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JEANNE S. WADLEIGH, Editor

MARCO W. REYNOLDS, Assistant Editor
PETER J. CHVANY, Photographer

Cover: *Syringa persica*. From Curtis's Botanical Magazine. Vol. 18. London, 1800.

The Uncommon Lilacs - Something Old, Something New

by JOHN H. ALEXANDER III

The lilac is a favorite flower in New England where it is the state flower of New Hampshire. Its popularity also extends across the northern half of the United States and into the southern half of Canada. At the Arnold Arboretum, undoubtedly more visitors come to view the lilacs than to visit any other single collection.

We have a special fondness for this plant which is as foreign to our shores as our forefathers were. No species of lilac is native to the New World; *Syringa vulgaris*, the common lilac, is indigenous to the mountains of Europe within the countries of Bulgaria, Czechoslovakia, Hungary, Roumania and Yugoslavia. But botanists did not discover it growing wild until 1828 when it was found in western Roumania. Cultivated for centuries in Turkey, it was brought from there to Vienna by 1563 and was common in Paris by the turn of the century. French, Dutch, and German nurserymen began selecting superior seedlings and by the early 1800's offered named clones for sale. An example is the cultivar 'Lucie Baltet' which originated in France before 1888 and is still considered to be one of the best pink-flowered varieties. So many cultivars originated in French nurseries, and in particular at the nursery of Victor Lemoine, that all selections of *Syringa vulgaris* have commonly been known as French Hybrid Lilacs.

It is these French Hybrid Lilacs that we particularly love. How many of us can walk by a lilac bush in bloom and not bend close for a draught of perfume, the mind conjuring up memories of springs past? With the advent of the smaller home, this plant, so deeply rooted in tradition, has been put aside for the contractor's *Taxus*. Not only the lilac's size, but the inferior quality of late summer foliage and the profuse suckering tendencies of some cultivars have discouraged many people from growing them. But now lilacs other than the common *Syringa vulgaris* and its cultivars are being discovered by gardeners. Many of these uncommon lilacs are smaller, some even small enough to be tubbed for the patio, and most sucker little if at all. They also are more resistant to mildew and leaf roll-necrosis.

Leaf roll-necrosis is typified by the interveinal and marginal chlorosis or yellowing of the leaf, and in severe cases by the inward curling

of the leaf so that the margins actually touch. A product of our urban environment, the disorder is believed to be caused by a combination of air pollutants. (6) Since different pollutants are found in varying quantities in different environments, conclusive evidence of resistance is not available. My statements of implied resistance to mildew and leaf roll-necrosis are based on observations at Rochester, New York (5) and on observations by the staff and volunteers of the Arnold Arboretum.

With few exceptions the lilacs mentioned here may be seen in the collection of the Arnold Arboretum. Most are available in the nursery trade. The best source list is available from the International Lilac Society, an organization of amateur and professional lilac enthusiasts. Requests for information on publications and membership should be addressed to Mr. Walter W. Oakes, Secretary, International Lilac Society, P.O. Box 315, Rumford, Me. 04276.

Syringa × *chinensis*

S. × *chinensis* is a garden hybrid that originated in the Botanic Garden at Rouen, France, about 1777. Its parents are generally believed to be *S. laciniata* and *S. vulgaris*. A beautiful shrubby plant, it can reach a height of 15 feet but is more likely to be 8 to 10 feet tall. Its flowers are lilac-colored and somewhat smaller than those of the common lilac, with which it blooms. An attractive advantage is that it produces clusters of flowers not only at the terminals, but from lateral buds down the stems, often forming an inflorescence 2 or more feet long.

Syringa × *chinensis* suckers only enough to be considered multi-stemmed and is certainly not a nuisance. The foliage is similar to that of the common lilac, but smaller and appears to be resistant to leaf roll-necrosis, although it is susceptible to mildew. Appearing in late summer, mildew does no serious damage to the plant and might well be tolerated in exchange for the great spring beauty and profuse flowering habits of this hybrid.

Syringa × *chinensis* has proved itself to be hardy in Zone II. (3) Two forms also are available: *alba*, white, and *sangeana*, lilac-red.

Syringa × *diversifolia*

S. × *diversifolia* is another garden hybrid. Open pollinated seed collected in the Arnold Arboretum in 1929 from a plant of *S. pinnatifolia* gave rise to hybrid seedlings. Alfred Rehder later determined these to be a cross with *S. oblata* var. *giraldii*, which was growing nearby.

The pale lilac to white blossoms are fragrant and attractive, appearing shortly before those of *S. vulgaris* and its cultivars. Usually

Plates reprinted from Curtis's Botanical Magazine are, clockwise from top left: Syringa josikaea (Vol. 13, 1833); S. julianae (Vol. 8, fourth series, 1912); S. oblata (Vol. 127, third series, 1901); S. amurensis (Vol. 53, third series, 1897).



about 6 feet high and almost as broad, *S. × diversifolia* has a rather open habit. It is not very popular, but this past fall I was captivated by a cultivar that we received in 1949 from the now-defunct Upton Nursery Co. of Detroit, Michigan. Called 'Nouveau', its deliciously fragrant, light pink flowers rebloom in early fall when its often pinnately cut foliage is an attractive burgundy and green. Preliminary observations have found it to be only slightly marred by leaf roll-necrosis and free of mildew, although all seedlings of this cross are not mildew resistant. Since all selections of *S. × diversifolia* do not rebloom to the extent 'Nouveau' did last autumn, it is possible that the characteristic is not consistent; but an autumn-flowering lilac with burgundy fall foliage would be unusual and highly desirable.

Syringa × hyacinthiflora — see *S. oblata*

Syringa josikaea

The purple flowers of this Hungarian native open ten days to two weeks after those of the common lilac. *S. josikaea* is a very hardy plant, even to Zone II. (3) It grows to 12 feet, and has an upright, open habit. The attractive leaves, unlike those of the common lilac, are elliptic, glabrous above, and closely resemble those of the genus *Prunus*. They are resistant to mildew and leaf roll-necrosis.

Not a beautiful plant, the Hungarian Lilac has proved itself as a good parent in hybridization. Some very fine late flowering lilac cultivars have *Syringa josikaea* in their background. Of the several listed here, all were introduced by the University of New Hampshire, are resistant to mildew and apparently to leaf roll-necrosis.

'Agnes Smith' — single, white

'James Macfarlane' — single, pink (a true pink)

'Nellie Bean' — single, purple

Syringa julianae

This multi-stemmed but non-suckering shrub is usually a 6- to 8-foot mound of slender branches. Hardy to at least Zone V, it blooms with the common lilac. Unlike *S. vulgaris*, its pale-lilac panicles appear from lateral as well as terminal buds, making the flower clusters appear much larger. The small leaves are not troubled by mildew, but have exhibited slight leaf roll-necrosis.

The cultivar 'Hers Variety' has gracefully arching branches that are more weeping than those of any other lilac. This cultivar, when grafted on a 5- or 6-foot standard, makes an absolutely stunning patio plant.

Syringa laciniata

Formerly known as *S. persica* var. *laciniata*, the Cutleaf Lilac is now considered to be a true species, and *S. × persica* a hybrid. The leaves of *S. laciniata* are deeply lobed and present a dainty, feathery appearance; they also are resistant to mildew and leaf roll-necrosis.

This Chinese native is hardy to Zone V and forms a graceful many-stemmed, non-suckering 6-foot mound of a shrub. Pale lilac flowers are produced in season with *S. vulgaris*. Because they break from lateral and terminal buds, the small clusters of flowers often cover 18 or more inches of the branch tips.

The unique foliage, attractive flowers and graceful habit make this lilac a favorite of all who know it.

Syringa meyeri

S. meyeri was unknown to the western world until 1908 when F. N. Meyer of the U.S.D.A. found it being cultivated in China. Purple-lilac flowers grace this handsome lilac that blooms in season with *S. vulgaris*, but unfortunately lacks its fragrance. The foliage is small, less than 2 inches long, and is not troubled by mildew or leaf roll-necrosis. A multi-stemmed, compact shrub not usually more than 6 feet tall and as broad, it is hardy to Zone II. (3) Specimens at the Morden Arboretum, Morden, Manitoba, are given a hardiness rating of 9 and 9.5 on a scale of 10.

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The correct name of a cultivar of *S. meyeri* known in the nursery trade as *S. palibiniana*, and “Dwarf Korean Lilac,” (but in reality from China) has been the subject of much confusion. Consternation regarding the correct name of this cultivar prompted me to write Peter S. Green, Keeper of the Herbarium, Royal Botanic Gardens, Kew, England. Mr. Green, a former Arnold Arboretum staff member, is probably the world’s foremost authority on the taxonomy of the genus *Syringa*. His reply follows:

S. palibiniana in a strictly taxonomic sense is a synonym of *S. patula*, and the popular dwarf lilac bearing this name, which is in widespread cultivation, is a misidentification. I believe it to be a cultivar of *S. meyeri* and intend to call it cv. ‘Palibin’.

More compact than the type, ‘Palibin’ can, with a little pruning, be maintained at 3 feet in height. A more formal approach would be to graft it high on a standard. Potted up, this lilac might well be used as a patio plant. It is so hardy that, in the vicinity of Boston, one might get by with only a minimum of winter protection. Bags of leaves or a mound of wood chips protecting the root ball probably would be sufficient. If your climate is colder, or if your patio is a raised wooden deck where the root ball would be exposed to cold air from underneath, it would be safer to plunge the pot in the vegetable garden or other convenient spot for the winter.

Syringa microphylla

S. microphylla is a most handsome small shrub; its height is usually 6 feet and it may grow to be twice as wide. The ovate, mildew-resistant leaves are usually less than 2 inches long, giving the plant its common name, the Littleleaf Lilac. Unfortunately, the leaves are somewhat susceptible to leaf roll-necrosis. The flowers of the species are a light pink or pale lilac color. They open at the same time as the common lilac and frequently rebloom in August or September. This second bloom is somewhat sparse and not really significant in the landscape, but in late summer it is most enjoyable to have a vase full of these fragrant lilac blossoms gracing the dinner table. The deep pink flowers of the cultivar ‘Superba’ are even more effective, but its foliage seems more likely to display leaf roll-necrosis than the species. *S. microphylla* has proved itself hardy in Zone III and survives in Zone II. (3)

Syringa oblata

S. oblata closely resembles the common lilac, but blooms ten days to two weeks before it, usually about May 10 in Boston. It is best known by the varieties *S. oblata* var. *dilatata* and *S. oblata* var. *gir-*



Syringa microphylla.

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aldii. Neither one of these is exceedingly beautiful in and of itself, but each, when crossed with *S. vulgaris*, has proved to be an excellent parent. This cross has given us the hybrid race *S. × hyacinthiflora*, which has greatly extended the flowering season.

Syringa × hyacinthiflora

S. × hyacinthiflora includes hybrids between *S. vulgaris* and two varieties of *S. oblata* — *S. oblata* var. *dilatata* and *S. oblata* var. *giraldii*. A number of cultivars of this group are available. Closely resembling *S. vulgaris* in appearance and fragrance, they flower a week or ten days earlier. They are very hardy, many of them having been bred at Dropmore Nursery, Dropmore, Manitoba, Canada, where winter temperatures of -50°F are not uncommon.

The *Syringa oblata* var. *giraldii* hybrids are often rather tall and leggy and benefit by frequent, ruthless pruning. Hybrids of *S. oblata* var. *dilatata* tend to be very broad shrubs, and are apparently less susceptible to leaf roll-necrosis. Although both *S. oblata* var. *dilatata* and *S. oblata* var. *giraldii* hybrids show resistance to mildew, those of the former are usually more resistant.

Some favorite cultivars are:

(D) indicates *S. oblata* var. *dilatata* parentage

(G) indicates *S. oblata* var. *giraldii* parentage

- 'Alice Eastwood' (G) double, magenta
- 'Anabel' (D) double, pink
- 'Assessippi' (D) single, lilac
- 'Doctor Chadwick' (D) single, mauve — nice compact habit.
- 'Esther Staley' (G) single, magenta
- 'Jewel' double, pink
- 'Necker' (G) single, pink
- 'Pocahontas' (D) single, pink

Syringa palibiniana — see *S. meyeri*

Syringa patula

S. patula, formerly known as *S. velutina*, is a tall shrub with an upright habit and pale lilac flowers. Hardy to Zone II, (3) this Korean native has foliage that is resistant to both mildew and leaf roll-necrosis. Although the species is not generally considered to be a horticulturally desirable shrub, it has given rise to an exceedingly beautiful cultivar, 'Miss Kim'.

Professor E. M. Meader of the University of New Hampshire collected seed of *S. patula* in the Poukhan Mountains of Korea in 1947. (8) One seedling, later named 'Miss Kim', became a slow-growing compact shrub with fragrant pale lilac flowers in spring and handsome burgundy-red foliage in the fall. The individual flowers, although somewhat small, are abundantly produced and appear at the same time as the later cultivars of the common lilac.

Syringa pekinensis

Forty-foot trees of *S. pekinensis* have been reported in China where this species is native, but on this continent it is usually a small tree, seldom reaching 25 feet. It is hardy at least to Zone III and what is probably the oldest specimen in the New World is maintained in Canada by the Ottawa Research Station. Their 76-year-old plant was grown from seed obtained from the Arnold Arboretum in 1902. The tree now approaches 25 feet in height and has a canopy of about 30 feet. The two main stems are 12 and 15 inches in diameter respectively and the bark is attractive and slightly exfoliating. (2)

The degree to which the bark exfoliates varies greatly between specimens. Some trees at the Arnold Arboretum show little or no exfoliation, while others display masses of orangey-brown bark strips from all but the oldest branches. The two plants with the most attractive bark, numbers 21634 and 21635-B, were both collected as

Syringa patula 'Miss Kim'. Photo: H. Corrow, courtesy of University of New Hampshire.

seed by Joseph Rock in 1926. Number 21634 is quite a bit broader and has a larger trunk than the latter; both approach 25 feet and may be taller. Their habit is reminiscent of that of an apple tree and they might be recommended for use anywhere a small low branching tree would be appropriate.

In the vicinity of Boston this lilac flowers about June 15. The creamy white flowers have a privet-like fragrance and closely resemble those of the other tree lilac, *S. reticulata*, with which it blooms. The foliage of this species is attractive and resistant to mildew. Some specimens are reported to have leaf roll-necrosis, while others appear to be resistant.

The exfoliating bark of this species offers year-round interest and makes the bare winter branches attractive. Because seedlings have varying bark characteristics and varying degrees of resistance to leaf roll-necrosis, only selected plants should be propagated and those, asexually.

The cultivar 'Pendula' is available, but unfortunately is not very pendant.





Exfoliating bark of Syringa pekinensis. Photo: J. Alexander.

Syringa* × *persica

S. × persica is a handsome, many-stemmed shrub about 6 feet in height and as much or more in width. Never found in the wild, it is apparently a hybrid that perhaps originated in the gardens of Persia, where it was cultivated for centuries. *S. laciniata*, which was formerly known as *S. persica* var. *laciniata*, is now considered to be one of the parents. The many small clusters of lilac flowers originate from both terminal and lateral buds forming a huge inflorescence that may extend 18 or more inches from the branch tip. These flowers are produced so abundantly that they weigh down the branches into graceful arches. The Persian Lilac blooms about the same time as the common lilac, but lacks the pleasant fragrance of the latter.

S. × persica is hardy to Zone II (3) and has shown good resistance to mildew and leaf roll-necrosis. The foliage and flowers are both small, but the number of flowers and the graceful appearance of this shrub make it easy to see why it is as valuable to today's gardens as it was to those of long ago.

Syringa potanini

First discovered in 1885 in Kansu, China, by the Russian explorer Potanin, *Syringa potanini* is a large shrub approaching 10 feet in height and as wide as it is tall. A non-suckering, multi-stemmed plant, it has small, densely pubescent leaves that are resistant to mildew but not to leaf roll-necrosis.

When the common lilac is in bloom, the Potanin Lilac abounds with fragrant pink flowers held in open erect panicles, and like *S. microphylla*, *S. potanini* produces a second, less abundant flush of flowers in late summer. Hardy to Zone V, this species has long been one of my favorites; it does best with plenty of space and clean air.

Syringa* × *prestoniae

In 1920, Isabella Preston of the Dominion of Canada, Central Experimental Farm, Ottawa, crossed the species *S. villosa* and *S. reflexa*, giving us the hybrid race *S.* × *prestoniae*. The result of this cross was the combination of some of the best qualities of both parents, greatly increasing the number of late lilacs.

Many people are prejudiced against the late lilacs because, in their opinion, late lilacs neither look nor smell like what a lilac should. The heavily veined leaves are elliptic and the flowers, if fragrant, hint at a scent of privet. I have found however, that there is a secret to liking these lilacs, and that is not to look at them as lilacs, but as pretty shrubs in their own right.

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The Preston lilacs bloom about ten days to two weeks after the common lilac. Hardy to Zone II, they are non-suckering shrubs that often reach 8 to 10 feet in height. The not-very-fragrant flowers of most cultivars are usually pinkish-lilac colored. Some cultivars, like 'Fountain', have gracefully arching branches similar to *S. reflexa*; others are much more upright, like *S. villosa*; an example would be 'Isabella'. The foliage of most is large and coarse, not very attractive, but usually resistant to mildew and leaf roll-necrosis.

Since Miss Preston's time, others have duplicated this cross and of the following recommended cultivars, those marked with an * are the result of the work of others.

'Fountain' single, pink

*'Hiawatha' (Skinner) single, pink

'Isabella' single, lilac

*'Miss Canada' (Cumming) single, pink

Syringa reflexa

S. reflexa has been most valuable to us as a parent of the hybrid race *S. × prestoniae*. It is a graceful, broad shrub that can reach 12 feet in height. When in bloom, the panicles of pink flowers arch and hang down like those of wisteria. It is this pendant characteristic that gives the species its common name, the Nodding Lilac.

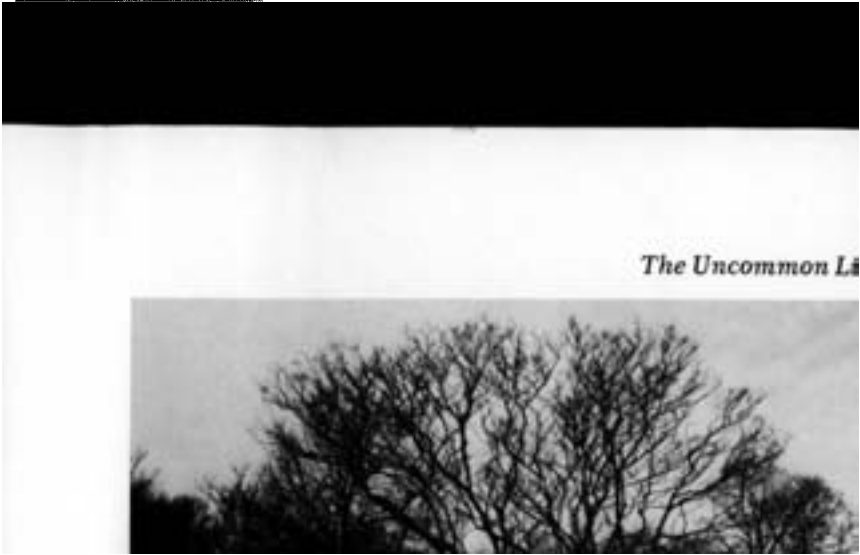
Hardy to Zone III and resistant to both mildew and leaf roll-necrosis, a good specimen of *S. reflexa* can be a beautiful plant. It is apparently a highly variable species; some authors have extolled its virtues while others downgrade it. Plants of *S. reflexa* growing in the Arnold Arboretum are not very thrifty, but Mr. W. W. Oakes of the International Lilac Society has informed me that his plant does well, although the blossoms only last a day or two. He recommends *S. × swegiflexa*, a hybrid between *S. sweginzowii* and *S. reflexa*, for the same habit, but improved flowering qualities.

Syringa reticulata

S. reticulata, the Japanese Tree Lilac, was formerly known as *S. amurensis* var. *japonica*. Sometimes reaching 30 feet, it makes a handsome small tree, but when young it may occasionally need some pruning to keep it single-stemmed.

In 1876 the Arnold Arboretum received seeds of this species from Japan. A beautiful specimen (AA #1111) from this original introduction is alive today in the Arboretum's collection. It is growing close to the road near the *Forsythia* collection.

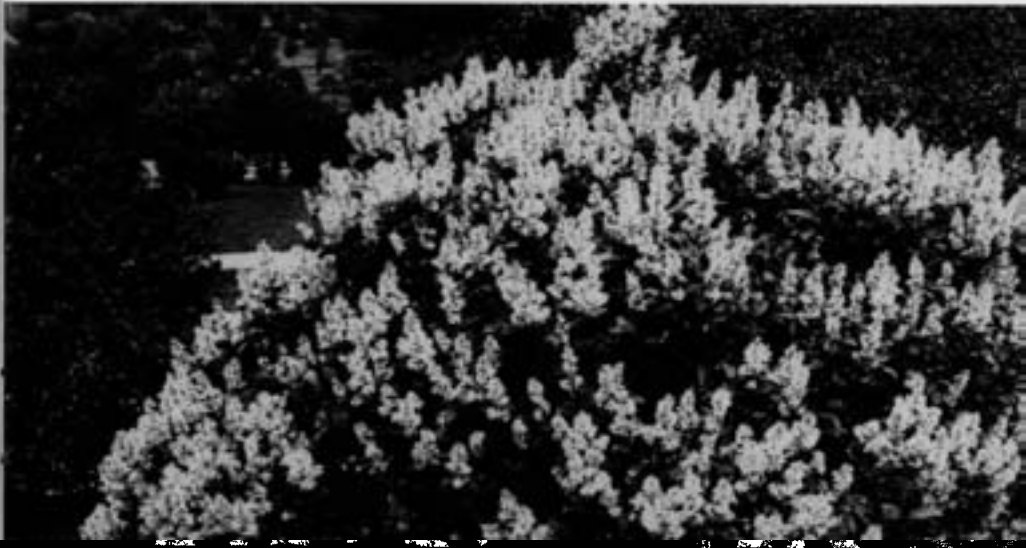
Large clusters of privet-scented flowers cover this tree in June, as it is one of the latest of the lilacs to bloom. Hardy in Zone II, (3) this species has foliage that is resistant to mildew and leaf roll-



Syringa reticulata. Photo: J. Alexander.



Syringa reticulata. Photo: J. Alexander.



necrosis. When the flowers and foliage are gone, the attractive cherry-like bark is visible, making this tree visually pleasing throughout the year.

The variety *mandshurica* blooms slightly before the type, and is shorter and less treelike.

Syringa villosa

S. villosa is a large, upright shrub, as much as 12 feet by 12 feet. Its pink flowers are held in upright panicles that open ten days to two weeks after *S. vulgaris* and give it the common name of Late Lilac. The large leaves are not troubled by mildew or leaf roll-necrosis.

Not a very beautiful or popular shrub, its chief attribute is that it is hardy to Zone II, and most suitable, therefore, for use in wind-breaks on the Northern Plains. But even for that purpose, *S. josikaea* might be a more attractive choice.



Syringa reflexa. From Curtis's Botanical Magazine. Vol. 16, fourth series, 1920.

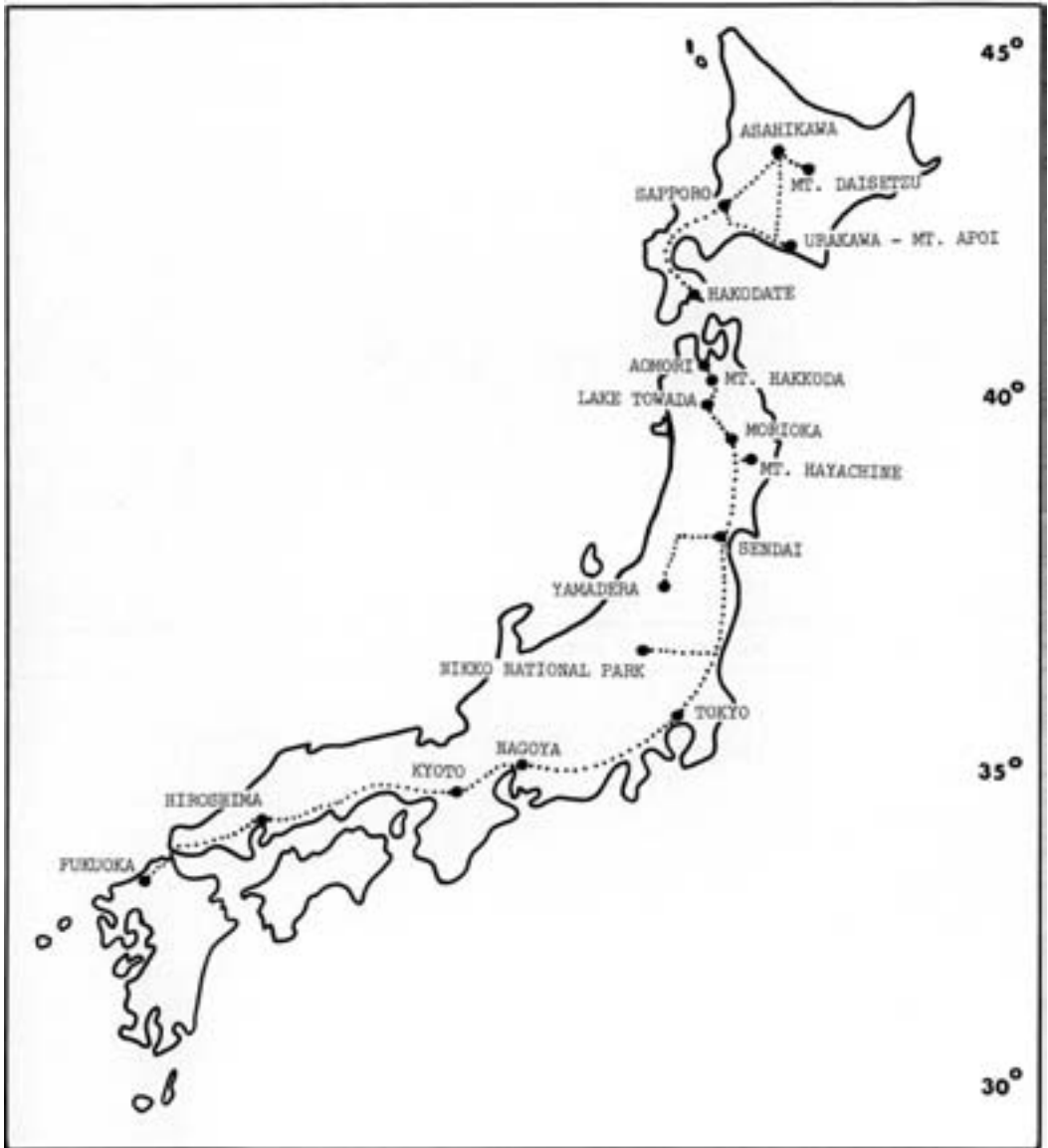
	HEIGHT	HABIT	HARDINESS	COLOR	FOLIAGE PROBLEMS		TIME OF BLOOM	FRAGRANCE
					MILDEW	LEAF ROLL-NECROSIS		
<i>Syringa</i>			ZONE					
× <i>chinensis</i>	8-10 feet	spreading shrubby	II	lilac	susceptible	resistant	with <i>vulgaris</i>	
× <i>diversifolia</i>	8-10 feet	open	VI	pale lilac	some resistance	slight	before <i>vulgaris</i>	yes
<i>josifaea</i>	12 feet	upright	II	purple	resistant	resistant	10 days to 2 weeks after <i>vulgaris</i>	slight, not pleasant
<i>julianae</i>	6 feet	shrubby	V	pale lilac	resistant	slight	with <i>vulgaris</i>	yes
<i>laciniata</i>	6-8 feet	shrubby	V	light lilac	resistant	resistant	with <i>vulgaris</i>	
<i>meyeri</i>	6 feet	shrubby	II	purple-lilac	resistant	resistant	with <i>vulgaris</i>	no
<i>microphylla</i>	6 feet	shrubby	IV	light pink	resistant	slight	with <i>vulgaris</i> reblooms	yes
<i>oblata</i>								
× <i>hyacinthiflora</i>								
<i>oblata dilatata</i>	10 feet	spreading	III	several	varies with cultivar		before <i>vulgaris</i>	varies
hybrids								
<i>oblata givaldii</i>	12 feet	upright	III	several	varies with cultivar		before <i>vulgaris</i>	varies
hybrids								
<i>patula</i>	8-10 feet	open	II	pale lilac	resistant	resistant	with <i>vulgaris</i>	yes
<i>pekinensis</i>	25 feet	tree	III	creamy-white	resistant	in some seedlings	3 weeks after <i>vulgaris</i>	like privet
× <i>persica</i>	6-8 feet	shrubby	II	lilac	resistant	resistant	with <i>vulgaris</i>	no
<i>potanini</i>	8-10 feet	shrubby	V	pink	resistant	susceptible	with <i>vulgaris</i> reblooms	yes
<i>prestoniae</i>	10 feet		II	several	resistant	some cvs. susceptible	10 days to 2 weeks after <i>vulgaris</i>	like privet
<i>reflexa</i>	12 feet	shrubby	III	pink	resistant	resistant	10 days to 2 weeks after <i>vulgaris</i>	no
<i>reticulata</i>	25-30 feet	tree	II	creamy-white	resistant	resistant	3 weeks after <i>vulgaris</i>	like privet
<i>villosa</i>	10-12 feet	upright	II	pink	resistant	resistant	10 days to 2 weeks after <i>vulgaris</i>	like privet



Syringa prestoniae. Photo: D. Wyman.

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Places visited during Arnold Arboretum collecting trip in Japan.

Japanese Journal

by RICHARD E. WEAVER, JR.

The aim of the Arnold Arboretum's collecting trip to Japan and Korea in the fall of 1977 has already been explained briefly in the January-February issue of *Arnoldia*. The present article will describe in more detail our experiences in Japan; another in the next issue of *Arnoldia* will cover the Korean portion of the trip. Space allows for the description of only the most memorable days, but a detailed itinerary with a list of the plants collected each day appears at the end of the article.

Steve Sponberg and I left Logan International Airport 10:00 a.m. on September 1, and after changing planes in Chicago, headed for Tokyo. Our route took us across Canada's Prairie Provinces, the southern Yukon Territory, and Alaska's Coast Ranges to Anchorage. The views of the ice-clad peaks and glacier-filled valleys were spectacular and we had an enticing glimpse of Mt. McKinley on the horizon. After a frustrating hour at the Anchorage airport, we took off on the long last leg of our trip, arriving at our hotel approximately 15 hours after leaving Boston.

The next morning was spent in the Ginza, the main shopping district, where everything was fascinating, particularly the flower and produce shops. The former featured many standard items, but we found several surprises: One of the most common potted plants was a dwarf form of *Gentiana scabra*, a native Japanese gentian. Other gentians, particularly *G. triflora* var. *japonica*, a bottle-type, were sold as cut flowers. I could hardly believe my eyes when I first saw bunches of *Eustoma grandiflorum* in the shops. This plant is an annual member of the Gentian Family native to the southern United States, but practically unheard of as an ornamental in our country; yet the Japanese had even selected white- and double-flowered forms. Ironically their name for it meant "Chinese Bluebell."

We had been told about the produce shops before we left the United States, but it was still quite an experience to see their selection of magnificent fruits which had been carefully nurtured throughout their development, and were sold as absolutely unblemished specimens, individually wrapped, at exorbitant prices. We found Tokyo in general to be as expensive as expected. For its size it is remarkably clean, and the drivers are unbelievably well-behaved. I cannot remember hearing a horn honk in Tokyo, a marked contrast to any large Latin-American city.

Dr. Katsuhiko Kondo, or Katsu for short, a friend of Steve's from graduate student days at the University of North Carolina, met us in the afternoon. Katsu, now on the staff of Hiroshima University, was to accompany us for most of our trip. We took him to a fine restaurant that featured the best beef I have ever eaten (at prices I would rather forget) and he then took off alone by train to Sapporo on Hokkaido where we would meet again a day hence.

On September 5 Steve and I flew to Sapporo, the capital city of Hokkaido Prefecture which encompasses the whole of the northernmost of Japan's four main islands. As we ascended from Tokyo we had a glimpse of Mt. Fuji above the clouds and smog, and travelling north we tried to spot the places where we would be collecting in a week or so. Katsu was waiting in Sapporo to show us to our hotel, the Washington. It was a fine hotel, but our double room was considerably smaller than any single I had stayed in before. With barely enough room to move about, we looked ahead with apprehension to cleaning seeds in such cramped quarters. We also had our first of many encounters with the last word in the Japanese idea of western-style bathrooms — tiny and completely moulded from a solid sheet of plastic.

After lunch we walked to the Botanic Garden of Hokkaido University, where we had an appointment with the Director, Dr. Tadao Ui. As we approached the Administration Building, we remarked on its New England Colonial architecture, recalling that the University and the Botanic Garden had been set up under the direction of a Professor Clark from what is now the University of Massachusetts at Amherst. Dr. Ui and his secretary were most cordial, and they explained the itinerary they had set up for us, starting immediately with a visit to the Hokkaido branch of the Government Forest Experiment Station on the outskirts of the city. Our host there was Mr. Jun-ichiro Samejima, a vigorous and enthusiastic young man, an expert on *Trillium* who had studied at Vanderbilt University. After considerable effort we explained to him that we were very anxious to do some collecting in the wild.

In the badly cut over forests near the station we had our first good look at a plant that we came to dislike intensely — *Sasa kurilensis* — a 3- to 4-foot bamboo that has become rampant with the widespread clearing of the forests on Hokkaido, choking out everything in its path. Here it was doubly annoying to wade through since it was covered with a fine dust from the erupting Mt. Usu about 40 miles away. But we were finally able to do some good collecting, and Steve was particularly excited by finding both of Hokkaido's magnolias, *M. kobus* and *M. hypoleuca*, with nearly mature fruit.

We returned to Sapporo for a dinner engagement with Dr. Ui and some of his staff. The meal was one that I shall never forget — a traditional multi-course banquet with a great variety of food, much of which we ate with less than gusto. But at least we were able to eat with chopsticks, since we had practiced at home.



The Administration Building of the Botanic Garden of Hokkaido University in Sapporo. The architecture shows the influence of Dr. William S. Clark, a New Englander who helped develop the garden. (All photos are by author.)

The next day we toured the plantings of the Hokkaido Forest Tree Breeding Station and made a few half-hearted collections. We really wanted to collect in the natural forests which we could see only a short distance away. We were told at first that the Nopporo Natural Forest was a reserve, and that collecting was forbidden. We persisted, and finally, under the friendly supervision of Mr. Norio Murano, we were allowed into the forest. Although it had been somewhat cut over, this was the sort of place we had been dreaming of — a rich forest dominated by trees of such familiar genera as *Acer*, *Ulmus*, *Quercus*, *Magnolia*, *Styrax*, and *Carpinus*. Here we found one of the main objectives of our trip, *Skimmia japonica*, growing near the northern limit of its range. The herbaceous vegetation was fantastic, and I could imagine what the place must look like in the springtime. We found orchids of several genera, many ferns, trilliums and their strange relative *Paris*, Jack-in-the-pulpit, baneberries, etc. I really love such plants and I could hardly contain myself.

Later, after lunch and a tour of the adjacent, ultra-modern museum commemorating Hokkaido's centennial, we set out across the city for Mt. Moiwa, a low peak where Charles Sargent had collected nearly a century before. We ascended the mountain by cable car and had a close look at the forest canopy below with the whitish flower clusters of *Aralia elata* and the huge leaves of *Magnolia hypoleuca* standing out conspicuously. The descent was an easy trail through a forest basically similar to that at Nopporo, but our collecting was limited since daylight was fading fast.

The next morning after touring the botanic garden, we thanked Dr. Ui profusely and boarded the train for Urakawa on Hokkaido's southeastern coast. The countryside was beautiful, reminiscent in many places of southeastern Pennsylvania where I grew up. As we approached Urakawa, the Hidaka Range, among Japan's oldest mountains geologically, came into view. We tried to pick out Mt. Apoi, a peak isolated from the main range that we were to climb the following day. Mt. Apoi is a remarkable mountain, slightly more than 800 meters high, but with an alpine zone and several endemic plants at its summit. The low alpine zone is due to the almost continuous fog that keeps the mean temperature low throughout the year.

We were met by a very jovial Mr. Minowa and ushered around to meet various local governmental and forestry officials. Evidently westerners do not often visit Urakawa. Quite exhausted, we were finally taken to our inn, the only *ryokan* (or Japanese inn) in which we stayed the entire trip. I was shown my room but told that I could not occupy it because dinner was being set up. I insisted on a bath, and upon returning found a seafood feast set up, attended by Mr. Minowa, the governor of the district, and Mr. Uchida, our guide for the following day. We had a most enjoyable evening, discussing all sorts of problems through Katsu's translation, while our cups were continually refilled with sake and other libations.

We mostly looked at our breakfast the next morning, particularly the bowl of fern fiddleheads with what looked like bacon but turned out to be whale meat. Not knowing our condition, the cook was disappointed that we had not eaten more. The next morning we had eggs.

Much too early on a dreary September 8 we set out for Mt. Apoi. The rain was light but persistent, and soaked us through, except for Mr. Uchida who had a distinct knack for remaining dry. We drove to the edge of the forest and proceeded to climb. The vegetation was basically similar to that at Nopporo. *Viburnum furcatum* was abundant and laden with its beautiful red drupes and we could not resist making a large collection. Several shrubs new to us added a bit of excitement. Our first large-leaved rhododendron, *R. brachycarpum*, was common at lower elevations, and although the capsules were green and scarce, we collected a few. Other members of the Heath Family included a species of *Menziesia*, a genus of deciduous shrubs

with flowers resembling those of blueberries, and *Vaccinium oldhamii*, our first of many encounters with this beautiful blueberry that now was taking on its burgundy autumn coloration. The maroon fruits in drooping clusters were just ripe enough for collection.

In a clearing along the trail I stopped to photograph a clump of the very beautiful *Ophelia tetrapetala* var. *yezoalpina*, an annual member of the Gentian Family with pale blue, spotted flowers. Focusing with a wet view-finder and fogged-up eyeglasses was frustrating enough, but the last straw was to find that I was out of film after taking just one picture. Soon afterward, Steve discovered that he was out of film as well. (The day was not a good one for photography anyway.)

The climb was an easy one, and the trail was good. As we ascended, the deciduous trees became admixed with *Pinus parviflora*, the Japanese White Pine. This area is one of the few places on Hokkaido where this species is native. We stopped to collect the "berries" of *Juniperus chinensis* var. *sargentii*, a low growing juniper, and soon came abruptly out of the forest and onto a very welcome, dry trail-side shelter perched at the foot of a treeless ridge leading to the summit of the mountain. Exciting new plants were all about us. We soon made collections of dwarf forms of *Berberis amurensis* var. *japonica* and *Lespedeza bicolor*, the latter frustrating us as before with immature fruits, but we collected them anyway. A mountain ash, *Sorbus sambucifolia* var. *pseudogracilis*, only 3 feet tall with clusters of large red-orange berries, was one of the most beautiful ones I had ever seen.

The climbing now became harder and we were lucky to find many interesting plants. The Japanese Stone Pine, *Pinus pumila*, a low, timberline species, was abundant, but we found few cones with seeds. We did make a good collection of *Rhododendron dauricum*, one of our favorite harbingers of spring back at the Arnold Arboretum, as well as of a prostrate form of *Potentilla fruticosa*, the Bush Cinquefoil. Well below the summit were 2-foot fruit-laden shrubs of one of our main objectives, *Betula apoensis*, a dwarf birch restricted in distribution to this mountain. With the summit yet a half-mile distant and the clouds clearing to reveal magnificent views of the Hidaka Range and the Pacific, we cursed our lack of film and decided to go no further.

Mr. Uchida suggested another route down, following the mostly treeless scrub for quite a distance. We soon found *Ilex rugosa*, *Leucothoe grayana* var. *oblongifolia*, *Ledum palustre* var. *diversipilosum*, *Juniperus communis* var. *nipponica*, and a large selection of my favorite group of herbaceous plants, the Lily Family. In a small area I found at least two species of *Veratrum* (false hellebore), *Lilium medeoloides*, *Tofieldia nutans* var. *kondoi*, an endemic species, *Convallaria keiskei*, the Japanese Lily of the Valley, and *Clintonia uden-sis*, with beautiful black fruits.

We worked our way down, with Mr. Uchida in the lead making

various noises to warn bears of our presence (The Eurasian Brown Bear is still relatively common here.). After a very late lunch at Mr. Uchida's headquarters, the Experimental Garden for the Department of Forestry of the Hidaka District, we looked at the plantings surrounding the station. Many exotic trees were being tested there as candidates for a reforestation program, but native plants were well represented as well. Our best collection was of undoubtedly the most beautiful species of *Euonymus* I have ever seen, *Euonymus macropterus*, a small tree covered with long, pendent red fruits, each segment with a slender wing.

The next morning Mr. Yojuuro Sato, a college friend of Katsu's who is now teaching high school on Hokkaido, joined us for a short collecting trip to one of the river valleys northwest of Urakawa. The rain was heavy and the plants mostly unexceptional. We did have our first encounter with *Staphylea bumalda*, the Japanese species of bladdernut, growing almost as a weed shrub. But it was wonderful to gaze over the forests and to see the treetops here and there splotched with the white-variegated leaves of *Actinidia kolomikta*, a woody vine closely related to *A. chinensis*, the plant that produces the familiar "Kiwi Fruit" we can occasionally buy in supermarkets in the United States.

After expressing our sincerest thanks and fond farewells to our hosts in Urakawa, we headed north on a scenic, narrow road toward Asahikawa in the center of Hokkaido. Mr. Sato's station wagon was loaded with grapes from his father's orchard — wonderfully sweet small grapes of the cultivar 'Delaware' from the United States, but seedless because each inflorescence had been hand-dipped in gibberellic acid. We had a feast, both of these grapes and hybrid melons which were like a cross between a cantaloupe and a honey-dew.

In the late afternoon we stopped for an hour or so at the Tokyo University Forest in Hokkaido, an experimental station near the town of Yamabe. Our most gracious host, Mr. Kurahashi, served us a rather untraditional Japanese tea complete with tomatoes and corn on the cob, fresh from the garden, before showing us around the plantation. Many native woody plants were represented, and we collected our first material of *Alangium platanifolium*, a plant very high on our list of desiderata. This low, shrubby plant with trilobed leaves and black fruits, in a family close to the dogwoods, is very rare in cultivation in the United States.

Another item of interest was a fine row of the true Monarch Birch, *Betula maximowicziana*. This plant has recently caused quite a stir in the United States since it has been touted as a white-barked birch resistant to the devastating bronze birch borer. Unfortunately the trees on which the observations were made were misidentified; as it turns out, most were the so-called Monarch Birches in the United States, including those at the Arnold Arboretum. The plant is resistant to the borer, but it does not have really white bark. Those



Mr. Akio Kurahashi and one of his assistants at the Tokyo University Forest in Hokkaido, preparing a rather untraditional Japanese tea.

we had seen in the wild had mostly silver-gray bark, although those here in Hokkaido were the best we encountered in Japan, with bark approaching white.

Just before we left we were ushered into what turned out to be the strangest museum I have ever seen: A dank, dark, concrete room lined with ceiling-high trunks and the corresponding cross-sections of what used to be magnificent specimens of the most important forest trees of Hokkaido. Who would have imagined two species of alders (*Alnus japonica* and *A. maximowiczii*) with trunks nearly 3 feet in diameter?

The last part of our journey, with the sun setting, was most enjoyable: Small towns; rolling farmland with fields of rice and melons growing beautifully at a latitude further north than that of Boston; the volcanic massif of Tokachi with steaming vents; and finally Asahikawa, Hokkaido's second largest city, pleasant and bustling, with a good room and a wonderful meal in a non-tourist restaurant complete with a traditional Japanese folk-singer.

To me, the next day, September 10, was the best of the trip. Our objective was Daisetsu-san National Park, encompassing the Daisetsu massif with one of the peaks, Asahi-dake, at 2345 meters the highest point on the island. As soon as we reached the outskirts of Asahikawa, the mountain loomed before us, the steaming vents plainly visible. Soon after we started the drive up the mountain, we saw a plant of *Sambucus sieboldiana* heavy with fruit. This elderberry is closely related to our own native *S. pubens*. A bonus at this stop was *Spiranthes sinensis*, one of the loveliest wildflowers we encountered. This orchid, the only Japanese species of *Spiranthes*, closely resembles our native ladies tresses, except that the flowers, arranged in a long spiral spike nearly 10 inches long, are pink rather than creamy white.

Climbing higher, we drove through a forest completely different from those we had seen before. The aspect was much like that of the subalpine forests of the western United States. Conifers, primarily *Picea jezoensis*, were mixed with deciduous trees, the commonest being *Acer ukurunduense* and *Betula ermanii*. The road ended at the ski lodge, and we had to rely on a cable car to take us to the alpine zone.

The views from the cable car were such that we could hardly contain our anticipation. For the most part the Japan we saw is often beautiful, but seldom spectacular. However, the view after we left the car and walked over a small rise was breathtaking. The peaks themselves set the backdrop, with the steam from the fumaroles near their base rising eerily to blend with the fog above. The half-mile in between was a gently rolling plateau covered with alpine vegetation. The edges, basically the treeline, were rimmed with *Pinus pumila*, *Acer ukurunduense* and *Sorbus matsumurana*, the last two with their autumn foliage brilliant orange and scarlet.

Although *Gentiana triflora* var. *japonica*, a bottle-type gentian with flowering shoots nearly 2 feet tall, added a touch of color, very few plants in the alpine vegetation were in bloom at this season. The vegetation is dominated by shrublets of a wide variety of species, mostly members of the Heath Family. The most conspicuous plant, however, was a species of the Rose Family, *Sieversia pentapetala*, a woody segregate of *Geum*, whose fuzzy fruit aggregates stood out above the green.

The alpine zone of Mt. Daisetsu is carefully patrolled by uniformed rangers, and we were warned by our hosts that we must not collect any plant material. Thoroughly frustrated, we were poking about on our hands and knees when one of the rangers came to investigate. As it turned out, he had a great appreciation for the plants he was protecting. Apparently overjoyed to find kindred spirits, he went about gathering seeds for us. After about an hour we decided to climb up for a closer look at the fumaroles, and when we returned,

The alpine zone of Mt. Daisetsu, showing the active fumaroles. The shrubs in the foreground are Pinus pumila and Sorbus matsumurana.

our ranger friend had several more packets of seeds, neatly labeled in Japanese, waiting for us.

Some of the plants we collected were as follows: Several species of *Vaccinium*, including *V. vitis-idaea*, the Mountain Cranberry, an old friend from the alpine areas of New England, and *V. praestans*, a prostrate species with large, red fruits; *Gaultheria miqueliana*, a relative of our Checkerberry but with large white fruits; *Loiseluria procumbens*, the Alpine Azalea of the New Hampshire mountains, but here growing more upright; *Phyllodoce nipponica*, still with a few pink flowers; *Rhododendron aureum*, a dwarf, yellow-flowered species that I can hardly wait to see in bloom; *Harrimenella stelleriana* (a segregate of *Cassiope*) and *Arcterica nana*, two dwarf species of the Heath Family; and a lovely alpine blackberry (*Rubus*) which we could not identify.

As we worked our way down the mountain we were appalled to find that *Sasa kurilensis*, the scourge of Hokkaido, was spreading even into the lower areas of the alpine zone. The subalpine forest was lovely, very open with many herbaceous plants of great interest, although few were in bloom. The most conspicuous was *Lysichiton camtschatcense*, a member of the Arum Family whose western Ameri-

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can counterpart is called the Western Skunk Cabbage. The large leaves resemble those of our native Skunk Cabbage of a related genus. The ripe fruit aggregates were all that remained of the inflorescence, with its large white, calla-like spathe.

In our searches on Mt. Daisetsu we failed to find one of our objectives, *Bryanthus gmelinii*, a rare, endemic Japanese shrublet of the Heath Family. But Mr. Sato knew of a nursery near the base of the mountain that specialized in local alpiners. We paid the establishment a visit on our way back to Asahikawa, and among many other interesting plants we found a *Bryanthus*.

The next day, after a few hours of collecting, we boarded the train for a seven-hour trip to Hakodate, Hokkaido's main port and one of the first Japanese cities opened to foreign commerce in the late 1850's. That night Katsu and I took a cable car to the top of Mt. Hakodate, overlooking the city, for a magnificent view. Our collecting the next day, in the coastal scrub near the city, was interesting but we encountered few new plants.

On September 13, we boarded the ferry for Aomori on Honshu, the Japanese "mainland." The boat was spacious and comfortable, a good thing since the trip took about four hours. Dr. Kankichi Sohma and one of his graduate students, Mr. Masamichi Takahashi, our hosts for the second portion of our trip, met us when we landed. Katsu had to return to Hiroshima, so we made arrangements for meeting him again in Nagoya before bidding farewell.

Dr. Sohma, a palynologist at Tohoku University in Sendai, was driving a university jeep into which we loaded all our gear before heading south for Mt. Hakkoda. Our destination was Tohoku University's biological laboratory on the slopes of the mountain. The laboratory itself turned out to be a delightful place. The main building was rustic inside and out, with a large western-style dormitory room, a small kitchen, and a traditional style room which we used as a combination working-dining room. Surrounding the building was a small but fine botanic garden, with plants native to the region interspersed amongst the natural vegetation. Most of the plants were labeled with their Japanese and Latin names.

Dr. Sohma suggested that we take a bath in the hot springs nearby before supper. As he said that it was one of the few traditional baths remaining in this part of Japan, we were excited and curious. When we got inside the men's dressing room we found a window leading directly to the comparable room for women so we suspected that the baths were coed. Inside the baths themselves, the scene was eery in the extreme — a huge room paneled with rough-hewn timbers, dimly lit and very steamy, smelling strongly of sulphur, with two very large pools filled with milky-colored water and mostly old Japanese of both sexes. We slipped into the first bath, whose water had been slightly cooled, and tried to relax. The bath was soothing, and we soon decided to try the other pool, whose water had been heated so

that it was possible for me to stay in only for a few minutes at a time.

Mr. Takahashi left before we did, and when we got back to the laboratory he was busily cooking supper. Since Steve and I had trouble remembering his name, it was suggested that we call him "Hashi," which appropriately was the word for the utensils we call chopsticks. Both Hashi and Dr. Sohma spoke English well and were extremely personable men, so we had a very enjoyable, as well as profitable, time with them.

The next morning, September 14, we climbed Mt. Hakkoda. Like Mt. Daisetsu, this is a volcanic massif with several peaks. However, there are no active vents and the hot springs are about the only evidence of volcanic activity. The trail we took led to the highest peak, at 1585 meters above sea level. This was a good day for collecting, since we encountered many new plants. The vegetation at the beginning of the trail was mostly deciduous forest with *Sorbus commixta*, *Acer tschonoskii*, *Acer ukurunduense*, *Cornus controversa*, and *Acanthopanax sciadophylloides*; the last, a member of the Aralia Family with large, palmately compound leaves. The shrubs again were mostly members of the Heath Family, including several azaleas, blueberries and species of *Menziesia*; in addition, *Ilex sugerokii* var. *brevipedunculata*, an evergreen holly, and *Lindera umbellata* var. *membranacea*, a relative of our spicebush, were abundant. As we climbed, *Abies mariesii*, a species of fir with dull purple cones, became prevalent. Mt. Hakkoda is the northern limit of its distribution.

This day we also had our first of many encounters with the phenomenon of Japanese high school students on holiday. Particularly in the fall, students from all over Japan, dressed in their black and white uniforms, are taken en masse on field trips. This day they were rather like ants and just as annoying. Besides detracting from the pristine beauty and seeming isolation of Mt. Hakkoda, they wasted much of our time by causing us to step off the narrow trails as they passed in seemingly unending streams.

We persevered, and finally lost the students as we neared the summit. Unfortunately, at the same time the weather deteriorated. The gray skies finally did more than threaten, and in the chill at the top of the mountain sleet fell as we tried to view the old crater through the mist.

The woody alpine vegetation was similar in composition to that on Mt. Daisetsu, except that here *Phyllodoce aleutica*, with creamy flowers, replaced *P. nipponica*. The herbaceous flora was quite new to us, however. On our descent we came across a large area where the snow had melted relatively recently, and many plants were in bloom. One of the most wonderful was *Shortia soldanelloides*, its pink, frilled flowers reminiscent of those of its famous American counterpart. This rare and notoriously difficult plant in American gardens was almost a weed all over the alpine zone on Mt. Hakkoda, even growing in the middle of the trail. Quite common also was a



Phyllodoce aleutica, a dwarf shrub of the Heath Family in the alpine zone on Mt. Hakkoda in northern Honshu. The urn-shaped, creamy-colored flowers are about 3/8-inch long.

brilliant blue alpine gentian, *Gentiana nipponica*, and a relative of the gentians, *Fauria crista-galli*, with its clusters of white star-shaped flowers and kidney-shaped basal leaves. *Metanartheceum luteo-viride*, an endemic Japanese member of the Lily Family, and a diminutive primrose, *Primula nipponica*, were in abundant fruit and I could not resist collecting them.

In the subalpine zone we came upon vast areas of a very unusual type of vegetation — a peat bog almost completely covered with a mat of grasses and sedges but interspersed here and there with orchids and several members of the Lily Family. Traversing the area was easy because of a very extensive and beautifully constructed boardwalk. Occasionally we came upon clumps of shrubs, mostly *Pinus pumila* and a natural hybrid, *P. × hakkodensis* (*P. pumila* × *P. parviflora*). Our most exciting find was a dwarf witch hazel, *Hamamelis japonica*. Hopefully, the seeds we collected from it will produce equally dwarf plants.

Heading south the next day, our ultimate destination being Sendai, we paused to make a collection of *Tsuga diversifolia*, one of the two Japanese hemlocks, which we found growing at the northern limit of its range. At Tsuta Hot Springs on the lower slopes of Mt. Hak-

Drs. Stephen Spongberg and Kankichi Sohma in the beautiful forests typical of the Lake Towada area on northern Honshu. The commonest trees in the forest were Magnolia hypoleuca, Fagus crenata, and Aesculus turbinata.

koda, we stopped longer to admire the truly magnificent forests where the dominant trees were *Fagus crenata*, (a species of beech), *Magnolia hypoleuca*, and *Aesculus turbinata*, the Japanese species of horse chestnut. All of these species have a smooth silvery-gray bark, and the last two have huge leaves. The undergrowth was sparse and open, everything combining to make a forest of uniquely beautiful character from the floor to the canopy. It was perfectly quiet and beautifully sunny, devoid of tourists or schoolchildren — all in all a wonderful experience for one who loves forests.

Still further south we collected along the shores of Lake Towada, a deep and very blue lake occupying the caldera of a long-gone volcano, much like Crater Lake, Oregon, in our own country. The forests here were similar but not quite so beautiful as those described above.

After spending the night in the city of Morioka, we collected part of the next day (September 16) on Mt. Hayachine, a non-volcanic mountain with serpentine rocks and several unusual plants. On our way to Sendai we stopped to inspect a traditional thatch-roofed farmhouse, a rare sight in Japan these days.

For the next several days our base was Sendai. We went to several interesting localities with Dr. Sohma and/or Hashi, but space will allow the discussion of only one, the northeastern part of Nikko National Park. This day, September 17, did not yield a large number



of collections, but the ones we did make were among the most interesting of the entire trip. The forests of the central part of Honshu are very rich, many of the more southern elements reaching their northern limit here. Within a few miles of Kashi Hot Springs, we found nine species of maples, unfortunately with very few in fruit. Here we saw our finest wild specimens of *Stewartia pseudocamellia*, but again without fruit. We did manage to make good collections of *Euptelea polyandra*, an unusual tree of uncertain classification, and one rare in cultivation but here growing almost as a weed. Our main objective this day was *Trochodendron aralioides*, a primitive, evergreen tree with its northernmost high elevation station in this area. To reach it we had to climb nearly to the top of Mt. Kashi on an easy trail through beautiful forest. On the way were a number of plants of *Magnolia salicifolia*, of great interest to Steve because these were shrubby, while most plants of this species cultivated in the United States are treelike. Reaching the ridge, we could not help but notice the similarity in the aspect of the vegetation to that of like situations in the Appalachians. Only pines were absent. We found the *Trochodendron* as the sun began to get quite low and we searched desperately for fruits. Finding none, in desperation we dug up a few rooted layers. As we were about to head down we found a few plants of another broad-leaved evergreen that none of us could identify. A few layers of this "mystery plant" were taken also, and we will have to wait until it flowers to find out what it is.

The morning of September 22 was our last in Sendai. Our farewell to Hashi and Dr. Sohma was a sad one since we had become good friends. I still look back in amazement at the time and effort these two men put into helping two complete strangers.

Most of the two days in Tokyo were spent packing things to be sent home as we would be taking the train to Sukuoka, on the island of Kyushu, before catching a flight for Seoul. Our party had now grown to three with the arrival of Steve's wife on September 24.

The Japanese trains were as efficient and comfortable as universally reported, especially the Shinkan-sen or Bullet Train, with a maximum speed of 120 miles per hour. On September 26 we arrived in Nagoya where Katsu and his father were waiting for us. We visited the Nagoya Botanical Garden briefly and were able to collect a few plants in a patch of natural woodland there. The next day we visited the elder Kondo's garden — a remarkable place. Mr. Kondo is interested in carnivorous plants and he has amassed a very good collection which he grows in a natural boggy area about an hour's drive from Nagoya. We were amazed to find Venus Flytraps growing happily and reseeding themselves, as well as many species and hybrids of our native pitcher plants.

On the evening of September 27 we arrived in Kyoto, spending the next day sightseeing in this wonderful city. Always on the go, we took the train to Hiroshima on September 29 and spent an en-

joyable afternoon at the Botanic Garden there. At that time the garden was less than a year old and it was hard to believe the progress in such a short time. It features the largest conservatory in all of Japan, and it is well planted with remarkably well established plants; even orchids have started reseeding themselves. The research program spearheaded by the Director, Mr. Karasawa, an authority on terrestrial orchids, is well established; so is the educational program which, we can proudly say, was developed with help and advice from the Arnold Arboretum.

On September 30 we met Katsu's young family before saying goodbye and leaving for Fukuoka. It was a sad moment. Besides providing more assistance than we can ever adequately thank him for, Katsuhiko Kondo has become a good friend.

Itinerary in Japan with plants collected at each site

2 September — Arrived in Tokyo.

3 September — Sightseeing and shopping in Tokyo. Met Katsuhiko Kondo.

4 September — Took bus tour to Nikko and Nikko National Park.

Acer japonicum

Weigela hortensis

5 September — Flew from Tokyo to Sapporo. Visited botanical garden of Hokkaido University in Sapporo, and Government Forest Experimental Station, Hokkaido Branch, near Sapporo.

Acer mono

Magnolia hypoleuca

Acer palmatum

Magnolia kobus

Actinidia arguta

Quercus mongolica

Aralia cordata

Vitis coignetiae

6 September — Visited Nopporo Natural Forest near Sapporo.

**Abies sachalinensis*

**Photinia villosa* var. *laevis*

Acer japonicum

Picrasma quassioides

**Alnus hirsuta*

**Prunus grayana*

**Alnus japonica*

Prunus ssiiori

**Alnus maximowiczii*

**Rosa acicularis* var. *nipponensis*

**Betula grossa*

Rubus phoenicolasius

Carpinus cordata

Rubus sp.

Cephalotaxus harringtonia var. *nana*

Skimmia japonica

Daphniphyllum macropodum var. *humile*

**Sorbus commixta*

Euonymus oxyphyllus

Viburnum wrightii

Paeonia japonica

— Visited Hokkaido Centennial Museum. Took cable car up Mt. Moiwa, near Sapporo.

Betula ermanii

Vaccinium smallii

Rhus sp.

Vaccinium sp.

7 September — Visited Botanical Garden in Sapporo. Took train from Sapporo to Urakawa. Visited with local officials in Urakawa.

* Cultivated material.

8 September — Climbed Mt. Apoi.

Acer japonicum
Alnus maximowiczii
Betula apoensis
Clintonia udensis
Ilex rugosa
Juniperus communis var. *nipponica*
Juniperus chinensis var. *sargentii*
Ledum palustre var. *diversipilosum*
Lespedeza bicolor
Leucothoe grayana var. *oblongifolia*
Menziesia sp.
Pinus parviflora
Pinus pumila
Potentilla fruticosa
Prunus nipponica

— Visited Experimental Garden for the Department of Forestry of Hidaka District in Urakawa.

**Acer ukurunduense*
 **Euonymus macropterus*
 **Euonymus* sp.

Quercus mongolica
Rhododendron brachycarpum
Rhododendron dauricum
Rosa acicularis
Rubus crataegifolius
Sorbaria sp.
Sorbus commixta
Sorbus sambucifolia var. *pseudogracilis*
Spiraea miyabei
Vaccinium oldhamii
Vaccinium vitis-idaea
Viburnum furcatum
Viburnum sp.
Zanthoxylum piperitum

**Ilex macropoda*
 **Rhododendron albrechtii*

9 September — Collected around Urokorethu, Urakawa Mountain.

Actinidia polygama
Juglans ailanthifolia
Metaplexis japonica
Picrasma quassoides
Prunus sp.

Rubus sp.
Staphylea bumalda
Stephanandra sp.
Tilia sp.

— Traveled by automobile to Asahikawa; enroute stopped at Tokyo University Forest in Hokkaido near Yamabe.

**Abies sachalinensis*
 **Acanthopanax divaricatus*
 **Acanthopanax senticosus*
 **Aesculus turbinata*
 **Alangium platanifolium* var. *trilobum*
Alnus hirsuta
 **Betula platyphylla*
Carpinus cordata
Cephalotaxus harringtonia var. *nana*

**Euonymus planipes*
 **Euonymus sieboldianus*
 **Juglans ailanthifolia*
 **Ribes latifolium*
 **Spiraea cantoniensis*
 **Spiraea* sp.
 **Styrax obassia*
 **Symplocos chinensis*
 **Vaccinium uliginosum*

10 September — Collected on Asahi-dake, Mt. Daisetsu, Daisetsu-san National Park.

Acer ukurunduense
Arctericia nana
Betula ermanii
Empetrum nigrum var. *japonicum*
Euonymus sieboldianus
Gaultheria miqueliana
Harrimanella stelleriana
Ledum palustre var. *diversipilosum*
Loiseluria procumbens
Phyllodoce nipponica
Picea jezoensis
Pinus pumila

Potentilla miyabei
Rhododendron aureum
Rubus sp.
Sambucus sieboldiana
Sieversia pentapetala
Sorbus matsumurana
Spiraea betulifolia
Streptopus sp.
Vaccinium hirtum
Vaccinium praestans
Vaccinium uliginosum
Vaccinium vitis-idaea

11 September — Collected in Northern Plant Garden, Asahikawa.

Alangium platanifolium var. *trilobum*
 **Bryanthus gmelinii*

Caulophyllum robustum
Cephalotaxus harringtonia var. *nana*

* Cultivated material.

Gaultheria adenothrix*Houttynia cordata**Parthenocissus* sp.

— Traveled by train to Hakodate.

*Phellodendron amurense**Prunus ssiroi***Tiarella polyphylla*

12 September — Visited Forest Experiment Station at Ohno, near Hakodate.

Collected in coastal scrub in Akukawa-cho, near Hakodate.

Crataegus jozana (?)*Ilex macropoda**Pinus thunbergii**Quercus dentata**Quercus dentata* × *mongolica**Quercus mongolica*

— Collected along roadside in Mitsumori-cho, near Hakodate.

Ampelopsis brevipedunculata var.*heterophylla**Ampelopsis* sp.*Corylus sieboldiana**Smilax* sp.*Staphylea bumalda**Vaccinium oldhamii**Viburnum dilatatum**Viburnum* sp.*Weigela hortensis**Maackia amurensis* var. *buergeri**Prunus grayana**Viburnum opulus* var. *calvescens**Vitis coignetiae*

13 September — Traveled by ferry to Aomori on Honshu; met Dr. Sohma and Mr. Takahashi. Traveled by jeep to the Mt. Hakkoda Biological Laboratory of Tohoku University; enroute stopped at entrance to Hachimantai-Towada National Park to collect. (Aomori Pref.)

*Akebia trifoliata**Betula ermanii**Sorbus commixta**Tilia miqueliana*

14 September — Climbed Mt. Hakkoda, Aomori Pref.

*Abies mariesii**Acanthopanax sciadophylloides**Acer japonicum**Acer tschonoskii**Acer ukurunduense**Alnus maximowiczii**Arctericia nana**Cornus controversa**Daphniphyllum macropodum* var. *humile**Gaultheria adenothrix**Gaultheria miqueliana**Hamamelis japonica**Ilex sugerokii* var. *brevipedunculata**Lindera umbellata* var. *membranacea**Loiseluria procumbens**Menziesia ciliicalyx* var. *multiflora**Menziesia pentandra**Phyllodoce aleutica**Prunus grayana**Quercus mongolica**Rhododendron brachycarpum**Rubus vernus**Tripetaleia bracteata**Vaccinium japonicum**Vaccinium ovalifolium**Weigela hortensis*

15 September — Collected in vicinity of Mt. Hakkoda Biological Laboratory.

Daphniphyllum macropodum* var. *humile*Ilex leucoclada*

— Traveled by jeep to Tsuta Hot Springs; enroute stopped to collect on slopes of Mt. Hakkoda.

Tsuga diversifolia

— Collected in forest surrounding Tsuta Hot Springs, Aomori Pref.

*Aesculus turbinata**Daphniphyllum macropodum* var. *humile**Hydrangea macrophylla**Ilex leucoclada*

— Drove to Lake Towada and collected in the vicinity. (Aomori Pref.)

*Acer japonicum**Acer mono* var. *mayrii**Aucuba japonica* var. *boreale**Euonymus* sp.*Pterocarya rhoifolia**Vaccinium smallii**Viburnum wrightii**Lindera umbellata* var. *membranacea**Pterocarya rhoifolia**Stachyurus praecox*

* Cultivated material.

— Drove to Morioka to spend the night; enroute did sightseeing around Lake Towada and collected along roadside near Yuze, Akita Pref.

<i>Ampelopsis brevipedunculata</i> var.	<i>Rhus javanica</i>
<i>brevipedunculata</i>	<i>Stachyurus praecox</i>
<i>Berchemia racemosa</i>	<i>Viburnum dilatatum</i>
<i>Lespedeza bicolor</i>	<i>Wisteria floribunda</i>
<i>Quercus serrata</i>	

16 September — Drove from Morioka to Mt. Hayachine; climbed into alpine zone. (Iwate Pref.)

<i>Acer distylum</i>	<i>Juniperus communis</i> var. <i>nipponica</i>
<i>Acer tschonoskii</i>	<i>Leucothoe grayana</i> var. <i>oblongifolia</i>
<i>Acer ukurunduense</i>	<i>Lonicera</i> sp.
<i>Betula corylifolia</i> (?)	<i>Rhododendron tschonoskii</i>
<i>Betula ermanii</i>	<i>Thymus</i> sp.
<i>Clematis apiifolia</i>	<i>Tsuga diversifolia</i>
<i>Juniperus chinensis</i> var. <i>sargentii</i>	

— Drove from Mt. Hayachine to Sendai.

17 September — Drove from Sendai to Nikko National Park; collected along roadside and climbed Mt. Kashi, behind Kashi Hot Springs, Fukushima Pref.

<i>Acer cissifolium</i>	<i>Magnolia salicifolia</i>
<i>Euptelea polyandra</i>	<i>Meliosma tenuis</i>
<i>Hamamelis japonica</i>	<i>Skimmia japonica</i>
<i>Hydrangea macrophylla</i>	<i>Trochodendron aralioides</i>
<i>Leucothoe</i> sp.	

— Returned to Sendai.

18 September — Collected on the grounds of the Medical School of Tohoku University, Sendai, Miyagi Pref.

* <i>Camellia</i> sp.	* <i>Trachycarpus fortunei</i>
* <i>Distylium racemosum</i>	
— Visited the Botanical Garden of Tohoku University, Sendai, Miyagi Pref.	
<i>Ardisia japonica</i>	<i>Neolitsea sericea</i>
<i>Aucuba japonica</i>	<i>Rhododendron semibarbatum</i>
* <i>Betula platyphylla</i>	* <i>Spiraea nipponica</i> f. <i>nipponica</i>
<i>Buckleya lanceolata</i>	* <i>Spiraea nipponica</i> f. <i>rotundifolia</i>
<i>Enkianthus campanulatus</i>	<i>Viburnum phlebotrichum</i>
<i>Lespedeza homoloba</i>	<i>Zanthoxylum ailanthoides</i>
<i>Lyonia elliptica</i>	

19 September — Drove from Sendai to Mt. Daito, Miyagi Pref.

<i>Abelia spathulata</i>	<i>Lespedeza bicolor</i>
<i>Akebia trifoliata</i>	<i>Lespedeza homoloba</i>
<i>Aucuba japonica</i> var. <i>boreale</i>	<i>Pyrus calleryana</i> var. <i>dimorphophylla</i> (?)
<i>Berchemia racemosa</i>	<i>Sapium japonicum</i>
<i>Callicarpa</i> sp.	<i>Schisandra repanda</i>
<i>Castanea crenata</i>	<i>Staphylea bumalda</i>
<i>Clematis maximowicziana</i>	<i>Symplocos chinensis</i>
<i>Clematis</i> sp.	<i>Viburnum</i> sp.
<i>Cryptomeria japonica</i>	<i>Weigela</i> sp.
<i>Deutzia crenata</i>	
<i>Helwingia japonica</i>	

— Returned to Sendai.

* Cultivated material.

20 September — Drove to Miyato, near Matsushima, Miyagi Pref.

<i>Ardisia japonica</i>	<i>Ornixa japonica</i>
<i>Boehmeria biloba</i>	<i>Paederia scandens</i>
<i>Buckleya lanceolata</i>	<i>Pinus densiflora</i>
<i>Calliandra mollis</i>	<i>Pinus thunbergii</i>
<i>Camellia japonica</i>	* <i>Pittosporum tobira</i>
<i>Corylus sieboldiana</i>	<i>Rhododendron semibarbatum</i>
<i>Diospyros lotus</i>	<i>Rhus trichocarpa</i>
<i>Euonymus radicans</i>	<i>Torreya nucifera</i>
<i>Eurya japonica</i>	<i>Trachelospermum asiaticum</i>
<i>Helwingia japonica</i>	<i>Tripetaleia paniculata</i>
<i>Juniperus chinensis</i>	* <i>Viburnum awabukii</i>
<i>Ligustrum ovalifolium</i>	<i>Viburnum wrightii</i>
<i>Liriope minor</i>	<i>Zanthoxylum piperitum</i>
<i>Neolitsea sericea</i>	

— Returned to Sendai.

21 September — Drove to Yamagata Prefecture on the Sea of Japan side of Honshu; collected in the mountain behind Yamadera.

<i>Betula schmidtii</i>	<i>Quercus acutissima</i>
<i>Clethra barbinervis</i>	<i>Styrax obassia</i>
<i>Deutzia</i> sp.	<i>Thujaopsis dolabrata</i>
— Drove to Yamadera; visited the temple there and collected in the vicinity.	
<i>Acer cissifolium</i>	<i>Ilex serrata</i>
<i>Betula platyphylla</i>	<i>Lindera praecox</i>

— Returned to Sendai.

22 September — Took train from Sendai to Tokyo.

23 September — Spent the day in Tokyo; met with Professor Hara. ㊦

24 September — Spent the day in Tokyo; "Happy" Sponberg arrived.

25 September — Took bus tour to Kamakura to see the giant Buddha, and then continued on to Hakone; visited Art Museum and adjacent garden.
Returned to Tokyo.

26 September — Traveled by train to Nagoya; visited the Nagoya Botanical Garden.

<i>Ilex serrata</i>	<i>Vaccinium</i> sp.
<i>Quercus</i> sp.	

— Visited Chrysanthemum show at Nagoya Castle.

27 September — Drove from Nagoya to Toyota; visited the carnivorous plant garden of Mr. Kondo.

<i>Ilex serrata</i>	<i>Quercus</i> sp.
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— Returned to Nagoya. Traveled by train from Nagoya to Kyoto.

28 September — Sightseeing in Kyoto.

29 September — Traveled by train from Kyoto to Hiroshima. Visited the Hiroshima Botanical Garden.

Alnus pendula

30 September — Sightseeing on Miyajima Island. Traveled by train from Hiroshima to Fukuoka.

1 October — Flew from Fukuoka to Seoul.

* Cultivated material.

Summer Bloom in the Arnold Arboretum

by IDA HAY BURCH

A guidebook comprised of a series of self-guided walks through the living collections of the Arnold Arboretum is currently under preparation by the staff. Tours organized around topics such as the seasons, twenty of the finest individual trees, seed dispersal, the meadow, plant introductions of the Arboretum, and more will be included.

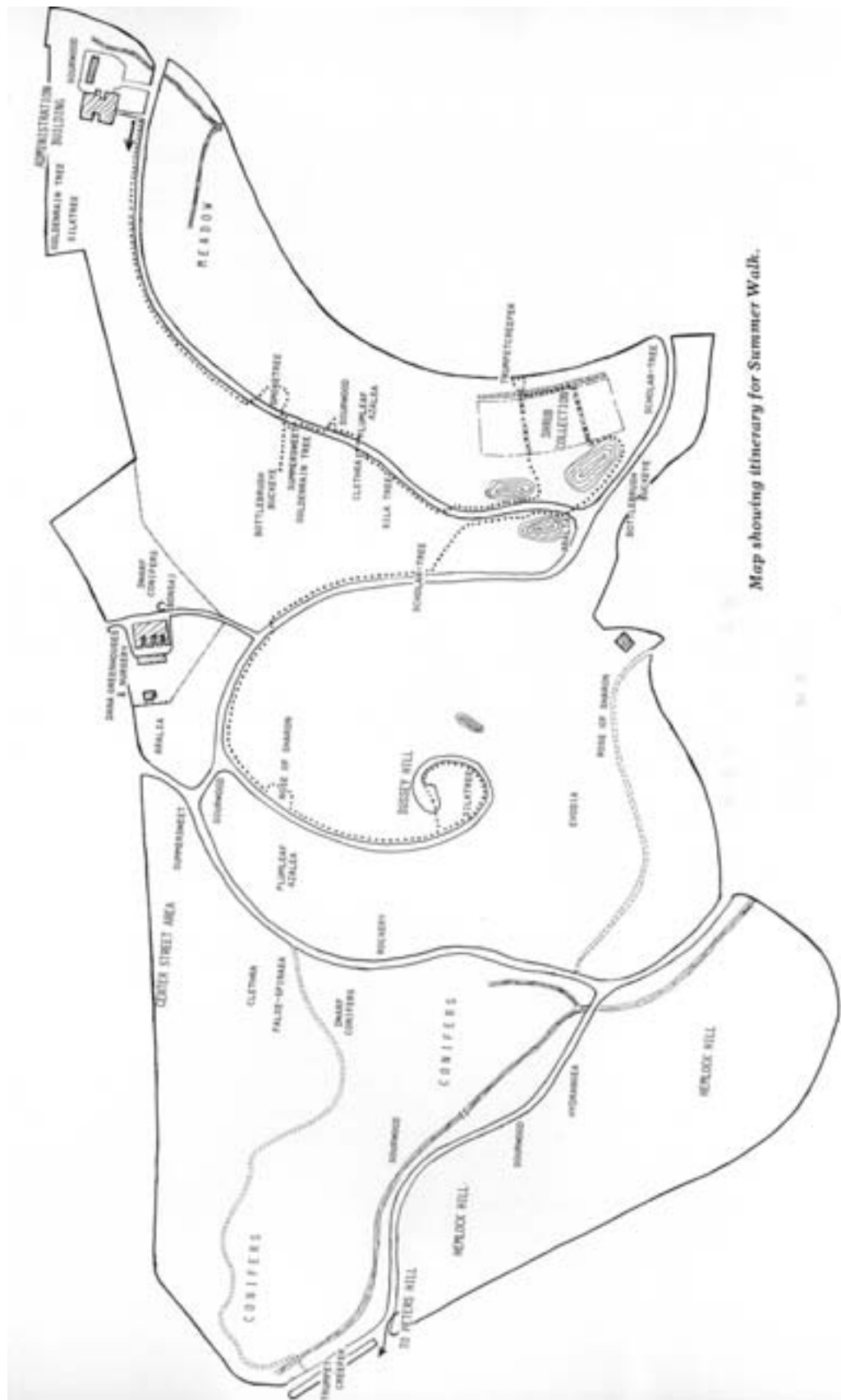
The following walk, intended for July and August, has been selected to give Friends of the Arnold Arboretum and other *Arnoldia* readers a chance to sample a self-guided tour this summer. We hope you will stop in at the Administration Building to give us your comments, or drop us a line. This will help us in the preparation of other walks. Ed.

While summer is vacation time for most people, it is the season of most active growth for the plants in the Arboretum. The majority of temperate woody plants here bloom in spring, which is the principal reason for the Arboretum's greater popularity at that season. In summer, when maximum heat and light are available, they are using this energy to mature fruit and form buds for next spring's flowering.

In summer there are few groups that are as showy as the forsythias, cherries, lilacs or crabapples. Summer-blooming trees and shrubs may be a neglected group horticulturally because of their more subtle displays, but there are many here to see. A number bloom over quite long periods — a month or more for some. Several of the shrubs in flower at this time formed their flower-buds since growth started this season; that is, their flower-buds do not over-winter as do those of spring blooming species. For some, much of the wood dies back each winter. Many of our summer blooming woody plants are members of unusual plant families, families that are found predominantly in tropical regions. All of the plants highlighted in this walk are of value in gardens for their color in summer, which is relatively rare among trees and shrubs hardy in this climate.

Visitors to the Arboretum will find that summer is a good time to observe the color and texture of foliage and the quality of shade produced by many spring-flowering trees and shrubs, and to evaluate their effectiveness in the landscape. Some plants definitely have more character or interest in their summer foliage than others.

Starting down the Meadow Road from the Administration Building, look across at the meadow, which is now at its height of color. (You may want to take the Meadow Walk at this time.) Up on the hill at the end of the flat lawn area next to the building are two of the important summer-blooming trees, the yellow-flowered, green-fruited Goldenrain Tree and the Silktree with its fuzzy, pink flower clusters.



Map showing itinerary for Summer Walk.

Appreciate these from a distance since you will have a closer look at other specimens further along.

As you proceed, a collection of *Tilia* species, lindens and basswoods, is on the right. A few of these excellent shade and street trees may still be in bloom in early July. Fragrance and nectar for bees are the main assets of their flowers.

Next, while you walk under and enjoy the architecture of the cork trees, look up the road to see the smoketrees. They are especially beautiful if seen with the morning or late afternoon light shining through their fuzzy fruiting structures. *Cotinus coggygia* is native to an area from southeastern Europe to central China. These large shrubs prefer a sunny, well-drained site and actually perform best in dry, rocky ground. In June small insignificant flowers appear. After flowering, the numerous stalks of sterile flowers elongate and become covered with fine hairs. By early July and lasting through August, the pinkish, plumose fruiting structures cover the plants, giving them their smoky look. The dark blue-green foliage is quite distinctive. Several cultivars can be seen by walking around the group. Some of these, such as 'Flame', have especially bright autumn color; others have purplish or red foliage throughout the growing season. Here you will also see some plants of the larger-leaved *Cotinus obovatus*, the only other species in the genus and native to the southeastern United States. It is now rather rare in the wild, probably because it has been cut down extensively to obtain a yellow dye from the wood. The fruiting clusters of the American Smoketree or Chittamwood are not as showy as those of the Eurasian, but in autumn this species outshines *C. coggygia* when the leaves turn a brilliant scarlet or orange.

If it is mid-July, leave the road on the right at the *Aesculus* or horsechestnut collection and walk about 20 yards to the foot of a wooded hill to see a very lovely summer blooming shrub, *A. parviflora*, the Bottlebrush Buckeye. The most familiar members of the genus *Aesculus* are trees, and all but this species bloom in late spring. With its large spikes of white flowers and dark green, palmately compound leaves, this shrub is one of the finest sights of summer in the Arboretum. There is a very cooling effect in the combination of green and white here in the shade. This species is endemic to Georgia and Alabama where it occurs in dense colonies in rich woods, shady hillsides and along stream banks. So distinct is it compared to other *Aesculus* that it is considered alone in a separate section of the genus. That means it has no very close relatives. Another distinction is that moths are most likely its principal pollinators. This particular plant, which forms a neat border to the oak woods, was added to the Arboretum collection in 1898 from the garden of Charles S. Sargent. At the end of July, as this plant has ceased flowering, *A. parviflora* var. *serotina* is in full bloom. Located to the right, further in from the road, it is a taller plant with narrower flowering spikes.



Cotinus coggygia.

Back at the road are some examples of the Goldenrain Tree, *Koelreuteria paniculata*, a medium-sized, round-headed tree species from China. The generic name honors Joseph G. Koelreuter, an 18th century German professor of natural history who is attributed with being the first to point out that insect visits are necessary for flower pollination. Wide clusters of cheerful yellow flowers appear on this plant during the first three weeks of July and are soon followed by light green bladder-like fruits which remain attractive all summer and autumn. In detail the four asymmetrically arranged petals each have a glowing orange-red spot at the base which changes color as the flowers age, probably serving as an indicator to insect visitors. *Koelreuteria* and a shrub, *Xanthoceras*, are the only members of a primarily tropical family, Sapindaceae, that can be grown in the Arboretum. Because of its ability to withstand drought and high winds, the Goldenrain Tree has been widely planted in the Midwest. Two of the varieties here may be of interest: 'September' consistently blooms two months later than the species. Originating as a seedling found growing on the campus of Indiana University, it has been in the trade only since 1967. A bit further down the road are two specimens of the very narrow-crowned variety, 'Fastigiata'.



Aesculus parviflora.

By the time the typical *Koelreuteria* is in fruit, the *Clethra alnifolia* var. *rosea* in front of it will be in bloom with upright clusters of pale pink, wonderfully fragrant flowers. This is the pink-budded form of the Summersweet, which often is found as quite a tall shrub in swamps or wet woods from Maine to Florida. When grown in drier situations, its form is dense and compact. There are a few places in Massachusetts where it occurs in colonies large enough to be of importance as a honey-plant. Few woody plants supply great quantities of nectar at this season, and so beekeepers usually must rely on a large source of flowering herbs for any late season honey production.

Above the azaleas in this border, *Oxydendrum arboreum* starts to flower as the Goldenrain Trees finish. Called Sourwood or Sorrel Tree, it is native to the eastern United States from Pennsylvania south. Both common and scientific names refer to the acid or sour taste of the leaves. Across the road beyond the Flowering Dogwood is another example of the species that you can examine more closely. The slightly drooping, lustrous leaves, curved sprays of ivory-white flowers, and narrow or pyramidal crown make this a distinctive and graceful tree. It is equally handsome in autumn when the leaves turn a rich red while remaining pale underneath, and flowers are followed by similar clusters of yellow-tan fruits. A close look at the urn-shaped flowers similar to those of *Pieris* or blueberries gives a clue that this is a member of the Heath Family, Ericaceae. *Oxydendrum* is the only tree of this family that is hardy here although the family is well represented in the Arboretum by such popular ornamental shrubs as *Rhododendron*, *Pieris*, *Vaccinium* and *Kalmia*. Sourwood has no close relatives among Ericaceae and is believed to be the survivor of a comparatively long, isolated evolutionary sequence. In the mountains of the South, Sourwoods are a very important source of nectar. The honey made from them is regarded as one of the finest flavored and commands a high price.

Also on this side of the road can be seen the last of the azaleas to bloom, *Rhododendron prunifolium*, Plumleaf Azalea. Its orange flowers appear throughout the summer. Not discovered until 1913, this species is found wild in a limited area along the Georgia-Alabama border. The Arnold Arboretum was responsible for first introducing this valuable azalea into cultivation in 1918 when it grew seed received from T. G. Harbison, a collector for the Arboretum.

Two more species of *Clethra* which may be compared with the Summersweet are across the road. This genus is another that is the only representative of its small family in the Arboretum. Taller than *C. alnifolia* and blooming a couple of weeks earlier is *Clethra acuminata*, called Cinnamon Clethra because of its smooth, rusty-brown bark. *C. barbinervis*, a native of Japan, is the tallest and earliest to bloom. It can attain the proportions of a small tree. Its flowers are larger, but only slightly fragrant, and the light tan bark is attractive. E. H. Wilson called it the handsomest of our clethras.

Your first close view of the Silktree, *Albizia julibrissin*, is at the foot of the wooded hill that reaches the road on the right. The best example of this species will be seen at the top of Bussey Hill. The delicate, airy aspect of the twice-pinnately compound leaves and pink powder-puff inflorescences on the flat-topped crown is unique among hardy trees in the Boston area. Of the three sub-families of the great Legume Family, the Mimosoideae is a group that occurs almost exclusively in tropical regions. *Albizia julibrissin* is the only woody mimosoid legume that will grow in this climate. The "powder-puff" is actually a cluster of several flowers, each with numerous pink thread-like stamens and insignificant green petals. Many un-

opened buds and spent flowers reveal that the Silktree blooms over a period of several weeks.

If you do not have time to complete the walk, at this point you may choose either to go only as far as the shrub collection or to go directly to the top of Bussey Hill.

There are a great many things to see in the shrub collection, but we will concentrate on only a few of them. As you enter the lefthand path from the grassy area between the ponds, honeysuckles occupy the first two rows. When laden with blue or bright red or orange translucent berries, many of these plants are quite pretty. The berries are relished by birds. Mottled, lopsided, apple-like fruits on shrubs in the next rows are those of the flowering quince, *Chaenomeles* species and varieties. These are not the "true" quince but can be used for jelly and are eaten by squirrels and other animals.

More examples of *Clethra* are at the end of the fourth row. Here you can see *Clethra alnifolia* cv. 'Pink Spire' which is the best pink variety.

Nearby, not blooming until late in August, are plants of *Clerodendrum trichotomum*, Harlequin Glorybower. The fragrant white flowers with long-exserted stamens and reddish calyx give a star-studded effect. As fruits mature to a steel-blue drupe, the calyx becomes fleshy and dark red in striking contrast. *Clerodendrum* and *Vitex* are members of another predominantly tropical family, the Verbenaceae. This gives a clue as to why these shrubs die down to the ground every winter in our New England climate. This is not necessarily a disadvantage. Since *clerodendrum* produces its flowers on growth of the current year, nothing is lost, except large size, by its being killed back.

You may see a few lingering flowers on the roses, but by August the orange or red hips begin to color, prolonging the season of interest for many of the shrub or wild-type roses. Rose hips are high in vitamin C and are used in teas and preserves.

The large shrubs with plume-like panicles of white flowers or reddish immature seed capsules are species of *Sorbaria*. They are members of the large, ornamentally important Rose Family. Called false-spiraeas, sorbarias come from central and eastern Asia. The impressed veins make individual leaflets look pleated, giving a rugged texture over-all. Because of their large proportions and suckering habit, false-spiraeas need plenty of room or a heavy pruning every few years. Across the path are their close relatives, the true spiraeas. Various species and varieties of *Spiraea* come into bloom throughout the spring and summer months. Most of the commonly planted kinds are of Asian origin. You may recognize that Steeplebush or Hardhack and Meadowsweet, which bloom in fields and roadsides of New England at this time, are also species of *Spiraea*. *Spiraea* × *bumalda* 'Anthony Waterer', a hybrid of two Japanese species which originated in England in the 1890's, is one of the most popular spiraeas be-



Albizia julibrissin. Photo: P. Bruns.

cause of its long period of bloom, deep flower color and compact habit.

Good shades of blue are rare among hardy shrubs. The grey cast and lacy texture of foliage add to the garden value of the uncommon chaste-trees or *Vitex*. Of the two species here, *Vitex agnus-castus* has coarser foliage but its dense clusters of flowers are more prominent than those of *Vitex negundo*. The white-flowered *V. agnus-castus* var. *alba* is rather bland by comparison. All have a strong aroma in their foliage which you may enjoy. The epithet, *agnus-castus*, and common name refer to the ancient use of this Mediterranean native as a symbol of innocence and purity at festivals and weddings. The flexible stems of *Vitex* are still used by the Greeks in basketry. Like clerodendrum, *Vitex agnus-castus* often dies back in winter. Next to the chaste-trees, 'Hever Castle' is one of many varieties of *Buddleia davidii* which we'll see on top of Bussey Hill. This one blooms later than the chaste-trees.

Behind the vine trellis, on the rock wall, the trumpetcreepers send forth 3-inch orange or red tubular flowers from mid-July to September. The Arboretum's plants are varieties of *Campsis radicans*, na-

tive from Pennsylvania to Missouri and south where it can become so rampant that it is considered a pest. *C. × tagliabuana* 'Madame Galen' is a handsome hybrid between *C. radicans* and a tenderer oriental species, *C. grandiflora*. Climbing by root-like holdfasts, trumpetcreepers may grow to 30 or 40 feet.

As you start back through the shrub collection on the other path, you may notice some low shrubs with arching branches full of pink flowers and spongy white berries resembling popcorn. Several species of *Symphoricarpos*, snowberries, grow here. All do well in any soil and retain their decorative fruits well into the winter. In the western United States where several species occur, their fruits are an important wildlife food. They may be toxic to humans, however.

Potentilla fruticosa, another member of the Rose Family, is one of a very few woody plants native to both northern hemispheres. It has an unusually wide, though discontinuous, natural distribution in mountainous regions and northern latitudes. Varieties of *Potentilla* are good subjects for the small garden since they seldom reach 4 feet in height. They have no serious insect or disease problems and will grow in a wide range of soils. As you can observe, there are many cultivars varying in flower color, length and time of bloom, and compactness of habit.

Among the potentillas and elsewhere in the shrub collection and on Bussey Hill are examples of the genus *Hypericum*, the St. Johnsworts. This large genus is represented here by several hardy, low shrubs with bright yellow flowers. There is an interesting explanation for their curious common name. With their sunny coloring, numerous radiating stamens, season of bloom and supposed curative properties, hypericums were most likely associated with celebrations of the summer solstice in ancient times. When the Christian Church took over these rites and converted them to honor St. John, the plants were renamed as well. The characteristic feature of *Hypericum* flowers is the numerous stamens which are sometimes grouped in three or five bundles depending on the species. *H. frondosum*, from the southern United States, is one of the best with its 2-inch orange-yellow flowers and bluish foliage. On older plants the red-brown bark exfoliates. Selected for its especially large flowers with striking orange anthers on relatively short filaments, *Hypericum* cv. 'Sun Gold' is a hybrid involving *H. patulum*, a widely cultivated species from China. The hypericums are recommended for their ability to grow on poor soils.

Of all the summer blooming shrubs, the hydrangeas are perhaps the most familiar. The flower clusters are flat, rounded, or pyramidal, often with fertile flowers in the center surrounded by showy neuter flowers which have only large petal-like sepals. Many garden forms have been selected for their more numerous neuter flowers. The "snowball" types completely lack reproductive flowers. Some of these were long cultivated in Japanese gardens before being introduced into this country.

Four of the species here bloom from late June into July. Variety 'Grandiflora' of the American species *arborescens*, the so-called Hills-of-snow, is one that develops only neuter flowers. Its flower heads are often so large that stems droop with their weight. *H. cinerea* is similar to, and often considered a subspecies of, *H. arborescens*. It is mainly represented in cultivation by cv. 'Sterilis'. *H. heteromalla* from the Himalayas has a similar inflorescence type but is a taller plant. The hydrangeas commonly sold by florists at Easter time are forms of *Hydrangea macrophylla*; here you can see a few of the hardiest forms. *H. macrophylla* is more commonly grown further south, especially along the seacoast, where its flower color is blue on acid soils and pink on alkaline.

The pyramidal panicles of *H. quercifolia*, Oakleaf Hydrangea, start to open in mid-July. Its bold, distinctive foliage which takes on russet tints in autumn, and its ability to thrive in shaded locations make this a valuable garden plant although it is less hardy than the other species.

The last to bloom is *Hydrangea paniculata* from Japan and China. Two varieties can be seen here: 'Praecox' which blooms three weeks earlier than the type, and 'Grandiflora' with all-neuter flowers in the cluster.



At the edge of the pond the shrub with neat spherical flower clusters is the Buttonbush, *Cephalanthus occidentalis*. It grows wild in similar situations throughout eastern America and is the only hardy woody member of the mainly tropical Madder Family, Rubiaceae.

Look across toward the other pond to see the dramatic effect of the 2- to 3-foot wide plumes of creamy-white flowers on the Japanese *Aralia elata*. Upright, scarcely branching stems and large horizontally oriented compound leaves forming a flat-topped crown add to the exotic look of this plant. Because of their threatening thorns and tendency to form dense thickets, this and its close American relative, *A. spinosa*, are both called Devil's Walking Stick.

In the Tree Legume area two genera exhibit summer bloom. The dense racemes of dull white flowers of *Maackia* species are not particularly showy but the shiny greenish bark with diamond-shaped lenticels is attractive.

The second Legume, *Sophora japonica*, Pagoda- or Scholar-tree, is one of the outstanding summer blooming trees. Its creamy-white flowers in loose panicles appear through the month of August, and a light shade is cast by its fine foliage. Leaflets are dark green above and a contrasting grey-green beneath. The Scholar-tree has been cultivated on temple grounds in Japan for at least a thousand years but is actually native to China and Korea. Chinese tradition dictates *Sophora japonica* as the memorial tree at the graves of scholars. A yellow dye can be obtained from the dried flowers and has been used medicinally in China. This tree is easy to grow and very tolerant of city conditions.

About midway up Bussey Hill, a planting of Rose of Sharon or Shrub Althea is the next flowering group to see. Linnaeus named the species *Hibiscus syriacus*, believing it to come from Syria. As with many plants that have been long cultivated by man, its nativity is uncertain but is now thought to be northern India and China. With either single or double flowers in shades of pink, purple or white, about twenty of the many cultivars are growing here and on the far side of the hill.

Most of the summit area of Bussey Hill was replanted in 1972, except, of course, the grove of White Pines and the large Silktree and other older specimens. This is our finest plant of *Albizia julibrissin*. (See the Twenty Favorites Walk for more on this.) Around the circle of fence are several shrubs of interest.

In August and September, *Elsholtzia stauntoni* bears its spikes of reddish-purple flowers profusely. This species was introduced into cultivation by the Arnold Arboretum in 1905 when John G. Jack obtained cuttings from plants he found in the hills near the Great Wall in China. Details such as the opposite arrangement and aromatic leaves, square stems and two-lipped flower form indicate that this is a member of the Mint Family.

Blooming earlier is a group of *Hypericum prolificum*. Compared with the species we saw in the shrub collection, this one has smaller flowers but they are abundantly produced. It is one of the hardiest of the St. Johnsworts.

You may see butterflies, or in the evening, moths fluttering around the nearby group of *Buddleia davidii* cultivars. They are called butterflybush and do attract these insects in numbers. This planting demonstrates some of the variability of flower color, time of bloom, and size of inflorescence of this species. The French missionary and plant explorer Abbé Armand David, who first discovered it wild in western China in 1869, is honored by the specific name. The shrubs are rather coarse-leaved, ungainly and large, but their fragrance and butterfly-attracting qualities make them welcome in any garden with sufficient space. These and the elsholtzias share the habit of dying back in winter here, but both grow up to bloom every year. The brown fruiting spikes of buddleias are good subjects for winter bouquets.

In front of the view of the Blue Hills are some striking plants, superficially resembling the Chaste-trees but smaller. Russian Sage, *Perovskia atriplicifolia*, is the only other woody member of the predominantly herbaceous Mint Family in the Arboretum. Its silvery white stems and leaves have a strange pungence and contrast visually with the violet-blue flowers. It is found wild from Afghanistan to western Tibet where it sometimes covers large areas to the exclusion of other vegetation. It does not appear to be that vigorous here but is said to thrive in hot situations.

We have seen the majority of the plants in bloom at this time in the Arboretum, giving good examples of the diversity and qualities of summer bloomers. From here you can use the map to see more or choose a different route to return.



NOTES FROM THE ARNOLD ARBORETUM

Austrobaileya

by RICHARD E. WEAVER, JR.

One of the plants unfamiliar to most Arnold Arboretum visitors is a rather nondescript vine with opposite leaves that is growing in the conservatory section of the Dana Greenhouses. The plant has been scrambling around the conservatory for about twelve years now, but has never shown any signs of flowering until three buds were noticed a few weeks ago by the greenhouse staff. One flower opened on March 29, the first time, to our knowledge, that a plant of this species, genus, or even family has ever bloomed in cultivation. The plant is a species of *Austrobaileya*, native to the tropical forests of North Queensland, Australia. The flowers are not particularly attractive, and they have a strong, unpleasant odor, but their structure places *Austrobaileya* among the flora that theoretically most closely resemble the first flowering plants on the earth.

As shown in the accompanying photograph, probably the first ever published of a living *Austrobaileya* flower, the perianth is not differentiated into petals and sepals, but rather consists of a series of spirally arranged tepals of greatly varying size. The stamens consist of a broad, almost leaf-like structure with the anther sacs attached to the upper surface. These all are considered to be primitive characteristics, and there are numerous others that do not show in the photograph.

Ever since *Austrobaileya* was described in 1933, botanists have been puzzled as to where it should be classified. It now is usually placed in a family of its own. The name commemorates two men, F. M. Bailey, a noted Queensland botanist, and I. W. Bailey, long-time Arnold Arboretum staff member and world-renowned wood anatomist who was particularly interested in primitive flowering plants and who published a detailed account of the anatomy and morphology of *Austrobaileya*.

The Arnold Arboretum's plant was grown from seed collected by a Mr. Webb and a Mr. Tracey near Ravenshoe, North Queensland. The seeds were sent to Mr. Peter Green, then on the staff here, and were sown in 1964. The lot consisted of four seeds, and only one germinated about a year later. In the absence of flowers, the plant was tentatively identified as *Austrobaileya scandens*, the only other

species described being *A. maculata*, and it was widely distributed under the former name. Now, even with flowers, we are not able to identify the plant with certainty. It has fewer tepals than either of the described species, and the flowers are not solitary; the stamens combine characters of both species. We are reluctant to describe it as a new species because of the very few, miserably preserved herbarium specimens on hand with which we can compare it.

The Arnold Arboretum has a long association with *Austrobaileya*. The genus and both species were described in Contributions from the Arnold Arboretum and the Journal of the Arnold Arboretum. Accounts of its chromosomes, anatomy and morphology were published in the latter journal. It is fitting that our plant, the parent of most all other plants in cultivation, should be the first to flower. The botanists of North Queensland also have an attachment to the plant, since it commemorates one of the most famous of them, since it is restricted to the region, and since it has caused such a stir in the botanical world; consequently, the new publication from the Queensland Herbarium has been named *Austrobaileya*.



The flower of Austrobaileya sp., slightly larger than life size, photographed in the Dana Greenhouses of the Arnold Arboretum. The fleshy tepals are greenish-white with purple spots. The heavily spotted structures in the center of the flower are staminodes, or sterile stamens. Photo: R. Weaver.

ARNOLDIA REVIEWS

The Terrace Gardener's Handbook. Linda Yang. New York: Doubleday and Co. 283 pages, illustrated. \$8.95.

Gardening Off the Ground. Art C. Drysdale. Canada: J. M. Dent and Sons Ltd., 125 pages, illustrated. Paperback. \$3.95.

Both of these books are written for the increasing numbers of individuals who would like to garden but are limited to the small spaces afforded by balconies, terraces or rooftops.

Linda Yang offers her personal experiences as a professional architect and an avid terrace gardener in New York City to discuss basic plant requirements and garden design. More important, however, are her observations on situations unique to terrace or rooftop gardening; things such as support strength of balconies and roofs, problems with high winds and falling objects, winter protection, and suitable plant material and containers. The use of woody ornamental trees and shrubs is recommended to provide year-round interest and form in these types of gardens.

Gardening Off the Ground gives similar but less detailed advice and cautions, and places more emphasis on flowering annuals and vegetables. The author writes from experience with plant material in Toronto, Canada which should be a source of encouragement to those inhabitants of the northern U.S. who are doubtful about the success of growing woody plant material outdoors in containers.

JAMES A. BURROWS

Flora of Okinawa and the Southern Ryukyu Islands. Egbert H. Walker. Washington, D.C.: Smithsonian Institution Press. 1159 pages, 209 black and white illustrations. \$36.75.

Okinawa and the Ryukyu Islands are familiar to those who lived during World War II as the islands to the south of the archipelago of Japan. Egbert Walker is the author with the late Dr. E. D. Merrill of the Bibliography of Eastern Asiatic Botany and sole author of the supplement. The present massive volume of 1159 pages (8" × 10 3/4") is the result of eleven years of work converting a check list to an excellent flora. It is not a tourist volume but rather a major contribution to the taxonomists and plant geographers studying the flora of Asia. The inclusion of cultivated plants, the indication of introduced weeds, the detailed synonymy with complete references and the high quality of the descriptions and the keys make this a volume certain to become a classic in its field.

RICHARD A. HOWARD



ARNOLDIA is a publication of the Arnold Arboretum
of Harvard University, Jamaica Plain, Massachusetts, U.S.A.