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THE AMERICAN *Horticultural* MAGAZINE

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APRIL COVER ILLUSTRATION

Crassula portulaca. Plant 40 years old with trunk 10½ inches in diameter at base and six feet tall.

Some Species of *Crassula* Known as the Jade Tree

BY FREDERICK W. COE*

In April of 1772, Charles Peter Thunberg arrived in Cape Town, South Africa to collect plants for Linnaeus and incidentally to perfect his knowledge of the Dutch language before going to the East Indies and Japan. At the time Japan would only allow trade with the Hollanders, so Dutch was a necessity for this Swedish pupil of Linnaeus if he were to collect in Japan. During his three years in South Africa he earned a name as the Father of South African Botany and collected thousands of specimens while working as a surgeon for the Dutch East India Company (1).

Then, as now, the preparation of succulent specimens was a difficult proposition. You can well imagine that with the many beautiful flowering plants available for collection, the rather dull crassulas may not have attracted as much attention. It should be noted that some of the crassula specimens collected by him were not taken from the wild but rather from his company's garden in Rondebosch and Cape Town (2).

It is to Thunberg we owe the name *Crassula argentea* still in common use in the 1930's when I first became interested in these plants. Vera Higgins has studied this genus more recently and she reports that the original specimen of *C. argentea* preserved at Uppsala more nearly resembles the dried leaves of *C. arborescens* than what is now in cultivation as *C. argentea* or *C. portulaca*. Her experiments in drying specimens of these plants make her believe that the much rarer *C. arborescens* was Thunberg's *C. argentea* collected in the company garden (2).

The common name used in the title well describes this succulent plant when grown in the home under partly shaded conditions. The leaves are medium green, convex upward, thick and shining, much as one might expect leaves carved of polished jade. In addition it soon forms a thick, smooth, tree-like trunk with drooping branches on specimens only 1½ to 2 feet high. This plant appears quite different when in an open, sunny situation year around as it would be on its native mountain side on the Cape of Good Hope. There it will ultimately reach ten feet or more in height. The leaves are usually more upright and the upper surfaces are concave from base to tip, while their color is in general a lighter green with a red border. The branches trend upwards, only drooping when they become quite long. In a sunny situation with poor soil the red borders of the leaves are even brighter.

This could very well be called the plant without a name, and no matter what is written, the taxonomists or commercial growers will be unhappy with the classification. The fact that it is a succulent plant is the primary cause for this difficulty, for this group is notoriously difficult to preserve as pressed specimens. A maple leaf is easily pressed and forms a good dried specimen which will last for centuries if well cared for. Any attempt to press a branch of the "Jade Tree" is disastrous. The leaves snap if the specimen is turgid and drop off in drying if partially wilted. Even with heat and pressure marked shriveling takes place and a final specimen looks little like the original plant. The species name Thunberg applies, "argen-

* Ross, California.

tea" (silvery), much more closely fits the silvery leaves of *C. arborescens* than *C. argentea*, the "jade tree."

From the above it is already apparent the troubles that come about when it is difficult to make a good herbarium specimen on first collecting a new species. The plant with the silver leaves (*C. arborescens*) is very localized in distribution but was even then commonly cultivated (2). This further points to the original *C. argentea* not being our present "jade tree," for this plant is not highly regarded in South Africa.

We now have a dilemma and the solution chosen by some has been to completely disregard the doubtful name *C. argentea* and place the jade tree under the name *C. portulacea* Lam. This name was applied in 1786 to plants grown for some years in the Jardin du Roi in Paris and named by Lamarck (2). It would be pleasant if this were the end of the matter, but there is another plant which is considered synonymous or a variety of what should now be called *C. portulacea*. This is *C. obliqua* Ait. which differs considerably in appearance, not only in growth habit and leaves, but also in having strongly sweet-scented flowers. The latter character is



PHOTO BY AUTHOR

***Crassula portulacea*. Base of trunk of large plant showing smooth bark even over stubs of broken-off branches.**

***Crassula portulacea* var. *obliqua*. Base of trunk of old plant, showing rough bark and stubs of branches. Note the**

numerous rooted small plants from branches which root after falling.

PHOTO BY AUTHOR





PHOTO BY AUTHOR

C. arborescens 'Tricolor', actually a variegated seedling of *C. portulacea* × *C. lactea* from a cross of Mr. Hummel.

C. portulacea Crosby's Compact. This plant is about seven inches tall. Notice the very short internodes which in the usual form are $\frac{1}{2}$ to 1 inch apart.

PHOTO BY AUTHOR

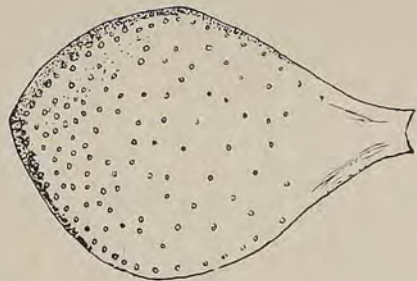


never mentioned in any description of the plant, yet it is the simplest way of separating flowering branches of *C. portulacea* and *C. obliqua*. In any case the material long in cultivation under the name *C. obliqua* is not found in the wild in South Africa and may or may not be the plant of Aiton described by Solander in 1789 (2). There are other confusing matters related to this cultivated plant which also was originally collected in the garden at Rondebosch. Vera Higgins has decided that it is better to consider it a variety of *C. portulacea*. There is newer material of this species which apparently occurs in Cape Province from Little Namaqualand to Natal. Plants under the name of *C. obliqua* at the University of California Botanical Garden differ somewhat in appearance from the usual cultivated plants and represent plants collected near Queenstown on Bowkerskop.

Some of the material in cultivation as *C. obliqua* is known to be of hybrid origin and this tends to throw some doubt on this species or variety. A group of seedlings raised from the cross of *C. portulacea* × *C. lactea* by Mr. Edward Hummel in the 1930's was the source of *C. 'Arborescens Tricolor'* which, except for the variegation of the foliage, appears identical to the *C. obliqua* in commerce (3). This would explain any difficulty in locating this species in the wild and also accounts for the difference in growth habit and the sweet-scented flowers. *C. lactea* has similar sweet-scented flowers and blooms in mid-winter with *C. portulacea*. Although several attempts have been made to get information about *C. obliqua* in South Africa, so far there has been no reply.

The *C. obliqua* commonly cultivated has other points that separate it from the "jade tree." The leaves are more or less sharp-pointed and are rhomboidal rather than rounded as seen in *C. portulacea*. In addition they are often twisted (oblique). The trunk of this plant is not smooth, for the branches in falling leave a stub which produces adventitious roots. Under ordinary conditions these soon dry up. When leaves fall off the branches

C. ARBORESCENS



C. PORTULACEA



C. OBLIQUA



Leaves	old leaves may be 2 x 3 inches, grey to white due to farina on surface and with green (in shade) or red (in sun) dots and red borders.	usually $\frac{3}{4}$ x $1\frac{1}{2}$ inches, shining green with red borders and a rounded outline. There may be red dots in bright light.	usually $\frac{3}{4}$ x $1\frac{1}{2}$ inches, dull green with a greyish cast, very narrow or no border of maroon red, rhomboidal shape with a sharp point, prominent dots along margin which is finely serrated, leaf often twisted (oblique).
Flowers	mid-spring, no odor, opening pale pink but fading rapidly in sunlight to a creamy white, inner surface turning a brownish pink on aging.	mid-winter, no odor, pale or good pink depending on the clone.	mid-winter, sweet-scented, pale pink, petals narrow compared to other two.
Stems	trunk fairly smooth with leaf and branch stubs not prominent. Drops a few branches when dry. Eventual height 8-10 feet in nature, but usually much less in cultivation.	trunk smooth, leaf and branch stubs inconspicuous. Eventual height 10-12 feet in nature, may reach half that height in cultivation. Drops few branches ordinarily.	trunk not smooth due to prominent raised annular scars where leaves drop on young branches and stubs of fallen branches on older portions with adventitious roots forming. Branches drop when dry. Eventual height 6 feet in cultivation.
Habitat	Karoo, near Laingsburg, Willowmore, very local in distribution.	Cape of Good Hope on hillsides, fairly common.	True species found in Cape Province from Little Namaqualand to Natal.
Misc.	Blooms sparsely in cultivation, clones vary in greyness of leaves.	Several forms cultivated, varying in leaf and plant size, leaf shape and coloring.	Roots edible. At least some forms cultivated are known hybrids (<i>C. portulacea</i> × <i>C. lactea</i>)
Bot. Names	<i>Crassula cotyledon</i> , <i>C. punctata</i> , <i>Cotyledon arborescens</i>	<i>Crassula argentea</i> Thunb., <i>C. nitida</i> Schoenl., <i>C. lucens</i> Gram.	<i>Crassula obliqua</i> Ait, <i>C. argentea</i> Thunb., <i>C. ovata</i> , <i>Cotyledon ovata</i>
Trade or common name	<i>Crassula arborescens</i> 'Silver Dollar'	<i>Crassula arborescens</i> , <i>C. argentea</i> "Jade Plant"	<i>Crassula arborescens</i> (variety)



PHOTO BY AUTHOR

***C. lactea*.** Leaves resemble *C. portulacea* var. *obliqua*, but when young have marginal dots. This is one of the parents of *C. arborescens* 'Tricolor' and also 'Dexteri'.

a raised scar is left, in contrast to the almost smooth scar left on the branches of *C. portulacea*. If the plant gets quite dry it drops many branches up to 3 or 4 inches in length which take root around the base of the original plant to form a "ground cover."

In summary of the above it appears that the name *C. argentea* Thunb. should be dropped because of its nebu-

***Crassula obliqua* (*C. portulacea* var. *obliqua*).** Notice the scaly leaves and the slightly serrate margin with a sharp point.

PHOTO BY AUTHOR



lous beginnings. *C. portulacea* Lam. and *C. obliqua* Ait. were considered synonymous from cultivated material in Europe in the late 18th century, and at least at present the latter is considered a variety of the former.

So far no description has been made of *C. arborescens* (Mill.) Willd., which has probably been mistaken for *C. argentea* and certainly been photographed in its habitat as *C. portulacea*. The plant has larger leaves than those previously discussed and they are light grey or white due to a fine coating of wax. Normally they have wider red borders than the other species and prominent but small green dots on the surface. The plant grows to 8 or 10 feet in nature and also tends to drop small branches as does *C. obliqua* when dry. The flowers come in mid-spring rather than mid-winter as in *C. portulacea* and *C. obliqua*.

The accompanying table attempts to clarify these plants and their differences.

Over the years there have been a number of horticultural forms of *C. portulacea* introduced and at least two hybrids of known parentage produced. Undoubtedly there are some seedling forms, but by and large most of the plants in the trade have been raised from cuttings of probably a very few original plants.

In correspondence with Mr. Edward Hummel, I have learned that at least two forms of what commonly is accepted as *C. obliqua* by the taxonomists are in reality hybrids. One is the previously mentioned *C. 'Arborescens Tricolor'* of the trade which Jacobsen gives as *C. portulacea* v. *obliqua* f. *variegata*, the other is called 'Dexteri' or 'Silver Bark' by some of the growers and for all intents is the usual *C. obliqua* except for the slightly more silvery bark of this plant. This is a sister seedling of the same cross that originated the "Arborescens Tricolor" plant and the parents were *C. portulacea* and the low-growing, winter blooming species, *C. lactea* (3).

Variegated Forms

Crassula 'Mrs. Steele's Marginata' also called 'Humell's Sunset'.

The origin of this plant as a bud sport

dates back to the late 1930's after the following two variegated forms were common in the trade. Mrs Clarion Steele in Los Angeles discovered a single variegated branch on one of her old nursery stock plants of the usual jade tree (*C. portulacea*) and propagated it. It is of interest because the variegation is of the superficial layers of the leaf instead of the deep and superficial layers as in 'Colorata' and *Arborescens* 'Tricolor'. 'Mrs. Steele's Marginata' is always variegated and never seems to revert to the usual green form. The coloring in bright light is red, yellow and green without sharp demarcations between the colors. Even branches in deep shade which may appear to be green will immediately show these colors when placed in sunlight (4).

Crassula 'Colorata'

This is a variegated plant which apparently originated in the Los Angeles region during the mid-1930's, probably as a bud sport of *C. portulacea*. The variegation is in both the superficial and the deep layers of the leaves and may also be present in the still green portions of the stems. Branches originating from buds in the axils of leaves that have little or no variegation may be entirely free of the desired variegation while buds formed in yellow variegated tissue grow into branches entirely devoid of chlorophyll. As would be expected the plant has a blotchy appearance with whole portions normal green or creamy white. The plant colors brilliantly in sunlight with red, yellow, and green the dominant colors.

Crassula × 'Arborescens Tricolor' or *C. obliqua* var. fol. *variegata* according to Jacobsen (5).

The history of this plant has already been given and it is a variegated seedling of a cross between *C. portulacea* and *C. lactea*. The variegation is of the silvery type rather than the "golden" form of the last two cultivars. In other respects it is similar to 'Colorata' in the manner of the variegation. The segments of the leaf that are variegated tend to be smaller so that the occurrence of buds that contain no chlorophyll or are entirely without variegation is less

frequent. Quite often only the most superficial layers will lack chlorophyll which gives the leaf a grey-green look in this portion. This plant is commonly used in small dish garden arrangements of succulents as it holds up well under poor light conditions. The leaves have the twist in them which gave the name *obliqua* to the plant.



PHOTO BY AUTHOR

Close-up of leaves of *Crassula portulacea* 'Crosby's Ruby' to show dots. Ring is red, center green, leaves are shiny with rounded margins.

Other Varieties

Crassula 'Dexteri' or 'Silver Bark'. This is a form of *C. portulacea* var. *obliqua* and looks very much like a completely green form of the var. *obliqua*. It is a sister seedling of the hybrid described above and other than a slightly more silvery bark, it is identical in appearance with the common cultivar of *C. obliqua* found in the trade.

Crassula 'Ruby' is a form of normal *C. portulacea* which colors brilliant ruby red in bright sunlight. It originated with Mr. Franklin D. Crosby on a nursery plant which bore a red branch sport removed in 1946. The pigment is limited to the leaves and new stems and the flowers are no darker than the usual form. Occasionally it reverts to the normal form (6).



PHOTO BY AUTHOR

Crassula arborescens in bloom during May. Flowers very much like *C. portulacea* in appearance.

Crassula 'Crosby's Compact'. This is a true dwarf form of *C. portulacea* which arose as a branch sport from *C. 'Ruby'* in 1959 at Mr. Crosby's nursery. Two plants started from this are only 16 inches high at this time, although possibly they would have grown slightly larger if material for propagation had not been removed. The leaves are smaller and the plant is quite upright, with short internodes. As the branches grow in length, the older leaves gradually grow larger giving a pyramidal and four-ranked look to the foliage. There is a dwarf form of *C. portulacea* once offered by the Succulenta Nurseries of Haut Bay, Cape Province, South Africa. I have been unable to get a description of the plant or of its origin.

Crassula 'Round Leaf Form'. This is an unnamed form of *C. portulacea* which probably originated as a seedling. The leaves are shaped like those of *C. arborescens* but otherwise the plant appears to be little different from the usual *C. portulacea* in cultivation.

Crassula portulacea 'Pink Beauty', a pink-flowered form cultivated at the University of California botanical gardens in Ber-

keley. This form will be introduced in spring, 1966 (7).

In general form and growth it appears similar to the usual *C. portulacea* but the pedicels, buds and flowers make it an outstanding plant when in bloom. The pedicels are a good ruby red while the pink buds open to excellent clear pink flowers. This plant originated from material imported from Southern Rhodesia, far from the usual range of the plant. For this reason it is probably a selected form in Africa. This may be the same as a form called 'Pink Joy' again once offered by Succulenta Nurseries.

Crassula obliqua wild collected form at the University of California botanical gardens. In general the plant resembles the plant in cultivation but the leaves are more diamond-shaped (see drawing in chart) than the usual form where the broad portion of the leaf is about a third of the way down from the tip. This is the plant mentioned in the text grown from material collected in South Africa.

A Possible Hybrid

Crassula portulacea 'Blue Bird'. This is a plant which originated in the Nether-

lands as a stray in a flat of seedlings of *C. portulacea* raised from seed collected in South Africa. Dr. B. K. Boom feels that it may represent a cross with *C. arborescens*, for the foliage has a similar grey coating (8). The plant growing at the University of California botanical gardens is 3 or 4 years old from a cutting and quite compact, possibly 14 inches high and as much across. The flowers are similar to *C. portulacea*, white or very pale pink, scentless and individually about 1/2 inch across. It blooms in mid-winter with the usual *C. portulacea*.

Known Hybrids

Crassula × 'Tegelberg's Hybrid'. This is the second hybrid of known parentage, originating from a cross of *C. portulacea* with *C. pulvinata*. The cross was made by Mr. Gilbert Tegelberg. The results were not considered of much interest by him but a few of the seedlings were given to Mr. F. D. Crosby. *C. pulvinata* has two-ranked leaves with fine white hairs on their surfaces. The flowers are small, white and rather nondescript and are carried in a cyme atop a tall stem. The flowers of the hybrid are similar and blossom in summer and the two-

ranked leaves are smooth and rather dull green. In bright light the leaves develop red edges. The stems may form adventitious roots which, under moist conditions, will reach the ground and form an extra prop. Branching is awkward and seems to vary in different plants, so there may be more than one seedling propagated and distributed. Plants gradually grow to over 1 foot in height and probably will reach 2 or more feet in time.

References

1. Lighton, Conrad. 1960. Juta & Co., Ltd. Cape Floral Kingdom.
2. *Journal of South African Botany*. 1958. 24: 109-114.
3. Hummel, Edward G. (personal communication). Hummel's Exotic Gardens, Carlsbad, California.
4. Steele, Clarian. (personal communication). Steele Cactus Gardens, Los Angeles, California.
5. Jacobsen, Herman. A Handbook of Succulent Plants. 1: p. 323. Blandford Press.
6. Crosby, Franklin D. (personal communication). Crosby Cactus & Succulent Ranch, Malibu, California.
7. To be released by the International Succulent Institute and also Meryl Richards nursery, Hayward, California in spring, 1966.
8. Boom, Dr. B. K. (personal communication). Institute of Horticultural Plant Breeding, Wageningen, Holland.

C. portulacea blossoms in January.

PHOTO BY AUTHOR



Some Plants of Kyushu, Japan and the Kurume Azaleas

By JOHN L. CREECH †

Southern Kyushu is the center of origin of our evergreen azaleas. On the cool, humid outer slopes of several volcanic cones from 800 meters continuing up to 1,700 meters, a variable array of azaleas thrive. In some places hybrid swarms form waist-high thickets through which one must force his way. At the lip of the cones, an entire plant of *Rhododendron kiusianum* can be cupped in two hands. These azaleas can be sorted into related types according to the elevations at which they occur and to the localities to which they are restricted.

Three mountains provide the most plausible clues as to the origin of the Kurume azaleas, foremost of the cultivars that have evolved from the species found in Kyushu. These mountains are Sakurajima (31°' N, 130°40' E), a unique, active volcano overlooking the city of Kagoshima; Takakuma (31°28' N, 130°49' E), a mountain chain adjacent to Sakurajima; and Kirishima (31°55' N, 130°51' E), a group of high volcanic cones famous for hot springs. These mountains are all within a 30-mile radius of Kagoshima. The species that are of significance to the origin of Kurume azaleas and that are found in these mountains are: *R. kaempferi* (*R. obtusum* var. *kaempferi*), *R. kiusianum* (*R. obtusum* var. *japonicum*), and *R. sataense*, a comparatively new azalea not mentioned in any earlier English literature.

Sakurajima

Sakurajima (1,118 meters),¹ an isolated, symmetrical volcanic cone, juts out into Kagoshima Bay, overshadowing Kagoshima City. The slopes of this active volcano are so covered with fresh lava rocks from constant eruptions that the upper portions do not support a forest cover. Yet, among huge lava boulders, azaleas thrive in profusion and present a variable array of colors from light pink to strong, reddish purple. I spent the entire day of April 24 wandering the paths that wind around the slopes of Sakurajima trying to draw some conclusions. *Rhododendron kaempferi* is the most prevalent species, readily distinguished by its loose, upright habit, flat to concave, elliptic leaves, and orange-red flowers, up to 2 inches across. A swarm of types closely resembling the Kurume azaleas in flower color and plant habit also grows here. Among brittle lava blocks also grows an azalea that has lavender flowers similar in size to those of *R. kaempferi*. Some Japanese refer to this azalea as "*R. obtusum*."² Plants (P.I. 231952) under this name collected on Sakurajima were obtained from the Kyushu Horticultural Station, Kurume, Kyushu, in 1956. Studies by Japanese horticulturists suggest that the majority of azaleas scattered over Sakurajima are hybrids between this azalea and *R. kaempferi*. In all my visits to Sakurajima, no azalea

†New Crops Research Branch, Agricultural Research Service, USDA, Beltsville, Maryland.

*Reprinted from ARS 34-75 Ornamental Plant Explorations—Japan 1961. May 1966. USDA.

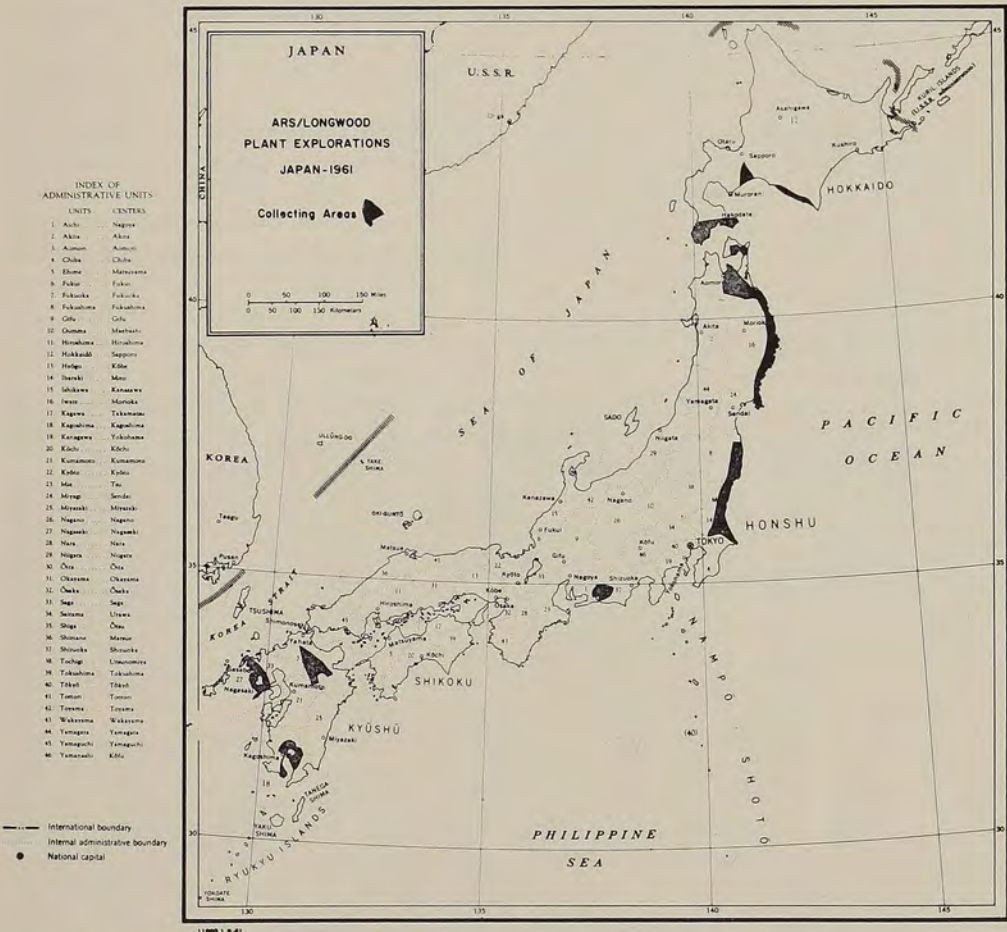
¹Numbers in parentheses, followed by the word meters, indicate the elevation for that location.

²In "A Monograph of Azalea" by E. H. Wilson and Alfred Rehder, Arnold Arboretum, Pub. 9, 1921, *R. obtusum* is referred to the garden forms known as the Kurume azaleas.



PHOTO BY AUTHOR

A view of one of the bays of Hirado Island. From this harbor, most of Japan's early emissaries sailed to China. Several Chinese plants were introduced here for the first time.



Map of Japan—showing general areas where collecting was undertaken during April-July 1961.



PHOTO BY AUTHOR

Open mountain meadows of Takakuma, Osumi, Kyushu, showing scattered plants of azaleas and holly.

similar to *R. kiusianum*, which inhabits the upper limits of Mt. Kirishima, could be found and the taxonomic status of the azaleas of Sakurajima is still a question.

Sakurajima is also famous for the culture of the loquat (*Eriobotrya japonica*). This delightful fruit is ripe at the height of the azalea flowering season. For the horticulturist, Sakurajima is a required stop. It is easily reached by ferry from Kagoshima and one can walk or hire a car to view the wild azaleas.

I left Sakurajima with a party of Japanese botanists in the late evening of April 24 and on the following morning we departed by jeep for Takakuma, the ash-covered mountain chain paralleling the coast of Osumi Peninsula. The route led through gorges inhabited by broadleaf evergreens and in one of these called Sarugajo (Monkey's Castle), we spent the better part of the day collecting plants. This is one of the few places in Kyushu where *Rhododendron serpyllifolium* grows wild. This tiny-flowered azalea grows on the moss-covered boulders along the ravine walls and varies in flower color from white to pink. One plant with dark-pink flowers (P.I.

274545) was collected. The finest of the flowering trees in these forests is *Symplocos prunifolia*. The tree grows to a height of 50 feet and the flowers are white, fragrant, and borne in dense terminal racemes. The seeds germinate slowly, usually with low viability. This probably explains why this tree is not cultivated. *Ilex latifolia* occurs here—the first place in which I encountered wild plants in Japan. *Fatsia japonica* and *Aucuba japonica* in fruit occur in great numbers. *Myrsine seguinii*, an evergreen shrub with narrow, lanceolate leaves, *Enkianthus cernuus* var. *alba*, *Hosta*, and *Tricyrtis* grow on the rocky face of the gorge. Where there were open areas cut over for charcoal, the stumps of *Machilus thunbergii*, a relative of the camphor-tree, were brilliant red from the multitude of flushing sucker growths.

By evening of April 25, we reached the cottage of the Kagoshima University Forestry Station in the Takakuma mountains. On the low hills surrounding this station, azaleas, holly (*Ilex crenata*), and camellias had been left standing in fields of *Miscanthus*. Small plantations of sugi (*Cryptomeria japoni-*

ca) and hinoki (*Chamaecyparis obtusa*) provided cover for several kinds of broadleaf evergreen shrubs. *Camellia japonica* was in full bloom.

Takakuma

The Takakuma mountains (1,236 meters) consist of a series of gradually ascending rises to the highest point on the Osumi Peninsula called Onogara. It is said that the low temperature at the Forestry Station (700 meters) is -7° C. in January and that snow falls about 10 times between December and March attaining up to 75 centimeters. The covering canopy of trees includes *Actinodaphne*, *Castanopsis*, *Cinnamomum*, *Daphniphyllum*, *Distylium*, *Machilus thunbergii* and *japonica*, *Neolitsea*, *Quercus*, and *Symplocos*. The second tree layer consists of *Camellia*, *Cleyera*, *Illicium*, and *Ternstroemia*; and the shrubby layer includes *Ardisia*, *Aucuba*, *Damnacanthus*, *Ilex*, and *Maesa*. Open fields are sporadically covered with individual plants of *Hydrangea*, *Ilex*, *Ligustrum*, *Rhododendron* (azalea), *Salix*, and *Vaccinium*. The azaleas are the conspicuous feature of the open meadows of Takakuma. From sea level to about

500 meters, *Rhododendron kaempferi* abounds on rock outcroppings and on ledges along trails. The flowers are typically brick red and the leaves large and scattered along the branches. At about 500 meters, a new azalea appeared. This is *R. sataense* Nakai. These plants are dense and moundlike, with flowers that range from pink to purple with broadly overlapping petals and shiny leaves that are flat to convex. This newly named species more nearly approximates the cultivated Kurume group than does either *R. kaempferi* or *R. kiusianum*. Both living plants and seed of *R. sataense* were brought into cultivation as a result of this exploration.

Camellia japonica grows abundantly on Takakuma and it seemed desirable to determine at what elevations this tree was limited. We set off early on April 26 and ascended during a drenching rain through magnificent forests of *Cryptomeria* interspersed with the usual broadleaf evergreens. The trail led around the outer ledges of the mountain where andromeda, hollies, and rhododendrons grew in quantity. *Rhododendron pentaphyllum* was just past its peak of bloom. It is not a vigorous plant

Rhododendron japonicum in its pine/chestnut habitat in central Kyushu.

PHOTO BY AUTHOR



and flowers sparsely. We penetrated the forest again and as we approached 1,000 meters, the broadleaf evergreens began to be noticeably reduced in number and stunted in habit. The last specimens of *Camellia japonica*, at approximately 1,050 meters, were ungainly, sparsely branched trees reaching a height of up to 3 meters. It surpassed any other broadleaf evergreen in number. The ground beneath the trees was littered with fallen blossoms, and occasional flowers continued to drop onto the bare, muddy soil. The flowers are purplish red, tubular, with five and six petals. The leaves are broad ovate to narrow elliptic. I saw no small seedlings and concluded that either the fruits were washed down the mountainside or fertile seeds were rarely produced. The protection offered by the canopy of conifers makes possible the growth of *C. japonica* here.

We trudged back down the mountain in the late afternoon through icy rain to the Forestry station. The morning of April 27, I collected a number of seedlings of *Rhododendron sataense*, packed my cuttings of *Camellia japonica*, and prepared to depart for Kirishima. The

trail followed along the shaded paths where the Japanese ladyslipper (*Cypripedium japonicum*) bloomed. It is characterized by two large fanlike leaves as wide as 6 inches across. We retraced our journey down the mountain road, past the many plants of *Rhododendron kaempferi* that were again noticeable as we descended to lower elevations, and arrived at Taramizu. Here we took a small boat to Kagoshima and remained in the city overnight. On April 28, I departed with my Japanese guides to Kirishima-kan by bus.

Kirishima

The Kirishima mountains (1,700 meters) are the highest volcanic cones in southern Kyushu. On the evergreen-clad lower slopes and in the grassy meadows at higher elevations occurs a complex of azaleas that have figured largely in the literature on the development of the famous Kurume azaleas. In 1955, I had climbed to the rim of the volcanic cone Karakuni-dake (1,700 meters) to observe the colonies of *Rhododendron kiusianum*, a small-leaved, purple-flowered azalea. When this azalea hy-



PHOTO BY AUTHOR

In central Kyushu, *Rhododendron japonicum* is a low growing stoloniferous shrub.



PHOTO BY AUTHOR

**Rhododendron sataense in flower during late April on Takakuma, Kyushu.
Dark foliated plants are Ilex crenata.**

bridizes with *H. kaempferi* from lower elevations, a bewildering array of seedlings with pink, scarlet, crimson, and purple flowers results. I repeated the observation, April 28-29, during the peak of the flowering of azaleas solely to assure myself of the fact that one could clearly distinguish between the localities where *R. kaempferi* and *R. kiusianum* occur. In all of my travels in Kyushu, I never found *R. kaempferi* above 800 meters elevation, although in northern Honshu, it grows at 1,200 meters near the top of Goyo-dake. *R. kiusianum* can be found only in the bare alpine meadows between 1,300 and 1,700 meters, except where plants have been brought down and planted around the hot spring inns for which Kirishima-jinza is so famous. Around the steaming sulfur beds near the inns where the volcanic soil is constantly warmed, *Ilex crenata*, *Rhododendron kaempferi*, and *Vaccinium bracteatum* abound. Higher up the mountains in volcanic fields composed of layers of fine ash, *Chaenomeles japonica* and *Ilex crenata* are scattered; but as one approaches the rim of the volcano, the steep slopes, now completely fogged in with chilling rain, now brilliantly clear, are dotted with tiny plants of *I. crenata* and *R. kiusianum*. When brought into cultivation, this azalea maintains its dense small-leaved habit and tiny flowers. Both purple and white forms occur in the wild, but the latter is rarely seen.

In the forest below the several inns is a magnificent waterfall called Senrigataki (meaning 1,000-mile waterfall). Along the winding stream-bed, *Rhododendron nudipes* (closely related to *R. reticulatum*) with flowers varying from red to purple was in full bloom. Here also, *Camellia japonica* grows into large trees up to 25 feet tall, which cover the ground with tubular dark-red flowers. *Prunus serrulata* was just past its peak but we observed hundreds of witches' brooms in the branches and many dying trees.

Although *Rhododendron kiusianum* must figure in the background of the Kurume azalea, I cannot concede that this azalea is the phylogenetic type of this race. I prefer to recognize it as the specific entity accepted by the Japanese rather than use the more common classification, *R. obtusum* f. *japonicum* Wilson. *R. kiusianum* has crossed with *R. kaempferi* to produce a remarkable hybrid swarm bridging the gap between these azaleas, but I have seen in my travels no locality where *R. kaempferi* and *R. kiusianum* are so intermingled that I would wish to relegate these species to subspecific status on the basis of continuous distribution.

Hirado Island

Hirado is a little-known island adjacent to Kyushu reached by about a 2-hour train ride from Sasebo and a short ferry trip from Hirado-guchi to the



PHOTO BY AUTHOR

Azaleas are among the first invaders of areas disrupted by volcanic eruptions. This is the plant considered by some Japanese as a progenitor of the Kurume azaleas.

island of Hirado. This island, which is now relegated to the occupation of fishing and subsistence farming, is steeped in Japanese history and romance. Feudal lords passed through Hirado on their route to subjugate Korea in the 4th century. Many chose to remain on Hirado upon their return. In the moss-covered shrines of Shijiki and Hichiro-no-Miya, the remains of a warlord Shijiki and his military commanders are enshrined.

Between A.D. 607 and 893, Hirado was a port of call for the Japanese emissaries to China as they returned home by way of Goto, Amakusa, Satsuma, Amami-oshima, and, lastly, the town of Usukawan, or Furuewan, or

Hirado. The tea plant and plum are said by some Japanese to have been introduced from China in the 12th century by way of Hirado. When Japan ceased her official contact with Tow (old name of China), Hirado became the base of operations for Chinese smugglers and pirates. The Chinese pirate Wanchi lived in Hirado town and in 1549 suggested to the feudal lords that the Portuguese trading ships use Hirado as a trading port. The Portuguese were followed by the Spanish in 1584 and the Dutch in 1597, although a Dutch company did not actually become established until 1609. The British East India Company formed a trading company on Hirado in 1613, but it lasted only 10 years. As a result of the poor management of the Factor, Richard Cocks, the doors closed on August 2, 1623. Finally, all factories on Hirado were closed when the Shogun Toyotomi Hideyoshi proscribed Christianity in 1641, and what limited foreign trading continued was relegated to the Port of Nagasaki. Hirado never again prospered.

Despite his poor judgment in commerce, Richard Cocks was apparently interested in plants. His diary³ reads: "June 19, 1615. I tooke a garden this day and planted it with pottatos brought from the Liquea, a thing not yet planted in Japan. I must pay a tay, or 5 shilling sterling, per annum for the garden." On July 29, he wrote: "I set 500 small pottato roots in a garden. Mr. Eaton sent me them from Liquea." This probably is the first introduction of the sweetpotato into Japan, brought up from the Ryukyu Islands by the British ships that supplied the trading goods for Japanese buyers.

Being isolated and scenic, Hirado became a favorite spot for the feudal samurai of older Japan and their palaces dotted the gentle slopes. It might also be said that many of these noblemen delved into the smuggling trade with the Chinese pirates and thus enhanced their fortunes. But the gentlemen did have

³Saburo Minagawa. *Diary of Richard Cocks, an English Merchant*, Tokyo, 1957. [In Japanese but with the diary in English original.]

elaborate gardens and these were planted largely to azaleas. Evidently, the popular *Rhododendron scabrum* was grown here as it was in the city of Kagoshima. This azalea was brought to Japan from the Ryukyu Islands.

The azaleas of Hirado are a distinct group characterized by unusually large flowers, some measuring up to 13 centimeters across and this character can easily be traced to *R. scabrum*. The color range is from pink through red to purple, which suggests the infusion of *R. mucronatum* and *R. phoeniceum*. My Japanese friends believe that *R. simsii*, from China, is also involved in the development of the Hirado azaleas, but I saw no plants of this species in any Hirado gardens nor the suggestion of it in the various hybrids on Hirado. It is not grown anywhere in Japanese gardens.

The Hirado azaleas are located in individual private gardens so one has to visit many places to see them all. Some of these gardens date back more than 300 years during which time selections were continually made from the spontaneous populations that sprang up among the original azalea plantings. Today, approximately 230 varieties of Hirado azaleas are recognized. Of these, my colleague, T. Tamura, Kurume Agricultural Station, Kyushu, suggested a list of 30 varieties that are representative of the range of variation in the Hirado race. These were collected either as small plants or unrooted cuttings from the various gardens and sent to the U.S. Department of Agriculture for propagation and evaluation.

The merits of the Hirado azaleas, insofar as American horticulture is concerned, have yet to be determined. Originating from *R. scabrum*, they are certain to be limited in hardiness to the southern azalea-growing regions. As for flower character, size is not necessarily a criterion for quality, but the colors are rather brilliant and the plants are prolific and vigorous. Their massive habit and height (some bushes are 6 to 8 feet tall) and large leaves suggest that they would serve best as background plants in parks and other locations where space is

ample. Although the Hirado azaleas were the primary objective of visiting the island, a number of plants seen and collected are worthy of note. In a small fisherman's garden at Ushiro-bira, I found a white-flowered form of *R. weyrichii* that originated on Goto Island. Regretably, none of the cuttings made from rather weak shoots survived, but herbarium specimens at least record its existence.

At the southern end of Hirado at Shiziki-zaki, on the small but abruptly rising mountain Yasuman-dake, *Damnacanthus indicus* flourishes so thickly that the spiny branches lock together. *Rhododendron kaempferi*, as expected, can be found on the sunny dividing ridges of rice paddies. *Buxus microphylla* hung over the paths and covered the ground with small seedlings. At the top of Yasuman-dake (514 meters) *Camellia japonica* grows as small bushes or as trees up to 25 feet tall, depending on the site. It was in full bloom in early May. Where the plants are exposed to the sea, they are dwarf, compact, and badly damaged by cold. But at a short distance into the woods where there is protection, they become straggly, tall trees. The forest floor on Yasuman-dake is dotted with *Asarum*, *Calanthe*, and *Hosta*. Like so many other locations with broadleaf evergreen associations, Yasuman-dake includes *Abelia*, *Ardisia*, *Camellia*, *Damnacanthus*, *Dendropanax*, *Fatsia*, *Glochidion*, *Hedera*, *Kadsura*, *Liqustrum*, *Myrsine*, *Rhododendron*, *Serissa*, *Symplocos*, and various camphor relatives.

I returned from Hirado, stopping long enough at Sasebo to airmail the collections gathered on the island, and turned my attention to the mountains of northern Kyushu near Nagasaki.

Tara-dake

In the vicinity of Nagasaki are several small mountain groups. One of these is Kyoga-dake, consisting of two peaks, Tara-dake (1,076 meters) and Gokahara-dake. Northern Kyushu is largely reforested with *Cryptomeria japonica*, but along the boulder-strewn rivers of

Cypripedium japonicum in bloom along shady paths of Takakuma, Kyushu.

PHOTO BY AUTHOR



these mountains, natural vegetation has been permitted. While "rock hopping" up the stream bed, we came upon large patches of *Lycoris sanguinea* var. *kiushiana* growing in loose granite chips. This orange spiderlily blooms in late July or early August. At the time of my visit, the winter foliage was just beginning to die down and the bulbs were so loose in the soil that they could be removed in quantity by hand.

Ilex latifolia plants with large, oblong leaves (up to 10 inches long) and sharply serrate margins were encountered frequently. Ample fruits remained to be collected. It is more abundant here than in any other locality I have visited in Japan. Occasional specimens of the rare natural hybrid *Ilex* × *kiusiana* (*I. buergeri* × *I. integra*) have been protected against destruction. This is a red-fruited, evergreen holly introduced into cultivation for the first time as a result of this expedition. *Camellia japonica* is the other conspicuous ornamental in the forests of Tara-dake. It grows as a second-story tree with its foliage mass well within the protecting canopy of larger trees. In open areas, such as the saddle dividing Tara-dake and Gokahara-dake, *C. japonica* becomes dwarfed and the

plant, described earlier, has flowers that vary from pink and flat-faced to purplish red and tubular. In my travels in Japan, I have never seen a white-flowered wildling of *C. japonica*. This period (May 11-13) was the peak of bloom, and some of the trees laden with flowers were so spindly that they bent over to the ground as we climbed to collect cuttings.

In these mountains, *Rhododendron kaempferi* had not flowered yet and no small-flowered azaleas, such as *R. kiusianum*, were found. *Illicium religiosum* with highly fragrant flowers, *Aucuba japonica*, *Enkianthus campanulatus*, and *Euonymus japonicus* are common. *Rhododendron metternichii* with rose-colored flowers grows on outer cliff ledges and *R. reticulatum* was in flower on the highest point of the mountain.

Seidagawa and Koshodake

The last days in Kyushu (May 13-14) were spent in the mountains of central Kyushu. A small peak at Seidagawa (520 meters) is isolated in the hot central plain and proved to be an unusually exciting locality. Here *Rhododendron japonicum* grows in profusion. Earlier western world records do not describe this azalea as growing wild in Kyushu. Above the town of Kusu in a pine-chestnut region, *R. japonicum* grows in hot sunny meadows, quite different from the cool bog habitats ordinarily frequented by this azalea. Furthermore, here can be found the broadest range of color variation occurring in the species. The colony includes the yellow form, *aureum*. Despite earlier observations by Wilson to the effect that the yellow form is rather rare, it accounts for about a third of the colony I visited at Seidagawa. Furthermore, seed collected from the yellow-flowered plants will produce a population of predominantly yellow plants, readily distinguished as seedlings by their pale-yellow winter buds and leaves which turn yellow rather than red in the autumn. This form is probably the yellow azalea described by Kaempfer as "*Rjuku tsutsusi flore igneo, punctis petalorum croceis, apicibus rufis.*" Wil-

son questions this point on the basis that Kaempfer could not have seen it enroute from Nagasaki to Kyoto. On the contrary, this journey would have allowed Kaempfer to see *R. japonicum*. Whether these southernmost colonies of *R. japonicum* will be significant in terms of heat tolerance must await the observations of others, but the recording of this highly significant colony and the availability of yellow-flowered populations should be important to the breeder of deciduous azaleas.

Mt. Kosho (861 meters) in northern Kyushu is an isolated, dry peak topped by a small, rocky shrine. Its contribution to the expedition was mainly the presence of what seemed to be a wild stand of *Buxus microphylla* var. *japonica*. One can never be sure of this point in Japan, for wherever there is a shrine, plants are often brought to be grown in the area. This could be the case with the several boxwoods on Kosho-dake (861 meters). However, the area was strewn with small seedlings, which were easily dug and shipped in plastic bags. Here, too, the fields yielded distinct types of *Ilex crenata*. *Lycoris radiata* grows in the moist shaded ravines. Bulbs of the latter were also easily obtained. *Pieris japonica*, *Wisteria japonica*, and even *Taxus cuspidata* var. *nana* could be found. Both *Hedera rhombea* and *Kadzura japonica* entwined the boxwood trees. These, too, were collected and shipped in plastic film to the American Embassy in Tokyo and on to the United States.

Ashitaka, Jurigi Village, and Hakone

The return from Kyushu to Tokyo was by way of Mt. Ashitaka near Hamamatsu, Honshu. The purpose of my visit (May 16-17) was to examine a naturally occurring hybrid between *Rhododendron kaempferi* and *R. macrosepalum* named *R. × tectum* Koidz. The roadsides and ditches were frequented with both *R. kaempferi* and *R. × tectum*, similar in color but easily separated by the glandular hairiness on the prominent calyx lobes of the hybrid. Magenta-flowered *R. kaempferi* and *R. macrosepalum*, frequented the shade of the higher pine

woods. Wilson also noted that these two, *R. kaempferi* and *R. macrosepalum*, grew together by the thousands and were easily recognized from train and car windows. Two orchids were encountered in the late evening after a march through seemingly endless hillside tea plantations. On a marshy slope too steep to plant tea, we found the colony of *Bletilla striata*. It evidently was a protected and not frequented area for the tiny plants, pink and white, dominated the slope. I did not see this orchid again in the wild and it is said by the Japanese to be rather rare. But in a private collector's garden in Mito, B.



PHOTO BY AUTHOR

***Lycoris sanguinea* var. *kiusiana* grows in the loose rock of Mt. Tara-dake, Kyushu. The flowers are said to be larger than the species type.**

**J. L. Creech collecting cuttings of
Hirado azaleas in garden on Hirado
Island, Japan.**

PHOTO BY AUTHOR



striata was cultivated, in its pink form only, and flourished. It would make a good garden plant in the United States.

Ashitaka is the locality for an azalea new to us, *Rhododendron komiyamae* Makino. This species is referred to by the Japanese as "Ashitaka tsutsuji" in reference to the fact that it grows at the summit of Mt. Ashitaka (1,098 meters). It is a small tree or large shrub 10 feet tall, semi-evergreen with rather narrow leaves, acute at both ends. The flowers are purple, 1 inch across, and have 10 stamens. In its social relationships with *R. kaempferi*, *R. komiyamae* compares favorably with that described for *R. sataense* and *R. kiusianum* in Kyushu. Behind a small farmhouse near Jurigi Village (900 meters), I came upon a colony of azaleas in bloom. They largely resembled some of the *kaempferi* hybrids I have seen in cultivation. The flowers varied from the brick red of *R. kaempferi* to the purple of *R. komiyamae*. The plants grew on top of moss-covered rocks protruding out of the boggy ground. These were upright plants 6 to 8 feet tall and characterized by 6 to 10

stamens. Earlier in my ascent, I had seen *R. kaempferi* in flower at lower elevations and had also climbed to the summit of Mt. Ashitaka to locate *R. komiyamae* in a rain that turned into light snow. It was on my return that I chanced upon this hybrid swarm, which gave all evidence of intergradation between *R. kaempferi* and *R. komiyamae*. This is not a new azalea, but must be what Wilson described as *R. obtusum* var. *kaempferi* f. *mikawanum*, which he collected in the Ashitaka mountains. We have on hand collections of the hybrid swarms, as well as *R. kaempferi* and *R. komiyamae*, from Ashitaka.

From Ashitaka, the route to Tokyo led to one more collecting place—Komaga-take in the Hakone Mountains, a small peak (1,354 meters) reached, pleasantly, by cable car. Here, one can find the prostrate *R. tanakae*. Strictly an alpine plant, this curious and rare species has thick, almost sessile leaves and minute white flowers that appear in July. Brought down from the mountains it promptly dies and is rarely cultivated by the Japanese. *R. wadanum* also grows in this region. Like its close relative *R. reticulatum* from which it differs in rather minor characters, such as having a partly glandular style and slightly different form of capsule, *R. wadanum* grows as single plants rather than in colonies. But these are a brilliant rose purple in flower so that one is drawn to them. They stood out like signal fires in the dark evergreen vegetation. Collecting in the small Hakone Botanical Garden completed the work of this first phase of the 1961 expedition.

For the convenience of horticulturists who may at some time wish to see the azaleas of Kyushu, the following trip details may be useful. The best time for such a visit is between April 20 and June 1.

Locality

- (1) Unsen-dake, near Nagasaki. From Isahaya Station to Obama hot spring by bus (1½ hours); to Unsen hot spring by bus (40 minutes); stay at Fukiya-onsen.
- (2) From Kagoshima City one can travel to several mountains, as follows:

(a) Kaimon-dake. From Kagoshima City to Ibusuki hot spring by train (2 hours); to Yamakawa by bus (40 minutes); to top of mountain on foot (1½ hours).

(b) Sakura-jima. From Kagoshima City by ferry (30 minutes); on foot (2 hours).

(c) Takakuma-yama. From Kagoshima City by small steamer (1 hour); to Takatoge by bus (1 hour); on foot (1 hour).

(d) Kirishima-yama. From Kagoshima City to Kirishima-jinge by bus (2 hours); to hot spring by bus (50 minutes); to Oonami crater or Naka-dake on foot (1,700 meters) (3 hours).

(3) From Kurume City, one can travel to several important azalea localities as follows:

(a) Horticultural Field Station, Kurume.

(b) Seidagawa. From Kurume City to Kitayama by train (2 hours); on foot (1½ hours) to top of mountain (about 520 meters).

(c) Kokonoe-yama. From Kurume City to Bungonakamura station (Kyudai line) by train (2½ hours); to Iidamachi by bus (½ hour); from Iidamachi to Hokke-in on foot (1,300 meters) and then to the top of Ofunayama (1,700 meters).

Species to See

Rhododendron kiusianum scattered from Unsen hot spring to the peak at Nida-toge (1,100 meters). Season, May 1-20.

R. scabrum in many Kagoshima gardens. In bloom in mid-April.

R. eriocarpum around the mountain top. In many color forms by June 1.

R. kaempferi and many hybrid swarms. In bloom April 20. Pure *R. kaempferi* at higher elevations (800 meters). Fields of *R. sataense* and *R. kaempferi* as well as *Ilex crenata* and *Camellia japonica*. Season, April 20-May 1. Ancestral home of *Rhododendron kiusianum* and hybrid swarms with *R. kaempferi*. Many other azaleas, hollies, and evergreen shrubs. Season, April 25-May 25.

Native azaleas of Kyushu in their representative localities; Kirishima mountains reproduced in miniature with appropriate plants. Many nurseries featuring azaleas and broadleaf evergreens. Season, April 20-May 10.

Open fields with yellow and orange forms of *R. japonicum*; culture of shiitake mushroom on oak logs. Season, May 1-10.

R. kiusianum in purple dense form and frequently in white-flowered form. Natural hybrids with *R. kaempferi* at lower elevations. Season, May to early June.

Collecting fruits and cuttings of *Ilex latifolia* on Mt. Tara-dake, Kyushu.

PHOTO BY AUTHOR



Sarcococca*

By THE HONORABLE LEWIS PALMER**

All lovers of boxwood have, I am sure, enjoyed the way in which a venerable bush, or ancient hedge, of *Buxus sempervirens* will impregnate the air around it with the agreeable odor of its pollen when the plant is in flower on a warm sunny day in late spring. But while the odor of boxwood is agreeable and unlike the odor of any other commonly cultivated plant, it could hardly be called sweet or fragrant. In this the boxwood differs from its near relations the sarcococcas, or as I prefer to call them, the Sweet Boxes, which have the same property of being able on a suitable day to impregnate the air for a considerable distance around them with their very sweet honey-like scent. And the Sweet Boxes will do this at a time when most other plants are wrapped in their winter sleep.

In England, beginning some years about Christmas time, when the winter is a mild one, the various species of *Sarcococca* will provide a succession of fragrant blossom until the end of March. And a few sprigs of it cut during this season and brought into the living room will provide a vase of fragrance scarcely inferior to that provided by the Winter Sweet (*Chimonanthus*).

Most of the sarcococcas are native of southeast Asia, and, with the exception of a few outlying species from Western China and the Himalayas, not frost hardy in the temperate zone. Some five species

have been introduced to cultivation in the open in British gardens during the present century and have proved winter hardy in many parts. Of these only two have, in my garden, entirely resisted the worst conditions of the winters during the last twenty-five years. Two others have suffered, one a very little damage and one a considerable amount, and have recovered; one succumbed altogether during the winter of 1961-62 when the weather charts recorded that my garden lay within the coldest patch in the whole of the British Isles. Contrary to what one would expect from the foregoing, my garden lies right in the South of England but inland from the sea on rather a cold north facing slope on a chalk soil. In winter the minimum temperature is usually around 10° to 15° F, but exceptionally —2° to —5° F has been experienced.

Like their cousin, *B. sempervirens*, the sarcococcas are slow-growing evergreens with bright green leathery leaves. The flowers are axillary and unisexual but borne on the same shoots. The female flowers are inconspicuous and consist of an ovary and style with 2 or 3 stigmas protruding from a sheath of tiny imbricated scales. The male flowers, which are borne in great profusion, consist of a bunch of usually white stamens about one inch long and tipped with pink or cream-colored anthers. The fruit is a drupe, generally black, but in *S. ruscifolia* bright red, which ripens in the early winter and persists on the bush until late spring, so that ripe berries and flowers occur simultaneously. Like the boxwood, the Sweet Boxes flourish best in neutral or alkaline soils and do not seem so happy in soils of a low pH. For any of my readers who would like further information about the taxonomy of *Sar-*

* This account of *Sarcococca* appeared in the October 1965 issue of *The Boxwood Bulletin* of The American Boxwood Society, Blandy Experimental Farm, Boyce, Virginia. It is republished here with the permission of the editor of that Bulletin, Mrs. Edgar M. Whiting. For the amateur gardener, it is the best account of *Sarcococca* of which the Editorial Committee is aware.

** The Honorable Lewis Palmer is a retired industrialist residing at The Grange, Headbourne-Worthy, Winchester, England. He is a well known amateur horticulturist and has grown *Sarcococca* species for 25 years. Mr. Palmer is at present a vice-president of The Royal Horticultural Society of England, has served on the Society's Council for 30 years, and was its treasurer for 11 years. He is also a fellow of the Linnaean Society.

cococca I cannot do better than refer them to the excellent article by J. Robert Sealy of the Kew Herbarium which appeared in the journal of the London Royal Horticultural Society for July 1949.

During the past twenty-five years I have cultivated all the species and varieties of Sweet Box that I could find amenable to open air cultivation. My experience with them has been as follows (listed in the order in which they come into bloom in England):

Sarcococca saligna, native of the Himalayas. This is a shrub about 4 to 5 feet high with drooping willow-like branches and rather pale bright green long-pointed willow-like leaves about 6 inches long by 1 inch broad. Unlike the other sweet boxes I have grown, its male flowers are green and scentless. In addition to this, its resistance to frost is very indifferent, so that I consider it the least interesting member of the family. With me it was never happy and always suffered in the winter so that it was always untidy, and now I have lost both my plants altogether. But, in fairness, I must add that I have seen it in gardens where it can withstand the winter conditions, and there it builds up a rather attractive broad bun-shaped bush which

is an asset in any group of evergreens. I have never seen the fruit.

Sarcococca hookeriana, native of the Himalayas. It was thought this species had been lost to cultivation when Mr. Sealy wrote his paper referred to above, but, subsequently, I discovered it growing in three different gardens, and through the kindness of their owners obtained plants. It is, like its variety, a shrub with 2 variants. One grows on a single stem and makes a woody not very attractive bush about 3 to 4 feet high. The other is low growing and produces stems from creeping rhizomes. Instead of making a compact dense bush, as is the case with *S. humilis*, stems come up at some distance from each other making a distinctly spotty effect. The leaves are leathery and rugose, dull green and $2\frac{1}{2}$ inches long by $\frac{3}{4}$ of an inch broad. The flowers are sparsely produced, the females with 3 stigmas and the males, fragrant, with deep pink anthers. It has much less garden value than the others, although it is perfectly hardy, and is always the last to flower in my garden. I have never seen any fruits on it.

Sarcococca hookeriana var. *digyna*, native of Western China (Fig. 1). Of this there are two variants in cultiva-

Fig. 1. *Sarcococca hookeriana* var. *digyna*.

PHOTO E. A. SOLLARS





CURTIS'S BOT. MAG. T. 9449

Fig. 2. *Sarcococca confusa*.

tion, one greatly superior to the other. The best sort has leathery narrow willow-shaped leaves about 4 inches in length by $\frac{5}{8}$ of an inch broad. The stems which grow straight up from underground rhizomes have a red bark and branch out at the top making a sort of mushroom-shaped bush about 3 feet high. The flowers are white and strongly scented and the anthers cream-colored. The second sort is a smaller shrub with paler green leaves and green bark, and usually pale pink anthers. In both sorts the female flowers have 2 stigmas, the fruits are black with a purplish bloom, and the plants entirely frost hardy in Britain.

Sarcococca ruscifolia, native of Central China. Unlike the previous species, this grows on a single stem making eventually a stout bush some 5 or 6 feet high. It has darkish green foliage, each leaf shaped like the ace of spades with a fine point and about $2\frac{1}{2}$ inches long. When

Fig. 3. *Sarcococca confusa*.

PHOTO E. A. SOLLARS



happy it produces its flowers in great profusion and is extremely fragrant. In this species the female flowers have 3 stigmas and the male flowers cream-colored anthers. The berries are red and very decorative but with an aggravating tendency to hide behind a leaf. Although it will stand an average winter, this species is somewhat less hardy than others. In the severe winter of 1961-62 the largest bush in my garden was killed outright. Its stem measured $2\frac{1}{4}$ inches in diameter.

Sarcococca confusa (Figs. 2 & 3). This species, as its name implies, was the cause of some confusion among taxonomists. There is a plate of it in the *Botanical Magazine* t. 9449 purporting to represent *S. humilis*, a very different species. This plate was drawn from material raised from seed sent back, about 1904, from China by E. H. Wilson of the Arnold Arboretum. J. Robert Sealy of the Kew Herbarium investigated the matter in 1947 and eventually described this as a new species, which he named *S. confusa*, from plants which were then cultivated in a number of British gardens. No record of its collection by Wilson could be found or any herbarium material from specimens collected in the wild. The plant is intermediate between *S. ruscifolia* and *S. humilis* in the shape of the leaves and in bearing female flowers with either 2 or 3 stigmas on the same shoot. Its origin therefore must remain a mystery until trained collectors can again penetrate to Western China. It may be that Wilson's native collectors gathered some seed from a species that he did not see himself, and brought him no herbarium material of it; or may be that they gathered fruits from a chance natural hybrid, that they did not recognize as such: but, if so, it was one of those very rare hybrids that breed true from seed, and are, in fact, newly created species. The plant is very robust in constitution and sows itself with great freedom in my garden. Some years I have to deal ruthlessly with the hundreds of seedlings that appear under and around the parent bushes. Like *S. ruscifolia*

this species makes a stout bush growing on a single stem about 5 to 6 feet high. Its leaves are elliptic about $2\frac{1}{4}$ inches long by $\frac{7}{8}$ of an inch broad and pointed. It produces an abundance of fragrant flowers with cream-colored anthers. The fruits are shining black berries, which do not conceal themselves behind the leaves. I have grown this species as a low evergreen hedge about 3 foot high, and its habit of perfuming the air in winter makes it particularly at-



PHOTO E. A. SOLLARS

Fig. 4. *Sarcococca ruscifolia* var. *chinensis*.

tractive for this purpose. It stands clipping quite well provided the clipping is done after flowering and well before midsummer. If the clipping is left too late there is a danger that brown patches will appear the following winter. This species is 99 per cent hardy in my garden. It has only once suffered damage in 25 years and then only in an exceptionally severe winter and to quite a minor extent.

Sarcococca humilis, native of Western China (Fig. 5). This is a low growing

bush rarely attaining more than 2 feet in height. It consists, like *S. hookeriana* var. *digyna* of a number of stems arising from creeping underground rhizomes. The leaves are broad willow-shaped, rather darkish green, about 3 inches long by $\frac{3}{4}$ of an inch broad. The female flowers have 2 stigmas, and the male flowers are fragrant and carry bright pink anthers. The fruits are black with a purplish bloom and more pointed or egg-shaped than those of other species. The plant is absolutely hardy and very ornamental for positions where a dense low-growing ground covering shrub is required.

Sarcococca ruscifolia var. *chinensis*, native of Western China (Fig. 4). This differs from *S. ruscifolia* in having rather pale green leaves with longer points and paler scarlet berries. In my garden it has not grown to the same size as the type, but has withstood severe frost more successfully. It is considerably later than the

type in coming into flower but is equally decorative as a garden shrub for a somewhat sheltered place except in mild climates.

[Editorial Note: *S. humilis* (syn. *hookeriana* 'Humilis'), *S. ruscifolia*, *S. hookeriana*, and *S. saligna* are available in a few nurseries in the United States, but the other species are difficult to come by. *Humilis* seems to be the hardiest and may be grown as far north as Zone 7a, although over winter it occasionally suffers some browning on some of the more exposed leaves. These leaves may readily be clipped off in early spring. Around Washington, D. C., *humilis* is grown in acid (pH 5.5-6.5) soil as a ground cover or edging (18 in.), suitable for shade. *Hookeriana* is about equally as hardy. Both these species are grown farther north in Zone 6 but subject to greater winter injury.

Ruscifolia grows as far north as Zone 7a but is more tender there than *humilis* and *hookeriana* and does not do well in that zone. In Zone 10a, in the San Francisco Bay area, *ruscifolia* is used extensively and blooms and fruits heavily.

Saligna is quite tender according to Frederick W. Coe of Ross, California, and leaf tips burn badly in the San Francisco area. In that area it blooms well but does not fruit.—F. P. L.]



PHOTO E. A. SOLLARS

Fig. 5. *Sarcococca humilis*. *S. confusa* in background.

Heaths and Heathers

BY HAROLD W. COPELAND*

There is a growing awareness in the United States of the true worth of heaths (*Erica*) and heathers (*Calluna vulgaris*), a group of ericaceous plants long cherished in England and Scotland. Returning visitors from these countries have brought their enthusiasm home to the States. Only in recent years, however, has there been any general establishment of heather collections or gardens in America; these, for cause, are chiefly concentrated in the favored spots of the northeast Atlantic coast and in Washington and Oregon. These areas more nearly approximate the ideal growing conditions of the British Isles, having in general naturally acid soil and more evenly tempered climate than other regions. Here in Chatham, Cape Cod, all cultivars appear to flourish as in England, and in the harsher climate of Poughkeepsie and Batavia, New York, there are some cultivars which have proven rewarding. Only after further years of testing can one state with certainty which cultivars can be grown in more extended areas of this country.

Certainly a gardener can find no more fascinating or satisfying subject than these small evergreen shrubs which require a minimum of care and provide an endless variety in beauty of flower, foliage, form, and height throughout the entire year. Winter only enhances their attraction. The winter blooming cultivars with their white, pink, lavender, and red flowers and their foliage of unbelievable hues of varied greens, gray, yellow, orange, pink, copper, bronze and red can brighten otherwise drab Northern gardens.

Having been a dirt gardener for 50 years, and having through this time found delight in such subjects as extensive collections of peonies and *Ilex*, I will yet say that for year round satisfaction I find nothing to equal heaths and heathers. Years ago we started with eight cultivars; from that small beginning there was no holding back. Anyone similarly "bitten" would do well to take membership in The Heather Society, whose secretary is Mrs. C. I. MacLeod, Horley Row, Horley, Surrey, England.

Of approximately 400 cultivars grown in England, and of which at the moment 250 are flourishing on our grounds, this is a study only of those plants which are strikingly attractive throughout the year, either because of highly colored foliage or enticing form. Flowers are an incidental.

However, in this connection, it should be realized that those cultivars chiefly valued for their flowers are likewise good garden subjects even after bloom is gone. Plants of this category comprised a comprehensive list of heaths and heathers which appeared in an article in *American Horticulture Magazine* for January 1965. Included also was a discussion of propagation, planting, culture, pruning, and winter protection.

In the lists immediately to follow, awards given by the Royal Horticultural Society of England are indicated, F.C.C. (First Class Certificate); H. C. (Highly Commended); A.M. (Award of Merit); A.G.M. (Award of Garden Merit). Some cultivars are so new they have not yet acquired the awards they are sure to later receive. Those of special worth are marked with an asterisk (*).

* Chatham, Massachusetts.

Foliage Cultivars

These plants have foliage of many colors, wholly or in part other than green, as gray, yellow, gold, copper, bronze, pink, flame or red. Some even possess several colors at once, or pass from one hue to another. Of the cultivars described below, some bear flowers, others few or none, but this factor is unimportant. The time has arrived when heaths and heathers are valued for foliage as much as for bloom. Descriptions chiefly concern foliage; all *Callunas* bloom in August and September.

It is exciting to know that offstage are thirteen new cultivars in this category just introduced in England which will gradually make their appearance in the trade.

***Calluna vulgaris* 'Rosalind', R.H.S. Gardens, Wisley, England.**



PHOTO FREDERICK G. MEYER

<i>Calluna vulgaris</i>	HEIGHT	FOLIAGE	FLOWERS
Alba Aurea	4 in.	bright green with yellow tips	white
Aurea	12 in.	gold becoming rusty red in winter; stems loosely twirling; A.M.	purple
*Beoley Gold	18 in.	bright gold; new	white
*Blazeaway	18 in.	gold and orange turning bright red in winter	light mauve
Cupraea	12 in.	copper gold becoming bronze red in winter; more upright than 'Aurea'; F.C.C.	purple
*Fred J. Chapple	12 in.	cream, gold, pink in spring; green summer; A.M.	purple, abundant
*Gold Haze	24 in.	bright gold; A.M.-F.C.C.	white sprays
Gold Pat	6 in.	gold with pink tips in spring; new	pink
*Golden Feather	18 in.	lovely feathery foliage, gold in summer becoming soft orange in winter; new; A.M.	mauve
Hammondii Aureafolia	18 in.	young growth striking whitish, yellow in spring	white



PHOTO FREDERICK G. MEYER

Calluna vulgaris 'Gold Haze', R.H.S. Gardens, Wisley, England.

	HEIGHT	FOLIAGE	FLOWERS
Hammondii Rubrifolia	18 in.	young growth tipped bright red in spring	purple
*Hirsuta Typica	18 in.	woolly silver, similar to 'Silver Queen'; A.M.-F.C.C.	mauve, sparse
*Joy Vanstone	18 in.	gold becoming rich orange in winter; new; H.C.	orchid pink
Mrs. Pat	6 in.	light green with vivid pink tips in spring	mauve
*Multicolor	6 in.	many shades of yellow, orange and bronze with red tips; A.M.	purple
*Orange Queen	24 in.	gold in spring progressing to orange; new; H.C.	pink
Prostrate Orange	4 in.	gold in spring progressing to orange, prostrate habit; new	pink
*Robert Chapman	18 in.	orange-gold becoming flame then red. Considered best of the Callunas for foliage; A.M.	soft purple
Rosalind: Underwood's var.	18 in.	gold	pink

	HEIGHT	FOLIAGE	FLOWERS
*Ruth Sparkes	9 in.	light gold, some stems revert to green, giving unusual yet attractive appearance; a recently introduced improved form supposedly does not revert; H.C.	double white
Serlei Aurea	24 in.	gold; A.M.	white
*Silver Queen	18 in.	woolly silver	lavender
Spitfire	12 in.	gold becoming bright bronze red in winter; winter foliage so fiery it seems surrounding snow would melt	pink
*Sunset	12 in.	many shades of yellow, gold and orange flecked over its foliage; new	pink
<i>Erica carnea</i>			
Ann Sparkes	9 in.	golden orange with some bronze; new	carmine red; winter
*Aurea	9 in.	gold	rich pink; winter
<i>Erica ciliaris</i>			
Aurea	12 in.	gold	pink; July-Sept.
<i>Erica cinerea</i>			
Ann Berry	12 in.	bright golden yellow with traces of light green	pink; June-July
*Golden Drop	4 in.	gold and copper becoming deeper in color with rusty red tips in winter; prostrate carpeter, considered best of the ericas for spring	rarely flowers
Golden Hue	18 in.	yellow	pink, sparse; June-July
John Eason	12 in.	golden bronze	salmon pink; June-July
<i>Erica hybrids</i>			
Gwavas	9 in.	mossy green, tipped yellow in spring	pink; July-Sept.
Williamsii	9 in.	young growth gold becoming golden green in summer, bronze in winter; H.C.	pink; July-Sept.
<i>Erica tetralix</i>			
*Alba Mollis	9 in.	striking silver gray; A.M.	white; June-Oct.
Cultivars Whose Charm Consists in Form			
<i>Calluna vulgaris</i> (All these Callunas bloom Aug.-Sept.)			
Alba Rigida	6 in.	dwarf of unusual twiggy growth; A.M.	white
Californian Midge	2 in.	compact with minute leaves	tiny purple
Dainty Bess	4 in.	smaller and slower growing than 'Hirsuta Compacta'	none as yet

	HEIGHT	FOLIAGE	FLOWERS
Foxhollow Wanderer	6 in.	rich green carpeter, vigorous spreader	purple; long spikes
Foxii Floribunda	5 in.	rich green mound	purple; sparse
*Foxii Nana	4 in.	beautiful dark green mound like a pincushion, dwarfed closer growth than above; A.M.	rarely flowers
Gnome	9 in.	green with lighter tips	white sparse
Gnome-Pink	9 in.	green with lighter tips	pink sparse
*Hirsuta Compacta (Sister Anne)	4 in.	compact soft woolly gray-green mound, acquires reddish tinge in winter	pink
*Humpty Dumpty	6 in.	lovely green mound of uneven growth giving a bumpy hummock appearance; unique; H.C.	white sparse
Kuphaldtii	4 in.	twisted growth in mound resembling a turban	rosy purple
Minima:Smith's var.	4 in.	distinctive solid mossy cushion becoming rusty in winter	purple sparse
Molecule	6 in.	minute dark green leaves	pink
Mousehole	6 in.	hairy dark green compact plant	pink-tiny
Mrs. Ronald Gray	2 in.	prostrate with strong twiggy growth	reddish purple
*Nana Compacta	6 in.	large sized pincushion, most floriferous of the miniatures	tiny pink
Pumila	4 in.	dainty compact dwarf	white
Pygmaea	3 in.	dark green close growing dwarf; A.M.	purple sparse
The Pygmy	2 in.	carpet of green loose tufts	rosy purple
Tom Thumb	6 in.	sage green miniature conifer; unique	pink, sparse
<i>Erica hibernica</i>			
Brightness	2 ft	fine specimen plant, dark bronze green	bright red; March-May
*W. T. Rackliff	2 ft	fine specimen plant, rich dark green with light green tips	large white; March-Apr.
<i>Erica mediterranea</i>			
*Superba	5 ft.	beautiful specimen plant, dense dark green	rosy pink trusses; March-May
Tree heaths			
* <i>Erica arborea</i> var. <i>alpina</i>	6 ft.	Splendid specimen plant of bright green plumose foliage; A.G.M.	ashen white; March-May

(There are other handsome cultivars among the tree heaths but there is a question of hardiness except in favored

locales of the Northwest. Testing in this country is insufficient at this time to warrant inclusion here.)

The Gothenburg Botanic Garden, Sweden

BY HARRY ELKINS*

In the summers of 1962, 1964, and 1966, I had the very great pleasure of visiting the Gothenburg Botanic Garden. When opportunity was offered

to share this experience in *American Horticultural Magazine*, I communicated with Mr. Tor G. Nitzelius, a member of the Garden staff. Mr. Nitzelius responded very promptly with such a tidy compendium of information that I deserted any thought of original organization in favor of presenting his notes almost verbatim, with a few minor changes.

Entrance



PHOTO H. RASPER

My visits to the Garden impressed me deeply. The great scope of the area, its varied habitats and the extraordinary comprehensiveness of its display of plant life attested the excellence of its planning and of its staff, both past and present. The staff members I met were invariably most helpful and gracious.

My friend, Mr. Lynn Zwicky, current editor of the *Grosse Pointe Men's Garden Club Bulletin*, has kindly helped me arrange the material.

History

The foundation of the Botanic Garden is mainly due to a generous donation of Mr. C. F. Lindberg in 1908 to the town of Gothenburg. In 1915, the Town Council decided that the planning of the Garden should be started, and in 1916 the first trees and shrubs were planted. The Botanic Garden was opened to the public in 1923.

Location

The Garden is situated in the southwestern part of Gothenburg, 57°42' N,** near the Main City Hospital. The city of Gothenburg, to which the garden belongs, has reserved this wide and varied area to stimulate interest among the public for gardening and plant life and to encourage practical as well as theoretical research work.

* Grosse Pointe, Michigan.

** Washington, D. C., is 38°53'N.



Administration Building.

PHOTO H. RASPER

The entire area is about 105 hectares (1 hectare = c. 2½ acres). Of this, 15 hectares constitute the garden proper, 35 are an untouched nature reserve; and 100 hectares outside the fence comprise more or less natural vegetation, with certain parts laid out as an arboretum in 1952.

Topography

The entrance lies at c. 27 m altitude, the highest point at about 120 m alt. Four valleys run through the area in a southwest-northeast direction, and give it a varied topography, with hills, small lakes, bogs, and streams.

Climate

The mild maritime climate is of major importance for the plants, and admittedly it is poorer in Gothenburg, than in most places in Great Britain. The temperature may sometimes go down to -26°C (-14°F) during the coldest spells. The annual rainfall is about 670 mm ($26\frac{1}{3}$ in).

General Plans

The Garden proper is divided into different departments bound together by lawns with fine trees and shrubs. There are special collections of *Clematis*, roses, and conifers (Pinetum); there is a Sys-

tematic department showing the relationship of the plants, and one for useful plants. The "Bamboo Grove" where fine specimens of *Arundinaria* are grown, is a very sheltered place behind the Pinetum, where you will find plants tender in the Gothenburg area, such as *Nothofagus antarctica*, Magnolias, and certain Rhododendrons. The Rhododendron valley leading up to the Rock Garden contains masses of rhododendrons planted under a shelter of natural deciduous forest. In the Rock Garden, you will find a wide selection of alpine plants, of such genera as *Campanula*, *Gentiana*, *Saxifraga*, *Sedum*, from different parts of the world, altogether between three and four thousand species, including many dwarf forms of *Salix*, not ordinarily seen in American gardens.

The Japanese Valley is of special interest. The plants are mostly from the wild in Japan, collected on two expeditions sent out by the garden, or from seeds received from Japanese botanists. The aim has been to select especially hardy and valuable forms. Of special interest to the collector of rarer plants is *Rhododendron aureum*, a prostrate alpine shrub with comparatively small glabrous leaves and yellow long-stalked

flowers. It is distributed not only in Japan and adjacent northern islands, but also over large areas in the East Asiatic mainland. It can be seen growing together with low forms of *Pinus pumila* in some of its native habitats.

There are specially selected low compact forms of *Pinus pumila* together with a most interesting natural hybrid between *Pinus pumila* and *P. parviflora*, called *Pinus* × *hakkodensis*. Some very exciting forms of the closely inter-related species of *Rhododendron metternichii* and *Rhododendron yakusimanum* are to be seen here. Fine specimens of *Kalopanax*, *Stewartia*, *Trochodendron*, many other rhododendrons, conifers, and herbaceous species, such as *Lilium giganteum* var. *glehnii* and *Arisaema thunbergii* indicate what can be grown in spite of the northern latitude.

The Nature Reserve consists of untouched natural deciduous forest. Oaks, elm, alder, and ash grow to a height of 30 m or more. The huge moss-grown trunks fallen on the ground make a delightful picture. The Nature Reserve is especially charming during spring

when the ground in some parts is completely covered by wood anemones (*Anemone nemorosa*).

The Outer Area, with the arboretum, shows many types of vegetation characteristic of the Swedish West Coast: heath, birch forest, different types of bogs, and small lakes with water-lilies. There are about 200 different kinds of trees in more than 400 smaller or larger stands. Thus you will find small forests of trees like the Dawn Redwood (*Metasequoia*) and Katsura Tree (*Cercidiphyllum japonicum*). If you enjoy a real walk, no less than 6.5 kms of roads and additional small paths, are at your disposal in this area. There are also elk roaming throughout this area.

Greenhouses

Although the greenhouses are rather small and old fashioned, they comprise rich collections. Charming alpiners, especially species of *Primula* and "bulbs" (*Fritillaria*, Mediterranean orchids, etc.) flower during late winter and early spring. The tropical and subtropical orchid collection (ca 1700 species) and the succulent collection (ca 900 species) are



Rock Garden.

PHOTO H. RASPER

worth a closer inspection. During summer, many of the latter plants are moved outdoors.

Some of the orchids to be found in the green houses are types unique in cultivation. The Japanese dwarf-orchid, *Taeniophyllum aphyllum*, is successfully grown side by side with the Philippine giant orchid, *Grammatophyllum speciosum*. The greatest rarity is *Disa uniflora*, legally protected in its native South Africa since the end of the 19th century. The Botanic Garden has a great many seedlings and full-grown plants of this species which flower in abundance every July and August.

Education and Research

The Botanical Institute was founded in 1926 and, since 1930, works in collaboration with the University of Gothenburg. Teaching of botany has, with a few interruptions, been going on since then, and the average number of students today is between 20 and 30. A number of botanists, attached to the Institute's staff carry out research work in dendrology, taxonomy, general phytogeography, and applied botany. The Botanic Garden has published its scientific results in *Acta Horti Gothoburgensis* since 1924. A seed list is issued annually.

Library

A library of 15,000 volumes was presented to the University of Gothenburg in 1964, but retains its location in the Botanic Garden. The Garden maintains, also, its own library, consisting mainly of horticultural literature. This is a wonderful place in which to browse.

Herbarium

The herbarium of some 1,000,000 sheets, like the original library, was presented to the University in 1962, but is housed within the Garden.

Staff

Mr. Per Wendelbo is Prefect of the Garden, and Professor of Taxonomy and phytogeography of the University of Gothenburg. He is a specialist on the taxonomy of oriental Liliiflorae (espe-

cially *Allium*) and oriental Primulaceae. Mr. Wendelbo has collected in Pakistan (1950), in Iran (1959), and in Afghanistan (1962); he has published papers on the taxonomy and geography of Oriental and Norwegian plants, and a monograph on *Dionysia*.

Mr. Bo Peterson is in charge of the herbarium, and was acting director 1962-65 and formerly curator (1960-62). Mr. Peterson's specialities are the taxonomy and geography of the Thymelaeaceae (*Daphne* family) and Coriariaceae (*Coriaria* family), botanical bibliography, and history of botany. He has travelled in southern Africa in 1956-57



PHOTO H. RASPER

Part of the Japanese Valley.

(S. Africa, S. Rhodesia, Mozambique, Basutoland, Swaziland), in Portugal in 1960, and in Italy in 1963, and has published on African Thymelaeaceae.

Mr. Tor G. Nitzelius handles public relations and is a horticulturist and dendrologist. Mr. Nitzelius is particularly interested in *Abies*, the firs, and other conifers, *Rhododendron*, Japanese plants, Mediterranean trees (both native and introduced) and hardiness zones. He has collected in Japan in 1952 and in Turkey in 1957 and 1966, and has made several trips to the Mediterranean coun-

tries. His published work includes books and papers on shrubs and trees.

Mr. John Engstrom has been with the Garden for forty-one years, and is head of the Alpine House and Rock Garden.

Mrs. Marit Wadstein is the librarian, and Mr. Ragnar Gullberg, grower, and now retired, is retained as a specialist in Orchidaceae.

Mr. Joseph Somogyi is a grower in the greenhouses.

Mr. Hans Lexo is chief of the outer garden and administrator of buildings.

Growing Rhododendrons in Houston, Texas

BY ARTHUR I. COYLE*

There are many rhododendron species and hybrid varieties available to gardeners. Not all of the species or hybrid varieties will grow in every area. Most rhododendrons prefer a climate with cool summers and mild winters. Such a climate exists in the Northwestern part of the United States, in the Seattle area, south to northern California, and in parts of the British Isles. A number of the species and possibly a hundred or so hybrid varieties will tolerate extremely cold winters. A very select group of rhododendron species and hybrid varieties will tolerate both extreme cold and high temperatures. At this time, we do not know of any rhododendrons, other than some of the azalea series, which will do well under a full Texas sun. There are, however, a number of rhododendron species and hybrid varieties which will thrive when grown in locations under partial to full shade. At our home in Houston, we are presently growing over 100 different rhododendron species and hybrid varieties out of a total of 128 plants of different sizes and ages which range from 3 years to 5 years old. In addition to the rhododendrons at our home, we have planted a number of hybrid varieties elsewhere in Texas which are doing very well. Many of our rhododendrons have bloomed twice and have already set buds for next year's bloom.

The main requirements for growing rhododendrons in the South are:

1. Sufficient shade for protection against direct rays of the sun.
2. Water not above pH 8.5. Water softened from a water softener will kill any acid loving plant (including all rhododendrons and azaleas).
3. A light, friable, acid soil is a must. The pH of the planting medium should be from 4 to 5 for most rhododendrons grown in hot climates. A few azaleas require a pH between 5.5 and 6 for most active growth. If an acid soil is not a natural occurrence in the planting area, it can be made acid with German peat moss and iron sulfate. Never use aluminum sulfate because the excess aluminum ions which would be available under acid conditions will kill any rhododendron.

*Types of rhododendrons to buy**:*

Our selection of rhododendrons for growing in a hot climate was originally based on the theory that cold tolerance and heat tolerance of rhododendrons go hand in hand. We have since learned that even some of the more cold tender rhododendrons will stand high temperatures. Disease resistance has proved to be as important a factor as heat resistance in growing rhododendrons in a high temperature area. Drainage is another factor because some rhododendrons require more air to their roots than others. Hybrid rhododendrons which have been subjected to extreme climate variation for a number of generations will no doubt be more hardy and disease resistant and should be obtained whenever possible.

* President Southern Chapter American Rhododendron Society, Houston, Texas.

** The hardiness ratings as published by the American Rhododendron Society are: H-1 Hardy to -25°F, H-2 Hardy to -15°F, H-3 Hardy to -5°F, H-4 Hardy to +5°F.

The following listed H-1 and H-2 groups of rhododendrons, more commonly called the Iron-Clads, have done well for us:

Album Elegans, apple blossom pink
 Catawbiense Album, white
 English Roseum, light pink
 Roseum Elegans, pink
 Roseum Superbum, rose
 Catawbiense Grandiflorum, lilac rose
 Nova Zembla, best red
 America, dark red

Rhododendrons of the H-3 and H-4 class which are doing satisfactory for us are:

Loder's White, H-4, white
 Jean Marie de Montague, H-3, aniline red
 Margret Dunn Golden Belle, H-4, apricot, flushed pink
 Mrs. T. H. Lowinsky, H-3, blush, reddish blotch
 Marinus Koster, H-3, deep pink
 Vulcan, H-3, deep red
 Betty Wormald, H-3, pink

For a more complete list of rhododendrons which are showing promise for us, see "*Rhododendron Experiences South of the 30th Parallel*", in the 1966 October issue of the quarterly bulletin of *The American Rhododendron Society*.

David Leach, author of *Rhododendrons of the World*, recently sent us the following list of heat resistant rhododendrons which are doing well in the area from Pine Mountain, Georgia north to Newport News, Virginia:

(*) Clones of unusual quality which perform well; the best in their color class.

(**) Reported by some to have undesirable habit of flowering partially in the fall.

Amphion	Boule de Neige
Anna Krushke	Caractacus
Antoon van Welie	Caroline
Arthur J. Levens	Catawbiense
Beauty of	Album
Littleworth	Cavalcade
Belle Heller*	Charles Bagley
Besse Howells	Charles Dickens
Bibiani	Countess of
Blue Peter	Athlone
Bonfire	



PHOTO BY AUTHOR

Two beds of rhododendrons at home of Arthur I. Coyle, Houston, Texas.

Cynthia
 Damosel*
 Dexter hybrid
 seedlings
 Doncaster*
 Dr. A. W. Endtz
 Dr. H. C.
 Dresselhuys
 Dr. O. Blok
 English Roseum
 Everstianum
 Fastuosum flore
 plena
fortunei
 Goldsworth
 Crimson
 Gomer Waterer
 Grierosplendour
 Holden**
 Jan Dekens
 Jean Marie
 Montague*
 Lady Bligh
 Leo
 Madame de Bruin
 Madame Masson
 Mars

Mrs. C. S. Sargent
 Mrs. Charles
 Pearson*
 Mrs. E. C. Stirling*
 Mrs. R. S. Holford
 Nova Zembla
 Peter Koster
 Pink Cameo
 Pink Flair
 Pinnacle
 P. J. M. Hybrids
praeavernum
 Prize
 Prof. Hugo de
 Vries
 Purpureum
 Elegans
racemosum
 Rocket**
 Romeo
 Roseum Elegans
 Roseum Superbum
 Sappho
 Sham's Pink
 Spring Dawn
 Spring Glory**
 Spring Parade**
 The Bride

Trilby
 Van Nes

Sensation*
 Vulcan*

Most of the above listed plants which do well in the middle Atlantic area will also grow here. A few are too susceptible to root rot to be a success in this area without special attention. The most vigorous growers are 'Roseum Superbum', 'English Roseum', and 'Mrs. T. H. Lowinsky'. Most resistant to root rot is 'Album Elegans'.

The species, with which we have had some success are: *catawbiense*, *minus*, *maximum*, and *argyrophyllum* var. *nankingense*. We are testing other species which look promising but all require much sharper drainage than the hybrids which we have tested. Care should be taken never to buy a grafted rhododendron for planting in a hot climate. Always specify "no grafts" when ordering rhododendrons for a hot climate. The graft causes poor sap circulation. Plants grafted on *R. ponticum* rootstock will die here within 60 days because *ponticum* is the most susceptible of all rhododendrons to root rot. Never



PHOTO BY AUTHOR

A bed of rhododendrons showing the raised beds so necessary in planting over clay soil.

buy by flower color. Always buy named plants. If the proper study of catalogues and books is made, you may expect reasonable success when ordering by name. Plants which require extraordinary soil conditions and disease control should be avoided in a hot climate.

Location and Planting

The location of rhododendrons in a hot climate is very important to their successful culture. In the northwestern part of the United States and parts of the Northeast, many rhododendrons grow in full sun. The same plants would die under our southern sun. Therefore we must improvise, by growing these beautiful flowering shrubs in the shade, or at least partial shade, preferably of pines and oaks. Elm trees and other shallow rooted trees should be avoided because of root competition.

In the Houston area, most rhododendrons should be planted where they are protected from 9:30 in the morning on, during June, July, and August when new growth is active. No direct evening sun should be allowed either. A few rhododendrons grown here will tolerate no sun at all. *R. maximum* will do well only in full shade. *R. catawbiense* will stand filtered but no direct sun, not even morning sun, which causes leaves of *catawbiense* hybrids to turn brown or black around the edges. The leaves of Fortunei hybrids turn yellow and the plant will die if not moved to a more shady location. 'Nova Zembla', 'Mrs. T. H. Lowinsky', and 'Roseum Elegans' are the most sun tolerant rhododendrons we have tested in the Houston area. All three get full morning sun.

Those desiring to grow rhododendrons in a hot climate without proper shade, might as well forget the whole matter. Fortunately, in Houston and many parts of Texas and the eastern half of the Gulf Coast, trees are often available as natural shade.

The corner of a house should be avoided as a site for most rhododendrons, because of high velocity winds which whip around the corner of a house. Near a house, rhododendron roots may eventually touch the alkaline

concrete, causing the plant to die next to the house. This may be avoided by placing a heavy piece of sheet iron next to the house foundation below the ground about six inches and treating the soil with iron sulfate and sulphur so that any calcium which leaches out of the slab will be converted to calcium sulfate (gypsum) which is harmless to acid loving plants. Clipping the rhododendron roots about 12 inches away from the slab once a year with a sharp bladed shovel would be helpful to those desiring foundation plantings.

In Houston, rhododendrons should be planted in October and November, especially for plants obtained in the northeast. Springtime planting in the South does not give enough time for root growth before the heat of summer. Many failures with rhododendrons can be attributed to spring plantings for the above reason.

Fall planting of plants with flower buds assures the southern gardener that the bloom buds will not be winter blasted as often happens when buying rhododendrons of borderline hardiness from a northern nursery. Fall planting also allows the rhododendron roots to become well established before the following summer.

We have had about 50 per cent success in planting some kinds of rhododendrons in late spring, but the required care of the plants was excessive until the roots became well established. Small plants are established much sooner than large plants, but small plants are tender and less disease resistant for the first 3-4 years after planting. Large plants should be obtained with very large root balls. Some six foot rhododendrons which arrived with small root balls were cut back to one foot above the roots in order to save the plants. A rhododendron 30 inches tall should have a root ball 18 inches in diameter when planted in a hot climate.

Type of Soil for Planting Rhododendrons in Hot Climate

Rhododendrons will not thrive under natural soil conditions in the Houston

area. Soils most suited for growing rhododendrons should be acid (pH not higher than 5.5), sandy loam (80% sand—20% clay) which contains a large amount of organic matter. All sandy soils will not hold enough moisture or nutrients to grow rhododendrons. Soils high in clay which occur widely in the Houston area, exclude air and hold too much water during wet weather. This encourages root rot fungi to develop. The higher the clay content, root rot fungus becomes more prevalent.

After losing a number of rhododendrons because of root rot, rhododendrons are now grown in a planting medium of 50/50 mixture of German peat and perlite only. Pine bark should never be used in rhododendron plantings. We lost four rhododendrons which were planted in a peat moss and pine bark mixture, because of the alkaline nature of the latter.

Planting of Rhododendrons

After the planting site has been selected, a space should be smoothed off at least 5 ft. in diameter. The procedure is as follows, and applies to clay loam soil of the Houston area:

1. Sprinkle 5 pounds of gypsum over the location to convert sodium clay to calcium clay. This gives better drainage of the clay soil. In some alkaline areas of Houston, add 20 lbs. of iron sulfate in an area 10 ft. x 10 ft. around the location to make the soil more acid. A liberal sprinkling of 5% chloradane dust and 20% lindane dust (according to directions) should be applied to the planting location and slightly raked into the soil. This will control many soil insects, such as wire worms, millepedes, centepedes, grub worms, cut worms, etc.

2. At the center of the raised planting bed, which has been elevated 2 inches above the surrounding area, add a small mound of washed flint type gravel 6 inches high and 14 inches in diameter. The root ball of the rhododendron will rest on the gravel dome to prevent it from settling.

3. The rhododendron bed is now ready for planting. Remove the burlap from the root ball. Gently carry the

plant to the center of the bed (place hands under the root ball—never lift the plant by the trunk) placing the root ball on the gravel mound. Use a strong stream of water to wash the soil away from the roots all the way around the ball. Leave the roots bare. The soil may have been satisfactory where the plant was originally grown, but will probably not be satisfactory in a hot climate. An exception is for root balls composed of sand and peat, in this case, only 2 inches of the roots need to be exposed. This is necessary, otherwise the roots may never penetrate into the new planting medium. The original soil washed from the root ball into the planting hole will inoculate the soil with beneficial mycorrhizal fungi from the original planting area. Lift the root ball and place a gallon of peat moss over the gravel and reset the plant in place.

4. The 50/50 mixture of German peat moss and perlite should be mixed with 1 cup of superphosphate, 2 tablespoons of fritted trace elements, a light sprinkling of 5% chlordane, 5% DDT dust and lindane dust. Suggest in areas with less rainfall than Houston should use 75% peat and 25% perlite.

5. Fill in with planting medium to 1/2 inch above the top of the root ball. Leave about 6 inches around the root ball free of fill to permit settling around the root ball with water several times. Complete filling in around the root ball and distribute planting medium around root hairs with a strong stream of water. The bed should be flat with rather steep sides. The bed may be held in place with boards, bricks, non-limestone rocks or a heavy mulch of pine needles about 8 inches thick when loose. Newly planted rhododendrons should have a good soaking at planting time and every 3 days for the first month, and the leaves should be sprayed daily with water for the first week.

NOTE: Gardeners who are interested in additional information regarding the culture of rhododendrons in the South may contact Secretary Southern Chapter, ARS, 364 Piney Pt. Rd., Houston, Texas 77024.

The Gardener's Pocketbook

Consider the Calabash

The tropical regions of the world abound with strange plants and trees. A smallish awkward-growing tree which can definitely be termed "strange," and yet which is of notable interest and importance to gardeners, is the Calabash.

The commonest of the five species of true Calabash, of the genus *Crescentia* (pronounced kre-sen-tee-ah) is *C. cujete* (koo-jay-tay), a widespread species in rather dry regions of Mexico and Central America. It is today cultivated—and often occurs as an escape in suitable places—in almost all warm parts of the globe, in this country enjoying a special

spot in select gardens in South Florida and Hawaii, and the warmest parts of California.

One's first encounter with a Calabash in full fruit, as is shown in the accompanying illustration, is a memorable experience. The strange gourd-like fruits are borne directly on the trunk and major branches of the tree, and appear to have been tacked onto the bark by some capricious surrealist. Varying from green or yellowish to almost black-purple when ripe, they measure as much as twenty inches in length in some varieties, and contain a rather messy pulp set with numerous seeds. The pulp is used in native medicine, as an emollient, laxative, astringent, and expectorant, and the seeds can be consumed after being roasted.

The woody shells, when cleaned and suitably cured—usually by slow smoking—are very extensively used for bowls and water-carriers in a great many tropical lands. Oftentimes, they are handsomely incised and colorfully painted. If properly prepared and used with some degree of care, they last literally forever. While immature they can be shaped through skillful tying and compressing, so that pipe-stems and maracas are also made from them.

The genus *Crescentia* was named for Crescenzi, an Italian agricultural writer of the 13th Century (who certainly never saw his namesake in the flesh)—belongs to the Bignonia Family (Bignoniaceae). Calabash flowers are short-stalked, expand fully at night, are of an unusual color—pale greenish yellow or purplish yellow, with more or less prominent dull brown or purple veins—funnel-like in



PHOTO BY AUTHOR

Calabash Tree (*Crescentia cujete*), fruiting in south Florida.

shape, and give off an atrocious odor as they age.

The common Calabash generally reaches a height of twenty feet at most (forty-foot specimens are distinct rarities in the tropics), with long wand-like branches extending outward mostly in a somewhat horizontal direction. The leaves are set on little knobs at irregular intervals on these branches, and exhibit considerable variation in size in a single leaf-tuft. Up to seven inches long, in this species the leaves are simple, while other kinds of *Crescentia* have 3-parted foliage (e.g., *C. alata*).

The Calabash cannot be classed as an attractive tree, but in addition to its considerable economic values, it also forms one of the best "hosts" for orchids, bromeliads, and other epiphytic plants which we have in our tropical gardens. In the wild, gnarled and contorted crescentias are usually almost smothered by epiphytes, and when these species are firmly affixed to the branches or trunk in cultivation, they thrive and grow with overwhelming abandon.

Crescentia cujete is available in many nurseries in the warm parts of this country, and since it grows rather slowly in average soil, with scant attention, makes an unusually interesting subject for the tropical garden or home greenhouse. It is propagated by air-layers, or from mature seed.

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***Dombeya* 'Rosemound', A New Cultivar**

The genus *Dombeya* with over 200 species has been known to most South Florida gardeners for many years because of its large representative member, *D. wallichii*, commonly called Pink Ball, or Mexican Rose Tree. Due to the tremendous proportions attained by mature plants, few gardeners are willing or able to allot garden space to the Pink Ball *Dombeya*. It often reaches a height of 20 feet, and may have a spread of

Fig. 1. Flower of *Dombeya* 'Rosemound'.



PHOTOS BY P. K. SODERHOLM

more than 30 feet. In keeping with the size of the bush, the light pink, ball-shaped flower heads are so large that the twin peduncles cannot support their weight above the foliage, and thus the floral effect is lost to the observer. If properly pruned, *D. wallichii* will make an attractive standard plant (2).

In 1951 the U. S. Department of Agriculture, Plant Introduction Station, Miami, Florida, received seeds labeled *D. elegans*. It was thought to be native to the Island of Reunion (1) and was hitherto unknown in this country. Recent study has disclosed that Plant Introduction 205654 is not *D. elegans*, and it has been designated *Dombeya* sp. aff. *D. burgessiae* Gerr. by botanists at the Royal Botanic Gardens, Kew, England, since they consider it close, if not a cultivated form of *D. burgessiae*, a species of known variability.

Propagations from this introduction called *Dombeya* 'Rosemound' have proved excellent ornamental subjects for planting in South Florida. The bush at maturity is smaller and more compact in growth habit than *D. wallichii*. Its abundant flower heads (Fig. 1) also are smaller, are dusty rose in color (slightly redder than Munsell hue 10RP 7/8), and—to the observer's delight—stand up in full view, well out on the periphery of the bush.

The cup-shaped flowers are $\frac{3}{4}$ to 1 inch across, petals obtuse, stamens slightly shorter than the stigma. Five strap-shaped staminodes, which are the identical color of the petals, help to intensify the overall mass of dusty rose. The flowers are carried in large umbels in such crowded profusion that many are unable to open to their fullest during the height of the bloom.

In 1953 young seedling plants were distributed to cooperating researchers, and two seedlings were planted in the station's test nursery. They received minimum care other than irrigation and fertilizer to see them through establishment and a twice-yearly feeding thereafter. Both plants grew rapidly and flowered lightly the second year. However, it was not until winter of 1959 that they revealed their full potential as ornamental subjects. By that time they were 8 feet tall, had a spread of 6 feet, and were of medium-dense growth habit. The following year the plants were seriously damaged by the hurricane which struck South Florida. Severe pruning was necessary to shape them and as a result flowering was delayed another year. In 1962 and each year since a magnificent display of bloom has appeared, starting early in November and stretching into late December.

Since the value of this introduction as



Fig. 2. *Dombeya* 'Rosemound' in full flower.

an ornamental was determined by workers at the station subsequent to the original distribution, and since seeds are rarely produced on the shrubs, reproduction by asexual means was considered necessary if a redistribution was to be made. Air-layering of large stems was moderately successful, but plants could not be produced in large quantities by this method.

Many methods for rooting cuttings were tried before consistently good results were obtained by soaking the basal end of 6-inch tip cuttings in a water solution of 75 parts per million indolbutyric acid for 24 hours, and rooting them in perlite under intermittent mist. Bottom heat of 70°F. proved beneficial in decreasing the rooting time.

Cuttings taken in January following bloom can be ready for planting in the garden in May. These will flower lightly in November, less than a year from cuttings. Plants started in this manner were incorporated in the landscaping of the station grounds the latter part of 1961 and in 1966, they were 4 to 5 feet tall. All 37 of these plants have a denser habit of growth than the parent clone. Without help from the pruner's shears, they have developed the beautiful, uniform habit of growth illustrated in Figure 2. This delightful mound of dusty pink prompted one observer to attach the name 'Rosemound' to these shrubs, thus suggesting a common name by which they are now becoming known.

In 1965 many nurserymen and research horticulturists received clonal plants of *D. sp. aff. burgesiae* 'Rosemound' from the U.S. Plant Introduction Station to provide initial stock from which we hope will spring a new and much admired garden subject.

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References

- 1.) de Cirdemay, Eugene Jacob. 1895. Flore de l'île de la Reunion XXVII:310-311.
- 2.) Menninger, Edwin A. 1958. What Flowering Tree Is That? p. 156. Edwin A. Menninger, Stuart, Florida.

Hypericum frondosum 'Sunburst', A New Cultivar

The shrubby *Hypericums* are among the more desirable plants for use in hot, dry and sunny situations. The most frequently seen are cultivars of *H. patulum* and its hybrid with *H. calycinum*, *H. × mosenianum*. Unfortunately, these are not reliably hardy north of Philadelphia. *Hypericum prolificum*, a native North American species, is fully hardy into southern Canada but has little to recommend it as an ornamental. Not so with *H. frondosum*, a close relative which has the hardiness of *H. prolificum* but, in addition, possesses a neater habit, considerably larger flowers, red-brown exfoliating bark and waxy blue-green leaves.

Hypericum frondosum is one of many plants whose high ornamental value has never been recognized by the trade. It is a good grower, seeming to thrive in almost any soil and is not difficult to propagate. It grows rapidly to a usable size yet can be controlled easily by pruning and never exceeds 5½ feet in height. An excellent show of bloom is provided from early July into August with the bright yellow flowers borne in terminal cymes on the new growth. It seems to have an effective life of more than sixty years.

As part of the *Hypericum* breeding program of the Plant Breeding Department of Cornell University, attempts were made to induce tetraploidy in *H. frondosum* through treatment of germinating seed with a .2% solution of colchicine. The seed was obtained from an old plant adjacent to the Floriculture Greenhouses at Cornell. This plant might well have been the one figured as *H. aureum* by L. H. Bailey in the 1900 edition of his Standard Cyclopaedia of American Horticulture. Of the many seed treated with colchicine, only several survived to bloom and only two of these had apparently been altered by the treatment. One showed severe distortion of plant parts having needle-like variegated leaves, weak growth and small abortive flowers. The other showed typical signs of tetraploidy. Under close ob-

servation since 1958, this plant and propagations from it have shown consistently larger leaves, stomata, flowers and shoots. The habit is more lax than that of typical *H. frondosum* and the growth more vigorous.

The following is a description of this clone to which we have given the cultivar name 'Sunburst':

Hypericum frondosum 'Sunburst'

The characteristics of the cultivar duplicate those of the species with the exception of an increased size of plant parts and a more lax habit of growth.

Plant height—to 1½ m.

Leaf length—5.5-6.0 cm.

Leaf width—1.5-2.0 cm.

Flower diameter—6.0 cm.

Petal length—2.5-3.0 cm.

Petal width—1.5-2.0 cm.

Width of androecium—(cluster of stamens)—2.5 cm.

Color—petals—RHS Primrose Yellow
601

stamens—RHS Indian Yellow

6/1

Fragrance—slight

In selecting a cultivar name, it was noted that the catalogue of Emlong's Nursery, Stevensville, Michigan, for Spring 1967, gives a descriptive name "Sunburst Shrub" for the cultivar *Hypericum* 'Hidcote'. This name has no validity as a cultivar name in this connection.

Hypericum frondosum 'Sunburst' is being released jointly by the Plant Breeding Department of Cornell University and Longwood Gardens. Inquiries are invited from reputable nurserymen intending to use the plants provided as stock plants for propagation purposes only.* Private individuals wishing this plant may, after January 1, 1969, obtain lists of nurserymen to whom the plants have been sent. Such individuals will not be eligible to receive plants from either Cornell University or Longwood Gardens. Requests from nurserymen in New York should be sent to Dr. Robert L. Plaisted, Department of

* Rooted cuttings will be available from Longwood Gardens on an exchange basis.

Plant Breeding, Cornell University, Ithaca, New York.

Others should write to Dr. Russell J. Seibert, Director, Longwood Gardens, Kennett Square, Pennsylvania.

ROBERT L. PLAISTED

Ithaca, New York

RICHARD H. LIGHTY

Newark, Delaware

The Lost *Elliottia*

The Georgia-plume, *Elliottia racemosa* is a very rare shrub of the heath family. Like the *Franklinia*, this shrub was "lost" to botanists for a number of years, but has in recent times been rediscovered in much of its original range. This is a very tall and handsome shrub, or small tree, with narrow evergreen leaves, and very showy racemes (see back cover) of white, fragrant flowers in late June or early July.

William Bartram, in his travels, mentioned finding a new shrub near Wrightsboro, Georgia. However, he did not give it a name. Stephen Elliott found and described a Georgia-plume near Waynesboro, Georgia, some time before 1809. Dr. Muhlenberg named the shrub for Mr. Elliott, and described it in his *Catalogue of North American Plants*. Neither Elliott or Muhlenberg had a description of the seed capsules.

H. W. Ravenal wrote a description of the *Elliottia* for the Torrey Botanical Club Bulletin, in 1879. In this he said, "I have for two seasons visited a patch of it growing about ten or twelve miles west of Augusta, Georgia, in the sand-hill region. On my first visit in September, we found a large number of bushes covering perhaps an acre or more. The old flower stems were still remaining, but not a capsule had formed. The plants had a stunted growth from the poverty of the soil and appeared to be offshoots from the old roots."

Dr. Asa Gray recognized the similarity of the *Elliottia* to a Japanese genus *Tripetaleia*. In a written description Dr. Gray gave the range for *Elliottia* as "wet, sandy woods near the Savannah River, at Waynesboro, and Augusta, and

on the South Carolina side of the river, near Hamburg, on the David L. Adams place. Fruit still unknown."

Mr. P. J. Berckman moved some *Elliottia* to his nursery in Augusta, where he succeeded in propagating a few plants from root cuttings. It is well that he did, for when Dr. Gray visited the area, he wrote, "not a vestige of *Elliottia* (in Columbia County) remains. A small patch is said to exist in Edgefield County, South Carolina, but all efforts to find it have failed." Dr. Charles S. Sargent wrote, "the range near Augusta, is now entirely barren of *Elliottia*. Unless another locality is found, I should not be surprised if the species is preserved only on P. J. Berckman's grounds." Mr. Berckman sent specimens from root cuttings to Kew Gardens and to the Arnold Arboretum. None of his plants ever set seeds. *Elliottia* has never been rediscovered near Augusta, nor on the South Carolina side of the river.

In the Journal of the New York Botanical Garden for 1901, J. K. Small wrote a history of the lost *Elliottia*, but ended on a cheerful note. "I received a letter from R. M. Harper in which he says, 'last Thursday, June 27, I collected the *Elliottia* in full bloom near Bloys, Bulloch County, Georgia. The plants grow in very dry pine lands, and this station is forty miles south of the original locality. Here are about 100 individual shrubs in full bloom.'

Dr. Harper wrote several accounts of the *Elliottia*, with photographs, for *Plant World*. In 1903, he wrote "I was accompanied by my friend, Prof. J. W. Hendricks, who has always taken great interest in my botanical work. While I was stopping to collect some other plants, Prof. Hendricks went ahead on his bicycle through the open pine woods and in a few minutes returned with a flowering branch of *Elliottia* to ask me what it was." Dr. Harper spoke of the large number of insects visiting the flowers and wondered why the *Elliottia* did not set seed.

Later Dr. Harper traced down several more stations for *Elliottia* in Emanuel County, and at the base of Turnpike Creek in Telfair County. Here he found

a single fruiting capsule. In 1903 he recorded a station north of Douglas, in Coffee County. This was burned over, but it was found that *Elliottia* regenerated in a shrubby manner after burning. Dr. Harper had a theory that the natural range of this species was limited to the Altamaha Grit Region.

Dr. Edgar Wherry visited Georgia in 1934, and started efforts to preserve the *Elliottia*. A new colony had been discovered by Dr. Wallace Kennedy of Metter, and a Dr. Charles C. Harrold who had become interested in protecting the colony from fire. Dr. Harrold acquired two tracts, totalling seventy-two acres, including the Stockinghead area. In 1958, Mrs. Harrold gave this station to Franklin Dulany and Miss Clermont Lee as a memorial to her husband. It was named the Charles Cotton Harrold Nature Reserve. In 1964 this was deeded to the National Nature Conservancy.

Underbrush has been cleared out in this colony, and the *Elliottia* grows tall and tree like in a park like environment. It has produced seed capsules and botanists in various parts of this country and abroad are experimenting in attempts to propagate this rare shrub from seed. So far most seed is not viable, and germination is a very slow process. One colony of *Elliottia*, near Lott's Creek, in Bulloch County is under study by professors and students from Georgia Southern College.

Notes for this account of the *Elliottia* in 1960, and from the *Elliottia Chronological Table*, compiled by Miss Clermont Lee in 1965, came from a compilation by Craig Bell. Photograph of the *Elliottia* bloom is by the late Ivan Tomkins.

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Koelreuteria paniculata 'September' A New Cultivar

Late summer flowering trees are rarities in the middle latitudes of America. After *Sophora japonica*, *Kalopanax pictus* and *Aesculus parviflora* var. *serotina* there is *Franklinia* and not much else before the autumn flowering *Prunus*

subhirtella var. *autumnalis* and *Hamelis virginiana*. *Koelreuteria paniculata* 'September' will soon join this select company.

Koelreuteria paniculata Laxm., the Goldenrain tree from China, Korea, and Japan, is a widely-cultivated small to medium sized flowering tree in U.S.D.A. Plant Hardiness Zone 6, with trees less frequently seen in Zone 5. Its usual flowering season in central Illinois and Indiana is in June to early July, though both Bailey's and Rehder's Manuals give it as July and August. Young seedlings may have their first flowering somewhat later in the summer, but in later years will nearly always flower in the first weeks of summer.

The senior author therefore was surprised, during the August 25-27, 1958 meetings of the American Institute of Biological Sciences, to see a group of three mature *Koelreuteria* trees on the Indiana University main campus at Bloomington, two of which were in flower. (The third tree, in fruit, evidently had flowered in early summer.) He has observed the trees again at least once in the summer or fall of the succeeding years, and found that the two unusual trees consistently maintained their heavy flowering, always in late August to early September, while the third tree flowered only at the normal season typical for the species. Seeds are mature on the typical tree by September, but not until early November on the later two.

Seeds from the late trees were distributed to several experimenters at the 1960 meeting of the International Plant Propagators Society, Eastern Region. Not all recipients have reported results, but seedlings from this source now are growing as far north as the Royal Botanic Garden, Hamilton, Ontario. The junior author germinated seeds in 1961, with the resulting seedling population lined out for observation in the nursery area of the U. S. National Arboretum, Washington, D. C. The first seedlings flowered and fruited in 1965, with the remainder coming into flower in 1966. To date no significant variation has been noted in growth characteristics. All six

trees are approximately ten feet tall. All have had their flowers openings in late summer to early fall, principally in the month of September. None has flowered earlier than August 20.

While this appears to be the start of a seed-reproducible late-flowering race of *K. paniculata*, not normally crossing with the earlier race, there is some variation in flowering time between seedlings grown at Washington and even between the two late-flowering old trees at Bloomington, where the most north-westerly planted tree is consistently a few days later than the other in peak of flowering. The registered cultivar name, 'September', is therefore reserved for plants clonally propagated from the tree in Bloomington which is most likely to have the majority of its flowers opening in September. It also appears to produce somewhat more numerous flower panicles and seeds, and is the larger of the two late trees, both of which are somewhat larger than the similar-aged "normal" tree, perhaps because they continue growth later in the season.

Through the cooperation of Indiana University, *Koelreuteria* 'September' scions and root cuttings are being increased for release to nurserymen. Experiments are continuing at the National Arboretum and the University of Illinois toward the possible selection of *Koelreuteria* cultivars to precede and follow the season of 'September'.

Among a small population of second-generation seedlings from 'September' started in a greenhouse at Urbana, Illinois in spring, 1966, is one plant whose growth indicates that it may be extremely late, if its flowering, as is usual for the species, accompanies the completion of growth elongation. This seedling, unlike all the others, was still making new terminal growth in December without receiving supplemental light to extend the short day length. It may be so late that its ornamental usefulness will be curtailed for Zone 6, but it should be an interesting clone to try in Zones 8 to 10, where *Koelreuteria* spp. of more southern adaptation (*K. bipinnata*, *K. formosana*) are sometimes cultivated.

Type Tree: *Koelreuteria paniculata* Laxm. 'September'. Origin unknown. Specimen 10 m tall. The most N.W. tree (nearest a small stream) in planting on S.W. corner of the President's lawn at Indiana University, Bloomington, Indiana. Leaves as in the species, partly bipinnate on spring growth, emerging a few days later than on the typical tree. Terminal growth continues later than for the species. The yellow flowers open on the larger than usual panicles in late August to early September, approximately 60 days later than usual for the species. Flowers and fruits are within the range of variation for the species. Seeds mature in November, and so far as tested have reproduced the late-flowering cultivar form. Represented in Herbarium of Indiana University by No. 113121 collected (in fruit, with pinnate leaves) by M. Starr, September 28, 1966. Another sheet of this collection is deposited in the herbarium of the Arnold Arboretum, where 'September' is registered as an ornamental cultivar.

JOSEPH C. MCDANIEL
Urbana, Illinois
SYLVESTER G. MARCH
Bowie, Maryland

Hollies on Cape Cod, Massachusetts

Due to conditions of climate and situation peculiar to Cape Cod, the growing of many *Ilex* species differs greatly from that in other regions of the same latitude. Chatham, where we are located, is far out at sea on the 'elbow' of Cape Cod with the Atlantic Ocean bordering three sides of town, and is in hardiness Zone 6 where limits of average annual minimum temperatures are -5°F . to $+5^{\circ}\text{F}$. Mean temperature in January is 33.5°F . and in July 70°F . Mean annual rainfall is 42.9 inches, though the 1965 drought year produced only 26 inches. Snowfall is slight compared to the mainland; during the greater part of each winter the ground is bare.

Our land has southern exposure sloping to a salt water inlet with the Atlantic Ocean beyond, and no real windbreak. With a substratum of clay, soil is acid, possessing ample organic

matter and a small percentage of sand; it never bakes hard and always remains friable.

The ocean tempers Chatham's climate. We have no abrupt temperature changes and no late spring or early autumn frosts. Dripping fog and heavy morning dew are helpful during dry periods. As has been said of Sulby, Isle of Man, so Chatham has "a climate free from the normal hazards of a winter on the mainland with its sudden temperature changes and damaging late frosts . . . ideal conditions of pure air, sunshine and moisture-laden wind."

The above is dwelt upon at length because it is necessary to an understanding of the manner in which *Ilex aquifolium*, for example, flourishes here in contrast to results achieved in other localities even on Cape Cod. Ten years ago leading horticulturists believed *I. aquifolium* could not be successfully grown on Cape Cod, except for a very few clones obtained by Wilfrid Wheeler and planted on the Whitney estate in Woods Hole. As shown in the list to follow, *I. aquifolium* and other species hitherto considered not hardy this far north really flourish in Chatham and adjoining Orleans. It is here I acknowledge indebtedness to Mr. Louis H. Carter of East Orleans for most valuable notes he made from observation of his comprehensive collection. Only after adequate testing under varied conditions will the true hardiness of different *Ilex* species become known.

Winter of 1960-1961 proved a real test, being one of the coldest on record. Chatham's lowest reading was 5°F., but in Falmouth, likewise on Cape Cod and only 40 miles distant, the reading was -15°F. This difference proved significant indeed. In Falmouth *I. aquifolium* varieties were badly injured; some were killed outright, some killed to the snow line, while others required ruthless cutting back. A few defoliated completely but finally made slow recovery. Only a small number of varieties were relatively unscathed of which names are supplied later.

By contrast, in Chatham all our *I. aquifolium* came through unharmed.

The twigs were in perfect condition, plump to the ends. Even second growth was unharmed in most instances.

From all this we concluded that somewhere between temperatures of -15°F. and +5°F. there exists a line determining success or failure in growing this species. In this connection it may be of interest that of over 200 kinds of trees and shrubs studied on our property, many which showed a die-back of 1-12 in. were a total loss in Falmouth.

The importance of ocean tempered climate appears again to be indicated by testimony of visiting holly growers from the Philadelphia and Maryland areas. One person remarked he had never seen *I. aquifolium* so heavily fruited as here (except in Oregon). He thought his late frosts, which we don't have, may affect pollination and hence production of berries. In growing over 200 cultivars of heather *Calluna vulgaris* and heath, *Erica* we have learned that our procedures and excellent results more closely parallel those of distant Seattle than Long Island or Philadelphia.

Species of *Ilex* are apparently immune to salt spray as encountered in occasional storms. The winds of hurricane 'Donna' on September 12, 1960 had an unobstructed path to our property direct from the ocean. Usually hurricanes here are accompanied by a deluge of rain which washes off any salt deposited on plant foliage. 'Donna', however, was a dry hurricane, attended by a scant .20 inches of rain; when the winds ceased, our windows on the southwest side of the house had the appearance of being white washed. Even with such a salt deposit all *Ilex* species and varieties were unharmed with these slight exceptions—some opacas died-back 2 to 3 inches, others not at all, and *I. pedunculosa* showed 3 to 6 inches of die-back with a slight browning of foliage. Other kinds of *Ilex* showed no effects of salt spray.

Birds seemingly prefer fruit of *I. opaca* to *I. aquifolium*. Some of our *opaca* trees are denuded of berries in winter, whereas the aquifoliums are usually untouched. Rabbits present our chief problem; despite a gun and foxes

that occupy a den on the grounds, it is necessary to provide a wire enclosure for all small *Ilex* except *crenatas*. Rabbits chop small plants almost to the ground line; even tall 'Jan van Tol' we protect, because being smooth leaved without barbs, rabbits destructively prune this variety.

Ilex species, hybrids and clones in the following lists have proven thoroughly hardy in Chatham and adjoining Orleans year after year. Oddly, or at least contrary to expectation, *aquifolium* flourishes better than *opaca*, though the latter is indigenous to the area. In the following lists, asterisks indicate those, which through the years, have also proven hardy at Falmouth. The cultivars 'Moorei' and 'Wilsonii' definitely require protection here; also to lesser degree 'Hendersonii', 'Lawsoniana', and 'Teufels Hybrid'. Asterisks indicate *aquifolium*s that have proven hardy at Falmouth through the years.

I. aquifolium

Alicornis	*Goliath
*Alice	Green Knight
*Ames	Green Maid
Angustifolia	*J. C. van Tol
*Boyce Thompson	*Lunn van Tol
Brownell Special	Moorei
*Ciliata Major	Ovata
Echo	Pendula
Ferox	Pinto
Fructu-	Recurva
aurantiaco	Rederly
Fructu-luteo	Scotia
Fertilis	Silver King
Firecracker	*Squire
*Glory	*St. George
Gold Gem	Syracuse
Golden Milkmaid	Teufels Hybrid
Golden Queen	Viola

I. crenata

Compacta	Longfellow-
Convexa	Major
Glass	Microphylla
Green Cushion	Maculata
Helleri	Oleafera
Hetzi	Stokes
Howardii	Tingle One

I. cornuta

Burfordii	Rotunda
National	

I. × altaclerensis

*Altaclerensis	*James G. Esson
Belgia	Laurifolia
*Camelliaefolia	Lawsoniana
*Evangeline	Shepherdii
Father Charles	Wilsonii
Hendersonii	

Ilex opaca

Elizabeth	Natale
Emily	St. Mary
Goldie	and 35 more named clones

Ilex species and hybrids

<i>I. glabra</i>	<i>I. × aquipernyi</i>
<i>I. pedunculosa</i>	<i>I. Nellie R. Stevens</i>
<i>I. perado</i>	
<i>I. pernyi</i>	<i>I. 'Lydia Morris'</i>
<i>I. pernyi</i> var.	<i>I. 'John T. Morris'</i>
<i>veitchii</i>	
<i>I. verticillata</i>	

HAROLD W. COPELAND
Chatham, Massachusetts

A Book or Two

(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.)

Foliage Plants for Indoor Gardening

By James Underwood Crockett. Doubleday & Co., 277 Park Ave., New York, N. Y. 10017. 1967. 165 pages. Illustrated. \$4.95 (Library) Members price \$4.20.

"The purpose of *Foliage Plants for Indoor Gardening* is to help you enjoy these living testimonies of the beauty of the earth for as long as possible." In this the writer has succeeded in giving you descriptive and cultural information about these new plants. Plants from jungles around the tropical world.

His "Glimpse at the whole picture" of plant culture is a good outline for the home grower. It includes a new dimension for most gardeners: Plants want to grow—you as a gardener usually want them to—This book tells you how you can change your objective to: "Maintain their health and beauty without increasing their size any more than is necessary." This is a new concept which is necessary to help them play their role as part of the total furnishings design.

The understanding of a plant's habit is needed. Watering is explained in a logical manner. Since this is one of the most critical areas for plant lovers, a knowledge is necessary to help to retard unwanted growth. Soils and feeding the plant for the home gardeners approach is necessarily reversed to that of the commercial growers—this is also explained here. The effective use of light, or the lack of it, both natural and artificial and air conditioning is dealt with. A plants total environmental needs are explained in simple and direct language.

How to buy plants, Natural and "Permanent" is frankly discussed with the merits and uses of each assessed.

A new approach to the listings of plants and their cultural requirements is given. They are listed in order of their importance, i.e. Foliage Plants for indoor gardeners, Minor Foliage Plants or one-of-a-kind plants.

For your convenience, in the index he has listed the common name, also the species and genus of the plants.

In Chapter 27 he has "Lists of foliage plants grouped according to their cultural needs". In Chapters 2 through 24 he has given the reader a wide choice of foliage plants and the cultural requirements of each.

He has explained the cultural requirements of the "Landscape in Miniature" (the Garden

in a Dish) which is so popular for shut-ins.

Chapter 26 is "Terrariums and Indoor Greenhouses." He again communicates the cultural needs of a wide range of suitable plants for these special places in our homes.

The color plates and the black and white photographs gives you a desire to begin your exploration with Mr. Crockett.

Again to relate a living plant to a vital place in the total indoor design of today's living has been explored, and in this Mr. Crockett has succeeded in telling the reader how to grow a plant well and keep it in the right proportion to the other furnishings. Plants are a part of the total design. He tells you how to live with and enjoy a wide range of plants.

MRS. DONALD D. RITCHIE

The Glory of the Tree

By Dr. B. K. Boom and H. Kleijn. Doubleday and Company, 501 Franklin Ave., Garden City, N. Y. 11531. 1966. 128 pages. Illustrated, black & white and color. \$12.95 (Library) Members price \$11.00.

The Glory of the Tree is a glorious book, with fidelity to the title. Dr. Edgar T. Wherry, professor of botany, Emeritus, University of Pennsylvania, assisted in editing the translation for the American reader. This book is concerned with the beauty of trees and their use, their history and folklore. There is a lot of little-known information about those trees we grow in our gardens. It is not a handbook dealing with the planting, pruning and care of trees, but, according to the authors, an attempt to help those who enjoy the outdoors, who keep their eyes open for what there is to be seen, and who wish to know something about what they see. The authors stress the fascination of trees, their growth and flowers, their fruits, their autumn tints and their winter starkness. There is a description of each tree, and simple characteristics are pointed out whereby trees may be identified. At the end there is an explanation of the Latin specific names of trees, a list of major botanical gardens and collections of hardy woody plants of the United States, Canada and Europe, and a selected list of books about trees.

TOM STEVENSON

Greenhouse Gardening For Fun

By Claire L. Blake. M. Barrows & Company.
425 Park Ave. So., New York, N. Y. 10016.
1967. 255 pages. Illustrated. \$6.95 (Library)
Members price \$5.90.

In *Greenhouse Gardening For Fun*, Claire Blake brings the pleasure of your own greenhouse garden within the limits of most anyone. Most anyone, that is, with a small space, a limited income, a reasonable amount of practical skills, and the desire to own your own greenhouse.

She takes one through the tedium of orienting oneself within the organized greenhouse. Decisions that must be made, she gives you several choices, but points out the limitations of each, i.e. in a cool greenhouse you save on fuel, have a simpler watering problem to master, have fewer bothersome insects and diseases and still will have a rather wide selection of plant materials to choose from. Even though you have a cool or warm greenhouse she points out there are micro-climates within the greenhouse so that you may still select a favorite plant that needs a special temperature etc. She also tells you how to create microclimates.

This is a rather comprehensive greenhouse gardening book that a beginner can read and with a reasonable amount of skill produce some satisfying results in terms of pleasure and plants.

The section on complete climate control system and "water" is most practical. Another section, soil and the sterilization of it, I found that I had reached much the same conclusions. It made me wish that I would have read her section on soils before worrying with sterilizing the soil, the pH range, their composition, and their fertilizers which usually gives anxiety to a novice. It is invaluable for a handy reference for either the novice or seasoned amateur. The contents, and index are well organized so that one can quickly find answers to gardening problems.

The propagation of plants is an up to date "how to do it" section that is easy to follow with diagrams and step by step procedures. A must for any gardener.

The colored pictures should appeal to the casual reader and the black and white photographs and diagrams are most helpful to almost any amateur gardener.

There are 79 pages devoted to the specific culture of individual plants. This reference should be invaluable to any gardener whether amateur or novice.

In the section, "The Greenhouse Garden Month by Month," Mrs. Blake gives you a guide and instructions to help you organize your work plan and bloom season and an outline of plants suggested for various temperature ranges. If you are a busy person, this could be a big help for you.

I recommend *Greenhouse Gardening for Fun* to anyone who has thought some time I'd like a greenhouse. He may very likely end up

buying one. Also, to those who need a handy reference. It's the kind of book that you wish you'd had when you began greenhouse gardening.

MRS. DONALD D. RITCHIE

Bromeliads In Color

By Victoria Padilla, Editor. The Bromeliad Society, 647 Saltair Ave., Los Angeles, Calif. 1966. 125 pages. Illustrated. \$5.95 (Library).

Bromeliads in Color and their Culture is a collection of authoritatively written and carefully selected articles that have appeared in the Bromeliad Society's Bulletins. It brings up-to-date the cultural handbook by the same Society.

One of the outstanding merits of this volume is the wealth of knowledge, plus experience, contributed from various sections of the United States and overseas, much of which may be adapted to the growers' particular conditions.

The introduction consists of a brief history of these plants by Walter Richter, an outstanding European expert. Next, the reader's appetite is whetted by a brief but very interesting account of a plant hunting expedition for new and rare bromeliads in the Matto Grosso by Mulford B. Foster, another renowned expert.

The classification, family and generic characteristics, and the excellent key to the genera are covered in an academic manner by Dr. Lyman B. Smith. The chapters concerned with the culture of the various genera are intelligently and clearly defined. The two xerophytic genera, *Hechtia* and *Dyckia*, which are often somewhat neglected in contemporary books, receive adequate coverage.

The chapters on propagation are of especially high standard, completely free from misleading generalizations. Meticulous attention has been paid to detail, demonstrating the various author's intimate knowledge of this facet. This is particularly obvious where singular idiosyncrasies occur in certain species, necessitating special techniques.

Indoor decoration using bromeliads is rapidly gaining favor. Several chapters are devoted to explaining factors necessary for success, including special features such as "Bromeliad trees" and driftwood arrangements.

The black and white and the color plates are, for the most part, of high quality. Bromeliads, especially the most bizarre and exotic types, appear somewhat difficult to reproduce authentically in color.

This is an excellent work, scaled in size to the modern horticulturist who wishes to learn more about this fascinating and highly satisfactory group of plants. In this age of "instant gardening," with its often attendant compromising standards of plantsmanship, it is indeed refreshing to read a volume containing erudite information, minus any superfluous "padding."

PATRICK A. NUTT

Modern Roses 6

By The McFarland Company in association with The American Rose Society. J. H. McFarland Co., Box 687, Harrisburg, Penna., 17108. 1965. 497 pages. Illustrated. \$19.50. (Library) Members price \$16.55.

As a rose enthusiast, a hobbyist or a plain rosarian, I found that *Modern Roses 6* is more than a book of 10,000 rose names and classification data; it is a wonderful book which lends enchantment in the most literal sense. It is two-fold in its purpose; it is full of the wonder nature inspires; it gives glimpses into the past of essential information on modern roses.

In our civilization and culture the growing of roses has become a major hobby among millions of young as well as the more experienced home gardeners. Condensed, authentic, basic and descriptive information on varieties beyond the current catalog descriptions can be found in this one volume. My review of this book has stimulated the desire to learn more about the ancestors and descendants of present day varieties of favorite roses, and those of historical importance. To me, there is no question but that the acquisition of such knowledge has given considerable charm and appreciation to the esthetic and therapeutic value of growing beautiful roses.

Modern Roses 6 is as up-to-date as it can possibly be at this time. In the Preface it is stated that "For nurserymen, the rose hybridizer, and the hobbyist it is designed to serve as an authentic source of historical and descriptive information on the species and cultivars (varieties) of the genus *Rosa*."

CHARLES C. MONTGOMERY

The Rose in India

B. P. Pal. Published by Indian Council of Agricultural Research, New Delhi, India 1966. 265 pages. Illustrated in black and white and in color. \$12.00 (Library)

The Rose in India written by B. P. Pal upon invitation of the Indian Council of Agricultural Research, was intended to deal with the roses of India with special emphasis on the roses of Delhi, the section of the country with which the author is most familiar. However, the author who is the president of the Rose Society of India has called upon many experts to whom he gives credit for the information on the wild roses of his country, the production of rose water and oil, as well as on fertilizers, soil, pests, diseases, and even the growing of roses for the cut-flower market. As a result the book is a comprehensive volume that includes the history of roses from early times to the present day, with information on lists for planting which include many American varieties, propagation, pruning, arranging, the various types of rose material, even to a chapter on miniatures.

The format of the book is excellent, fine printing, with garden pictures in black and white, individual roses in color, and fine line drawings of steps in pruning and also garden designs. The book seemed to this reviewer quite superior to some of the recent books on roses produced in the United States, with much valuable material presented in concise form for the grower in our own country as well as for the rose grower in India.

MAUDE GAY BENZINGER

It's Your Community

By Henry B. Raymore and H. Stuart Ortloff. M. Barrows and Co., 425 Park Ave. So., New York, N. Y. 10016. 1965. 240 pages. \$3.95 (Library) Members price \$3.35

The authors of *It's Your Community* have responded to the urgent need for a handbook to guide those interested in civic improvement and the beautification of our country. Those individuals who are responding to the call for action in this important field of endeavor—to improve our environmental surroundings—will find valuable ideas and suggestions that should prove most useful in directing their activities towards making our communities better places in which to live.

The authors have included a brief review of the historical development of our communities. It is their contention that planners of civic projects will have a better understanding of the problems facing their communities today if they have some background knowledge regarding the ways in which our present societies have evolved and the reasons for the plight of ugliness in which we find ourselves currently living.

Vital problems facing the modern community such as the deterioration in the heart of older communities, growth of suburban areas around cities, difficulties encountered in moving traffic, lack of parking facilities, and the need for roadside rehabilitation, recreational areas and conservation of open spaces are discussed at length in various chapters of the book.

The authors have plainly spelled out the need for community planning to attack the above listed problems as well as many others that confront our societies. They have suggested methods by which civic projects may be accomplished that will have lasting value to the whole community. They have also explained the reasons why failure has followed various attempts at civic improvement and ways in which to avoid these pitfalls.

All members of communities interested in the beautification of their surroundings will find assistance in this book regarding the proper procedures to be followed in planning civic projects, both large and small. Those willing to accept the challenge to improve and beautify America will find *It's Your Community* well worth reading.

HELEN P. REED

Flower and Garden Photography

D. X. Fenton, Chilton Books, 227 S. 6th St., Philadelphia, Pa., 19106. 1966. 128 pages. Illustrated. Price \$4.95. (Library) Members price \$4.20.

"Since few of us are blessed with total recall and most memories become clouded with time, memory leaves much to be desired in retaining natural beauty—it should then become obvious that for accuracy and repeated enjoyment of actual beauty—the camera is the thing". This book gives simply and clearly the information for the amateur gardener. In Chapter two, "Photography's Garden Tools," kinds of cameras, accessories, tripods, exposure meters, lens, shades, filters and flash are all discussed. In Chapter three and succeeding chapters, the author furnishes information on the use of black and white or color film, color film types, filters, exposures, storing of films, taking close-ups, shows, arrangements and garden photography. This book should be very useful to all of us with cameras.

GEORGE M. DARROW

Encyclopaedia of Cultivated Orchids

Alex D. Hawkes. Faber and Faber Limited, London, 1965; The Orchid Weekly, P. O. Box 435, Coconut Grove, Florida, (American distributor). 672 pages. Illustrated. \$37.00.

The first comprehensive work on orchids in cultivation in more than 50 years, this handsome volume is of considerable importance to both the professional and the amateur orchidist. Indeed, in its field it will be acknowledged supreme, for it offers more than a compilation, providing complete guidance in identification and culture and superbly demonstrating the evolution of knowledge and interest in a plant group noted for incredible diversity and beauty.

The book's treatment of the more than 700 genera considered valid in the Orchidaceae includes discussion of the basic appearance of each genus, its distribution, cultural requirements, and hybridization within the genus and with allied genera. Descriptions of the species in general cultivation follow and involve synonymy, flowering season, distribution, and temperature needs. Less commonly encountered species are described briefly.

This vast amount of information is imparted in a style remarkable for its blending of brevity and readability, with no sacrifice of either comprehensiveness or botanical accuracy. The book is copiously illustrated with monochrome and color photos and a great number of drawings from works not readily accessible to the growing number of orchid hobbyists. Of bonus value to the novice is the index of phonetic pronunciations, the glossary, and a cross-indexed list of multigeneric hybrid groups.

As with any work of this scope, taxonomists may contest an occasional point of nomencla-

ture. The book, however, stands as monumental, and the author's reputation as one of the world's foremost orchidologists is enhanced by its publication.

THOMAS POWELL

Hardy Plants of Distinction

By Alan Bloom. Published by Collingridge, London, England. 1965. 130 pages. 37 black & white photographs. 35 shillings or \$4.90.

The extensive knowledge and distinctive enthusiasm of an extraordinary plantsman are well exhibited in *Hardy Plants of Distinction*. This slim volume will go far to enlighten many readers to the boundless satisfaction of using flowering perennials in a landscape scene.

The first two chapters, which purportedly define the purposes and methodology of the island method of growing perennials, are grossly oversimplified. Although the plants are adequately provided for in the "Descriptive Glossary of Plants," the explanation of the principles of design and construction, and the problems of composition, necessary to bring an unconventional method of perennial cultivation and arrangement to fruition, is deceptive. It is assumed, in many areas, that the readers are novices on the subject of perennial gardens. On the other hand, it is presumed that the reader has an immense amount of technical knowledge pertaining to design, and to the mechanics of cultivation. The readers are carefully led down the garden path, while circumventing the "islands," and are ultimately set adrift in a sea of grass.

The development of island beds in opposition to the conventional method of perennial borders can be very satisfying. However, copious illustrations are needed to emphasize the advantages of this method. Their sparsity in *Hardy Plants of Distinction* will not convince gardeners who are entrenched in the border method. There should have been many more photographs of the islands at different seasons to draw attention to the superiority of this method, aesthetic or otherwise.

Unfortunately, the title is misleading, for only after surveying the book is it clear that the coverage is limited to perennials hardy to the mild environment of southeastern England.

The paragraph entitled "Letting Off Steam" was of particular interest to me as a practicing taxonomist, active in nomenclatural problems of cultivated ornamentals. It is stated on page 27 that a Latin plant name which "has been used and accepted for a long time, should not be changed except for the best of reasons." Could there be any better reason to apply the "correct" name than strict adherency to the rules of priority and legitimate publication that are legislated for in the international codes of nomenclature?

The "Descriptive Glossary of Plants" is very informative. It is admirably constructed and points out the good as well as the weak

characteristics and cultural requirements of the carefully selected perennials.

The chapter dealing with "Plants for Special Purposes" and the ingenious "Merit List and Plant Index" alone make the book a convenient and valuable addition to a gardening library. The measure of planting density, indicated by the number of plants recommended per square yard (in the "Merit List and Plant Index"), is especially significant, because unfa-

miliarity with growth characteristics and cultural requirements often leads to over-planting or under-planting.

As an extremely readable dictionary which provides descriptions and cultural directions for many desirable perennials worthy of greater popularity, *Hardy Plants of Distinction* is recommended.

T. R. DUDLEY



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Nickerson Color Fan

The American Horticultural Society has been interested for many years in making available to the horticultural public a popularly priced color chart that could be used as a standard in all phases of horticulture. Accurate charts, in the past, have been too costly to publish at a moderate price.

No color chart, except those with a thousand colors or more, can contain all the colors needed by all the various horticultural

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Included with the color chart is a twelve-page booklet explaining the use of the fan in detail. Printed in small type, on each color, is the popular color name and its numerical designation in the Munsell System of Color Notations which is fast becoming accepted as standard by many

industries and societies dealing with color systems in America. The chart uses color names that have been selected as standard by the Inter-Society Color Council and the National Bureau of Standards.

Judges who have used the fan report that the color chips are so easy to handle, particularly when working with color classes, that they prefer it to any other color reference.

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Flower Cluster of *Elliottia racemosa*