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Contents

Crabapples at the National Arboretum ROLAND M. JEFFERSON	231
The Tucson Botanical Garden HARRISON G. YOCUM	237
The Granite Gardens of Georgia MARIE B. MELLINGER	240
King Alfred and Form No. 1040 TOM D. THROCKMORTON, M.D.	245
Actinidia Chinensis—A Promising Fruit and Some Related Species EDWIN A. MENNINGER	252
Trees do Grow Fast E. SAM HEMMING	257
Siberian Iris—A Modern Approach PEG EDWARDS	261
A Book or Two	266
The Gardeners' Pocketbook	
The Genus <i>Symphyantra</i> . ROBERT M. SENIOR	270
<i>Araucaria columnaris</i> —An Amazing New Caledonian Tree. ALEX D. HAWKES	272
The Hardest Acacia? LYNN R. LOWERY	274
<i>Lagerstroemia fauriei</i> . B. M. BASHAM	275

APRIL COVER ILLUSTRATION

Podophyllum peltatum—Photo by Peter Pettus



NATIONAL ARBORETUM

The buds of Malus 'Van Eseltine' are deep rose-red spheres that unfold into massive double pink flowers.

Crabapples At The National Arboretum

BY ROLAND M. JEFFERSON

Mention the National Arboretum and practically anyone who has heard of that institution automatically thinks of azaleas. Such an assumption is perfectly natural, for few horticultural attractions are as colorful as the 60,000 azaleas massed on the Arboretum's Mt. Hamilton Hillside. But this hillside, for all its beauty, is not the ultimate in cultivated elegance at the Arboretum.

The Gotelli collection of dwarf conifers, the assemblage of both native and exotic specimens of dogwoods, the hundreds of magnificent camellias along the Anacostia River, the fragrant magnolias, and the hollies in great variety, all command their share of attention.

In addition to these familiar attractions, the maturing crabapple collection has come to receive considerable attention from the visiting public. Consisting of 600 plants it is largely the result of the collective contributions of members of the American Association of Nurserymen in 1949, and the donation of scions of over 100 varieties from the late Arie den Boer of the Des Moines Water Works. It now contains approximately 600 plants representing about 200 species and cultivars.

Ornamental crabapples are considered the most dependable of all small flowering trees for cold climates. The hardiest varieties will flower after exposure to temperatures as low as -50° F; the least hardy of the commonly cultivated varieties are satisfactory in areas having winter lows of -10° F. There are varieties suitable for every region that experiences temperatures below zero in the U.S.A. The extensive plantings at the Des Moines Water Works, Des Moines, Iowa, at the Morton Arbore-

tum, Lisle, Illinois, and at the Arnold Arboretum, Jamaica Plain, Massachusetts, have been the principal American sources of information for best planting in our northern gardens. Since crabapples are progressively less satisfactory as one moves southward, recommendations for southern gardens are, if made on the basis of northern collections, likely to be less dependable. The National Arboretum's collection is beginning to provide needed information on the best varieties for the middle and upper south.

Our observations over the past 15 years indicate that most crabapple varieties are perfectly satisfactory for the greater Washington, D. C. area. Winters are cold enough to provide the approximately 1,200 accumulative hours of temperatures below 45° required to break bud dormancy. While the area's average annual rainfall of the past 10 years has been 5 to 15 inches below the long period average of 40 inches, there is no evidence that crabapples have suffered from drought.

The various cultivars in the Arboretum collection are constantly being evaluated for ornamental merit. Flowering and fruiting, plant habit, foliage and resistance to insects and diseases are evaluated. The following are but a few of the many cultivars that can be recommended for this area and for others of somewhat similar climate in the upper and middle south:

Malus 'Golden Hornet'.

This crabapple with its large yellow fruit of approximately three-fourths inches across was added to the collection in 1955. Our records indicate that it was received through the Glenn Dale Plant Introduction Station, from its originator, John Waterer Sons & Crisp of Twyford, Berkshire, England. Dis-

■ Roland Jefferson is a taxonomist at the U. S. National Arboretum. He has had the opportunity to observe and study the arboretum's extensive crabapple collection.

played by its originator in the 1949 and 1961 exhibits of the Royal Horticultural Society of England, *M.* 'Golden Hornet' received an Award of Merit in 1949 and a First Class Certificate in 1961.

Now about 9 feet tall, this plant has upright branches covered each spring with single white blossoms. The most attractive time for *M.* 'Golden Hornet', however, is in the fall, when the fruit, by sheer weight and numbers, pulls the once upright branches over into long pendulous boughs of yellow.

Malus halliana 'Parkmanii'

When in flower the Parkman Crab is one of the Arboretum's most beautiful crabapples. Each year from mid to late April it is covered with hundreds of double pink blossoms that hang in clusters from deep red pedicels. Although it may reach a height of 15 feet at maturity, this plant has added only 18 inches in 15 years, and therefore is one of the Arboretum's slowest growing crabapples. Its very small, dull red fruits have no ornamental merit.

This plant, cultivated for many years in Japan under the name *Yae-kaido*, was introduced into America in 1862, when it first appeared in the Boston garden of Francis Parkman, the amateur horticulturist and former president of the Massachusetts Horticultural Society, for whom it was named.

Malus 'Ellwangeriana'

As an alternate bearer, flowering and fruiting heavily on alternate years, this crabapple would not be preferred by many gardeners. But having so many other cultivars, the Arboretum can wait during the many months necessary for it to display its scarlet fruit. Often orange or yellow on their shaded side, and a little less than an inch across, the fruits of this cultivar are abundantly and attractively spaced over this medium-size tree. The flowers, dark pink in bud and white when fully open, closely resemble those of *Malus floribunda*, to which it is sometimes considered to be related. When in fruit in the fall, however, its beauty excels that of *M. floribunda*, making it—despite mediocre flowering quality—one of the Arboretum's outstanding crabapples.

The name 'Ellwangeriana' probably dates back to the old Ellwanger & Barry Nurseries of Rochester, New York. However, according to Wyman¹, this crabapple has not yet been found in any of their catalogs.

Malus hupehensis

Tea Crab

Native to China and Northern India, this species was introduced into cultivation in 1907 by E. H. Wilson, former Keeper of the Arnold Arboretum.

¹Donald Wyman, "Crabapples for America."

Planting of Malus Hupehensis.

NATIONAL ARBORETUM





NATIONAL ARBORETUM

Malus 'Oekonomierat Echtermeyer'.

In spite of its being an alternate bearer, the Tea Crab can be rated among the better National Arboretum crabapples for, when in bloom, few are more floriferous. Its flowers begin as tight, cardinal red buds later fading to pure white, they engulf the tree with thousands of closely spaced blossoms that diverge from numerous short spurs.

After flowering, the main point of interest centers in the Tea Crab's shape. A low tree that has grown less than 13 feet in 15 years, this species has many branches armed with still more short spur-like branches. Together they zig-zag outward at lengths often equaling the tree's height. This peculiar branching habit gives the Tea Crab the wide vase-like shape that helps identify it.

Though less spectacular than many other crabapples in the fall, the Tea Crab is covered with dull greenish fruit, the abundance of which make it an interesting specimen.

Malus 'Oekonomierat Echtermeyer'

M. 'Oekonomierat Echtermeyer', or Pink Weeper, was introduced in 1914 by Ludwig Spaeth Nurseries of Berlin, Germany.

This crab, situated on a small mound bordering a road, is noticed by many

passersby. In the spring the flowers, purplish pink with wide, spreading, twisted petals, can scarcely compete in beauty with other Arboretum crabapples. In the fall its purplish red fruit does not stand out among the other red-fruited varieties. Yet its dark, purplish green leaves and weeping habit entitle it to a place among the Arboretum's more interesting crabapples. *M. 'Oekonomierat Echtermeyer'* is beautiful by habit alone, standing 11 feet tall, with an upright main stem forking into many flexible branches that droop gracefully to the ground.

Malus 'Selkirk'

M. 'Selkirk', received in 1951 as *Malus* Morden 457, was named in 1962 by the Experimental Station, Morden, Manitoba, Canada, which introduced it.

In addition to having many beautiful large, carmine red flowers, this crabapple, unlike most, displays outstanding, glossy red fruit from early summer into fall. Thus its fruit color lasts longer than that of any crabapple in the Arboretum. Its three-fourths inch fruit, which hang abundantly from this medium-size tree, is highlighted by reddish leaves that turn dark green as the summer advances.



NATIONAL ARBORETUM

This 17 year old tree of *Malus sieboldii* var. *zumi* is covered with masses of single white flowers.

Seventeen year old tree of *Malus tschonoskii*.

NATIONAL ARBORETUM

Malus sieboldii var. *zumi*²

Given the Japanese name O-zumi, this crabapple was introduced in 1892 by the late Professor Charles S. Sargent of the Arnold Arboretum.

It is beautiful in spring as well as fall. Its rose-red buds open into countless single white flowers which cover the plant in a beautiful mass of white.

In summer, *M. sieboldii* var. *zumi* has commonplace foliage and a spreading, rounded shape, and it often remains inconspicuous until fall. Then with the ripening of the small dark red fruits that stand out in great numbers all over the plant after the leaves fall, *M. sieboldii* var. *zumi* again emerges as one of the very good, red-fruited crabs. Its small crabapples, best from late October until mid-November, attract many birds.

Malus tschonoskii

M. tschonoskii, a native of Japan and first discovered at the foot of Mt. Fujiyama, was also introduced, in 1892, by Professor Charles S. Sargent of the Arnold Arboretum.

It is considered one of the Arboretum's truly unusual crabapples. Al-

²Name as it appears in *Flora of Japan* by Jisaburo Ohwi, p. 548, 1965.



though it has produced neither decorative flowers nor fruit in 15 years, it has many other ornamental attributes. Beautifully clothed in white, long, fine, and silvery pubescence, its young leaves and twigs are noticeable even among the flowering crabs. Its thick gray pubescence on the under side of the leaves presents a pleasing contrast with the upper surface of green.

In the fall, when the fruits of other crabs reach their color peak, *M. tschonoskii* also undergoes a color change. Leaves so attractively green and gray during the summer now turn to various shades of bronze, crimson, orange and yellow, making this crabapple the most outstanding for fall color in the Arboretum's collection.

Malus × 'Van Eseltine'

Named for botanist Glen P. Van Eseltine, who in 1930 produced it by crossing *M. arnoldiana* with *M. spectabilis*, this cultivar (with a tendency to alternate-year flowering) is an introduction of the Agricultural Experimental Station at Geneva, New York.

This beautiful, upright crabapple stands out sharply among the broad-spreading cultivars that surround it. Its narrow vaselike shape is distinctive. Its flower buds develop as deep rose-red spheres that later unfold into massive pale pink, double flowers. These blossoms hang from long maroon pedicels that enhance their beauty, and they frequently have as many as 20 petals.

After its blooming period, *M.* 'Van Eseltine' again fades into obscurity. Although diseases often mar its leaves, rendering its brownish yellow fruit less attractive, it must, by flowering beauty alone, be included among the better crabapples in the collection.

Malus 'Winter Gold'

A clone of *M. sieboldii* var. *zumi* 'Winter Gold' was introduced by S. G. A. Doorenbos, former Director of Parks, The Hague, Holland.

'Winter Gold' has consistently been one of the better all-purpose ornamental crabapples in the collection. In spring it is covered with red buds which later unfold into beautiful white blossoms. All

through summer its green, disease-resistant leaves add grace to its spreading upright shape. Fruits that turn a beautiful golden-yellow in fall remain on the tree until winter. This tree, in its full glory, has no peers among our other yellow-fruited crabs.

Among crabapples here discussed are plants to serve various landscaping needs. *Malus hupehensis*, *M. sieboldii* var. *zumi*, and *M.* 'Golden Hornet' would greatly enhance the beauty of any park or large garden. *M. tschonoskii*, with its interesting foliage and upright habit, can serve as an accent plant. The slow-growing *M. halliana* 'Parkmanii' and *M.* 'Van Eseltine' would be excellent for small gardens. Indeed crabapples can contribute much to the spring and autumn landscape.

Sixteen year old tree of Malus 'Van Eseltine'.

NATIONAL ARBORETUM





NATIONAL ARBORETUM

The gray pubescent underside of Malus tschonoskii leaves present a pleasing contrast with the upper surface of green.



NATIONAL ARBORETUM

The fruits of Malus 'Wintergold' are a golden yellow and persist on the tree until early winter.

The Tucson Botanical Garden

By HARRISON G. YOCUM*

In view of the interest of so many people, a collection of native and exotic plants, especially cacti and rare palms, is being assembled as an incentive for study and appreciation. Many find much enjoyment in having the opportunity of viewing such displays, as it would become another of the many attractions with which Tucson is so favored. Because of this ever increasing demand, it is felt that eventually a valuable purpose will be served.

The Tucson Botanical Garden was founded in honor of the writer's parents, Mr. and Mrs. Harry Yocum on their 42nd wedding anniversary, December 20th, 1964. However, the collection was initiated long before that (early 1940's) through stimulation in the study of plants while a student in the Nature Study Club of Liberty High School, Bethlehem, Pennsylvania under the supervision of Mr. Warren M. Horne. Serious study of the wild and cultivated plants led to the gradual establishment of a collection, requiring much patience in acquiring the material and in growing it to attractive proportions.

Wonderful landscape possibilities can be created with the wealth of material that thrives under average Tucson conditions. The mild climate of the area is conducive to many kinds of plants. Besides the wide variety of cacti and succulents, many subtropical species do well with adequate care. Even some tropics—banana, bird-of-paradise and bougainvillea—make lush growth with protection. Because of their slow maturity, eventual beauty and difficulty in obtaining rare species, the palms are the most prominent. Work with them is most intensified as they are largely all in the

seedling stage, not exceeding ten years although a number are attaining luxuriance. Common ones include some members of *Washingtonia*, *Phoenix*, *Butia*, *Trachycarpus*, *Erythea*, *Sabal* and *Chamaerops*. Others being tested for endurance are *Copernicia*, *Jubaea*, *Livistona*, *Nannorrhops* and *Trithrinax*. Of course genera in addition to the above will merit observation. Even the palms of the humid tropics do well with adequate humidity provided in the plexiglass conservatory. Only species requiring this as well as frost-tenderness would need such protection. The strictly tropical types make good growth during the strong summer heat in partially shaded patios and similar situations where they are protected from the wind; this is especially true as humidity of the season increases.

As of September, 1965, one hundred species of palms are represented with other foliage plants in addition to over 200 kinds of cacti and succulents. The more attractive, botanically interesting and rare types are stressed. To mention a few of the palms: there is the very spiny *Aiphanes acanthophylla* from Puerto Rico with sharp spines to over one inch long all over the pinnate frond; the unusual *Neodypsis decaryi* of Madagascar with its leaf-sheaths so arranged as to give a triangular appearance to that portion of the stem; the deeply cleft orbicular leaves of the Cuban *Coccothrinax miraguama* suggesting the spokes of a wheel; the Carnauba wax-palm (*Copernicia cerifera*) from Brazil, the leaves of which yield this important wax; small representatives of the eventually gigantic Talipot palm (*Corypha unbraculifera* and *C. elata*) of India; the rare Sealing Wax palm (*Cyrtostachys lakka*) with ultimately starting red-lacquered leaf sheaths from the Borneo rain-forest; the famous Betel

*1628 N. Jefferson Ave., Tucson, Arizona.

■ Harrison Yocum is a Research Assistant at the Tucson Botanical Garden which was founded in honor of his parents.



HARRISON G. YOCUM

Cactus and Rock Garden.

Nut palm (*Areca catechu*) much prized for its fruit in the East Indies; also the *Licuala* palms of southeast Asia and *Latania* from the Mascarene Islands have highly ornamental plicate leaves.

Other plants of interest include the Sensitive Plants (*Mimosa*) of Brazil with their palmately-compound leaves, and a climber from Sumatra with pinnately-compound foliage that is phototropic as well as thigmotropic. The Traveler's Tree (*Ravenala madagascariensis*), a gigantic member of the Banana family that is sometimes called Traveler's Palm, is interesting in storing water in the sheathing leaf-bases.

To be appreciated, the cacti should be seen in bloom from March to November. The parade of flowers commences with the various Hedgehog or Rainbow Cacti (*Echinocereus*), the leader being *E. rosei*—probably natural hybrids of *E. conoideus*. For Easter color, the showy yellow blooms of the Texas Rainbows

are associated with the violet blossoms of Fendler's Hedgehogs, after which native Arizona Rainbows glorify the month of May. The interesting button cactus (*Epithelantha micromeris*) always raises comment by their button-like appearance. Creamy or pale rose flowers produced throughout summer are followed by attractive elongated red fruits in the center of its white, globular body. Like many of the *Echinocereus*, they prefer limestone soil. Summer brings forth the showy nocturnal night-blooming cereus (*Harrisia martinii*, *Peniocereus greggii*, *Hylocereus* and others) and the Easter-lily cactus (*Echinopsis*).

Being surrounded by desert and mountains, Tucson is fortunate in that a wide variety of rocks can be used for attractive "rockscaping." For instance, cacti and rocks go together naturally and infinite designs can be created with them. In addition, colorful rocks can be used to enhance foliage plants thus combining botanical and mineralogical specimens to good advantage. Harmonizing

well to create patterns for conservation are the blue of chrysocolla, "sparkling rocks"—crystallized with quartz and "pintz" (the latter of much smaller sized crystals), white or stained "cauliflower rocks"—usually of botryoidal calcite, the striped "candy rock"—wonderstone, and varieties of chalcedony and other agate.

Appreciation is due the following for supplying seeds or exchange plants: the American Horticultural Society, Fairchild Tropical Garden, New York Botanical Garden, Missouri Botanical Gar-

den, Longwood Gardens, El Paso Cactus & Rock Club, Billings McArthur of Winter Park, Fla., Randolph Fuller of Naples, Fla., Dr. M. S. Darian of Vista, Calif., Paul Weissich of the Honolulu Botanical Gardens, Dr. O. M. Barth of the Instituto Oswaldo Cruz in Rio de Janeiro, and the famous Botanic Gardens of Singapore, Indonesia, Ceylon, India, Mauritius, Trinidad, British Guiana and Brazil. Also Frank R. Mark and Dale B. Morrical of Los Cruces who have donated many of their unusual cacti.



HARRISON G. YOCUM

Washingtonia filifera—about 15 years old.

The Granite Gardens of Georgia

BY MARIE B. MELLINGER

In the upper Piedmont of Georgia, are certain granite-gneiss outcrops, rising in exposed rock masses, or as monadnocks (isolated domes) above the plain. They range over an area some one hundred miles wide.

Since 1776 these granite gardens have been explored by botanists, and their unique floras listed and described. William Bartram was possibly the first to botanize these areas, followed by André Michaux in 1795. They were followed by a whole list of famous men: T. D. Schweinitz in 1812, Thomas Nuttall in 1816, Rev. Thomas Porter in 1846, H. W. Ravenal in 1848, J. K. Small in 1893 and 1894. At the turn of the century, Roland Harper explored the granite outcrops and in 1943 Rogers McVaugh did his well-known *Vegetation of the Granitic Flat Rocks*. Dr. W. B. Baker and Robert B. Platt and Madeline P. Burbank have done extensive studies of these areas, as has Haskell Venard of Atlanta. This is a short summary of what the granite gardens once were and a warning of what they might become.

I was fortunate enough to see some of these granite outcrops in May, 1965, and they are still filled with outstanding surprises for the botanist and plant lover. I am indebted to Mrs. Marene Snow and Mr. Venard for making this possible. Unfortunately, we were seeing the granite gardens after a period of extremely dry weather, yet there were still an abundance of flowering plants.

At one time some two hundred and fifty plants were listed for these areas, some fifty of which were casual weeds or immigrants. Seventeen species were listed as endemic only to these areas. In 1920, these rock outcrops were still relatively unspoiled, but since that time stone quarries have made inroads into the mountains and tourist attractions have

replaced many of the natural rock gardens. Public apathy and carelessness has caused many of the outcrops to be despoiled of their rich heritage of plants. Every year there are fewer endemic species and more weedy, introduced plants.

Many of the plants once listed by J. K. Small for Stone Mountain are no longer found there, among them the Granite Gooseberry (*Ribes curvatum*), the phacelia (*P. hirsuta*), a mountain mint (*Pycnanthemum curvipes*), a vetch (*Vicia hugeri*), and a rock oxalis (*Oxalis colora*). At an early date Wilson listed the Spleenwort (*Asplenium bradleyi*) from near the summit, and Small again listed it in 1894. Although Bradley's spleenwort still occurs on some sandstone cliffs of western Georgia, it is presumably lost from the granite outcrops. So too is the Golden Honey-suckle (*Lonicera flava*) listed by Roland Harper. There is a very remote possibility that some of these rarities may have been overlooked by more recent botanizing expeditions but little hope of this. There is considerable evidence that many of the granite outcrops were once much wetter than in recent years, and more capable of holding moisture loving plants.

Still evident and most showy are the vast expanses of rock covered with crustose lichens and mosses in an array of colors and patterns. The lichens are, of course, the rock crumblers and earth builders. They pave the way for other plants by helping create pits of humus, like oases, in the rocks. Because they have the ability to absorb and store moisture they can exist through dry periods more easily than the more delicate forbs. Reindeer Moss (*Cladonia rangifer*) occurs in various forms, along with the scarlet knobbed *Cladonia cristatella* and the Goblet Lichen, *Cladonia grayi*. There are vast patches of gray or

■ *Hardeeville, South Carolina.*



MARIE B. MELLINGER

Dark patches of Rock Moss.

yellow *Parmelia* on flat expanding circles on the rocks.

Botanists have made special studies of the mosses of the granite outcrops, and at least seven species are at home there. The dark patches of rock moss, *Grimmia*, are especially noticeable when blackened and dry, taking on a more subdued hue after a rain. Other common mosses include Horn-tooth Moss (*Ceratoden*), *Bruchia*, and *Polytrichum*. Peat Moss (*Sphagnum*) is found in wet pockets. A few lip ferns, *Cheilanthes*, still grow from rocky crevices, blending their woolly gray fronds with the lichen and hepatic shades of gray and black.

Among the outstanding sights of the granite gardens are the pools, called variously "weather pits," "rain pools," or "solution pits with intact rims." There moisture collects and remains to host an abundance of aquatics. We did not see the fairy shrimp, *Eubranthropoda*, mentioned by Odum as being "completely isolated vertically as well as horizontally from any other bodies of water." Neither did we see the Twinleaf, *Amphianthus pusillus*, a rare member of the figwort family (Scrophulariaceae). *Am-*

phianthus has been described as a delicate, glabrous annual, with leaves that float on the surface of the water. The tiny white flowers are usually cross-pollinated by insects, but in dry seasons the plant produces self-pollinating blooms at the base of the stems. The seeds can also lie dormant during a dry season.

We did see patches of the pretty pale blue flowered *Lindernia monticola*, also a figwort, at the pool edges. At one station we found the Quillwort, *Isoetes melanospora*, in a wet pocket. This was first listed by Canby on Mount Arabia in 1869, and by Small in 1893 on Little Stone Mountain. With the quillwort we found the proliferating Spike Rush, *Eleocharis vivipara*. We saw no sign of the endemic *Juncus georgianus*, first listed by W. M. Canby in 1869, and again by Small in 1895, nor the *Rhynchospora saxicola* of Small and Harper. We did see last year's dried plants of *Cyperus granitopholus*, a small red-stemmed galingale, believed by some botanists to be an endemic species, and by others to be an ecological variant of *Cyperus inflexus*. In their wonder at the plant growth of the granite knobs, bot-

anists sometimes went overboard in hastily naming new species. More extensive study and modern methods of chromosome counts prove some of these to be merely variations of other species caused by the unusual conditions in which they grow.

We did not see any of the Trout Lily, *Erythronium americanum*, but the season may have been too far advanced or too dry for any signs of its presence. We saw seed of the Yellow Rush-lily *Schoenolirion croceum* (once *Oxytrichia*), in wet depressions on the outcrops. Spiderworts, *Tradescantia ohioensis* and *T. hirsuticaulis*, were present in large patches. *Agave* (once *Manfreda*) and *Yucca filamentosa*, both appeared at the outcrop perimeters.

Plant succession on the granite outcrops is a matter of increasing or decreasing depth of soil and availability of moisture. Somehow, the weedy and introduced species seem better able to compete in times of drought. Fescue grasses (*Festuca rubra* and *F. octoflora*) seem to have almost taken over some

areas. So too has the little-barley, *Hordeum pusillum*. Of the native grasses we found Silky Hair-grass; *Agrostis hyemalis* and *A. elliottiana*, large patches of Broomsedge, *Andropogon virginicus*, and several panic grasses of the genus *Panicum*.

Possibly the best known plant of the granite gardens is a small member of the stonecrop family (Crassulaceae) called *Diamorpha*. Certain areas of the outcrops are given the name "Diamorpha communities," because at certain times of year this is the dominant plant. The outcrops turn vividly red in color from their covering of *Diamorpha*. These are very small plants with extensive root systems that help hold soil in pockets and crevices. In spring it has small white flowers. By June it seems to have almost disappeared, but the dried plants retain their seeds until the cool and damp weather of autumn. *Diamorpha* was still rather abundant on most of the rock outcrops we visited.

The dwarf stonecrop, *Sedum pusillum*, is listed as an association plant of

Pool rimmed with Lindernia monticola.

MARIE B. MELLINGER



Diamorpha, but a close search failed to reveal any, although it was the season when it should have been in bloom. We did find a few plants of *Talinum*, the rock portulaca, a small succulent with flowers that open only during the middle of the day. We did not see either the pink flowered *Portulaca smallii* or the yellow-flowered *P. coronata*, both listed by Small in 1894.

Several plants endemic to the granite gardens are still, happily to say, fairly abundant. We saw great patches of the felty, silvery gray leaves of the Rock Ragwort, *Senecio tomentosa*, and the Creeping Rockworth, *Arenaria brevifolia*. Colonies of prickly pears *Opuntia humifusa* were opening their large, fragile pale yellow blooms. We saw young plants of the *Viguiera porteri*, or Rock Daisy (often mistaken for a *Coreopsis*) that cover these rock hills with golden flowers in autumn. Unfortunately a prolonged drought can keep these seedlings from coming into flower.

We saw flowers of the Wild Savory, *Satureja caroliniana*, Blue Sage, *Salvia azurea*, Tall Bluets *Houstonia longifolia* and Pinewort, *Hypericum gentianoides*. The Lavender Milkwort, *Polygala curtisii* was almost ready to blossom. The showiest of all were the Rock Primrose *Oenothera*, bright golden patches against the rocks and contrasting with the pink of Beardstongues or *Penstemon*. Lacking from older plant lists, and probably introduced in more recent years were the weedy plantain, *Plantago virginica*, Toadflax, *Linaria canadensis*, Sorrel, *Rumex hastalatus* and *Geranium carolinianum*. All of these were common. Many plants from older lists were missing, but whether from temporary dry conditions or because they had permanently disappeared is anyone's guess. A botanist visiting the outcrops in autumn could still expect to see *Helianthus*, *Coreopsis*, *Liatris*, *Gerardia*, and the showy *Hypericum*.

Around the edges of many of the outcrops and sometimes venturing out upon the rocks, were vast, riotous tangles of Japanese Honeysuckle (*Lonicera japonica*). Cross Vine, *Bignonia capreolata* and three species of smilax *Smilax bona-*

nox, *S. glauca*, and *S. smallii*, climb over shrubbery and trees. From rocky crevices the smilaxes emerged as dwarfed, shrubby bushes, along with the Virginia Creeper, (*Parthenocissus* and the Carolina Jessamine *Gelsemium sempervirens*. Dr. Baker has advanced the theory that abnormalities in the jessamine growth may be due to radiation of substances deep in the granite. Other botanists infer that the odd forms are due to the scarcity of nutrients and moisture.

The Shining Sumac, *Rhus copallina* grows short and stubby on the outcrops and large and rampant in adjoining woodlands. Normally a vine, Poison Oak, *Rhus quercifolia*, also grows shrub-like on the rocks and there closely resembles its sweet smelling and harmless relative, the Fragrant Sumac, *Rhus aromatica*. There are a few bushes of Sparkleberry, *Vaccinium arboreum* and Fringe Tree, *Chionanthus* on the outcrops along with Swamp Privet, *Forestiera* and small dwarfed shrubs of Thornapple *Crataegus uniflora*.

Trees struggle for sustenance on the granite outcrops, often appearing in gnarled or freakish forms. Winged Elm, *Ulmus alata*, liquidambar, and Persimmon, *Diospyros* are found there along with the Shortleaf Pine, *Pinus echinata* and the Loblolly, *Pinus taeda*. Chinaberries are still found where J. K. Small reported them running wild with peach trees and Crepe Myrtle in 1893. The Hop Tree, *Ptelea trifolia* is still found on Kennesaw where it was supposedly planted by the Indians.

A dwarfed oak called *Quercus georgina*, is found on the granite ridges along with a form of the Water Oak, *Q. nigra* forma *microcarya*. It is said these oaks as well as those in adjoining woodlands hybridize freely and several hybrids are listed for the area. There is beginning to be evidence that some of these oaks may be ecological variations rather than valid hybrids or species. At least it gives botanists a good subject for argument.

If this summary of the granite gardens seems vague as to exact locale of some species of plants it is purposely so. Good friends and botanists have told me

that to publicize the exact locale of rare plants is to subject them to the pickers and diggers who would carry them all away. If this is true it is a sad commentary on our modern day nature lovers.

However, it is true that the general public should somehow be made to realize that these granite gardens with their natural plant associations are something special. An effort should be made to preserve at least some of them before their vegetation is entirely destroyed. On our recent trip we saw many places where rubbish had been dumped upon the rocks. Hot rodders had used the granite hills for drag strips. Scouts and picnickers had built fires in many of the shallow depressions. Something should be done to prevent such desecration and to preserve so unusual a natural heritage.

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Gray foliage of Senecio tomentosa

MARIE B. MELLINGER

King Alfred And Form No. 1040

BY TOM D. THROCKMORTON, M.D.

I had only been at the Callaway Gardens, in Pine Mountain, Georgia, for about twenty minutes when I broke one of the Ten Commandments. I stepped out of the Inn door, to get my bearings, and saw that old American beech. A muscular, silver-gray trunk rose straight as any arrow for the best part of 100 feet, to disappear into a trembling golden cloud as autumn's vagrant airs stirred the turning leaves. In the smooth bark, high as a tall man's head, were carved interlocking hearts and pairs of names; obviously lovers rather than horticulturists, although there need be no mutual exclusion of the two. As this king of trees peered out across his domain, and his minions of scattered undergrowth, I fractured that Commandment: "Thou shalt not covet."

Here was I, a surgeon from Iowa, recently bereft of eight very old vase-shaped elms by an incredible plague of dutch-elm disease, and now confronted with a glimpse of unattainable riches. And today, as I think over my collection of adolescent pin oaks and youthful sugar maples thrusting here and there above the house-top, I still covet that beech. And I also treasure the days spent at the Callaway Gardens, on the occasion of the Twentieth American Horticultural Congress, under the auspices of the American Horticultural Society.

Actually, to coin a phrase, "a funny thing happened to me on my way to Pine Mountain": I received a copy of the Wayside Garden Catalogue in about 1949. I was overwhelmed by page after page of tulips. What red-blooded, moderately lazy American male (whose favorite color is red) could possibly withstand such temptation. Visions of great glowing goblets on stems like buggy-whips crowded through my mind as I

filled out the order blank. I also ordered a small collection of narcissus. They, too, had the guarantee of preformed flowers in the bulbs. And also, I wasn't quite sure what they were.

As spring uncovered the rosy-purple tulip shoots, she also uncovered tight blue-green quivers of stiff, erect daffodil leaves. By that time, I had learned that narcissus were really daffodils. As the buds of the tulip 'Red Emperor' lifted above the foliage and took on a powdery red cast, the spathes burst on a double handful of daffodils. And then I learned that all daffodils are not yellow trumpets. I saw 'Selma Lagerof', and have been madly in love with her since that day: a milky-white perianth broad but informal as a sail not tightly set by a catspaw of wind. And the trumpet was not a trumpet at all, but a cup, flaring like a ballet skirt; green-hearted, the lemon cup was broadly bordered by an orange rim with enough red in it to make a Sioux brave take to the warpath.

I think I was expecting Pollyanna, and met Salome instead. The only similar experience I have had was, at age sixteen, when a Chicago girl spent a summer-month with relatives on our block. 'Selma Lagerlof' bewitched me, and I've been a daffodil fancier since I first saw her.

As a new plant hobbier, I read all I could find (wisely) and bought all I could afford (unwisely). 'King Alfred' is synonymous with the word "daffodil" to most of us—which is a great pity. How many thousands of gardeners have decided that they just could not grow daffodils, because a handful of big, heavy

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*Delivered October 14, 1965 before the Twentieth American Horticultural Congress at Callaway Gardens, Pine Mountain, Georgia.

bulbs of 'King Alfred' melted away in a year or two? Actually, 'King Alfred' needs a breath of salt sea air if he is to flourish. Also 'King Alfred' had no father! King Alfred is an autotetraploid and therefore a bastard-plant, in several senses of the word. And the thoughts of illegitimacy which cling to 'King Alfred', led by connotation to the Federal Income Tax.

The departments of government have developed an increasing interest in Social Security numbers, despite a statement on your card which says: "For Social Security and Tax Purposes—Not for Identification." In a "Special Message for Taxpayers," we were informed in 1964 that: "During the past year, continued progress has been made in installing our automatic data processing system, and some parts of the system are now operative in all of the fifty states. The system is designed to give you better service and more efficient and effective enforcement of tax laws. Our aim is to make sure that everyone pays his share—and no more—of the cost of keeping America safe, prosperous and healthy.

"For your own protection, and to promote fast, accurate processing of your return, *please* (italics mine) watch these points:

"Name and Address—

"Copy your Social Security number exactly as it appears on your account card. This number is important to rapid processing of your return and to identifying your tax affairs."

I thought it was mighty neighborly of the government to use the word "*please*," as above. In the entire 20 page government booklet, the word *please* is used on just one other occasion:

"Attach forms W-2 to your return.

If not available, *please* explain."
(Italics mine)

So, your Federal and State tax data are filed away in computers under your Social Security number. If you have been lucky enough to get your wife a job, her number is required too. And if she hasn't had a job, the Feds would like to give her a number, anyway. Let us look, briefly, into the other types of data

that are being accumulated under your Social Security number:

1. Bank account and checking account.
2. Stock and bond transactions.
3. In Iowa, a Social Security number is required by law to obtain a driver's license.
4. Hospital admission.
5. Military enlistment.
6. Life and accident insurance.
7. Death certificate.
8. And now, for Medicare.

These and other bits of data on your life, habits, and experiences are currently being filed away—and are on tap under just one number, assigned especially to you. Almost all bulky data are now recorded and stored in electronic computers and data processing equipment: handling insurance and banking, building automobiles and waging war are dependent upon computers. If this universal system of collecting, filing, and processing information is good for people, then why is it not good for plants?

Just suppose you put all the collected facts about your favorite flower in a special drawer in your old roll-top pigeon hole desk. If some day you need to know the parentage of that particular flower, or the name of its breeder, you can go straight to that special little drawer, rifle through its contents, and find the answer. If you are interested in 5,000 plants, you just need a desk with 5,000 pigeon-holes. But if the drawers are kept in alphabetical order, the addition or subtraction of a single plant would mean a reshuffling of many drawers. If you manage to find the drawer of your favorite flower, in this mammoth desk, it will still be necessary for you to read over almost everything in the drawer to find the name of the breeder, or of the seed parent.

If you are really systematic and have every drawer logically arranged and stuffed full—where do you put *new information* about your favorite flower if and when it becomes available? Actually, by this time you would have two strong men in white coats looking after you; or you would have begged, borrowed, or stolen an electronic computer.

I found myself in just about that quandary with a burgeoning file of daffodil parentages, and so I asked "George" to help me. "George" is an I.B.M. No. 1440 computer and data processing system. He lives, in sullen splendor, in a plate-glass air-conditioned apartment at the Iowa Methodist Hospital, in Des Moines, Iowa. "George" is constantly attended by a bevy of lovely ladies who punch cards and alter data programs to his taste. "George" supposedly works for Mr. Bill Tate, in charge of the Computer Center. However, when "George" gets into one of his irritable, finnickily, hair-splitting moods, none of us is certain as to just who is doing what to whom.

How did the computer get the name? Well, any job too tedious, too time-consuming, too detailed, or too unprofitable, for people has been turned over to the computer. In other words, if the job is an unattractive nuisance, "let George do it!!" Currently "George" interprets electrocardiograms; records the data output of the hospital laboratories; diagnoses congenital heart disease in children; keeps a running census of the patients and tabs on available rooms keeps the hospital inventory; keeps the payroll, and writes the employee's checks, after making suitable deductions for time off, Social Security, tax withholding, insurance, etc. "George" is obtaining some contact with the more human side of people, through what are known as "accounts receivable." Is it any wonder that "George" took up daffodils as a hobby?

Perhaps "George" would take all of this more kindly if I told you a bit about him. The computer has a built-in memory of 8,000 bits of information. This is supplemented by a number of "disc-packs," each of which looks like a stack of 6 long-playing phonograph records, and each pack is capable of storing 2,000,000 bits of information. By means of this equipment, "George" is able to store or retrieve information at a rate of 62,500 bits per second. The information retrieved from this system is printed out, 120 characters per line at 250 lines per minute—a good deal faster than you can

read. "George" makes 2 true carbon copies, if requested.

Thus, here is a system which allows almost instantaneous storage and retrieval of data, and also allows random access to any specific bit of stored data. In other words, all data about any one plant can be stored at a specific location or address within the computer; and that material or any lesser portion of it may be picked out at will, to be listed or compared with other data to suit your taste.

My taste was daffodils. With the help of Mr. Harry I. Tuggle, Jr., Mr. William Panill, and Mrs. Roberta Watrous, decisions were made as to what type of daffodil information was worth storing. Our decisions were:

1. The name of the plant.
2. The seed parent.
3. The pollen parent.
4. Name of breeder.
5. Class and color. The horticultural classification is that approved by the Royal Horticultural Society, and by the American Daffodil Society. A code was developed which allows "George" to print a short but accurate color description of the bloom, when these data are known.
6. Season of bloom.
7. Height of plant.
8. Chromosome count (most daffodils are tetraploids.)
9. Fertility data, i.e., seed fertile, pollen fertile, or sterility if known.
10. Date—of origination or introduction or registration of the cultivar.

If any of the above data is regarded as questionable, uncertain, or of apocryphal origin, it is identified with a question mark (?). If several daffodils have gone under the same name, this fact is indicated by code and data is filed separately when known.

After two years of work, and substantial cooperation from many daffodil fanciers and breeders. I have accumulated data on almost 5,000 daffodils. These data have been digested by "George," and in that form are dignified by the title "Daffodil Data Bank of the American Daffodil Society."

Name	Seed Parent	Polen Parent	Breeder	Class & Color	S	HT	CC	FT	DT
Romance	Rose Caprice	Infatuation	J. Lionel Richardson	2B Pink	4	4		59	
Rose Caprice	Templemore	Green Island	J. Lionel Richardson	2B Pink	4	3		SP 52	
Infatuation	Glenshane	Waterville	J. Lionel Richardson	2B Green Yello Pink	4	3		SP 54	
Templemore	White Sentinel	OP	J. Lionel Richardson	2C	4	3		SP 38	
Green Island	Gracious	Seraglio	J. Lionel Richardson	2B Green White Yelo	4	4		SP 38	
Glenshane	Silver Plane	Rinsey	Guy L. Wilson	2C White White Yello	5	3		SP 41	
Waterville	White Sentinel	Seraglio	J. Lionel Richardson	2C Green White Yello	4	3		SP 43	
White Sentinel	Beacon	17 Seedling 1	Rev. Geo. H. Engleheart	2C	4	3	28	SP 26	
OP									P
Gracious			L. Van Leeuwen & Son Ltd	2B White White Yello	3	4		SP 31	
Seraglio	Mozart	Gallipoli	The Brodie of Brodie	3A Yello Yello Orang	4	4		SP 26	
Silver Plane			Authur E. Lowe	3B Yello	5	3		S 27	
Rinsey	Silver Coin		Percival D. Williams	3C Green White White	5	3		SP 34	
Beacon	Princess Mary	33 Seedling 1	Rev. Geo. H. Engleheart	3A Yello Yello Orang			28	SP 97	
17 Seedling 1			? Rev. Geo. H. Engleheart	2C					P
Mozart	Princess Mary		? The Brodie of Brodie	3A Yello Yello Red				S 34	
Gallipoli	Bernardino	Will Scarlett	The Brodie of Brodie	2A Orang	4	3		P 23	
Silver Coin		Hellenicus	Percival D. Williams	3C Green White White	5	3		SP 49	
Princess Mary	64 Seedling 1	Hellenicus	Edward Leeds	2A Yello Yello Orang	3	3		S 84	
33 Sedling 1	Recurvus	Poet							P
Bernardino	Duchess of Brabant	Lulworth	Philip John Worsley	2B Yello Yello Orang				SP 07	
Will Scarlet	Abscissus	Radiiflorus	Rev. Geo. H. Engleheart	2B Red		4		SP 98	
Hellenicus				10					P
64 Seedling 1		? ?		1A					S
Recurvus				10 Yello Yello Red	6	3		SP	
Poet				9					SP
Duchess of Brabant	Minnie Hume		? William Backhouse	3B Yello	4	3		S 89	
Lulworth	Bicolor	Radiiflorus	John Kendall	2B Orang		2		SP 90	
Abscissus				10 Yello Yello	4	2	14	S	
Radiiflorus				10 Green Red Red	5	3	14	SP	

Now let us see what the Daffodil Data Bank is capable of doing:

1. The data on any one flower can be had almost instantaneously.
2. A "print-out" of all the contained information on all daffodils can be had in about 40 minutes.
3. Lists of daffodils having one or more qualities may be had in about 5 minutes. Among such lists are—
 - a. All flowers bred by a certain breeder.
 - b. All children of any daffodil.
 - c. All children of any specific daffodil cross.
 - d. Lists by classification, i.e., yellow trumpets, jonquils, cyclamineus, species, etc.
 - e. Lists by color, i.e., all pink cupped daffodils, cups with a green eye, or with a red rim.
 - f. Lists by season of bloom, from extra-early to late, in 7 arbitrary periods of bloom.
 - g. Lists by plant height, i.e., miniature, small, medium, and large.
 - h. Lists of specific chromosome counts, such as a list of all known triploid daffodils.
 - i. Lists of known fertile or infertile plants.
4. Date of introduction is added as a mark of identification. However, lists of daffodils bred in particular decades make fascinating pictures of plant breeders and where they were going at any one time.
5. Most sophisticated of all of "George's" talents lies in his ability to print the family tree of a daffodil for seven generations. The form of such a family tree "print-

out" is that familiar to all genealogists, whether botanical or D.A.R. And, as a little anti-climax, "George" automatically includes, at the conclusion of each family tree, a little biography of each plant mentioned.

6. George is an author of small note. In March, 1965, a print-out from the computer was photographically reduced and printed in a ring binding between covers for \$3.25 including postage. The style is a bit dull, but the information on more than 4,000 daffodils is compressed to 103 pages.

Just how practical is such a plant data bank? I really don't know, but the following observations are helpful:

1. The genetics of the "pink" daffodil becomes fairly obvious.
2. The genetics of the "reversed bicolor daffodil" is explored, with some rather astonishing conclusions.
3. The common parent in two strains of "pigment unstable" daffodils has been found.
4. Flowers with valuable recessive traits can be located.
5. I do a little amateur daffodil breeding and this past Spring, all of my crosses were chosen by the computer as F_2 , F_3 hybrid types—which is almost impossible without data of the type I had available.
6. In what other form could you develop a library of 5,000 plants, with random access to any plant, and yet store it on a shelf, like small stacks of phonograph records or a roll of magnetic tape?

We have discussed what "George" can do for you; now, what can you do to "George." First, you can add, subtract, or alter data in any area of the recorded file by merely submitting a suitably punched card to the system. Secondly, the rather intricate and detailed programming required by this project is applicable to any other variety of plant, with suitable modifications. There are

more than 1,000 man-hours in the Daffodil Data Bank. There are more than \$10,000 of machine and program time in the project—a contribution of "George," Bill Tate, and myself. This collection of data has not cost the American Daffodil Society one cent!

The American Horticultural Society is in a unique position to capitalize on George's efforts. The A.H.S. is not only a society of garden and plant-minded people; it is also a society and association of specific *plant societies*. In each and every one of these component plant societies is a hard core of interested, diligent plant lovers who want to know more of their favorite plant and in turn are the source of such knowledge. These people should be put to work under the watchful cooperation of a special committee of the A.H.S.—"The Plant Data Bank" should be formed.

Each plant society should decide what items of information about *their* plant are of greatest use and interest. Each society must determine how to code their standards of classification and how best to describe their plant and flower, if such descriptions are desired. Once the tastes of each plant society are determined, then the data must be gathered by interested members of that society.

Up to this point, no expense has been encountered by anyone. Now, the finished proof-read data are sent to "George," where they are converted to verified punch-cards for \$50.00 per 1,000 cards, i.e., \$250.00 for 5,000 cards. For about \$500, "George's" program can be modified to produce the results required by any plant society, if the requirements are within reason. The charge for re-programming might be substantially less if the alterations are simple. The whole data file of cards and the program could then be put on a few dollars worth of magnetic tape for storage and from which a disc-pack could be built from time to time as the plant society requests data. Simple listings, as family trees, would cost about \$1.00 each. A print-out of all 5,000 plants would cost about \$7.50 per list, if run in triplicate. I understand the American Orchid Society has more than 30,000 named orchids. If

this list is ever to be submitted to data processing, some considerable expense will be involved. Perhaps some form of birthcontrol should be practiced in certain plant societies; a registration fee to go toward their registration and data keeping functions seems indicated.

In conclusion, the A.H.S. should encourage the formation of a Central Plant Data Bank. The data should be shaped to the wishes and requirements of specific plant societies. The largest item of expense is man-hours, expended to gather data and translate facts and figures to the computer's vocabulary. As a matter of fact, I might suggest that the A.H.S. does not need more money; it needs more people to work! The source of the vitally interested person who will contribute man-hours is in the component plant societies. This source can be

tapped if the A.H.S. and the special plant society have a common cause. In a Plant Data Bank there is such a common interest.

Computers now assign patients to hospital rooms, keep tabs on the pathology department and are real whizzes in the diagnosis of heart disease. A computer may even think at length about appendicitis—but to date, none has been licensed to do surgery, which is probably just as well, because those beady-eyed little lights, as they blink, do not offer much by way of reassurance in a "bedside manner." And also, as a patient, you could never afford a large computer as a surgeon—"George" has several cousins who are far more expensive by the hour than I am. People need machines; but machines also need people—and in this instance, lots of them.



"George"

TOM D. THROCKMORTON

Actinidia Chinensis

A Promising Fruit And Some Related Species

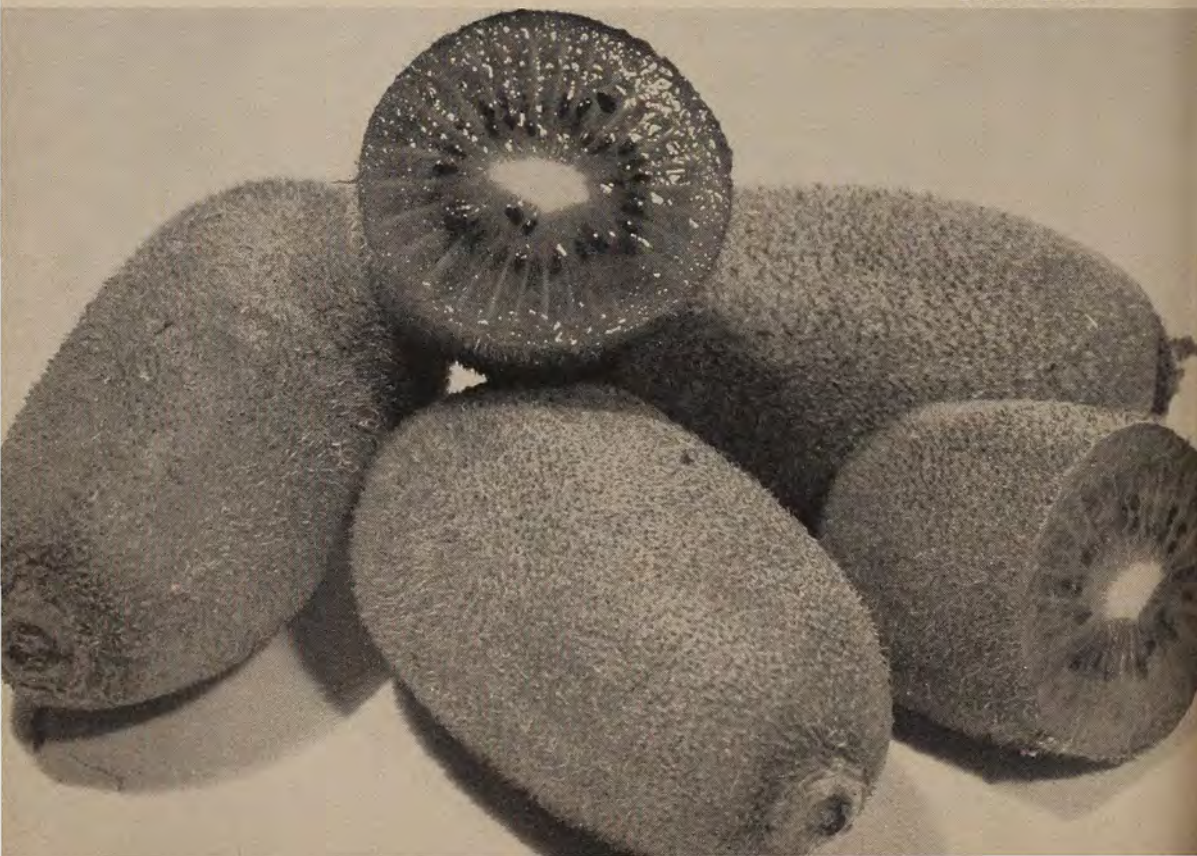
BY EDWIN A. MENNINGER

The tasty fruit of a vigorous Chinese vine (*Actinidia chinensis*) has definite market possibilities in the United States but the field remains virgin. Limited cultural experiments have been carried on at the United States Department of Agriculture Station at Chico, California, but no efforts have been made by any-

body to explore the commercial possibilities, to discover best areas in this country for cultivation, or even to pick up the successes achieved by growers in New Zealand where the fruit has been produced commercially for ten years. *Actinidia* is happy in climates that grow oranges, but apparently requires more

This group of Actinidia fruits displays in cross section the luscious, attractive green interior of the fruit with its many tiny purple seeds around the core. The outside of the fruit is less attractive, for it is as brown as a potato and covered with stiff fuzz which must be removed before eating, either by scalding or by peeling the fruit.

DOUGLAS ELLIOTT



elevation than south Florida can provide, as experiments there at sea level have been abortive, although attempted at the U. S. Plant Introduction Station, Miami, over a long period, 1935-1957.

Of course all American housewives are hostile anyway toward new fruits and vegetables. Fifty years elapsed before the avocado achieved its proper place as an American table delicacy; half this time was spent living down that horrible name "alligator pear."

Actinidia is similarly handicapped because it is usually called Chinese gooseberry; of course it has no connection with geese or with that sour fruit which disappeared from cultivation about the time of the Spanish-American war. Commercial growers in New Zealand realized that nobody knowingly would spend money for a fruit called gooseberry, so they changed to another bird and adopted the equally silly name of Kiwi-Berry. (A kiwi is a virtually extinct, flightless New Zealand bird.) Under the name Kiwi-Berry the fruit was shipped to distributors in Australia, England, and the United States and the New Zealanders in 1962, sold nineteen tons of Kiwi-Berries in the United States, mostly through mail order fruit clubs and chain restaurants. They also sold thirteen tons in Australia and twenty tons in England. Those enterprising down-unders thus disposed of their crop surplus at the fancy price of 80¢ a pound or more. The total 1962 crop in New Zealand was 617 tons of fruit, and sales were made despite a name as far-fetched and inappropriate as Jerusalem artichoke or Guernsey lily.

What does the *Actinidia* fruit look like. First of all it lacks uniformity. Although no standardized named varieties are recognized, the improved strains produce fruits the size and shape of an elongated turkey egg, 2½ to 3½ inches long and from 1 to 1½ inches in diameter, of a brownish color like a potato, and cov-

ered with stiff, fuzzy hair—anything but attractive to the eye. Hence the fruit must be peeled, as those hairs irritate if they get in the throat. Inside, the story is different. The flesh is a beautiful, translucent pale green, and at center are the tiny purple seeds, crisp and crunchy, that need not be removed before the fruit is eaten, which is just as well as they are very small and numerous. The raw fruit is cut and sprinkled with sugar and is eaten alone or in fruit salads. It is also used before getting dead ripe, in stews, preserves, jams, sauces, and these are bottled or canned. In commercial processing, the exterior hairs are removed in a weak lye solution. Chemical analysis has shown that *Actinidia* fruits are richer in Vitamin C than an orange, although the ascorbic acid content of large fruits is only half that of small fruits.

Considerable variation occurs in the size and shape of Actinidia fruits. Those on top, left to right, appear to be illustrative of Allison and Abbott strains, those at bottom of Hayward and Bruno strains.

COURTESY NEW ZEALAND JOURNAL OF AGRICULTURE



■ Edwin Menninger is a longtime horticulturist particularly renowned for his writing on tropical and subtropical trees and shrubs especially flowering species. He is responsible for the introduction of numerous ornamental plants into Florida.



COURTESY NEW ZEALAND JOURNAL OF AGRICULTURE

Greater production of Actinidia fruits is achieved by training the vines over pergola-like frames, so that the fruit can hang down within picking reach. It is also much easier for the picker to see this way.

The development of improved fruits in New Zealand dates back to 1910 when Bruno H. Just and other pioneers began hybridizing and producing better and finer fruits, though unfortunately they failed to name the crosses. For years these went unidentified, but more recently the New Zealand Department of Agriculture has sorted out and named, after extensive field trials, the preferred commercial strains. These are titled 'Bruno', which is longer and thinner, like a sausage; and three types that are shorter and fatter, 'Hayward', 'Abbott', and 'Allison'. Strangely enough the fragrant, pretty, white blossoms of these four strains are sufficiently unlike that the strain can be identified from the blossom. Development of these improved types eliminated the small-fruited early forms in New Zealand which were inferior in taste and many had tough, inedible fibres running through the central axis of the fruit.

What does the ripe fruit of *Actinidia* taste like? One writer says it is "delicious, being of a sweet flavor which has been likened to a strawberry, to rhu-

barb, and to the common gooseberry. Yet, it is unlike any of these, having its own distinctive, exotic taste." Just, exactly, what is an "exotic" taste? The unripe fruit is rich in pectin but this disappears as the fruit ripens. The fruit also contains an enzyme called actinidin which, like the enzyme in the papaya, is useful in tenderizing meat.

If would-be growers in North Florida, on the Gulf fringe States, or in California, could forget about poultry—goose, kiwi, etc.—and concentrate on production of *Actinidia* under its correct name, they might well find it a successful venture for the vine grows easily in mild climates, almost too easily. It ramps over everything that gets in its way—trees, shrubs, sheds; in New Zealand it climbs 40-foot Japanese cedars (*Cryptomeria japonica*) and a single plant will bear up to 700 lbs. of fruit in a season. This is easy to pick, with no prickles, but as difficulties are encountered in picking up a 40-foot tree, vines are usually trained over wire fences or pergola-like frames.

Because of the rampant habit, and be-

cause the fruit is produced only on new growth (as with grapes), pruning of the vines and keeping the new fruit-bearing runners within easy picking range, is extremely important. The vines are dioecious (sexes on different plants), and one male plant is required for each 6 to 8 females. As the fruit of most seedling vines is inferior, commercial planting is restricted to vines of known sex and proved fruitfulness. Propagation by hardwood cuttings has proved unsatisfactory at Chico, although softwood cuttings may offer possibilities.

Experience has shown that the vines need deep, rich soil, adequate drainage, and ample water supplies during the fruiting season. The vines appear to thrive in warm inland valleys. At Chico

the temperature range is down to 18-20° F. in winter and as high as 115° in summer. An annual rainfall of 18-25 inches is sparse in summer so that irrigation of the vines is often necessary.

Experienced growers in Florida believe that lack of altitude has been responsible for the failure (to date) of all *Actinidia* plantings in Florida, even in areas where oranges thrive. They call attention to the fact that in China, *Actinidia* "is very abundant from 2500 to 6000 feet altitude," according to Wilson.¹ To establish this fruit under Florida conditions might necessitate an experimental growing of several thousand *Actinidia* seedlings, saving for further

¹Wilson, E. H.: *A Naturalist in Western China*. New York, 1913. Vol. II, p. 32. Also cf. Vol. I, pp. 31, 32, 57, 173.



COURTESY NEW ZEALAND JOURNAL OF AGRICULTURE

The rampant growth of Actinidia vines smothers the flowers and fruit in a welter of leaves, especially when trained on wire fences.

breeding and selection those few which come closest to thriving under local, sea-level conditions. Sandy, acid soil would be better than limestone, and of course it should be free of nematodes. Until such experimental work is done, it cannot truthfully be said that *Actinidia* will not grow in Florida.

Actinidia fruit normally ripens early in December. Late frosts enhance rather than hurt the taste of the fruit, though they may knock all the leaves off the vine. Early frosts during the spring flowering may cut the fruit yield. Through the winter the vines are deciduous and dormant, so are uninjured by heavy frosts.

After picking, *Actinidia* fruit is usually allowed a further ripening of a month to improve the flavor. This brings the product on the market at the Christmas season when fresh fruits are in high demand. The slow ripening

The male flowers of Actinidia. The blossoms are fragrant and pretty; at first white, the petals soon turn brown.

DOUGLAS ELLIOTT



habit makes possible long storage and overseas export shipping, for with proper packing it keeps well for as long as four months. Experience in New Zealand has shown that *Actinidia* is damaged by storing in the same room with other fruits, such as apples and pears, but can be kept most successfully if packed in wooden boxes with polyethylene liners.

The New Zealand Department of Agriculture has published extensively on *Actinidia*, and a dozen or more of these booklets and excerpts may be consulted at Morton Collectanea, University of Miami, Coral Gables 46, Florida. They cover propagation, culture, harvesting, processing, and preparing for shipping, storage, etc., together with a lot of recipes for preparation of the fruit for the table.

Actinidia is not a complete stranger in the United States. Both *A. chinensis*, the best fruiting species, and half a dozen other species are frequently grown for their very ornamental foliage, although usually only one vine is planted and consequently no fruit is borne. Two species, *A. kolomikta* (hardest of all, to eastern Canada), and *A. polygama*, are attractive to cats. Dr. David Fairchild in *The World Was My Garden*, recorded a visit to a greenhouse in Boston, and he quoted Jackson Dawson: "The cats have somehow discovered that this new Chinese plant (*A. kolomikta*) is good to eat, and they gave me any amount of trouble in its propagation. I keep an old cat here in the greenhouse to catch the rats, and she has bitten off the potted plants nearly to the ground. For a long time I couldn't find out what was cutting back my *Actinidia* plants, but one day I saw some cat's hairs on the plant and later saw the cat at work. The large vine which we set out in the arboretum was clawed to pieces, until we put netting around it."

A. kolomikta is preferred for ornamental gardening because its fully developed leaves are variegated with white and pink at the tips. Sometimes this variegation covers the whole leaf.

Trees Do Grow Fast

By E. SAM HEMMING

Several incidents in my early professional career made me aware that virtually no laymen and few plantsmen were able to guess the correct age of most mature trees they saw. With this awareness, I became interested in noting the true ages of trees as I could discover them: also, with the passage of some time, I knew the age of others because I had planted them, on my own place or for others.

An early incident came when, discussing the size of an avenue of red and white oaks, mostly 3 and 4 feet in diameter, and guessing their age at more than a century, I was surprised to find on counting the rings of one recently cut down, that it was a little over 60 years old. Another incident, more humorous, occurred while walking around the estate of a very kind lady and, remarking on a nice avenue of American Beech and White Oak, all 3 and 4 feet or more in diameter, I said that they were quite old. She turned to me and said, "Sam! My father planted those when I was a little girl!" We are still good friends.

On another occasion, reading one of our fine garden magazines, I noted a caption under a photograph bemoaning the loss of a large "centuries old" weeping willow. I know now most weeping willows complete their life cycle in thirty-five years or so.

During most of my years as a plantsman I have also been interested in so-called "Colonial" gardens but, after investigation, have found no plant specimens of which I am sure, were planted prior to 1776 or anywhere near that, in spite of venerable appearance. Even

English Boxwood, long known for its longevity, grows surprisingly fast. I know plants which my father planted in 1924 that have reached 6 feet in height.

There are trees, of course, at least a century in age and in the West the Redwood, Douglas Fir and Bristlecone Pine may live thousands of years. Here in the East, the White Oak attains great age and my home is only a dozen miles from the famed "Wye Oak" estimated to be 450 years old. Yet the tree that reaches the century mark is a rarity and, as modern zoologists claim that no animals have a life span exceeding the three score and ten of man, the same, essentially, can be said of the trees. With few exceptions trees complete their life cycles within the life span of a man's 70 years.

Of course, many people will remark when planting a tree that they will never live to sit under its shade and that they want the most rapidly growing tree possible. Usually, the younger the person the more concerned they are. Their impatience is founded on several things: age is synonymous with an old, large tree, often an oak. When a tree is newly transplanted the gardener is most conscious of its presence on the lawn and during the first two or three years is the period when it does its most meager growing. Further to confound their impatience, certain trees are much slower to establish themselves, sometimes regressing before actually growing.

Still other plant habits confuse the layman. While it is true that climate has an effect on trees' growth, yet many grow quite large in colder climates, witness the Elm trees of New England and eastern Canada. I live in the Chesapeake

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Bay region of Maryland, where the growing season is long, yet this is of only minor consideration for so many trees make all their growth for the year in a one to three week period in spring, regardless of the climate.

Trees, too, have comparable stages to man, either three or four, as you may wish to term them: the first two, juvenile and youthful; then maturity; then old age. Growth habits change considerably within these stages. It is only in the youthful stage that trees will continue to grow during the summer season; even then, it is in rhythmic spurts rather than as continuous growth.

It is possible to document these remarks, as my father started this present nursery of mine in 1930, the year I finished college; so that we have a record of a wide variety of both native and exotic trees that are now mature plants, all between 25 and 35 years of age, as well as still others planted for various customers, along with a fairly accurate record of what cultivation and fertilizing they have been given.

Perhaps the record of the growth of some of these, particularly of choicer varieties, will reassure the gardener that ten years will give a respectably sized tree and that thirty years will often produce a tree as high as 75 feet with a three foot trunk diameter and that an

***Abies nordmanniana*—apprx. 40 years old—45' high, 15" trunk diameter, 20' spread.**

E. SAM HEMMING



actively growing tree makes annual rings as much as one inch wide.

The sizes given for the trees mentioned are quite accurate, the height being measured with the aid of a Brunton Pocket Transit and the diameter of the trunk measured at a point one foot above the ground.

The tallest tree measured on our own place is a Pin Oak. It is 75 feet high, has a spread of 40 feet and a trunk diameter of 36 inches. I know of another Pin Oak on a client's place planted as a 2½ inch caliper tree on a property that was a cornfield in 1936, that is even larger. It might be noteworthy that while some of the trees on our place are in landscape positions, others are more or less leftovers, and that, undoubtedly, trees we sold early in the years we were here would have been still larger.

Just as we find an oak the largest of them all, it might be worth mentioning that the quick-growing trees do not make larger trees than the quality types. I do not have a good comparable specimen of Silver Maple; I do know of a Chinese Elm that is the same age as the Pin Oak on the previously mentioned client's place which is as much as 12 inches less in trunk diameter. I might digress here to say that we long ago gave up growing the Chinese Elm because of its erratic growth and other poor qualities.

Even the term "quick-growing" often used synonymously with the brittle "soft" wood trees like Silver Maple is misleading, for one spring I measured the growth of five representative trees, all about 2 inches in caliper, in the nursery row. The Silver Maple grew 33 inches from its terminal shoot Pin Oak, 32 inches; Norway Maple, 22 inches; Sugar Maple, 27 inches; Red Oak, 48 inches.

After our Pin Oak, the most notable specimens are three conifers: Deodar Cedar, 65 feet high, 31 inch diameter trunk and 24 foot spread; *Cryptomeria japonica*, 60 feet high, 23 inch diameter trunk and 24 foot spread; *Taxodium distichum*, 60 feet high, 22 inch trunk diameter and 21 foot spread. Deodar Cedars that I have cut down have often had

individual growth rings exceeding one inch, making a two inch trunk diameter increase annually.

Two deciduous trees not generally thought of as growing large or rapidly show that *Acer rubrum* reached 57 feet high, 23 inches diameter of trunk and 30 foot spread, and *Betula pendula* 'Dalecarlica' 50 feet high, 19 inch diameter trunk and 27 foot spread.

The broadest spread was found in the Chinese Chestnut and the American Beech. The Beech, not thought of as very quick-growing, reached 48 feet high, 24 inch diameter trunk and 45 foot spread; the Chinese Chestnut is 58 feet high with 31 inch diameter trunk and 48 foot spread. The chestnut was just a little older, being planted as a two year seedling in 1930. It is my experience that the beech is one of the slowest of all trees to establish itself, often taking five years before it makes normal annual growth.

Of late years, because of the changing types of architecture of the modern home, and to avoid interference with utilities, some trees that reach a smaller mature size have been recommended, including the following. The *Sophora japonica* grew to be 36 feet high, 15 inch trunk diameter and 21 foot spread; the *Koelrueteria japonica* 33 feet high, 17 inch trunk diameter and 24 foot spread; *Cericidophyllum japonicum* 36 feet high, 18 inch trunk diameter and 22 foot spread. Other small trees include *Ilex opaca* 22 feet high, 12 inch trunk diameter and 18 foot spread; *Cornus florida* 'Rubra' 18 feet high, 10 inch trunk diameter and 24 foot spread; Japanese Weeping Cherry 25 feet high, 24 inch trunk diameter and 33 foot spread.

Cryptomeria japonica 'Lobbii' is often considered a compact form of the type but it reached 50 feet high with a 17 inch trunk and 18 foot spread. I suppose my favorite evergreen, where it does well, is *Abies nordmanniana*. It is not very rapid in growth, but a specimen planted as a 3 to 4 foot tree in 1930 on my lawn is close to 40 years old and is 45 feet high, 15 inches in trunk diameter and has a 20 foot spread.

The pines, true softwoods, grow quite

rapidly. Our native *Pinus taeda* in about 30 years grew to 51 feet high, with a 26 inch trunk diameter and 22 foot spread, and definitely out of its climatic range, in 25 years has reached 40 feet high, with a 17 inch trunk and 24 foot spread. *Pinus griffithi*, *P. strobus*, *P. sylvestris* and *P. nigra* make comparable growth.

To complement these total growth figures, some measurements I took of some young trees growing in the nursery row are interesting. I measured these trees weekly both as to the length of the terminal growth and the increase in diameter of the trunk.

For a 10 foot Silver Maple

DATE	TOTAL TERMINAL	TOTAL DIAMETER
April 15		1 19/32"
April 22		1 19/32"
April 29	4 inches	1 19/32"
May 6	6 inches	1 19.5/32"
May 13	16 inches	1 21/32"
May 20	24 inches	1 22/32"
May 27	24 inches	1 24/32"
June 4	30 inches	1 25/32"
June 10	33 inches	1 25+ /32"
June 17	stopped	1 26/32"
June 24	"	1 26± /32"
July 6	"	1 27/32"
July 15	"	1 27+ /32"
July 22	"	1 29/32"
August 3	"	1 31/32"
August 9	"	2"
August 18	"	2 1.5/32"
August 31	minor new growth	2 3.5/32"
September 11	stopped	2 5/32"
September 22	"	2 5.5/32"

For a 10 foot Pin Oak

DATE	TOTAL TERMINAL	TOTAL DIAMETER
April 15		2 2/32"
April 22	6 inches	2 2/32"
April 29	12 inches	2 2/32"
May 6	18 inches	2 3/32"
May 12	18 inches	2 3.5/32"
May 20	24 inches	2 4/32"
May 27	27 inches	2 5/32"
June 4	30 inches	2 6+ /32"
June 10	32 inches	2 7/32"
June 17	stopped	2 7/32"
June 24	"	2 8/32"
July 6	"	2 8+ /32"
July 15	"	2 9/32"
July 22	"	2 10+ /32"
August 3	"	2 11/32"
August 9	"	2 12/32"
August 18	"	2 12/32"
August 31	"	stopped

Even the so-called dwarf plants are hard to keep dwarf over a period of years. I have already mentioned the English Boxwood. The Irish Yew, the

most dwarf of the yews, will reach to 12 feet in 30 years, and a pair of *Taxus cuspidata* 'Nana' by my front steps spread 12 feet despite frequent prunings. *Cephalotaxus harringtonia* 'Fastigiata' and *C. h.* 'Drupacea' will reach 12 to 15 foot dimensions in that length of time. The slowest growing pine, *Pinus cembra*, in 25 years will reach 18 feet with a spread almost as great. The oldest plant of which I have a direct record is a Japanese Maple planted just before World War I with a spread of 25 to 30 feet and a height of 15 feet.

Recently, we cut down a dying Caro-

lina Poplar on my lawn which was about 100 feet high and had a trunk almost 4 feet. For the 35 years I knew the tree, it seemed about the same size yet it had only 65 rings and the last 30 rings were encompassed in a width of about 5 inches (10 inches in all).

It is hoped that these figures will help the professional plantsman answer some of the questions about time and growth that he is so frequently asked, and help the amateur gardener in many of his planting decisions to remove a bit of the feeling of impatience that is inevitable when planting a tree.

***Quercus palustris*—Apprx. 35 years old—75' high, 40' spread, trunk diameter 36".**

E. SAM HEMMING



Siberian Iris—A Modern Approach

By PEG EDWARDS

For a while in the 1920's it looked as though Siberian Irises might catch up in popularity with the Tall Bearded Group which at that time consisted mostly of diploids (24 chromosomes); the new tetraploid Bearded (48 chr.) were just beginning to filter down from the hands of the specialists into the gardens of the 'lay' iris fanciers. The rate of introduction of new Siberian varieties was on the upswing, with the fine introductions of Miss Preston, Mr. Morgan, and Mrs. Cleveland'. Still-popular varieties, such as 'Gatineau', 'Caesar's Brother', 'Llewellyn', were about to join the earlier 'Blue Ridge', 'Turquoise Cup', and 'Caesar' from these American Breeders. In England Mr. Waterer's 'Heavenly Blue' had come into the trade to join the earlier introductions of Mr. Perry. These and other breeders were putting into the hands of the connoisseur-gardner plants decidedly finer than the chance seedlings and accidental hybrids which were all that was available earlier. By the mid-1930's those wonderful, tetraploid Tall Bearded were getting the main attention of the fanciers and making a strong impression on the rising generation of hybridizers. There was no comparison in the matter of color range—the Siberians' white, blue, violet and red-violet versus the wide, almost full-spectrum color range of the Tall Bearded and the wider range of patterns; the seemingly much greater ease of growing and breeding Tall Bearded over most of Canada and the United States; the impressive size of the Tall Bearded as compared with the smaller, daintier Siberians—in

short, the TBs had all the advantages.

By the late 1940's a certain dissatisfaction began to develop among iris fanciers. In many parts of America these glamorous irises had to be staked to keep them upright. The breeders' enthusiasm for new and startling colors and color combinations seemed, to some growers, to be causing them to neglect such matters as flower production, vigor, hardiness and disease resistance; and perhaps most telling was that these splendid plants were simply too overwhelming for the small suburban gardens that were really beginning to proliferate on the fringes of our cities.

Of course, there was no one reason why any particular group of irises came into prominence at this time, but several types did make an appearance, or at least began to catch on with fanciers, the Miniature and Standard Dwarfs, Table Irises, Spurias, and Arils. Each had a different appeal for a different group of iris lovers. With the Siberians I can pinpoint several reasons for the sudden rise of interest. For one thing, flower arranging was developing away from the simple massing of flowers into mixed bouquets in the style of the three previous centuries, toward the Japanese and Contemporary styles in which a few flowers were carefully placed to create a visual line which gave a feeling of rhythm, motion, grace and delicacy—somewhat the feeling of the actual plant in the garden. The Tall Bearded irises just didn't fill the bill, but the Siberians did, beautifully, with their thin flexible stems and flowers not too small to be visible and not too large to dominate the whole composition. At the same time gardeners came to realize that here were irises which didn't have to be di-

■ Mrs. H. L. Edwards is one of the founders and first President of the Society for Siberian Irises, a Section of the American Iris Society. She has been breeding irises since 1950.

vided every two or three years but which, once established, could be left in one spot for as much as ten or fifteen years with a minimum of fuss. They sometimes took a year or two to settle in, but with a little patience, moderately acid soil, and reasonable applications of fertilizer and water they would soon settle down to make fine clumps of graceful, butterfly-like flowers. Their size also made them suitable for small gardens, yet, planted in masses, they were equally good in the largest plantings.

A few growers became interested in working with the Siberians. Wheeler's 'Yankee Trader' (1953), Hall's 'Royal Ensign' (1950), Scheffy's 'Blue Moon' (1952) and 'Royal Herald' (1949), Hodson's 'Mountain Stream' (1954), Cassebeer's 'White Swirl' (registered originally as 'Frank Stubbs' in 1954), and Marx' 'Congo Drums' and 'Seven Seas' (1954) all appeared just at the right time to reinforce this rising interest and to send the new Siberian fanciers hunting through catalogs for the few introductions of the 1930's and early 1940's that were still available. It appears certain that many varieties were produced during these slack years which have been lost because there was no real demand for them. And of course, new fanciers enlarged the market for new introductions, and the new varieties brought more new fanciers—what I believe the physicists might call a resonance effect. By 1960 one could really speak of a Siberian 'audience,' still small, but growing.

Siberians were still pretty much confined to the violet segment of the spectrum; even the blues and reds, so-called, were mostly lavender-blue and red-violet or orchid. Yellow species, such as *I. forestii* and *I. wilsonii*, were not very impressive and rather difficult to grow, except for a few clones and not at all easy to obtain. To make matters worse these were 40-chromosome species while most of the garden varieties were 28-chromosome. Crossing the two groups gave seedlings which were almost uniformly 'doggy' and nearly sterile. There were several other 40-chromosome species, rather tricky to grow for the most part,

such as *I. chrysographes*, the most attractive, which had been crossed with *I. forestii* in 1923 by Mr. Perry, who named several seedlings of this breeding. The named seedlings were off the market, and what remained was a group sold as Chrysofor seedlings. Like their parents they were not easy to manage in the average garden, and while interesting they were not really beautiful. Other crosses had been made with other 40-chromosome species but these too were generally cantankerous garden subjects. Somehow, if these yellows could be worked into a line of breeding which would produce strong, vigorous seedlings, the color-range of Siberians would come close to rivaling the Tall Bearded group on plants that didn't need staking, were not subject to borers, were relatively free of diseases, and could stay put for years.

At about the time I was falling in love with 'White Swirl', Maurice Kitton, in England, had come to the conclusion that *I. chrysographes* was not the parent to combine with the yellows, but that *I. delavayi* might be. A few American hybridizers were beginning to work in the same area. I have not as yet seen any of the Kitton introductions except in color-slides, and the American work has not as yet progressed very far. But on present evidence it appears that we should soon have not only strong, vigorous, beautiful yellows, but apricots, pinks, orange-reds, readily available in the next five years or so. Prices may be high at first but they will drop as stocks increase. In addition, these 40-chromosome species seem to carry an inheritance of a pattern new to irises—a sort of leopard-spotting that appears in some of the Chrysofor seedlings and is turning up in some other crosses. In addition there are possibilities of not only the bitones and bicolors but also tricolors, plus the veining patterns that are already familiar in the 28-chromosome group.

And what of this older line of breeding? Any line which is intensively bred seems to burst forth in 'breaks.' 'White Swirl' was one of these. Its form is quite different from that of its ancestors



Well grown plants of Siberian Iris.

F. W. CASSEBEER

from which it is derived, and its seedlings are also producing some breaks. Dr. McGarvey has produced seedlings of orchid hues not previously known in Siberians. At the same time Mr. Cassebeer is turning up seedlings with the form of 'White Swirl' in the blue and violet rang, some on short stems, to giving us nicely proportioned true dwarf Siberians. Other lines are also turning up dwarfs, and I don't mean the normal-size flowers on short stalks which have passed for dwarfs hitherto, but plants all in scale.

The growth habit of Siberians varies considerably. Most of our hybridizers recognize this and are working to produce new varieties which will fit into a new garden as readily as 'Summer Skies', a delightful older variety in light blue and white. I have yet to hear of it *not* blooming the spring after it has been planted. Most varieties adapt readily to most climates in the Temperate Zone as long as the soil is somewhat acid, but a few kinds are decidedly demanding, such as 'Eric The Red', which I have planted three times without hav-

ing had a bloom, yet a few miles away it seems quite happy. Some varieties, delightful in bloom, have floppy foliage over the ground during the summer with a messy appearance. However, most varieties, once the clump has begun to increase, become more self-supporting. The flopping habit is another characteristic breeders are working to eliminate.

We have had little trouble with insects and diseases, but some Siberians are unhappy in the more southerly parts of the country while others are a bit tender for the more northern parts of the Siberian climate belt. More and more we are trying to produce varieties tolerant of heat and cold. Another improvement would be greater tolerance of limestone soils.

To start planting a bed of Siberians, what would I choose, and how should they be grown? Until I had a little experience, I would first choose these, all available for a dollar each or less, 'Summer Sky'; 'Blue Ridge'; a good light blue with less lavender than most; 'Caesar's Brother', a vigorous medium violet; 'Royal Herald', similar to 'Caesar's Brother' but perhaps darker and with a different form; 'Llewellyn' and 'Blue Star', both blue and violet bicolors, again with different flower-shapes; 'Snow Crest', about the best of the older whites; and 'Red Emperor', red-violet with a lighter, bluish area on the falls. There are many others but these make a good start. Some more expensive would include 'White Swirl'; the "double" 'Tealwood', violet with very broad, almost horizontal standards; any of the Cassebeer introductions, such as 'Blue Brilliant', which has almost a true blue tinge at the center of the fall; 'Violet Flare', a very rich light violet; 'Placid Waters', a cool light blue; Marx' 'Seven Seas', a dark blue-violet, and 'Congo Drums', a deep violet self. If you like patterned irises by all means get 'Yankee Trader'.

Siberians prefer a fertile, humusy, moderately acid soil (pH 5.5 to 6.5) capable of holding considerable moisture but not inclined to become soggy. Choose a location where sun is available for at least eight hours. Good drainage is important, since they do not like

wet feet. Plant them a little higher than the surrounding ground. If you live in an alkaline-soil area, you might try excavating the bed to a depth of a foot or more, then add about an equal bulk of acid peatmoss plus a lavish helping of acid-plant fertilizer. Work this mixture thoroughly together, then pile it 10-12 inches high above the surrounding ground. The plants are set with roots well spread so that the rhizomes are $\frac{1}{2}$ to 1 inch below the surface. Water them in and keep the ground moist for the next couple of weeks. If your water tends to be alkaline a rainbarrel is very useful. Clip off the foliage as it turns brown in the fall, don't yank it, as this will loosen the new roots and make the plant more likely to heave in later winter and early spring. If you live in an area with much freeze-and-thaw, a mulch of straw, salt hay or similar material may be helpful. Water them well during the spring and through the bloom season. As soon as growth starts in early spring work in very lightly some acid-plant fertilizer, so as not to disturb the roots close to the surface. Many of the new plants should bloom the first year. After blooming, fertilize again and water during the early summer. Removal of seedpods will encourage new growth and greater bloom, and by the second spring all should bloom for you.

Concerning the spacing of the plants. This will depend on how large you want the clumps to grow. If you set out groups of three or more of a variety, plant them 8 or 10 inches apart, with a foot or more between groups. If you have only one division of a variety space them a foot or more apart. In five years a small division can spread to a foot or even 18 inches in diameter. A 2 foot spacing between varieties is also good, filling the spaces with annuals for the first couple of years. As the clumps spread out there will be some dead areas in the center, which if removed and replaced with fresh fertile soil, some of the growth will turn inward and fill the gap. To decrease the size of a thick clump, cut wedges out of the circumference with a sharp knife either in early spring or just after blooming, lifting out the pieces

with a spading fork for replanting in some other location. Again fill the depressions with fresh earth.

What could an amateur plant breeder aim at? In the 40-chromosome group, quite a lot. I have mentioned the widened range of colors, but I think that new and different plants in the older colors could also be produced. Certainly this division of the *Sibiricae* will reward the breeder with finer bloom, stronger plants, better branching, the more it is worked with. The 28-chromosome group also can be improved still more. Its color possibilities are far from exhausted. Tetraploid (56 chromosome) seedlings have already been produced, and these may make possible a much wider range of habit, height, and color-combinations. The breeding of Siberians is perhaps a little more complicated than that of the Tall Bearded. I am more careful to keep the blooms covered before and after making crosses to avoid contamination with other pollen (circles of nylon chiffon tied over the bud before it opens seem to give good protection), and the pollen is not always easy to obtain. Once the seed pods have formed the procedure is fairly simple. As soon as the seed pod starts to turn brown I remove it, with its tag and put the seed in a clean dry pill bottle. I add a little vermiculite, a few drops of water, snap on the lid, and store them in the refrigerator (not the freezer) for two to three weeks. Seeds are then sown in small pots, covered with about an inch of earth, and removed to a cold-

frame where they will stay over the first winter. Some seedlings may appear in the fall and these may be transplanted to pots and left in coldframe over winter. Label each pot with the cross number or letters, plus a separate number for each plant potted. In spring prepare a bed for the seedlings, just as for new plants, lining the young plants in rows about the time the mature plants are blooming. Seedlings should be spaced 6 to 8 inches apart in the row, with rows 8-12 inches apart. Young plants require frequent watering and some shade in the middle of the hotter days (temperatures over 80° F.). By the next winter seedlings should require no more care than the mature plants. Seedlings will start blooming the second spring at which time rogues should be removed immediately. Do not pot these seedlings. Keep all plants that look good for at least a second year, when the mature character is reached.

I think that in 15 years it will be possible to have a border of Siberians, in many colors, from 10 to 40 and more inches tall, with bloom season extended perhaps to two months and even the possibility of reblooming in late summer. Seedlings have turned up that produce a second crop of flowers in late summer or early fall. Other seedlings are appearing with two and even three side branches, which adds to the total quantity of bloom. Whatever the breeders may develop, the Siberian iris will always find a place of distinction in gardens.

A Book or Two

Orchids, Care and Growth

By Michel Paul. Published in U. S. by Universe Books, Inc., 381 Park Ave., South, New York, N. Y. 10016. 1965. 135 pages, illustrated. Paperback \$1.95. Cloth \$2.75. (Library)

Orchids, Care and Growth is a fine addition to our knowledge of how to grow and take care of greenhouse orchid culture. Most of the culture information follows the conventional procedures recommended by other orchid books. The book is well illustrated both as to culture-techniques and as to color reproduction and text-figures showing generic differentiating characteristics.

Though not distracting to the amateur, but obvious to the professional are several undesirable features. I have not seen the original Dutch edition, of which this is an English translation, so I cannot tell whether all of these are features of the author or the translator. But they do appear in this edition.

First, the misuses of terms: p. 8—"The extensive orchid genus"—when family is meant; page 36—*Ada* Ldl. represents a genus of orchids, not a tribe; a similar misuse of tribe (meaning genus) is on page 39 for *A. (Angraecum) sesquipedale* Thou.; p. 132—"Hybrids produced from two or more tribes of orchids," when only genera are listed. As a matter of taxonomy, generic names which are assigned to hybrids, i.e. by the hybridization of species of two genera, are designated according to the International Rules of Botanical Nomenclature, by placing \times in front of the new genus, as \times *Adaeglosium*, \times *Adioada*, etc.

Second, although this book is published in USA (America is misspelled on copyright page), the translation is typically British, as indicated by such spellings as metre (p. 42); colour (p. 8); coloured (p. 8); hybridisation (p. 15); sterilising (p. 29); centimetres (p. 29); whiteish (p. 51) etc.

Third, and the most confusing: Having the authority names after the generic and specific names is commendable; very few horiculture books do this (not even Roy. Hort. Soc. nor Bailey's *Cyclopedia of Horticulture*; nor *Exotica*). But the spelling should be identifiable, correct and consistent. *Cattleya* Ldl. (p. 50) and *C. amethystoglossa* Lind & Rchb. f. both refer to Lindley. The proper abbreviation for Lindley is Lindl.

Reichenbach fil. is variously abbreviated, but hardly Rchb. f. would be correct, and surely not *C. warscewiczii*—Rchb. f. as it appears on page 59. Also on p. 58, *C. trianae* Lind. Rch. f. is hardly correct either. On p. 63, Klotzsch is probably meant for Klotzch.

Cypripedium reginae Walt is not correct; it should be *C. reginae* Walt.; again p. 68 *C. montanum* Dougl. Ldl. is not correct; p. 79, *D. chrysanthum* Wall. Ldl. is not correct; Batem on p. 53, but Batem. on p. 90; Batem Ldl. is wrong on p. 104; H. B. K on p. 97, but H. B. & K. on p. 111, 118, and 119, etc.

Again I want to call attention to the fact that the basic subject material of this book and its presentation is very good. It is unfortunate that the book was not checked for its scientific accuracy before publication.

CLYDE F. REED

Hybrids

By David C. Rife. Published by Public Affairs Press, 419 New Jersey Ave., S.E., Washington 3, D. C., 1965, 160 pages, illustrated. \$3.75 (Library).

A most interestingly book written in layman's language on hybrids in plants and animals. The author first tells the meaning of "hybrid" with examples in both plants and animals. This orients the reader for chapters that follow. The story of hybrid corn is told using this to point out what basic genetic principles were discovered and the improvement in corn production that has resulted in enormous yields. The present day breeds of cattle are discussed to illustrate the influence of hybridization in animals. Unusual hybrid combinations in some plants and animals are described. In plants these include examples of interspecific hybrids in lilies, iris, wheat, tobacco, melons, as well as other plants. Interesting animal combinations are included, such as horse and donkey, buffalo and cattle, tigers and lions, bear species. The final chapter deals with man and the various populations of the world.

CONRAD B. LINK

The Small Rock Garden

E. B. Anderson, Pan Books, Ltd., London, 1965. 144 pages.

As the most recent of the Pan Piper Small

(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.)

Garden Series, this book does exactly what it sets out to accomplish—reduce the institutional rock garden to dimensions suitable to the modern home owner. Rock gardening is certainly the form of gardening most easily adapted to a small place and, with the constant tendency to smaller lots and houses and an increasing interest in fine horticulture, rock gardening is gaining in popularity. Without falling prey to the dogmatism and prejudices of many who write on the subject, Mr. Anderson presents a thorough outline of the processes and plants involved in rock gardening on a small scale. The discussions of rock plants are divided according to difficulty and cultural preference with a short section on shrubs for the rock garden. The easy-to-read style and balanced humor that characterize Mr. Anderson's two earlier paperbacks are here also.

My one quarrel with the book, and it is not really a valid criticism, is that it was not written for American conditions, a fault that could hardly be overcome in a book purposely limited as to length and written primarily for a British audience. No one, I am certain, realized this more than Mr. Anderson, for he has traveled about the United States and certainly appreciates our climatological difficulties well. Most of the plants listed from New Zealand and South America will not, however, easily find a home in the United States in the north because it is too cold and wet, in the south because it is too hot, and in the west because of heat and drought. Only in our northwest can we attempt to grow well plants from these regions. Some of the plants he mentions as fussy are our weeds, and some of our difficult gems are the bane of British gardeners. All this, of course, goes without saying and detracts little from the value of this fine book as a guide to those beginning a rock garden.

For the book itself, we could only wish that better paper had been used, both for the text and illustrations. The content deserves better.

RICHARD W. LIGHTY

Bromeliads, The Colorful Houseplants

By Jack Kramer. Published by D. Van Nostrand Co. Inc., 120 Alexander St., Princeton, N. J. 1965, 114 pages, illustrated. \$5.95 (Library). Members price \$5.05.

A book on culture of an interesting group of plants that are useful as house plants, in the home greenhouse or out doors in frost free areas.

One hundred and fifty species and varieties are described, with a brief description of the genus and kinds. Cultural comments are made for many of these—based on the author's experiences and study.

The Lily Yearbook, No 17, 1964

George L. Slate, Editor. Published by The North American Lily Society, Inc., Geneva, New York (Library).

Something in this issue for a lily enthusiast

whether just starting or one of many years experience. As with many specialized yearbooks several articles are concerned with breeding, hybrids, and their evaluation and in propagation of such new kinds. Authors include many familiar as lily specialists—S. L. Emsweller, Jan de Graaff and Norma E. Pfeiffer. Special note should be made of the research reports by staff members of the U. S. Department of Agriculture. These include *The Effects of Temperature, Supplemental Light and Types of Storage on Forcing of Easter and Other Lilies*, by Neil W. Stuart; *Weed Control in Lilies* by L. L. Danielson and S. L. Emsweller and the *Beltville Lily Introductions* by Joseph Uhring.

CONRAD B. LINK

Fruit Culture in India

Dr. Sham Singh, Dr. S. Krishnamurthi and S. L. Katyal—Editors. Indian Council of Agricultural Research, New Delhi, India. 1963. 456 pages. Illustrated. (Library).

This is an informative work for amateur growers of primarily subtropical and tropical fruits as well as other plant enthusiasts who enjoy the exotic in practical terms. A map on page 11 gives an idea of the country's climatic diversity: India stretches from temperate-zone Kashmir where heavy frosts occur, on southward to Cape Comorin in the humid coastal tropics. Frost can sometimes occur above a line that dips well below the tropic of Cancer into the provinces of Bombay, Mysore and Andhra Pradesh. The authors therefore seem well advised in devoting 57 pages (about 12.5 percent of the book) to temperate-zone fruits and nuts.

Upon considering India's geography and range of climates one can accept the authors' statement: "In India, the area under temperate fruits is by no means large at present, but the quality of the fruit produced is superb and compares very favorably with that attained in other countries. The present production can meet only a fraction of the demand and, consequently, the prices remain very high." From the viewpoint of plant explorers it is unfortunate that native forms of peach and plum are not discussed. This is perhaps because quality of these types is relatively low and the purpose of the book is to encourage cultivation of varieties of maximum market value, many of which have been introduced from Europe or America. The 'Ambri Kashmiri' apple is described together with clones more familiar to westerners, as are 'Baghu Gosha' and 'Nashpati' pears. A section on nuts covers the almond, hazelnut, pecan, walnut and cashew. People who know fruit-growing will find a good many old friends among the tropical and subtropical fruits treated and will be intrigued by a few (e.g. mangosteen and breadfruit) which are not grown outdoors on the mainland of this country. Eastern North American readers who may be surprised to find the grape (*Vitis vinifera* cultivars) listed among subtropical fruits should recall that vines have been planted alongside fig trees in Asia Minor

since Biblical times.

The book gives us an insight into horticultural practices in a developing country: "farmyard manure," bonemeal and wood ash in mixture are suggested for fertilizing mango trees yet one finds supplemental use of inorganic fertilizers recommended, as well as the application of trace elements where needed to correct nutritional deficiencies. People familiar with the Indian practice of allowing domestic animals to roam at large may question whether the term "farmyard manure" as used by these authors has the same meaning as in Europe and North America where penning makes it easier to collect manures in useable quantities. Inexpensive and readily available Bordeaux mixture and copper are recommended for controlling fungous diseases, however existence of other and newer metallic sprays is mentioned. Chlorinated hydrocarbons are discussed fully and recommended for certain pests.

There is a long (55 pages) chapter on preservation which includes rather thorough instructions for home canning and juice preservation, interesting recipes for pickles, sauces, chutneys, jellies and jams, and a brief discussion of freezing fruits and vegetables.

This book falls short of one of its avowed purposes, usefulness to "the advanced research worker in pomology," and furthermore there is no index or literature cited. This will probably not bother many amateurs who enjoy browsing through a new book, gathering impressions of the world as seen and dealt with by fellow-gardeners in another area.

ROBERT J. KNIGHT, JR.

Gardening by the Sea

By Daniel J. Foley. Chilton Books, 226 S. 6th St., Philadelphia, Pa. Illustrated. 285 pages. 1965. \$6.95 (Library). Members Price \$5.90.

This most recent book by horticulturist and garden writer Daniel J. Foley is a valuable contribution to the limited literature available on the subject of seaside ornamental horticulture. As the title implies, the basic aspects of gardening by the sea are considered in view of the distinctive limitations imposed by a coastal habitat. There are chapters on dunes and wind-breaks as well as more general information on planting, pruning, and insect and disease control. However, the most useful portions of the book are the descriptions of plants which may be grown under seaside conditions. Although few plants can withstand full exposure to wind, salt spray and wind-blown sand, as well as sandy, saline soil, a wide variety of plants is available for use in the more protected areas along the coast. These are described in chapters on trees, shrubs, vines, groundcovers, perennials, annuals, and summer-flowering bulbs. Separate chapters are devoted to roses, heaths and heathers, and rosemary. Plants grown on both Atlantic and Pacific coasts are included. The many photographs of plant materials are outstanding for their clarity, especially those which illustrate the textural qualities of foliage.

Plants are listed by common names, resulting in some inconsistency in the citing of botanical names, and in several cases the author incorrectly uses the term "genera" instead of "species." The cross-references to chapters rather than page number are rather difficult to use.

ROBERT L. BAKER

Building a Greenhouse and Potting Shed

By A. K. Berry. Pergamon Press, 44-01, 21st St., Long Island City, N. Y. Illustrated. 104 pages. 1965. Paperback. \$1.50. (Library)

A practical book intended for a high school class in England—to use in building a small greenhouse with attached service building. Details are given beginning with the foundations and building a brick wall for support. Good suggestions for the amateur builder but not many American gardeners will build the type described. Ready cut homesized greenhouses are available with metal frames and wood or all metal which are easy to construct and require simple foundations. These have greater use to the amateur greenhouse builder.

CONRAD B. LINK

The Chrysanthemum Book

By Roderick W. Cumming. D. Van Nostrand and Co. Princeton, N. J. 1964. 301 pages. Illustrated. \$7.95. (Library) Members Price \$6.75

A well written manual of chrysanthemum culture. The author begins with its history in the Orient, Europe and the United States and the persons associated with its development. This leads to the discussion of the species and the horticultural classification of the many types and cultivars now available.

The culture of this plant is discussed from planting time and all the details in growing to bloom. For those with a greenhouse, cultural directions are included not only for the normal season of flowering but for the out of season or year round production. For the exhibitor, information is given on the special care and techniques that may be followed for growing prize winners as well as exhibiting them.

The author has long been associated with the chrysanthemum as was his father who introduced many varieties. He describes the techniques of breeding, the development of new varieties, and the growing and evaluating of new varieties. This book is highly recommended to any interested in the chrysanthemum.

CONRAD B. LINK

The Gardener's Bug Book

By Cynthia Westcott. Third edition, Doubleday and Company, Inc., Garden City, New York, 1965, 625 p. \$9.95. (Library). Members Price \$8.45

The Gardener's Bug Book is an all inclusive reference work on nearly 1900 species of garden pests mostly insects with a cross index to the

pests on about 950 species of plants, most of which are vegetables or ornamentals.

Accounts start with the common name and scientific name of the insect and range from a line to as much as a page.

The 65 or more insect sections are by common name—ant-lions, ants, aphids, armyworms, etc.

The entries are readable, informative and accurate. I marvel at the enormous detail—host plants for every insect and insects for every host.

Some of the detail will be useless to the gardener but will be quite helpful to specialists in zoological classification. For example—nematode classification, 4 pages; families of moths, 2 pages.

There is an imposing list of insecticides, acaricides, etc.—about 150 of them with short descriptions and uses. And helpful directions for spraying plants and keeping sprayers in shape.

The glossary and the selected bibliography will also be helpful. I approve of the full index.

I have one criticism—the poor quality of the pen drawings of insects. They are mostly lopsided and crude. Note for example those on pages 100, 113, 125, 142, 161 and 226. The colored plates are generally pleasing but why such inaccuracies as the crooked stripes on the cucumber beetle (XII) and the roundheaded apple tree borer? (XIV).

Overall, I would find *The Gardener's Bug Book* an excellent reference.

THEO. L. BISSELL

Other Books Added to the Library

American Tomato Yearbook

By John W. Carncross. Published by C. S. Macfarland, Jr., 114 Elmer Street, Westfield, New Jersey, 07090. 1965. \$2.00. (Library)

A Library Guide to Agriculture

By K. W. Neal. Published by K. W. Neal, 41, Wychbury Road, Finchfield, Wolverham-

pton, Staffs, England. 1965. \$50. (Library)

Food Quality

By American Assoc. For the Advancement of Science. Published by American Assoc. For The Advancement of Science, 1515 Mass. Ave., N.W., Washington, D. C. 1965. \$8.50. (Library)

Marine Algae of Gough Island

By Yvonne M. Chamberlain. Published by The British Museum (Natural History), Cromwell Road, London, S.W. 7, England. 1965. (Library)

The Silent Sky (The Incredible Extinction of the Passenger Pigeon)

By Allan W. Eckert. Published by Little, Brown & Company, Boston, Mass. & Toronto, Canada. 1965. \$4.95. (Library)

Advances in Insect Population Control

By International Atomic Energy Agency. Published by National Agency for International Publications, Inc., 317 East 34th St., New York, New York, 10016. 1965. \$2.00. (Library)

Ideas in Modern Biology (Proceedings—Vol. 6—16th Int. Cong. of Zoology)

By John A. Moore. Published by Doubleday & Company, Inc., 277 Park Avenue, New York, 10017. 1965. \$8.00. (Library)

The Ceylon Species of Asplenium

By W. A. Sledge. Published by The British Museum (Natural History), Cromwell Road, London, S.W. 7, England. 1965. (Library)

Consumers All (The Yearbook of Agriculture 1965)

By The U. S. Dept. of Agriculture. Published by Superintendent of Documents, Washington, D. C. 20402. 1965. \$2.75. (Library)

Gardeners' Pocketbook

The Genus *Symphyandra*

In the large family of Campanulaceae there are many plants that thrive in our gardens. Of course, the Campanulas outnumber all the other genera. Nevertheless in any good sized garden, we are likely to see specimens of *Platycodon*, *Edraianthus*, *Phyteuma*, and possibly *Codonopsis* and *Adenophora*.

The *Symphyandras* are not often cultivated, partly due to the fact that some have flowers that closely resemble those of various *Campanulas*—and also partly due to the fact that the seeds of *Symphyandras* are not as readily obtained as are those of *Campanulas*. Moreover, there are about 300 species of *Campanula*, and probably not more than 16 species of *Symphyandra*, mostly native to the Caucasus and Asia Minor; one species is found in Crete and one in Korea. The main characteristics that differentiate these two genera are found in the anthers. In *Symphyandra* the anthers are joined into a tube surrounding the upper part of the style. In *Campanula*

the anthers are entirely free from the style. Of course, this distinction, which is recognized by the taxonomist, is hardly of interest to the gardener.

Like most of the *Campanulas*, the flowers of the *Symphyandras* we have raised are violet-blue, purplish, or white. One is of a yellowish cast. All have flowers bell-shaped, five lobed, and nodding. The plants we have raised range in height from six to eighteen inches. The seeds germinate readily, and seem to require nothing more than a well drained soil and some sun. The species *S. wanneri* and *S. pendula* are prolific bloomers. The resulting formation of the numerous seed pods, which is a debilitating process for the plant, possibly results in the belief that some of them are really biennials. In one instance, we had a plant of *S. wanneri* that apparently bloomed itself to death. With another plant, we cut off all the flowers immediately after blooming; this one survived, and bloomed the following year.

Some of the *Symphyandras*, such as *S. cretica*, probably cannot endure our wet variable winters, and should no doubt be placed in a cold frame or in the Alpine House. On the other hand, our *S. wanneri* was planted in the rock garden. *S. hoffmannii* we kept in a cold frame; it started blooming about the first week in June, and there still were flowers on it a month later.

With the exception of *S. asiatica* and *S. ossetica*, of which we have never been able to secure seeds, we have grown all of the plants mentioned below.

S. armena. This plant is about six to twelve inches high, with erect and decumbent branching stems. It has ovate, coarsely toothed leaves, the lower ones long-petioled, the upper ones much smaller, and almost sessile. The rather thin peduncles bear terminal drooping bluish violet flowers that are tubular campanulate, with short lobes. One characteristic of the calyx is that it has five of the Caucasus mountains where it

Symphyandra asiatica.

CURTIS BOT. MAG.



is said to grow in crevices among rocks, blooming in mid-summer.

S. asiatica. In Curtis's *Botanical Magazine*, plate 8837, also in the R.H.S. *Dictionary of Gardening* there are pictures of this plant, together with descriptions. Apparently it has stems up to two and one-half feet high and very large bell-shaped delicate violet flowers, fully one and one-half inches long, with short slightly recurved lobes. It is native of Korea, the only species found in this part of the world.

S. cretica. This is a very interesting species with large bluish violet bells, slightly inflated below the middle of the flower; these hang down along the upper part of the unbranched stems that are fully fifteen inches high. The toothed basal leaves, possibly over three inches long, and distinctly cordate at the base, have long petioles. The few leaves along the stem are all much smaller. There is said to be a white flowered form also. Originally we secured seeds through the Peter Davis botanical expedition to Crete. Though the plant derives its name from this island, it is said that some varieties are found in neighboring islands. Possibly in our climate it is not reliably hardy, but it should certainly thrive in the Alpine House, possibly even in a cold frame.

S. hoffmannii is an attractive plant, which one authority says is "of good habit, and well worth cultivating." Our plant was about sixteen inches high, with erect, flowering stems. The basal leaves are large, toothed, oblanceolate, on short petioles. The large flowers blooming on the upper part of the stem are white, drooping, with short acute lobes. These started blooming about the middle of June and there were still flowers a month later. It is a native of Yugoslavia. Some authorities have questioned whether this plant is a true perennial, or a biennial. Based on our experience with the plant pictured, I am inclined to think it is a perennial. Although the basal rosette from which the flowering stem arose finally died, nevertheless several side shoots with their basal leaves continued to live, and now, several months after the flowering stem died



ROBERT M. SENIOR

Symphyandra hoffmannii.

these side shoots are still living and promise to bear flowers again.

S. ossetica is probably an attractive plant, since at one time it was given an Award of Merit by the Royal Horticultural Society. It is said that the erect stems are about one foot high, bearing many slightly nodding, rather narrowly bell-shaped flowers, of a deep lilac shade; its lobes are slightly recurved. There are numerous toothed leaves below the middle of the stem. Apparently one characteristic of the calyx lobes is that they are denticulate and almost as long as the corolla. It is a native of the Caucasus.

S. pendula. Farrer considered this plant "the most beautiful thing of its kind that the garden beholds in August." Later he added, "its flowers are a most wonderful glassy shade of pale and translucent yellow white." At one time it also received an Award of Merit. The plant has numerous bright green basal leaves that are rather large, ovate-cordate, coarse-toothed, on long petioles. The pendulous stems, hardly one foot high, bear numerous drooping bell-shaped flowers that narrow considerably toward the base; their lobes are fairly long and

recurved. Although the plant has been classed as a perennial, due to its profuse and long period of bloom, like some other members of this genus, it may die of exhaustion. It is a native of the Caucasus.

S. wanneri has been in cultivation for many years, and is frequently listed in the catalogs of nurserymen. As recently as 1961 it received an Award of Merit. Our plant was about one foot high, with many branching stems bearing numerous drooping tubular-campanulate bluish violet flowers; its very short lobes were fairly erect. The basal leaves are rather thin, saw-toothed, narrowing into a winged petiole. The upper stem leaves are also coarsely toothed, ovate and sessile. The calyx lobes are erect, and hardly one-half the length of the corolla tube. As above mentioned, if you let all the flowers go to seed, the plant will probably die. It is a native of the Balkans.

The next two plants mentioned have probably never been described or pictured in this country. They are both native to Russian Armenia, and I understand derived their names from certain districts in that region. We were able to

Symphyandra wanneri

ROBERT M. SENIOR



secure seeds from a botanic garden located in this province.

S. daralaghezica. We received seeds of this plant in 1965, and although they germinated and bore basal leaves, it did not bloom in that year. Our description therefore is of their basal leaves: the account of the flowering stems is taken from the original description of the plant. The basal leaves are rather thin, serrate, heart-shaped, petiolate, widest at the base, and one inch long. Indeed, if it were not cordate at the base, the leaf would be definitely triangular. The flowering stems, at least fifteen inches high, bear numerous, slightly nodding white, tubular campanulate flowers. The calyx with minute hairs; its lobes are spreading, acute, with very tiny, acute appendages. It is found in rocky crevices at an altitude of about 6000 feet.

S. zangezura. The original description of this plant was as follows: stems about one foot high, erect or decumbent, and usually branching, with single terminal flowers. Lower leaves long-petiolate, deeply cordate and palmate, oblong-triangular, coarsely dentate or entire, the pedicels very thin. Corolla nodding, violet-colored, almost subrotate, with lobes cut almost halfway. Calyx-lobes spreading, linear-lanceolate, with short acute appendages. In comparing the description of this plant with that of *S. daralaghezica*, it will be observed that in regard to the leaves, stem, and calyx appendages, there are many points of similarity. The main differences seem to be that one has white tubular campanulate flowers, while the other has more subrotate violet-colored flowers. It occurs to us therefore, that possibly one may be only a variety of the other.

ROBERT M. SENIOR
Cincinnati, Ohio

Araucaria Columnaris— An Amazing New Caledonian Tree

The genus *Araucaria* contains a dozen or so species of very unusual and often impressive tropical and subtropical coniferous trees. Several of them have long been justifiably popular with gardeners, especially the juvenile form of the so-

called Norfolk Island Pine, *Araucaria heterophylla*, long known as *A. excelsa*. The relatively hardy Bunya Pine, or Monkey-Puzzle Tree, *Araucaria bidwillii*, the Hoop Pine, *A. cunninghamii*, and more rarely, the lovely Pinheiro, *A. angustifolia*, have all found a place in our choice American plant collections.

These Araucarias well illustrate the strange, disjunct distributional range of this genus. *A. heterophylla* is found only on tiny Norfolk Island, between Australia and New Zealand; *A. bidwillii* and *A. cunninghamii* are Australian; and *A. angustifolia* is widespread in southern Brazil, Uruguay, and Paraguay. Another, species, *A. araucana*, is found at rather high elevations, where snow often falls, in Chile and Argentina, and almost all of the others are encountered only on the South Pacific island of New

Caledonia. One of these New Caledonian Araucarias is the subject of these notes.

Araucaria columnaris is certainly among the most amazing of all of the extraordinary members of its genus. It was discovered by Captain Cook, and I cannot do better as an introduction to it than to quote the words of William Jackson Hooker, writing in connection with plate number 4635 in the *Botanical Register* for the year 1852.

"To Capt. Cook, the great circumnavigator, in his second voyage, is due the first discovery of this Araucaria, in the little islands off New Caledonia, and subsequently on the main island: 'On one of the western small isles was an elevation like a tower; and over a low neck of land, within the isle, were seen many other elevations resembling the

***Araucaria columnaris* growing in the wild on the Ile des Pins, New Caledonia. Some of the trees approach 200 feet in height.**

COURTESY PACIFIC AREA TRAVEL ASSOCIATION



masts of a fleet of ships'; and again, a few days later, 'as we drew near Cape Coronation, we saw in a valley to the south of it a vast number of those elevated subjects before mentioned, and some low land under the foreland was covered with them. We could not agree in our opinions of what they were. I supposed them to be a singular sort of trees, being too numerous to resemble anything else; and a great deal of smoke kept rising all the day from amongst those near the Cape. Our philosophers were of opinion that this was smoke of some internal and perpetual fire. My representing to them that there was no smoke here in the morning would have been of no avail, had not this interal fire gone out before night, and no more smoke been seen after. They were still more positive that the elevations were pillars of basaltes, like those which comprise the Giant's Causeway in Ireland.'

"On nearing the island, a few days later, 'every one was satisfied that they were trees, except our philosophers, who still maintained they were basaltes.' To the commander, 'they had much the appearance of tall pines, which occasioned my giving that name to the island. I was, however, determined not to leave the coast till I knew what trees these were which had been the subject of our speculation, especially as they appeared to be of a sort useful to shipping, and had not been seen anywhere but in the southern part of this land.'

"At length Capt. Cook landed, accompanied by the Botanists. 'We found the tall trees to be a kind of Spruce Pine, very proper for spars, of which we were in want. We were now no longer at a loss to know of what trees the natives made their canoes. On this little isle there were some which measured twenty inches diameter, and between sixty and seventy feet in length, and would have done well for a foremast to the Resolution had one been wanting. Since trees of this size are to be found on so small a spot, it is reasonable to expect to find some much larger on the main and larger isles; and if appearances did not deceive us, we can assert it. If I except New Zealand, I, at this

time, knew of no island in the South Pacific Ocean where a ship could supply herself with a mast or a yard, were she ever so much distressed for want of one. My carpenter, who was a mast-maker as well as shipwright, was of opinion that these trees would make exceedingly good masts. The wood is white, close-grained, tough, and light. Turpentine had exuded out of most of the trunks, and the sun had inspissated it into a rosin, which was found sticking to them, and lying about the roots. These trees shoot out their branches like all other pines, with this difference, that the branches of these are much smaller and shorter; so that the knots become nothing when the tree is wrought for use. I took notice that the largest of them had the smallest and shortest branches, and were crowned, as it were at the top, by a spreading branch like a bush' (probably occasioned by their having been formerly densely crowded, and the tallest having most liberty at the top). 'This was what led some on board into the extravagant notion of their being basaltes; indeed, no one could think of finding such trees here.'

The habit of this New Caledonia Pine, *Araucaria columnaris* (which is not, of course, a pine at all!), is well shown in the accompanying illustration of an old church surrounded by the towering trees on the Iles des Pins (Isle of Pines), off the southeast corner of New Caledonia. Through these specimens are indeed impressive ones, they are mostly less than the 200 feet which is on occasion attained by thus remarkable species.

Araucaria columnaris (with the synonym, *A. cookii*) is a rarity in contemporary cultivation in this country, albeit a most desirable plant for the connoisseur. In warm climes, it can be grown outdoors, but otherwise needs the protection of the heated greenhouse.

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The Hardest Acacia?

Acacia wrightii is one of the hardest of the tree acacias. It is probably harder than all of the approximately 300 spe-

cies of *Acacia* occurring in Australia. About 300 more species are found throughout warm climates in other parts of the world.

The Australian *Acacias* are much better known in the U.S. (especially California) than the natives and may have more ornamental value. *Acacia farnesiana* or Huisache is the best known acacia of the Southwest and it is also found in other parts of the world.

A. wrightii while not as fast growing as Huisache makes a larger tree in Houston because it is not hurt in coldest winters that freeze back Huisache. It also blooms more consistently.

Many years Huisache does not bloom in Houston because the blooming season is late winter and cold often gets the swelling bloom buds. *A. wrightii* usually blooms at least twice during summer after which curly reddish-brown seed pods are formed. *A. wrightii* while liking good drainage tolerates more moisture than most western natives. The finger-like white fuzzy blooms are fragrant.

The trees are very easy to grow from seed and germinate almost as fast as lima beans. When not in bloom or seed it is hard to separate from the almost identical appearing *A. greggii*. *A. greggii* is shrub-like with flowers that are in creamy yellow spikes.

As a small flowering tree *A. wrightii* should have a future because of adaptability, hardiness (probably down to 0°F), and good ornamental value.

The drawing is by Mrs. Peggy Berg from a tree growing in Houston. (See Backcover)

It may be unfair not to mention probably the most attractive Texas acacia. *Acacia berlandieri* (Guajillo) is a large shrub with ferny foliage resembling but finer than mimosa (*Albizia julibrissin*) with white round mimosa-like flowers in early and late winter. Many claim that the clear honey produced from the Guajillo around Uvalde, Texas is the best honey in the U.S. Unfortunately Guajillo is not as hardy as *A. wrightii*.

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Lagerstroemia fauriei

Lagerstroemia fauriei of the Loosestrife family is now being grown in the Houston area and is destined to become another important specimen plant.

Very little information has been written about it and no record could be found in the leading garden encyclopedia of an accepted common name. In fact the only mention of it was found in an article of the April 1958 issue of *The National Horticulture Magazine* entitled "Exploring Southern Japan for Ornamental Plants" by Dr. John L. Creech. He was on a plant exploration team that was sponsored by the United States Department of Agriculture and Longwood Gardens. In this article he said . . . "Only a few trees of this endemic species were noted; it was evident that it would soon be extinct in the wild." Dr. Creech further stated that the trees were deciduous, had brown and green flaky bark, had white flowers, and that they attain a height of 30 ft. He collected seed from one of the last "wild" trees on the Japanese island of Yaku-

Lagerstroemia fauriei.

LYNN LOWERY



shima and brought them back to the Plant Introduction Station, where they were germinated and either seedlings or cuttings were sent to various people in the United States to grow and test.

The tree in my garden was planted in the spring of 1961 from a 5 gallon container. After removing the turf, the soil was prepared by adding rotted pine bark, steer manure, and some 5-10-5 commercial fertilizer which was thoroughly mixed with existing sandy loam. It was 3 ft. tall and branched 1 ft. from the soil line. The first whorl of branches were removed then another was removed the following spring and the lower outer limbs were removed several times during each growing season. Presently it is 15 ft. tall and has a beautiful vase shape. Three other trees were planted during 1961 in various sections of the city. One of these was planted in sandy soil and has grown more slowly than the ones planted in heavier soils. Good drainage is very important to proper growth and yet they prefer constant moisture; however, the slower growing tree seems to have the longer bloom period of this group.

L. fauriei has leaves that are light green in color and they are longer and more lacy than *L. indica*. It has small white flowers that are about 1/2 in. in diameter which open here in late May and early June. The duration of bloom is approximately three weeks and will extend sporadically into the fall. The old bark peels into long ribbons leaving a satin smooth, burgundy-colored new bark behind.

Propagation is relatively simple with hardwood cuttings, but they will probably not grow as rapidly as seedlings. In the spring of 1964 what appeared to be three seedlings of *L. fauriei* were found growing in a flower bed. Two of them were transplanted in the summer of the same year. The one remaining, grew to a height of 5 ft. by the spring of 1965 and then it was transplanted to another

location. Early in July it began to form its flower buds and it was noted that they were pink which caused a stir of excitement because *L. fauriei* buds are white. The excitement was justified because the flowers were dark lavender and of the same size of those on *L. fauriei*. However, the leaflets were longer than *L. fauriei* but of the same coarseness. A watermelon red *L. indica* grows 15 ft. away from the *L. fauriei* in my garden and it appears that the seedling is a hybrid of the two (*L. fauriei* × *L. indica*). The lavender seedling has been in continuous bloom for two months and the longer duration could be an inheritance from the *L. indica*.

A second seedling too is a hybrid, and it began to bloom in early September with flowers that are pale pink or light orchid much the same shade as *L. indica*. The florets are also about 1 in. diameter, similar to *L. indica* and its leaves are small and lacy like *L. fauriei*.

This year's seed crop from *L. fauriei* will be collected, planted, and observed for more new hybrids. It might prove interesting to take seed from the *L. indica* growing nearby and see what develops.

In summation it should be noted that *L. fauriei* is a valuable plant for several reasons:

1. It is a rapid grower which requires little attention.
2. It is a perfect small tree for small areas.
3. It has a beautiful lacy appearance.
4. It has attractive bark and yellow leaves in the fall.
5. It has few if any serious insect or disease problems.
6. It grows well in average soil with good drainage.
7. It has opened a new area for developing many new and interesting hybrids.

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Acacia wrightii

MRS. PEGGY BERG