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ORNAMENTAL PLANT EXPLORATIONS-- JAPAN, 1961

Agricultural Research Service

U.S. DEPARTMENT OF AGRICULTURE

in cooperation with

Longwood Gardens of the Longwood Foundation, Inc.

Japan, as envisioned by European travelers of the 17th century – from a copy of "De Beschryving Van Japan," by Engelbert Kaempfer in the Museum, Hirado Island, Japan.

ORNAMENTAL PLANT EXPLORATIONS--JAPAN, 1961¹

By John L. Creech²

INTRODUCTION

A plant exploration in Japan was undertaken by the U.S. Department of Agriculture from April 14 to July 28, 1961. Objectives were to investigate the geographical distribution of selected woody and herbaceous plants of Japan and to collect propagating material from important variations of species valuable as ornamentals in American horticulture. This was the sixth in a series of ornamental plant explorations conducted cooperatively by the Agricultural Research Service, U.S. Department of Agriculture, and Longwood Gardens, Longwood Foundation, Inc., Kennett Square, Pa. For the writer, it was the third plant-collecting expedition to Japan. These trips, including the explorations of 1955 and 1956, have encompassed the major islands and most of environmental regions of the Japanese Empire. A short visit to Hong Kong completed the 1961 work.

Japan is a significant source of many better known garden ornamental plants. Probably more Japanese native plants are used in our gardens than plants from any other country. Multitudes of such plants were introduced indirectly from Japan by way of Europe. Later, introductions were made into the United States directly as a result of Perry's opening of Japan in 1854. The potentialities for their improvement have by no means been exhausted because we have not taken full advantage of variation that exists among the wild species.

A review of some of our most popular sorts of ornamentals emphasizes this viewpoint. The Japanese azaleas, camellias, and hollies that flourish in so many gardens are scarcely representative of the variation in hardiness or form that exists among certain parental species I observed in the wild. I am convinced that natural variations found in these plants will be significant in the horticultural improvement and range of adaptation of these important nursery crops. Many observations discussed here have not been brought to the attention of western horticulturists previously. This is another objective of this report.

In considering new ornamental plants from Japan, those species are included that are regarded as minor because of, perhaps, the previous lack of adequate material to sufficiently evaluate their potentialities rather than their failure to meet horticultural standards. Several broadleaf evergreen species that are native to Japan warrant further investigation. These are Ardisia japonica, Aucuba japonica, Eurya japonica, Machilus Thunbergii, and Ternstroemia gymnanthera. Existing collections of these plants now in the United States, which have origins that are obscure or which have been derived from garden sources, are not the best criteria. Rather, we need to examine wild entities along the north Pacific coast of Japan or in similar localities where the climate is far more severe than that where these species are mostly cultivated in the United States.

During the exploration of Japan in the fall and winter of 1956, I was content to bring to the United States species that would add variety to southern gardens without considering hardiness relative to origin. Additional study of the Japanese literature showed that many species are found in Japan far north of places where collections were made earlier. Because many of the 1956 introductions are for garden use, an exploration was planned that might increase their value through a better understanding of their distribution patterns.

The expedition began in April, at the beginning of the azalea flowering season in southern Kyushu. Japan is the center of distribution of azaleas in the Orient and Kyushu is the most favored locality for azaleas in Japan. Combination of a highly acid porous volcanic soil and a mild maritime climate with moderate, evenly distributed rainfall provides an ideal environment for the development of extensive colonies of azaleas. The timing of the expedition also

¹Cooperative investigations of the Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture, and Longwood Gardens of the Longwood Foundation, Inc.

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allowed me to see the famous "Hirado" azaleas in flower. "Hirado" azaleas are grown exclusively on Hirado, an Island in the Sea of Japan, and some Japanese believe that these have the largest and most beautiful flowers of any of the azaleas. Approval had been obtained from the Japanese Ministry of Agriculture and Forestry to visit Hirado to confirm the existence of such an azalea race and to obtain a representative collection of cuttings and plants for testing in the United States.

DISTRIBUTION OF WOODY PLANTS IN JAPAN

No region or country of comparable size in the North Temperate Zone possesses so rich and variable a woody flora as does Japan. As might be expected, 3 centuries of contact with this kingdom of intensely plant-conscious people has brought a multitude of rare and beautiful introductions to our gardens. Until 1861, however, there were no large shipments of ornamental plants sent directly from Japan to the United States.

Japan is a formation of islands that are literally the tops of a volcanic mountain chain rising from the Pacific Ocean. Japan's flora is governed by a unique set of environmental factors, chief of which are the monsoons, one bringing sustained summer rains from the south, and the other bringing snow and cold winter rains from Asia. The winter precipitation, which is of greater significance from our viewpoint, is largely deposited along the Sea of Japan coast of Honshu as a result of the mountain ranges that run down the center of northern Honshu. Snow falls early and accumulates to several feet.

Western Honshu, Shikoku, and Kyushu, although equally mountainous, are so oriented that they are less influenced by this winter monsoon. Winters here are clear, warm, and sunny and one can collect plants throughout the winter. Mountains on the Pacific side of northern Honshu block the path of the Siberian monsoon, so the winters are sunny; but the Oyashio or Okhotsk Current sweeps down the Pacific coast of Honshu from the Kuril Islands and brings severely cold winter weather.

About 5,000 species of higher plants are found in Japan, ranging from species adapted to subtropical rain forests and mangrove swamps in the south to species of subarctic forests and alpine moors in the north. Japan is exceedingly well populated with broadleaf evergreens, one of our major interests in developing improved horticultural plants. These species are found mostly in the western regions of Japan, particularly Kyushu and Shikoku. Except in the high mountains of these islands, broadleaf evergreen forests predominate. One will find in these warm temperate rain forests: Ardisia japonica; A. crenata; Aucuba japonica; Camellia japonica and several relatives; Castanopsis cuspidata; Cinnamomum japonicum as well as the related genera Litsea and Neolitsea; Cleyera japonica; Eurya japonica; E. emarginata; Fatsia japonica; Ligustrum japonicum; Machilus Thunbergii; Pittosporum tobira; evergreen oaks including Quercus glauca and Q. acuta; and Ternstroemia gymnanthera. Many of these species are familiar plants in American gardens.

Horticulturists should note that the broadleaf evergreens of these warm temperate forests are distributed for a considerable distance northward along the Sea of Japan and the Pacific Ocean coasts of Honshu. Representatives from the northern limits of Japanese distribution may be widely adaptable in climatically analogous areas of the United States. Ardisia japonica, a fine evergreen ground-cover plant, introduced into the United States previously from a typical warm temperate forest of southern Japan, has been found growing as far north as Funakoshi above Sendai on the Pacific Ocean side of Japan. It even grows on Okushiri Island, near Hokkaido, suggesting a greater degree of hardiness than presently attributed to this plant.

In general, the pattern of broadleaf evergreen distribution is such that species flourish farther north on the Sea of Japan side of Honshu than on the Pacific side. The warm currents and much heavier snow cover along the Sea of Japan provide a more favorable climate for these plants. The Pacific side with its harsher climate might be the more rewarding region in which to collect broadleaf evergreens.

Among the broadleaf evergreen species of Japan distributed as described above are the following: Buxus microphylla var. japonica, Camellia japonica, Euonymus japonicus, Eurya japonica, Hedera rhombea, Ilex integra, Machilus Thunbergii, Pittosporum tobira, and Raphiolepis umbellata var. integerrima. Many of these are common and others probably should become well known in gardens of the coastal regions of the United States.

The map (fig. 1) showing the distribution of Camellia japonica is typical for this entire group of plants. Some species can be split into distinct Sea of Japan and Pacific elements. Other species, such as Ilex leucoclada, will not tolerate the dry cold winter of the Pacific side of Honshu and are distributed along the Sea of Japan side of Honshu across the northern tip at Aomori into the foot of Hokkaido. Cryptomeria japonica is planted more widely and grows better on the Sea of Japan side of Honshu than on the Pacific side. Other important plants, including the azaleas Rhododendron japonicum and R. Kaempferi, grow extensively across the islands of

Figure 1.--Distribution of Camellia japonica in Japan.

Kyushu, Shikoku, and Honshu from sea level into the highest mountains. They seem to be tolerant to differing winter conditions.

A curious group of prostrate forms of broadleaf evergreens attain added distribution into Hokkaido. Their morphological adaptation to a snow cover makes this possible. In each instance, the normal upright form ceases to grow about where the decumbent form begins. Thus we have Aucuba japonica var. borealis, Ilex crenata var. radicans, Daphniphyllum macropodum var. humile, and Skimmia japonica var. intermedia, all prostrate varieties, growing farther north than the upright and more typical form of the species.

ONE HUNDRED YEARS OF COLLECTING JAPANESE GARDEN PLANTS

The first direct shipments of ornamental plants from Japan to the United States were made in 1861. Since then, many scientists have studied the plants of Japan. If one were to select from among the horticulturists and botanists who journeyed to Japan after the opening of Japan by the Treaty of Kanagawa, 1854, those contributing most to American horticulture, George R. Hall, David Fairchild, and Ernest H. Wilson would be among the leaders.

George R. Hall, a physician turned trader during the years before Perry's expedition, made shipments of ornamental plants from Japan to Boston, Mass., in 1861. By wardian case and a perilous ocean voyage, a great array of bamboos, cherries, conifers, magnolias, maples, and the lilies, Lilium auratum and L. speciosum, first arrived on our shores. Robert Fortune, the famous British explorer, had become acquainted with Hall's garden in Yokohama and had deposited there many of his own collections made as he traveled the road from Kyushu to Tokyo. It was in Hall's Yokohama garden that Fortune found plants of the male form of Aucuba japonica for which he had searched diligently. His objective was to introduce male and female plants into England as a means of obtaining a winter-hardy evergreen "covered with a profusion of crimson berries nearly as large as olives." He hoped that Aucuba would achieve the position of "the most hardy and useful exotic evergreen we possess."

Both Hall and Fortune departed Japan for their respective homelands, arriving there in 1862, each with wardian cases full of plants that probably resulted from a sharing of the proceeds of their individual collections in the newly opened Empire of Japan. Hall deposited most of his material with Parson's Nursery at Flushing, N.Y. Some plants eventually were established in his garden at Bristol, R.I., and I recall, as a student, having seen some of the plants collected by this famous person. This early plant collector is honored by the names of a number of ornamental plants, including Malus Halliana, Lonicera japonica var. Halliana, and Hall's Amaryllis (Lycoris squamigera), which he first introduced into cultivation.

David Fairchild, champion of plant exploration in the U.S. Department of Agriculture, was responsible for the introduction of many Japanese economic and ornamental plants into our country. He arrived in Japan on April 26, 1902, but, according to his notes, too late to see the flowering cherries in bloom as he had desired. However, Fairchild traveled the length of Japan, sampling the curious edibles with enthusiasm. The margins of his field map of Japan are annotated with notes on interesting plant localities. During this journey he noted the extensive use of Zoysia japonica as a lawn grass and sent the first Zoysia introductions (P.I. 9299-9300) to the United States, along with a collection of 18 bamboos and 30 varieties of flowering cherries. To David Fairchild we owe recognition not only for his own collections but also for his continued encouragement of the Department's plant exploration program, resulting in the vast contributions to American agriculture by Department explorers.

Ernest H. Wilson, Keeper of the Arnold Arboretum, Jamaica Plain, Mass., has contributed more to ornamental horticulture than any other plant collector. It would be impossible here to account for the many garden plants he brought to the United States, but these collections are fully documented in the records of the Arnold Arboretum. Our present-day knowledge of azaleas is based on Wilson's collections and writings. Collectors continually strive to bring together

sets of the 'famous Wilson's fifty' Kurume azaleas selected by him at the Akashi nursery in Kurume, Japan. If one visits the nursery of Akashi, the younger, he will see some of the original plants displayed for E. H. Wilson and he will see Wilson's signature in the nursery guest book. The azalea is among the best loved of our garden plants and creates immense excitement when it blooms in the spring. It is a leading florist crop, ranking ninth and valued at \$255,697 (1959 Census of Agriculture) annually. Through the increasing use of these brilliant and so readily cultivated plants, the name of E. H. Wilson will long be remembered.

COLLECTING LOCALITIES, 1961

Four main phases of field work in Japan may be identified in relation to the sequence of plant collecting during the 1961 exploration. These are as follows:

- (1) Kyushu - Sakurajima, Takakuma, and Kirishima Mountains; Hirado Island, Tara-dake, and Seidagawa, Koshodake, and Ashitaka, Jurigi Village, and Hakone.
Honshu
- (2) Honshu - Abukuma Range of the Kanto Floral Region including Takahagi, Taira, and Tomioka Forestry Districts, Tsukuba-san and Kashima Shrine.
- (3) Honshu - The north Pacific coast from Kinkazan to Hachinohe, Tsubaki-jima and Areshima, Lake Tawada, Mt. Hakkoda, and Shimokita Peninsula.
- (4) Hokkaido - Lake Shikotsu, Hidaka Mountain Range, Oshima Peninsula from Hakkodate to Matsumae, and Esan.

KYUSHU AND THE KURUME AZALEAS

(April 22-May 20)

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

Three mountains provide the most plausible clues as to the origin of the Kurume azaleas, foremost of the cultivars that have evolved from the species found in Kyushu. These mountains are Sakurajima (31°35' N. 130°40' E.), a unique, active volcano overlooking the city of Kagoshima; Takakuma (31°28' N. 130°49' E.), a mountain chain adjacent to Sakurajima; and Kirishima (31°55' N. 130°51' E.), a group of high volcanic cones famous for hot springs. These mountains are all within a 30-mile radius of Kagoshima. The species that are of significance to the origin of Kurume azaleas and that are found in these mountains are: R. Kaempferi (R. obtusum var. Kaempferi), R. kiusianum (R. obtusum var. japonicum), and R. sataense, a comparatively new azalea not mentioned in any earlier English literature.

Sakurajima

Sakurajima (1,118 meters)³, an isolated, symmetrical volcanic cone, juts out into Kagoshima Bay, overshadowing Kagoshima City. The slopes of this active volcano are so covered with fresh lava rocks from constant eruptions that the upper portions do not support a forest cover. Yet, among huge lava boulders, azaleas thrive in profusion and present a variable array of colors from light pink to strong, reddish purple. I spent the entire day of April 24 wandering

³Numbers in parentheses, followed by the word meters, indicate the elevation for that location.

J. L. Creech standing in front of a large specimen of Rhododendron Kaempferi on Sakurajima, Kyushu.

Habitat of Rhododendron Kaempferi, among lava blocks on Sakurajima, Kyushu.

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

the paths that wind around the slopes of Sakurajima trying to draw some conclusions. Rhododendron Kaempferi is the most prevalent species, readily distinguished by its loose, upright habit, flat to concave, elliptic leaves, and orange-red flowers, up to 2 inches across. A swarm of types closely resembling the Kurume azaleas in flower color and plant habit also grows here. Among brittle lava blocks also grows an azalea that has lavender flowers similar in size to those of R. Kaempferi. Some Japanese refer to this azalea as "R. obtusum." ⁴ Plants (PI 231952) under this name collected on Sakurajima were obtained from the Kyushu Horticultural Station, Kurume, Kyushu, in 1956. Studies by Japanese horticulturists suggest that the majority of azaleas scattered over Sakurajima are hybrids between this azalea and R. Kaempferi. In all my visits to Sakurajima, no azalea similar to R. kiusianum, which inhabits the upper limits of Mt. Kirishima, could be found and the taxonomic status of the azaleas of Sakurajima is still a question.

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

I left Sakurajima with a party of Japanese botanists in the late evening of April 24 and on the following morning we departed by jeep for Takakuma, the ash-covered mountain chain paralleling the coast of Osumi Peninsula. The route led through gorges inhabited by broadleaf evergreens and in one of these called Sarugajo (Monkey's Castle), we spent the better part of the day collecting plants. This is one of the few places in Kyushu where Rhododendron serpyllifolium grows wild. This tiny-flowered azalea grows on the moss-covered boulders along the ravine walls and varies in flower color from white to pink. One plant with dark-pink flowers (PI 274545) was collected. The finest of the flowering trees in these forests is Symplocos prunifolia. The tree grows to a height of 50 feet and the flowers are white, fragrant, and borne in dense terminal racemes. The seeds germinate slowly, usually with low viability. This probably explains why this tree is not cultivated. Ilex latifolia occurs here--the first place in which I encountered wild plants in Japan. Fatsia japonica and Aucuba japonica in fruit occur in great numbers. Raphanaea neriifolia, an evergreen shrub with narrow, lanceolate leaves, Enkianthus cernuus var. alba, Hosta, and Tricyrtis grow on the rocky face of the gorge. Where there were open areas cut over for charcoal, the stumps of Machilus Thunbergii, a relative of the camphor-tree, were brilliant red from the multitude of flushing sucker growths.

⁴ In "A Monograph of Azalea" by E. H. Wilson and Alfred Rehder, Arnold Arboretum, Pub. 9, 1921, R. obtusum is referred to the garden forms known as the Kurume azaleas.

By evening of April 25, we reached the cottage of the Kagoshima University Forestry Station in the Takakuma mountains. On the lowhills surrounding this station, azaleas, holly (Ilex crenata), and camellias had been left standing in fields of Miscanthus. Small plantations of sugi (Cryptomeria japonica) and hinoki (Chamaecyparis obtusa) provided cover for several kinds of broad-leaf evergreen shrubs. Camellia japonica was in full bloom.

Takakuma

The Takakuma mountains (1,236 meters) consist of a series of gradually ascending rises to the highest point on the Osumi Peninsula called Onogara. It is said that the low temperature at the Forestry Station (700 meters) is a -7° C. in January and that snow falls about 10 times between December and March attaining up to 75 centimeters. The covering canopy of trees includes Actinodaphne, Castanopsis, Cinnamomum, Daphniphyllum, Distylium, Machilus (Thunbergii and japonica), Neolitsea, Quercus, and Symplocos. The second tree layer consists of Camellia, Cleyera, Illicium, and Ternstroemia; and the shrubby layer includes Ardisia, Aucuba, Damnacanthus, Ilex, and Maesa. Open fields are sporadically covered with individual plants of Hydrangea, Ilex, Ligustrum, Rhododendron (azalea), Salix, and Vaccinium. The azaleas are the conspicuous feature of the open meadows of Takakuma. From sea level to about 500 meters, Rhododendron Kaempferi abounds on rock outcroppings and on ledges along trails. The flowers are typically brick red and the leaves large and scattered along the branches. At about 500 meters, a new azalea appeared. This is R. sataense Nakai. These plants are dense and mound-like, with flowers that range from pink to purple with broadly overlapping petals and shiny leaves

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

Rhododendron sataense in flower during late April on Takakuma, Kyushu. Plants with dark foliage are Ilex crenata.

that are flat to convex. This newly named species more nearly approximates the cultivated Kurume group than does either R. Kaempferi or R. kiusianum. Both living plants and seed of R. sataense were brought into cultivation as a result of this exploration.

Camellia japonica grows abundantly on Takakuma and it seemed desirable to determine to what elevations this tree was limited. We set off early on April 26 and ascended during a drenching rain through magnificent forests of Cryptomeria interspersed with the usual broadleaf evergreens. The trail led around the outer ledges of the mountain where andromeda, hollies, and rhododendrons grew in quantity. Rhododendron pentaphyllum was just past its peak of bloom. It is not a vigorous plant and flowers sparsely. We penetrated the forest again and as we approached 1,000 meters, the broadleaf evergreens began to be noticeably reduced in number and stunted in habit. The last specimens of Camellia japonica, at approximately 1,050 meters,

Cypripedium japonicum in bloom along shady paths on Mt. Takakuma, Kyushu.

J. L. Creech packing young azalea seedlings in sphagnum moss, before shipping in plastic bags.

were ungainly, sparsely branched trees reaching a height of up to 3 meters. It surpassed any other broadleaf evergreen in number. The ground beneath the trees was littered with fallen blossoms, and occasional flowers continued to drop onto the bare, muddy soil. The flowers are purplish red, tubular, with five and six petals. The leaves are broad ovate to narrow elliptic. I saw no small seedlings and concluded that either the fruits were washed down the mountainside or fertile seeds were rarely produced. The protection offered by the canopy of conifers makes possible the growth of C. japonica here.

We trudged back down the mountain in the late afternoon through icy rain to the Forestry station. The morning of April 27, I collected a number of seedlings of Rhododendron sataense, packed my cuttings of Camellia japonica, and prepared to depart for Kirishima. The trail followed along the shaded paths where the Japanese ladyslipper (Cypripedium japonicum) bloomed. It is characterized by two large fanlike leaves as wide as 6 inches across. We retraced our journey down the mountain road, past the many plants of Rhododendron Kaempferi that were again noticeable as we descended to lower elevations, and arrived at Taramizu. Here we took a small boat to Kagoshima and remained in the city overnight. On April 28, I departed with my Japanese guides to Kirishima-kan by bus.

Kirishima

The Kirishima mountains (1,700 meters) are the highest volcanic cones in southern Kyushu. On the evergreen-clad lower slopes and in the grassy meadows at higher elevations occurs a complex of azaleas that have figured largely in the literature on the development of the famous Kurume azaleas. In 1955, I had climbed to the rim of the volcanic cone Karakuni-dake (1,700 meters) to observe the colonies of Rhododendron kiusianum, a small-leaved, purple-flowered azalea. When this azalea hybridizes with R. Kaempferi from lower elevations, a bewildering array of seedlings with pink, scarlet, crimson, and purple flowers results. I repeated the observation, April 28-29, during the peak of the flowering of azaleas solely to assure myself of the fact that one could clearly distinguish between the localities where R. Kaempferi and R. kiusianum occur. In all of my travels in Kyushu, I never found R. Kaempferi above 800 meters elevation, although in northern Honshu, it grows at 1,200 meters near the top of Goyo-dake. R. kiusianum can be found only in the bare alpine meadows between 1,300 and 1,700 meters, except where

Rhododendron kiusianum
grows as low mound-like
plants in the lava on the
faces of volcanic cones of
Kyushu.

plants have been brought down and planted around the hot spring inns for which Kirishima-jinza is so famous. Around the steaming sulfur beds near the inns where the volcanic soil is constantly warmed, Ilex crenata, Rhododendron Kaempferi, and Vaccinium bracteatum abound. Higher up the mountains in volcanic fields composed of layers of fine ash, Chaenomeles japonica and Ilex crenata are scattered; but as one approaches the rim of the volcano, the steep slopes, now completely fogged in with chilling rain, now brilliantly clear, are dotted with tiny plants of I. crenata and R. kiusianum. When brought into cultivation, this azalea maintains its dense small-leaved habit and tiny flowers. Both purple and white forms occur in the wild, but the latter is rarely seen.

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

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

Hirado Island

Hirado is a little-known island adjacent to Kyushu reached by about a 2-hour train ride from Sasebo and a short ferry trip from Hirado-guchi to the island of Hirado. This island, which is now relegated to the occupation of fishing and subsistence farming, is steeped in Japanese history and romance. Feudal lords passed through Hirado on their route to subjugate Korea in the 4th century. Many chose to remain on Hirado upon their return. In the moss-covered shrines of Shijiki and Hichiro-no-Miya, the remains of a warlord Shijiki and his military commanders are enshrined.

Between A.D. 607 and 893, Hirado was a port of call for the Japanese emissaries to China as they returned home by way of Goto, Amakusa, Satsuma, Amami-oshima, and, lastly, the town of Usukawan, or Furuewan, on Hirado. The tea plant and plum are said by some Japanese to have been introduced from China in the 12th century by way of Hirado. When Japan ceased her official contact with Tow (old name of China), Hirado became the base of operations for Chinese smugglers and pirates. The Chinese pirate Wanchi lived in Hirado town and in 1549 suggested to the feudal lords that the Portuguese trading ships use Hirado as a trading port. The Portuguese were followed by the Spanish in 1584 and the Dutch in 1597, although a Dutch company did not actually become established until 1609. The British East India Company formed a trading company on Hirado in 1613, but it lasted only 10 years. As a result of the poor management of the Factor, Richard Cocks, the doors closed on August 2, 1623. Finally, all factories on Hirado were closed when the Shogun Toyotomi Hideyoshi proscribed Christianity in 1641, and what limited foreign trading continued was relegated to the Port of Nagasaki. Hirado never again prospered.

Despite his poor judgment in commerce, Richard Cocks was apparently interested in plants. His diary⁵ reads: "June 19, 1615. I took a garden this day and planted it with potatoes brought from the Liquea, a thing not yet planted in Japan. I must pay a tax, or 5 shilling sterling, per annum for the garden." On July 29, he wrote: "I set 500 small potato roots in a garden. Mr. Eaton sent me them from Liquea." This probably is the first introduction of the sweet potato into Japan, brought up from the Ryukyu Islands by the British ships that supplied the trading goods for Japanese buyers.

Being isolated and scenic, Hirado became a favorite spot for the feudal samurai of older Japan and their palaces dotted the gentle slopes. It might also be said that many of these noblemen delved into the smuggling trade with the Chinese pirates and thus enhanced their fortunes. But the gentlemen did have elaborate gardens and these were planted largely to azaleas. Evidently, the popular Rhododendron scabrum was grown here as it was in the city of Kagoshima. This azalea was brought to Japan from the Ryukyu Islands.

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

The Hirado azaleas are located in individual private gardens so one has to visit many places to see them all. Some of these gardens date back more than 300 years during which time selections were continually made from the spontaneous populations that sprang up among the original azalea plantings. Today, approximately 230 varieties of Hirado azaleas are recognized. Of these, my colleague, T. Tamura, Kurume Agricultural Station, Kyushu, suggested a list of 30 varieties that are representative of the range of variation in the Hirado race. (See pages 57-58) These were collected either as small plants or unrooted cuttings from the various gardens and sent to the U.S. Department of Agriculture for propagation and evaluation.

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

⁵ Saburō Minagawa, Diary of Richard Cocks, an English Merchant, Tokyo, 1957. [In Japanese but with the diary in English original.]

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

T. Tamura and J. L. Creech describing flowers of Hirado azalea varieties at Nambu Garden, Hirado Island, Japan.

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

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

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

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

Tara-dake

In the vicinity of Nagasaki are several small mountain groups. One of these is Kyoga-dake, consisting of two peaks, Tara-dake (1,076 meters) and Gokahara-dake. Northern Kyushu is largely reforested with Cryptomeria japonica, but along the boulder-strewn rivers of these mountains, natural vegetation has been permitted. While "rock hopping" up the streambed, we came upon large patches of Lycoris sanguinea var. kiushiana growing in loose granite chips. This orange spiderlily blooms in late July or early August. At the time of my visit, the winter foliage was just beginning to die down and the bulbs were so loose in the soil that they could be removed in quantity by hand.

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

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

In wooded areas, at low elevation, Camellia japonica develops into straggly, multistemmed trees. This stand is at 600 meters on Tara-dake, Kyushu.

Camellia japonica grows as dense shrubby plants in open fields at upper zone of Tara-dake, Kyushu.

Rhododendron japonicum in a pine-chestnut habitat in central Kyushu.

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

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

Seidagawa and Kosho-dake

The last days in Kyushu (May 13-14) were spent in the mountains of central Kyushu. A small peak at Seidagawa (520 meters) is isolated in the hot central plain and proved to be an unusually exciting locality. Here Rhododendron japonicum grows in profusion. Earlier Western World records do not describe this azalea as growing wild in Kyushu. Above the town of Kusu in a pine-chestnut region, R. japonicum grows in hot sunny meadows, quite different from the cool bog habitats ordinarily frequented by this azalea. Furthermore, here can be found the broadest range of color variation occurring in the species. The colony includes the yellow form, aureum. Despite earlier observations by Wilson to the effect that the yellow form is rather rare, it accounts for about a third of the colony I visited at Seidagawa. Furthermore, seed collected from the yellow-flowered plants will produce a population of predominantly yellow plants, readily distinguished as seedlings by their pale-yellow winter buds and leaves which turn yellow rather than red in the autumn. This form is probably the yellow azalea described by Kaempfer as "Rjuku tsutsusi flore igneo, punctis petalorum croceis, apicibus rufis." Wilson questions this point on the basis that Kaempfer could not have seen it enroute from Nagasaki to Kyoto. On the contrary, this journey would have allowed Kaempfer to see R. japonicum. Whether these southernmost colonies of R. japonicum will be significant in terms of heat tolerance must await the observations of others, but the recording of this highly significant colony and the availability of yellow-flowered populations should be important to the breeder of deciduous azaleas.

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

A yellow-flowered plant of Rhododendron japonicum in full bloom. The flowering period is late April to early May in Kyushu.

Buxus microphylla var. japonica on the rocky ledges of Mt. Kosho, Kyushu.

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

Ashitaka, Jurigi Village, and Hakone

The return from Kyushu to Tokyo was by way of Mt. Ashitaka near Hamamatsu, Honshu. The purpose of my visit (May 16-17) was to examine a naturally occurring hybrid between Rhododendron Kaempferi and R. macrosepalum named R. X tectum Koidz. The roadsides and ditches were frequented with both R. Kaempferi and R. X tectum, similar in color but easily separated by the glandular hairiness on the prominent calyx lobes of the hybrid. Magenta-flowered R. macrosepalum, on the other hand, frequented the shade of the higher pine woods. Wilson also noted that these two, R. Kaempferi and R. macrosepalum, grew together by the thousands and were easily recognized from train and car windows. Two orchids were encountered in the late evening after a march through seemingly endless hillside tea plantations. On a marshy slope too steep to plant tea, we found the colony of Bletilla striata. It evidently was a protected and not frequented area for the tiny plants, pink and white, dominated the slope. I did not see this orchid again in the wild and it is said by the Japanese to be rather rare. But in a private collector's garden in Mito, B. striata was cultivated, in its pink form only, and flourished. It would make a good garden plant in the United States.

Ashitaka is the locality for an azalea new to us, Rhododendron komiyamae Makino. This species is referred to by the Japanese as "Ashitaka tsutsuji" in reference to the fact that it grows at the summit of Mt. Ashitaka (1,098 meters). It is a small tree or large shrub 10 feet tall, semievergreen with rather narrow leaves, acute at both ends. The flowers are purple, 1 inch across, and have 10 stamens. In its social relationships with R. Kaempferi, R. komiyamae compares favorably with that described for R. sataense and R. kiusianum in Kyushu. Behind a small farmhouse near Jurigi Village (900 meters), I came upon a colony of azaleas in bloom. They largely resembled some of the Kaempferi hybrids I have seen in cultivation. The flowers varied from the brick red of R. Kaempferi to the purple of R. komiyamae. The plants grew on top of moss-covered rocks protruding out of the boggy ground. These were upright plants 6 to 8 feet tall and characterized by 6 to 10 stamens. Earlier in my ascent, I had seen R. Kaempferi in flower at lower elevations and had also climbed to the summit of Mt. Ashitaka to locate R. komiyamae in a rain that turned into light snow. It was on my return that I chanced upon this hybrid swarm, which gave all evidence of intergradation between R. Kaempferi and R. komiyamae. This is not a new azalea, but must be what Wilson described as R. obtusum var. Kaempferi f. mikawanum, which he collected in the Ashitaka mountains. We have on hand collections of the hybrid swarms, as well as R. Kaempferi and R. komiyamae, from Ashitaka.

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

that one is drawn to them. They stood out like signal fires in the dark evergreen vegetation. Collecting in the small Hakone Botanical Garden completed the work of this first phase of the 1961 expedition.

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

Locality

(1) Unsen-dake, near Nagasaki. From Isahaya Station to Obama hot spring by bus (1 1/2 hours); to Unsen hot spring by bus (40 minutes); stay at Fukiya onsen.

(2) From Kagoshima City one can travel to several mountains, as follows:

(a) Kaimon-dake. From Kagoshima City to Ibusuki hot spring by train (2 hours); to Yamakawa by bus (40 minutes); to top of mountain on foot (1 1/2 hours).

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

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

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

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

(a) Horticultural Field Station, Kurume.

(b) Seidagawa. From Kurume City to Kitayamade by train (2 hours); on foot (1 1/2 hours) to top of mountain (about 520 meters).

(c) Kokonoe-yama. From Kurume City to Bungonakamura station (Kyudai line) by train (2 1/2 hours); to Iida-machi by bus (1/2 hour); from Iida-machi to Hokke-in on foot (1,300 meters) and then to the top of Ofunayama (1,700 meters).

Species to See

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

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

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

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

Native azaleas of Kyushu in their representative localities; Kirishima mountains reproduced in miniature with appropriate plants. Many nurseries featuring azaleas and broad-leaf evergreens. Season, April 20-May 10. Open fields with yellow and orange forms of R. japonicum; culture of shii-take mushroom on oak logs. Season, May 1-10. R. kiusianum in purple dense form and frequently in white-flowered form. Natural hybrids with R. Kaempferi at lower elevations. Season, May to early June.

IBARAKI PREFECTURE - ABUKUMA RANGE

(May 24-June 5)

The second phase of the 1961 expedition initiated a survey that ultimately included the entire Pacific Coast of Honshu, northward from the famous shrine city, Kashima (35° 58' N. 140° 38' E.) to Tomioka (37° 21' N. 141° 01' E.). The specific areas included in this phase of the

collecting work were the forests of the Takahagi, Taira, and Tomioka Forestry Districts; the isolated mountain in the Kanto Plain called Tsukuba (840 meters); and the protected forests of the Kashima Shrine itself.

Ibaraki University is located at the prefectural capitol, Mito, and here I met with my highly competent guide, interpreter, and companion, Masamune Sato, a leading Japanese botanist. His contacts with the forestry officers, as well as his intimate knowledge of the region, were important. Under the forestry system of Japan, the operating unit is the District Forestry Office, which controls a defined National Forest. Each District (338 total) is part of a larger administrative unit, the Regional Forestry Office, of which there are 14 for the entire country. National forests account for 30 percent of the total area (22 million hectares) in forests, and individual landholders own 50 percent of the forestry land. Shrine, prefectural, city, and company forests account for the remaining 20 percent. Ninety-four percent of the individual holdings are less than 5 hectares in size. Thus, the areas of natural vegetation of Japan are largely confined to the forests belonging to the national government. Collecting in such forests is best undertaken in cooperation with the forestry officers. These men are thoroughly trained woodsmen although their knowledge of native species that are not of forestry value is somewhat limited.

Takahagi, Taira, and Tomioka Forestry Districts

The Abukuma Range is a region of transition; along the coast near Kashima, one can observe the last of the broadleaf elements of the evergreen forests of southern Japan. This includes Ardisia crenata, Castanopsis cuspidata, Cinnamomum japonicum, Damnacanthus indicus, Fatsia japonica, Hydrangea involucrata, Neolitsea sericea, Quercus acuta, and Q. myrsinaefolia.

Our first collecting area was in the Takahagi Forestry District near Ibaraki City. The most interesting localities were the beach areas. These were planted to forests of the black pine (Pinus Thunbergii) for sand-dune control. The shore juniper, Juniperus conferta, has invaded the pinewoods. In the shelter of the pines, the shore juniper grows to 18 inches tall, but on the open sands spreads prostrate and carpets miles of beach front. Occasionally, a small hummock will accumulate an assortment of broadleaf and coniferous evergreens, such as Camellia japonica, Euonymus japonicus, Eurya japonica, Juniperus chinensis, Ligustrum japonicum, Machilus Thunbergii, and Pittosporum tobira. Camellia japonica blooms from early January to March and there was no snow here during 1960-61. The climate is not particularly severe, as evidenced by the extensive use of Damnacanthus and Fatsia in gardens.

Rhododendron Kaempferi had already flowered in the hills but along the edges of rice paddies near the ocean, it was still in bloom on May 28. At the sea cliffs, R. japonicum grows in semishade mixed with Kaempfer's azalea, and it was also in flower. Unlike the colonies of azaleas in southern Japan with their broad range of color, the flowers of R. japonicum here are limited to the typical orange-red shades. A single plant of R. Kaempferi had hose-in-hose flowers, the first of its kind I had seen in the wild.

At many points the cliffs abruptly erode into the ocean and provide the picturesque scenery so typical of Japan. An orange-yellow daylily in full flower dominates the open areas. This is Hemerocallis longituba, the earliest of the species to flower. Collections of these May-flowering plants have now provided breeders with the full range of flowering sequence. In 1956, I collected the October-flowering type H. littorea in a similar habitat in southern Shikoku and it not only has proved hardy in Maryland but also has maintained its late-flowering habit.

Ootakino (37° 21' N. 140° 42' E.) is the highest mountain of the Abukuma Range (1,193 meters). We traveled part way by jeep along a logging road and on foot to the severely cutover meadows at the top. The open fields are inhabited by Rhododendron japonicum and the plants are multistemmed from the constant cutting back by harvesters of small brush. In the few wooded areas bordering these brush fields, R. Kaempferi grows up to 6 feet tall, straggly, but brightly coloring the woods with its salmon-colored flowers. Occasional plants of the white-flowered R. quinquefolium were flowering. Seldom does one see these three azaleas at their peak of bloom in one locality.

Pinus Thunbergii inhabits the coastal dunes throughout the warmer regions of Japan.

Juniperus conferta, the shore juniper forms solid mats of green on the beaches of the Pacific coast of Honshu.

A mixed broadleaf evergreen association along the coast of northern Honshu. Straggly trees in the background are mostly camellias.

Constant erosion by the ocean eventually cuts off small sections of the ocean cliffs along the Coast of Honshu.

On this mountain, the winter snow accumulates to 7 meters and the temperature falls to -15° to -20° C. Along the return route in the late evening we encountered in the nearby riverbed a huge pendulous tree of Abies firma, said to be 200 years old. A. firma in its typical form is one of the finest forest trees of Japan. It grows to 150 feet tall and is a symmetrical pyramidal tree with massive basal branches. The rich, glossy leaves make it the most beautiful of Japanese firs. A large tree of Camellia japonica, single flowered, grew along the roadside here. Cuttings were taken from this tree since it was the only specimen I had seen at so high an elevation in this region (605 meters). Seeds from this particular tree also were sent to the U.S. Department of Agriculture in 1962.

Cornus kousa was the most conspicuous tree along the riverbanks. It showered down as huge, white-flowered, pendulous trees over the edges of the watercourses. The floral bracts varied greatly in size from tree to tree.

I had now traveled the length of the Abukuma Range from seacoast to the highest peaks. Clearly the pattern of plant life had changed from the pure broadleaf evergreen

Abies firma, one of the most handsome firs of Japan, grows along rocky streambeds in the Abukuma Range of Northern Honshu.

Cornus Kousa, in flower along the wooded stream banks,
cascades as a waterfall, Ibaraki Pref., Honshu.

Cornus Kousa, showing the variability in the size of floral bracts that is encountered
in the mountains of central Honshu. Period of bloom is late May to early June
according to locality.

A view of a "residential forest" surrounding the Nyra Garden, Ibaraki Pref., near Takahagi City. The main forest is Cryptomeria japonica.

forests of southern Japan to a mixture dominated by conifers and deciduous plants. Abies firma is the most handsome natural conifer seen here, but is not of forestry importance and the planted forests are mostly Chamaecyparis, Cryptomeria, and Thujopsis.

Although I studiously avoided the delights of visiting gardens during this trip, the Nyta Osamu Garden at Izura, Ibaraki Prefecture, could not be bypassed. It represented to me the unique ability of the Japanese to establish a residence within the framework of a natural setting. This is what the Japanese refer to as a "residential forest." As he travels by train or car across the plains, one cannot help but notice these small, green, forestlike patches sitting in the middle of seas of green rice plants. It is blended into a natural setting with such smoothness that the two can scarcely be separated. The composition at Nyta Garden is centered on a small forest of Cryptomeria japonica planted to the top of the hill. Occasional trees of Quercus myrsinaefolia are growing. Within the protection of the conifers and fronting on them is the ever-present stand of bamboo, Moso-chiku (Phyllostachys edulis) in this instance. This forest provides a natural climate control, bringing coolness in summer and blocking out the cold winds in winter; offers small wood for starting charcoal fires and occasional timbers for house repairs. The bamboo also has many other uses. The pale green of the bamboo is a sharp contrast to the dark Cryptomeria foliage.

The house and outbuildings are placed effectively in this grove, facing out over the rice paddies. The entrance to Nyta Garden is a long ramp of stone through a plain wooden gate. One is immediately confronted with an immaculate garden. The path, now brushed sand, divides around a small circle in which the center piece is a trained black pine. Considerable use is made of azaleas planted both in the ground and in containers, ardisias, cut-leaf maples, damnacanthus, and serissa, all trained and sheared into formal habit. A large podocarp is trained into a pyramid.

A small side garden, designed for private enjoyment of the household, is secluded by a podocarp hedge. In the garden are typically trained plants of Japan, maples supported with bamboo poles, terrestrial orchids, and other shrubs of neat, formal habit, which provide a complex of green shades. Such a viewing garden is not rampant in color but is intended to provide a restful and harmonious blending of greens. A stone lantern and simple pool with golden carp complete the setting. Trimmed sentinels of cryptomeria, cypress, and podocarpus stand about. Only with permission does one enter this part of the garden.

Tsukuba-san and Kashima Shrine

Tsukuba-san (876 meters) is an isolated tourist-type mountain sitting in the Kanto Plain, often crowded with children and reached by a cable car if desired. We went to collect the locally grown Citrus tumida, but also paused to gather seedlings of Ardisia japonica, Camellia japonica, Eurya japonica, Ilex crenata, I. integra, Kadsura japonica, and Osmanthus heterophyllus. Handfuls of small plants can be collected in the damp humus of the rain forest and easily shipped in plastic bags with a high rate of survival. At times when seed is not ripe, this is the only recourse for the collector.

Returning from Tsukuba-san, we traveled by launch through Kasumiga Lake to the Kashima Shrine. Here a show of Iris Kaempferi was the center of attraction. Small garden shows are commonplace in Japan and extremely popular. This one had the added attraction of combining a photographic exhibit with the irises. At Kashima, the only collections of interest were Damnacanthus indicus and Fatsia japonica. The area resembles southern Japan with plants requiring a warm, temperate climate, including epiphytic orchids and evergreen ferns. This is, also, the last of the truly evergreen forests along the outer coast of Honshu.

Lacking greenhouse facilities, Japanese propagators resort to plastic bags to enhance the success of conifer grafts at a forestry research station near Mito, Honshu.

From Kashima, I returned to Tokyo by boat and train, shipped those collections made at Tsukuba-san and Kashima, and made preparations for the journey to the region called the Tibet of Japan.

HONSHU - THE NORTH PACIFIC COASTAL REGION

(June 9-29)

We left Tokyo for Sendai, intent on undertaking a journey throughout the northeast quarter of Honshu, known as the Kitakami floral district. Along the coast of this region, I hoped to visit the most northern habitat of Camellia japonica and to determine the manner in which this and other broadleaf evergreens completed their distribution in northern Japan. To my knowledge, no foreign collector had previously made this journey. It required the cooperation of several forestry district offices for transportation and transfers to adjacent districts as I reached the boundaries of each domain. My colleague on this trip was S. Kurata, a fern specialist from the University of Tokyo.

Kinkazan (38°17' N. 141°34' E.), a small island off the Ojika Peninsula, was our first collecting site. The flora is a mixture of northern and southern Japanese elements but comparatively few broadleaf evergreens. C. japonica, which flourishes on the coast, seems totally absent from Kinkazan and I was hard pressed to find specimens of Machilus Thunbergii although both species occur many miles north on the mainland. Rhododendron Kaempferi and R. japonicum, in full bloom, were encountered all over the island and Cornus kousa grew as large trees and was at its peak of bloom (June 11). Paeonia japonica, in both pink- and white-flowered forms, and two small herbs, Chloranthus japonicus and C. serratus, flourish in the moist shade. These two herbs have white flowers in terminal spikes, those of C. serratus always being forked. Torreya nucifera, now rare in Japan, grows to a height of 50 feet on this island. Other conifers are the maritime species mentioned earlier.

Returning from Kinkazan, we collected in the forests around the port of Ayukawa. These forests are cultivated primarily as an adjunct to the fishing industry for it is believed that their presence enhances the near-shore fishing grounds. Only maintenance cutting is permitted.

Machilus Thunbergii--a closeup of this broad-leaf evergreen tree showing the smooth, light grey bark. This tree is on the sea cliff above Ayukawa, Miyagi Pref., Honshu.

Ardisia japonica has formed a solid ground cover in dense shade at Ayukawa, northern Honshu. Covering trees are Camellia, Ilex, Machilus, and evergreen oaks.

Camellia japonica. On rocky seacoasts, this species is always stunted and partly defoliated by wind and sea effects.

Here I located the most extensive colonies of Ardisia japonica I have seen in Japan. This evergreen ground cover grows in the same dense fashion as the familiar Pachysandra but it has red fruit and lustrous green leaves. It spreads by underground stolons. Collections made at Ayukawa have thrived for the past three winters in Lanham, Md., and Ardisia japonica could be an acceptable ground cover for locations south of Washington, D.C. •

Other collections made at Ayukawa included Camellia japonica, Eurya japonica, Ilex integra, and Pittosporum tobira. In this area Camellia japonica grows on the faces of the sea cliffs, along with deciduous oaks and black pines. It is a scrubby tree showing much winter damage but is said to bloom from December to March. The winters are open, with light snow only two or three times and temperatures down to -4°C . Machilus Thunbergii is also common and in small villages is known as "Sasaki" performing the religious functions of Cleyera japonica, known by that same common name in southern Japan.

Tsubaki-jima and Areshima

Two islands near Shizukawa ($38^{\circ}30'\text{ N}$, $141^{\circ}29'\text{ E}$.) are important outposts for broadleaf evergreens. Tsubaki-jima, so named because it is a dense jungle of camellias, is a small, round island, black on the horizon, because of the thick evergreens, especially Machilus Thunbergii. This handsome relative to the camphor-tree has not been introduced previously although it exceeds both the camphor-tree and the evergreen oaks in hardiness. In the spring the young growth flushes brilliant orange, not unlike that of Pieris japonica. Inland on Tsubaki-jima, the forest floor is littered with young seedlings of Camellia japonica, Euonymus japonicus, Eurya japonica, Ilex integra, Machilus, and Pittosporum tobira. Northward of here, some of these plants will no longer be seen. On the narrow, gravel beach of both islands, Lilium auratum and L. maculatum grow.

Areshima is an island similar to Tsubaki-jima but closer to shore. I found Skimmia japonica along the north beaches with red fruit in hollylike clusters at the branch terminals. Ardisia japonica, prevalent on Tsubaki-jima, could not be found. Camellia japonica develops a distorted habit on rock faces. On the beach fronts, it clings to the rocks within a foot of the tidal limit,

Camellia japonica growing along the roadside in Iwate Pref. This is near the northern limit of distribution. Such trees are grown as a source of oil.

attesting to its salt tolerance. Within the forest it reaches 12 inches in diameter and attains 12 feet in height. On the mainland, many more camellias can be found, but we had approached the limit for most broadleaf evergreens. In this area, the first frost comes in late October and some snow falls by November 25. Temperatures may fall to -6° C. at some time every winter.

Our route northward from Shizukawa followed along small dirt roads flanked with continuous clumps of the daylily, Hemerocallis longituba, an orange-flowered species restricted to northern Japan. Poncirus trifoliata is used for hedges in the small farm clusters. On sandy beaches, Rosa rugosa appeared for the first time. Dense clumps of the neat Chrysanthemum japonicum and an Allium in bloom with purple heads were the most attractive of the beach plants.

On June 15, we spent the day collecting camellias along the mountain road as it wound toward Goyo-san (1,341 meters). Barley is the main crop in this region and camellias are frequently planted in the vicinity of the grainfields. At a small town, Rikuzen-Takeda, the seeds of Camellia japonica are pressed for oil that is used for cooking and as a hairdressing. Quantities of seed were on hand from the last year's crop, but later showed very low viability.

At the top of Goyo-san, Diervilla hortensis was in full bloom. It is a large shrub, about 8 feet tall, with long arching branches covered with carmine flowers. Rhododendron Kaempferi was just at the end of its flowering period. The flowers are small, dark red with a heavy blotch. R. japonicum was also in flower with rather uniform orange-red blooms. These azaleas were now found in deciduous forests, mostly birch and maple. We exchanged jeeps at the mountain top and drove down the tortuous road through small villages crowded to the river side by the steep mountains. In the late evening we again arrived at the coast at the village of Kamaishi. Stops were made at Sangan Island ($39^{\circ}18'N$. $141^{\circ}59'E$.) and at Cape Funakoshi ($39^{\circ}18'N$. $141^{\circ}59'E$.)

On Sangan Island, Pseudosasa japonica, the arrow bamboo, has overrun the vegetation, but we were able to dig Hemerocallis esculenta, Lilium auratum, and L. maculatum. Juniperus chinensis and Rosa rugosa grow on the outer fringes of the bamboo.

Funakoshi is the northernmost locality for truly wild stands of Camellia japonica. Here in the protection of large Cryptomeria trees in a swale behind the seacoast, some 30 or 40 straggly trees are grouped together. The flowering period here is in late April and early May. At Miyako, about 25 kilometers away, the winter temperature does not fall below -10° C. Cuttings were collected from nine trees at different sites in the stand.

Rodgersia podophylla growing in the moist woods of Mt. Hayachine, Iwate Pref.

Dryopteris crassirhizoma, a hardy fern, and Cephalotaxus Harringtonia var. nana, a spreading shrub with ascending branches, both grow in northern Honshu and Hokkaido.

The last natural habitat of Camellia japonica along the Pacific Coast of Honshu is at the village of Raga. Here, camellias are grown for seed oil.

Hyachine (1,914 meters) (39°34' N. 141°29' E.) is the highest mountain of Kitakami region and considered by the Japanese to have a noteworthy alpine flora since it is of Paleozoic formation. In the boggy approaches to the streams, I encountered the first of the prostrate forms of upright species, namely, Cephalotaxus Harringtonia var. nana and Ilex crenata var. radicans. Rodgersia podophylla, a saxifrage with huge palmate leaves and terminal spikes of white flowers, was the most conspicuous plant. Here, too, I collected Vitis Coignetiae, a heavy vine plant with broad leaves as much as 12 inches across. This turns brilliant red in the autumn and should be a desirable hardy climbing garden plant. Numerous ferns, particularly the hardy Dryopteris crassirhizoma, were scattered throughout the Hayachine's bogs. This is an area noted for frequent rockslides and the road which follows the course of small rivers was overhung with massive threatening ledges. More than once we were halted by a bulldozer clearing the road.

The northernmost place where Camellia japonica is cultivated on the Pacific coast of Honshu is the tiny fishing village of Raga, Tanohatamura. The trees are in shrine gardens and around one or two of the dwellings. An elderly farmer assured me that these were native plants and flowered in May. He generously permitted me to collect cuttings and presented a bag of seeds. These were, as usual, part of the oilseed harvest. It is worth emphasizing that C. japonica and Euonymus japonicus are the only upright broadleaf evergreen shrubs either wild or cultivated in this locality.

During this part of the collecting work, I had visited every significant locality for Camellia japonica and gathered 21 lots of cuttings representing different habitats. In addition, large seed shipments were made by the forestry officers in the spring of 1962. Together with collections from high elevations in southern Japan, these are the most extensive collections of wild types of C. japonica brought into cultivation.

Lake Towada and Mt. Hakkoda

Lake Towada and Mt. Hakkoda (1,600 meters) are on the midline of northern Honshu. Although the lake area is highly scenic, the forests are mainly deciduous and it is on Mt. Hakkoda that the plant collector will find excitement. Mt. Hakkoda is capped with perpetual snow and replete with moorlands colonized by ericaceous and other subalpine plants. The latter part of June is a delightful period for a visit. There is a good, but crowded, Japanese-style inn and a small botanical garden containing the local plants. The two main bogs are O-take (1,000 meters) and Kenashitai (1,100 meters). These can be reached by car and one can spend the time viewing colonies of Rhododendron japonicum and R. Fauriae in full bloom. But the real delight to the plant collector is to climb on foot to the higher moorland where a wealth of hollies, other woody species, and flowering herbs can be seen growing in picturesque bogs.

We climbed from one bog to the next, collecting both seeds and cuttings of hollies. Ilex Sugerokii, is the most vigorous holly species on Mt. Hakkoda. It is a shrubby species rarely exceeding 8 feet. Fortunately the fruits hold over from the previous year and germinate without difficulty. Cuttings from both male and female plants and seeds also were collected.

I. crenata var. radicans grows in and around the bog pools while I. rugosa completely prostrate can be found considerably higher in rocky ledges or hidden under dense clumps of Pinus pumila. The Rugose holly does not fruit heavily. In the protection of sasa bamboo and conifers, Ilex leucoclada, a red-fruited evergreen holly, can be found occasionally. It is the largest fruited holly of northern Japan but is one of the species that is not found on the less humid Pacific coast. Rather, it is restricted to those regions bordering the Sea of Japan where winter precipitation is high. Where it cohabits with I. rugosa, the natural hybrid I. X Makinoi results. The hybrid is easily distinguished by its decumbent habit and large, somewhat rugose leaves. Both male and female plants of this hybrid were collected.

Around the bog pools, Lysichiton camtschaticense, with beautiful, large callalike flowers, grew abundantly and solid stands of Veratrum Maackii var. japonicum were covered with erect heads of creamy-white flowers.

Ilex rugosa growing at the border of an extensive planting of Pinus pumila. This colony is just at the line of perpetual snow on Mt. Hakkoda, Honshu.

Lysichiton camtschatcense spreads around and through the bog pools of Mt. Hakkoda and blooms in June in this alpine environment.

Natural hybridization in hollies. Left, Ilex rugosa; Right, I. leucoclada; Center, I. X Makinoi.

Upland bogs on Mt. Hakkoda, Honshu--habitat of Rhododendron japonicum at its northern limit of distribution.

Rhododendron japonicum in full bloom on Mt. Hakkoda, June 24, 1961. In this locality the flowers are uniformly orange red.

Rhododendron japonicum is the most spectacular azalea on this mountain. This is the northern limit of natural distribution and a remarkable contrast to the colonies found blooming in Kyushu in early May. It was in full bloom on June 24. The plants were scattered throughout the bogs, often at the very edges of the pools. It is a meadow plant here as elsewhere in Japan. At its northern limit, R. japonicum is a vigorous plant with large glaucous leaves. The flowers are uniform in color throughout the stands. It is a glowing orange red and the trusses of 10 to 12 flowers are compactly borne. By far, this is the finest form of the species I have ever observed in Japan. If it proves to be a distinct biotype for color and form, this type will be a most useful azalea for areas requiring hardiness. The winters at Hakkoda are extremely cold but the snow accumulates to several feet and remains until late in the spring. This azalea was not found again as I traveled in Japan north of Mt. Hakkoda. One advantage from securing material of this type is the opportunity to conduct research on inheritance patterns for azaleas as a basis for further improvement.

Shimokita Peninsula

The northernmost point of Honshu is the hook-shaped peninsula, Shimokita. This remote area features a small mountain, Osore-san (879 meters); a small sulfur lake, Usuri, locked within this mountain; and outcroppings of sulfur surrounding the lake bed. Lake Usuri is famous among the Japanese and considered one of their most sacred grounds. Worshippers come here from all parts of the land. Because of its scenic beauty, Osore-san has been designated as a Prefectural park. The sulfur lake, 8 kilometers in circumference, is surrounded by peaks forested mainly with Thujopsis dolabrata var. Hondae (Hiba). Its seedlings are scattered in great numbers along the road cuts; and in the forests, young trees pressed down by the snow

A colony of Ilex crenata var. radicans at Osore-san, Honshu, illustrates the compact spreading habit of this variety.

Schizophragma hydrangeoides climbing over a dead tree trunk in Osore-san forest illustrates the horticultural merit of this plant.

cover layer themselves in the humus. The forest floor contains numerous ferns, occasional plants of Ilex rugosa, I. leucoclada, and their hybrid combination, I. X Makinoi. Of the vines, Schizophragma hydrangeoides, as if a planned addition to the landscape, covering dead trees, and Actinidia kolomicta inhabited the deep forest. Only the male plants of Actinidia display handsome pink and white variegated leaves. The most curious plant of this area is Aucuba japonica var. borealis. This is a compact, decumbent form of the species adapted to this region

of intense winter cold and deep snow. Some plants, 18 inches tall, bore masses of red fruit and could conceivably make fine low garden elements.

Around the sulfur lake itself, in a setting of almost blinding whiteness, Ilex crenata var. radicans spreads as a completely prostrate plant while I. Sugerokii grows among it in its usual upright, hedgelike fashion. Ledum palustre and Rhododendron Fauriae are also in this association. We concentrated on the various hollies, Aucuba, and also gathered several plastic bags of seedlings of Thujopsis without difficulty.

Ilex sugerokii at Osore-san, Honshu, grows in a dense upright manner. Scattered around it are Ledum palustre, Rhododendron Faurei, and Ilex crenata var. radicans.

Aucuba japonica var. borealis, illustrating the decumbent habit of many of the broadleaf evergreens found in northern Japan.

Aucuba japonica var. borealis, the dwarf variety from northern Japan. This is a heavy-fruited type growing at Osore-san, Honshu.

I departed from Shimokita by jeep to Aomori city and returned to Tokyo on June 29. During this phase of the Japan exploration, I had examined the last locality of Rhododendron japonicum at Mt. Hakkoda and that of several broadleaf evergreens at various points along the Pacific coast of Honshu. The last species to be found among the upright plants were Camellia japonica and Euonymus japonicus. Simultaneously, prostrate forms of broadleaf evergreens that could not survive without adapting to the favorable environment provided by the snow cover began to appear. Among these procumbent forms are: Aucuba japonica var. borealis, Daphniphyllum macropodum var. humile, Ilex crenata var. radicans, and Skimmia japonica var. intermedia.

The broadleaf evergreen tree elements all disappeared and the forests changed to mixed conifer-deciduous associations, of which the Fagus crenata forest predominated. Among the ground-covering evergreens, Pachysandra terminalis had become common and Euonymus Fortunei var. radicans occurred regularly in the forests.

Because of the significance that I attach to the distribution of broadleaf evergreens of Japan and the relationship of northernmost elements to hardiness, a number of ornamental garden plants from Japan with this kind of distribution are listed. The northernmost locality on the Pacific Ocean side and the Sea of Japan side are given. I have visited all of those on the Pacific side of Honshu, relatively few on the side of the Sea of Japan.

Evergreen Species	Northernmost Distribution	
	Pacific Ocean	Sea of Japan
<u>Ardisia crenata</u>	Hitachi	?
<u>Ardisia japonica</u>	Tsubaki-jima	Okushiri Island (Hokkaido)
<u>Aucuba japonica</u>	Sendai	(absent)
<u>Aucuba japonica</u> var. <u>borealis</u>	(absent)	Southern Hokkaido
<u>Buxus microphylla</u>	Hitachi	Sakata
<u>Camellia japonica</u>	Funakoshi	Kominato
<u>Daphniphyllum macropodum</u>	Sendai	(absent)

Evergreen Species	Northernmost Distribution	
	Pacific Ocean	Sea of Japan
<u>Daphniphyllum macropodum</u> var. <u>humile</u>		Central Hokkaido
<u>Euonymus Fortunei</u> var. <u>radicans</u>		Central Hokkaido
<u>Euonymus japonicus</u>	Raga	Hirasawa
<u>Eurya japonica</u>	Rikuzen-takeda	Kogane-zaki
<u>Fatsia japonica</u>	Hitachi	?
<u>Hedera rhombea</u>	Kawai	Okushiri Island (Hokkaido) (absent)
<u>Ilex crenata</u>	Ayukawa	
<u>Ilex crenata</u> var. <u>radicans</u>		Sakhalin
<u>Ilex integra</u>	Tsubaki-jima	Sakata
<u>Ilex leucoclada</u>	(absent)	Southern Hokkaido
<u>Ilex rugosa</u>		Sakhalin
<u>Ilex Sugerokii</u>		Central Hokkaido
<u>Ligustrum japonicum</u>	Takahagi	?
<u>Machilus Thunbergii</u>	Funakoshi	Kogane-zaki
<u>Pachysandra terminalis</u>		Sakhalin
<u>Pittosporum tobira</u>	Tsubaki-jima	(absent)
<u>Raphiolepis umbellata</u>	Sendai	Kashio
<u>Skimmia japonica</u>	Ayukawa	(absent)

The significant garden plants which naturally extend over to Hokkaido are few. The species of interest include Aucuba japonica var. borealis, Hedera rhombea, Ilex crenata var. radicans, Ilex rugosa, Pachysandra terminalis, Rhododendron Albrechtii, R. Kaempferi, R. Tschonokii, and Rosa rugosa. Others not frequently found in warmer parts of Japan are circumpolar species, such as Andromeda polifolia, Empetrum nigrum, Ledum palustre, Myrica gale, Oxycoccus quadripetalus, Rubus chamaemorus, and Vaccinium Vitis-idaea. The lilies and daylilies of Hokkaido are also important contributions to our gardens. Numerous conifers and deciduous trees of Hokkaido are often used in American gardens. These were not considered in the present trip since we know so little about their variation and grow only chance progenies or garden varieties.

HOKKAIDO

(July 6-21)

Hokkaido is the "pioneer" island of Japan. It has a rather recent history in comparison to old Japan. Much of it reflects the influence of American agriculturists for the "pioneering" of Hokkaido was exclusively under American tutelage. The capital was fixed at Sapporo in 1871 and the Sapporo Agricultural College opened its doors in August 1876 with the first president, an American, William S. Clark, also president of Massachusetts Agricultural College. Clark remained only 8 months and yet left an image that is still reflected in the Japanese people of Hokkaido. His departing words spoken at a small farewell luncheon were "Boys, be ambitious". The saying is still in common use by the students of the present University of Hokkaido.

My starting point in Hokkaido was the Sapporo institution. An excellent Botanical Garden here, under the direction of M. Tatewaki, dates back to Clark's era. Professor Tatewaki is one of the foremost forest botanists of the North Pacific region and had helped to plan my first travels in Hokkaido in 1955. His students make annual treks into the many forests that cover Hokkaido. This island has the most extensive forest reserves of Japan.

Objectives of the 1961 Japan exploration of Hokkaido were finding the ultimate northern locality of Rhododendron Kaempferi, considering the hollies of Hokkaido and some reported cultivated distributions of camellias, and exploring the Hidaka Mountain Range, which faces the

Shimokita Peninsula of Honshu. In 1955, I had explored the easternmost Hokkaido regions adjacent to the Kuril Islands and climbed to the barren alpine meadows of the highest mountain, Daisetsu (2,345 meters), but the plants found here have only limited value in ornamental horticulture. Comparable or better plants are found in Europe and North America. Without doubt the most overwhelming species in Hokkaido is Sasa kurilensis, a thicket bamboo that invaded large tracts of land cut over during the Second World War. It competes with all other undergrowth and probably has displaced many species of woody and herbaceous plants.

Lake Shikotsu

Lake Shikotsu (42° 45' N. 141° 20' E.) is a crater topped by one large peak, Izari-daki (1,318 meters). Otherwise the terrain around the lake is high moorland inhabited by scrub trees and ericaceous plants of an alpine nature. The principal forest trees are Abies sachalinensis and Picea jezoensis and occasional stands of Acer mono, Betula platyphylla var. japonica, Carpinus cordata, Fraxinus mandshurica var. japonica, Sorbus commixta, and Taxus cuspidata. There are only three azaleas. Rhododendron Kaempferi grows on wooded slopes in rather dense shade or along streams where seedlings crop up by the thousands. R. Tschonoskii, with small white flowers, grows as tangled prostrate colonies much as do some of our native blueberries. R. Albrechtii is scattered and sparse in cutover woodland. Euonymus Fortunei var. radicans and Pachysandra terminalis are the common ground covers and the brilliant Actinidia kolomikta and Hydrangea petiolaris grow as lianas. Rhododendron Kaempferi and R. Tschonoskii were both in bloom during early to late July. A small spirea of rock garden quality, Spiraea betulaeifolia, was also in flower and formed dense-headed plants of grass height.

Hidaka Mountain Range

From Lake Shikotsu, we journeyed down the coast of Hokkaido along the Hidaka Mountain Range (42° 35' N. 142° 45' E.) to Cape Erimo. This route is called the "Golden Road" because it costs so much to continually repair the damage from landslides. Along the roadside, the steep cliffs are natural sites for Dianthus superbus, Hemerocallis Middendorffii, and short-stemmed Lilium elegans. In marsh areas, Filipendula kamschatica and Iris Kaempferi were mixed pink and purple. The wild I. Kaempferi is small compared to the cultivated forms and flowers are reddish purple. I wandered through a swampy pasture noting the variation in flower type and selected and dug individual plants that were showing variations in form.

Spiraea betulaeifolia, a dwarf species flowering in mid-July in northern Honshu.

Driving along this road, carved casually out of massive looming cliffs, is an easily recalled experience. Along the narrow seafront, the beaches were often ribboned with extensive gatherings of giant kelps. These had been brought from deep water and were being dried for food. Rosa rugosa grew in numerous colonies behind the beach. It is one of the best dune-holding plants of this region. Inland from the narrow beach, loose shale affords little room for woody shrubs. Herbaceous species of plants predominated. Without doubt, Hokkaido is the place to search for daylilies. More extensive colonies are found here than anywhere else in the Japanese Empire.

Facing the ocean as it does, the Hidaka Mountain Range is a rich floristic locality. This range was so dense with fog that nearby climbers could be heard but could not be seen. Rhododendron Kaempferi grows at all elevations on Mt. Apoi (810 meters), one of the highest peaks of the range. A prostrate alpine plant, Lonicera caerulea var. edulis, with edible bright-blue fruit, colonizes rocky outcroppings. The small herbaceous perennial, Clintonia udensis, characterized by basal leaves and 12-inch spikes of white flowers followed by dark-blue fruit, is common in open boggy localities.

Two hollies occur here, Ilex crenata var. radicans and I. rugosa, both prostrate types and undoubtedly covered with snow all winter. Of the lilies, I frequently encountered Lilium medeoloides, with lowest leaves in false whorls and small nodding orange flowers. A plant that attracted my attention was a Polygonum growing beside the path. It had such compact habit it appeared to have been sheared. It has possible merit as a border plant and a large clump was dug.

Hakodate, Matsumae, and Esan

We returned to Sapporo from the Hidaka Mountain Range and proceeded to the southernmost tip of Hokkaido to Hakodate City to begin a trip that included the entire lower peninsula of Hokkaido, first to the lower left, toe part where the ancient castle city of Matsumae is found and then to the right, heel tip with a spurlike mountain called Esan.

The Hakodate region is remarkably like the northern tip of Honshu; forests of Fagus crenata and Thujaopsis dolobrata with an undercover of Aucuba japonica var. borealis, Ilex leucoclada, and Skimmia are frequently encountered. The pastureland resembles some of the open areas of New England--mixed clumps of beech, maple, and oak trees, and rampant with elderberry, honeysuckle, and roses. Along the coastal road near Esashi I spent a morning in a fine meadow filled with daylilies (Hemerocallis Middendorffii), and collected plants to express some of the variations of this robust orange-yellow daylily. The flowers varied from those with narrow straplike segments to others with broad ovate overlapping segments and flowers 1.5 centimeters across. Others had multiple buds with many flowers open at one time. Each clump was dug, labeled as to type, and subsequently sent to Glenn Dale, Md.

Matsumae is one of the oldest cities of Hokkaido, dating back to the reign of the Tokugawa daimyos. It is typical of the castle towns of old Japan, not frequently seen in Hokkaido. In the gardens of Matsumae, Cryptomeria, fig, persimmon, and timber bamboo can be found. The only large plants of Camellia japonica I saw in Hokkaido grow here. A good collection of flowering cherries is reminiscent of the culture of Kyoto. I am sure the feudal lords arriving in this harsh land longed for the warm, sophisticated culture of Kyoto and transplanted as much of that as possible, including the plants. What significance can be attached to these plants is conjecture, but at least a number of garden camellias flourish and may be the hardier remnants of the varieties transported to this place. All are late flowering here--April to June--and include singles and doubles in both white and pink. It is the northernmost center of camellia culture in Japan. All of the collections of camellias were successfully established at Glenn Dale, but I am sorry to say none of the buds of the flowering cherries succeeded. I found Rhododendron japonicum in the hills around Matsumae, but so few in number and associated with habitation that these must not be native. This colony accounts for the statement that R. japonicum occurs in Hokkaido. Calanthe discolor, with yellow flowers on 10-inch stalks, was encountered among the forest floor plants. This orchid should be hardy in the middle Atlantic States. Daphne miyabeana, a dwarf

The northernmost cultivated trees of Camellia japonica are in the town of Matsumae, Hokkaido. Sciadopitys verticillata and Cyptomeria japonica are planted in the same shrine garden.

Mt. Esan, Hokkaido, a fog-shrouded ocean-side peak is inhabited by compact colonies of Ilex crenata var. radicans, Empetrum nigrum, Ledum palustre, and Rhododendron Tschonoskii. Rhododendron Kaempferi flowers on this mountain in mid-July.

Rhododendron Tschonoskii in flower on the foggy summit of Mt. Esan, Hokkaido.

evergreen species with red fruits in pairs, and at least three species of Ilex, I. leucoclada, I. radicans, and I. rugosa, were the most common broadleaf evergreens. Hydrangea acuminata with fertile blue inner florets and a large ring of sterile blue outer florets was conspicuous in the dark Cryptomeria forests.

A brief trip to Esan (400 meters), a volcanic mountain with areas still denuded from an explosion about 100 years ago, concluded the Hokkaido collecting. Some parts of Esan are so active it is impossible to tolerate the heat and glare of the sulfur outcroppings. This is a famous site for those studying transition of volcanic ash to arable land. According to the French geologist staying in the forestry house with me, higher forms of plants do not appear in such a disrupted place until some clay particles have formed. It is understandable why azaleas are among the first invaders of volcanic regions.

A magnificent array of plants, including both evergreen and prostrate types, grew in open meadows. Rhododendron Kaempferi was in full bloom although it was now July 18. Seedlings were easily gathered along the sides of ash paths and in the open meadows. Empetrum nigrum, Enkianthus, Hydrangea, Ledum palustre, and Rhododendron Tschonoskii (in flower) were scattered about.

HONG KONG

(July 23-27)

I flew to the Crown Colony of Hong Kong on July 23 to collect specimens of azaleas and some of the native holly species. Two azaleas are important, Rhododendron Farrerae and R. Simsii, the former not previously in cultivation in the United States. My guides were Ralph Dean of Hong Kong Urban Services and Andrew Tse, azalea fancier and exporter. On the Tse farm I saw the beautiful Mussaenda hybrid 'Dona Aurora' in full bloom. It has cream-colored flowers, which at a distance looked almost green. Both azaleas were successfully collected. R. Farrerae grows on the face of Victoria Peak mixed with evergreens, Symplocos and Machilus, old friends from the early days of collecting in Kyushu, Japan. Two forms of Rhododendron Simsii were gathered from the plantings of the Botanical Garden.

The U.S. Department of Agriculture was also interested in additional specimens of water-chestnuts (Eleocharis dulcis) since we are attempting to cultivate this water crop at Savannah.

On lands of the New Colony, mainland China, this crop is grown and exported to the United States to use in Chinese foods. Approximately 13 types were collected for comparison with the one variety now being cultivated in the United States.

SUMMARY

In retrospect, this was my most rewarding journey to Japan, replete with new locations for important ornamental plants. These travels encompassed the entire range of distribution of Rhododendron Kaempferi during its flowering season, beginning with its locality on the subtropical beaches of southern Kyushu to the cool alpine stream beds of central Hokkaido. Camellia japonica was followed in a similar fashion both latitudinally and elevationwise, bringing to breeders both seed and vegetative stocks, which represent most of the wild variation in this species in Japan. Among the deciduous azaleas, the range of variability in flower color of Rhododendron japonicum according to locality is greater than that of any related oriental or occidental species, but this had not been fully appreciated nor had these variations existed in cultivation before this exploration.

From Hirado Island came not only representatives of the race of azaleas famed in Japan and bearing that name, but also knowledge of the existence of a white form of Rhododendron Weyrichii not previously recorded in literature.

Two new evergreen azaleas were seen for the first time by other than Japanese collectors and both were introduced into cultivation in the United States for the first time. These include Rhododendron sataense from Kyushu, and the natural hybrids of R. Kaempferi and R. komiyamae from the Fuji area.

Equally significant are the holly collections, which represent a broad range of the wild distribution of the evergreen species. Ilex crenata, I. leucoclada, I. rugosa, and I. Sugerokii, together with certain natural hybrids known only in the literature, I. X kiusiana and I. X Makinoi.

This exploration did not yield much in the way of introducing new species for this was not the intent. Rather, this effort to improve significant garden plants has provided the broadest base of breeding stocks of documented origin yet available to those concerned with Japanese plants.

Looking forward, a similar investigation along the Sea of Japan side of Japan can be anticipated. This includes the homeland of the additional forms of Camellia japonica and nearby Korea where Camellia japonica also grows wild. A number of azaleas and lilies not found in Japan also grow wild in Korea.

ENUMERATION OF THE INTRODUCTIONS

Japan-Hong Kong, 1961

Seeds, cuttings, and small plants were collected and shipped to the United States by the writer during this exploration. Additional lots of seeds were shipped by various Japanese collectors during the winter of 1961-62 as a result of instructions on specific plants or locations from which seed was desired. Cuttings collected during the exploration were prepared in the field for immediate propagation on arrival in the United States. Excess foliage was removed and the basal ends of the cuttings were cut cleanly. Lots of cuttings were moistened and tied together with the cut ends in damp sphagnum moss. The bundled cuttings were placed in 1-quart polythene bags that were sealed with wire ties. The bagged collections were loosely packed in cardboard cartons and shipped by air to the U.S. Department of Agriculture Inspection Station, Washington, D.C. This method has been uniformly successful and has been followed by the writer during all of his collecting expeditions.

The enumeration of collections is arranged alphabetically by genus and species. Nomenclature is based on the "Flora of Japan," by J. Ohwi, Tokyo, Japan. For the large series of collections of some species, the first PI numbers reflect the southernmost locality. The PI numbers, increasing in order, are in keeping with the northward progression of the collecting.

This is an historical account and is not intended as a source listing of plant materials. Sufficient time has elapsed since the undertaking that most of the materials collected have been provided to breeders and horticulturists throughout the United States.

A

ABIES FIRMA Sieb. & Zucc. Pinaceae. Momi.

A massive fir tree attaining 150 feet in the mountains of Kyushu, Shikoku, and Honshu. This is the largest and most beautiful of Japanese firs, characterized chiefly by the bifid apex of the bright-green, leathery leaves.

277637 Cuttings from a pendulous tree, growing in a riverbed near Kawauchi, Futaba-gun, Fukushima, Honshu.

ACTINIDIA KILOMIKTA (Rupr.) Maxim.

Dilleniaceae. Miyama-mata-tabi.

A vine, usually climbing on trees at forest edges and along roadsides of northern Japan. Only the staminate form of this species is characterized by beautiful pink and white blotches on the leaves.

276074 Cuttings from a highly colored male plant at Shikotsuko, Hokkaido.

ACTINODAPHNE LANCIFOLIA Meisn.

Lauraceae. Kago-no-ki.

A tall evergreen tree usually restricted to the evergreen forests of southern Japan. The leaves are lanceolate, shining,

similar in size to those of the camphor-tree. The fruit is red.

277663 Seed from a tree at Taira, Ibaraki Pref., Honshu, by Biological Institute, Ibaraki University, Mito.

ALLIUM sp. Liliaceae.

275501 A small species with purple flowers on stalks to 10 inches; growing in sandy places among rocks along the seacoast near Kesenuma, Miyagi Pref., Honshu. Bulbs.

ARDISIA CRENATA Sims. Myrsinaceae. Manryō.

A small evergreen subshrub inhabiting the dense undergrowth of broadleaf evergreen forests. The plant is erect and entirely glabrous; leaves ovate, toothed, with marginal glands; fruit red in terminal clusters on side branches. Southern Japan.

275053 From a garden at Hanakawa, Kita-Ibaraki City, Honshu. Seedlings and seed.

276554 From Nyta Garden, Izura, Ibaraki Pref., Honshu. About northernmost garden locality. Seed.

ARDISIA CRISPA (Thunb.) DC. Kara-tachibana.

A small evergreen shrub similar to A. crenata in habit but with lanceolate leaves and axillary flowering branches. Fruit red. Southern Japan.

274762 Seed from a white-fruited form cultivated in Mori Garden, Hirado Island, Kyushu. Said to come true to type from seed.

ARDISIA JAPONICA (Thunb.) 'Blume, Yabu-kōji.

A ground-covering evergreen, inhabiting moist, shaded woods, spreading by underground stolons. The flowers are white, followed by red fruit. This is the hardiest of ardisias, distributed as far north as islands off the coast of Hokkaido. A number of collections were made from northern localities.

274526 Seed from Mt. Takakuma, Osumi Pref., Kyushu, at 600 meters.

274761 Edge of woods, Kurume, Fukuoka, Kyushu. Seed.

275070 In damp woods, Akai-dake, Taira, Ibaraki Pref., Honshu, at 605 meters. Seedlings.

275385 In ocean-front forest, Ayukawa, Miyagi Pref., Honshu. Seedlings.

275502 Growing among shrubby camellias as ground cover. Tsubaki-jima, a small island near Shizukawa, Miyagi Pref., Honshu. Seedlings.

ASARUM sp. Aristolochiaceae.

274696 Seedlings of a small herbaceous evergreen with variegated, dark-green, heart-shaped leaves. Growing in dense wood, Hirado Island, Kyushu, at 400 meters.

AUCUBA JAPONICA Thunb. Cornaceae. Ao-ki.

A glossy, evergreen shrub with coarsely toothed leaves and bright-red, oblong fruits in terminal clusters. Sexes on separate plants. Usually growing in shaded places, especially steep ravine walls. Distributed in southern Japan and northward to central Honshu.

274834 On Tara-dake, Nagasaki Pref., Kyushu, at 700 meters. Seed.

276555 In dense evergreen forest on Kaimon-dake, Satsuma Pref., Kyushu, at 500 meters. Seed.

276556 Seed from a variegated garden form, Nyta Garden, Izura, Ibaraki Pref., Honshu.

AUCUBA JAPONICA var. BOREALIS M. & K. Hime-ao-ki

This is the decumbent variety restricted to the northern parts of Japan, including Hokkaido, especially areas of deep snow. Seen as a dense plant covered with bright-red fruit, it suggests a highly ornamental form.

275783 Plant 18 inches high, compact, with prolific fruiting. Mt. Osore-san, Aomori Pref., Honshu. Cuttings.

275848 Growing along roadside in shady forest of Thujopsis on Mt. Osore-san, Aomori Pref., Honshu. Seed.

275849 Fruiting plant, Mt. Osore-san, Aomori Pref., Honshu. Seed.

276116 Fruiting plant, Gamushi National Forest, Oshima, Hokkaido. Seedlings.

276159 Seed from Gamushi National Forest, Oshima, Hokkaido.

276160 Seed from Enosato Regional Forest, Oshima, Hokkaido.

278661 Seed collected by Forestry Officer, Matsumae, Tsurumachi, Hokkaido.

B

BLETILLA STRIATA (Thunb.) Reichenb. f. Orchidaceae. Shi-ran.

A terrestrial orchid with ovoid pseudobulbs and elliptic to lanceolate leaves. Flowers, 3 to 7, rose-pink, in a spike. A rare species of southern Japan but frequently cultivated.

274868 Plants from a large colony near Kikugawa, Shizuoka, Honshu.

BLETILLA STRIATA f. GEBINA Ohwi. Shirobana-shi-ran.

The white-flowered form of the species. 274867 Plants with clear, white flowers from a large colony near Kikugawa, Shizuoka, Honshu.

BUXUS MICROPHYLLA var. JAPONICA (Muell.-Arg.) Rehd. & Wils. Buxaceae. Tsuge, Asama-tsuge.

An erect tree to 10 feet high with broadly ovate, shining leaves to 1 inch long. Although occasionally found wild in the mountains of southern and western Japan,

this plant may have been introduced from Korea to Japan.

274697 Along edges of rice paddies at Ushiro-bira, Hirado Island, Kyushu. Seedlings.

274869 A small tree growing near top of Mt. Kosho, Kyushu, at 861 meters. Seedlings.

276274 Along paths on Hakone Shrine, Motohakone, Honshu. Seedlings.

276346 Seed from plants growing on Mt. Kosho, Fukuoka Pref., Honshu, at 861 meters.

C

CAESALPINIA JAPONICA Sieb. & Zucc.

Leguminosae. Jaketsu-ibara.

A shrub to 8 feet, armed with prickles; leaves with 6 to 8 pairs of oblong leaflets to 1/2 inch long; flowers yellow in terminal racemes. Common in low hills of Kyushu, Ryukyu, and Shikoku Islands. 274763 Seed from plants on open sunny slopes of Kaimon-dake, Satsuma Pref., Kyushu.

CALANTHE DISCOLOR Lindl. Orchidaceae. Ebine.

A terrestrial orchid, pseudobulbs with long grasslike leaves. Flowers borne loosely along scapes, sepals brownish, petals white or rose. Common in foothills throughout Japan.

274527 Plants from evergreen forest on Mt. Takakuma Osumi Pref., Kyushu, at 700 meters.

CALANTHE DISCOLOR var. BICOLOR (Lindl.) Makino. Takane.

274528 Similar to species but with much larger flowers and restricted in distribution to Kyushu. From Mt. Takakuma Osumi Pref., Kyushu, at 800 meters.

CALANTHE DISCOLOR f. SIEBOLDII

(Descne.) Ohwi. Ki-ebine.

A race with clear yellow flowers; found in all parts of range of distribution.

274529 From Mt. Takakuma, Osumi Pref., Kyushu. Seedlings.

276117 From Gamushi National Forest, Oshima, Hokkaido. Seedlings.

CALANTHE TORIFERA Schltr.

Sarumen-ebine.

A terrestrial orchid with yellow flowers in spikes up to 18 inches.

275784 Plants from woods near Lake Towada, Aomori Pref., Honshu.

CALANTHE sp.

274698 A terrestrial orchid with green and white flowers in terminal spike. From dense forest on Yasuman-dake, Hirado Island, Kyushu. Plants.

274699 A terrestrial orchid with dark-red and white flowers in terminal spike. On Yasuman-dake, Hirado Island, Kyushu. Plants.

CAMELLIA JAPONICA L. Theaceae.

Yabu-tsubaki.

Evergreen tree or shrub to 25 feet with glabrous branches; elliptic leaves, 3 to 6 inches long, lustrous green above, entirely glabrous. Flowers red with many perules; petals erect; almost tubular in form. Distributed in coastal mountains of Kyushu, Shikoku, and Honshu. In southern Japan, *C. japonica* occurs up to 1,000 meters. In northern Honshu, at sea level as far as Raga, Aomori Pref., on Pacific coast; Kominato, Aomori Pref., on Sea of Japan coast.

The following collections give a broad range of local types based on elevation, latitude, seacoast, and inland sites.

274530 Cuttings from tree in bloom, with single pink flowers on April 26, 1961.

Mt. Takakuma, Osumi Pref., Kyushu, at 800 meters.

274531 Cuttings from small tree at limits of elevation of distribution; flowers pink, tubular. Mt. Takakuma, Osumi Pref., Kyushu, at 1,000 meters.

274700 A cultivated specimen with red anemonelike flowers, prolific, in full bloom on May 2, 1961. Ushiro-bira, Hirado Island, Kyushu. Cuttings.

274701-703 Cuttings from individual small trees at top of Yasuman-dake, Hirado Island, Kyushu, at 514 meters. Flowers red, single, in bloom May 5, 1961.

274796 Cuttings from tree, 25 feet high, with single red flowers; small, narrow leaves. Along streambed on Tara-dake, Nagasaki Pref., Kyushu, at 900 meters. In bloom May 9, 1961.

274797 A double-flowered cultivar, pink petals with white edge. At farmhouse on

Tara-dake, Nagasaki Pref., Kyushu. In bloom May 10, 1961. Cuttings.

274798 Cuttings from a tree 20 feet high, with shining green, broadly ovate leaves; flowers pink. On Tara-dake, Nagasaki Pref., Kyushu, at 600 meters. In bloom May 10, 1961.

274799 Cuttings from a small-leaved tree with dark-red, tubular flowers. On tara-dake, Nagasaki Pref., Kyushu, at 900 meters. In bloom May 10, 1961.

275054 Cuttings from seacoast; plants with shrubby habit. From Izura, Ibaraki Pref., Honshu. Just past bloom May 28, 1961.

275071 Cuttings from a single plant in mountains at Akai-dake, Taira, Ibaraki Pref., Honshu, at 605 meters. Past bloom May 29, 1961.

275386 From plants along roadside near Niijima, Miyagi Pref., Honshu. Cuttings.

275387 Dwarfed plants on seaciff near Ayukawa, Miyagi Pref., Honshu. Approaching northern limit. At this locality, plants are frequently sprayed with salt water. Cuttings.

275503 Seedlings gathered from damp camellia forest on Tsubaki-jima, near Shizukawa, Miyagi Pref., Honshu.

275504-505 Cuttings from individual trees on Areshima, a small island inhabited by large groves of camellias. Miyagi Pref., Honshu.

275506 Cuttings from small trees growing along inland road near Kesennuma, Iwate Pref., Honshu.

275507-508 Cuttings from roadside trees between Kesennuma and Rikuzen-Takeda, Iwate Pref., Honshu. Said to be grown solely for seed oil.

275509-513 Cuttings from individual trees in protected swale at seacoast. Cape Funakoshi, Miyako, Iwate Pref., Honshu. Northernmost large colony along Pacific coast.

275514-517 Cuttings from colony inland from coast growing in full sun; said to flower in May; remnants of flowers still present; single, red. Near Cape Funakoshi, Miyako, Iwate Pref., Honshu.

275518 Cuttings from plants at northernmost locality for species on Pacific coast. Near Raga, Iwate Pref., Honshu.

Said to flower in mid-May, single, red; used for oil.

275684 Seed from trees growing at Rikuzen-Takeda, Iwate Pref., Honshu. Used for oil, single red flowers.

275685 Seed from trees at northernmost planting. Raga, Iwate Pref., Honshu. Wild?

276118-121 Cuttings of cultivars growing in Matsumae Castle Garden, Matsumae, Hokkaido. Said to have been brought from Kyoto in earlier centuries.

276118 'Beni-tsubake'. Double pink; May.

276119 Double pink.

276120 Double white.

276121 'Osotake'. Double pink; May.

277733 Seeds gathered by Japanese collectors along road near Miyako, Iwate Pref., Honshu.

277734 Seeds gathered by Japanese collectors along roadside at Kawaguchi Village, Fukushima, Honshu.

279005 Seeds gathered by Japanese collectors at Mt. Takakuma, Osumi Pref., Kyushu, at 500 meters.

279188-189 Seeds gathered by Japanese collectors at Iwaizumi, Iwate Pref., Honshu.

CEPHALOTAXUS HARRINGTONIA var.

NANA (Nakai) Rehd. Cephalotaxaceae.

Hai-inugaya.

A spreading shrub with ascending branches, restricted to the mountains of northern Japan, especially the more snowy Sea of Japan region.

275519 Cuttings from plants growing at foot of Mt. Hayachine, Iwate Pref., Honshu, at 900 meters.

CHLORANTHUS JAPONICUS Siebold.

Chloranthaceae. Hitori-shizuka.

An erect glabrous perennial to 6 inches from branching rhizomes; leaves simple, in pairs but mostly whorled at the ends of branches. Flowers white in terminal spikes.

275388 From moist woods on Kinkazan Island, Miyagi Pref., Honshu. Clumps.

CHLORANTHUS SERRATUS (Thunb.)

Roem. & Schult. Futari-shizuka.

Similar in habit to *C. japonicus* but flowers borne in bifurcate spikes, hence the common name, "futari," meaning two

as opposed to "hitori" for *C. japonicus*.
 Distributed throughout northern Japan.
 275389 From Kinkazan Island, Miyagi Pref., Honshu.

CITRUS JUNOS Sieb. Rutaceae. Yuzu.
 275520 This is the common rootstock used for inarching mandarin orange. These plants were grown as a hedge at the probable northern limit of its adaptation. From a farmyard near Shizukawa, Miyagi Pref., Honshu. Cuttings.

CITRUS RETICULATA Blanco. Tumida.
 A small-fruited mandarin-type citrus reported to be especially hardy.
 275072 Cuttings from a tree in hotel garden, at foot of Mt. Tsukuba, Ibaraki Pref., Honshu.
 277652 Seed from same source as 275072.

CLINTONIA UDENSIS Trautv. & C. A. Mey.
 Liliaceae. Tsubame-omoto.
 A perennial from short rhizomes, leaves basal, narrowly oblong, soft, and relatively thick. Flowers white on naked stalks to 10 inches high; fruit deep-blue, shining. Distributed in the damp coniferous woods in high mountains of Honshu and Hokkaido.
 276075 Plants from upland bog at Shikotsu-ko, Hokkaido.
 276109 Seeds from plants in damp conifer forest on Shikotsu-san, Hokkaido.
 276110 Seed from open alpine bog, Mt. Apoi, Hidaka, Hokkaido.

CRYPTOMERIA JAPONICA (L. f.) D. Don.
 Taxodiaceae. Sugi.
 Evergreen conifer attaining 150 feet, with reddish bark and whorled, drooping branches; leaves spirally arranged and awl shaped. This is a highly variable tree, ranked first among timber trees of Japan. Selections have been made for adaption to different climatic regions, particularly in relation to winter snow cover and precipitation. Seed has been obtained from four selected seed lines.
 279745 From Ajigasawa, Aomori Pref. (Coast of Sea of Japan)
 279746 From Owani, Aomori Pref. (Sea of Japan inner mountains)
 279747 From Shirokawa, Akita Pref. (Sea of Japan inner mountains)
 279748 From Tono, Iwate Pref. (Pacific Ocean-inner mountains)

CYPRIPEDIUM JAPONICUM Thunb.
 Orchidaceae. Kumagai-sō.

A terrestrial orchid with two large, round, many-nerved leaves, to 6 inches in diameter; flowers solitary, yellowish-brown. Commonly distributed in dense, moist woods of southern Japan.
 274532 Along path in dense shade on Mt. Takakuma, Osumi, Pref., Kyushu. In bloom April 27, 1961.

D

DAMNACANTHUS INDICUS Goertn. f.
 Rubiaceae. Aridōshi.

A much-branched evergreen shrub with slender, horizontally spreading branches. Leaves broadly ovate, lustrous, spined at the base of petiole. Fruit red. A frequently seen plant in damp warm, temperate rain forests of southern Japan. Sometimes cultivated.

274746 Growing in dense forest, Ushirobira, Hirado Island, Kyushu.

275494 In evergreen forest near northern limit of distribution, Kashima Shrine, Ibaraki Pref., Honshu.

276557 Cultivated in Nyta Garden, Izura, Ibaraki Pref., Honshu.

DAMNACANTHUS MACROPHYLLUS Sieb. ex Miq. Ōba-no-aridōshi.

Similar to *D. indicus* but larger in all parts and lacking the lustrous green color.
 274835 Seed from plants in a warm, temperate rain forest on Mt. Iwaya, Nagasaki Pref., Kyushu, at 300 meters.

DAPHNE MIYABEANA Makino. Thymelaeaceae. Karasu-sikimi.

A small evergreen shrub with purplish-brown branches and dark-green, lustrous leaves, oblanceolate, narrowing at the base. Fruit is round, bright-red, in pairs. A rare species of Hokkaido and northern Kyushu.

276161 Seed from Gamushi National Forest, Oshima, Hokkaido.

DRYOPTERIS CRASSIRHIZOMA Nakai.
 Aspidiaceae. Ō-shida.

A large deciduous fern with attractive dark-green dissected fronds to 24 inches long. Frequents high-elevation bogs; quite hardy.

275785 Along shady path below Yachi Onsen, Aomori Pref., Honshu, at 600 meters. Seedlings.
DRYOPTERIS SAXIFRAGA H. Ito. Iwaitachishida.

An especially hardy fern distributed in the high mountains of all Japan. The stipes are densely scaly; blades up to 10 inches, rather broad; pinnae lanceolate.

275390 In moist forest on Kinkazan Island, Miyagi Pref., Honshu, at 400 meters. Seedlings.

DRYOPTERIS sp.

275521 An evergreen fern with fronds to 18 inches, on limestone ledges in Akka Forest, Iwate Pref., Honshu. Seedlings.

E

ELAEAGNUS GLABRA Thunb.

Elaeagnaceae. Tsuru-gumi.

An evergreen climbing shrub with red-brown scales on branches and leaves; fruit oblong, scaly, orange, edible. Inhabits forests and meadows of coastal areas of southern Japan.

274836 Seed collected on Mt. Iwaya, Nagasaki Pref., Kyushu, at 350 meters.

275495 In an evergreen forest at Mt. Tsukuba, Ibaraki Pref., Honshu, at 500 meters. Probably northern limit of distribution. Seed.

ERIOBOTRYA JAPONICA (Thunb.) Lindl.

Rosaceae. Biwa.

Woolly-pubescent, coarse, evergreen tree with broad oblanceolate leaves, with straight veins ending in the marginal teeth. Flowers white or reddish, fruit terminal, erect, yellow, with two to several large seeds. A much-desired fruit of southern Japan, usually ripe in late spring. Kagoshima, in Kyushu, is the center of culture.

274533 'Mogi'. Earliest (to mid-May).

The best variety in fruit quality and bearing. Fruit large to medium. Scions.
274534 'Karabiwa'. An old, thin-fleshed, small-fruited variety. Resistant to gall diseases. Scions.

274535 'Kesamatsu'. Fruits small. Used as understock. Scions.

Six improved varieties of loquat scions. Sent by Horticulture Division, Tokai-Kinki Agriculture Experiment Station, Okitsu, Honshu.

276275 'Kanton'.

276276 'Kusunki'.

276277 'Mizuho'.

276278 'Nojima-wase'.

276279 'Toi'.

276280 'Tsukumo'.

EUONYMUS FORTUNEI var. RADICANS

(Sieb.) Rehd. Celastraceae. Tsuru-masaki.

An evergreen climber with green terete branches, elliptic to obtuse leaves to 2 inches long. Usually found in moist areas, such as shaded underside of rock walls. Distributed throughout Japan.

275073 An especially diminutive type from a cliff face on Mt. Tsukuba, Ibaraki Pref., Honshu, at 700 meters. Entire plant.

EUONYMUS JAPONICUS Thunb. Masaki.

A large evergreen shrub with smooth, green terete branches. Leaves elliptic, serrate, lustrous dark-green. Fruit globose, with orange-red aril. Widely distributed on moist, sea-facing slopes. One of the few large evergreen shrubs that frequent Hokkaido.

276122 Cuttings from plant in Matsumae Castle Garden, Matsumae. Hokkaido.

EUONYMUS sp.

275786 A sprawling shrub with thin, broadly ovate leaves, branches terete. Probably deciduous. Along streambed near Lake Towada, Aomori Pref. Honshu, at 400 meters.

EURIA JAPONICA Thunb. Theaceae.

Hi-sakaki.

An evergreen shrub with elliptic, deep-green, lustrous leaves characterized by erect obtuse teeth. Flowers yellowish-green, in small pendant, axillary clusters. Fruit purplish-black. Usually distributed in the coastal forest and often exposed to sea winds. Appears drought tolerant for an evergreen shrub and often found growing on barren rocky ledges. Southern Japan and along the coasts of lower Honshu.

275391 In evergreen forest at Kiyosaki, Ayukawa, Miyagi Pref., Honshu. This collection is probably at the northernmost

limit on the Pacific Ocean side of Honshu.
Seedlings.

F

FATSIA JAPONICA (Thunb.) Descaisne & Planch. Araliaceae. Yatsude.

An evergreen shrub with large palmately, 7- to 9-lobed nearly orbicular leaves, up to 15 inches across. Flowers in large terminal umbels, appearing in November. Fruit black, in May. Common in the sea-facing evergreen forests of lower Japan, especially Kyushu. Much planted in gardens.

274536 Seed collected along cliffs of Sarugajo, Osumi Peninsula, Kyushu.

275496 Seed from roadside plants near Taira, Ibaraki Pref., Honshu. Probably northern limit.

FILIPENDULA KAMTSCHATICA (Pall.)

Maxim. Rosaceae. Oni-shimotsuke.

A stout perennial herb of cooler regions of Japan with erect, somewhat angled stems. Leaves palmate, toothed. Flowers pink, in loose terminal corymb. In bloom June to September.

276076 In swampy open fields near Utabetsu, Hidaka, Hokkaido. July 10, 1961. Although the flowers of the forms found in Honshu and lower Japan are white or faintly pink, those of the Hokkaido collection were bright pink. Seedlings.

H

HEDERA RHOMBEA (Miq.) Bean. Araleaceae. Kizuta.

An evergreen woody climber, branches brown with holdfast roots along stems. Leaves simple or lobed. Fruit black in umbels. Usually entwined on trees in broadleaf forests of southern Japan.

275080 Adult form growing near top of Mt. Kosho, Kyushu, at 861 meters. Seed.

HEMEROCALLIS EXILIS Satake.

Liliaceae. Musashino-kanzō.

275524-525 Small daylilies with yellow or orange flowers, dwarf stature. These plants may be the alleged hybrid between H. Longituba and H. vespertina. Growing on sandy hillside overlooking ocean at Shimamokoshi, Iwate Pref., Honshu.

275524 Pale-yellow flowers, in bloom June 19, 1961.

275525 Orange flowers, in bloom June 19, 1961.

HEMEROCALLIS LONGITUBA Miq.

Liliaceae. No-kanzō.

A daylily with thickened roots, rather thin leaves, and flowers in loose clusters of up to 10 orange-red blooms. Common along the seacoast of Honshu. Around Sendai, this species is the first to bloom.

275040 Growing along seacliffs at Tomioka, Ibaraki Pref., Honshu, May 29, 1961. Orange-flowered daylily in full bloom in mid-May to late May. Early

flowering habit may be of value. Plants. 275392 Along roadside between Ishinomaki and Ayukawa, Miyagi Pref., Honshu.

June 9, 1961. An early flowering orange-colored species with narrow petals. Plants.

HEMEROCALLIS MIDDENDORFII Trautv. et Meyer. Liliaceae. Ezo-zentei-ka.

An orange-yellow daylily usually restricted to the mountain meadows of Hokkaido and northward into Siberia. It flowers in June and July and the flowers are borne on very short pedicels. A number of individual plant types were selected in the wild for flower characters.

276077 On seacliffs along road to Cape Erimo, Hidaka, Hokkaido. Flowering July 10, 1961. Plants.

276111 Flowers clear orange. Heavy muck soil, Mt. Apoi, Hidaka, Hokkaido, at 1,300 feet. Seed.

276123 Orange-yellow flowers. Along seacoast near Esaisi, Oshima, Hokkaido. In flower July 15, 1961. Plants.

276124 Straplike segments; orange flowers. Along seacoast near Esaisi, Oshima, Hokkaido. In flower July 15, 1961. Plants.

276125 Segments broad, overlapping; flowers 6 inches across. Along seacoast near Esaisi, Oshima, Hokkaido. Flowering, July 15, 1961. Plants.

276126 Several flowers open at one time in cluster. Along seacoast near Esaisi, Oshima, Hokkaido. In flower, July 15, 1961. Plants.

HEMEROCALLIS MIDDENDORFII var.

ESCULENTA (Koidz.) Ohwi, Zentei-ka.

This appears to be a geographical race restricted to the island of Honshu.

275522 Orange daylily with rather campanulate shortflowers. Along moist banks above ricefields, near Kesen-numa, Iwate Pref., Honshu. June 14, 1961. Clumps.

275523 Orange-yellow daylily. On slopes of cape near Otsuchi, Iwate Pref., Honshu. June 16, 1961. Plants.

HEMEROCALLIS VESPERTINA Hara.

Asama-kisuge.

This is a lemon-yellow species said by Japanese botanists to be restricted to Honshu and Kyushu, yet some areas inland in Hokkaido were covered with this plant by the thousands. It is a fragrant species, separated from the other species by having no thickened roots.

276078 Lemon-yellow flowers. Along roadside between Sapporo and Chitose, Hokkaido. July 9, 1961. Plants.

HOSTA KIKUTII F. Maekawa. Liliaceae.

Hyūga-gibōshi.

Elliptic to lanceolate leaves to 8 inches long; flowers white with white lanceolate bracts. A species of local distribution in Hyuga, Kyushu.

274537 Growing along mountain streambed, on granite cliffs at Sarugajo, Osumi Peninsula, Kyushu, at 300 meters.

HOSTA NAKIANA F. Maekawa.

Kanzanshi-gibōshi.

Long-petioled oblong ovate leaves, with margins slightly incurved at the base, somewhat undulating. Flower scapes much longer than the leaves; bracts boat-shaped, white to purple; perianth darker purple. A species of limited distribution in Kyushu.

274801 On Tara-dake, Nagasaki Pref., Kyushu, at 950 meters. May 10, 1961. Plantain lily of local distribution; flowers pale-purple. Seedlings.

HOSTA spp. (plants)

274704 From Yasuman-dake, Hirado Island, Kyushu, at 400 meters.

275074 From Akai-dake, Taira, Ibaraki Pref., Honshu, at 550 meters.

275075 From top of Mt. Tsukuba, Ibaraki Pref., Honshu, at 827 meters.

275076 From Mt. Tsukuba, Ibaraki Pref., Honshu, at 400 meters.

275393-394 From ocean-front forest, Ayukawa, Miyagi Pref., Honshu.

HYDRANGEA INVOLUCRATA Sieb.

Saxifragaceae. Tama-ajisai.

A stout scabrous shrub with leaves usually oblong to elliptic, and coarse, hairy beneath. Inflorescence small, enveloped by large purplish bracts. Sunny rocky places in the mountains of central Honshu, Shikoku, and Kyushu.

275055 Seedlings from a small hillside above Kisara village, Ibaraki Pref., Honshu.

HYDRANGEA MACROPHYLLA var.

ACUMINATA (Sieb. & Zucc.) Makino. Yama-ajisai.

Erect shrub with opposite, simple leaves, usually toothed and lustrous. Flowers in flat-topped cluster with sterile flowers at periphery. Common throughout Japan; highly variable in the wild. Many garden cultivars in Japanese gardens.

275787 Flowers white with blue sterile periphery florets. On border of small lake, Osore-san, Aomori Pref., Honshu. 276127 Blue fertile florets and blue sterile periphery ones. In Cryptomeria forest at Matsumae, Hokkaido. Cuttings.

I

ILEX ASPRELLA Champ. ex Benth.

Aquifoliaceae. Shima-umemodoki.

A deciduous holly shrub up to 9 feet high with ovate leaves 1-2 inches long and small red fruit. Native of southeastern China and probably not in cultivation in the United States.

276339 From the Hong Kong Botanical Garden. Seed.

ILEX CRENATA Thunb. Aquifoliaceae.

Inu-tsuge.

A highly variable evergreen holly with densely twiggy grayish branches, elliptic or narrowly ovate leaves, lustrous dark-green above, paler beneath; the midrib depressed above, often whitish; fruit black. This is the most widely distributed species of holly in Japan and is a social plant, often with azaleas. It

grows under a variety of moisture conditions from upland bog to dry, volcanic cones.

274538 Small tree, round headed, leaves ovate with white midrib. Along streambed, Mt. Kirishima, Kagoshima, Kyushu, at 1,200 meters. Seedlings.

274802 Small shrubby type; leaves dark-green, small, ovate. Top of Mt. Kyogatake, Nagasaki Pref., Kyushu, at 1,057 meters. Cuttings.

274870 Mostly spreading form with small, dark-green leaves. Mt. Kosho, Kyushu, at 750 meters. Cuttings.

275056 Small evergreen holly. Near northern limit for species. Small hill near Maetoku School, Kisara village, Ibaraki Pref., Honshu. Seedlings.

275077 Narrow small leaves. Mt. Tsukuba, Ibaraki Pref., Honshu, at 450 meters. Seedlings.

275793 Upright form to 8 feet high with vigorous growth and many branches. This is probably an isolated plant of the species growing with subsp. radicans. In swampy locality on Osore-san, Aomori Pref., Honshu. Cuttings.

275856 Plant to 8 feet high, vigorous with upright form growing among prostrate plants. Growing in swampy woods on Osore-san, Aomori Pref., Honshu. Seed.

279006 Takakuma Experimental Forest, Kagoshima University, Osumi Peninsula, Kyushu, at about 500 meters. Seed.

ILEX CRENATA var. FUKASAWANA Makino.
Tsukushi-inu-tsuge.

274539 Along streambed on Mt. Takakuma, Osumi Peninsula, Kyushu, at 900 meters. April 26, 1961. Small to medium shrub. This variety characterized by angled branches and larger leaves than normal. Cuttings.

ILEX CRENATA var. RADICANS (Nakai)
Tatewaki. Hai-inu-tsuge.

275789 Mt. O-take, Aomori Pref., Honshu, at 1,200 meters. Large leaf type. Cuttings.

275790 Mt. O-take, Aomori Pref., Honshu, at 1,200 meters. Small leaf type. Cuttings.

275791 Mt. O-take, Aomori Pref., Honshu, at 1,200 meters. Small leaf type. Cuttings.

275792 On sandy, sulfur beach around small lake on Osore-san, Aomori Pref., Honshu. Prostrate, the growth dense and twiggy makes a ground cover. Seedling.

275794 On rocky cliffs in full sun on Osore-san, Aomori Pref., Honshu. A dense plant of compact habit and shiny foliage. Cuttings.

275795 Along roadside at Osore-san, Aomori Pref., Honshu, at 214 meters. Large-fruited form. Cuttings.

275850 Growing along stream at edge of sphagnum bog, at 700 meters, Yachi Onsen, Aomori Pref., Honshu. Low-growing evergreen; leaf size variable; fruit black. Seed.

275851 Growing at edge of sphagnum bog, at 850 meters, above Yachi Onsen, Aomori Pref., Honshu. Low-growing evergreen; leaf size variable, fruit black. Seed.

275852 Growing at edge of sphagnum bog, at about 970 meters, near Sukayu Onsen, Aomori Pref., Honshu. Low-growing evergreen; leaf size variable; fruit black. Seed.

275853 Growing in open boggy meadow, at about 1,300 meters, at Mt. O-take, Aomori Pref., Honshu. Plant to 4 feet high; leaf size variable. Seed.

275854 Growing on perimeter of sphagnum bog, at about 1,200 meters, at Mt. O-take, Aomori Pref., Honshu. Plant low-growing evergreen shrub. Seed.

275855 Growing among sulfur outcropping at Osore-san, Aomori Pref., Honshu. Prostrate form. Seed.

275857 Growing along road at Osore-san, Aomori Pref., Honshu, at 214 meters. Full sun. Large-fruited form. Seed.

276079 In cleared area of forest, Shikotsu-ko, Hokkaido, at 500 meters. Female plant of prostrate type. Seedling.

276080 Open cut-over area, Shikotsu-ko, Hokkaido. Cuttings.

276081 On Horomon mountain in cut area, full sun along Horomon River, Hidaka, Hokkaido. Prostrate form with small leaves growing as ground covering. Seedlings.

276082 On Horomon mountain, Hidaka, Hokkaido, at 100 meters. Prostrate form with larger leaves than 276081. Seedlings.

276112 Open cut-over area, Shikotsu-ko, Hokkaido, at 400 meters. Plant wild, low-growing, evergreen; fruit black. Seed.

276128 In Gamushi National Forest, Oshima, Hokkaido. Low-growing, evergreen holly; fruit black. Seedlings.

276129 In beech forest, Enosato Regional Forest, Oshima, Hokkaido. Prostrate form; fruit black. Seedlings.

276162 Open mountain meadow, highly sulfurous area, Mt. Esan, Hakkodate, Hokkaido. Seeds.

276558. Swampy, shaded ravine, foot of Mt. Hayachine, Iwate Pref., Honshu. Plant prostrate or procumbent; fruit black. Probably southern limit for this variety at low elevation. Seed.

275788 Lake Towada, Aomori Pref., Honshu, at 400 meters. Low growing. Seedlings.

ILEX INTEGRA Thunb. Mochi-no-ki.

A small evergreen tree to 15 feet with obovate leaves to 3 inches and subglobose red fruit to 1/2 inch long. This holly is ornamental because of the especially large fruit. It is distributed mainly in southern Japan although some plants occur in broadleaf forests along the coast of Honshu.

275395 In evergreen forest at Kiyosaki, Ayukawa, Miyagi Pref., Honshu. Plants from northern limit. Seedlings and cuttings.

ILEX × KIUSIANA Hatsusima.

Narihira-mochi.

Alleged to be a natural cross of I. buergeri × I. integra.

274837 An evergreen holly with red fruit, somewhat smaller in size than I. integra. Rare. On Tara-dake, Nagasaki Pref., Kyushu, at 500 meters. Seed.

ILEX LATIFOLIA Thunb. Tara-yo.

An evergreen holly to 25 feet with leaves up to 10 inches long and red fruit in large clusters. Rarely found in Kyushu and Shikoku in thickets near the sea. Frequently planted around shrines.

274838 Along streambed on Tara-dake, Nagasaki Pref., Kyushu, at 650 meters. Seed.

ILEX LEUCOCLADA Makino. Hime-mochi.

An evergreen holly with lanceolate entire leaves up to 4 inches long, fruits red, large. A rather rare species of northern Japan, probably related to I. integra.

It hybridizes naturally with the prostrate species, I. rugosa. This plant has been introduced into cultivation recently.

276130 In beech forest, Enosato Regional Forest, Oshima, Hokkaido. Female plant growing in semishade. Seedlings.

276131 In Cryptomeria forest along sea-coast, Matsumae Forestry Region, Oshima, Hokkaido. Seedlings.

276132 In beech forest of Enosato Regional Forest, Oshima, Hokkaido. Growing in semishade. Cuttings.

276133 Evergreen holly with red fruits. In Gamushi National Forest, Oshima, Hokkaido. Northern limit of distribution. Female seedlings.

ILEX × MAKINOI Hara. O-tsuru-tsuge.

A natural hybrid between I. leucoclada and I. rugosa exceeding both parents in vigor and size. This cross has also been made by the writer at Glenn Dale, Md.

275796 Female plant from O-take, Aomori Pref., Honshu, at 1,100 meters.

275797 Male plant from dense wood on Osore-san, Aomori Pref., Honshu, at 600 meters.

ILEX PUBESCENS Hook. & Arn.

A small evergreen shrub to 10 feet with elliptic leaves up to 2 inches long, covered with grayish hairs. Fruit red in fascicles in leaf axils. A native of southern China, probably not in cultivation.

276340 Seed from the Hong Kong Botanical Garden.

ILEX ROTUNDA Thunb. Kurogane-mochi.

A large evergreen tree, often reaching a height of 50 feet with ovate entire leaves up to 4 inches, resembling those of the Japanese privet. Fruit small, red, in large clusters on current growth. A native of southern Japan and to China, this holly has proved to be one of the finest trees for the gardens of Southern United States.

274765 Seed from garden at Kurume, Fukuoka Pref., Kyushu.

276341 Seed from Hong Kong Botanical Garden.

ILEX RUGOSA F. Schmidt. Tsuru-tsuge.

This is the prostrate holly species of the mountains of northern Japan, also in alpine regions of southern Japanese mountains. Branches angular and green; leaves oblong or lanceolate, up to 2 inches long, with a rugose network of finely impressed veins; fruit red, usually solitary.

275798 Female plant from forest edge, Osore-san, Aomori Pref., Honshu.

275799 Female plants. Roadside at edge of forest on Osore-san, Aomori Pref., Honshu. A vigorous form from rather low elevation.

275858 Understory of Pinus pumila, Mt. O-take, Aomori Pref., Honshu, at about 1,300 meters. Seed.

276083 In cut-over land, growing on trunks of dead trees, Shikotsu-ko, Hokkaido. Seedling.

276084 On Horomon mountain in full sun, growing as ground cover on serpentine rock, Hidaka, Hokkaido. Seedlings.

ILEX SUGEROKII Maxim.

Akami-no-inu-tsuge.

A small, upright evergreen holly with ovate leaves to 1 1/2 inches long and solitary, red fruit in the axils of the current growth. It is distributed in the northern parts of Honshu and southern Hokkaido, often found in association with Ilex crenata. Because of its habit, I. Sugerokii should make an excellent hedge plant.

275800 Cuttings from a female plant. Yachi Onsen, Aomori Pref., Honshu, at 700 meters.

275801 Cuttings from a female plant, Yachi Onsen, Aomori Pref., Honshu, at 700 meters.

275802 Cuttings from a female plant, Yachi Onsen, Aomori Pref., Honshu, at 700 meters.

275803 Cuttings from a female plant, Yachi Onsen, Aomori Pref., Honshu, at 700 meters.

275804 Cuttings from a female plant above Yachi Onsen, Aomori Pref., Honshu, at 850 meters.

275805 Cuttings from a female plant, above Yachi Onsen in moist upland bog, Aomori Pref., Honshu, at 970 meters.

275806 Cuttings from a female plant, around sphagnum bog, on O-take, Aomori Pref., Honshu, at 1,150 meters.

275807 Cuttings from a male plant, around small lake, Osore-san, Aomori Pref., Honshu.

275808 Cuttings from a female plant, Osore-san, Aomori Pref., Honshu.

275859 Growing at 700 meters in sunny places along stream at edge of sphagnum bog, Yachi Onsen, Aomori Pref., Honshu. Seed.

275860 Growing at 850 meters along roadside above Yachi Onsen, Aomori Pref., Honshu. Seed.

275861 Growing at 970 meters at edge of sphagnum bog near Sukayu Onsen, Aomori Pref., Honshu. Seed.

275862 Shrub around bog, at 1,200 meters, Mt. O-take, Aomori Pref., Honshu. Seed.

276085 Grows to 2 feet high; leaves ovate, shiny, evergreen. On Mt. Apoi, Hidaka, Hokkaido, at 200 meters. Cuttings.

276163 Grows to 4 feet high in this locality. On Mt. Esan, Hakkodate, Hokkaido. Cuttings and seed.

276164 Open alpine meadow, Mt. Esan, Hakkodate, Hokkaido, at 400 meters. Seed.

ILEX VIRIDIS Champ. ex Benth.

An evergreen holly to 15 feet high with yellowish ovate serrate leaves and solitary black fruit. Native of Hong Kong and southern China.

276342 From the Botanical Garden at Hong Kong. Seed.

IRIS GRACILIPES Maxim. Iridaceae.

Hime-shaga.

A low-growing, slender iris from short, branching rhizomes; scapes to 12 inches high; flowers purple. Distributed in the low mountains of Kyushu and western Honshu.

276281 A horticultural form with variegated leaves. Collected at the Hakone Shrine, Motohakone, Honshu. Plants.

IRIS KAEMPFERI Sieb. Iridaceae
Hana-shōbu.

A tall iris, leaves with prominent midrib; flowering scapes up to 3 feet, flowers reddish-purple, outer segments clawed, the limb yellow, inner segments erect and smaller. Common in the swampy bogs of Kyushu, Honshu, and Hokkaido.

276086 Purple flowers. In swampy open field near Utabetsu, Hidaka, Hokkaido.

276113 Wet open meadow near Utabetsu, Hidaka, Hokkaido.

J

JUNIPERUS CONFERTA Parl.

Cupressaceae. Hai-nezu.

A procumbent dioecious conifer with short, sharp leaves having white grooves. Cones globose, purplish-black. Distributed on sand beaches from Kyushu to Hokkaido. An excellent beach erosion plant.

276559 From dense prostrate colonies on beach at Ashiarai, Ibaraki Pref., Honshu. Seed.

K

KADSURA JAPONICA (Thunb.) Dunal.

Magnoliaceae. Sane-kazura.

An evergreen climbing dioecious shrub with simple, elliptic, rather fleshy, and shiny dark-green leaves. Flowers insignificant, 2 to 3 fruit bright red, borne on a fleshy receptacle. Mostly found in Kyushu, Shikoku, and western Honshu.

274766 On slopes of Yasuman-dake, Hirado Island, Kyushu, at 400 meters. Seed.

L

LASTREA OLIGOPHLEBIA (Baker) Copel.

Aspidiaceae. Hime-warabi.

A small terrestrial fern with hairy fronds and blades profusely divided. Usually found in thickets of the lowlands of Kyushu, Shikoku, and western Honshu.

275057 Mt. Hanazono, Kita-Ibaraki City, Ibaraki Pref., Honshu, at 800 meters. Plants.

LEUCOTHOE GRAYANA Maxim. Ericaceae.
Hana-hiri-no-ki.

A deciduous shrub of 3 feet high with stout, upright branches and reddish stems. Leaves broad, elliptic, with light-green hairy upper surface. Flowers white in nodding terminal racemes. Usually on slopes in mountains of northern Honshu and Hokkaido.

275396 In shady conifer forest on Kinkazan Island, Miyagi Pref., Honshu. Seedlings.

LILIUM AURATUM Lindl. Liliaceae.
Yama-yuri.

With stems to 3 feet, tinged purple. Leaves short-petioled, narrow-lanceolate. Flowers few, white and dark-red spots, fragrant. Throughout hills of Honshu.

275526 White flowers with yellow bands, growing in heavy soil at edge of island of Tsubaki-jima, Miyagi Pref., Honshu. Bulbs.

LILIUM MACULATUM Thunb. Liliaceae.
Sukashi-yuri.

A small lily, stems to 15 inches high, stout, erect. Leaves sessile, lanceolate. Flowers orange-red, spotted. Usually found on rocky areas along the coast of Honshu and Shikoku.

275527 Orange flowers on rocky cliffs, Tsubaki-jima, Miyagi Pref., Honshu. Bulbs.

275528 Small with orange spotted flowers; on rocky slopes of Sangan Island, Iwate Pref., Honshu. Bulbs.

276087 On rocky cliffs above sea road near Mt. Apoi, Hidaka, Hokkaido. Usually not reported from Hokkaido. Bulbs.

LILIUM MEDEOLOIDES A. Gray Liliaceae.
Kuruma-yuri.

A small lily with slender, smooth stems; lowest leaves in false whorls. Flowers small, orange-red, few to many dark spots, segments recurved. Damp swamps and meadows, often ascending to alpine regions of northern Japan.
276088 In sunny moist meadows on Horomon mountain, Hidaka, Hokkaido. Bulbs.

276135 In Gamushi National Forest,
Oshima, Hokkaido. Bulbs.
LONICERA CAERULEA var. *EDULIS*
Turcz. ex Herd. Caprifoliaceae.
Ke-yonomi.

A prostrate shrub, much-branched with
pubescent shoots and exfoliating bark;
leaves oblong, pubescent. The fruit is
dark blue, bloomy, oblong, sweet,
edible. Found only in northern parts of
Japan (Hokkaido) and Siberia.

276114 Loose serpentine rock on Mt.
Apoi, Hidaka, Hokkaido, at 800 meters.
Plants.

LYCORIS SANGUINEA var. *KIUSHIANA*
Makino. Amaryllidaceae. O-kitsune-no-
kamisori.

A hardy lycoris with spring leaves and
orange-red flowers in late July or early
August. The perianth segments are
narrowly oblanceolate, only slightly
recurved. The variety, *kiushiana*, has
larger flowers than any other variety of
the species. Found in moist hills from
Kyushu to northern Honshu.

274800 On Tara-dake, Nagasaki Pref.,
Kyushu, at 600 meters. Bulbs.

274871 Mt. Kosho, Kyushu. Bulbs.

LYSICHITON CAMTSCHATCENSE (L.)
Schott. Araceae. Mizu-bashō.

A large perennial with thick, foetid,
erect deep-rooted rhizomes; leaves
elliptic, entire, gradually narrowing to
a flat petiole; spathe showy, blade white
8 to 12 inches long, elliptic. Common in
high alpine swamps of Honshu, Hokkaido,
and the Kuril Islands. Flowers, May to
July.

275809 In sphagnum bog above Sukayu
Onsen, Aomori Pref., Honshu, at 1,000
meters. Seedlings.

M

MACHILUS THUNBERGII Sieb. & Zucc.
Lauraceae. Tabu-no-ki.

A large evergreen tree to 40 feet high
with stout branches; leaves alternate,
elliptic, lustrous green above, pale
beneath, veins raised beneath. Flowers
inconspicuous. Fruit black. Remarkable
for the brilliant red new growth in the
spring. Distributed in foothills of Kyushu,

Shikoku, and Honshu, probably hardier
than the camphor-tree.

275529 Seedlings from northern limit of
of distribution. Tsubaki-jima, a small
island near Shizukawa, Miyagi Pref.,
Honshu.

MENZIESIA CILIICALYX var. *BICOLOR*
Makino. Ericaceae. Tsurigane-tsutsuji.

A deciduous shrub to 4 feet high with
ovate minutely toothed leaves, glaucous
except for hairs on midrib beneath.
Flowers purple and white in loose
umbels. Found in boggy uplands of
Honshu and Hokkaido.

275810 Seedlings collected on moist road
cut at Lake Towada, Aomori Pref.,
Honshu.

MENZIESIA CILIICALYX var. *PURPUREA*
(Makino.) Ohwi. Murasaki-tsurigane-
tsutsuji.

A much-branched shrub to 3 feet high.
Leaves oblong, with coarse hairs above
and on petioles. Flowers purple.
Mountains of central Honshu, especially
Hakone.

276282-283 Seedlings collected at Mt.
Hakone, Honshu.

276282 from Ōwakudani

276283 from Kamiyame.

O

OPHIOPOGON JAPONICUS (L. f.) Ker-Gawl.
Liliaceae. Ja-no-hige.

A perennial, grasslike plant with leaves
to 10 inches long in fascicles. Flowers
pale-purple, 10 to 12 on scapes, to 6
inches. Fruits round, deep-blue. Scat-
tered throughout Honshu and southern
Japan.

275530 From Tsubaki-jima, a small island
near Shizukawa, Miyagi Pref., Honshu.
Seedlings.

P

PAEONIA JAPONICA Miyabe & Takeda.
Ranunculaceae. Yama-shakuyaku.

A perennial with ternately compound
leaves and solitary, white flowers to
2 inches in diameter.

275398 Plants in bloom in shady places,
on Kinkazan Island, Miyagi Pref., Honshu.

PAEONIA OBOVATA Maxim. Benibana-yama-shakuyaku.

Similar to the preceeding except that flowers are pink.

275397 On Kinkazan Island, Miyagi Pref., Honshu, in moist, shady woods; in full bloom, June 11, 1961. Plants.

PIERIS JAPONICA (Thunb.) D. Don.

Ericaceae. Asebi.

An evergreen shrub to 12 feet high. Leaves oblanceolate, minutely toothed. Flowers in terminal, nodding panicles, white. Sunny hills and woods of southern Japan. Not a social plant; found only as individuals.

276560 Growing around edges of small pond near Taira, Ibaraki Pref., Honshu. Seed.

277419 A reddish-flowered cultivar from nursery area near Tokyo. Cuttings.

PITTOSPORUM TOBIRA (Thunb.) Ait.

Pittosporaceae. Tobera.

Evergreen, much-branched shrub; leaves narrowly obovate, glabrous, rounded at apex; flowers white, fragrant, in umbels; fruit capsules globose with red seeds. A seaside plant of Kyushu, Shikoku, and western Honshu.

275058 Seedlings from Kita-Ibaraki City, Ibaraki Pref., Honshu. Near northern limit of distribution.

275399 Seedlings collected at Kiyosaki, Ayukawa, Miyagi Pref., Honshu. Northern limit of distribution.

POLYGONUM sp. Polygonaceae.

276090 On sunny banks along path on Horomon mountain, Hidaka, Hokkaido. Dwarf species growing as a moundlike plant with small white flowers. Seedlings.

PONCIRUS TRIFOLIATA (L.) Raf. Rutaceae.

Kara-tachibana.

A deciduous shrub with spiny, green, compressed branchlets; leaves trifoliate, petioles winged; fruit a large yellow berry.

275400 Cuttings from Ayukawa, Miyagi Pref., Honshu. Heavy spines. Introduced from China.

275531 Cuttings from farmyard near Shizukawa, Miyagi Pref., Honshu. About northern limit on Pacific Coast of Honshu.

PRUNUS PERSICA (L.) Batsch. Rosaceae.

276284-287 Four varieties of canning peach. From National Agricultural Institute, Hiratsuka, Honshu.

276284 Kanto 2. Scions.

276285 Kanto 5. Scions.

276286 Kanto 12. Scions.

276287 Kanto 14. Scions.

PRUNUS SERRULATA Lindl. Yama-zakura.

This is the common hill cherry of Japan. It is characterized by acutely serrulate, oblong leaves with glands near top of petioles. Flowers pink, in corymbs. Fruit purplish-black. A highly variable species of wide distribution, often cultivated.

276136-140 A collection of scions from varieties growing well in the ancient Matsumae Castle Garden, Matsumae, Hokkaido.

276136 'Matsumae Kyazoki'. Double pink.

276137 'Tao Yamae Zakura'. Double light-purple.

276138 'Okuruma Gaishi'. Double pink.

276139 Unnamed. Double pink.

276140 Unnamed. Double light-pink.

PRUNUS TOMENTOSA Thunb. Yusura-ume.

A shrubby cherry with dense hairs on young branches, petioles, underside of leaves. Flowers pale-pink, small. Fruit subglobose, red, edible. Cultivated for flowers and fruit. Introduced from China. 275863 Growing along edge of barley field on road between Akka and Kuji, Iwate Pref., Honshu. A bush cherry; fruits large, about size of cranberry strikingly attractive. Seed.

PRUNUS VERECUNDA Koehne.

Kasumi-zakura.

A species closely related to *P. serrulata*. Leaves elliptic, coarsely toothed, thin, and bright-green beneath. Flowers pink. A mountain species from Hokkaido and Honshu.

275864 Tree to 40 feet high, growing in moist area along river near Lake Towada Aomori Pref., Honshu, at 500 meters. Seed.

PRUNUS sp.

276165 Gamushi Forestry Station,

Oshima, Hokkaido. Cultivated cherry raised from seed; fruits black, size of small commercial variety. Seed.

PSEUDOSASA JAPONICA (Sieb. & Zucc.)

Makino. Gramineae. Yadake.

The arrow bamboo of Japan. Culms 6 to 10 feet tall, nodes not elevated; internodes elongate, culm sheath especially persistent. Leaf blades narrowly lanceolate, leaf sheaths glabrous, somewhat purplish. Kyushu, Shikoku, and Honshu. 275078 Rare form with opposite side to bud swollen. Mito, Ibaraki Pref., Honshu. Plants.

Q

QUERCUS ACUTA Thunb. Fagaceae.

Akagashi.

A large evergreen oak to 50 feet high with entire leaves that are glabrous and lustrous; 8 to 13 pairs of veins. Acorns small, ellipsoidal, dark-brown. Common in southern Japan, widely planted in parks and gardens.

274540 Seed gathered along riverbed on Mt. Kirishima, Kagoshima, Kyushu, at 750 meters.

QUERCUS MYRSINAEFOLIA Blume.

Shira-kashi.

A small, evergreen oak with dark purple-brown branches. Leaves lanceolate to ovate with short mucronate teeth on upper portion of blade. Warmer parts of Honshu to Kyushu.

275041 Izura, Ibaraki Pref., Honshu. Evergreen; small, ovate, glossy leaves. From northern limit. Seed.

R

RAPHIOLEPIS UMBELLATA (Thunb.)

Makino. Rosaceae. Sharimbai.

An evergreen shrub with stout brown branches; leaves lustrous above, ovate with toothed margins; flowers white, fragrant, in upright panicles; fruit lustrous black. Usually in thickets along the seacoast of Kyushu, Shikoku, and western Honshu. It is commonly planted in seaside parks.

277653 Seeds collected along the coast at Omura, Kyushu.

277664 Seeds presented by the Biological Institute, Ibaraki University, Mito, Ibaraki Pref., Honshu. Collected at the northern limit of distribution along the Pacific coast.

RHODODENDRON sp.

Ericaceae.

274705 to 274735 A collection of cultivars from Hirado Island, referred to as the Hirado Azaleas. These are largely selections of *R. scabrum* and possibly hybrids with *R. mucronatum*. Rarely cultivated in Japan outside of Hirado Island. Flowers are unusually large. These were collected from various private gardens on the island. Descriptions includes flower color, flower size (in diameter), and garden source.

274705 'Hiran'. Bright purplish-red, 10.5 cm. From Ura Garden. Cuttings. 274706 'Irihinokumo'. Deep pink, 9 cm. From Ura Garden. Cuttings.

274707 'Kumonoue'. Deep purplish-pink, 10 cm. From Kumazawa Garden. Cuttings.

274708 'Kurokoshima'. Purplish-red, 10.5 cm. From Ura Garden. Cuttings.

274709 'Rakuyo'. Medium pink, 10.5 cm. From Nambu Garden. Cuttings.

274710 'Ranman'. Deep pink, 10 cm. From Ura Garden. Cuttings.

274711 'Shinnan'. Purplish-pink, 11 cm. From Ura Garden. Cuttings.

274712 'Shinsho'. Deep purplish-pink, 13 cm. From Ura Garden. Cuttings.

274713 'Tai Hai'. Deep pink, 11 cm. From Kumazawa Garden. Cuttings.

274714 'Tensho'. Reddish-pink, 9 cm. From Kumazawa Garden. Cuttings.

274715 'Eiko'. Bright purplish-pink, 9 cm. From Mori Garden. Cuttings.

274716 'Fukuju'. Light purplish-pink, 10 cm. From Mori Garden. Cuttings.

274717 'Hakurakuten'. Pure white, 8 cm. From Mori Garden. Cuttings.

274718 'Harunohikari'. Light purplish-pink, 10 cm. From Mori Garden. Cuttings.

274719 'Harunoumi'. Light purplish-pink, 10 cm. From Mori Garden. Cuttings.

274720 'Heiwanohikari'. Reddish-purple, 8 cm. From Nambu Garden. Cuttings.

274721 'Hiradonohomari'. Purple (heavy blotch), 9.5 cm. From Mori Garden. Cuttings.

274722 'Horai'. Strong red, 10.5 cm. From Mori Garden. Cuttings.

274723 'Izaribi'. Strong red, 9.5 cm. From Mori Garden. Cuttings.

274724 'Kintoki'. Strong purplish-red, 8 cm. From Mori Garden. Cuttings.

274725 'Irihinokumo'. Deep pink, 9 cm. From Mori Garden. Cuttings.

274726 'Myoken'. Purplish-pink, 10 cm. From Mori Garden. Cuttings.

274727 'Myoken'. Purplish-pink, 9.5 cm. From Nambu Garden. Cuttings.

274728 'Momoyama'. Strong purplish-pink, 9 cm. From Nambu Garden. Cuttings.

274729 'Matsurahime'. Light purplish-pink, 11 cm. From Mori Garden. Cuttings.

274730 'Rashomon'. Strong red, 11 cm. From Mori Garden. Cuttings.

274731 'Reimei'. Bright purplish-pink, 10 cm. From Mori Garden. Cuttings.

274732 'Senzai Kaku'. Light to strong pink, 10 cm. From Mori Garden. Cuttings.

274733 'Sekiyo'. Strong red, 11.5 cm. From Shiziki Garden. Cuttings.

274734 'Shinnan'. Purplish-pink, 11 cm. From Mori Garden. Cuttings.

274735 'Tenjin'. Deep purplish-pink, 6.5 cm. From Nambu Garden. Cuttings.

RHODODENDRON ALBRECHTII Maxim.
Murasaki-yashio-tsutsuji.

A deciduous azalea to 6 feet with slender branches. Leaves thin, clustered at ends of branches, with short hairs on upper surface and margin. Flowers 3 to 6, brilliant rose-purple; stamens 10. A rather rare azalea found in northern Honshu and mountains of Hokkaido. Late flowering.

276091 Seedlings from cutover woods at Shikotsu-ko, Hokkaido, at 400 meters. Purple flowers.

RHODODENDRON DAURICUM L.
Ezo-murasaki-tsutsuji.

A partly evergreen azalea. Leaves coriaceous, oblong, characterized by discoid brownish scales beneath. Flowers solitary, pink to purple;

stamens 10. A mountain azalea found only in Hokkaido in Japan and distributed on into Siberia.

276092 On rocky areas of Horomon mountain, usually semishade, Hidaka, Hokkaido. Seedlings.

RHODODENDRON FARRERAE (Tate) Sweet.

An evergreen azalea somewhat low growing, with short, stiff branches, covered with appressed hairs. Leaves whorled in three's, coriaceous, crowded at ends of branches. Flowers rose-pink, with red-purple spots, stamens 8 to 10.

276257 Plants from Victoria Peak, Hong Kong. Probably not in cultivation in the United States.

RHODODENDRON INDICUM (L.) Sweet

276288 'Tanima-no-yuki'. This is said to be the first known bicolored azalea of Japan. Flowers are deep cinnabar red with white throat, single, medium size. Said to have been developed in Kurume, Japan. Plants.

RHODODENDRON JAPONICUM (Gray)

Suring. Renge-tsutsuji.

A deciduous azalea with stoloniferous habit and ramifying branches. Leaves oblanceolate, vivid green above, glaucous or minutely hairy on the nerves beneath. Flowers vermillion, or orange to golden-yellow; stamens 5. Inhabits a great mountain range from sunny, dry plateaus in central Kyushu to boggy alpine meadows at Mt. Hakkoda, Honshu. At southern limit yellow flowers are commonly seen; none at all at northern limit. Collections here represent both of these localities.

275081 Seeds from red-flowered plants from Mt. Seidagawa, Kyushu. Plants bloom in late April.

275082 Seeds from yellow-flowered plants from Mt. Seidagawa, Kyushu. Plants bloom in late April.

275401 Seedlings from Kinkazan Island, Miyagi Pref., Honshu. Orange-flowered phase in bloom June 10, 1961.

275532 Seedlings from top of Mt. Goyo, Kamaishi, Iwate Pref., Honshu, at 1,200 meters. Orange-flowered phase.

275811 Seedlings from northern limit at O-take, Aomori Pref., Honshu, at 900

meters. Dark-vermillion, highly uniform for color.

277728 Seeds from yellow-flowered plant, Kyushu Agricultural Experiment Station, Kurume, Kyushu.

277729 Seeds from red-flowered plant, Kyushu Agricultural Experiment Station, Kurume, Kyushu.

277332 Seeds from Kesen-gun, Iwate Pref., Honshu.

277735 Seeds from Mt. Hakkoda, Honshu, at northern limit of distribution.

278156 Seeds collected in Tanichi National Forest, Aomori Pref., Honshu.

RHODODENDRON KAEMPFERI Planch.
Yama-tsutsuji.

This is the mountain azalea of Japan. It is a social plant, frequenting the edges of woods from sea level to about 800 meters. It is an upright shrub to 12 feet high. Leaves thin, dimorphic; spring leaves elliptic, summer leaves narrowly ovate. Flowers 2 to 3, vermillion, fairly uniform in color. It ranges from sea level in southern Kyushu to 800 meters in the mountains of Honshu and is found on all of the islands of Japan. Where it occurs with related species, hybrid populations can be found. It flowers from April to July according to locality, as may be noted by collection notes.

274542 Small shrub on rocky cliffs in sunny places. Foot of Mt. Takakuma, Osumi Pref., Kyushu. In bloom April 27, 1961. Seedlings.

274543 From Mt. Takakuma, Osumi Pref., Kyushu, at 300 meters. In bloom April 27, 1961. Seedlings.

274544 From Maruo Forest, Mt. Kirishima, Kyushu, at 800 meters. In bloom April 28, 1961. Seedlings.

274736 From dry cliffs of Yasuman-dake, Hirado Island, Kyushu. In bloom May 5, 1961. Seedlings.

274875 Small plant with ovate concurred leaves; brick-red flowers. Mikata gahara, Hamamatsu, Shizuoka, Honshu. Seedlings.

275032 At Orahama, along sea cliffs near Tomioka, Ibaraki Pref., Honshu. In bloom May 30, 1961. Seedlings.

275033 At Orahama, along sea cliffs near Tomioka, Ibaraki Pref., Honshu. In bloom May 30, 1961. Typical plant except calyx is petaloid. Plant.

275034 Upright habit; flowers range in color from salmon to rose-purple. On Ootakine, Ibaraki Pref., Honshu, at 1,100 meters. In bloom May 30, 1961. Seedlings.

275060 Near seashore at edge of rice-field, Kita-Ibaraki City, Ibaraki Pref., Honshu. In bloom May 28, 1961. Deciduous; flowers brick-red. A late-blooming type. Seedlings.

275061 Behind Maetoku School, Kisara Village, Ibaraki Pref., Honshu. Past flowering. Seedlings.

275402 On Kinkazan Island, Miyagi Pref., Honshu. June 10, 1961. Seedlings.

275403 On highest point of Kinkazan Island, Miyagi Pref., Honshu, at 440 meters. June 12, 1961. Brick-red flowers. Seedlings.

275533 At top of peak near Mt. Goyo, Kamaishi, Iwate Pref., Honshu, at 1,200 meters. June 15, 1961. Dark-red form with heavy blotch; flowers small. Seedlings.

275534 At foot of Mt. Hayachine, Iwate Pref., Honshu, at 900 meters. June 18, 1961. Leaves rather hairy, flowering. Seedlings.

275535 Along limestone cliffs, Akka, Iwate Pref., Honshu, at 300 meters. June 20, 1961. Red flowers. Seedlings.

275812 Near Lake Towada, Aomori Pref., Honshu. June 22, 1961. Red flowers. Seedlings.

276093 At Shikotsu-ko, Hokkaido, growing in dense woods among bamboo thickets. July 8, 1961. In full bloom. Seedlings.

276094 On Horomon mountain, Hidaka, Hokkaido, growing on loose serpentine rock, sunny places. July 11, 1961. Seedlings.

276095 On Horomon mountain, Hidaka, Hokkaido, along rocky cliffs above roadway, sunny location. July 11, 1961. Flowering. Seedlings.

276096 Along walls of streambed, moist, loose serpentine rock, Horomon

mountain, Hidaka, Hokkaido. July 11, 1961. Plants.

276097 At summit of Mt. Apoi, in loose serpentine rock, alpine conditions, Hidaka, Hokkaido. July 12, 1961.

Prostrate, twiggy due to environment and flowering about July 1. Seedlings.

276141 In Gamushi National Forest, Oshima, Hokkaido. July 15, 1961. Red flowers. Seedlings.

276142 Along streambed, on Mt. Esan, Hakkodate, Hokkaido. July 18, 1961.

Past bloom. Seedlings.

276289 Collected near the Lake Ashinoko, Hakone, Honshu. May 25, 1961. Seedlings.

RHODODENDRON (*R. KAEMPFERI* × *R. KOMIYAMAE*)

A putative natural hybrid. Plant is upright. Leaves typical of *R. Kaempferi* but more glabrous. The flowers are pink to purple, stamens 6 to 9. This is probably the plant referred to by Wilson as *R. obtusum* var. *Kaempferi f. mikawanum*. It occurs on Mt. Ashi-taka, only in the zone of association of the two parental species.

274872-873 Seedlings from Mt. Ashi-taka, Shizuoka Pref., Honshu, at 1,000 meters.

277686-697 A collection of seed from individual plants from the hybrid population growing on mossed-over rocks behind farmhouse at Jurigi Village, Mt. Ashi-taka, Shizuoka Pref., Honshu, at 100 meters.

RHODODENDRON *KOMIYAMAE* Makino. Ashi-taka-tsutsuji.

An upright azalea with narrow ovate leaves and purple flowers; stamens 10. This is an endemic azalea found only on Mt. Ashi-taka Shizuoka Pref., Honshu, above 1,000 meters. It flowers in late April and early May.

277685 Seed from a plant growing in farmyard at Jurigi Village, Mt. Ashi-taka, Shizuoka Pref., Honshu.

RHODODENDRON *MACROSEPALUM* Maxim. Mochi-tsutsuji.

An azalea with large hairy leaves, purple flowers, long narrow sepals, and numerous glands; stamens 5. Usually on

sunny hills at low elevation in western Honshu and Shikoku.

274874 Seedlings from Miyakoda, Shizuoka Pref., Honshu, at 200 meters.

RHODODENDRON *METTERNICHII* Sieb. & Zucc. Tsukushi-shakunage.

A rhododendron to 16 feet high. Leaves oblanceolate, acute at both ends, rusty tomentose beneath. Flowers rose-colored, 7 lobed, stamens 14. A mountain species from western Honshu, Shikoku, and Kyushu.

274803 Seedlings from top of Mt. Kyogatake, Nagasaki Pref., Kyushu, at 1,057 meters.

RHODODENDRON *METTERNICHII* var. *PENTAMERUM* Maxim. Shakunage.

A shrub to 6 feet high. Leaves oblanceolate, pale-brown tomentum beneath. Flowers rose-colored, 5-merous. Limited to high mountains of central Honshu.

275059 Seedlings from Mt. Hanazono, Kita-Ibaraki City, Ibaraki Pref., Honshu. May 28, 1961. Evergreen with pink flowers in early May.

277665 Seed from same source.

RHODODENDRON *PULCHRUM* var. *CALYCINUM* (Lindl.) Rehd.

276290 'Akebono'. Flowers pink, large.

276291 'Shirotae'. Flowers white, large. From Division of Horticulture, Kyushu Agricultural Experiment Station, Kurume, Kyushu. Plants.

RHODODENDRON *QUINQUEFOLIUM* Biss. & Moore. Goyō-tsutsuji.

A distinct azalea with corky, brown bark, whorled leaves and white, campanulate flowers; stamens 10. A somewhat rare azalea, difficult to establish. Found in the mountains of Honshu and Shikoku.

275062 Seedlings from Mt. Hanazono, Ibaraki Pref., Honshu, at 800 meters.

RHODODENDRON *SATAENSE* Nakai. Sata-tsutsuji.

A species closely related to *R. Kaempferi* and *R. kiusianum*. An upright compact shrub with obovate leaves, shiny above, dull-green beneath, petioles short, covered with pelose hairs. Flowers rose-pink to red; stamens 5. This is a local species, found only in the Takakuma Mts.

274541 On Mt. Takakuma, Osumi, Kyushu, at 700 meters. A collection of seedlings which represent color variation of this higher elevation population. 279007 Seedlings from Mt. Takakuma Forestry Station, Kagoshima, Kyushu, at 500 meters.

RHODODENDRON SERPYLLIFOLIUM (A. Gray) Miquel. Unzen-tsutsuji.

A much-branched, small azalea. Leaves smaller than for any other Japanese species. Flowers white to red, terminal, about 1/2 inch across; stamens 5. This azalea is quite restricted in distribution, found largely in the highly volcanic soils around hot springs.

274545 Cuttings from plants along cliffs of Sarugajo, Osumi, Kyushu, at 400 meters.

274546 Seedlings growing on rocky cliffs of mountain stream at Sarugajo, Osumi Peninsula, Kyushu, at 400 meters.

RHODODENDRON SIMSII Planch.

This is the Chinese azalea that figures so prominently in the parentage of forcing azaleas. It is a twiggy plant to 9 feet high. Leaves large, not dimorphic, lanceolate, covered with minute appressed shiny brown hairs. Flowers 2 to 6 in clusters, red with purple blotch; stamens 10.

276258 Cuttings from early-flowering plant. Hong Kong.

276259 Cuttings from late-flowering plant. Hong Kong.

276343 Seed from Hong Kong Botanical Garden.

RHODODENDRON TSUSIOPHYLLUM Sugimoto. Hakone-kome-tsutsuji.

A prostrate shrub, mostly alpine in habitat. Leaves thick, sessile, elliptic, and hairy above. Flowers 1 to 3 in terminal clusters, 1/2 inch across, white; stamens 10. A rare species, difficult to grow except under alpine conditions.

276292 Seedlings collected at Mt. Komagatake, Hakone, Honshu.

276293 Cuttings collected at Mt. Komagatake, Hakone, Honshu.

RHODODENDRON × TECTUM Koidz. Miyako-tsutsuji.

A natural hybrid between R. Kaempferi and R. macrosepalum with brick-red

flowers, but leaves and branches with pilose hairs as for R. macrosepalum.

274876 Along the roadside near Miyakoda, Shizuoka Pref., Honshu. Seedlings.

RHODODENDRON WADANUM Makino.

Togoku-mitsuba-tsutsuji.

A deciduous azalea, with rhombic leaves, broadly cuneate at the base and brown hairs on upper surface, closely related to R. reticulatum. Flowers bright rose-purple; stamens 10. A mountain species usually growing as isolated shrubs; restricted to central and northern Honshu.

276294 Collected at Mt. Kamiyama, Hakone, Honshu. Seedlings.

RHODODENDRON WEYRICHII Maxim.

On-tsutsuji.

A large, deciduous azalea to 15 feet tall. Leaves in whorls of three's except scattered on vigorous shoots. Flowers brick-red, usually appearing before the leaves; stamens 10. An unusual azalea with a disjunctive distribution from western Japan to Korea.

274547 Seedlings from along rocky cliffs of mountain stream at Sarugajo, Osumi Peninsula, Kyushu.

274737 Cuttings from a plant with white flowers said to have been collected on Goto Island. From Kiyashi Farm, Ushirobira, Hirado Island, Honshu. This is the first knowledge of a white form of this species. It is not described in azalea literature elsewhere.

274839 Seaside at Kushima-zaki, Nagasaki Pref., Kyushu. Deciduous with orange-red flowers. Seeds.

ROSA ACICULARIS Lindl. Rosaceae. Ō-takane-ibara.

A shrub with reddish-brown armed branches; leaflets 5 to 7, oblong, vivid green above, whitish beneath; flowers solitary, pink; fruit oblong. In high mountains from Hokkaido to Sakhalin.

276099 Along roadside in sunny places, Horomon mountain, Hidaka, Hokkaido. Pink flowers, followed by oblong fruits. Seedlings.

ROSA HIRTULA (Regel) Nakai. Sanshō-ibara.

A large much-branched rose with much-flattened thorns; leaflets 9 to 19, ovate with serrulate margin. Flowers solitary,

terminal, pale pink, 2 to 3 inches across. Fruit globose. Restricted to the Hakone mountains.

276295 Collected at Mt. Komagatake, Hakone, Honshu. Cuttings.

276296 Collected at Mt. Kamiyama, Hakone, Honshu. Cuttings.

ROSA LUCIAE Fr. & Rochebr.

Ō-fuji-ibara.

A nearly glabrous rose with arching stems and rather flat thorns; leaflets 5 to 7, slightly lustrous, ovate, 1 to 1 1/2 inches long. Flowers in a corymb, about 1 inch across, white. Restricted to the low mountains of Kanto and Tokaido Districts.

276297 Collected at Mt. Komagatake, Hakone, Honshu. Seedlings.

RUBUS VERNUS Focke. Rosaceae.

Benibana-ichigo.

An unarmed alpine shrub with three-foliolate leaves and solitary, nodding, deep-pink flowers up to 2 1/2 inches across; fruit globose, yellowish-red. Found in alpine regions of northern Honshu.

275813 Large dark-red flowers about 1 inch across; ornamental. Along path on O-take, Aomori Pref., Honshu, at 1,450 meters. Seedlings.

S

SAMBUCUS SIEBOLDIANA var. MIQUELII (Nakai) Hara. Caprifoliaceae.

Ezo-niwatoko.

A large shrub with yellow-brown lenticellate branches. Leaves 5 to 10 inches long, 5 to 7 leaflets, toothed. Flowers white in broad flat head. Fruit red. This is the northern form of the species, distributed from northern Honshu to Sakhalin.

276115 Along mountain road, Horomon mountain, Hidaka, Hokkaido, at 1,300 meters. Seed.

SERISSA FOETIDA (L. f.) Lam.

Rubiaceae. Hakuchoke.

A small evergreen shrub to 2 feet. Leaves opposite, ovate, entire, leathery. Flowers white. This species is apparently not native to Japan. There are both variegated and double-flowered cultivars.

274738 At summit of Mt. Shiziku-dake, southernmost locality of Hirado Island, Kyushu. Small evergreen shrub growing only a few inches high. Escaped? Seedlings.

SHORTIA SOLDANELLOIDES (Sieb. & Zucc.)

Makino. Diapensiaceae. Iwa-kagami.

A creeping perennial. Leaves few, coriaceous, orbicular, dark-green and lustrous, mostly at ends of stems. Flowers 3 to 10 in erect racemes, rose-pink. Fruit a capsule. Distributed throughout Japan, in moist shaded woods.

275079 Mountains above Biobu Valley, Taira City, Ibaraki Pref., Honshu, at 500 meters. Seedlings.

SKIMMIA JAPONICA Thunb. Rutaceae.

Miyama-shikimi.

A dioecious, evergreen shrub. Leaves simple, entire, alternate. Flowers white, small in terminal cymes. Fruit bright-red, highly ornamental. Found in moist shady forests throughout Japan.

275686 From Areshima, small island near Shizukawa, Miyagi Pref., Honshu. Growing wild in shady forest with camellias. Seeds.

SKIMMIA JAPONICA var. INTERMEDIA

Komar. Miyama-shikimi.

A variety characterized by creeping, ascending branches. Usually found in high mountains of northern Japan where snow protection is afforded.

275865 Seeds from plants in moist woods on Mt. O-take, Aomori Pref., Honshu, at 1,350 meters.

276100 Seedlings from shady forest on Shikotsu-ko, Hokkaido.

276143 Female plant from Gamushi National Forest, Oshima, Hokkaido.

276144 Female plants from beech forest of Enosato Regional Forest, Oshima, Hokkaido.

SYMPLOCOS CRASSIFOLIA Benth.

Symplocaceae.

276344 From the Hong Kong Botanical Garden. An evergreen species probably not hardy except in southernmost United States. Seed.

SYMPLOCOS LANCIFOLIA Sieb. & Zucc.

Shirobai.

276345 From the Hong Kong Botanical Garden. An evergreen tree species of the

tropical rain forest. Probably not hardy except in southernmost United States.

Seed.

SYMPLOCOS LUCIDA Sieb. & Zucc.

Kuro-ki.

A small densely branched evergreen shrub. Leaves alternate, coriaceous, elliptic, 2 to 3 inches long; teeth scattered on margin. Flowers sessile, in axillary heads, not conspicuous. Fruit black. A good shrub for the seaside in milder climates. Common in Kyushu and Shikoku along the coast.

274804 Cuttings from Kushima-zaki, Omura, Kyushu.

277730-731 Seed from same locality.

SYMPLOCOS PRUNIFOLIA Sieb. & Zucc.

Kurobai.

Broadleaf evergreen tree to 25 feet high with terminal racemes of fragrant white flowers. A brilliant spring-flowering tree of southern Japan. When it is in flower, one of the outstanding trees of the forest.

274548 Seedlings collected in a dense evergreen forest on Mt. Takakuma, Osumi Pref., Kyushu, at 700 meters.

T

THUJOPSIS DOLABRATA var. *HONDAE*

Makino. Cupressaceae. Hinoki-asunaro.

A conifer with pendulous branches.

Leaves lustrous, deep-green above, with conspicuous white patches beneath. The variety 'Honda' has branchlets more dense and cones larger than those of other varieties.

275814 Seedlings from large forest at Osore-san, Aomori Pref., Honshu.

TORREYA NUCIFERA (L.) Sieb. & Zucc.

Taxaceae. Kaya.

A glabrous tree with spreading brown branches. Leaves linear, gradually tapering to a short-spined apex. Fruit drupelike, purplish.

275404 Kinkazan Island, Miyagi Pref., Honshu. Grows to 50 feet high here. Seedlings.

TRICYRTIS OHSUMIENSIS Masamune.

Liliaceae. Takakuma-hototogisu.

A perennial with creeping rhizomes.

Stems erect, 10 to 20 inches high.

Leaves oblong, clasping. Flowers axillary, solitary, yellow, without spots.

A rare species, limited to Osumi, Kyushu.

274549 From rocky cliffs along streambed on Sarugajo, Osumi Peninsula, Kyushu. Seedlings.

V

VACCINIUM BRACTEATUM Thunb.

Ericaceae. Shashambo.

A much-branched evergreen shrub; leaves coriaceous, lustrous, elliptic-ovate; flowers white in racemes 1 to 2 inches long, more than 10 flowers; fruit reddish-purple. A choice evergreen shrub restricted to the mountains of southern Japan, especially the hot springs of Kyushu.

274550 Maruo Forest, Mt. Kirishima, Kagoshima, Kyushu, at 800 meters. Seedlings.

279008 Takakuma Experimental Forest, Kagoshima University, Osumi Peninsula, Kyushu, at 500 meters. Seed.

VERATRUM MAACKII var. *JAPONICUM*

(Baker) Shimizu. Liliaceae. Shuro-sō.

Perennial with stout rhizomes and erect stems. Leaves narrowly oblong, plicately nerved, tapering to the base into a sheath. Flowers purplish-red on spikes to 2 feet long. A bog plant of alpine regions of northern Japan.

276101 Growing as a bog plant on Mt. Apoi, Hidaka, Hokkaido. Seedlings.

VITIS COIGNETIAE Pulliat et Planch.

Vitaceae. Yama-budō.

A strong-growing vine; branches tomentose when young, tendrils intermittent. Leaves cordate, with 3 to 5 lobes, dull above, thickly gray-pubescent beneath. Leaves turn brilliant crimson in the autumn and it is a highly ornamental vine.

275536 Along limestone cliffs near Akka, Iwate Pref., Honshu, at 300 meters.

Vine, leaves large, usually three-lobed, turning reddish in autumn. Seedlings.

Z

ZOYSIA JAPONICA Steud.

Gramineae. Shiba.

274805 This is the most important lawn grass of Japan. This is a fine-leaved selection from the Nagasaki Agricultural

Experiment Station. Omura, Kyushu.

Undetermined

274806 Small ground-covering vine, leaves ovate, silver variegated; coarsely toothed. At foot of Mt. Iwaya, Nagasaki Pref., Kyushu. Plants.

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