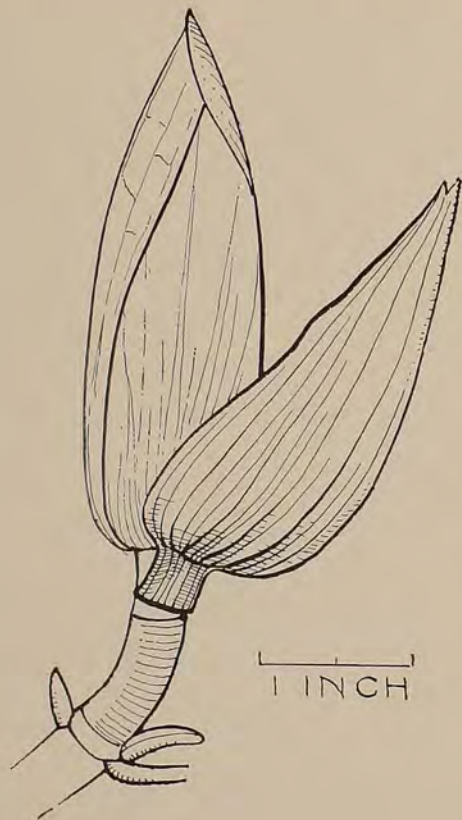


Figure 1

Figure 2

night save that the petals elongate somewhat. The color of the flower is unusual. The base of each visible petal is white (greenish at the extreme base) but the apical half in the center (extending down to three-quarters at the sides) is Rose Madder, Horticultural Colour Chart 23/2, not carmine as is mentioned in the literature. Not until late afternoon is there any further marked change in appearance of the flower when between 4 and 5 p.m. the six or eight petals separate and the flower becomes fully open soon after 5 p.m. (fig. 5). The three or

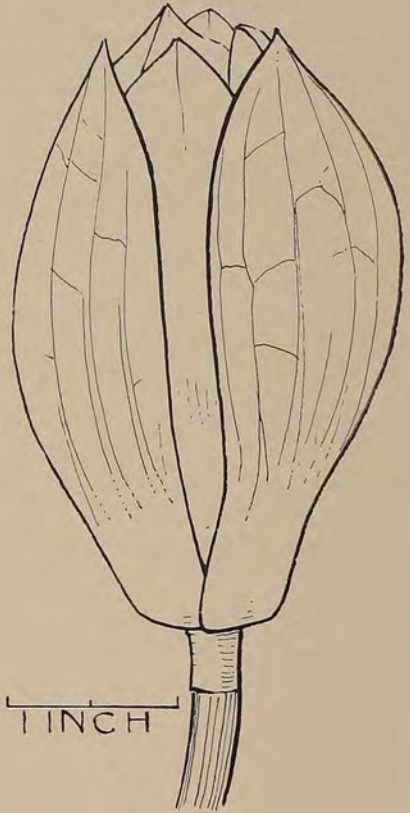


Figure 3



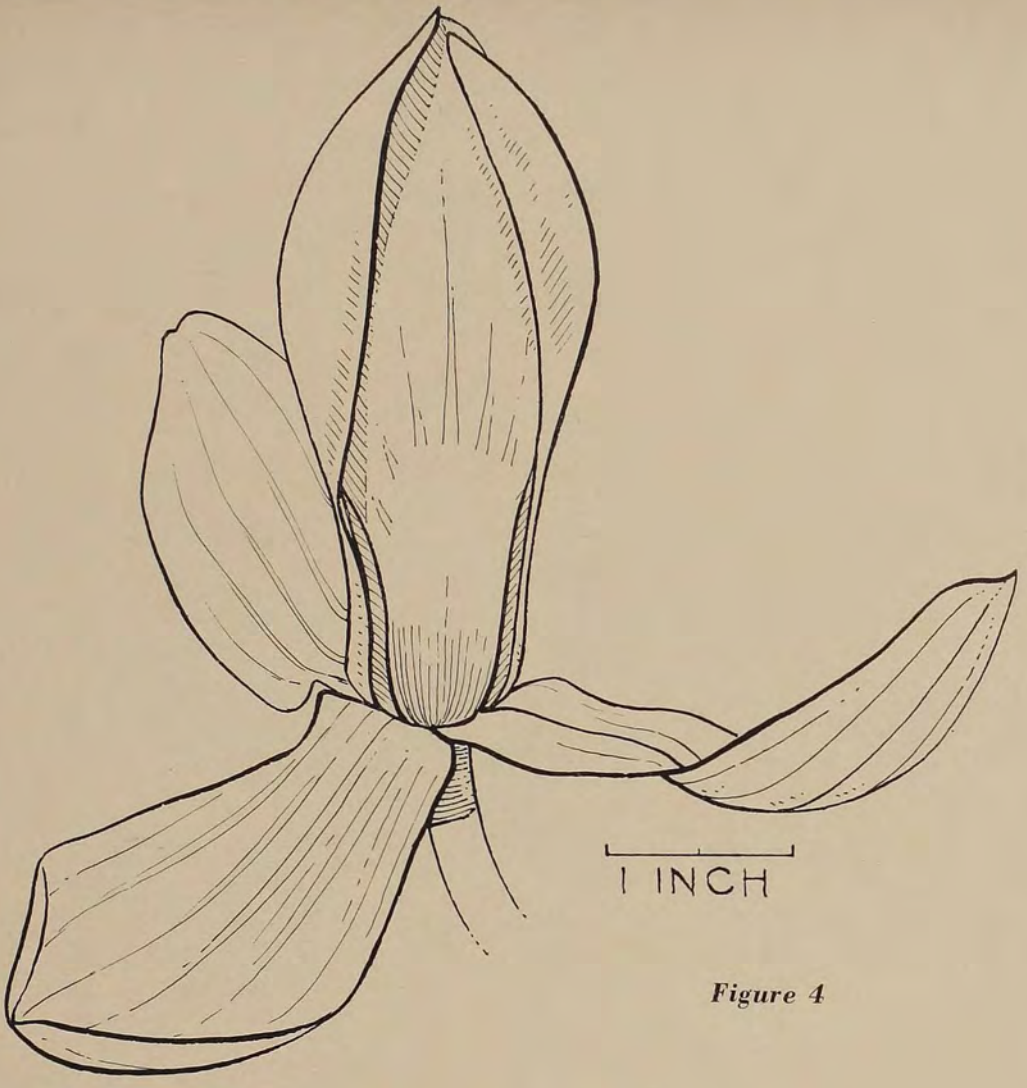


Figure 4

Figure 5



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Figure 6

four innermost petals are creamy white flushed with rose madder at the margins. During this final stage of opening the stamens, white with a red base, about 120 in number, drop off; the 100 pale green carpels with their buffish stigmas form a fused compact cone in the center.

The flower remains in good condition until the following morning and during the day gradually discolors. The Godavari tree, which, alas, has now been cut down, during the second and third weeks in May, bore several hundred flowers, each from five to seven inches across.

National Forest Areas of Interest to Horticulturists

Christopher M. Granger*

There are several types of special classifications or reservations in the national forests of interest to the readers of the American Horticultural Magazine.

National forests should not be confused with national parks. National forests were originally established to protect watersheds and to produce timber "for the use and necessities of the citizens of the United States." Thus they were created to be *producing* property. National parks were set aside to preserve intact superlative examples of natural wonders. National forests are administered by the Forest Service, an agency of the United States Department of Agriculture. National parks are in the custody of the National Park Service, in the Department of the Interior.

Most of the national forests are in the West, where they were set aside from the public domain. Those east of the Mississippi were acquired mainly by the purchase of private lands under the Weeks Law, which was enacted to protect the headwaters of navigable streams, and later broadened to allow purchase of land for the production of timber.

There are national forests in forty states, embracing a total area of over 180 million acres. They are managed under the principles of sustained yield and multiple use. The former means that the allowable harvest of timber must not exceed timber growth. The same rule applies to the use of the forage by permitted livestock. Multiple use means the coordinated use of all national forest resources—timber, forage, recreation, etc., so that where two or more uses overlap on a given area, no one use or combination of uses is destructive of the others.

Multiple use, however, does not mean that all uses can be allowed on all parts of each national forest. Where desirable

one or more uses may be given dominance. It is here that the special classifications enter the picture. Those of interest to horticulturists are described below.

Wilderness Areas and Wild Areas

Wilderness areas are portions of the national forests within which it is desired to preserve primitive conditions of environment. Regulations of the Secretary of Agriculture provide that in wilderness areas "there shall be no roads or other provision for motorized transportation, no commercial timber cutting, and no occupancy under special use permit for hotels, stores, resorts, summer homes, organization camps, hunting and fishing lodges, or similar uses." Wilderness areas must be over 100,000 acres in size and are established by order of the Secretary of Agriculture. Wild areas are identical in purpose and management but are less than 100,000 acres, with a 5000-acre minimum size. They are established by order of the Chief of the Forest Service.

There is another similar category—primitive areas. These are areas with wilderness characteristics which have been designated in order to guard them pending final study of their suitability for permanent classification as wilderness or wild areas. Public hearings are held when requested, before final decision as to permanent designation, including any proposed changes in boundaries.

As of January, 1963, there were 16 wilderness areas with a total area of 6,285,816 acres; 30 wild areas totaling 1,047,554 acres; 37 primitive areas aggregating 6,098,532 acres; and one canoe area in Minnesota, 886,673 acres. The grand total of these areas is 14,318,576 acres. Except for small wild areas in New Hampshire and North Carolina and the canoe area in Minnesota, the great wildernesses are in the eleven western states.

*The author, now retired, entered the National Forest Service in 1907 and for many years was an assistant chief in charge of the administration of the national forests.



U. S. FOREST SERVICE

Sosbee Cove poplar stand. This area has been set aside by the Forest Service as a memorial to former Ranger Arthur Woody.

Some of the wilderness areas are huge in size. The Idaho Primitive area covers 1,232,744 acres or nearly 2000 square miles; the Selway-Bitterroot Wilderness area in Idaho and Montana embraces 1,242,659 acres, also nearly 2000 square miles—about the size of Delaware.

Access to these wilderness, primitive, and wild areas is only by foot or horseback. Here nature is left alone except to prevent destruction by fire or epidemic insect or disease infestations. Here are many kinds of flora, ranging in size from giant trees to the smallest of dwarf alpine evergreens and the tiny flowers that bloom at the edge of the timberline snowbanks. Everything is on a grand scale, forests, high mountain meadows replete with wildflowers, lakes, streams, waterfalls, and glaciers. The list of tree and other plant species is too long to record here, but the naturalist will find specimens of every mountain plant in which he may be interested.

Special Areas

This category embraces tracts with different special characteristics—purely scenic, historical, archeological, geological, botanical, memorial or virgin forest. The horticulturist will find these areas of particular interest. They are tracts of outstanding or unique beauty or otherwise of unusual significance that require special management to preserve these qualities. They are maintained as nearly as possible in an undisturbed condition, but other activities and uses, which are not inconsistent with the protection of the special values, are permitted. There are no size limitations; the 74 areas so far designated vary in size from four acres to one of 283,000 acres in Alaska. They are designated by the Regional Forester (the United States is divided into ten national forest regions) unless 100,000 acres in area or larger, when the Secretary of Agriculture must proclaim the area. From the list of such areas several examples having special botanical values will be described.

COLEMAN RIVER SCENIC AREA in the Chattahoochee National Forest in Georgia (headquarters at Gainesville). This tract of 330 acres embraces rich shrubberies of mountain laurel (*Kalmia latifolia*), Rhododendron, Azalea, Leucothoë, Dogwood (*Cornus*), and ferns.

BLOOD MOUNTAIN ARCHEOLOGICAL AREA, also in the Chattahoochee National Forest, with an area of 28 acres, covered with purple and white rhododendron (*R. catawbiense*) and (*R. maximum*); mountain-laurel (*Kalmia latifolia*), azalea, and coltsfoot (*Tussilago farfara*). The purple rhododendron in May is a feature. According to Cherokee myth this tract is the home of the Nunneli or Spirit People.

HIGH SHOALS CREEK FALLS SCENIC AREA, Chattahoochee National Forest, 170 acres, stream banks of five water falls clothed with luxuriant growth of rhododendron and mountain-laurel.

SOSEBEE COVE SCENIC AREA, Chattahoochee National Forest, 175 acres includes a 25-acre stand of virgin yellow poplar (*Liriodendron tulipifera*) and thirty species of wild flowers, including Dutchman's Breeches (*Dicentra cucullaria*) and showy orchis (*Orchis spectabilis*). This area is a memorial to a Forest Ranger.

LODA LAKE SCENIC AREA, in the Manistee National Forest in Michigan, headquarters at Cadillac. The great attraction of this 72-acre tract is the profusion of many species of wild flowers in a forest environment, around a small lake.

WHEELER PEAK SCENIC AREA, Humboldt National Forest, Nevada, headquarters at Elko. This 28,000 acre area includes Wheeler Peak, the highest mountain in Nevada, a rock glacier, and perennial snow field. The flora (trees, shrubs, flowers) is represented by four life zones.

LAFAYETTE BROOK SCENIC AREA, White Mountain National Forest, New Hampshire, headquarters at Laconia. The vegetative cover of this 900 acre tract ranges from old growth Red Spruce (*Picea rubens*) to Sugar Maple (*Acer saccharum*), Beech (*Fagus grandifolia*), Sweet Birch (*Betula lenta*), and alpine grasses and flowering plants above 4,500 feet elevation.

PINKHAM NOTCH SCENIC AREA, White Mountain National Forest, New Hampshire. A 5,600 acre area including

the slopes of Mt. Washington and famous Tuckerman Ravine, where alpine gardens contain rare arctic flora attracting many botanists.

WHITEWATER RIVER FALLS SCENIC AREA, Nantahala National Forest, North Carolina, headquarters Asheville. Area 266 acres, contains Whitewater Falls of some 420 feet and river banks of pink rhododendron.

QUAKING ASPEN BOTANICAL AREA, Willamette National Forest, Oregon, headquarters Eugene. A glacial cirque of 240 acres containing a prime example of a mountain sphagnum bog with typical bog plants.

FALLS BRANCH CREEK SCENIC AREA, Cherokee National Forest, Tennessee, headquarters Cleveland. Spectacular 70-foot waterfall and virgin eastern hemlock (*Tsuga canadensis*) and hardwood forest, with a jungle of huge rhododendron.

UNAKA MOUNTAIN SCENIC AREA, Cherokee National Forest. The 360 acre tract on mile high Unaka Mountain is blanketed with rhododendron, white and pink azaleas, flame azaleas, mountain-laurel, and vaccinium.

BIG THICKET SCENIC AREA, Sabine National Forest, Texas, headquarters Lufkin. The forest includes red-berried shrub holly (*Ilex ambigua*), plus an abundant flora made possible by many spring-fed bogs. The lush biotic community is typified by Possum-haw Viburnum (*Viburnum nudum*) and various ferns.

MOUNTAIN LAKE SCENIC AREA, Jefferson National Forest, Virginia, headquarters Roanoke. This 1,543 acre tract contains varied plant life, rich in rhododendron and rare herbaceous species. Nine hundred kinds of flowering plants have been inventoried here.



U. S. FOREST SERVICE

Diamond Lake with Continental Divide in the background



U. S. FOREST SERVICE

***Purple rhododendron (Rhododendron catawbiense) at Roan Mountain
Pisgah National Forest***

PINK BEDS AND ROAN MOUNTAIN AREAS. These areas of 300-400 acres each are famous for great fields of rhododendron and azalea. The Pink Beds are in the Pisgah National Forest, North Carolina, headquarters Asheville. The Roan Mountain tract lies in both the Pisgah and Cherokee National Forests, the former in North Carolina, the latter in Tennessee.

ANCIENT BRISTLECONE PINE FOREST BOTANICAL AREA. Inyo National Forest, California, with headquarters at Bishop. A tract of 28,960 acres contains the world's oldest living thing—the bristlecone pine (*P. aristata*) ranging from very young to mature trees estimated to be 4,300 years old.

While the foregoing are especially distinctive in the horticultural sense, the horticulturist can find flora of interest in every national forest. The process of identifying scenic areas is a continuing one and the list is constantly being lengthened.

Persons wishing more information on a given area may write the Forest Super-

visor of the national forest concerned, at the headquarters listed above. A letter may be addressed to Forest Supervisor (name of Forest), National Forest (City and State).

Digging plants of any kind is not permitted. Information as to permits for digging or collecting plants elsewhere in national forests may be obtained from the Chief, Forest Service, Department of Agriculture, Washington 25, D. C. The writer should state the part of the country in which he is interested and the kinds of plants desired, so that his inquiry may be referred to the proper local office.

Natural Areas

These are areas representing a major, natural vegetational type in an unmodified condition, preserved exclusively for purposes of science and research. All use, except research and study, is prohibited, and no improvements of any kind are built. The latest statistics available show 63 natural areas ranging in size from 40 to over six thousand acres, with a total area of over 82,000 acres.

History of The Modern Delphinium

Frank Reinelt¹

Modern delphinium hybrids as seen in gardens today, have resulted in the combined efforts of a number of plant breeders dating back over a hundred years. Vilmorin-Andrieux already offered seed of *Delphinium elatum* in the 18th century, this species being accepted as a main parent of today's garden hybrids along with *D. formosanum* and *D. grandiflorum*.

The era of modern delphinium began when Victor Lemoine of Nancy, France, the dean of all hybridizers, took the first steps in breeding delphiniums and offered seventeen hybrids in 1857, some with fully double flowers. M. Lemoine carried his work on for seventy years, and gardeners will forever be indebted to him for the enormous diversity of material found in gardens, directly or indirectly, stemming from his efforts.

At the same time in England, James Kelway embarked on a large scale breeding program importing the best plants from France. Between 1878 and 1918 over a thousand named varieties of delphinium were introduced by Lemoine and Kelway alone. They popularized delphiniums to such an extent that many other plant breeders began working on them, and the race was on. Ronald Parrett, in his admirable book on delphiniums, describes in detail the history of the named varieties and mentions that in the short span of forty years no less than 1,821 varieties were introduced.

Charles F. Langdon of Bath, England, acquired a collection of named varieties in 1890 from Kelway and Lemoine. His work which was continued by his son and grandson contributed the lion's share to the development of present day named varieties. Other men influenced delphinium greatly, notably Watkin Samuel with his Advancement Strain of very long spikes. Frank Bishop made a considerable contribution with his Com-

monwealth Strain from the early thirties until his death. However, the Langdons' work, distributed by the firm of Blackmore and Langdon, has dominated the introduction of named varieties since the turn of the century.

Carl Foerster in Monheim, Germany, concentrated on breeding blues of pure perennial habit. His flowers were mostly single and too small to compete with the larger and more popular hybrids produced in England, France, and eventually America.

N. F. Vanderbilt in America started a new phase by combining the English hybrids with *D. scopulorum*, a native of the high Sierras of California. Mr. Vanderbilt produced a strain of graceful plants with thin hard stems and some mildew resistance. His fame spread quickly when he exhibited his delphinium at the 1915 Panama Pacific Exposition and World Fair in San Francisco. With an unlimited enthusiasm, Mr. Vanderbilt kept working until his death in the early forties.

The major step in combining some of the English varieties with the Vanderbilt Strain was made by Dr. Leon H. Leonian, a professor at the West Virginia University. Dr. Leonian contributed a major step by producing clear self colors in large editions such as had never been seen before especially in the lavender tones. His untimely death was a blow to the delphinium world. No doubt had he lived longer, he would have had tremendous impact on future delphiniums.

Charles Barber became the father of the large whites, originated from a chance seedling from his Hoodacre Strain which was largely a reselection of the English hybrids. Up to Mr. Barber's time, whites were mostly single and of muddy color and poor constitution.

Captain Edward Steichen whose world acclaimed work in photography has assured him a niche in the Hall of Fame, is also perhaps the greatest amateur breeder of delphinium. Although Captain Steichen has never distributed any of his seed or plants, his exhibits at the

¹Frank Reinelt is a member of the firm of Vetterle and Reinelt of Capitola, California, and has been responsible for the development of the Pacific strain of *Delphinium* for which his firm is well known. Breeding and sale of the Pacific strain of Tuberos Rooted Begonias and Polyanthus primroses are other specialties.

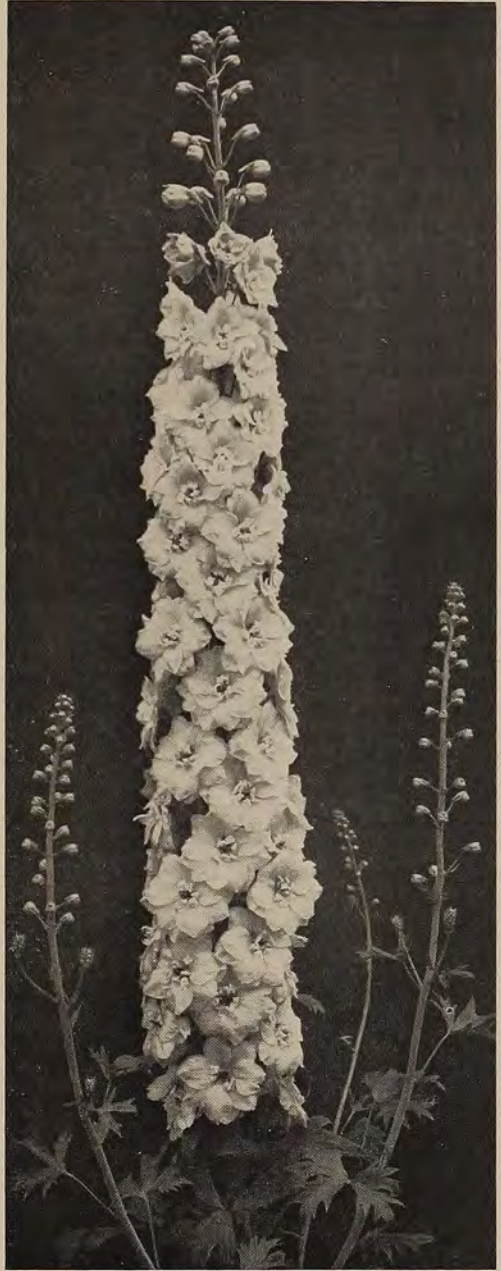
Museum of Modern Art in New York have never been equaled by anyone. Unfortunately, most of his stock was lost during the second World War when the Captain was Chief of Photography for the U. S. Navy and absent from his gardens for several years. A dwarf strain of belladonna hybrids with much larger flowers and a wider range of colors than the type was salvaged and will be introduced as the "Connecticut Yankees."

I came to California from Czechoslovakia in 1926 where we grew wild species only such as *D. elatum* and others. Seeing a bed of seedlings from Milicent Blackmore growing on one of the estates here was a revelation. The plants were in heavy adobe soil that had been liberally enriched with cow manure and bonemeal. The enormous eight foot spikes impressed me so that I began breeding delphinium immediately and with an enthusiasm that has never left me.

My beginnings were with a few packages of seed from Blackmore and Langdon which gave nice large flowers, from Watkin Samuel whose plants produced the longest spikes, and from N. F. Vanderbilt whose delphiniums had graceful thin hard stems. At first, carried away by enthusiasm, I made more crosses than I had room to plant, and the surplus seed was grown by my gardening friends who returned to me anything exceptional. An article at that time disclosed that Watkin Samuel was growing five thousand seedlings each year. This number seemed unattainable, and yet in a few years I was growing as many as a hundred thousand every year.

The color range at that time was limited to lavender and violet shades with some bi-colors and a very few blues of rather dull tone. There were no pure whites, just a few creams, until Charles Barber introduced his 'Pearl Necklace'. I paid ten dollars for a package of this seed and thought it well worth the price when the plants began to bloom, giving about eighty percent very fine whites.

Someone in every generation of plant breeders tries to raise a red delphinium. Like the others, I labored many years on this project using both the yellow and red forms of *D. nudicaule* and *D. cardinale* with more or less indifferent results. The lasting effect on my strain as a whole I shall mention later.



VETTERLE & REINELT

Galahad Series

Carl Salbach introduced my efforts in delphinium breeding in his catalog in 1930 as the Pacific Strain. I entered the commercial field in 1934 with the organization of the firm of Vetterle & Reinelt. My partners who were wholesale growers of tuberous begonias on a very large scale buying their seed from Europe, tested begonia seed from my crosses and then offered me a partnership with plant

improvement as the aim. Being young then, I tried breeding everything at once. Begonias became and still are our main subject, but delphiniums have never lost their charm for me. I began growing five thousand seedlings a year and financing the project by selling cut flowers.

Here close to the ocean, mildew was far more prevalent than in the sunny district where I had been growing my plants. Whites, particularly, were almost completely covered with it, but I remember a plant developed from Watkin Samuel seedlings which stood absolutely clean among the multitude. This, then, became one of the main parents from which I began breeding for mildew resistance.

Through correspondence, I became closely acquainted with Dr. Leonian and had the pleasure of growing some of his crosses through the years. Dr. Leonian developed the clear selfs, the purity of which was far ahead of anything in commerce at that time. His strain was based again on the English hybrids and the Vanderbilt strain. There was no room for jealousy or wishful thinking in this scientist's make-up. Year after year we exchanged crosses and cheerfully criticized or commended each other as the material turned out either good or bad. Dr. Leonian's untimely death prevented our meeting personally, yet I lost one of my finest friends, and the world lost one of the outstanding delphinium breeders of all time.

Major N. F. Vanderbilt, whose strain became famous when exhibited at the Panama Pacific Exposition in San Francisco in 1915, was our constant visitor for many years. Being an incorrigible enthusiast, the Major would tramp through our plantings by the hour, selecting all odd variations and carting them home for experiments. He did plant breeding in his later life for Jackson and Perkins at their experimental station in San Jose. Here I saw Ruys' 'Pink Sensation' for the first time along with some other *D. nudicaule* hybrids.

My original object was to select individual seedlings and to propagate them from cuttings following the English method. However, my thinking had to be revised. The method would have been too difficult commercially because of variation in climatic conditions in this

country. The planting would be in full bloom in California before spring had even begun in the east where most of the market was at that time. The disease known as aster yellows virus was an even more forceful argument. This disease carried by leaf-hoppers deleted my first propagation of named varieties by infecting sixty percent of the plants. Another difficulty, especially in eastern sectors, was the black crown-rot. This disease has now spread all over the country more or less and accounts annually for most of the losses in delphinium. Since producing named varieties was impracticable, I turned rather to breeding series in individual colors which would come comparatively true from seed.

Early in my breeding program I succeeded in breaking down the species, *D. cardinale*, by x-raying the seed in varying doses. The idea was to find the killing point. The most interesting lot out of the different ones x-rayed was one exposed for forty minutes. Only one seed germinated, apparently a normal *D. cardinale*. However, when selfed, it gave a variety of types in the second generation. Plants appeared from four inches to eight feet tall, mostly distorted in one way or another, but some with flowers almost twice the normal size. A giant race of *cardinale* was bred up from these. They also crossed quite freely with my garden hybrids, apparently having had a double set of chromosomes. The resulting seedlings were intermediate between the two types and ranged from lavender to wine-violet shades. While these were of no commercial value in themselves, they gave exceptionally luminous color when crossed with the garden hybrids. The blues and purples were dull until that time. The *cardinale* heritage accounts for the vividness of tone we have in these today. It also brought a rich velvety brilliance to 'Black Knight', and by mating the giant *cardinale* seedlings with the whites, several blush-colored plants appeared from which the Astolat series was eventually bred.

The ancestor of the Lancelot series came from a Leonian cross, one of the first pure self lilac shades. Generation after generation the other colors began coming truer and truer from seed. As visiting wholesale seedsmen from America and abroad were impressed with the

results, the demand for seed caused me to increase plantings to one hundred thousand seedlings per year. Progress then became fairly rapid.

California is blessed with a climate where delphinium can be bloomed anywhere from March to the end of November. I have kept forcing two generations a year simply by transplanting seedlings from flats about six inches apart and directly into beds where they bloom very young and show results early. This method was particularly meaningful in the beginning when large blocks of experimental series from *cardinale* stock could be tested at low cost.

My chief aims in breeding were uniformity and brilliancy of color, good form and habit, mildew resistance, and the possibility of coming true from seed. Several times I have stabilized a color, but did not like the habit or form and have finally discarded the strain. Occasionally, exceptional seedlings appeared, which in turn were used to improve other lines and to bring them up to standard.

We sow seed in August, transplant seedlings in the early part of October, and as a rule have them in full bloom during April and May. After seed is harvested, we plow the planting under. It is not economical to keep the plants watered and weeded and anyway the space is needed for a new generation. Each generation becomes a little better and more uniform which softens any regret over some of the beautiful seedlings that are plowed under.

Naturally with this method we cannot select for perennials. Over a period of years there has been quite a controversy on the perennial habit of Pacific Strain, but there was little I could do about it. In America, in a few favored locations like the Pacific Northwest, or some of the mountainous districts, delphiniums are perennial. In the rest of the United States the climate leaves much to be desired for growing them. Unfortunately, neither crown-rot nor aster yellows virus respects the perennials, and until we are able to control these two diseases, there is little use in trying to breed perennial delphiniums.

Some time ago I was discussing the subject of perennials with Captain Edward Steichen who was visiting here.



VETTERLE & REINELT

Bicolor Type

According to his experiments, it takes five years on an average to test whether or not a plant is a true perennial. Then only five percent of the crosses between perennial plants again inherit the true character. At this rate the prospect of raising fine flowers with everything desired would be limited, if one could raise one generation only in five years.

It would be a challenge to propagate exceptionally fine seedlings, and eventu-



VETTERLE & REINELT

Bluebird Series

ally I shall try to do this in a limited way for my own pleasure and personal garden. However, I would hesitate to turn this into a commercial venture, as large plantings which take years to propagate could be wiped out in a matter of weeks. As I have many other irons in the fire, the time I can spend on delphiniums is now limited, and I have to devise the simplest methods possible.

Since the war, we grow approximately five thousand seedlings each of the various color shades, and fifteen to twenty thousand light blues and whites which

are in the greatest demand. I try to narrow each color to the best half-dozen plants, which we intercross as a group, sowing the seed and raising a new generation the following year. In alternate years, instead of crossing we let plants self in order to shed out any undesirable characteristics, and also to keep up the ability of self-seeding. In earlier years, I used to choose plants that had six stigmas and seldom any pollen so as pollination could be done without the time-consuming deanthierization. This worked very nicely until in a few years most of these plants would not seed at all unless pollinated. A change had to be made for the production of bulk seed. Every character is inheritable, and diabolically, it seems that bad ones are almost more so than good ones.

Most of the color shades possible have been reached with what we have to work with now, but clarity of color and especially the clarity of the contrasting bee can be improved certainly. We could carry this to any point by increasing the bee to becoming as large as the flower.

I have tried to get a different colored bee for each series in the Pacific Strain to make them more distinct. The most difficult ones are the golden-fawn bees. One year they seem to be there and the next are as elusive as ever.

Each year I use some exceptionally outstanding seedlings in combinations with other color shades for the possibility of introducing new leads into groups that have been closely interbred and are not now offering anything new. While pure races are good in their uniformity, it is among the mongrels that one usually finds the finest specimens. Perhaps this is so because of the combinations of so many factors.

The pink and raspberry tones introduced as the Astolat series, are actually diluted magentas, and attractive only in the young stages, especially during dull weather. Magenta in its pure form can be brilliant, but is always muddy when combined with other colors and difficult to eradicate. Even the bluest of blue delphiniums have traces of magenta in them. One has only to look on the reverse side of the petals to see this. Blues of the sea-green-blue tones could be achieved if we had a true yellow garden hybrid with which to work. For several years, I tried crossing *D. sulphureum*

'Zalil' with garden hybrids and although seed was produced, the resulting plants were always pure 'Zalil' or pure garden hybrids, depending on which was used as the seed parent.

When Mr. A. A. Samuelson of Pullman, Washington, introduced his strain of West of the Rockies Hybrids, a common western species, I thought that a major step towards red was accomplished. Mr. Samuelson's plants, unlike *D. nudicaule* which blooms only once before going dormant, kept sending new spikes all summer and were quite hardy in Pullman's low winter temperatures that occasionally drop to 20 degrees below zero. The flowers were larger than *D. nudicaule* with a range of shades from red through rose and pink. He also produced a dwarf strain of apricot-yellow tones with contrasting red bees that were particularly charming. In his own garden I saw a row of seedlings which represented all the colors found in delphinium species. These were dwarfs of the *nudicaule* type, and the thought occurred to me that if all colors were possible in one group why not in another.

I interbred the West of the Rockies hybrids for several years with the best of the Galahad and Astolat series with indifferent results. The red and yellow color came only in the *nudicaule* form and habit, and those with garden hybrid characteristics were mostly purples and magentas. A seedling from Galahad crossed with one of the dwarfs was an appealing and graceful plant with single white flowers and a contrasting blue bee. This persisted in my garden for several years, but was no use in breeding—being a mule.

It remained for the scientists to accomplish the seemingly impossible, and the prize goes to Dr. R. A. Legro at the Agricultural University at Wageningen in Holland. Dr. Legro began experimenting in 1953 and describes in detail his results along with photographs in natural color in the 1963 yearbook of the British Delphinium Society. Colchicine induced tetraploid-colored species which interbred among themselves. These were finally mated to garden hybrids which gave the key to Pandora's Box.

Another distinguished scientist who labored along similar lines and produced a red garden hybrid is Dr. G. A. Mehl-

quist at the University of Connecticut. His article is in the same issue of the British Delphinium Society Yearbook and describes in detail his own experiments.

No seed of Dr. Legro's hybrids has been released as yet. They are still in the early stages of development. Now it is only a matter of time until we have all of the colors among our garden hybrids. The quest for the sea-green-blue which has kept haunting me for years may one day be accomplished.



VEITLER & REINELT

Black Knight Series

Factors Affecting the Germination of Palm Seeds

Harrison G. Yocum*

Palmology, or the study of palms, usually is concerned with their taxonomy and other botanical aspects. While this is important the door remains open for much work to be done along horticultural lines. A survey of the existing literature on palms reveals the deficiency of adequate horticultural work with the majority of the species. Most of the cultural studies have been concerned with the commercial and economic ones—particularly the African Oil, Coconut, and Date palms.

The horticulturist is interested in growing plants for their aesthetic effects, and among them palms for bold or graceful results. Regrettably, many worthwhile species are rarely seen in cultivation, except in good collections at the famous botanic gardens of the tropics. The majority of palms are slow growers, especially under average indoor conditions, and this makes them well suited as ornamental house plants. The leaf patterns, varied vestures, and color combinations of leaves and petioles are so diverse in this group of plants that they merit greater use in decoration. Today, perhaps the most popular house palm is the *Collinia elegans* probably because of its dwarf habit. Most people are not aware that there are many others much more attractive.

Condition of Seeds

It is important that the seeds be firm and free from pathogens. Imported seeds are generally inspected as they enter a country. However sometimes some seeds are soft, or they may have fungus on/ or inside the pericarp and since it is not good to plant such seeds, they should be discarded. One should start with fresh seeds to obtain a greater percentage of germination (6, 11, 13). Viability is lost with age and for this purpose importation by air is recommended. Some seeds (for example—*Jessenia* and *Oenocarpus*) develop a shrunken embryo after two or

three weeks as a result of desiccation from not being received in time (2, 13). This is particularly true when seeds start germinating in transit if packed in tins of peat moss or in polyethylene bags. Sometimes seeds of the Betel Nut, *Rhopaloblaste* and *Rhopalostylis* are fully germinated with plumules upon arrival; such seeds can be individually potted. This applies also to seeds with emerging radicles which often occurs in *Actinorhysis*, *Orania*, and *Pholidocarpus*.

Treatment of Seeds

On receiving the seeds, the moist or dry hulls should be removed, if not already done, to reduce danger of infection. The original reason for removal of the hulls was to improve access of water through the micropyle to the embryo (4). Another reason for their removal would be the ever present factor that fungi readily attack the hulls, and especially when they are fleshy. It is known that fleshy hulls particularly may secrete some hormone or inhibiting agent which delays germination (9, 10, 12). If care is exercised, the woody hulls of *Acrocomia*, *Astrocaryum*, and *Bactris* may be removed by cracking under pressure in a vice, or gently tapping with a hammer on a concrete surface. When the hulls are removed with difficulty, scarification near the micropyle is preferred to cracking; this may be accomplished by filing but care must be taken not to injure the embryo. Seeds with thin hulls are easily removed by hand.

After removal of the hulls, flotation in water is a good practice. Experience has shown that floating seeds usually are not viable (8). Sowing of unviable seeds is more apt to introduce pathogens thereby endangering the germination of viable seeds; the former usually have a musky odor.

At this stage it is well to rub the viable seeds vigorously between the palms of the hands under running water in preparation of sowing. This abrasive

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action would remove loose hull tissue and pathogens if any were lying on the surface. Seeds may be dusted with a fungicide if there is any suspicion of harmful organisms.

Unless the seeds are to be mailed, immediate planting after washing is recommended in order to prevent desiccation of the embryo.

Soaking of Seeds

Work with the soaking of seeds prior to planting is meagre. Experiments have been carried out by De Leon (2, 13), Johnston (9, 13) and Kitzke (8). There is the likelihood that the various species will or will not require soaking for different lengths of time. It may be beneficial or harmful to a particular species. When the water treatment is prolonged, it is well to change the water daily.

Kitzke reported that freshly harvested seeds of *Copernicia* germinated as soon as two days after soaking began; seeds were soaked in water at 132°F. for five minutes. The work of Kitzke shows that soaking untreated seeds in daily fresh changes of tap water for nine months results in a sporadic germination through that time. Any occasional occurrence slime attacking seeds during this water soaking period may be controlled by previously dusting the seeds with a fungicide—such as arasan or semesan. The water-soaking method may benefit other small-seeded palms besides *Copernicia*.

Work with seeds of *Elaeis guineënsis* reveals that a pre-treatment of soaking in water results in poor vigor of the seedlings. This is probably caused by damage to the embryo by prolonged anaerobic conditions inside the hull (4). Hence it would seem that seeds with thick hulls, as mentioned previously, are best scarified by filing near the embryo, taking care not to injure it.

Planting

Here, we are concerned only with the sowing medium. Many growers use a particular substance, usually because they have found a good degree of success. Where loam alone is used, it is best sterilized to reduce risk of losses. Other media are charcoal dust, cracked charcoal, peat, perlite, sawdust, sharp sand, sphagnum and vermiculite, alone or in various combinations. Insert materials, such as perlite and vermiculite

are recommended because of their porosity and water holding capacity. Powdered charcoal, however, is reported to be superior to all other media in the germination of *Elaeis* seeds (4, 5); arguments for this will be given later.

Receptacles, be they flats, pots or tins (if not in the open) for starting seeds should be thoroughly cleaned if not sterilized and kept where animals and insects can not molest them. Seeds may be sown thickly until ready for thinning-out after germination (7, 13). Small seeds may be $\frac{1}{4}$ of an inch apart; other distances will vary with the shape and size of the seeds.

The depth of planting will differ with the germination media to be used; the lighter the medium generally the deeper the seeds may be planted. The seeds may be covered with their own depth of the medium used (1); or small seeds may be covered about four times their thickness, and large seeds covered with the top of them about one inch from the surface (6). The writer is of the opinion that regardless of size, all seeds may be planted so their upper surface is just below the top of the medium. This will give adequate aeration provided uniform moisture is maintained around the seeds.

Often an elongating root raises the seed above the sowing medium before its plumule is developed or as it is developing. Hence it is wise to transfer the germinating seeds individually to deeper receptacles before the roots get too long and intermixed, otherwise it will be almost impossible to separate them without injury or loss. The roots of *Bismarckia*, *Borassus*, *Copernicia*, *Hypphaene*, *Latania*, *Lodoicea*, *Orania*, *Pholidocarpus*, and *Raphia* (not to mention others) go to a considerable depth before the plumules ascend. The emerging radicles of such deep-rooters tend to be thick in diameter (3 mm. or more). Except for the Palmyra (*Borassus*) and Double-coconut (*Lodoicea*), 5-quart oil cans make suitable containers

Moisture Considerations

Since the seeds must be kept watered, the drainage should be thorough to prevent sourness. By respiration, seeds may accumulate carbon dioxide in the containers if the seeds are planted too deeply or in poorly drained receptacles. Because oxygen is necessary for germina-

tion in the oxidation of compounds for growth, high concentrations of carbon dioxide are known to displace the oxygen and thus retard or prevent germination of seeds (4). The speed of germination is improved by better aeration of the seeds. For this reason shallow planting in flats over constant bottom heat is preferred.

Sufficient levels of moisture are important for successful germination. Naturally, a higher moisture content would fill the pore spaces at the expense of the oxygen. So there should occur periodic changes in moisture and aeration. It seems that these fluctuations in moisture content will improve the air circulation in such porous materials as charcoal or vermiculite better than it would in less porous materials. Work with seeds of the African Oil Palm (*Elaeis*) in charcoal reveals that the speed of germination increases with its increasing moisture content. The wettest charcoal, nearly saturated to its maximum water capacity, proved to give the best results. A decrease in germination occurs if the moisture falls below 36% (4). The high porosity of charcoal is a contributing factor to this. Consequently, planted seeds should be kept uniformly moist at all times in any such porous material.

Supplemental Heat

In cool climates, artificial heat is important to successful germination. Loomis (9) reported an experimental method using controlled heat cables on the surface of the sand or soil in which the seeds were planted. This would not be recommended with lighter porous material (charcoal or vermiculite). Most workers have shown better results when the cable is placed below the seeds. A heating cable materially hastens germination when the thermostat is set at 80°F. Heat seems to reduce the losses that may occur from decay favored in a cold, damp germination medium—especially under conditions of excess moisture. In addition to supplying warmth, the heat will result in more rapid evaporation, which in turn will favor the moisture-aeration balance.

It should be pointed out that after germination, the seedlings should be re-

moved from the bottom heat to cooler temperatures or else the heat turned off. It has been reported by Lothian (10) that seedlings of *Livistona* were injured and even died subsequent to germination because of strong bottom heat, or they may have perished because the lowest layer of the medium dries out too excessively.

Summary

The conditions affecting the germination of palm seeds may vary to such an extent that one or more factors may be detrimental to optimum results. The initial factor is that the seeds be as fresh as possible because viability averages only a few weeks. When present, the hulls surrounding the seeds should be removed if they are not scarified. Planted seeds should have adequate aeration, bottom heat, drainage and moisture, providing the latter is not limiting; good drainage prevents troubles from excess water or inadequate aeration. A bottom heat of 80°F. is a factor of great importance for optimum results in the germination of palm seeds.

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A Book or Two

A Gardener's Book of Plant Names

A. W. Smith. A Handbook of the Meaning and Origins of Plant Names. Harper & Row, Publishers, New York, Evanston, and London. 1963. xix plus 428 pages. \$5.95. (Library).

This compact volume is a handbook for gardeners who wish to look up the meanings and origins of plant names. Also included are an introduction explaining very briefly how plants get their names, a short list of botanical definitions, and a list of common names with their corresponding scientific names.

The usefulness of such a publication depends on its accuracy, hence this reviewer compared it with other more scholarly horticultural references on plant names. On page x of the Introduction a statement that a plant name may consist of a genus name plus more than one species epithets is incorrect, as is the claim on page xi that it can have more than one varietal name (*Alyssum saxatile* var. *compactum citrinum* is not correct).

The section on common names merits considerable criticism and would best have been completely omitted from the book. This section tells us that Indian grass is *Arundo*, that Innocence is *Collinsia*, that wild licorice is *Abrus*, and that balm-of-gilead is *Cedronella*. There are many people who are likely to question these facts or at least to inquire about the other plants so-called. Another kind of inaccuracy results from the author's attributing certain common names to an entire genus, e.g., Texas bluebonnet to *Lupinus* (actually only one or two species); Indian tobacco to *Lobelia* (actually only *L. inflata*).

Leaving the best until last—the main part of the book should be quite helpful. Here, the author (a Greek and Latin scholar with a broad knowledge of horticulture) gives the meanings and origins of such species epithets as *canus*, *capensis*, *capillaris*, *capillipes* and *cappadocicus*. Not only the great majority of species epithets are included, but also a considerable range of garden genera. Although such information is contained in certain well-known horticultural reference books, a convenient compilation in briefer, easier-to-find form was needed.

The biographical information, however, should be cross-checked with other references: what is the correct spelling of the first name of Augustus Lippi (*Lippia*) and what is the correct date of his death? This book gives 1701, other references 1703 or 1704. Similar disagreements were found among the references compared as concerns the birth and death dates for certain other early botanists. The genus *Marshallia* apparently was named for Moses Marshall instead of Moses' uncle, Humphrey Marshall; the same error appears in one other important reference source. The birth date for Joseph Koelreuter probably should be 1733 instead of 1773 as stated by Smith. The critical reader will find controversial the derivation of the species epithets *matronalis*, *mollugo*, and *telephium*. Citation of such minor errors or confusions may be unjust to the author, since generally the main section of the book is reasonably accurate and should be very useful to its readers.

E. E. TERRELL

Miniature Bulbs

Roy Genders. St. Martin's Press, 175 Fifth Ave., New York 10, N. Y. 1963. 191 pages, 48 pages of photographs. \$6.75. (Library).

This book will appeal especially to those who enjoy flowers and want to extend the flowering season in their garden. Bulbs often provide flowers either very early or very late in the season as well as being of prime importance for the spring months. The author describes bulbs from *Allium* to *Zephyranthes*—the species and varieties, general culture, and specific variation in culture as some species may require. The earlier chapters are concerned with the general uses of bulbs in various landscape uses as in the lawn, with shrubs, in an alpine garden, naturalized, and for forcing in the home or cool greenhouse. Incidentally, the term bulbs as used in this book is with its broadest meaning to include corms, tubers or fleshy roots.

C. B. L.

(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.)

Encyclopedia of Roses in Natural Color

H. Edland. St. Martin's Press, 175 Fifth Ave., New York 10, N. Y. 1963. 175 pages, 421 illustrations—colored. \$6.00. (Library).

A pocket-sized handbook of rose varieties. The varieties are arranged in alphabetical order with a description of each. The name of the variety is followed by the illustration number, the classification of the variety, the introducer's name and year of introduction and a brief description. The description is intended to help identify a variety and its characteristics. They are prepared somewhat like the descriptions in the American Rose Annual.

As a further aid in identification, a list of varieties is included separating them into basic color groups and types.

Several pages are devoted to the general classification of roses of all types and general cultural information.

C. B. L.

Trees and Shrubs for the Southeast

Brooks E. Wigginton. University of Georgia Press. Athens. 1963. 277 pages. 23 plates. \$7.50. (Library).

A need has long existed for an authentic text on plants for southeastern gardens. This is a region favorably situated, climate-wise, to grow many plants of the Orient that have made Japanese and Chinese gardens so exquisite. Mr. Wigginton writes of these plants and others with a familiarity and thoughtfulness that causes the reader to follow through the book unaware that he is reading compact comments on individual plants.

The book is divided into plant groups in the usual fashion—vines, groundcovers, lesser shrubs (under 6 feet), major shrubs, and trees. There are three appendices—plant lists for the New Orleans area, for the shore area of Georgia, North Florida and the Gulf Coast, and for the Southeastern Mountains. Each of the plant group sections is introduced by a discussion of concepts for using that particular type of plant, then a recommended listing divided according to climatic groupings, i.e. Southern Coastal Plain, Southern Piedmont, and Upper South. For each area plants are also grouped according to general or restricted use. There follows an alphabetical listing of these plants by scientific name with appropriate notes on plant character, requirements, garden use, and effect. These notes are directed toward garden and foundation planting composition and avoid the usual filler material found so often in similar books where the writer utilized often well-known facts. Nor are the plant lists limited to more common plants, but rather include many of our recently introduced species destined for the gardens of the future. It is only in this area that the reviewer has picked up any errors, but these are not serious. For example, *Ardisia japonica*, discussed under lesser shrubs, is actually a groundcover growing in the manner of *Pachysandra* for which it can serve as a substitute. Nor am I certain, in reference to *Cleyera* and *Ternstroemia*, which plant the writer is discussing; probably the latter, but this is a confused point

of long standing owing to incomplete botanical classification.

Most of the good and potentially useful plants for the Southeast are discussed, and this includes a great many natives as well as exotics. Among those missing, however, is *Pinus thunbergii*—one of the most valued Japanese conifers, of considerable merit for use along the coastal areas. The bamboos are discussed in their respective plant groups, but these are so unique and important in the southeast that they should, in the reviewer's opinion, have been classed by themselves.

One can do well to obtain this book even if he lives out of the intended area of interest. It offers exciting possibilities for the experimenter who would like to try plants beyond their usually recommended range. I think this is a good source book for such plants because the author is somewhat conservative in the range of adaptation for many of his plant choices.

The plates are directed towards landscaping fundamentals, showing use of plants to achieve certain objectives—canopy, screening, area definition, patterns, and similar expressions exhibited by plants when selected with thought and appreciation for their more subtle aspects.

J. L. C.

Growing Orchids at Your Windows

Jack Kramer. D. Van Nostrand Company, Inc., Princeton, New Jersey. 1963. 151 pages. Illustrated. \$4.95. (Library).

Several books have appeared on the market within recent years that have dealt, in whole or in part, with the subject of growing orchids in dwellings. The subject is no longer new, but it has not yet been fully explored.

This book is well written and well illustrated for the potential orchid enthusiast who has no place in which to grow orchids other than his home. It lists, illustrates and describes, in relatively non-technical language, orchid species which the author considers adaptable to residential culture.

Culture techniques, such as potting and window arrangement, are illustrated. Orchid pots, watering, fertilizer and fertilizing practices, summer outdoor culture, the use of supplemental artificial light and pests and disease problems are touched upon.

An appendix contains summarized information on plant types, their preferred light conditions, size, flowering time, flower size, color, etc. There also is a list of dealers, both domestic and foreign, from whom orchid plants and growers' supplies may be purchased.

This is an excellent book for its intended audience, the beginner and potential beginner, who has little or no horticultural knowledge or experience.

E. G.

The New Complete Book of African Violets

Helen Van Pelt Wilson. M. Barrows and Company, Inc., 425 Park Avenue South, New York, 1963. 299 pages, illustrated.

Mrs. Wilson's new book is an enlarged and updated version of her earlier books on African violets. According to the author, "All existing material has been updated and half again as much new added through chapters on genetics, fluorescent lighting, flower arranging, selling violets, photographing them, and club programs." This book has a fairly comprehensive coverage of important subjects such as illumination, diseases and pests, propagation, and cultural methods. The chapters on species, other gesneriads, early varieties, and genetics should prove interesting and instructive to many African violet enthusiasts who prefer to breed and create their own varieties. The text is well illustrated with beautiful drawings and photographs, colored and black and white. The photograph of *Saintpaulia velutina* should be replaced with one of a more vigorous specimen.

T. A.

The World Book of House Plants

Elvin McDonald. Published by the World Publishing Co., Cleveland, Ohio, 1963. 318 pages. Illustrated. \$7.95. (Library).

An easily read book on the culture of plants in the home. Culture is discussed first with such topics as soils, containers, maintenance and pest control. Each of these are considered in simple practical terms. Indoor propagation of plants is discussed. Suggestions are made of kinds of plants suitable for specific locations in the home as to light and temperature. Cultural information is given on the forcing of bulbs, indoor culture of herbs, training of house plants as "standards" or in tree form and the use of vines and hanging baskets.

The second half of the book describes many kinds of plants suitable as house plants, with a brief description of the species and culture. The book is well illustrated with photographs, and line drawings illustrate many of the plant descriptions. The plants are grouped alphabetically according to the plant family. The book is well indexed to find the plants easily.

C. B. L.

Soil and Plant Analysis—A Practical Guide for the Home Gardener

Milton Morris. Milton Morris Publications, Orinda, Calif. 1963. 36 pages. (Library).

A bulletin on soil and plant analysis for the home gardener on what is involved and what to expect from such tests. The tests and soil problems discussed are those found in the Western United States. The make-up of the booklet, hand-lettering, an dinteresting sketches on the margins, many with an oriental flavor, are of more interest than the text.

C. B. L.

Gardening on Lime

Judith M. Berrisford. Faber and Faber, 24 Russell Square, London. 212 pages, 1963. Colored frontispiece, plus text photos. \$8.40. (Library).

This book is written for British gardeners who live in areas with predominantly alkaline soils. In Britain these soils consist of three main types—chalk, limestone, and alkaline clays or marl.

The seventeen chapters encompass presumably the complete range of circumstances one might encounter in growing ornamental plants on alkaline soils. Content includes the simple chemistry of alkaline soils, but the major part of the book concerns the kinds of plants one may expect to grow on these soils. A chapter on growing fruit and vegetables on alkaline soils is also included.

F. G. M.

The American Home Garden Book and Plant Encyclopedia

By editors of *The American Home*. Published by M. Evans and Co., Inc. 1963. 512 pages. \$7.95. (Library).

A general garden book with information on all kinds of ornamental plants in garden and landscape use. The last section of the book is a plant encyclopedia giving both the scientific and common name of plants, some general descriptive information about each and cultural requirements. It covers a wide range of topics being written for a general gardener and not for the expert who will want much more detailed information. The book covers so much that at times it becomes very general, and the reader may need to look further for information on his local situation. The plant lists are of this kind with such broad headings they may be of little use without other information. However, the book will serve the general gardener satisfactorily and that is the audience for whom it is intended.

A Catalogue of Redouteana Exhibited at the Hunt Botanical Library, 21 April to 1 August, 1963

Hunt Botanical Library, Carnegie Institute of Technology, Pittsburgh, Pennsylvania. 117 pages. Illustrated in black and white, 2 color plates. \$5.00. (Library).

This catalogue of Redouteana is not the first and certainly not the last in a long series of tributes to one of the greatest flower painters of all time. Before Mrs. Hunt's untimely death early in 1963, she had planned an exhibition of her collection of Redouté.

The Redouteana material in the Hunt collection consists of 203 items. The catalogue is divided into four chapters: (1) Flower paintings, (2) Books illustrated by Redouté, (3) Redouté's drawings, paintings, and prints, and (4) Letters and documents by Redouté.

Pierre-Joseph Redouté (1759-1840), a Belgian by birth, came from a distinguished family of painters. Pierre-Joseph's early life was devoted largely to interior decorating and the painting of portraits and religious scenes. His interest in flower painting was inspired by the Dutch flower painters of the 17th century. Redouté is most celebrated for his years in Paris and his association with the Empress Josephine at the Malmaison. After the fall of Napoleon, Redouté worked for an assortment of nobility in various parts of Europe. At the Malmaison Redouté produced three of his most sumptuous works, "Jardin de la Malmaison," a joint work by Ventenat, Redouté, and Mirbel, "Les Liliacées" and "Les Roses," the latter two produced by Redouté himself. This triumvirate of works represents the acme of Redouté's success as a flower painter.

The Hunt catalogue shows the high quality expected of works published by the Hunt Botanical Library. The catalogue is superbly produced. A number of Redouté's fine flower paintings are reproduced in black and white. Two color plates illustrate *Begonia obliqua* from L'Héritier's *Stirpes Novae* and *Erica vestita* from an undesignated work. Redouté "brought the art of flower painting to unexpected heights, and by immortalizing his botanical subjects he immortalized himself."

F. G. M.

Flora of Missouri

Julian A. Steyermark. The Iowa State University Press, Ames, Iowa, 1963 (Printed in Holland). lxxxiii plus 1725 pages, copiously illustrated. \$18.50. (Library).

Steyermark's *Flora of Missouri*, without question, is the most definitive State flora to be published in recent years. In scope, this new work most closely resembles Deam's *Flora of Indiana* published some years ago.

Although the work is written primarily for botanists, it is both a wild flower book and a flora combined. Horticulturists interested in wild flowers will find the author's field notes an outstanding feature of this book. For many years, Dr. Steyermark grew scores of Missouri plants in his garden near Chicago and much data in the book is recorded from garden records.

This flora is a manual based largely upon the author's personal experiences with Missouri plants in the field. During the nearly thirty years required to produce this book, the author alone collected 60,000 specimens of Missouri plants.

Although detailed technical descriptions usually found in floras are lacking, the keys to the species, varieties, and forms are more comprehensive than for most floristic works. The field notes, the common names, and uses of plants are highly useful attributes of this flora. In addition, each plant is provided with a map

showing its distribution county by county in Missouri. The flora lists more than 2,400 species.

The book is much more than a mere flora of Missouri. It will be useful in the eastern states and for the whole of the midwest. Dr. Steyermark has produced what was obviously a labor of love.

F. G. M.

Gardens

Miles Hadfield, G. P. Putnam's Sons, New York (Printed in Italy), 128 pages. Illustrated in color and black and white. \$3.95. (Library).

In a neat beautifully produced little volume of 128 pages and 7 chapters, the author attempts to show something of the developmental history of gardens in Europe, America, and the Far East. Several dozen gardens are listed, but in a relatively brief account such as this, the author is limited to a thumb-nail sketch of each garden. The theme of the book traces the history of garden development from the Moorish gardens in Granada, through Le Nôtre, Lancelot 'Capability' Brown's English garden, to the development of gardens in America in the 19th century in such places as Fort Worth, Texas and penthouse gardens in New York City.

Chapter 1, called Italy and Beyond, cites examples of some of the most noted of early Renaissance gardens of Italy, with examples of historic gardens in Austria, Spain, and Portugal. Chapter 2 is limited to France and Le Nôtre. In Chapter 3, The Gothic North, readers are introduced to gardens of Holland and Germany. In Chapter 4, Oriental Interlude, the author discusses some aspects of garden design in the Far East. Chapter 5 is devoted entirely to English gardens. Chapter 6, entitled Nineteenth-century Variety, is devoted partly to early American gardens. Chapter 7, entitled Greenhouses and Alpine Gardens, shows how the orangery was used in European gardens of the 18th and early 19th centuries, and we are brought into the 20th century with examples of contemporary garden design.

This little volume with its many excellent colored plus black and white illustrations is recommended as background reading, especially for persons planning to visit some of the classic gardens of Europe.

F. G. M.

The Practical Home Gardener: A Guide to the Cultivation of Plants in Australia with Special Details for the Drier Regions

T. R. N. Lothian. Lothian Publishing Co. Pty. Ltd., Melbourne, Australia. Second Edition, 1963. 390 pages. \$28.00. (Library).

The Gardeners' Pocketbook

Nymphaea gigantea var. *alba*

Although the blue form of the Australian waterlily had been grown for almost one hundred years, it was not until 1946 that the white-flowered form of the magnificent lily was introduced to the water gardener. Thanks to the efforts of Mr. Albert De Lestang of Queensland, Australia, seed was collected by roving aborigines and sent to the United States. Collection was by no means a simple operation, for the seed pods sink beneath the water, and the presence of crocodiles added to the hazards.

Both color forms of *Nymphaea gigantea* are somewhat temperamental and slightly less hardy than the more commonly grown members of the subgenus *Brachyceras*. They require a warmer minimum water temperature of 75-77° F. and tend to become dormant or "go to sleep" if a sudden drop in temperature occurs soon after planting. Because of this sensitivity, the tubers are planted out a week or so later than the other tropical water-lilies.

Although the tubers are not as prolific as most of the hybrid varieties, one tuber will produce approximately six stoloniferous growths successively. These can be removed at the two or three floating-leaf stage, and each plant potted into a three or four inch pot. Within six weeks to three months, the plant will form a tuber that can be used for further propagation or display. Tubers can be overwintered by storing them in Mason jars containing moist sand.

The flower is typical of members of the subgenus *Anecphya*, standing eighteen inches out of the water and the samens are incurved and filamentous. The white petals are broader than those of other members of the subgenus *Brachyceras*. At Longwood Gardens, flowers have attained a diameter of nine inches and are extremely fragrant on the first day of opening. The center of the flower surrounded by the golden stamens is filled with nectar. Each flower lasts four to five days after which it sinks beneath the water.

Unlike other tropical day-flowering waterlilies which close about 5:00 P.M.,

Nymphaea gigantea var. *alba* stays open at night, lending itself to artificial lighting.

The clone grown at Longwood Gardens appears homozygous, for seedlings from self-pollinations have flowered true to type. Seed is best sown as soon as ripe, in shallow pans, one-fourth inch deep in a mixture of equal parts of loam and sharp sand. The pans should be submerged two to three inches beneath the surface of the water.—PATRICK NUTT, *Longwood Gardens, Kennett Square, Pa.*

Begonia evansiana

Begonia evansiana, the only species hardy in northern gardens is a native of China. I believe that the plant has great garden value because it provides a beautiful display of foliage during many months and then delivers a fine show of flowers in August after many other perennial plants have finished. The flowers are deep pink about an inch across.

I grow them in complete shade, under a Shagbark Hickory (*Carya ovata*) tree, in a soil high in humus. The area is under-planted with narcissi and the edges of the beds contain great numbers of snowdrops and scillas. The exclusion of direct sunlight is a must. Even short exposure to morning sun (in my garden) will cause the leaves to turn brown on the edges. The plants are shallow-rooted and need a constant supply of water. In severely hot weather, even one day's delay of watering will cause serious damage to the leaves. One problem in maintaining this plant is the tendency to crowd each other for space. When bare spots occur, I simply transplant some surplus specimens into such areas. They transplant without the slightest wilting.

Each autumn the area receives a mulch of oak compost to a depth of about 3 or 4 inches. By early spring, this layer is compacted to one inch or less. Modest application of a complete fertilizer in early spring, prior to emergence of new growth seems to supply all the plant food required. When the plants become ragged sometime in October,

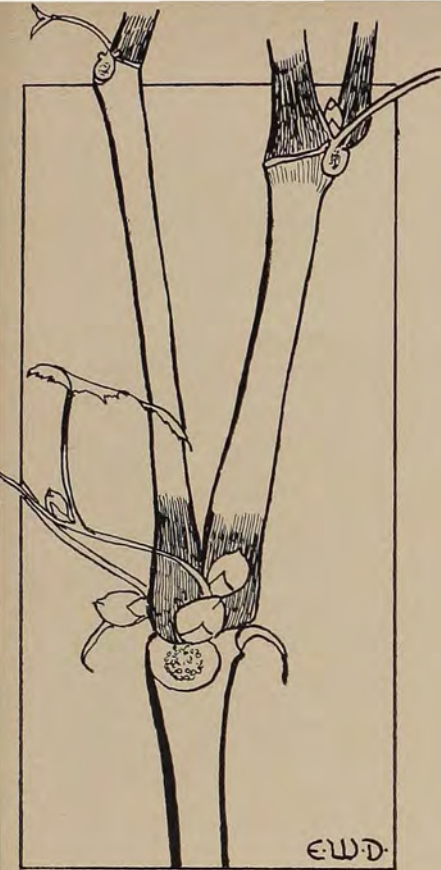


EDGAR DENISON

Begonia evansiana. Planting in my garden covers about 200 square feet, and the plants grow to a fairly uniform 2½ feet high. Flowers are deep pink.



Development of a young plant of B. evansiana from a bulbil.



they are cut down and left in place to be covered by the mulch. Since bulbils are profusely produced in the leaf axils, this may be the cause of getting too many plants in one place.

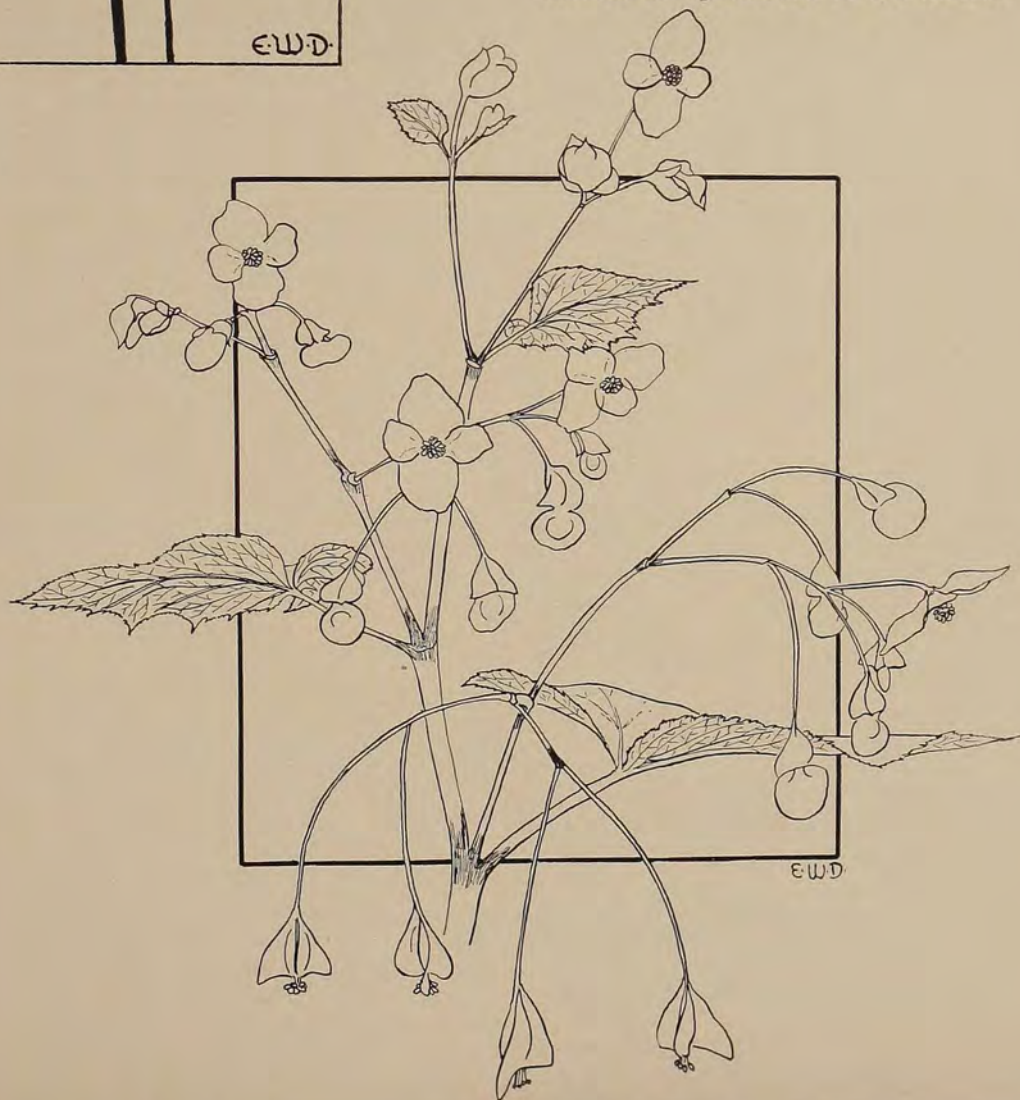
I have never seen any diseases on *B. evansiana*.—EDGAR DENISON, Kirkwood 22, Missouri.

EDITOR'S NOTE:

The magnificent bed of *B. evansiana* in Mr. Denison's garden is proof that skill and patience are essential ingredients in the growing of fine plants. In spite of difficult growing conditions in the central midwest, a better display of this hardy begonia would be difficult to find anywhere. This plant will, however, thrive in many areas of the country, except perhaps in some of the higher mountain areas in the Rocky Mountain region. The dried seed pods make interesting subjects in flower arrangements.

F.G.M.

Bulbils are produced at the nodes.





BERNARD HORNE

Magnolia officinalis 'Biloba'

Two Rare Magnolias in Michigan

In 1936, seeds of *Magnolia cylindrica* Wilson and *M. officinalis* Rehd. & Wils. 'Biloba' were obtained from the Lu-Shan Botanical Garden in Kiu Kiang, China. The first was described in the catalog merely as a "handsome, small, rare deciduous tree, first described by the late Dr. E. H. Wilson in 1927, and a limited supply of seeds becomes available for a first time." Of the other it is stated: "It is introduced for the first time, leaves obovate, 1-1.5 ft. long, whitish beneath, with a deep notch at tip, flowers pale yellow or grayish yellow, fragrant, 5-7 inches across, cup-shaped, appearing before the leaves in April or May. Very handsome tree of pyramidal habit with showy flowers. Rare."

I have in my garden in Livonia a tree of each species, planted as seedlings in the spring of 1937. Though the trees have been crowded by virgin beech, *M. officinalis* 'Biloba' is now about forty feet high and *M. cylindrica* about twenty feet.

The former began flowering when ten feet tall. Usually it blooms about May 20. The flowers may be described as 5 to 6 inches across, petals pale cream in-

side, ivory outside; sepals sea green outside, shading to cream at base, inside greenish cream more green at the rim. Ovary purplish over cream. The flowers are pleasantly fragrant. Note from the photograph that the tree blooms *after* the leaves appear, not before the leaves, as stated in the catalog.

Neither tree has ever been injured by frost or freezing.

The blooms on *M. cylindrica* are similar in color, except for a purplish wash at the base on the outside. They appear about April 25, before the leaves. The latter are rarely over five inches in length. The blooms are cylindrical in form, about 4 inches long, opening widely only when fading; no scent. This pleases me more than any magnolia bloom with which I am familiar.

Wilson's notes, published in Rehder and Wilson, *Ligneous Plants of Anhwei*, Journ. Arn. Arb., page 109 (1927) give the following data on *M. cylindrica*:

"This very distinct new species is well distinguished by its thin, narrow, prominently reticulated leaves, by its slender petioles, and by its cylindrical fruits. It is most closely related to the Japanese *M. salicifolia* Maxim. which has rather



BERNARD HORNE

Magnolia cylindrica as it opens



BERNARD HORNE

Magnolia cylindrica just before fading

larger leaves usually acuminate and glaucescent on the under side, glabrous winter buds and branchlets, and a smaller, much less cylindrical fruit. The flowers of our new species are unknown but they appear before the leaves. The foliage is deciduous and the wood when cut has a spicy fragrance similar to that of *M. salicifolia* Maxim. and *M. kobus* DC."

M. officinalis 'Biloba' which may have greater interest to us in this country, because of its relation to species here, is described in Sargent: *Plantae Wilsonianae* I. pp. 391-393, (1911-1913) as follows:

"Kiangsi: Kukiang, foot of ascent to Kuling, cultivated, alt. 300 m., VII 2 07, tree, 10-12 m. tall. Except in its bilobed leaves this variety differs in no particular from the type. It is also cultivated for the medicinal value of its bark and leaves. The peculiarity of the foliage is constant in all trees that I saw. This variety is also cultivated in the vicinity of Ningpo where it was collected a few years ago by Bishop Moule." Of the type he says that "he never saw a wild tree but it is very commonly cultivated

in the mountains of western Hupeh and Szech'uan." He says further that it does not grow to as large a tree as its Japanese relative (*M. obovata*) but its flowers and foliage are equally handsome. Its bark and flower buds constitute a valued drug which is exported in quantity to other parts of China and that is why it is cultivated. The tree dies when the bark is peeled so that is probably why there are no wild trees. Extract from the bark is taken as cough and cold medicine and as a tonic. Flowers make a medicine for women * * * * Cultivated at Kew and elsewhere."

In Johnstone "*Asiatic Magnolias in Cultivation*" (1955) there is some discussion of the relation to and differences from *M. obovata*, and doubt is cast on the regular appearance of the bilobed leaves on such trees as the late author knew, with the suggestion that this character might not be sufficiently constant to warrant the varietal name. The only note of interest to us in this country is that while *M. obovata* fruits fairly regularly in such gardens as he knew, *M. officinalis* does not, as it is more "susceptible to frost." He adds that

the species seems to be a woodland tree, and cites the sizes of large old specimens so planted.

To the question, as to whether or not a gardener with small premises should plant one rather than the other, he would suggest that he himself would prefer the Japanese species, although he adds later, that if genuine forms of the bilobed tree were available, that fact might alter the decision.

Scions from the Michigan trees have been sent to two nurserymen and to the Morton Arboretum.—Gus KROSSA.

EDITORIAL NOTE:

In the R.H.S. Journal, Vol. lxxxviii Part 11, page 462 (1963), in an article by T. H. Findley, "Tree Magnolias at Windsor" there is a reference to both *Magnolia officinalis* 'Biloba' and to *M. cylindrica*. "... A form of *M. officinalis*, which is known as var *biloba* has proven a very fast-growing tree with beautiful flowers and foliage. Our tree is now 25 feet, with a spread of 14 feet. Plants raised from seed have come true, with the wide two-lobed leaves." Again: "I still rate *M. salicifolia* (Fig. 175) as

one of the best tree magnolias for the small garden, although the newcomer, *M. cylindrica* should, when better known, be widely planted. Slightly larger in size of flower than *M. salicifolia* or *M. kobus*, this magnolia has a quality all its own. It received an Award of Merit when shown in April 1963."

Agaves on the Texas Gulf Coast

In the past three years we have tested about fifty species of agaves. Our objective has been to find species, other than the ubiquitous *A. americana*, which would be attractive in size and form and which could withstand the high humidity common on the Gulf Coast, as well as the periodic winter freezes.

The nomenclature of the agaves is very confused. Because of the morphological variability exhibited by many species, numerous varieties have been described as species. It is not uncommon for one species to have five or more specific names. For consistency more than anything else, we have tried to follow A. J. Breitung, who has been studying the agaves since 1954.

Species which seem to have definite landscape possibilities, because of their attractive appearance and adaptation to the Gulf Coast climate are: *Agave victoriae-reginae*, *A. stricta*, *A. parryi*, *A. schidigera*, *A. filifera*, *A. scabra*, *A. ghiesbreghtii*, *A. parviflora*, *A. univittata*, *A. striata*, and *A. falcata*. Showing promise, but needing further testing are: *A. splendens*, *A. toumeyana*, *A. deserti*, *A. potatorum*, *A. bracteosa*, *A. palmeri*, *A. schottii*, and *A. verschaffeltii*. Attractive, but definitely not cold hardy are; *A. attenuata*, *A. angustifolia*, *A. vilmoriniana*, *A. decipiens*, *A. macroacantha*, *A. horrida* var. *gilbeyi*, *A. shawii*, and most of the species from Baja California.

Agave stricta, native of the Tehuacan area of Mexico, is a particularly interesting species. It is symmetrical in form and attains a height of about 24 inches and breadth of about 36 inches. When grown in full sun, the leaves take on a reddish or purplish tinge. Our experience with *A. stricta*, and with *A. striata* and *A. falcata*, which are similar in form, has been that they do not die after blooming as do most agaves, but tend to branch from the base.



BERNARD HORNE

Magnolia cylindrica



WILLIAM WELCH

**Collection of yuccas, agaves, sotols,
nolinas**



**Narrow-leaved *Agave stricta* in front;
A. victoriae-reginae behind and right**

Another species which has proved to be very successful, and which is showing up in the trade in increasing numbers, is *A. victoriae-reginae*. The numerous leaves grow closely together in a cabbage-like form and the tracery of white markings on the leaves is most attractive on a background of dark green. The largest of the plants we have is 15 inches tall and 20 inches wide. This represents threefold growth in about four years.

We have found that in Houston the agaves make the best growth in beds raised from four to six inches. Good drainage is very important, hence our beds are made from a mixture of gravel, sand, leaf mold, and good garden soil. We have found also that mulching the plants with pea gravel or lime chips, not only provides a neat appearance, but helps to keep the lower leaves in better condition.

The only insect pest we have encountered is a small black proboscoïd beetle, probably *Sychophorus interstitialis*, which likes to bore into the soft core of agaves and yuccas. We have controlled it successfully by digging the beetles out with a knife and sprinkling dieldren around the base of the plants. Be sure and follow directions for using dieldren, as it is highly toxic.

One word of caution. We suggest that agaves be obtained from dealers who specialize in such plants. California, New Mexico, and Arizona have laws against collecting agaves (and other

plants) without an approved permit. In Texas, *A. scabra* is found only in the Big Bend National Park, where it is protected. Other Texas species are not protected, except by trespass laws, but there is a real danger that the plants may become extinct in the natural state through careless over-collecting.—J. F. PIERATT, *Houston, Texas*.

***Ilex Cornuta*, Thirty Years After**

In the April, 1934 issue of the National Horticultural Magazine—just thirty years ago—there was a report by this writer on some *Ilex cornuta* seedlings on a private estate near Santa Barbara, California. These had been planted in hedges to enclose and divide some semi-formal gardens and as individuals around the buildings. A recent visit to this estate was very interesting. All of the hollies were doing well and had made good growth. The hedges were thick and well developed; the individuals were attractive, large shrubs. Actually, the results were even better than had been originally anticipated.

Ilex cornuta is a native of China. Some plants released from the Division of Plant Exploration and Introduction of the United States Department of Agriculture for testing in this area appeared so attractive that a more thorough trial seemed warranted. Five pounds of seed were purchased from a seed dealer in China in the late twenties for a test planting. The seeds germinated very well and growth of the seedlings was

satisfactory. Variations in leaf shapes were soon noticeable, while differences in their habits of growth became more and more apparent as the hollies became older. Many of the plants have grown to fifteen feet high. They vary from a loose open habit to a very dense close growth. In the young stage one of the seedlings in this trial group showed definite dwarfish characteristics. This is even more evident thirty years later when compared with the other members in this test planting.

The leaf of the Chinese holly is the most interesting part of the plant even though some of the plants bear large, bright red fruits in profusion. Leaves of this holly seen by the writer are always oblong in shape, although the proportion between length and breadth varies considerably. The edges of the leaf curve slightly toward the underside. The lobes terminate in a hard, sharp spine. The specific name *cornuta*, which means horned, is derived from the spiny character of the leaf. There is generally a smaller spine at the apex of the leaf. The spines on the sides vary considerably from none on one side and one or two on the other side to one or two on both sides. In Bailey's *Cyclopedia of Horticulture*, Rehder says that the base of the leaf on older plants is more rounded and spineless. This characteristic is not yet evident on these seedlings. Does that mean that *I. cornuta* 'Burford' has reached this stage of maturity or the rounded, spineless base of its leaves is one of the variations so evident in this species?

An excellent opportunity to study the flowering habits of Chinese holly as these seedlings developed was, unfortunately, only partially utilized because bulbous plants were proving so interesting at that time. Recent correspondence with Harry Wm. Dengler, of the University of Maryland, guest editor of the society's 1957 *Handbook of Hollies*, indicates that there is some irregularity in their blooming habits. He also writes that the issue of the magazine which contained my original observations on the Chinese holly also included a description of 'Burford' and that since that time some sixty named and/or numbered varieties of *Ilex cornuta* have been selected. This further emphasizes the necessity of very careful selection of plants for vegetative propagation.

After thirty years it is a little puzzling that there are not more Chinese holly in cultivation in this section of the United States. This may be partly due to its relatively slow growth. Most of the residential sections in California are expanding so rapidly that people have not had much time for future planning in their gardens. Fast growing plants that will give a quick effect seem to be the vogue. However, one large wholesale nursery in the Los Angeles area and another one near Sacramento are currently listing named *I. cornuta* varieties. The plant is not as difficult to grow as rhododendrons and camellias. Rhododendrons are widely grown in the San Francisco Bay region and camellias are very widely grown all over the coastal regions of California. Eventually, as selected well-grown plants gradually become available, the public may realize the attractiveness of *I. cornuta* for this area.—DONALD JAMES.

Editors Note:

The U.S.D.A. yearbook of 1941 shows that for a 40 year period the growing season at Santa Barbara averaged 331 days with a maximum during this time of 115°F and minimum of 23°F recorded.

Ternstroemia gymnanthera

Ternstroemia gymnanthera is one of those rare ornamental shrubs obscured through synonymy, and, because it is not suited to British gardens, it has not found its way into American horticulture in the usual manner. It is grown in California, reflecting the influence of Japanese garden on its culture. However, even in the nursery trade, *T. gymnanthera* is sometimes confused with *Cleyera japonica*. Our plant is red-fruited, while *Cleyera* is black-fruited.

The botany of these less-familiar camellia relatives is confused and incomplete. Few of the descriptions I have read, both botanical and horticultural, are completely accurate and most suggest limited intimate acquaintance with the living plant. The purpose of this discussion of *T. gymnanthera*, besides emphasizing its identity, is to record the fact that it is a good garden plant for



DONALD JAMES

Hedges of Ilex cornuta which have been growing for nearly forty years in the vicinity of Santa Barbara, California. The plants are trimmed four times a year.

blending with other broad-leaved evergreens and that it has thrived in suburban Washington for several years.

Ternstroemia gymnanthera (*T. mokof*) is an oriental plant, known locally in Japan as "Mokkoku." It is a large evergreen tree in its natural habitat but sufficiently slow in growth to warrant its use in landscape design. The habit is erect and the branchlets are straight and stiff. The alternate leaves are clustered at intervals along the stem and ovate with entire margins, dark glossy green above and pale green beneath. Although not mentioned in the available literature, the petioles are bright red, as is the new growth in spring. The solitary white flowers are perfect, 1.5 cm. across, and appear in early summer. The fruits are orange-red, about the size of a holly fruit, pendant, and expose 2 red seeds when ripe.

Ternstroemia gymnanthera is used in foundation plantings along Tokyo streets, where it is sometimes black with the grime of winter smoke. My first acquaintance with it as a garden plant was in the courtyard of a small inn on Shikoku Island. Here, a large plant was sheared in a bonsai fashion to which it responds readily owing to the clustered leaf-habit mentioned above.

The reader may be aware that in the days of feudal Japan when the new middle class was stirring, the display of the gardening arts was still reserved for the nobility, and the trespasser to these edicts might have lost his head. The newcomer in order to enjoy such pleasures was forced to secrete his small garden behind walls and content himself with shade-loving plants. *Ternstroemia* has long been a favorite of such gardens for the dark shiny leaves reflect the scantiest of light and the red petioles are in subtle contrast. A plant in my garden is likewise grown in a shaded bed under a house eaves where it receives little light and water from occasional rains and as often as I apply it. From a hardiness standpoint, *T. gymnanthera* has outgrown *Camellia sasanqua* to which I think it is comparable in habit. While the latter has been badly damaged by some of our recent winters, *Ternstroemia* plants growing on either side of the *sasanquas* have suffered only minimum

leaf burning. In garden use, *Ternstroemia* blends well as a background plant for azaleas, camellias, Japanese holly, and other broadleaved evergreen plants where variation in green is the objective.

It may also be noted that *Ternstroemia gymnanthera* is a valuable timber tree and the white posts, turning pale reddish, are used for decorative purposes in the construction of the *tokonoma* of Japanese homes.—JOHN L. CREECH, *Hyattsville, Maryland.*

Curcuma roscoeana and *Globba winitii*

Today is November 4th, eight weeks since the flower cones started pushing out among the leaves of *Curcuma roscoeana*; even in this ninth week the bracts of the cones still have some color, with flowers still appearing almost every day.

The curcumas and the globbas, of the ginger family, and dormant in winter, were potted in April in 8" azalea pans in rich compost mixed with perlite and medium chicken grit with an addition of small amounts of bone meal and dried cow manure, plus 1/2 teaspoon of Es-Min-El.

In May they were moved with the rest of my plants to the Fairchild Tropical Garden and placed there on the north of and under date palms, where the curcuma and the globbas, as is proven by the flowering, found ideal sun and shade.

The plants are placed in large flats raised on concrete building blocks, 16 in. from the ground, without any protection from the elements; are kept constantly moist with perfect drainage, and were given two fertilizings. In June, they received two tablespoons of bone meal and two tablespoons of sheep manure. In August, three plantabs were supplied to each pot.

The curcuma and the globba (*G. winitii*) did not escape notice or comment by almost everyone that had access to the restricted place in the garden where they are growing. One of the curcumas was taken to a flower symposium, where it drew very favorable attention and discussion.

Ease of growth, attractiveness of foliage, and the beauty of the long-lasting bracts, surely do recommend these two subjects to any flowering plant enthusiast with even very limited space avail-



ALEK KORSAKOFF

Curcuma roscoeana, two views

ALEK KORSAKOFF

able.—ALEK KORSAKOFF, *Fairchild Tropical Garden, Miami, Florida*

Blotch of Horsechestnut and Blight of Sycamore

When leaves on Horsechestnut (*Aesculus hippocastanum*) or Buckeye (*A. spp.*) trees curl and turn brown by August, or when in early spring the leaves of Sycamore (*Platanus occidentalis*) blacken and shrivel of blight, the thoughtful gardener may wonder what could have been done to protect his trees from the ravages of disease. Fortunately, some potent fungicides are now available to combat the blotch and the blight and certain other shade tree diseases as well. Also, recent research has brought to light new information about critical times to spray for the disfiguring and debilitating, Horsechestnut leaf-blotch and sycamore blight.

Each disease is caused by a specific pathogenic fungus having its own cycle of development. Each fungus responds in its own way to its environment. Therefore, at critical stages in the growth of the fungus and its host, weather plays an important part in determining whether the fungus reaches, grows into and produces disease in its host plant. If one could know what temperatures would prevail and when and how much rain would fall during the critical

periods, one could pre-determine whether spraying would be necessary. Sprays for disease control are almost wholly preventive, not curative. The fungicide, for best results, must be on the plant when the pathogen gets there. After the fungus invades a plant's tissues it is generally, but not always, too late to obtain good control by spraying. So, get and keep the fungicide on the battle line ready to meet the pathogens when they arrive. Thorough spraying, carefully done, to protect all vulnerable parts is essential. Use adequate equipment. Don't send a squirt gun to do a high pressure spraying job. Use the recommended formulation.

Horsechestnut and Buckeye Leaf-Blotch

A fungus causes the disease. Leaflets develop small to large, dry, brown spots by mid-summer. Margins of the dead areas are usually yellowish. Commonly whole leaflets brown and dry. Black, spore-bearing fruiting bodies of the fungus develop on the dead parts. Poor growth, poor form and stunting are characteristics of trees attacked repeatedly by leaf blotch.

Control.—Spray 2 or 3 times at 10- to 14-day intervals. The number of applications required and the interval between them depends upon weather during the critical period for infection. Rain

washes fungicide from leaves. Spray as soon as possible after rain. Spray first when the leaf buds begin to open. Subsequent timing of additional applications depends upon weather. However, for complete protection, even if the weather is dry, make a total of 2 applications at 14 day intervals.

Formulations.—Use zineb (Parzate), ziram (Zerlate) or dodine (Cyprex) at the strength recommended by the manufacturers.

Fertilize poorly growing trees at a minimum rate of 2 pounds per inch of trunk diameter. Use 5-10-5, 10-6-4, or any similar formulation. If fertilizers containing a higher percentage of nitrogen are used, apply less. Organic nitrogen fertilizers may also be used.

The blotch pathogen lives over winter on fallen leaves. Raking leaves in autumn may help in control but leaf removal cannot be depended upon to hold the disease in check.

On city streets, during severe droughts or excessively hot, dry weather, leaves of Horsechestnut or Buckeye may curl and dry in the absence of infection by the blotch fungus. The small, black, spore-bearing fruiting bodies of the blotch fungus are absent from drought injured leaves.

Sycamore Blight

A pathogenic fungus causes Sycamore blight. The blight affects buds, expanding leaves, new shoots and older twigs. The pathogen lives over winter in fallen leaves, in twig cankers, and on diseased buds. In seasons favorable to blight, the disease is frequently mistaken for frost damage because of the blackened young leaves and twigs. The blight is sporadic. Some years practically no noticeable symptoms appear; other years nearly every Sycamore is severely diseased. Weather holds the key to this variability. Mean daily temperatures between 50°F and 55°F during the period of leaf expansion favor infection and subsequent severe shoot-blight, according to recent research studies of the Illinois Natural History Survey. Their scientists report that mean daily temperatures above 60°F. are unfavorable for shoot-blight. The blight seldom kills trees but it reduces growth, causes malformation of the crown, kills twigs and branches. The

ungainly appearance of many sycamores may be ascribed to the effects of blight.

Control—Spray and prune. Fertilize to restore vigorous growth. Spray to prevent new infections from spores carried over winter on buds, produced in cankers, and on fallen leaves. Prune in autumn or winter to remove cankers. Heavy pruning to remove all small growth should reduce the chances of infection. Neglected trees in the neighborhood may be a source of spores of the blight fungus. Spraying will help to reduce that hazard.

Spray when buds begin to swell and the protective outer cap is being pushed off. If weather is cool, spray again in 10 to 14 days. Organic mercury formulations such as Puratized Agricultural Spray, Phix, and Coromerc have been recommended.¹ Amounts recommended in each 100 gallons of water for the applications are:

<i>Material</i>	<i>1st application</i>	<i>2nd application</i>
Puratized Agr.		
Spray	1.5 pts.	1.0 pts.
Phix	0.5 lbs.	0.25 lbs.
Coromerc	1.5 lbs.	1.0 lbs.

London Plane is resistant to blight but the disease may damage London Planes in seasons favorable to the blight.—CURTIS MAY, *Pathologist, Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.*

¹Trade names are used in this publication only to provide specific information. Their use does not constitute a guarantee of the products named and does not signify that they are approved by the U. S. Department of Agriculture to the exclusion of others of suitable composition.

CAUTION: Pesticides are poisonous; handle them with care. Read the container label carefully. Follow all directions and heed all precautions for storing, mixing, applying, and disposing of pesticides.

On Tree Flowers

Spring is in the air bringing with it bursting buds and here and there a blossom. There is no need to get into the woods or fields to see the first Spring blooms for on many a street of town or city are to be seen our common shade trees, whose blossoms, bursting their scaly winter coats, are among the earliest and commonest of vernal flowers.

Few people think of street trees as having flowers, yet they do. Fewer still have ever had a close look at such blossoms. The reason for such unfamiliarity is obvious. Most tree blooms, though prolific in number, are tiny insignificant things, often mistaken for opening leaves, and so frequently out of the reach that they may be easily passed by. Besides, showy petals and alluring fragrance are often much suppressed or even lacking, for many a tree species is dependent on the wind rather than on insects for pollination. Accordingly, only important flower parts like the pollen-producing stamens and the pollen-receiving pistils are present.

There is rhyme and reason behind such early flowering among trees, for in wind pollination plants such as these, there is a distinct advantage in flowering before the foliage appears. Heavy leaves impede the free play of the wind and would not permit the wide and free interexchange of wind-blown pollen.

The ingenious ways by which flowers attract insects are known to many. Yet nature has also molded the wind-pollinated flowers of trees in equally artful ways to best utilize the vagaries of the breezes. Pendulous catkins, representing elongated clusters of tiny flowers, insure that the pollen produced by the male flowers will be shaken out by the gentlest zephyr. Such structures may be seen in the alders and oaks, birches, willows, and poplars. Non-catkin producers, like the maples and elms, accomplish the same thing in another way by dangling their tiny clustered flowers at the tips of slender silken filaments.

Unlike the careful bee the wind is wasteful of the golden dust it carries with the result that only a fraction of the pollen in the air lands on the flowers for which it was intended. In order to combat such waste, wind-pollinated trees must be bounteous producers of the golden dust which is also light, smooth and dry, the better to be blown about. Insect-carried pollen is usually sticky to facilitate carrying by those creatures. Moreover, like the proverbial duck's back, wind-carried tree-pollen resists wetting by April's showers and, of course, this fact makes for better dispersal during wet weather. On the other hand the sudden discharge of pollen at

the break of Spring brings to many humans another year of hay fever though at this season it might better be called tree fever.

Trees have a definite schedule of flowering. In the northeast some wind-pollinated trees like the willows (*Salix*) begin flowering in February and March, progress to their height in early April, and in general will be through blooming by the time leaves have appeared. Bend down a few branches and take a close look at some common tree flowers.

Among the earliest of comers in the East is the Red or Swamp Maple (*Acer rubrum*), whose colorful densely-crowded flowers long precede the leaves. Each tiny cluster holds several types of flowers. Some may be male with only stamens, some female with only pistils, or in some cases perfect flowers may be found with both stamens and pistils. Whatever the kind of flower tiny scarlet petals are present in the Red Maple, but may be partly hidden by the oversized stamens or pistils. The familiar Sugar Maple (*A. saccharum*), whose yellow-green flowers hanging pentalless at the ends of silken strands, comes midway in the Springtime tree-blossom parade of maples. For this reason its flowers are more likely to be seen along with the young expanding leaves. Tardiest but the showiest flowered of all the maples is the Norway (*A. platanoides*), a favorite shade tree of street plantings. Its yellow-green petals are the largest of any found among our commonly cultivated maples.

Flowers of the American Elm (*Ulmus americana*) appear early and like those of the Red Maple are borne in close little clusters which soon fall, littering sidewalk and street with floral debris. Elm flowers, however, are mostly perfect, with both male and female structures in each flower. So prolific is the pollen of the elm that it is one of the chief culprits of Spring hay fever. The catkins of alders, birches, poplars and willows are equally early though those of the willow, because of their silvery beauty, are the most familiar. Many are surely acquainted with budding Pussy Willow (*Salix discolor*) from whose cozy silken covers push out either golden-tipped stamens or greenish styles. Willow trees, you see, are like hollies being either male or female and so either male catkins or



W. D. HODGE

Flowers of Sassafras Albidum

female catkins will be found. Thus the pollen of willows cannot simply be blown from one branch of a tree to another, but must be carried to a distant individual tree of the opposite sex.

Leatherwood or Wicopy (*Dirca palustris*), a shrub which grows in rich, moist woods, has yellow bell-like flowers; its tough, rope-like bark was often used by the Indians for thongs. In our latitude

late March finds the Spice-Bush (*Lindera benzoin*), another shrub, flaunting its honey-yellow flower clusters along many a singing rill. The Spice-Bush's country cousin is the aromatic Sassafras tree (*Sassafras albidum*). Greenish yellow flowers, either male or female, precede the more familiar mitten-shaped leaves, but make their appearance from within a mass of leaf-like scales.



W. H. HODGE

Sugar-maple tree in flower. (Acer saccharum)

"Slowpokes" are the numerous nut trees, among them the oaks (*Quercus*), walnuts (*Juglans*), and hickories (*Carya*), whose flowers appear on the spring-flowering schedule of trees. Of our more common deciduous trees, the tiny blooms of the nut-producers are perhaps the least familiar. These are also catkin bearers, but in each case only pollen-producing flowers are to be found in the

pendulous green catkins, the better to be shaken out by the wind. The female flowers, on the other hand, which need only sit and catch the wind-blown pollen, are tiny, insignificant things found either sitting solitary or with a few companions in a small cluster along the branchlets.

Conifers, too, produce wind-pollinated flowers, but hidden as they are by the

evergreen leaves they are little appreciated. Spring finds such trees as the pines producing two kinds of cones, one with pollen-producing flowers and the other with those which will receive this sulphur dust. The tiny male flowers of pines (*Pinus*), clustered at the branch tips of these trees in Spring, are real pollen factories. So abundant and profligate is their production that great clouds of pollen sometimes may be seen blowing from these trees. And in forests of pines the numbers of pollen grains are so great that they settle over the whole landscape to form a so-called "shower of sulphur."—W. H. HODGE.

The Exalted Weed

Last week [end of November], the altar vases in the many chapels of the Basilica of St. Peter in Rome held misty clouds of what seemed to be white, wild ageratum. A few additional flowers were used for color, sometimes carnations, sometimes gerbera, and often chrysanthemums; but the white flowers were predominant and set the style of the arrangements.

I thought of the tall blue and white ageratum in my own garden in Washington, D. C., that grew like weeds and spread like weeds, and *were* weeds although I loved them.* I moved closer to the vases. The thousands of tiny fluffy flowers were exactly as I remembered mine, but the leaves were more rounded than mine, and had a thick, shiny, evergreen quality. Could that account for their exalted status, I wondered?

Later, I found large tubs of the blooming plants decorating the wide street of Via Veneta, and I saw another in a roof garden.

But again, the leaf was wrong.

As I cannot speak Italian, I took a sprig of the plant to the American Embassy, across the street, and asked for the Agricultural Attaché. The attaché was attending the FAO Convention at the United Nations building, but Mr. Wuhrman and Miss Ginevri, of the staff, began working on my problem. The next day they made an appointment with Prof. Anzalone, Istituto e Orto Botanico, Città Universitaria. He gave me and my little sprig an hour of his busy time and came up with the name

Eupatorium ligustrinum (*E. micranthum*). I have not found this species growing wild in old gardens here as the other species does in my garden.

Prof. Anzalone also identified *Sonchus tenerimus* for me—the yellow flower that looks like a tiny dandelion. It grows everywhere, but especially on the tops of old ruins, church steeples, in wall crevices, and wherever a little touch of yellow from above would be welcome.

In the University grounds I found the light blue early spring iris and the narcissus already coming into bloom. The large flowered quince was blooming as was an evergreen virburnum. The orange balls of *Poncirus trifoliata* were still hanging on the thorn tree. There were the huge oleanders, the pine trees whose lower branches have been removed, and the English daisies that have escaped into the lawns and gone wild.

I visited the FAO—Food and Agriculture Organization of the United Nations, which has been convened for a month. There I found projects on how to cross-pollinate for rust-resistant wheat, and how to use algae for protein, and how to improve sheep in Ecuador.

It is difficult to mention the American Embassy without remembering the banks of flowers that the Roman people brought there last week in sympathy for the loss of our President. They came by the thousands to record their names as mourners. In Naples, I photographed hundreds of flower-laden students walking slowly to the American Consulate, their ranks growing larger, block by block.—ALMA BYHRE BOND, *Washington, D. C.*

*EDITOR'S NOTE: The plant referred to probably is *Eupatorium coelestinum*, a native plant of eastern U.S.

Plants from a Medicinal Garden

Aconite—Monkshood

The plant as grown in the garden is very showy, but with poisonous properties. It may be planted where there are deer and other browsing animals without fear of its being eaten.

In 1640, Parkinson speaks of the poisonous effects of Aconite or Monkshood and tells of a bluebottle fly that feeds on the nectar without harm and of making an antidote to the poison from the flies, again referred to by Dioscorides, who speaks of the plant as being poisonous to

animals of all kinds. He says: "Ye root of this being laid on a scorpion doth mortify him."

Bees will not touch the Monkshood except when all other sources of honey are unobtainable; however, there is never enough honey taken to harm anyone. Honey made from certain plants, such as *Rhododendron* (Azalea), *Castanea sativa*, and *Kalmia angustifolia* (Lamb-kill), is harmful, but with the modern method of extracting honey there is little fear of this. In his book, *Pharmacognosy*, published by Lea & Febiger, Dr. Edward P. Claus says of Aconite: "The poisonous nature of Aconite was known to the Chinese and Indians. Of the 18 kinds of Aconite mentioned by Hindu writers, 10 were considered too poisonous to be used in medicine. Störch, a Viennese physician, introduced it into medicine in 1762."

Symphoricarpos

Another lovely bush growing in my garden is the Snowberry, Waxberry, or Indian Currant (*Symphoricarpos*). It is an erect or spreading shrub, with slender branches, and round or oval leaves. The flowers are white or rosy-tinged. The berries are round and white. There are twelve species, ten in the Western States, one in Mexico, and one in China.

Saponin, a poisonous drug, is contained in the leaves only. Indians made a decoction for colds and stomachache by pounding and steeping the roots. The fruits act as an emetic and a cathartic. As a honey plant, it is fairly important, producing a white honey.

Snowberries are highly regarded as an ornamental due to the striking bunches of fruit and lovely leaves.

It is an important wild-life food, as the berries remain on the bushes most of the year. Birds use the bushes as pro-

tective shelter; bears eat the fruit, and deer eat the twig and foliage.

Chia

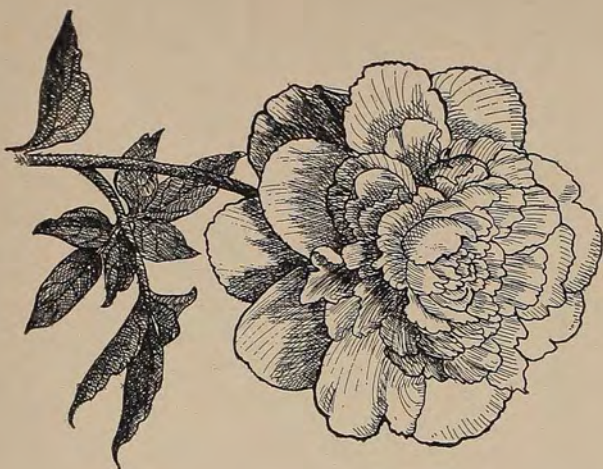
Salvia columbaria, from the Latin "salvia," to save, because of its medicinal use. There are over 500 species. The plant is an extremely old one and seeds of it have been found in the old graves of the Mahua race of Mexicans, showing that the plant was grown and used by them. Portola was given seeds of the Chia when his expedition came to San Francisco in 1769.

The plant grows below 4,000 feet in open dry places, 3 to 15 inches high, with 2 or 3 whorls of small blue flower heads to a stem. Indians gathered seeds by bending the stalks over a basket and shaking the seeds into it. The seeds, similar to flaxseed, were parched and ground to be used as gruel. Medicinally, it was used to soothe inflamed digestive organs; also, a few seeds put in the eye on going to sleep will by morning have gathered all particles of dirt due to the mucilagenous quality of the seed when wet. The seeds are highly regarded as a demulcent and when made into a poultice are good for gunshot wounds.

Spanish Californians were great users of the seed. As late as 1894 it sold for \$6.00 to \$8.00 per pound.

A fine drink, with the taste of flaxseed, can be made by putting a teaspoonful of ground seed into a glass of cold water for a few minutes; those who like a tastier drink will add a little sugar and lemon juice.

Chia is a desirable plant for the garden, blooming through April and May when spring flowers are most abundant; and if one likes the sage smell, it is pleasant to gather and put in a room.—MURIEL W. SWEET, *Oakhurst, California.*



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CONTRIBUTORS—Silvia Saunders; P. P. Pirone; William H. Krekler; Harold E. Wolfe.

Getting down to *specifications of this book*: It, of course, deals with both *TREE PEONIES* (*Suffruticosa* or *Moutan*, *Delavayi*, *lutea*, *potanini*) and the more familiar *HERBACEOUS PEONIES*.

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July 1951 48 pages 21 plates 50c

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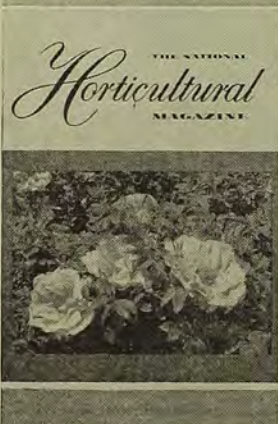
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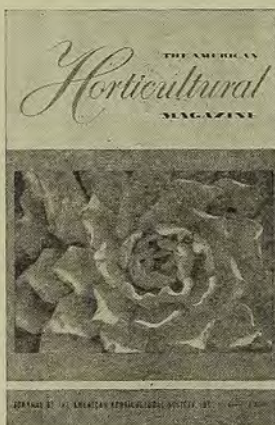
• The Aurelian Lilies • Designing an Environment for Man, Part III. Development of Indoor-Outdoor Space. Part IV. The Enrichment of Experiences • Names for Cultivated Plants • Gibberellins in Horticulture, A Preliminary Review • 1959 Seed Distribution Program • The Saratoga Horticultural Foundation • 21 book reports • NOTES: Chamaedoreas Are Tough. More on Spray Mist Propagation. Two Good Conifers: Notes on Southern Taxaceae. *Littonia modesta*. More on the Clark Dwarf Applestock. The Portuguese Sundew. *Hydrangea otaksa*. About Color Changes. Helleborus in Louisiana. An Extra from "Dried Blooms" of Cape Chinkerrichees. Rex Begonia Culture. • Complete index for the year. • *Development of Indoor-Outdoor Space* illustrated on front cover; four Rex Begonias, on the back.





January 1960* 64 pages 43 plates 50 cents

• The Fairchild Tropical Garden • Blueberry Breeding: Past, Present, Future • The Calabash Trees • Lenten Roses in the Southeast • 24 book reports • NOTES: Ornamental Species of *Mucuna*. Notes on Two Heath Plants. *Tulbaghia violacea*. Our Native False Aloe. *Byblis gigantea*. *Leucojum vernum* and *L. aestivum* Gravetye Giant. *Camellia granthamiana*: Another rare gift from China. • *Byblis gigantea* illustrated on the front cover; *Mucuna rostrata*, on the back.



April 1960 64 pages 55 plates 50 cents

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July 1960 64 pages 71 plates 50 cents

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October 1960 64 pages 39 plates 50 cents

• The Gotelli Arboretum of Dwarf and Slow Growing Conifers (22 illustrations) • Adventures with Hardy, Herbaceous Hibiscus • A New Plant Hardiness Map for the United States and Southern Canada • Some Moraeas for Southwest Gardens • Snapdragons for Gardens, Greenhouses, and Research • The Yellowgroove Bamboo • 18 book reports • NOTES: Two Unusual Hoyas. *Nymphaea* 'Bob Trickett.' My Experience with *Gloriosa*. *Kaempferia*, Again. On the Distribution of *Loropetalum chinense*. Allegheny *Pachysandra* as a Groundcover. *Habranthus robustus*. Two *Zephyranthes* New Here. • Complete index for the year • *Loropetalum chinense* illustrated on the front cover; a wood carving of *Typha latifolia*, on the back.

*Journal of the American Horticultural Society was changed to The American Horticultural Magazine in 1960.

January 1961 192 pages 123 plates \$4.95*

CULTIVATED PALMS A Special Issue

AN INTRODUCTION TO THE PALMS • The World of Palms • Palm Characteristics, Illustrated • Botany and Classification of Palms • The Native Palms • The More Commonly Cultivated Palms • Palm Portraits. CULTURE OF THE PALMS • Preparation and Germination of Palm Seeds • Viability of Palm Seeds • Propagation of Palms • Fertilization Requirements • Pruning Palms • Palm Insects • Palm Diseases • Cold Tolerance of Cultivated Palms. USES OF THE PALMS • Use of Palms in the Home Grounds • Small Palms for Special Locations • Palms for Home and Greenhouse • Palms in Decorative Arrangements • Palms as Hedge Plants • Palms for Northern and Central Florida • Palms for California • Palms for Hawaii • Living Palm Collections • Index of Palm Names • *Veitchia merrillii*, the Christmas Palm, illustrated in full color on the front cover; *Phoenix dactylifera*, on the back.

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July 1961 64 pages 46 plates \$1.00

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October 1961 64 pages 38 plates \$1.00

• Some Shade and Ornamental Maples, Part 1 • Bougainvillea Culture • The Seed Collection, United States Department of Agriculture • A Unique Ornamental Bamboo • 11 book reports • NOTES: Dragon Tongue. *Pittosporum glabratum*. Jojoba—An Overlooked Ornamental Shrub of the Arid Southwest. *Franklinia alatamaha*. Chilean Guava. Chinese Quince. Tropical Fragrance in the Annonaceae. *Zephyranthes smalli* in North Carolina. A Fabulous Bromeliad. *Osmanthus* "San Jose." *Habranthus*. *Xanthoceras sorbifolium*, a rare shrub of merit. Indoor Culture of Bougainvilleas. A Hybrid Victoria. • *Seeds from the USDA Collection* illustrated on the front cover; *Franklinia alatamaha*, on the back—a scratch-board drawing.





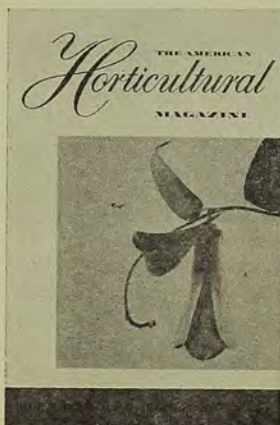
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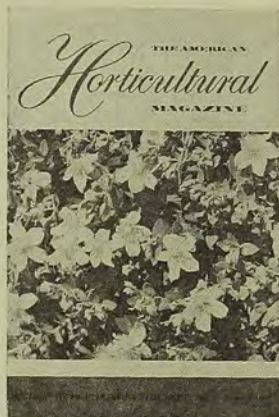


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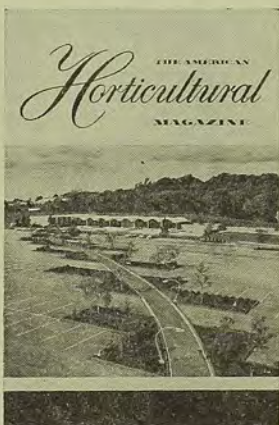
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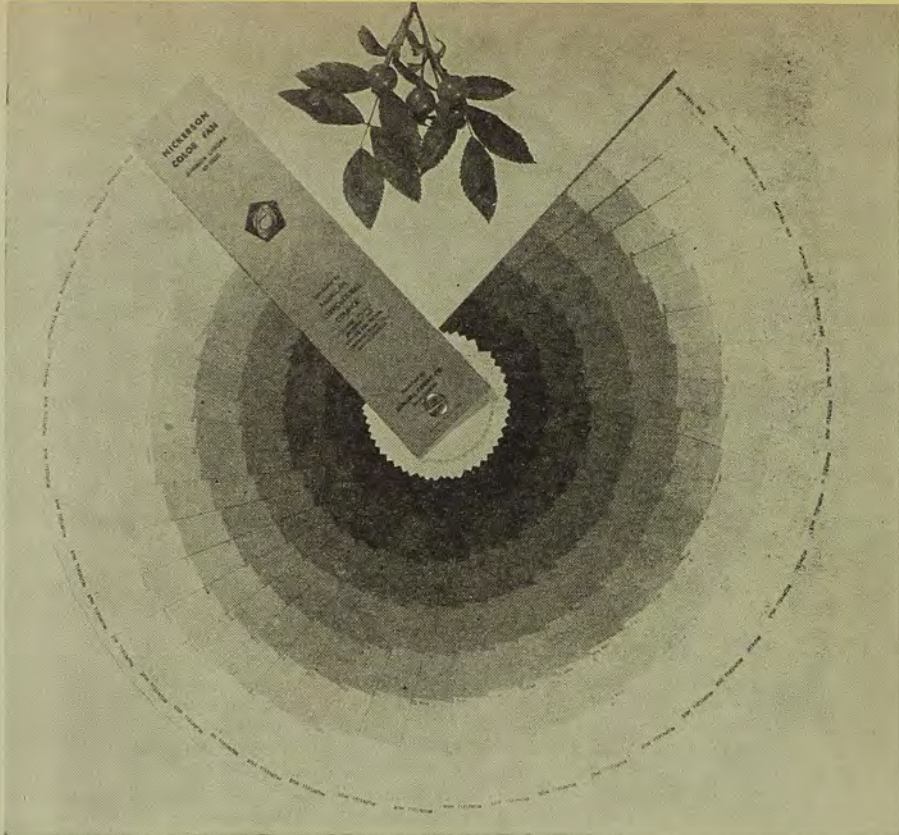
• Longwood Gardens • The Spuria Iris • A New Flowering Shade Tree—the "Bradford" Pear • Joseph F. Rock, 1884-1962 • New Grapes for Old: California Moves East • 8 Book Reports • NOTES: Metasequoia glyptostroboides "National" • Something about Crinums • Possible New Hollies for the South • A Japanese Crinum • New Reception Center at Longwood Gardens on front cover • Helianthus angustifolius on back.



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