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Cover Illustration: TREE PEONY 'NISHIKI-NO-SHITONE'

The National Horticultural Magazine

The National Horticultural Magazine is a quarterly journal, being the official publication of The American Horticultural Society, Incorporated. It is devoted to the dissemination of knowledge in the science and art of growing ornamental plants, fruits, vegetables, and related subjects. The Journal is published by Monumental Printing Company at Thirty-second Street and Elm Avenue in Baltimore, Maryland, and is entered as second class matter in the post office of that city in accordance with the Act of August 24, 1912. Subscription to the Journal is included in membership, which is \$5.00 a calendar year.

Original papers increasing the historical, varietal, and cultural knowledges of plant materials of economic and aesthetic importance are most welcomed and will be published as promptly as possible. Material of lasting interest appearing in related journals will be reprinted as available. Publications received for the Library will be reviewed and made available to members after publication of the reviews. These books are designated "Library" following the prices in the book reviews. Reviews of private collections will also be accepted and published. These books, however, are not available for loan to members of the Society.

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"Year's Dawn Picture, painted on Flower Day (i.e. Twelfth day of the second month) in the year Kén-Wu."

Dr. Basil Gray, Keeper, Department of Oriental Antiquities, who grants permission to present this illustration to our members, on behalf of the Trustees of the British Museum, writes:

"The Chinese painting, which is Number 314 in the Department, bears no artist's signature, and the two seals below the inscription are not legible. The large seal at the bottom might merely express good wishes for the new year.

"The colouring is natural on white paper, the plum blossom stems" suggesting the beginning of things, "being sepia, the foliage of peony," symbolizing prosperity, "is yellow-green and blue-green, the vase is a pale blue, the fungus," a symbol for longevity, "in the foreground is brownish yellow, and the rock in the background greyish-white. The narcissus represents the new year.

"The date is a cyclical date which could refer to any year—1870, 1810, 1750, etc. We think, however, that the most likely date is 1870. In any case the picture is certainly 19th century."

THE TREE PEONIES

John C. Wister & Harold E. Wolfe

With illustrations from photographs by Gertrude M. Smith
(Unless otherwise credited)

Introduction

ONE OF THE MOST MAGNIFICENT, most beautiful, and most interesting of all plants — the tree peony — is at last coming into its own as an important garden plant. Its present popularity is very belated. It has been known in our gardens for over a century and a half. It was frequently mentioned in our gardening presses and shown at flower shows over a century ago. Yet, in spite of its fine qualities, and the lavish praise bestowed upon it by writers; it was not known to many people until the past quarter century. Even now the choicest kinds are available in only a comparatively few nurseries.

How can this paradox be explained? Hovey, writing in 1864 in the *American Gardeners Magazine and Register*, said: "It is too slow a plant for us Americans. We must have something like a verbenas which can be had in full bloom and sells cheap." The present enormous sales of plants in our

One of the factors which determines the extent to which any cultivated plant will be used and distributed, regardless of how desirable it may be, is the facility with which it may be propagated. In the case of the tree peony, this has certainly been the principal one. Its propagation has always been



Renshaw

Part of the Tree Peony Collection at Swarthmore College, Swarthmore, Pennsylvania.

roadside stands and supermarkets attest the great upsurge of interest in gardening. Even ninety years after Hovey's severe criticism, it can be noted that most of those sales, while not verbenas "in full bloom," are in spirit closely akin to them. While they may be magnolias, azaleas, or other plants of a more permanent nature than the verbenas, their greatest sales are either in flower or in bud promising to burst into flower a day or two after planting.

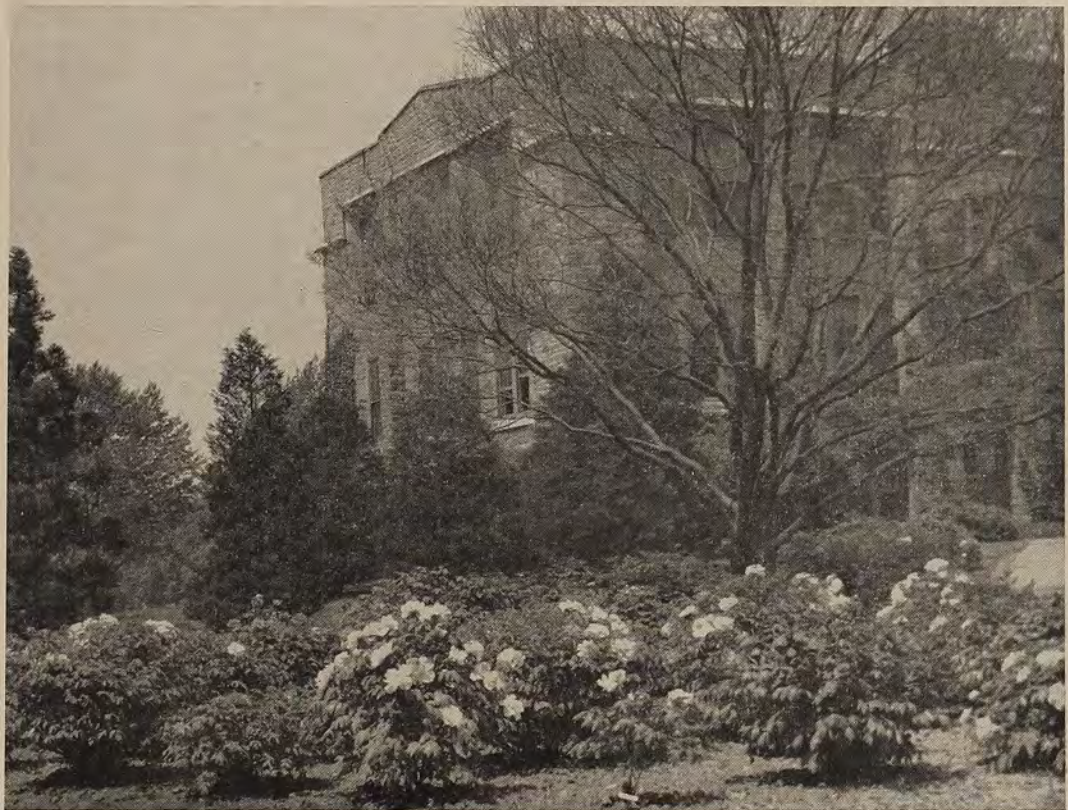
a problem in Europe and in this country. While it may not have been so in China and Japan, successes there, even before the days of plant quarantines, have not, through large-scale importation, been translated into a sufficiency of plants reasonably available here.

So, even though the qualities of these truly fine shrubs are recognized, and through the media of words and pictures proclaimed to an interested and waiting public, this means little unless there can be developed a method

of producing them in large quantities.

Enough has been learned about their culture to remove a great deal of the past uncertainty. Now they must be made available. This can be done. During the past quarter century and particularly during the past decade, there has developed a greater interest in their propagation. These years of experimenting have given us much ex-

tory of the tree peony and its remarkable qualities, with some practical information as to how to overcome the drawbacks and difficulties which have, in the past, kept it from what many of us believe its rightful place in our gardens. Parts of the history are taken, almost verbatim, from a long article written in 1924 by one of the present authors and published in 1928 in *The*



Renshaw

Another view of the Tree Peony Collection at Swarthmore.

perience that will be of great help to propagators—both present and future.

More than any other publication in this country, *The National Horticultural Magazine* presents to its readers serious accounts of many plants, common or rare, which deserve thoughtful consideration from those who wish to call themselves true gardeners. It is fitting, therefore, that in these pages there should be a complete and up-to-date presentation of the his-

Manual of the American Peony Society. Copies of this book are practically unobtainable and can be found only in a few horticultural libraries, so that it seems quite proper to again make this information available. Much additional botanical and historical information has been obtained from the Monograph by Col. F. C. Stern, *A Study of the Genus Paeonia*, published by The Royal Horticultural Society, London, 1946.

Botany

PAEONIA Linn. 1737. The ancient Latin name from Paeon, a mythical physician. Long considered a member of the Buttercup Family, Ranunculaceae, some recent botanists have now assigned it to a family of its own, Paeoniaceae. Distributed from west Europe and north Africa through Asia to Japan, and one horticulturally unimportant group in California.

This paper is not concerned with the Subgenus Paeon, De Candolle 1824, Lynch 1890, which includes some thirty herbaceous species. The following notes concern only the woody section of the genus, the tree peonies. Older botanists placed these under Subgenus Moutan, Lynch 1890. (Stern calls this Section Moutan De Candolle in Prodr. 1824.) All the wild types are diploids with ten chromosomes.

1

SUFFRUTICOSA GROUP

This includes only the species *Paeonia suffruticosa*, commonly called the Moutan tree peony. The distinguishing botanical characteristics are: the disc produced as a thin leathery sheath which at first completely envelops the carpels; lower leaves bipinnate with some hairs on lower surface; pinnae entire or more often palmately

two to three lobed. Plants found in west China in provinces of Kansu, Szechwan, and Shensi. Reports of plants in other sections are probably garden escapes. (Stern 1946 calls this Subsection *Vaginatae*.)

2

DELAVAYI GROUP

The older botanists included here the species *P. delavayi* and *P. lutea*. Stern includes them also and adds a third species, *P. potanini*. The distinguishing botanical characteristics of the second group are: the sheath is absent; the disc produced as conspicuous fleshy lobes around base of carpels; lower leaves biternate, glabrous; leaflets pinnatiparted, with pinnae deeply lobed and toothed. The plants have several flowers to a stem. Leaves are lanceolate or linear, and have linear or lanceolate bracts below the calyx. Plants found in west China and Tibet. (Stern 1946 calls this Subsection *Delavayanae*.)

Enumeration and Description ~~of the~~ of the Species

SUFFRUTICOSA GROUP

1. *Paeonia suffruticosa* Andrews, *Bot. Rep.* 1804. Name means "some-what like a shrub."

Syn. *P. arborea* Donn, *Cat. Hort. Cantabr.* 1804.

P. moutan Sims, *Bot. Mag.* 1808.

P. papaveracea Andrews, *Bot. Rep.* 1807, and various combinations of the above.

The Moutan tree peony was first known as a cultivated plant. It has leaflets deeply and incisely divided, the apex of the lobes and teeth sharply acute. When the wild type was collected by W. Purdom in 1910, Rehder, in *Journ. Arnold Arboretum*, 1920, named it variety *spontanea*. Its leaflets were more or less unequally trilobate and apex of lobes and teeth blunt. This botanical variety has white flowers with magenta purple blotches, but other wild types are reported to have magenta purple flowers.

DELAVAYI GROUP

2. *Paeonia delavayi* Franchet, *Bull. Soc. Bot.*, France, 1886.

Collected by Père Delavay in 1884 in Yunnan and named for him—flowered and first exhibited in Paris, 1892, although other reports say first introduced 1900. It was collected again by Forrest in 1910. This is believed to be the oldest and most primitive species of this group. Seedling forms differ, one being reported to six feet. Flowers dark mahogany which give it the common name, the maroon tree peony, although it is also commonly called the Delavay tree peony. Its flowers are three and a half to four inches. The flowers have conspicuous

involucres of eight to twelve green bracts inserted close against the prominent calyx of five leathery, greenish sepals. This species is distinguished from *P. lutea* and *P. potanini* by this conspicuous involucre with the greater number of bracts and sepals.

The following names of so-called varieties appear in the literature but have no authentic standing:

alba—a creamy white, now referred to

P. potanini forma *alba*—which see.
acutiloba—Listed by Barr. Flowers deep crimson, anthers golden, foliage deep cut. May likewise be a form of *P. potanini*.

angustiloba—Now given specific rank as *P. potanini*—which see.

vera—Introduced 1930 by Lemoine.

Said to have come from China but whether from a wild source or a garden is not stated. Lemoine says differs from the type in habit, quickly attaining five feet. Also differs in foliage. Flowers large, single, darkest mahogany crimson.

The other species of this group or subsection have flowers with an involucre, bracts and sepals together numbering five to seven, the outer one to four, more or less foliaceous, the innermost rounded and sepaloid.

3. *Paeonia lutea* Delavay ex Franchet, *Bull. Soc. Bot.*, France, 1886. Syn. *P. delavayi lutea* Finet. & Gagnepain, 1904. Marquand, 1929.

P. lutea *superba* Hort., 1908.

Yellow like a large buttercup or yellow with reddish blotches at base and commonly called the yellow tree peony. Has a lilylike fragrance. Two to two and a half inches, in cultivation, sometimes to three inches. Very variable, usually about three feet, but Kingdon Ward reported six to eight feet. Delavay discovered it in Yunnan 1883 in spruce forests at eleven to thirteen thousand feet. Sent to Paris Museum of Natural History in 1886, but it has also been referred to as the

wild yellow tree peony of southern China. It flowered in 1892 and was exhibited by Professor Maxime Cornu. The segments and lobes of the leaves are mostly three-fourths to one and a quarter inches wide. The foliage is handsome and fernlike.

4. *Paeonia lutea* variety *ludlowi* Stern and Taylor, *Bot. Mag.* 1953. Syn. *P. lutea* Tibetan form Stern in *Jour. Hort. Soc.*, October. Commonly called the Tibetan peony or the Ludlow peony.

Seed collected by Ludlow and Sherriff in 1936, their No. 1376, in a comparatively restricted area in south-eastern Tibet. There it forms colonies in dry gravel terraces in shrubby thickets of holly-oak forests, at nine to eleven thousand feet. This was in parts of the Tsangpo Valley where there is an annual rainfall of forty inches or less, this zone being intermediate between the rain drenched Himalayan belt and the dry wind-swept plateaus.

It grows eight feet high in comparison with the Chinese form of *P. lutea* which grows only five feet. It never has more than two functioning carpels while *P. lutea*, the type, has three to four carpels which are only about half size. It has stiffer stems holding the flower upright on almost erect pedicels above the apical cluster of leaves. The flowers are larger and more open than the type, for in the type they are somewhat cupshaped and concealed by the foliage. In England, where it seems to accommodate itself better than does the type, it flowers three weeks to a month earlier, and flowers best in full sun, either on chalk rubble, rich loam, or poor granite soil. Only a few plants have reached this country, and some difficulty with its culture has already been experienced in the St. Louis area.

It is an erect, unbranched or sparingly branched shrub. Stems are com-

monly leafless except on current year's growth. Leaves trifoliolate but usually biternate. Flowers usually four to each stem, up to four and three-fourths inches across.

Ludlow, Sherriff and Taylor collected seed again in 1938, their No. 6392. Ludlow, Sherriff and Eliot collected seed in 1947, their No. 13313.

In general, the plant differs by taller growth, stiffer stems, holding flowers upright, larger leaves and larger flowers, more open than *P. lutea*, all producing a very superior plant. Flowers were shown at the Chelsea Flower Show in London in 1947.

So-called varieties of *P. lutea* that have been offered by nurserymen include

superba (Lemoine int. 1905 and described in *Rev. Hort.* 1906.)

Probably one of the original seedlings and perhaps less green and a better yellow than some of the others.

speciosa Listed by Barr 1938. Flowers yellow, suffused reddish purple.

splendens Listed by Barr 1938. Flowers dark yellow, probably latest of all to flower.

It seems likely that any ambitious nurseryman could give similar Latin names to almost any seedlings raised from *P. delavayi* or *P. lutea*.

5. *Paeonia potanini* Komarov, *Not. Syst. Herb. Hort. Bot. Petrop.*, 1921. Discovered by and named for Grigory Nokolajelitsch Potanin.

Syn. *P. angustiloba* Stapf in MS. in the Kew Herbarium, unpublished.

P. delavayi angustiloba Rehder & Wilson, in *Plant. Wilson.* 1913.

Wilson collected this in Szechwan on border of Yunnan at ten thousand feet in 1904. Lemoine introduced it into commerce in 1920 under the name

given by Rehder and Wilson. It will probably commonly be called the Potanin peony, or the narrow-lobed peony. Plant stoloniferous. The segments and lobes of the leaves mostly three-sixteenths to three-eighths an inch wide. Only in the lower part of the less dissected upper segments are they as wide as three-fourths. Flowers up to two and one-quarter inches, maroon red, opening widely, stamens yellow. The pinnatifid leaves, cut into very narrow lobes, are graceful and a bright green, and the plant deserves to be grown for its foliage alone. The

are more oblong and shortly acuminate. The flowers are yellow and do not open widely but are shaped more like the flowers of Trollius. For this reason it might be called the globe-flowered tree peony, but it seems more likely to be called Forrest's tree peony. The flowers are also held more erect than those of the type. It is a more effective plant than most plants of *P. lutea* because the flowers stand up well above the foliage. Collected by Père Monbeig and by Forrest on Mekong-Yangtse Divide. Introduced into commerce by Ruys 1939 as *P. forresti*.

A "lost-named" variety at Swarthmore with flowers pink, silvery at the edges, deepening in the heart; petals have a strongly marked deep rose narrow splash at the base.



plant is not as tall as *P. delavayi*.

6. *Paeonia potanini* forma *alba* F. C. Stern, *A Study of the Genus Paeonia*, 1946.

Syn. *P. delavayi* variety *alba* Bean, 1933. This form has white flowers.

7. *Paeonia potanini* variety *trollioides* Stapf ex F. C. Stern, *Jour. Roy. Hort. Soc.* 1943.

Syn. *P. trollioides* Stapf ex F. C. Stern in *Jour. Roy. Hort. Soc.* 1943.

P. forresti *trollioides*. Saunders in *Nat. Hort. Mag.* 1934.

Like the type, it is stoloniferous. This botanical variety differs from the type in that its segments and lobes

8. *Paeonia lemoinei* Rehder 1920. *P. lutea* × *suffruticosa* Lemoine about 1900 or Henry before then.

The hybrid group is apparently now used to include all the Henry, Lemoine, and Saunders hybrid varieties, but under botanical rules this could hold only if *P. lutea* is considered as a botanical variety of *P. delavayi* and not as a distinct species. The species *P. delavayi* probably enters into the parentage of most or all the darker hybrid varieties.

We know of no records of *P. potanini* having been used for hybridizing. Hybrids have been secured from *P. ludlowi* in England but have apparently not yet flowered.

History

The Chinese Type

THE NAME of the Moutan tree peony is derived from the Chinese Mow tan, or Muh tang, or Mew tang. It grows in northwestern China ordinarily from three to six feet and has occasionally been reported up to ten feet in the wild. The wild plant became known only in 1910. There is practically no literature about this wild form, yet botanical, horticultural, artistic, poetic, medical, and historical references, designs, and paintings go back at least to 536 A.D. and refer to garden forms originated by the Chinese. Even the most ancient authors refer to it as a flower long cultivated.

John C. Wister standing by a plant of the Chinese variety Banksi in the old Painter Arboretum (John J. Tyler Arboretum), Lima, Pennsylvania. This variety, a light lavender-pink, is the first one brought to England (1784 or 1786) at the request of Sir Joseph Banks of Kew. This particular plant is known to have been in the Painter Arboretum for about a century. It is about eight feet across and had 134 flowers this spring.





'Hesperus' a pale yellow overlaid with dusky rose.

The ancient Chinese called the tree peony the "King of Flowers," and some of them apparently believed that older generations of Chinese had actually produced the tree peony from the herbaceous peony by their gardening skill. Much was written about their supposed medicinal value and some authors state that only after the year 600 were the plants widely grown as ornamentals. By 750 there were known, and described, thirty named varieties(1).¹ There were ancient accounts of flowers, yellow, blue, violet and black, selling at fantastic prices like "one hundred ounces of gold." Whether these colors were the fabric of the imagination, or obtained by the use of dyes, is not known.

The first embassy of the Dutch East India Company to China traveled from Canton to Peking in 1656. One of its members(2) later wrote about the trip and described the tea plants and pineapples. He described also tree peonies as being like roses but without thorns and twice as large, in color mostly white with a little purple,

¹For this and other numbered references, see Appendix, Page 51.

'Harvest' (Flower is just past its best). One of Professor Saunders' hybrids; flowers bronze gold with rose flush on petal edges.



but also yellow(?) and red(?). No one seems to have taken this story seriously until more than a hundred years later. Then, Sir Joseph Banks of Kew, having seen Chinese drawings, read the account and engaged a Mr. Duncan, a "medical gentleman," attached to the British East India Company, to procure a plant(3). This man procured a plant in Canton in 1787. The impression at that time was that the plants grew wild near Canton, but later it was reported(4) that they were grown by gardeners in mountainous

in 1789 by Sir Joseph Banks and planted at Spring Grove, Isleworth, about ten miles from London, was named *Paeonia moutan banksi*. In 1829, it was reported to be eight feet high and ten feet across. It was very double, magenta or purplish red at the center fading to light pink at the edges. The original plant lived until 1842 when it was destroyed during a building operation(5). Other varieties reached Kew in 1794 and 1797, one a semi-double deep rose pink(6). In 1802, Capt. James Prendergast of the



'Eclairer' and Miss Susan Cobbs, Dean of Women at Swarthmore College. Flowers are pale lavender-rose.

regions nearly a thousand miles away, and shipped by river boat in open baskets without soil. In Canton they were potted and sold, the price depending, like modern Easter Lilies, on the number of flower buds per plant. After flowering, they were thrown away as they would not thrive in the hot climate of Canton where they would have no winter rest.

The Canton plant sent by Mr. Duncan to Kew, or a second plant received

Hope, brought from China a single or semi-double white with large purple spots at the base. It flowered in the garden of Sir Abraham Hume of Wormley Bury, Herts., in 1806(7). Botanists considered it to be the true species and they called it *P. papaveracea*(8), and later *P. moutan papaveracea*, not, as is commonly supposed, on account of its resemblance to the flower of a poppy, but because one of its microscopic parts resembled the

seed vessel of the common European poppy. True to the botanists' habit of changing names, in time, *P. moutan Banksi* became *P. moutan papaveracea Banksi*. By whatever name, the older tree peonies proved good growers in England. Sabine⁽⁹⁾ in 1826 reported a twenty-four-year old plant seven feet high, forty feet in circumference, producing 660 flowers, of which 130 were disbudded to increase the size of those remaining. The plant at Wormley Bury, by 1835, was reported to be fourteen feet in diameter and

In the early 1800's, the plants sold for about ten guineas apiece, but by 1825 there were quotations at one guinea and in 1836 at three and one-half shillings. It is not known whether these were for additional importations or for home grown plants, but, after 1817, no startling new varieties seem to have been mentioned until the time of Fortune.

There seems to have been great dissatisfaction during this period with the attitude or behavior of the Chinese exporters. Hovey⁽¹¹⁾ said that the Chi-



'Renkaku' and Mrs. J. Folsom Paul. 'Renkaku,' meaning "Flock of Cranes," is a pure white with a well shaped flower.

to have borne 320 flowers. In 1940, when Major A. Pam owned the property, there were flowers on an old plant that was believed to be part of the original plant, or a seedling of it. These reports do not seem to bear out later British complaints about the extreme difficulty in growing the plant in the English climate, such as William Watson's remark in 1890 that the plants die a foot for every six inches they grow⁽¹⁰⁾.

nese were so selfish about all the plants they possessed that they did not wish any foreigners to have them. He said they deliberately substituted inferior varieties for those they had agreed to sell, even when they had as many or even more plants of better varieties.

Nurseries on the continent imported plants from China during the first half of the century and raised seedlings to which they gave long Latin names or the names equally unpronounce-

able and unspellable of patrons of the arts. Among these nurseries were Baumann, Noisette, Mathieu, His, Makoy, and Seneclaus. Further details about these are to be found in the American Peony Society's 1944 *Tree Peony Check List*.

An interesting sidelight on the period concerns a Belgian amateur (12) who sowed seed in 1823, and in 1836 produced a flower so magnificent that he named it 'Gloria Belgarum.' He was so vain that he showed it only to his most intimate friends and so selfish that he did not want any to have propagations from it. He was reported to have kept two "enormous" dogs on guard over the plant night and day for nearly thirty years, but apparently, in spite of this, some scions were stolen and the plant was available in nurseries about 1861.

Robert Fortune, the great explorer of the Royal Horticultural Society, made four trips to China and introduced many fine plants to England. In 1846, he brought twenty-five of the finest tree peonies ever to come out of China. Among these were 'Atrosanguinea,' 'Berenice,' 'Bijou de Chusan,' 'Dr. Bowring,' 'Globosa,' 'Glory of Shanghai,' 'Lord Macartney,' 'Pride of Hongkong,' 'Robert Fortune,' 'Samarang,' and 'Zenobia.' These were enthusiastically received and quickly propagated, so that both British and continental nurseries cataloged them in some quantity in the 1860's.

Certain disappointments were noted. The "Black Peony" wasn't black but a deep purple. The Wistaria-blue variety was a very ordinary lilac color. The slow propagation kept prices high, which checked the distribution of the plants. Some of them lacked vigor, but even so it was the best collection of varieties of the time and infinitely better than the early importations. It made up for the many disappointments of earlier shipments on which the roots

had been too severely cut. Writers intimated that the exporters did not want the plants to live and that they even scalded seeds before selling them to foreigners.

Up to the time of Fortune's trip, the Chinese had sold hundreds of so-called distinct varieties, which, when they bloomed, proved to be the same five or six first imported between 1787 and 1810. Fortune's collection was the finest ever brought from China. There is apparently no record of any other Chinese garden varieties having been imported up to the time of the publication of the *Peony Manual*. Since then, Japanese nurseries have offered "rare" or "new" Chinese varieties. They had new names at least, but, when they bloomed in this country, proved identical with the importations of long ago.

The 1860's, 1870's and 1880's were the years of the greatest popularity of the Chinese varieties. In the 1860's, the German nursery, Haage & Schmidt, offered sixty-one varieties; in Holland, Krelage offered a hundred and ninety varieties; and in France, Verdier advertised twenty-five thousand plants in twenty varieties. In the 1870's, in Belgium, van Houtte listed one hundred and sixty-eight varieties; in Germany, Spaeth claimed three hundred and fifty varieties, but, unfortunately, the catalog did not give the names. In the 1890's, Paillet, near Paris, listed three hundred and thirty-seven kinds. Many of the catalogs stated that a large number of the finest varieties came from Italy, but whether they were raised there from seed or imported from China or Japan is not stated. Long searches in the literature at the Arnold Arboretum, the Massachusetts Horticultural Society, the New York Botanical Garden, and the United States Department of Agriculture Library have failed to bring to light any definite information

on this subject.

One of the earliest and best articles on the whole subject was written in 1826 by Joseph Sabine(14). This was extensively plagiarized, or even copied word for word, without acknowledgment in the British, French, Belgian, and German gardening papers for nearly fifty years! Any additional remarks appearing in one of these papers seemed to go the rounds of the others in a few months. It was not a time of originality and the remarks seemed to travel in a cycle of (a) appreciation of beauty, (b) hope and prediction of great popularity, (c) astonishment that the plants are so little known, (d) remarks on danger of spring frosts, and (e) remarks on difficulties of propagation.

As the century drew to a close, the references became fewer and fewer. When the old growers died, the desire for large collections of Chinese tree peonies apparently died with them. The varieties they had grown with the possible exception of *P. papaveracea* had full double flowers. They were so heavy that the stems could not properly support them, with the result that many of the flowers were hidden under the foliage. In addition to the varieties already mentioned, there were being grown under European names, one white, 'Lambertinae'; a few very beautiful salmon pinks and rose pinks such as 'Carolina d'Italie,' 'Comte de Rambuteau,' 'Jeanne d'Arc,' 'Marquis de Clapiers,' 'Mme. Stuart Low,' and 'Mme. Victor Gillier'; a gorgeous rose red or cherry red, 'Reine Elizabeth'; and a fine deep purple, 'Souv. de Ducher.' There were also hundreds of lilac pinks, magenta pinks and plain magentas, most of which were very unattractive. Many closely resembled *Banksi*. Typical varieties were 'Arch-duc Ludovico,' 'Athlete,' 'Beaute de Twickel,' 'Jules Pirlot,' 'La Ville de St. Denis,' 'Morris,' 'Princess Louise,'

'Reine Amelie,' 'Reine des Fleurs,' 'Triomphe de Vandermaelen,' and 'van Houttei.' All these varieties proved, in Holland and France, easy to propagate in comparison with the later introduced Japanese varieties. Which varieties bearing European names were actually raised from seed in Europe and which were Chinese varieties renamed is not too definitely established. The 1944 *Tree Peony Check List* contains all the available information and shows at least which European nurseries gave the names and introduced the varieties. In the decade before World War I, Chinese or European types were being propagated by wholesalers in Orleans, France, and Boskoop, Holland, and sent to this country.

All this history refers to the garden varieties of Chinese origin, or their European raised seedlings. Nobody knew the exact home of the species. One report states that Hugh Scallan and Giuseppe Giraldi found the species growing wild in Shensi sometime between 1890 and 1896. They did not collect plants or seeds. Stern mentions a claim of discovery by a Doctor King in 1884 but thinks the plants may have been escapes from garden plants. In 1896, Paul Bruhl either found similar plants or reported on Doctor King's discovery. In 1910, Purdom(15) found it. He sent a herbarium specimen to the Arnold Arboretum which Rehder, in 1920, named *P. suffruticosa* variety *spontanea*. He sent seeds to Veitch in England and to Professor Sargent. About fifty seeds of the latter shipment germinated, but the young plants were destroyed by rats. The Veitch Nursery raised a plant which they sent later to Professor Sargent. From this, a second herbarium specimen was made.

In 1914, Reginald Farrer(16) found plants of the wild white variety in Kansu. In his book, *On the Eaves of*



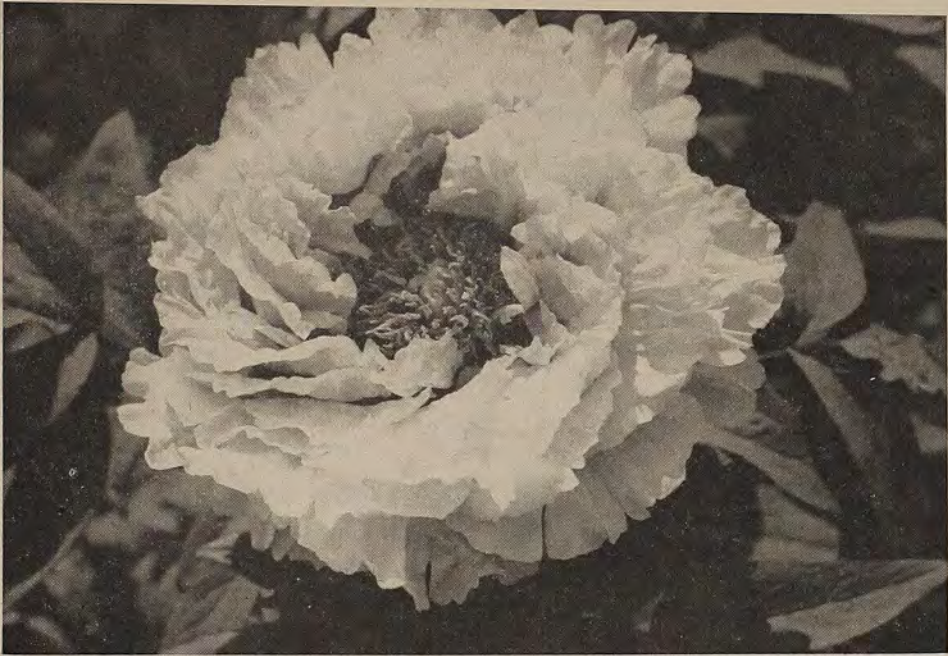
'Kasumi-no-mori' (Grove in Mist) has carpels tipped with rose and pink flowers.

the World, (Edward Arnold and Company Publisher, London, 1926), he wrote a most poetic account of them. He had reached a tiny village after a long trip and in the evening climbed the nearby wooded hills. There he rested and gazed "down the steep loess tracks to the little village so pleasant-looking in its grove of poplars, till my eye was caught by certain white objects farther along the hillside, that were clearly too big by far to be flowers . . . Through the foaming shallows of the copse I plunged, and soon was holding my breath with growing excitement

as I neared my goal and it became more and more certain that I was setting eyes on *Paeonia moutan* as a wild plant. The event itself justified enthusiasm but all considerations of botanical geography vanish from one's mind in the first contemplation of that amazing flower, the most overpoweringly superb of hardy shrubs. Here in the brushwood it grew up tall and slender and straight, in two or three unbranching shoots, each one of which carried at the top, elegantly balancing, that single enormous blossom, waved and crimped into the boldest grace of line, of absolute pure white, with featherings of deepest maroon radiating at the base of the petals from the base of golden fluff at the flower's heart. Above the sere of thorny scrub the snowy beauties poise and hover, and the breath of them went out in the twilight as sweet as any rose. For a long time I remained to worship, and returned downward at last in high contentment."



'Hana-no-mikado,' Emperor of the Flowers, is a lilac rose double, which, though a Japanese variety, more closely resembles the double type grown by the Chinese.



'Shuchiuka' (*Flower in Wine*) is one of the most beautifully shaped and colored Japanese varieties. Delicate pink with deep pink splashes at the base of each petal.

Further on Farrer stated "the Moutan is par excellence the national flower of China. There is hardly a house or abbey without a bush or two—the Imperial Palaces revel in rows upon rows . . . arranged in narrow shallow terraces each just wide enough for a single line of plants, and piled up one behind another till the effect of that towering long bank all ablaze must surpass the wildest imagination of the show bench . . . I cannot but feel that in similar raised terraces the peonies might find better drainage and kindlier conditions in England where at present they still remain more loyally obedient to the wishes of their late Imperial mistress than do her other special favorites, the Palace doglings, one of whose special points, as laid down by Her Majesty's own hand, was that they should 'bite the foreign devils instantly.'"

Farrer wrote that in southern Kansu the tree peony was always white but that further north it was magenta. He believed further exploration would reveal wild types of other colors, but since his time, with the world in turmoil, this has not happened.

Stern reports seeing herbarium specimens in Paris, and at Kew, that had been collected by Abbé Licent and A. E. Pratt in Kansu and Shensi in 1922.

The main fact reported by all these explorers was that the plants grew in woodland on steep mountain sides. This now makes us comprehend the need for partial shade rather than full sun in our hot summers. The plants have mostly been grown in the sun because of our knowledge that the herbaceous peonies, the most important of which are prairie plants, like sun. But as with herbaceous plants, the need for good drainage has long been understood.

About 1932, the explorer, J. F. Rock, collected in a Lamasery seeds of what he believed to be a wild peony from Kansu. The resulting plants flowered in America, Canada, Great Britain, and Sweden about 1938. They were like *P. papaveracea* of Andrews except that the sheaths enclosing the carpels were white, not purple. Apparently there have been no introductions of Moutan peonies from China since 1932.

History

The Japanese Type



'Kintagio' (Castle of Kinuta). Flowers are pale pink.

MOST BOTANISTS are agreed that the tree peony did not grow wild in Japan but that Buddhist monks had taken it from China and Korea to Japan in the sixth, seventh and eighth centuries along with such fruits as the apple, pear, plum, peach, apricot, cherry, quince, and orange, and such ornamental plants as the Yulan magnolia and the Sophora (17). The few students who think that the Moutan peony was indigenous to Japan, as well as to the Asiatic continent, admit that all the improved kinds came from China.

The name Moutan, that came with the plant, was corrupted to Bhotan or Botan which is still the Japanese name for peony. The tree peony enjoyed great esteem as early as 724 A.D. Later authors discoursed on its medicinal value and described its colors. Some estimated that there were from five hundred to a thousand distinct kinds. In Nara and in Yamata there was a variety called "Thousand Petals," and there were stories of plants selling for a hundred ounces of silver, and of a black peony, 'Kuro-botan'(18). Wilson believed many of these stories were copied from older Chinese stories such as have been mentioned before. (There is, however, a modern Japanese deep crimson-purple variety named 'Kuro-botan.')

The first Europeans to see tree peonies in Japan were Kaempfer(19), about 1690, and Thunberg(20), in 1775, but they mention them only briefly. Apparently no plants were sent to Europe either by them or by later travelers until about 1844, perhaps because they thought the varieties they saw identical with plants sent to Europe from China.

The first known importation of tree peonies from Japan was by Siebold (21) in 1844. It was said to come from the Imperial Gardens of Tokyo and Kyoto and to contain forty-two of the finest varieties. They began to bloom in Holland in the Siebold Nursery and in the garden of Prince Frederic in 1848. They were entirely different from Fortune's Chinese varieties and the descriptions sound as if they covered all the types since offered in Japan. Nothing is known of their subsequent history except that the Dutch nurseryman, Krelage, cataloged a few from Siebold in 1867 at from one to twelve dollars each, but only two or three varieties seem to have survived and to have later been offered by other nurserymen. L. Boehmer,

a German nurseryman in Yokohama, exported plants in 1866, but they also did not long survive. There were practically no Japanese tree peonies to be had in Europe or America until they began to come from the Japanese nurseries in the 1890's.

In 1891, Professor Sargent visited Japan and brought back a collection of a dozen or more Japanese varieties. Very soon after that several Japanese dealers (not actual nurserymen), the most prominent of which were the Yokohama Nursery Company, and the Tokyo Nursery Company, printed catalogs in English and perhaps in German and French. Kelway in England, Goos & Koenemann in Germany, and Paillet, Lemoine, and Dessert in France, offered plants for sale under elaborate English, German and French names. Of the lot, Auguste Dessert was the only one to attempt to give the original Japanese name, but that did little good as less than half of the plants he imported, like those received by others from Japan, proved true to name or description. Dessert, however, was the person most responsible for bringing about the new popularity of the tree peony for he continued to specialize in tree peonies longer than the others and his catalogs are our best information of the first quarter of this century.

Trollope(22) about 1918, wrote of tree peonies in Korea, where he said the plants needed some winter protection. Shortly after that E. H. Wilson told one of the present authors that the tree peonies in Korea were the finest he had ever seen anywhere.

Conder(23), writing about the floral art of Japan, stated that the tree peony was delicate and needed great care. He said the Japanese called it "the flower of twenty days" because it stayed in bloom that long. It is not clear if he meant that one bloom would last that long, which might be possible dur-

ing very cool weather. Another writer(24), in telling how the culture of tree peonies in Japan amounted to a regular worship, described how each individual plant was fed and watered and given light and shade by the use of an individual straw thatch covering. Under such care, flowers could be kept in good condition longer than if grown in the open.

Conder may have meant that all varieties together gave an extended flowering period totaling nearly three weeks, which in cool weather might easily happen. He quotes the poet Tung Po as saying, "The floral monarchs should be visited in the morning. He who should see their splendor in the afternoon cannot be considered a good judge," which would seem to indicate that even under Japanese conditions the flower faded rapidly.

John Dunbar, a famous park superintendent of Rochester, New York, imported tree peonies from Japan about 1900. They made a sensation when they bloomed. The plants, like all early Japanese importations, were grafted on Moutan stocks, and, like all such plants, were short lived. Dunbar had saved seeds, however, from his first flowers and so was able to continue the strain if not the original clones. J. Wilkinson Elliot, in Pittsburgh, between 1905 or 1910 and 1915, and Bertrand H. Farr, in Wyomissing, Pennsylvania, between 1910 and 1920, imported from Japan and propagated plants. Thomas J. Oberlin of Sinking Spring, Pennsylvania, near Wyomissing, imported plants from Japan, the first apparently in the 1890's, and began to propagate on what was then a large scale. In the 1930's and 1940's, his son, R. L. Oberlin, had a stock of approximately seven thousand plants and was grafting about a thousand a year.

In the 1920's, the Yokohama Nursery was still sending to this country

a beautiful book of color illustrations of fifty named varieties and offering these varieties for sale. Various persons importing these received good plants, the flowers of which hardly ever corresponded to the illustrations. On one occasion, one of the present authors wrote to the nursery asking if it might be possible, by paying extra, to get an authentic set corresponding to the illustrations, this set to be used to establish the correct names of the plants in this country. He received an indignant reply from an American living in Japan who was at that time the president or general manager of the company. The letter stated that no business was desired from and that no plants would be sent to anyone who didn't like the company's method of doing business, or their method of labeling!

About this time, catalogs reached this country from Chugai Shokubutsu Yen, a nursery growing all, or at least a good part of the tree peonies they offered, in contrast to the earlier so-called nurseries which merely bought plants from small growers and resold them. These catalogs gave good descriptions of two hundred or so varieties, dividing them into "Choice," "Selected," "New and Rare," "Newest," and "Miscellaneous" varieties, and for good measure added "Winter Flowering Varieties." Of the last named varieties, they carefully explained they did not mean that they flowered in winter! To them the term meant that in their climate the plants would produce some flowers in the autumn until stopped by cold weather. They also explained that by crimson they often meant to convey the color that Americans called light pink, or that they meant a white flower with blotches of deep red. They were at least honest in calling to the attention of prospective customers what the English terms they used meant to them.

The Chugai varieties imported in the 1920's and early 1930's proved to be the handsomest to reach this country. Not only that, they were true to descriptions, and re-orders brought the same variety under the same name. It is from these varieties that we had for the first time an opportunity to know what we meant when we mentioned 'Akashi-gata,' 'Dokushin-den,' 'Tro-no-seki,' or other named variety. It is unfortunate for us that the Chugai Nursery went out of business either shortly before or during World War II.

The Japanese seed and bulb firms of T. Sakata & Company, and of Henry & Lee, on several occasions and as a favor, collected from Japanese growers other fine varieties and sent them to this country. These also proved true to description.

Just before the late war, beautifully illustrated catalogs from K. Wada, of Numaza-shi, reached this country. Many of the names of the varieties were new, but whether the varieties were really different is not known, nor do we have record of how many plants actually reached this country before the war. Several nurseries and amateurs in the Puget Sound area brought in plants, but many of them apparently did not long survive. These catalogs, by the way, offered yellow varieties under Japanese names, but Mr. Wada sent information that these were French varieties renamed. Wada is still in business and has been sending plants to this country in the past few years.

The Japanese ideal of a flower was very different from that of the Chinese, and from the same original stock they produced mostly single or semi-double flowers. Their few full doubles are not so heavy as the Chinese flowers and are held reasonably upright rather than drooping and falling under the foliage. They seed freely, which the Chinese do not. Most propagators have found them more difficult to propagate than

the Chinese. Many of the varieties are not so strong growing as the Chinese sorts.

The *American Peony Society Bulletin* of September, 1944, published a list of all Japanese varieties then known. No one knows the originators or introducers of these varieties. Many of them have been grown in out-of-the-way parts of Japan for generations, if not for centuries. Often their names are not names at all but merely words meaning "white peony," "dark peony," or "very fine." The difficulties of transliteration from the Japanese word characters have led to many inconsistencies of spelling often in the same Japanese catalog. There are, for instance, changes of single letters. Often *g* and *k*; *j* and *sh*, *z* and *ts*, *ds*, *s* and *dz* seem to be interchangeable; yet no English speaking person can be perfectly sure they are in any single instance. There are names like 'Homei,' 'Howmai,' 'Howmei,' which may or may not be variations of one name. Other examples are 'Hokwan' and 'Ohkwan.' One Japanese wrote before the war that "gyoku" was simply "an other pronunciation of 'tama'." How can Americans understand the ramifications of this language? We Americans add to the trouble by hastily and incorrectly copying the labels.

Some Americans think we should translate the names into English. Who can do this when 'Ruriban,' the name of one of the finest purple varieties, may mean Lapis Lazuli Vessel, or Ultramarine Basin, or Indigo Purple Tray?

Our troubles have been multiplied by the carelessness or unscrupulousness of some Japanese nurserymen. The principal exporters of the 1910-1925 era would sell a collection of fifty varieties with fifty different labels and all but two or three plants would prove to be identical. The same firm would send fifty plants of one special white

variety and the flowers would bloom pink, scarlet, and purple. In dealings with many Japanese nurserymen, we know only those already mentioned who sent plants true to description and the same variety under the same name on a re-order.

All these reasons combine to cause confusion. Only through the offices of the American Peony Society has some order been brought out of that confusion. It is now possible to buy plants of some of the best Japanese varieties in this country and get them true to name. For this we can thank the late R. L. Oberlin, the late Prof. A. P. Saunders, William Gratwick, and many others who worked with the American Peony Society.

The color range of the varieties now available in the American nurseries specializing in tree peonies is remarkable. Many varieties have not been tested long enough in different areas to warrant conclusions as to which are the "best." We cannot give any comprehensive list of recommendations. It is not even practical to show which are the most popular as is done today with irises, hemerocallis, and other plants which can be propagated and widely distributed in a relatively short time.

It seems better, therefore, to merely quote examples of good varieties without pretending they are necessarily

better than others which are not mentioned. This will serve at least to call attention to the great color range.

In white, (Class I, of the American Peony Society), there are 'Gessekai,' 'Godaishu,' 'Fugi-oe-ryo,' 'Renkaku,' and 'Yaso-okina,' which are pure white throughout, 'Ima-chowkow,' which is creamy, and 'Kogane-zome' and 'Shuchiuka,' with pinkish and purplish splashes.

In pinks, (Class II), there are the pale 'Dokushin-den' and 'Shishinden,' and the deeper 'Iro-no-seki,' 'Doun,' and 'Terute-nishiki.'

In rose-red to vermilion, (Class III), there are 'Mikasa-yama,' 'Akashi-gata,' and 'Ukare-jishi.'

In scarlet, (Class IV), 'Hatsuhinode,' 'Hiodoshi,' 'Nishiki-no-shitone,' and 'Ouchinime.'

In crimson to maroon, (Class V), 'Koi-kagura,' 'Kasane-jishi,' and 'Konron-koku,' 'Hatsu-garashu,' 'Sumi-no-ichi,' and 'Kokko.'

In purple, (Class VI), 'Rimpo' and 'Ruriban.'

In magenta, (Class VII), 'Shikoden,' 'Éclairer,' (very early), and the common Japanese grafting stock sold under the name Moutan.

In lilac-rose and pale-rose purple, (Class VIII), 'Jitsu-getsu-ko,' 'Hanano-mikado,' 'Nippon-zakura,' and 'Jinjuden.'

History

The Delavay Group



Tree Peonies in the Garden of Mrs. Arthur Hoyt Scott at Rose Valley, Pennsylvania.

COMPARED to the long history of the Moutan peony, the yellow and maroon species and botanical varieties of the Delavay Group are of comparatively recent discovery and introduction. The two first known, *Paeonia lutea* and *P. delavayi*, were discovered in China by the French Jesuit, Father Jean Marie Delavay. He sent them to Paris in the late 1880's, and they bloomed there in the early nineties.

They were first described as distinct species by the French botanist, Franchet. Later botanists considered *P. lutea* to be merely a botanical variety of *P. delavayi*. Rehder, in his *Manual of Cultivated Trees and Shrubs*, felt that the differences were sufficient for each to be regarded as a species. Similar differences of opinion greeted later discoveries by the botanist, Potanin, and the great explorer, George Forrest. Potanin's plant, which had maroon flowers, was regarded by the Kew botanist, Stapf, as a species, and named by him in an unpublished manuscript *P. angustiloba*. Rehder and Wilson promptly (in 1913) reduced this to *P. delavayi* variety *angustiloba*, and a few plants got into the trade under that name. The Russian botanist, Komarov, in 1921, put it back as a true species and named it, for its discoverer, *P. potanini*.

Forrest's plant, a yellow, got into the trade under the name *P. forrestii*, and then Stapf in another unpublished paper called it *P. trollioides* because its cup-shaped flowers reminded him of the genus *Trollius*. *The National Horticultural Magazine*, in 1934, under a photograph by Silvia Saunders, coupled the two names, and then Stern decided the plant was merely a botanical variety of *P. potanini*. Meanwhile, a white form was named *P. delavayi alba* by Bean in 1933, only to be changed to *P. potanini alba* by Stern in 1943.

Finally, Ludlow and Sherriff, exploring in Tibet in 1936, sent to England seeds of what they called a Tibetan form of *P. lutea*, and this has now been christened *P. lutea* variety *ludlowi*.

All this is very confusing to the horticulturists, who are apt to feel that their importance comes not from the technical differences, but rather from their similarity to each other. As horticulturists, we should be interested in all the forms as possible

parents, with the Moutan peony, of a totally new set of hybrids which may in time outdistance all other peonies in importance.

Superficially, none of these plants seems to give promise of any value for breeding. Indeed, the first flowers of *P. lutea* that were shown in Paris seemed so insignificant that one of the greatest horticulturists of the time, M. Maxime Cornu, publicly remarked that it would never amount to anything. We wonder if he has turned over in his grave every time one of the new hybrids has made its debut! What a pity he did not live to see even the one that his colleague, Professor Louis Henry of the Paris Museum of Natural History, raised and named in his honor, 'Souvenir de Maxime Cornu.'

Professor Henry raised a second hybrid and named it 'Mme. Louis Henry.' But the great Lemoine had seen the possibility of the new race and raised a series of hybrids, a list of which is presented later. A few of these came to this country about the time of World War I, and their strange exotic coloring created astonishment when they were exhibited by members of the American Peony Society.

One of the leading members of that society, its Secretary, Professor A. P. Saunders of Hamilton College, procured plants of *P. lutea* and *P. delavayi*, and began his work which was to prove so wonderfully successful. Not caring for the double flowers, so heavy that they hung down under the foliage, Professor Saunders used the pollen of single and semi-double Japanese Moutan varieties. As a result, he produced single and semi-double flowers. The color range is very wide, as a glance at the attached list will show. Year after year these flowers have been exhibited at peony society meetings. The first of them, 'Argosy,' has been propagated in sufficiently

large numbers to be available for general distribution. Most of the others are of more recent introduction, still very scarce, and high priced. We all long for the time when they will be available in quantity.

The European hybrids and those of Professor Saunders, and also the crosses made more recently by breeders he has inspired, were all made in one way, by saving the pollen of Moutan varieties and putting it on the later-blooming *P. lutea* and *P. delavayi*. Recently, several breeders have tried the reverse cross, so far without success.

All the present hybrids are sterile or at least very nearly so. They often produce seed pods without any seeds inside, or if there are seeds, they are hollow. There are occasionally a few apparently good seeds, but they do not germinate. At least that is the story so far, with only a small number of supposed exceptions.

Four of these supposed exceptions were raised by Professor Saunders. One of these, 'Heart of Darkness,' is a flower worth growing for its depth of color and richness of petal quality. The other three are of inferior quality but are being grown in the hope they may produce seed. So far, all have proved sterile, which is most disappointing, as this second generation, or, as the geneticists say, the F_2 generation, is supposedly fertile.

During the past three or four years, William Gratwick has been making many crosses using Professor Saunders' named (and some numbered) hybrids. He has collected and planted from these crosses some seeds that appeared to be good. The results have been disappointing thus far. Perhaps we shall hear more of these in a few years. One of the present authors believes strongly that if enough of these supposedly sterile hybrids or "mules" were raised, a consistently fertile plant

would be bound to appear. As an approach to it, he has in this season of 1954 one plant of 'Harvest' (Saunders' group) which is apparently producing seed in three sets of carpels.

It should be noted that the remarkable hybrids which Professor Saunders has raised, named, and introduced, have been obtained by the use of relatively few seed parents, as he did not, at the beginning of his work, have many plants of either *P. lutea* or *P. delavayi* available. But these plants, in addition to being the mothers of hybrids, set much seed to their own pollen, and these seedlings of the species have proved very variable in size and vigor of plant, in size of flowers, and in strength of stem. There are now enough plants in existence to enable future breeders to choose among different plants for the purpose of selecting those which have the most desirable characteristics. This should make still further progress possible.

The above known hybrids have come from using as seed parents the two original species introduced by Father Delavay. There is no record apparently that hybrids of *P. potanini* or *P. trollioides* exist. Colonel Stern has made crosses with *P. lutea Ludlowi*, and we shall all wait expectantly for these to flower. If reports of the important characteristics of this Tibetan peony are true, it should indeed prove to be most valuable as a parent.

All that can be said now is that the possibilities of further improved hybrids cannot even be guessed. It is to be hoped that the American Peony Society will encourage many new (and young) breeders to try their hands at this fascinating work.

Meanwhile, we have over fifty new kinds, known to be very beautiful, to enjoy as soon as they can be propagated in quantity. Some of the most important are here listed.



'Chromatella,' one of Lemoine's yellow hybrids, showing the bad habit of the flowers hanging down under the leaves.

By Victor and Emile Lemoine
Single

'L'Esperance,' (1909), yellow.
There is a dispute whether this was raised, flowered, or introduced before Professor Henry's varieties.

'Mine d'Or,' (1943), yellow.

'Aurore,' (1935), coppery yellow, deeper than 'Mme. Louis Henry.'

'Sang Lorraine,' (1939), (*P. delavayi vera* × Moutan), crimson maroon.

Double—very heavy

Yellow

'Alice Harding,' (1935), (*P. lutea* × 'Yaso-okima').

'Chromatella,' (1928)

'Eldorado,' (1949)

'La Lorraine,' (1913). Flowered 1904, exhibited, Paris, 1909.

Yellow with red

'Flambeau,' (1930)

'Satin Rouge,' (1926)

'Surprise,' (1920)

VARIETIES RAISED IN FRANCE

By Professor Louis Henry

'Mme. Louis Henry,' (1919), (*P. lutea* × 'Reine Elizabeth'), single, yellow, blended with red.

'Souv. de Maxime Cornu,' (1919), (*P. lutea* × 'Ville de St. Denis'), heavy double, yellow, blended with red. This was said to have been raised, or to have first flowered, in 1897.

VARIETIES RAISED IN AMERICA

All by Professor Saunders

I. The "Roman Gold Group." Yellow, clear or almost clear, generally single.

'Amber Moon,' (1948)

'Arcadia,' (1942)

'Argosy,' (1928)

'Canary,' (1940)

'Golden Bowl,' (1948)

'Goldfinch,' (1948-1950)

'Nankeen,' (1950)

'Narcissus,' (1941)

'Roman Gold,' (1941)

'Silver Plane,' (1948-1950)

'Silver Sails,' (1940)

'Stardust,' (1950)

'Wings of the Morning,' (1948), formerly 'Aureole.'

- II. The "Golden Hind Group." Yellow, clear or almost clear, generally semi- or fully double.
 'Age of Gold,' (1948-1950)
 'Alhambra,' (1948)
 'Celestial,' (1948-1950)
 'Daffodil,' (1948)
 'Gold Dust,' (1950)
 'Golden Hind,' (1948-1950)
 'Golden Isles,' (1948)
 'Gold Sovereign,' (1950)
 'High Noon,' (1952)
 'Hyperion,' (1948-1950)
 'Nereid,' (1949)
 'Orion,' (1948)
 'Spanish Gold,' (1948-1950)
- III. The "Tea Rose Group." Generally yellow, but tinted and suffused reddish, single to double.
 'Angelet,' (1950)
 'Apricot,' (1948-1950)
 'Brocade,' (1941)
 'Countess,' (1942)
 'Damask,' (1941)
 'Festival,' (1941)
 'Golden Mandarin,' (1952)
 'Happy Days,' (1948)
 'Harvest,' (1948-1950)
 'Holiday,' (1948-1950)
 'Marchioness,' (1942)
 'Pastoral,' (1950)
 'Segovia,' (1949)
 'Spring Carnival,' (1944)
 'Sunrising,' (1948)
 'Tea Rose,' (1948)
 'Titania,' (1949)
- IV. The "Banquet Group." Generally reddish, but with yellow undertone, single to double.
 'Banquet,' (1941)
 'Centaur,' (1941), (to be discarded).
- 'Chinese Dragon,' (1950)
 'Conquest,' (1948)
 'Hesperus,' (1948-1950)
 'Regent,' (1945)
 'Renown,' (1949)
 'Right Royal,' (1950)
 'Rose Flame,' (1950)
 'Summer Night,' (1949)
 'Tiger, Tiger,' (1948)
 'Trophy,' (1944)
- V. The "Black Pirate Group." Crimson to very dark almost black maroon, single to double.
 'Black Douglas,' (1948)
 'Black Panther,' (1948)
 'Black Pirate,' (1941)
 'Charioteer,' (1949)
 'Corsair,' (1941)
 'Daredevil,' (1948)
 'Heart of Darkness,' (1948), second generation hybrid.
 'Lombard,' (1948)
 'Monitor,' (1948)
 'Phoenix,' (1941), (to be discarded).
 'Red Cloud,' (1950)
 'Red Currant,' (1948)
 'Red Jade,' (1948)
 'Thunderbolt,' (1948)
 'Vesuvian,' (1948)
- VI. The "Mystery Group." Ivories, pearled shades, suffused mauves, single to double.
 'Coronal,' (1941)
 'Harlequin,' (1952)
 'Infanta,' (1948)
 'Melody,' (1948)
 'Mystery,' (1948)
 'Princess,' (1941)
 'Savage Splendor,' (1950)

Culture

IN SPITE of the century and a half history of the tree peony in America, very little definite information concerning its cultural requirements has been published. Its mountainside forest home suggests partial shade and good drainage. We know it came from limestone regions, and that it flourishes in the limestone soils of western New York. We do not know its exact pH preference, nor do we know how much feeding may be of benefit. It has been suggested that 6.5 to 7 may be the most satisfactory.

One of the earliest American accounts is by Landreth (25) in 1832. Hovey (26), in 1835, refers to them as "those truly magnificent undershrubs." He writes that they are "though yet rare, perfectly hardy and flower freely," and that they "may also be grown in pots and wintered in the cellar."

In 1836, Hovey (27) writes that tree peonies "are among the most splendid plants of which our gardens can boast" and that "they are as yet unknown to country gardens and perhaps with the exception of the amateur and the nursery collections in or about our principal cities few if any plants are to be found."

Hoffman (28), in 1849, translated an article by Ito Ilfei and other articles in Japanese manuals. He quotes two formulae for soil mixture. One called for one third each of black peat, well rotted leaf mold, and garden soil; the other for equal parts of river bog, garden soil, and sand. After discours-

ing about these, this solemn author stated "individuals must work things out for themselves," which is most certainly true in this country. It might be said that H. W. Collingwood's famous saying, repeated in *The Rural New Yorker* over a period of many years, "Ask the plant," was merely a paraphrase of this.

The quotation from this eastern author that seems to fit in with much American experience, of both the past and the present century, is that "a plant attacked by rot at the root often dies."

The Japanese, who are said to have little good soil, feed it heavily with fish and other similar fertilizers. There are no records of fertilizer experiments in this country. Some growers express fear that too much nitrogen may produce soft growth abnormally subject to *Botrytis*.

For years, experienced horticulturists had so much trouble with the tree peony that they might easily have concluded it was not worthy of being tried further. It is now evident that the trouble did not lie with the plant,

nor yet with those who were pioneering with it. It was simply that its requirements and its responses were not known.

Perhaps the most significant fact that has been learned is that it requires deep planting. Many of the earlier instructions state that plants should be set out with the grafted joint, or the point of juncture, at ground level, or one inch below the ground. Plants which were set out in this manner afforded the scion little or no opportunity of forming its own roots. It is not difficult now to see why mortality was high. Deep planting makes for more vigorous root systems. These in turn mean a wealth of subterranean buds and a consequently strong growth above the ground. If a tree peony is planted deeply in an acceptable location, it can be burned or cut to the ground *at any time of the year* and it will still survive. As a matter of fact, the development of fine specimen plants can sometimes be hurried along by cutting the plant to the ground three or four years after being set out. This gives a completely new set of vigorous, healthy stems. The time to

do this is in early fall, which is late enough to avoid new growth in that season and early enough to interest the root system in putting all it has into getting buds ready for new stems the following spring.

As for the "acceptable location," this means a good soil which is fairly rich in humus, in no more than one-half shade, in a well-drained location. For all practical purposes, it is not necessary that this location be a protected one, at least in the latitudes of Philadelphia and St. Louis. It must be remembered that the ancestors of our present plants grew and thrived in a most rigorous climate characterized by extremes of heat and cold. Because of this, they are well fitted for the climates prevailing in many parts of this country, for here, too, they find these extremes. Mid-western experience has proved them exceptionally well fitted to withstand drought.

We are growing at present two general types of Moutan tree peonies. Those first brought to this country were from China by way of England. The later arrivals are those from Japan, where the tree peony has perhaps

Age of Gold. Another of Professor Saunders' yellow hybrids. Flower is a flat rosette with ruffled petals, bright gold.



reached its highest degree of development. These are, of course, known as "Japanese" varieties. Between the two there can be little comparison. The Japanese are more graceful plants, their foliage is more beautiful, their flowers are generally single to semi-double, and are with few exceptions borne well above the foliage. They are much more reliable in bloom than the European type. They are not nearly so susceptible to frost damage. They do not need to be given the protection from early frost that has been felt necessary with the others. In the Philadelphia area, in the past thirty-four years, only once (in 1921) have the flower buds been injured by frost. That year an early spring overnight drop of temperature from eighty to fifteen degrees Fahrenheit destroyed practically all spring flowers, and killed roses and privet hedges to the ground.

MULCHES

While it is perhaps not necessary nor advisable in all areas, the practice of mulching tree peonies has proved valuable in the Middle West. This is in line with the general experience with mulches on other shrubs in this area, where summers are customarily hot and dry. There is no question but that rather heavy mulching helps keep down ground temperatures and conserves moisture, both of which features are conducive to good root growth in tree peonies.

When sawdust is incorporated into the soil, the bacteria which decompose it tie up the nitrogen by changing it from nitrates to nitrites. These nitrites

are not usable by plants. There is as much nitrogen in the soil as ever but it is simply not available. After the first few years, the nitrite ions pick up oxygen and become nitrates again and are then usable by plants. It should be remembered that when sawdust is incorporated into the soil a nitrogen-depleting effect shows up at once. It is then that an elemental supply of nitrogen should be added, but, as above stated, even if it is not added, the soil returns to normal in a few years.

When sawdust is used as a mulch, however, so little of it is in contact with the earth there is usually no trouble from a nitrogen deficiency. It is well to bear in mind, though, the possibility that this deficiency may result from using sawdust as a mulch and therefore one should keep on the look out for its symptoms.

Any available mulch will do from such extremes as straw and hay, on the one hand, to leaves, ground corn-cobs, peat moss, and buckwheat hulls, on the other. Each will, of course, require different treatment. Some may prove a sheltering home for mice and other small animals and require the use of traps or poison baits. Others may harbor spores of various fungi, particularly of *Botrytis*. Spraying with Bordeaux mixture, or Fermate, as mentioned elsewhere in this paper, provides an effective control. So, the question of "to mulch or not to mulch," like many other questions, is one to be decided by each grower. If he lives where ground temperatures and aridity are no problem, he may well decide it is not necessary. On Long Island, for instance, it is not advisable, but, in the Middle West, it is nearly a must.

Propagation

TREE PEONIES can be propagated by division, by layering, by cuttings, by root-grafting, and by seeds. While the seeds give a large increase in number of plants, the gene constituency of both the European and Japanese varieties is so involved through centuries of breeding that there is wide variation in the seedlings. So, for increase of stocks of named varieties, we must depend on the four asexual methods.

Divisions

INCREASE by division is, of course, the simplest of all methods. It can be used with plants which are several years old, but will not work so well with those which have been in one location for ten years or more, because these seem to have a few large roots rather than many small ones. When a tree peony to be divided is lifted, care should be taken to get all the roots possible. It should then be washed with a hose to remove all the dirt from the roots so that the structure of the plant can be discerned. Places at which it will divide well will, in most cases, be rather evident, but, if not, a few tugs on it at the crown will generally indicate where it will come apart.

It is surprising how many divisions can be made from a plant if the purpose is to obtain as great an increase as possible, for as long as a division has a section of root and one eye, it

will develop into a new plant. However, if the purpose of the division is not to obtain a maximum increase, or if the divisions are to be set out immediately in plantings, it is well not to carry the dividing process too far. In instances where specimen plants are desired as soon as possible after the dividing process, it is best to follow the well known rule applied to herbaceous peonies and to make three to five eye divisions.

It is well to point out here that there is no particular advantage in retaining a plant's stems. It requires courage to cut these off at ground level, but if the divisions have good eyes at the crown and on the roots, this is the thing to do. Where they are not cut off, the plants on being reset will generally keep them alive for one season, but they will almost invariably succumb at the end of this first year or the second year, and the energy that the plant has sent into them will have been wasted. It is therefore best to cut the stems off before replanting. The plant can then invest its stored resources into new ones. If a division is lacking in buds on the roots or at the crown, as will happen occasionally,

the stems should not be cut off. All one can do in this instance is plant it very deeply and hope for the best.

Divisions should always be set out somewhat deeper than the plant from which they were made, but always deep enough so that the "crown" of the plant is at least six inches below the surface of the ground. Stems that are sent up from this depth within a short time will form roots at their bases which will add to the general strength and vigor of the plant.

Layers

PROPAGATION by layering is a favorite method of many amateurs, beginners and advanced alike, who wish to increase the number of their favorite plants. It works well, easily, and quickly with trees like magnolias and Japanese cherries, and shrubs like forsythias and azaleas.

Little is known about its practicability with tree peonies. It would be too slow a method for nurserymen and few amateurs have tried it. The usual method is to cause a stem to grow close to the ground by holding it down with wires. Stems are often very brittle and therefore should be bent down a little at a time. A cut is made on the stem, resulting in a small split which is held open by a pebble or small stick. The cut can then be treated with hormones to encourage the growth of roots. The cut is then covered with about four inches of soil which is held in place by a heavy stone, or a heavy wire staple can be used to prevent movement of the layer.

In dry spells, the layers should be watered regularly. They should root in two years.

Mr. H. F. Stoke of Roanoke, Virginia, has evolved a special technique, the important part of which is the use of a charcoal covering immediately around the layer, this acting both to insure proper drainage and aeration,

'Dokushin-den,' from Dokushin Castle, has very pale pink flowers; carpels are tipped with red.





'Kintagio,' meaning "Castle of Kinuta," showing bush habit. (See Page 16 for close-up of flower.)

thus preventing the smothering and resultant decay of newly formed buds at the nodes. These buds become short, succulent shoots and the next spring appear above the surface to become the stalks of the new plant.

In this method the stalks are bent over the ground in the spring when the leaves have reached nearly full development just before the blooming period. Charcoal of an average of half an inch in diameter is used. It is placed over the nodes that can be expected to develop buds for next season's growth to a depth of two or three inches. Soil is banked around the charcoal to this same depth to hold the charcoal in place, but soil is not placed over the charcoal.

An easy way to do this is to pour the charcoal into a tin can which is open at both ends and is placed directly over the nodes. The soil is then filled in around the can to the same elevation and the can is then lifted out to be used in the process of layering another node.

By this method, the leaves, of course, are not covered. The layer should not be disturbed either during its first year or its second year. In the spring of the third year, as soon as the leaves have reached nearly full development, the stem is girdled between the parent plant and the layered node. This checks the return to the parent plant of the food being manufactured in the leaf. In the autumn of the third year, the layer can be cut off from the parent and lifted and replanted.

This method gives a sturdy plant at the end of the third season and requires practically no attention.

In recent years the gardening press has reported many successes from air layering many trees and shrubs. Air layering was practiced by the Chinese thousands of years ago and has been used continuously ever since for house and greenhouse plants. Instead of being layered under the soil, the stem was wrapped in sphagnum moss or similar material in which the new roots formed. The drawback in the

past was the need of keeping the moss watered almost daily.

Now by the use of the new plastics, Polyethylene film and Vinylite, moisture is prevented from evaporating from the moss. This obviates the necessity of daily watering and makes the method practical to use outside. The procedure of cutting and of keeping the cut open by a stone or stick remains the same.

Several persons are now attempting air layers on tree peonies, but the work began so recently that no reports of results are available at this time.

Cuttings

GARDENERS of the last century, while lacking much of our present-day scientific knowledge, had many skills that are rare today. They excelled in the art of propagation as can be seen from an account in the French magazine *Revue Horticole* (29) ninety-five years ago.

This described the making of cuttings of shrubs with large pith and tender wood of which the Bignonia and tree peony were mentioned as typical.

About mid-June, buds of the current year's growth (such as are commonly used in peach budding and rose budding) of tree peonies were cut off. The cuts were shallow, only about half the depth of the stem. The leaf stalk was left on and the leaf cut about in half. The buds were sowed almost like seeds in a mixture of peat and sand in trays, covered about half an inch or an inch. The trays were usually round for convenience in covering with the bell-jars ("cloche") so universally used in France. (We would use flats in a greenhouse, frame sweat-box, or plastic tent.)

The trays were watered regularly, placed in half shade and kept covered with the bell-jars until the end of September. In this process, no top growth is made by the bud, but half a dozen or a dozen roots, from one to two inches in length, are formed which will enable top growth to start early the next spring.

The leaf stalk and leaf should remain green during the summer and fall off at the natural ripening time. If the leaf stalk should turn black prematurely, it is a sign that the bud has died.

French nurserymen asserted that these buds formed plants straighter than those made from stem cuttings, indicating that stem cuttings were also being rooted successfully. They said that in the tree peony side buds, which would otherwise be lost or make only small growth, could be utilized without checking the growth of the plant. Apparently this method has not been used in this country, or at least not in recent years.

During the past twenty years, various stories have cropped up from time



'Kansenden' (*Palace of Sweet Spring*). This is a white with creamy tints, and carpels tinged with rose.

'Hesperus,' another of Professor Saunders' yellow hybrids, has pale yellow flowers overlaid with dusky rose.



to time that certain persons were growing some of the hybrid tree peonies from cuttings. Investigation never seemed to locate any actual plants that had been propagated by this method.

Apparently the late Edward J. Gardner of Horicon, Wisconsin, was the only person successful in rooting cuttings of the Moutan varieties. In the 1940's, he used softwood cuttings under a continuous mist spray, but he operated on a comparatively small scale only. He expected to undertake mass production, but his illness and untimely death prevented his doing this.

A number of nurserymen have had recent success in the mass production rooting of subjects hitherto not thought practical or even possible. By various types of frames, with and without bottom heat, and greenhouses with controlled humidity through continuous mist spray or fog machines, they have produced from cuttings enormous numbers of plants like Soulange magnolias, pink dogwoods, Japanese maples, and various rhododendron species and hybrids, that were formerly grafted.

Professional magazines like *The American Nurserymen* have, in the last four or five years, run series of articles on this subject describing in great detail the various new techniques and procedures. This has quite naturally stimulated tree peony growers to try the new methods, and in a few years perhaps we shall learn of their successes or failure. There have been small-scale successes in rooting cuttings under polyethylene tents. No reports are available at this time.

Grafts

GRAFTING is the method used almost universally now in the propagation of named varieties. It is the best known, and apparently one of the most certain, uncertain though it sometimes is.

The Japanese originally grafted on Moutan stocks. This made splendid plants quickly, but they were short lived because suckers of the stocks soon smothered out the grafts. The Dutch and French grafted on rhizomes of the Chinese herbaceous peony, *P. albiflora*, and probably also on *R. officinalis*. Even as long ago as 1890, a great authority, William Watson (30) of Kew, criticized such stocks as unnatural and uncongenial, but the Japanese, nevertheless, began to use *P. albiflora* in the 1910's and 1920's. It has been used continuously there and in France, Holland, and this country ever since.

There is conflicting testimony concerning the best types and sizes of these rootstocks to use and similar conflict concerning time of grafting. This grafting season varies from mid-July until late autumn. Several persons have recently suggested the possibility of winter grafting both with and without a greenhouse.

Most persons prefer scions with two buds, but some advocate or at least are willing to use one bud scion. We know of one propagator who uses those with three buds if he can get them.

A rootstock four to six inches long seems to be standard, varying in thickness from exact thickness of scion to three-fourths of an inch. The older propagators used raffia or waxed string, but nowadays rubber bands are preferred by most. Most use wax, but at least one (Cottage Gardens) does not consider this either necessary or advantageous. One of the present authors also has come to this conclusion.

There is greater divergence of opinion (or of practice) after the graft has been made. Back in the 1920's, Bertrand H. Farr of Wyomissing, put the grafts in five- or six-inch pots and sank them in deep frames. Cottage Gardens sells plants in large pots, but the new grafts are heeled in, close together in sand and peat in a sweat box in a very warm greenhouse for a month or two before potting in three-inch pots which are five inches deep. The pots are wintered in frames which at first have just enough heat to prevent freezing. This heat, later in the winter, is increased to about seventy degrees Fahrenheit during the day. In the spring, these plants are shifted to five-inch pots and the rubber bands are cut (a practice that others think unnecessary).

W. B. Clarke has grafted the yellow hybrids on potted stocks of *P. delavayi* and has had good results.

Treatment in other places varies. The Morton Arboretum winter grafts in the open ground without glass covering but with deep mulch. Most others prefer glass protection, some without heat (as at Swarthmore), others with electric cables or other bottom heat.

There has been considerable difference of opinion concerning methods of making grafts. As already noted, literature on the subject has not been lacking, but there seems to be in it little of definiteness of specific instruction which would enable one to proceed at once to the remarkable efficiency of the Japanese and Chinese propagators.

The Chinese practiced grafting in the eleventh century, but this art did not become known to the Japanese before 1700. In most of the literature, the word "Moutan" is used to designate tree peony understock, and this refers to the purple variety used by the Japanese. This may be a wild form of the species. It is very vigorous and suckers freely. In this discussion of grafting, the words tree peony will be used to designate any tree peony root whether it be from a named Japanese or European variety, or one of the hybrids.

There are differences of opinion as to which is better for grafting, the herbaceous or tree peony. Some propagators prefer one—some the other. This is in itself evidence that each must have its merits. Certainly it can be said of the herbaceous type that it is sufficiently similar to and congenial with the scions to give satisfactory results. But it is also true that tree peony understock is more closely related and evidently more congenial, for grafts made with it at the same time and under the same conditions as those made on the most desirable of herbaceous roots "take" sooner and in two years will show twice the growth.

The chief reason given by those who

prefer the herbaceous roots is that, if the understock "suckers" later on, the shoots are easily recognized and can be cut off at once. This group points out, and correctly, that many a named-variety graft has been crowded out by the more vigorous growth of "suckers" from tree peony understock. This serious fault can be avoided, however, by treating the understock, except that of own-root grafts, as a nurse-root only, serving but to keep the scion alive and growing until it has struck its own roots. This crowding out by the understock may also be taken as an indication of the advantage of deep planting. The difference in vigor between the "wild Moutan" and the named varieties grafted on it is hardly enough, at least in most cases, to account for the crowding-out process. It is probable that, were the situation reversed, with scions of "wild Moutan" on named-variety understock, the latter would likewise take over.

The use of two-bud scions on herbaceous roots and deep setting of grafts will almost, without exception, give plants with roots on the scions at the end of the second year. At the end of this time, they generally have a root system of their own sufficient to carry them on. If lifted at this time, or if more certainty is desired, a year later, when they are three years old, the understock can be clipped off and the plants reset, putting them in a little deeper than they have been growing. There is, of course, no need for clipping the understock from own-root grafts.

What has been said relative to the development of roots on the scions grafted on herbaceous roots applies also to those of tree peony understock, but a scion develops a better root system sooner on these.

It is sometimes possible to make own-root grafts of which the understock and scion are of the same variety,

as suggested in the 1920's by Professor Saunders. As an illustration of the superiority of this type of graft, one propagator reports that from a one-year old, two-bud scion, own-root graft of a hybrid, he was able to cut six one-bud scions. The practice of robbing young grafts of scions is not recommended. It is mentioned only to show the amazing growth progress of own-root grafts.

One objection that can be made to the use of herbaceous understock is that, if left on the plant when it is set out in its permanent location, the understock will eventually grow to huge proportions. Its shapeless bulk will occupy a large space that could be used much more advantageously by the plant's own roots. These understocks sometimes get almost as large as a basketball. It is difficult to see what their value to the plant can possibly be after they reach this size.

One other advantage of tree peony understock is that when it is clipped off, when the graft is two or three years old, it can be used again. It will have a quite natural growth and in many instances will have increased so that it can be divided and serve as understock for two or three more grafts. This is an outstanding example of conservation of a rather valuable asset, and a propagator in this manner, over a period of years, can gradually increase his tree peony understock without buying a single additional plant.

But, in addition to this almost ideal manner of conserving and re-using this understock, there is a quite simple way of adding to it. This is by raising tree peony seedlings. By far the greater part of these will be of inferior quality as far as garden standards are concerned, but some of them will be quite vigorous, and the roots of all of them will be fine for understock when they are four or five years old.

There are several methods of making grafts. One is the wedge type which is suitable for both herbaceous and tree peony understock. In this graft the lower part of the scion is cut into a wedge shape, each of the two cuts being made downward beginning as near the bud above them as possible. Each should be made in one stroke if possible. The difficulty in making the cut comes from the fact that the portion of the stem immediately surrounding the pithy center is quite hard and has a way of disturbing the stroke of the knife, both when it enters and when it leaves this hard portion. It is essential that the surface of the scion to be joined to the understock be smooth, as nearly a plane surface as possible. If the initial cut leaves an uneven surface, it should be smoothed out by subsequent trimming. The understock is simply split down the center for a sufficient distance to receive it. The scion is fitted deeply into the understock which is then wrapped tightly with a rubber band, a number 33 band being ideal for this purpose. It should be cut at one end, which gives a strand about seven inches long. Its elasticity makes it possible to accommodate quite easily either small or large roots. When the root has been firmly bound, the end of the band is simply tucked under one of the encircling loops and drawn tight. This fastens it sufficiently. In addition to the ease with which the rubber band can be handled and the fine job it does of holding the scion and understock firmly together until they have joined, it has also the desirable feature of losing the greater part of its tension after it has been out in the ground for a few months. Because of this, it does not constitute a hindrance to the later

growth of the plant and hence does not need to be cut off.

For this type of graft, herbaceous roots can be from a half to an inch in diameter at the large end, and any convenient length, usually from four to seven inches. Tree peony roots somewhat smaller can be used, for very few will be found larger than five-eighths of an inch at the large end. These roots are more difficult to split than are the herbaceous, due to their tough, woody centers.

Tree peony roots no larger than a lead pencil can be used for understock. With this size, the scion, instead of being cut in a wedge, is simply cut diagonally across or at an angle, making the cut as long as it can be made. The small root is then given the same kind of cut so that the two will match. They are then wrapped together with a rubber band as before. For such small ones as this, one-half of the Number 33 band is long enough.

Another type of graft, especially suited to herbaceous understock, is the triangular. This requires more time to

'Hatsu-garashu,' the "First Crow of the Year," with crimson-maroon flowers, one of the finest of the dark varieties.



make than does the wedge type. It is a little more difficult and time-consuming to fit the scion and the understock together. As the name suggests, the lower part of the scion is trimmed to a triangular shape. The trimmed portion will almost resemble an inverted triangular pyramid, with one face, that of the bark of the scion, slightly curved. A corresponding triangular cut is made in the root at its top. This is made at such a depth that the bark face of the cut scion will coincide as nearly as possible with the curving surface of the understock. Securing a good fit, with even contact on both surfaces, is what consumes the time in this operation. The graft is bound with a rubber band as for the others. One theoretical advantage of this graft is that it places the scion's cambium at a more effective location, allowing it to join the understock at its outer edge. It is possible that this is a theoretical advantage only, for in the other types of graft no care need be taken to see that edge matches edge. Scions do just as well placed squarely in the middle of the root no matter what its size may be.

Still yet another type is the side

graft. For quantity production, this appears to be the best. It is quite simple to make. The scion is cut diagonally or at an angle with as long a cut as can conveniently be made. It is not cut in a wedge or triangular form. A strip or slice is then cut from the edge of the root to be used, and the scion is placed on it so that its entire surface is in contact with the freshly exposed surface of the root. It is bound with a rubber band the same as the others.

As soon as grafts are made, they should be placed in water to which Purex or Clorox has been added at the rate of one tablespoon per gallon of water. This insures the grafts being free of fungus when they are put out. They should be left in this for a half hour or so, and then wrapped in damp newspapers or burlap until such time as they can be put outside for pre-planting conditioning. No wax or paraffin is necessary but can be used to cover the graft if desired.

As soon as convenient after the grafts are made, they should be placed in sawdust for a few weeks. The sawdust can be a couple of inches deep on the ground in any well-shaded place. The grafts are placed on this horizon-

'Tama-fuyo' (Jeweled Lotus). Flowers very pale pink with deep rose carpels.



tally and can be piled up three or four rows deep with sawdust between each layer. They are then covered with sawdust to a depth of at least three inches, and watered occasionally so as to keep the entire bed damp but not wet. An ideal way of handling this is to use a fog- or mist-producing nozzle, but ordinary sprinkling will suffice. Evaporation keeps the sawdust cool. The grafts are left in this sawdust for three to four weeks.

At the end of three or four weeks, the process of union between scion and understock is usually well under way. The grafts are taken to the field and planted in rows in a trench the width of a spade. The grafts are placed on each side of this trench about three to four inches apart with the top bud two to three inches below the surface. It is customary to set them out vertically, but it is quite possible that they would do just as well horizontally. The ground is leveled and covered with sawdust to a depth of about three inches. If the ground is dry, the trench should be soaked before it is completely filled. Put out in this manner, the grafts will need no more attention until they are to be lifted two or three years later. The sawdust not only protects them somewhat from rapid temperature changes but it also minimizes weed growth in the bed later on. The young growth the following spring will have no difficulty in pushing its way through the sawdust. Where sawdust, or some similar mulch, is not used, the ground may pack, and the new growth may be able to push through only with difficulty, if at all.

Roots to be used as understock should be procured if possible two or three weeks before the grafting is to be done. They should be kept in a cool place. This treatment prepares them for receiving the scion and knitting with it by setting in motion within the root those chemical processes involved

in root development.

When grafts are to be planted in the open field, they should be made sufficiently early in the season to allow the scion and rootstock to knit together before there is danger of damage by freezing. If grafts are to be planted in greenhouse, or in frames with bottom heat, such danger does not enter into the picture.

Whether they are planted indoors or out, grafts made later than the middle of October seem to give a smaller percentage of success than those made earlier. Mid-August is a good time to start. This gives a full two months in which grafts can be made with a maximum chance of survival. Various individuals have made grafts during practically every month of the year, but this two months' period appears to be the best. Only scions from the current year's growth are used. It should be emphasized that the most critical phase of the grafting process seems to be their handling immediately after they are made. If placed where they are cool and moist, they will soon knit together. After this has taken place, their chance of survival is appreciably enhanced, and they can be set out with little fear of damage even from freezing.

There is a definite advantage in using scions from younger stems. They seem to have more vigor and to knit with the understock better than those from the older stems. By "younger stems" is meant those that have their growth completely from the ground in the year they are to be used. By "older" is meant those stems which spring from growth on the plant which is old wood.

It is easier to make the grafts with the former because the internodal spaces are longer. Scions taken from growth that has come from old stems will be shorter and stubbier. After a plant is established, the height of one

year's growth from the ground can be surprising. One such stem may provide as many as four good two-eye scions, whereas a new stem growing from an older one, well up on the plant, usually provides less than four single-eyed ones.

from one plant of 'Souvenir de Maxime Cornu' one fall, cutting every stem to the ground. The next spring it grew very vigorously, bore a number of large blooms, and that fall it provided a hundred and twenty single-eye scions. With some of the hybrids,



'Tama-fuyo,' another view, showing bush habit.

A radical departure from accepted practice is one which is very effective when a grower desires to use a plant solely as a source for scions and forgets about its becoming a specimen plant. This method is to cut the stems to the ground each fall. Not only can the grower use every scion available on the plant at that particular time, but he assures himself of an equal or greater number next year. This annual cutting to the ground, far from hurting the plant, seems to be a good thing for it. Especially is this true when working with hybrids. One propagator cut eighty single-eye scions

single-eye scions are quite usable for grafts, but this does not seem to hold true for Moutans.

The sooner the scions are used after they are cut, the better. From the time they are cut until they are used, they should be kept in damp sphagnum moss in a container which will prevent evaporation. A few drops of Clorox and Purex in this moss will prevent development of fungus. If the scions are to be kept for some time before being made into grafts, the stems should be left entire and not cut into grafting lengths. If they are to be kept for more than a day, as for mail-

ing, they should be placed in a plastic bag with barely damp moss.

It will be found advantageous to use two-eye scions for all except the hybrids. If one has plenty of bud wood, it is, of course, not extravagant to use two-bud scions for them also, but it is not so essential. When two buds are used, the scion seems to develop its own root system sooner, the rootlets starting at the lower bud.

If one wishes to grow plants for a maximum scion production, he should grow them in full sun, in soil with a fairly high nitrogen content. Plants grown under such conditions will produce many more stems, and hence more scions, than those grown in even half shade.

Seeds

MANY PEOPLE grow seedlings with good to indifferent results. The Japanese manual quoted by Hoffman (31) stated that if seeds were "sown as soon as seed pods begin to open nine out of ten will grow." One of the present authors has proved this to be true. Hoffman's next quotation, that if the seeds become dried "hardly one in a hundred will germinate," is certainly not correct, as many people have raised good plants from seeds sent from Japan long before the days of air mail. At Swarthmore College seeds have frequently been kept till spring before sowing, and yet a goodly percentage (fifty per cent or more) have come up and made good plants.

The Japanese story that some seedlings, if not disturbed, will flower the third year seems fantastic. In this country six or seven years is about the average and some plants take nearly twice that time. The Japanese advice to plant two and a half inches deep and cover with mats coincides with the directions given later in this article.

Dr. Lela Barton of the Boyce Thompson Institute (32) has published a paper on the germination of seeds under alternate growing and resting periods. This paper reports that seeds planted in early autumn germinated and produced roots at a daily temperature of sixty to eighty-five degrees Fahrenheit, but that, if kept at this high temperature, the rooted seeds failed to send up stem or leaves, and as a result the roots died.

When the seeds with the developed roots were kept at a low temperature of about forty to fifty degrees for two or three months and then put in cool greenhouse at about fifty-five degrees, a good growth of the shoot with stem and leaves resulted.

Seeds planted in fall and winter in cold frames did not give satisfactory results. Seeds planted in May, June, or July produced roots during the summer. The cold winter period then broke the dormancy of the stem and leaf growth which then appeared the following spring.

This follows the experience of many of the older writers who planted seeds in autumn and kept them in root cellars, and who reported root growth the first summer but no top growth until the second spring.

Doctor Barton recommends sowing seeds as soon as ripe and placing in a warm greenhouse for about three months, at which time root growth should be complete. Then the seed pots or flats should be transferred to a cold cellar, cold storage room or electric refrigerator with a temperature of

thirty-two to fifty degrees Fahrenheit for two or three months. Then they can be brought into a cool greenhouse and top growth will begin in a few days.

No one who has raised any quantity of seedlings from good named varieties has reported the resulting percentages of the different good colors in contrast to the unwanted colors in the magenta range.

Raising tree peonies from seed is simple. Almost anyone who cares to should be able to raise his own plants. Of course no one can predict with any degree of accuracy just what he will get but there is always the possibility of getting new and unusual ones. Fortunately, very few tree peonies of inferior quality have been named and marketed. The percentage of fine things in named varieties of these plants is high. So, while most of the seedlings will be far from the quality of the finest named varieties, there will, nevertheless, be many which will make quite acceptable garden plants. Seedlings of pure wild species will of course be true to type.

Seeds should be harvested at their earliest stage of maturity or ripeness, just as they are beginning to turn black. If they are taken too soon, they are more susceptible to fungus in the process which is to be used for their germination. If taken after they have turned black, they may already have entered their dormant period. In gathering seeds, it is advisable to go over the plants at least every other day, for there is a wide variation in the time of ripening in the different varieties, and even in that of seed clusters on the same plant.

On being harvested, seeds should be stored in a cool place. A basement floor is often sufficient. A root cellar is better. If neither is available, the vegetable bin of an electric refrigerator will do. Seeds can then be stored until the

entire crop is collected, or they may be stratified immediately. The best means of stratifying them is to pot them in ordinary clay pots of convenient size and sink them deeply in the ground for about six weeks.

Before the seeds are placed in the pots they should be soaked for a few minutes in water containing either Purex or Clorox in the proportion of a tablespoon per gallon. This will destroy any fungus which might later cause the seeds to rot.

The soil, which should be very friable and crumbly, is placed in the bottom of the pot to the depth of about an inch. Upon this a layer of seeds is placed, on these another layer of soil, then another layer of seeds, alternating, until the pot is filled. It is important to have sufficient soil to insure each seed being completely covered for it is from this soil that the seed will, through what is now a hard coat, absorb the tiny bit of moisture which is necessary to set in motion the chemical changes which lead to the swelling of the hypocotyl and the resultant rootlet.

The pots should be buried so that their top rims are at least eighteen inches below the surface of the ground in a well-shaded, well-drained location. If the ground is dry, water should be poured into the hole and allowed to soak in before the pots are placed in it. The pots should always be soaked in water before burying. They are then covered with soil and the hole filled to previous ground level. The refilled area and the ground around it should be well mulched.

In about six weeks the pots are lifted, inverted, and the contents jolted out. A mass of tiny rootlets, each protruding from the open end of one of the seeds, will appear. Every viable seed in the pot should show visible signs of germination. The rootlets will vary in size from those just appearing in the seed end, to some an inch and a



Another of Mrs. Arthur Hoyt Scott's plants for which we have no name. The flowers are a beautiful pink, silvery at the edges, deepening in the heart. Each petal has a strongly marked deep rose narrow splash at the base.

half long. It is because of the tenderness of these roots that the potting soil must be crumbly.

If the seed-and-earth mass does not jolt out easily, it is a simple matter to break the pot.

The seeds are now ready to be put out in beds. An easy manner in which to handle them is to prepare a trench as wide as the spade used and about two and a half inches deep. The ground should be rich and well drained. It should be in half shade if this is possible, although the young plants will do surprisingly well in full sun. The seeds

can be scattered in this trench as close as one inch apart. The trench is then filled, the ground leveled, and a two to three inch covering of sawdust placed over it. This will help conserve moisture, and will help keep weeds and grass out of the bed the next year without constituting a hindrance to the young tree peony shoots that will, the following spring, make their way up through it.

In the spring, before growth starts, sprinkle the surface with a chlordane dust to prevent possible damage by cutworms. As soon as the tiny plants

appear, it is well to spray the bed with a half strength solution of Bordeaux mixture or a correspondingly weak solution of Fermate. The spraying should be repeated several times during this first season at intervals of two weeks. This is a precautionary measure against *Botrytis*. Should the first season be dry it is essential that the plants be given several soakings.

The seedlings should be left in this bed for two years, or still better three years. Their young roots are tender and do not stand transplanting very well.

When the seedlings are moved, they can be placed in rows with the plants as close as six or eight inches. They can then be left until they have bloomed and it is known whether they are to be grown on or discarded. Propagators will, of course, discard none, for their roots will be valuable as understock on which to graft scions of named varieties. While on the average, one can expect blooms in five to seven years, a few plants may bloom when three years of age, but others may take ten years or more. It has been said that the longer it takes a plant to bloom as a seedling, the better it will be, but there is no known evidence to support this belief.

Top: Pot has been inverted and dropped on the ground. Seeds and earth come out easily if not too wet. This bunch of seeds had been left buried too long, but no harm was done. Could have been lifted two weeks earlier.

Center: The loamy soil crumbles quite easily with very little root breakage, even at this stage. Rooted seeds separate quite easily. All that remains to be done now is to put the sprouted seeds out in the trench about four inches deep and cover. Leaves will appear the following spring.

Bottom: The soil in this pot was washed out with a hose and water to present a better view of the seeds. The high percentage of germination is clearly indicated in this illustration.



There seems to be no difference in the general quality of seedlings which are the result of hand-controlled pollination and those from wind-blown or insect-carried pollination. Some close observer may eventually discover some varieties giving better seedlings than others, but there is no convincing evidence of this at this time. The gene constituency of all the named varieties is so mixed up that there is always a great variation in their seedlings.

Germination of seeds has, of course, been obtained by many different methods. One propagator, for instance, keeps them in damp sawdust. One of the present authors has successfully used the sawdust method, and also has germinated seeds in the vegetable bin of his ice box in a slightly damp mixture of peat moss and vermiculite, in a plastic bag. He uses the pot and the burial method for quantity production only because he has found it simplest, surest and easiest.

A good indicator as to the viability of seed is a flotation test. The seeds are placed in water for a couple of days. Those which drop below the surface are certain to be good, but it does not follow that none remaining

afloat will not be viable. There may be at least a twenty-five per cent germination from seeds which remain afloat at the end of forty-eight hours.

Seeds from single-flowering varieties are generally larger and more elongated than those from the doubles. Some have felt that plants should not be allowed to set seed because it could overtax them and diminish subsequent bloom. Careful observation has not borne this out. When seed is allowed to form, there does not seem to be any appreciable difference in the number of blooms the following years.

The growing of tree peonies from seed should be encouraged not only for the production of new varieties, but also for the purpose of producing a greater supply of valuable grafting understock. Also, as the plant is still a comparative newcomer to this country, we do not know what changes in its growth and habits may arise from the different environmental influences prevailing in the various parts of this great continent. We know only that changes and variations generally do occur under such circumstances, and that there is no reason to suppose that the tree peony will prove an exception.

Pests and Diseases

VERY LITTLE of the difficulty that has been experienced with the tree peony in this country has been due to damage by animals, insects, or disease (33).

Rabbits often cause much damage to tree peonies. They particularly like to nibble off the terminal buds on young stems and may cut back young seedlings almost to the ground. This is unfortunate because, when one is raising either seedlings or young grafts, the terminal bud is often the only one that would have bloomed the following year. The only preventive in the case of rabbits is to protect the plants with wire or any practicable enclosure. This is a simple matter when one is raising a small number of plants, but not so easy in the case of large plantings. A good dog and sometimes a cat may keep the rabbits on the move even if they do not succeed in catching them.

There are few insects with which we need be concerned in the growing of tree peonies. One is the small carpenter bee, *Ceratina dupla* (34). The female of this insect bores its way down through the pithy center of stems, depositing its eggs at the bottom of the hollowed out area. It makes its entrance on the sides of older stems where branches have been broken off or at the top where blooms or scions have been cut. It will often go all the way down the center of a two-foot stem to the ground line. In some cases, it is not able to do this because of the closing of the pithy center by heavy wood at the juncture of a side-stem.

Stems which are thus affected show damaged growth and eventually die. The death of these stems does not constitute a serious injury to the plant, because if it is planted properly the damaged stem will be replaced by growth from beneath, but it is a hindrance in the development of specimen plants. This bee does similar damage in branches of blackberry, elder, and sumac, and possibly also in lilac, kerria and aster. Its natural range is from Quebec to Wisconsin to Florida.

The most successful way of dealing with this bee is to stick a carpet tack of the proper size in the end of any stem which has been cut for any reason whatsoever. This tack will remain for a long time, and effectually prevent the bee's entrance. In the case of broken side branches, it is well to fill the openings there with putty, or it is an easy matter just to wrap tape around the stem at the opening.

Another serious insect is the thrip, *Heliethrips haemorrhoidalis*. These may damage blooms particularly in warm springs. Buds that seem to be blasted or which do not open as they should may be infested with these insects. On opened flowers they cause spots. A recommended spray is six teaspoons of liquid Chlordane, six teaspoons of fifty per cent wettable DDT, one-half cup of sugar or Karo (mixed in as a sticker) in three gallons of water. Spray three times, ten days apart, beginning when buds are small.

Another recommended spray is one-

tenth pint of forty per cent Nicotine Sulphate, one-half pound fishoil soap, in ten gallons of water, applied with force just before the flowers open.

Sanitary measures include burning of infested blooms and any infested rubbish.

Minor attacks may come from scale insects. Oyster shell scale, *Lepidosaphes ulmi*, is the commonest of these, though San Jose Scale, *Aspidiotus perniciosus*, may also be found. They suck the juices, thus weakening the plant. They are easily controlled by the standard strength dormant miscible oil, or lime-sulphur spray, one to eight.

Root-knot, caused by eel-worms or nematodes, *Herodera marioni*, is often found on herbaceous peonies and is most common in the South. It does occur, however, along the Atlantic Seaboard and occasionally attacks peonies in the Philadelphia and New York areas. It can be recognized when digging by small galls an eighth to a quarter inch in diameter on the roots. These galls kill the young roots and the plant is stunted and fails to bloom.

The nematodes live in the soil, which is one of the reasons for a rotation of crops on any piece of land. Peonies should not be planted where peonies have grown except after a lapse of four or five years. It is said that root-knot can be controlled by a hot water treatment somewhat different to that recommended for eel-worm in daffodils. The daffodil treatment is a hundred and ten degrees Fahrenheit for three hours, but the Dodge and Rickett recommendation for herbaceous peonies is a hundred and fifteen degrees for a half hour. Others suggest this should be followed by an immediate plunge in cold water. In view of the value of tree peony plants, which may become infected without apparent warning, it is hoped that this and any other promising remedies will be thoroughly tried.

It is believed that scions may be safely cut from the upper part of infected plants and that these scions will not carry the nematodes. Further research is needed on this.

The most serious disease is gray mold blight, *Botrytis paeoniae*. It appears on the bases of the shoots when they are about a foot long in the spring. The gray mold sheds spores which are carried by the wind and by insects to other plants. It is more prevalent in wet seasons and attacks more frequently those plants which are growing in locations where they do not get much sun and where air circulation is not adequate. *Botrytis* attacks principally young shoots, and often its damage is done before it is noticed, when the injured stems suddenly wilt and fall over. Not only does it damage or destroy new growth at the base of the plant, but it also sometimes affects new stem growth higher up. The spores which cause this damage to the upper part of the plant may be airborne, but there is also some reason to believe that ants carry them on their feet. Ants do not infest tree peony plants to the extent that they visit the herbaceous ones, but they are frequently found on them.

Two sprays have been found effective for this fungus. They are Bordeaux mixture and Fermate. Standard strength solutions may be used. The first spraying, in the spring, should be done just after the plant is starting to leaf and the young shoots are coming from the ground. The entire plant should be sprayed, also the area around it. It will not hurt to include in this spray some chlordane for thrips. Spraying should be repeated at least twice more at intervals of two weeks. If a planting has had considerable infestation, the whole ground area should be sprayed with Bordeaux or Fermate in the late fall. A rather heavy spraying should be given at this time in

order to reach protected areas in the vegetative cover on which the fungus lives over winter. Old leaves and old debris should be burned.

Mulching, which is so beneficial to the plant, also, unfortunately, supplies a home for this pest and, where used, should therefore be well sprayed.

Stem wilt, *Lepteosphaeria coniothyrum* or *Coniothyrium suckeli*, girdles stems at the base. This cuts off the water supply and the whole stem wilts and dies quickly. The Japanese call it the "sudden death disease." Affected parts of the plant should be cut out and burned. Nearby plants and soil should be sprayed with a three to three to fifty Bordeaux mixture or with Ammoniacal Copper Carbonate. The latter spray does not disfigure the foliage of the plants.

Downy leaf blight, *Phytophthora paeoniae*, causes a wilt similar to Botrytis but forms no characteristic mold. It is mainly a foliage blight but does at times affect stems, which turn black as they die. It can be controlled by the same means employed against Botrytis, and it is particularly important to spray the surrounding area, both plants and soil.

Leaf blight, *Cladosporium paeoniae*, is not ordinarily troublesome. It causes

small, circular, discolored spots first on the leaves and then on the stems. It usually appears after the plants have made at least half their season's growth and therefore causes little apparent injury. It does not kill the leaves. Here again sanitation is the best preventive and it may be sprayed as is done for *Botrytis*.

Leaf spot, *Septoria paeoniae*, is not in any way a major threat. It may appear at times and makes itself known by round, gray spots.

The number of and long names of the pests given above are apt to scare many gardeners into believing that tree peonies are unduly susceptible to all manner of troubles, the control of which is too difficult for the average human. It is well, therefore, to repeat the first sentence of this chapter that tree peony pests are a minor matter. They should be watched for, of course. Most can be guarded against by ordinary garden sanitation and will not require spraying. The gardener whose eyes are open will be able to detect dangers before much harm has been done. When spraying is required for one trouble, it will be found that the same spray is effective for other troubles, too.



This plant, in Mrs. Scott's garden, shows the deep markings which are found at the base of each petal in many varieties. It also shows the twisted and gnarled appearance of the woody stems. The name of the variety has been lost, but the flowers are white, the splashes are deep purple.

Conclusions

THE PRESENT authors are enthusiastic about the future possibilities of the development of tree peony growing in this country. They point to the growing number of nurseries propagating plants on a larger scale than at any time since the European boom days of the 1860's, 1870's, and 1880's. They are proud to note the high quality of the varieties now being grown in contrast to those known a century, a half century or even a quarter century ago.

They believe the early struggling pioneer days are over and that enough knowledge is now at hand to warrant the work of breeding, growing, and propagating going into really high gear.

Moutan section alone, secondly, for the possible, but not yet tried, hybrids between the species of the Delavay Section, and thirdly, for the hybrids between the finest clones of the Moutan Section and the finest representatives



'Kokirin,' meaning "Golden Brocade," is a scarlet-flowered variety, noticeable for its fringed single flowers.

They urge the American Peony Society not only to continue its fine work of the past but also to redouble its efforts to make the tree peony as widely known and grown (except in our coldest sub-zero Minnesota and Canadian sections) as the herbaceous peony.

The dozens of present day breeders of herbaceous peonies (35) have done and are doing wonderful work. We need now an equal or greater number of tree peony breeders, firstly, for the

of the Delavay Section, their species, wild varieties or forms, garden forms, or hybrids.

Finally, we want second and third and fourth generation hybrids of all the clones with complicated parentage. A glance at the history of iris breeding (36), daffodil breeding, (37) and azalea and rhododendron breeding (38), gives just an inkling of what the future may hold for tree peonies if enough American gardeners, amateur

or professional, put their hand to it.

Let it not be forgotten either that breeders need new material with which to work. The late C. D. Beadle (39), of Biltmore, North Carolina, between 1940 and 1950 brought into his test garden over three thousand numbered wild forms of azaleas from our Southern States, which hitherto had merely been lumped under the names of a dozen or so species, but which seemed to have horticultural value or promise for breeding. Botanists and horticulturists had been collecting plants in the same areas for a century or more, yet had overlooked the possible importance of these individual plants. Think what may be found if the world can ever achieve peace instead of war and revolution, and if exploration may again become possible in China, the "Mother of Gardens."

We need not only new species and botanical varieties and wild hybrids, if

they exist, but also clones of these species from the most northern locations and the highest altitudes. We need hundreds or thousands of wild clones that have superior habits of growth, or larger flowers, or more flowers, or new or distinct colors and color combinations. And lastly, we need wild seeds not by the dozen or the ounce but by the thousand, and by the pound, because any one of the resulting plants may have characteristics new to us and therefore of possible value for the garden or for breeding.

The authors extend to the readers of this article, to the members of the American Horticultural Society, and the members of the American Peony Society, an invitation to visit their tree peony plantings. They believe that all the present day growers listed in the appendix will similarly welcome visits when their plants are in bloom.

Appendix

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 Delavay, Abbé Jean Marie, 1834-1885, French Jesuit explorer in China.
 Dessert, Auguste, 1859-1929, Chenonceaux, France, nursery.
 Donn, James, 1758-1813, Cambridge, England, botanist.
 Farr, Bertrand H., 1863-1924, Wyomissing, Pennsylvania, nursery.
 Farrer, Reginald John, 1873-1920, British explorer in China.
 Finet, Achille Eugene, 1863-1913, Paris, botanist.
 Forrest, George, 1873-1932, British explorer in China.
 Fortune, Robert, 1812-1880, British explorer in China.
 Franchet, Adrien, 1834-1900, Paris, botanist.
 Gagnepain, Francois, 1866- , France, botanist.
 Gardner, Edward J., 1891-1952, Horicon, Wisconsin, nursery.
 Goos & Koenemann, Niederwalluf, Germany, nursery.
 Gratwick, William, Pavilion, New York, breeder, contemporary.
 Henry, Professor Louis, 1853-1903, Paris Museum of Natural History.
 Hovey, Charles M., 1810-1877, Cambridge, Massachusetts, horticultural writer and editor.
 Huth, Ernest, 1854-1897, botanist.
 James, Nelson, Greybull, Wyoming, breeder, contemporary.
 Japanese Nursery Company, Settsu, Japan, 1910.
 Kaempfer, Engelbert, 1651-1715, Dutch traveler.
 Kelway & Son, Langport, England, seedsmen.
 Komarov, Vladimer Leontyevitch, 1869-1945, Russia, botanist.
 Krelage, E. H., Haarlem, Holland, bulb grower.
 Leichtlin, Max, 1832-1910, Baden-Baden, Germany.
 Lemoine, Victor, 1823-1912, Nancy, France, breeder, nursery.
 Lemoine, Emile, 1862-1943, breeder.
 Licent, Abbé R. P., Priest in China.
 Linnaeus, Carolus, 1707-1778, Sweden.
 Ludlow, F., contemporary, British explorer in Asia.
 Lynch, Robert Irwin, 1850-1924, England, botanist.

- Monbeig, Pere, explorer with Forrest. Niigata Prefecture, Japan, about 1920, nursery or public garden.
- Oberlin, Thomas J., 1850-1936, Sinking Spring, Pennsylvania.
- Oberlin, Reuben L., his son, died 1954.
- Paillet, Louis, Chatenay, Seine, France, about 1880-1900, nursery.
- Potanin, Grigory Nokolajelvitch, 1835-1920, Russia, explorer in China.
- Pratt, A. E., British explorer in Asia about 1887-1900.
- Purdom, William, 1880-1921, British explorer, China 1909-1912; 1914-1920.
- Rehder, Alfred, 1863-1949, Germany and America, Arnold Arboretum botanist.
- Rock, Joseph Francis, 1884- , explorer.
- Ruys, B., Royal Moerheim Nursery, Dedemsvaert, Holland.
- Sabine, Joseph, 1770-1837, England.
- Sakata, T., Yokohama, Japan, seedsman.
- Sargent, Professor Charles Sprague, 1841-1927, Arnold Arboretum.
- Saunders, Professor A. P., 1869-1953, Clinton, New York, breeder.
- Saunders, Silvia, successor, 1953.
- Sherriff, Major G., British explorer in Asia, contemporary.
- Siebold, Philipp Franz von, 1796-1866, in Japan 1823-1830, imported plants from Japan.
- Sims, John, 1792-1838, England, edited *Botanical Magazine*.
- Stapf, Otto, 1857-1933, Vienna and Kew, botanist.
- Stern, Colonel Frederick Claude, Goring-by-Sea, Sussex, England, contemporary.
- Stoke, H. F., Roanoke, Virginia, contemporary, amateur grower.
- Takii Nursery, Kyoto, Japan, 1940.
- Taylor, George, British Museum, contemporary, explorer in Asia?
- Thunberg, Carl Peter, 1743-1822, Sweden, botanist.
- Tokio Nursery, Tokio, Japan, about 1896.
- Weiss, Freeman, formerly of the U. S. Department of Agriculture, pathologist.
- Whitnal, Josiah, Belleville, Illinois, 1894-1951, amateur grower.
- Wilson, Ernest Henry, 1876-1930, England and Arnold Arboretum, explorer.
- Wister, John C., Swarthmore, Pennsylvania, contemporary.
- Wolfe, Harold E., Belleville, Illinois, contemporary.
- Yokohama Nursery, Yokohama, Japan, about 1900-1920.
- See also list in *Peonies, The Manual of the American Peony Society, 1928*, and its supplement.

Tree Peony Importers And Dealers, Wholesalers And Retailers

	Approx. yearly quantity offered	Approximate number of varieties offered			Approx. total kinds offered	Seedlings
		Chinese Moutans	Japanese Moutans	Lutea and Delavayi Hybrids		
Atha Gardens West Liberty, Ohio	500				50	
W. B. Clarke & Company, Inc. San Jose, California (Wholesale Only)	500		x	x	25	Yes
Growers Exchange 24100 Drakewood Road Farmington, Michigan (John J. Riordan)	5000	x	x	x	200	No
Lake Sammanish Evergreen Nursery Route 1, Box 79 East Stanwood, Washington (Irving Edwins)	500		50	2	100	No
Louis Smirnow 8 Elms Court Drive Sands Point, New York	5000	x	x	x	200	Yes
Marinus van der Pol Route 6, Washington Street Fairhaven, Massachusetts	500	5		5	25	
Wayside Gardens Mentor, Ohio		7	2	3		No

Flowerfield Gardens, Oyster Bay, Long Island, New York, and Minnewashto Gardens, 12322 Como Avenue, S. E., Minneapolis, Minnesota (J. F. Brown), data not available.

Tree Peony Collections In Amateur Gardens
(Open To Peony Enthusiasts On Request By Appointment)

Grower	Approximate number of		Chinese Moutans	Japanese Moutans	Lutea and Delavayi Hybrids	Seedlings
	plants	varieties				
Dr. Rush C. Bauman 92 High Street Nutley, New Jersey	50		2	2	6	
Lewis S. Blyth ^a Route 2, Box 477 Medford, Oregon		155				
Elmer A. Claar 617 Thornwood Lane Northfield, Illinois	40	20				
H. L. Collier 2022 32nd Avenue, South Seattle, Washington	40	25			x	
A. M. Dewey 3 East 336th Street Willoughby, Ohio		11			3	
Frank Gilliam Washington and Lee University Lexington, Virginia	200	138	19	87	32	
Wm. T. Gotelli 66 Crest Drive South Orange, New Jersey	500	400	x	x	x	
Dr. David Gurin 4 Grosvenor Place Great Neck, New York	125					
Edward Heathcote Porth Washington, New York		100			x	200
Roy Hennessey Route 1, Box 74 Scapoose, Oregon	100	75			10	
Fador Kernin Route 2 Shelby, Nebraska	100	100+				c
Halfdan Lem ^b 19215 Aurora Avenue Seattle, Washington	220	75	x	x	26	
Earl Morse 20 Surrey Road Great Neck, New York	200				x	Yes ^d
Morgan D. Reinbold 202 Waverly Street Shillington, Pennsylvania	50	many	x	x	12	
Mrs. Arthur H. Scott Todmorden Farm Media, Pennsylvania	100 ^e	2				Yes
H. F. Stokes 1436 Watts Avenue Roanoke, Virginia	100	100		x	x	x
O. B. Thorgrimson Northern Life Tower Seattle, Washington	12	12		x	5	
Wm. R. Troyan 6806 Brecksville Road Independence, Ohio	*	150	10	100	40	Yes
Harold E. Wolfe ^f 24 South 86th Street Belleville, Illinois						

^aWill enter commercial field in 1956 or later.

^bA nurseryman, but no longer selling tree peonies.

^cSome hundreds of seedlings.

^dAnd also own hybrids.

^eMostly seedlings.

^fBeginning in 1956, or later, will enter commercial field, operating a tree peony nursery under the name of St. Clair Gardens, Inc. Expects to produce 10,000 or more saleable plants a year.

*Many thousands.

Tree Peony Nurseries, Propagators, and Growers

Code ^a	Approx. yearly quantity offered	Approximate number of varieties offered			Approx. total no. varieties grown	Seedlings
		Chinese Moutans	Japanese Moutans	Lutea and Delavayi Hybrids		
1. Cottage Gardens Lansing, Michigan (N. I. W. Kriek)	3000	10	5	12		No
2. Curtis Garden 8810 Colerain Road Cincinnati 24, Ohio (Louis Mattfeld)	1000	4	30	x	50	No
3. Toichi Domoto Nurseries 26591 Western Road Hayward, California (Toichi Domoto)	5000				50 ^b	Yes
4. William Gratwick Pavilion, New York	1000		50	20 ^c		Yes
5. Mission Gardens Techny, Illinois (Wm. F. Christman)	500		x	x	50	
6. Oberlin Peony Gardens 425 Pennsylvania Avenue Sinking Springs, Penna. (R. L. Oberlin)	500	50	70	20		Yes
7. A. P. Saunders Hybrid Peonies Clinton, New York (Miss Silvia Saunders)	200		x	75		Yes
8. Tingle Nursery Company Pittsville, Maryland (L. G. Tingle)		8	2	8		No

^aSerial numbers here assigned are used in the following Alphabetical Check List of Tree Peony Names to designate varieties the particular nursery is selling.

^bMostly own seedling varieties.

^cFifty others are being tested.

Lewis S. Blyth, Medford, Oregon; St. Clair Gardens, Inc., 24 South 86th Street, Belleville, Illinois (Harold E. Wolfe), expect to enter commercial field in 1955 or 1956. Listings of the varieties these growers expect to have are not available.

Tree Peony Collections In Public Gardens

Code ^a	Collections	Approximate number of varieties of			Approximate number of seedlings
		Chinese Moutans	Japanese Moutans	Lutea and Delavayi Hybrids	
BT	Boyce Thompson Institute Yonkers, New York				100
MT	Morton Arboretum Lisle, Illinois		17	18	
RO	Rochester Park System Rochester, New York				500
SP	Spring Grove Cemetery Cincinnati, Ohio		x	x	
SW	Scott Foundation Swarthmore, Pennsylvania	10	125	75	1000
TY	John J. Tyler Arboretum Lima, Pennsylvania		50	10	400
UW	University of Washington Arboretum Seattle, Washington	5	60	18	
WH	Whitnal Park Botanical Gardens Hales Corner, Wisconsin		80	8	

^aThe abbreviations here assigned are used in the following Alphabetical Check List of Tree Peony Names to designate where the particular variety may be seen.

*Alphabetical Check List Of Tree Peony Names
In Public Collections And/Or Available In Nurseries 1954-1955**

- J V 'Abokiu' (Abo Palace) (Japan before 1896) 6.
 C VIII 'Adzuma Kagami' (Mirror of the East) (Jap. bef. 1893) SW, WH. 1, 4.
 J IV 'Adzuma-sibori' (Dappled Pattern of the East) (Jap. bef. 1909) 6.
 L 'Age of Gold' (Saund. 1948-1950) SW.
 J II 'Akashi-gata' (Akashi Beach) (Shore of Akashi) (Jap. bef. 1893) SW, UW.
 J III 'Akashi-jishi' (Lion of Akashi) (Jap. bef. 1893) SW, TY, UW. 6.
 J II 'Akatsuki-no-yuki' (Snow Under Waning Moon) (Jap. Chug. 1929-1935) TY. 6.
 C II 'Albert Crousse' (Oberlin 1938) 6.
 L IX 'Alhambra' (Saund. 1948) SW.
 L IX 'Alice Harding' (Lem. 1936) SW, TY, UW, WH. 1, 6.
 L IX 'Amber Moon' (Saund. 1948) SW.
 L X 'Angelet' (Saund. 1950) SW.
 'Ankamin,' UW.
 J V 'Anyano-hikare' (Light in Darkness) (Jap. bef. 1926) SW. 4, 6.
 L X 'Apricot' (Saund. 1948-1950) MT, SW.
 J II 'Arashi-yama' (Mt. Arashi) (Storm Mountain) (Jap. bef. 1931) WH. 4.
 L IX 'Arcadia' (Saund. 1942) SW.
 C VIII 'Archduc Ludovico' (Bur. bef. 1867) 1, 8.
 L IX 'Argosy' (Saund. 1928) MT, RO, SW, TY, UW, WH. 1, 6, 8.
 J VIII 'Arlesienne' (Des. 1909) SW.
 J IV 'Asahi-minato' (Rising Sun Seen from the Harbor) (Jap. bef. 1896) SW.
 C VIII 'Athlete' (Mouch. 1867) 1, 6, 8.
 J VII 'Auguste Dessert' (Des. 1902) SW.
 C VII 'Auguste Ravel' (Pai. 1889) 6.
 L X 'Aurore' (Lem. 1936) SW, TY, UW. 1, 6, 8.
 J III 'Aya-nishiki' (Figured Brocade) (Jap. bef. 1895) SW.
 C VIII 'Banksi' (Chin. Int. Banks 1789) MT, TO, WH. 6.
- L X 'Banquet' (Saund. 1941) SW, MT.
 J IV 'Banzaimon' (Gate of Cheers) (Jap. bef. 1937) SW.
 C III 'Baronne D'Ales' (Gom. bef. 1886) WH. 6.
 J I 'Beatrix' (Jap. bef. 1905) TY, SW.
 J II 'Beikoku' (America) (Jap. bef. 1890) MT, WH. 6.
 C I 'Bijou de Chusan' (Chin.-For. 1846) SW. 6.
 L V 'Black Douglas' (Saund. 1948) MT, SW.
 L V 'Black Panther' (Saund. 1948) SW.
 L V 'Black Pirate' (Saund. 1935) MT, SW. 4.
 C I 'Blanche de Chateau Futu' (Mouch. 1867) WH.
 C I 'Blanche de Noisette' (Nois. bef. 1864) 6.
 J V 'Bokuryo' (Black Dragon) (Jap. bef. 1926) SW.
 L X 'Brocade' (Saund. 1941) SW.
 J I 'Byakuo-jishi' (White King of Lions) (Jap. bef. 1935) SW.
 L IX 'Canary' (Saund. 1940) SW. 4.
 C II 'Carolina d'Italie' (Italy or Chin. bef. 1846) SW, WH. 6.
 L IX 'Celestial' (Saund. 1948-1950) MT, SW.
 L V 'Centaur' (Saund. 1941) SW, UW.
 L V 'Charioteer' (Saund. 1949) SW.
 L X 'Chinese Dragon' (Saund. 1950) SW.
 'Chiyo-no-hana' UW.
 L IX 'Chromatella' (Lem. 1928) MT, SW, TY, UW, WH. 1, 6.
 C VI 'Col. Malcolm' (Chin.-For. 1846) 1.
 C VII 'Comte de Flandre' (Don. bef. 1946) 6.
 C III 'Comtesse de Crawford' (Senl bef. 1889) 6.
 C II 'Comtesse de Tuder' (Gom. 1856-1866) SW. 6.
 L X 'Conquest' (Saund. 1948) SW.
 L X 'Copper Rose' (Saund.).
 C I 'Coquette des Blanchés' (bef. 1889) 6.
 C VI 'Cornelia' (Chin.-For.) WH.
 L IX 'Coronal' (Saund. 1948).
 L V 'Corsair' (Saund. 1941) SW.
 L X 'Countess' (Saund. 1942) SW.
 L IX 'Daffodil' (Saund. 1948) 4.
 J III 'Dai-hochō' (Emperor's Castle) (Jap. bef. 1931) TY.
 J III 'Dai-kagura' (Merry Dancing) (Jap. bef. 1896) SW.
 J VII 'Daiōh' (The Great King) (Jap. bef. 1931) 4.
 'Daiyo-kuden' UW.
 L X 'Damask' (Saund. 1941) SW.
 J II 'Dantenmon' (The Gate of Danten) (Chug. 1932) UW. 4.

*The first section of the listing designates the **type**: C = Chinese, J = Japanese, L = Lutea Hybrid.

The second, the **color**:

- | | |
|----------------|-------------------------------|
| I = White | VI = Purple |
| II = Pink | VII = Magenta |
| III = Rose Red | VIII = Lilac Rose |
| IV = Scarlet | IX = Yellow |
| V = Crimson | X = Yellow with reddish tones |

The third is the **alphabetical name**.

The fourth, in parenthesis, is the **translation** of the Japanese name. Other parentheses contain the name of the **raiser** and **date**, or approximate date, of **introduction**.

The fifth section contains the code for the **public garden** in which the particular variety may be seen. (See Page 55 for name of garden.)

The sixth section furnishes the **nursery** or grower from which the variety may be purchased. (See Page 55 for name of supplier.)

- L IV 'Daredevil' (Saund. 1948) SW, MT.
 C VII 'De Bugney' (Amand bef. 1846) SW, MT. 6.
 J II 'Dokushin-den' (Dokushin Castle) (Jap. bef. 1913) SW.
 J III 'Donkelaari' (Mie. or Don bef. 1867) 6.
 J II 'Doun' (Jap. bef. 1931) SW.
 C VIII 'Duchess de Morny,' WH.
 C VIII 'Dumont de Courset' (Guer. after 1863) WH.
 J VII 'Eclairer' (Des. 1909) SW.
 L IX 'Eldorado' (Lem. 1949).
 'Elizabeth d'Italie,' RO.
 J VIII 'Empereur Alexander II' (Sieb.-K.) 6.
 L IX 'Festival' (Saund. 1941) SW, MT.
 L X 'Flambeau' (Lem. 1930) SW, TY, UW.
 1, 6, 8.
 J I 'Flora' (Jap.-Sieb.) 1, 6, 8.
 'Fo sotsuka,' UW.
 C III 'Fragrans Maxima Plena,' 6.
 J IX 'Fuji-no-akebono' (Daybreak on Fuji) (Jap. bef. 1929) MT. 6.
 J III 'Fuji-no-mori' (Grove of Fuji) (Jap. bef. 1919) MT, WH. 6.
 J I 'Fuji-oe-ryo' (Dragon Hovering Over Mt.) (Jap. bef. 1926) SW.
 'Funkei,' UW.
 J 'Furo-zome-nishiki' (Black Painted Brocade) (Jap.) TY.
 J I 'Fuso-no-tsukasa' (Jap. bef. 1931) WH.
 J VI 'Fuyorem' (Jap. bef. 1929) 6.
 J I 'Gabisan' (Mt. Gabi) (Jap. bef. 1898) SW, TY. 4.
 J I 'Gekkyuden' (Palace of the Moon Kingdom) (Jap. bef. 1910) SW.
 J 'Gessekai.'
 L IX 'Gold Dust' (Saund. 1952).
 L IX 'Gold Sovereign' (Saund. 1950).
 L IX 'Golden Bowl' (Saund. 1948).
 L IX 'Golden Hind' (Saund. 1948-1950).
 L IX 'Golden Isles' (Saund. 1948).
 L X 'Golden Mandarin' (Saund. 1952).
 L IX 'Goldfinch' (Saund. 1948-1950).
 J VI 'Hana-daigin' (Magnificent Flower) (Jap. bef. 1910) SW, WH, UW. 2.
 J I 'Hana-den' (Palace of Flowers) (Jap. bef. 1912) SW, TY.
 J II 'Hana-kiso' (Floral Rivalry) (Jap. bef. 1929) SW, WH. 4, 6.
 J II 'Hana-kurabe' (Floral Competition) (Jap. bef. 1926) SW.
 J VIII 'Hana-no-mikado' (Emperor of the Flowers) (Jap. bef. 1926) SW.
 J III 'Hana-no-nishiki' (Golden Floral Brocade) (Jap. bef. 1919) 6.
 L X 'Happy Days' (Saund. 1948) SW.
 L VIII 'Harlequin' (Saund. 1952) SW.
 J IX 'Haru-no-akebono' (Spring Dawn) (Jap. bef. 1929) WH. 6.
 L X 'Harvest' (Saund. 1944-1950) SW. 4.
 J X 'Hatsu-garashu' (First Crow of the Year) (Jap. bef. 1929) SW, WH.
 J IV 'Hatsu-hinode' (Rising Sun of the New Year) (Jap. bef. 1926) WH, UW, SW. 4.
 L V 'Heart of Darkness' (Saund. 1948).
 L X 'Hesperus' (Saund. 1948-1950) MT, SW.
 L IX 'High Noon' (Saund. 1952) SW.
 J III 'Higurashi' (Twilight) (Jap. bef. 1929) SW, WH, UW.
 J III 'Hinode-no-seki' or 'Hinode sekai' (Sunrise in the Open Country) WH, UW. 4.
 J IV 'Hino-tobira' (Passage of the Sun) (Jap. bef. 1896) SW, TY.
 J IV 'Hino-tsukasa' (King of the Scarlets) (Jap. bef. 1931) SW, WH, UW. 2.
 J IV 'Hiodoshi' (Scarlet Suit of Armor) (Jap. bef. 1929) TY. 4.
 J I 'Hira-no-yuki' (Snow of Hira) (Jap. bef. 1934) UW. 4.
 J IV 'Hiryō' (Flying Dragon) (Jap. bef. 1896) SW.
 J IV 'Hiryō-nishiki' (Flying Dragon Brocade) (Jap. bef. 1929) SW. 6.
 J III 'Hodai' (Reign of Chinese Emperor Ho) (Jap. bef. 1931) SW, TY, WH. 4.
 L X 'Holiday' (Saund. 1948-1950) SW.
 J III 'Homei' (Good Name) (Jap. bef. 1931) SW, TY. 2.
 J IV 'Ho-o-nishiki' or 'How-o-nishiki' (Jap. bef. 1929) TY.
 J VIII 'Horaisan' (Mt. Horai) (Mountain of Heavenly Beauty) (Jap. bef. 1926) UW, WH.
 J VI 'Horakumon' (Gate of Horaku) (Gate of Abundant Pleasure) TY, UW. 4.
 'Howren-huo-tsukasa,' UW. 4.
 J II 'Howzan' or 'Hozan' (Treasure Mountain) (Jap. bef. 1934) UW. 4.
 'Husha-kaken,' UW.
 L IX 'Hyperion' (Saund. 1948-1950) SW.
 J I 'Ima-chowkow' (Name of an ancient Saint) (Jap. bef. 1929) SW. 6.
 J III 'Ima-shojo' or 'Ima-syojo' (New Shojo) (Jap. bef. 1931) TY. 2, 4.
 C VIII 'Imperatrice Josephine' (Hiss. 1939) WH.
 J IV 'Impumon' (Gate of Impu) (Chug. 1932) UW. 4.
 L I 'Infanta' (Saund. 1948) SW.
 J II 'Iro-no-seki' (Barrier of Gay Color) (Jap. bef. 1893) SW.
 J IV 'Iwato-kagami' (Sacred Mirror) (Jap. bef. 1895) SW, TY.
 J V 'Iwato-kagura' (Sacred Dance of Iwato) (Jap. bef. 1926) TY. 6.
 C III 'Jeanne D'Arc' (Sen. bef. 1889) SW, WH. 6.
 J IV 'Jitsu-getsu-nishiki' (Sun and Moon Brocade) (Jap. bef. 1927) SW, TY, WH. 2.
 C III 'Josephine Seneclauze' (Sen. 1889) WH. 6.
 C III 'Jules Pirlot' (Mak. bef. 1867) UW, WH. 1, 8.
 J III 'Kagura-jishi' (Sacred Lion Dance) (Jap. bef. 1926) 2, 4.
 J I 'Kai-haku-hatsu' (Snow-White Hair) (Jap. bef. 1926) SW.
 J VII 'Kamada-fuji' (Wisteria at Kamada) (Jap. bef. 1893) MT, SW. 5, 6.
 J VII 'Kamada-nishiki' (Kamada Brocade) (Jap. bef. 1929) SW, WH, UW.
 J VII 'Kamata-fuji' (Wisteria at Kamata) (Jap. bef. 1937) UW, WH.
 'Kami-kase,' UW.

- J I 'Kansenden' (Palace of Sweet Spring) (Jap. bef. 1898) SW, TY.
- J II 'Kasuga-yama' (Mt. Kasuga) (Jap. bef. 1932) 6.
- J II 'Kasumi-gaseki' (Cloudy Landscape) (Jap. bef. 1929) 6.
- J I 'Kathryn' (Lambert 1944) 6.
- J VI 'Kenreimon' (Gate of Kenrei) (Chug. 1932) UW. 2.
- J I 'Kigyoku' (Precious Jewel) (Jap. bef. 1919) SW.
- J IV 'Kiku-botan' (Chrysanthemum Peony) (Jap. bef. 1919) SW.
- J I 'Kimi-gayo' (National Anthem of Japan) (Jap. bef. 1929) TY. 6.
- J I 'Kimpai' (Gold Cup) (Gold Medal) (Jap. bef. 1934) SW.
- J IV 'Kin-fukurin' or 'Kin-pukurin' (Jap. bef. 1896) SW. 4.
- J I 'Kinipaiseten' or perhaps 'Kimpaiseten' (Jap. bef. 1913) SW, TY.
- J IV 'Kin-ka-den' (Golden Flower Temple) (Hall of the Golden Flower) (Hall of Golden Glory) (Jap. bef. 1934) WH. 2, 4.
- J II 'Kintajio' or 'Kinutajio' (Castle of Kinuta) (Jap. bef. 1913) SW.
- C I 'Kochs Weisse' (Koch bef. 1889) WH.
- J I 'Kogane-zome' (Golden Dye) (Jap. bef. 1926) SW.
- J V 'Koi-kagura' (Sacred Love Music) (Jap. bef. 1926) SW.
- J V 'Koka-mon' (Gate of Koka) (Chug. 1932) 4.
- J IV 'Kokirin' (Small Kirin) (Old Golden Brocade) (Jap. bef. 1893) SW, TY.
- J V 'Kokko' (Black) (Jap. bef. 1937) SW.
- J V 'Kokko-no-tsukasa' (Black Leader) (Jap. bef. 1931) SW, UW.
- J V 'Kokko-shi' (King of Black Light) (Jap. bef. 1929) SW, TY. 6.
- J V 'Koku-ho' or 'Koku-how' (Black Bird) (Jap. bef. 1929) SW. 6.
- J VI 'Koku-ryu-nishiki' or 'Koki-riu-nishiki' (Black Dragon Brocade) (Jap. bef. 1905) SW.
- J V 'Koku-tsuru' (Black Crane) (Black Heron) (Jap. bef. 1938) 4.
- J I 'Komachi-shiro' (White Beauty) (Jap. bef. 1929) 2.
- J V 'Konron-koku' (Land of Konron) (Jap. bef. 1893) SW, TY. 6.
- J II 'Ko-zakura' (Small Cherry) (Jap. bef. 1931) UW.
- J V 'Kuma-gai' (Name of a person) (Jap. bef. 1932) 2.
- J IV 'Kumona-nishiki' or 'Kumo-no-nishiki' (Cloud Pattern Brocade) (Jap. bef. 1893) SW, TY. 6.
- J V 'Kuro-botan' (Black Peony) (Jap. bef. 1896) SW. 1, 8.
- J V 'Kyokko' or 'Kyokuko' (Mysterious Light) (Jap. bef. 1929) 6.
- C I 'Lactea' (David 1839 or Guerin) 6.
- L IX 'La Lorraine' (Lem. 1913) SW, UW, WH. 1, 6, 8.
- C 'Lambertinae' (Mak. 1846) WH. 6.
- C IX 'La Ville de St. Denis' (Mouch. 1854) WH. 6.
- L IX 'L'Esperance' (Lem. 1909) SW, TY, UW, WH. 6.
- L VI 'Lombard' (Saund. 1948).
- C III 'LouisVerschaffelt,' RO.
- C III 'Louise Mouchelet' (Mouch. 1860) RO, WH. 1, 2, 6.
- lutea, SW, UW. }
lutea ludlowi, SW. } See under species.
lutea splendens, SW. }
- C II 'Mme. Amand' (Amand. bef. 1867) 6.
- C VIII 'Mme. de Vatry' (Guer. bef. 1867) 6.
- C V 'Mme. Edouard Seneclauze' (Ober. 1941) UW. 2, 6.
See also 'Reine Elizabeth.'
'Mme. Fernand Lemaitre,' UW.
- C III 'Mme. Henriette Caillot' (Pai. 1889 as new) WH.
- C III 'Mme. La Marquise de Vogue' (Ober. 1941) 6.
- L X 'Mme. Louis Henry' (Henry 1919) SW, TY, UW. 1, 6, 8.
- J II 'Mme. Pierre Dessert' (Des. 1909) SW, TY.
- C III 'Mme. Stuart Low' (Mak. 1863) WH. 2, 6.
- C II 'Mme. Victor Gillier' (Named Pai. 1889) WH.
- L X 'Marchioness' (Saund. 1942) SW. 4.
'Marie Seguinot,' WH.
- C II 'Marquis de Clapiers' (Sen. bef. 1899) SW, WH. 6.
- C VIII 'Meiji-no-homare' (Glory of Meiji) (Jap. bef. 1910) UW.
- J I 'Meikow-how' (Jap. bef. 1931) SW.
- L VIII 'Melody' (Saund. 1948).
- C II 'Meteore' (bef. 1910) 6.
- J IV 'Mikado-nishiki' (Emperor's Brocade) (Jap. 1929) 6.
- J III 'Mikasa-yama' (Mt. Mikasa—Three Hats) (Jap. bef. 1902) SW, TY.
- L IX 'Mine d'Or' (Lem. 1941) 1.
- J III 'Mitama' (Beautiful Gem) (Jap. bef. 1929) 6.
- J III 'Miyako-no-nishiki' (Miyako Brocade) (Miyako was old Capital of Japan) (Jap. bef. 1929) SW.
- J III 'Miyo-no-hikare' (Brilliance of the Reign) (Light of the Era) (Jap. bef. 1926) 6.
- J VI 'Miyuki-nishiki' (Imperial Procession Brocade) (Jap. bef. 1929) 6.
- J II 'Momo-yama' (Mt. Momo) (Mountain of Peach Orchards) (Jap. bef. 1931) SW, UW. 2, 4.
- L V 'Monitor' (Saund. 1948).
- C III 'Mont Vesuve' (Sen. bef. 1889) 6.
- C III 'Monte Christo' (Named Pai. 1889) 6.
'Mt. Nishika.'
- J III 'Mt. Rokku' (Jap. bef. 1936) 4.
- J VI 'Mure-garasu' (Flock of Crows) (Jap. bef. 1932) SW, TY.
- L VIII 'Mystery' (Saund. 1948) MT.

- J I 'Nagoya Castle' (Jap. bef. 1936) SW. 4.
 J II 'Naniwa-nishiki' (Naniwa Brocade) (Jap. bef. 1929) 4.
 L IX 'Nankeen' (Saund. 1950).
 L IX 'Narcissus' (Saund. 1941) SW.
 J VI 'Negricans' (Jap. bef. 1864) SW.
 L IX 'Nereid' (Saund. 1949) SW.
 C VII 'Newmani' or 'Neumanni' (bef. 1846) 6.
 J II 'Nira' (Ober. 1934) 6.
 J III 'Nishiki-jima' (Brocade Island) (Jap. bef. 1937) TY, WH.
 J III 'Nishiki-jishi' (Lion Adorned with Brocade) (Jap. bef. 1937) 6.
 J II 'Nishiki-no-shitone' (Gold Brocade Cushion) (Jap. bef. 1910) SW, UW.
 J IV 'Nishiki-no-tsuya' (Brilliance of Brocade) (Jap. bef. 1931) UW, WH. 2.
 J IV 'Nissho' (Sunbeam) (Sunshine) (Jap. bef. 1931) TY, UW, WH. 2, 4.
 J IV 'Nisshoko' (Flag of the Rising Sun) (Jap. bef. 1934) SW.
 J I 'Oh-gonsome' (Golden Hues) (Dyed in Gold) (Jap. bef. 1829) MT. 6.
 J IV 'Oh-kwan' (Crown) (Huge Circle) (Jap. bef. 1929) 6.
 J I 'Okina-jishi' (Aged Lion) (Jap. bef. 1926) SW, WH. 2, 4.
 C III 'Omar Pacha' (Named Pai. 1889) 6.
 C IV 'Onyx' (bef. 1886) See also 'Reine Elizabeth.' 6.
 J V 'Ori-hime' (Princess Ori) (The Weaving Princess) (Jap. bef. 1931) 4.
 L IX 'Orion' (Saund. 1948) SW.
 J IV 'Osho-kun' (Magnificent Chinese Prince) (Jap. bef. 1926) 6.
 C V 'Osiris' (Chin.-For.) MT. 6.
 J I 'Otome-no-mai' (Girls' Dance) (Jap. bef. 1929) 6.
 L X 'Pastoral' (Saund. 1950) SW.
 C I 'Perle des Blanches' (bef. 1879) 6.
 L VI 'Phoenix' (Saund. 1941) MT. *potamini*, UW. See under species.
 L VII 'Princess' (Saund. 1941) SW.
 C VI 'Princess Louise' (Sen. bef. 1889) WH.
 C II 'Princess Mathilda' (bef. 1899) WH. 6.
 J I 'Princesse de Metternich' (Jap. Sieb.) 6.
 C III 'Purity' (Named Pai. 1889) WH.
 C II 'Ranieri' (Italy bef. 1846) WH.
 L V 'Red Cloud' (Saund. 1950) SW.
 L V 'Red Currant' (Saund. 1948) SW.
 L IV 'Red Jade' (Saund. 1948) SW.
 L X 'Regent' (Saund. 1945) SW.
 C III 'Regina Belgica' (Jap. Sieb.-K. or Mak. bef. 1867) 6.
 C III 'Reine Amelie' (Named Pai. 1889) 6.
 C III 'Reine des Violettes' (For.-China) 6, 8.
 C III 'Reine Elizabeth' (Cas. bef. 1846?) RO, SW, UW, WH. 1, 2, 6, 8.
 J I 'Renkaku' (Flock of Cranes, or Flight of Cranes) (Jap. bef. 1931) MT, SW, WH. 6.
 L X 'Renown' (Saund. 1949) SW.
 L X 'Right Royal' (Saund. 1950) SW.
 J VI 'Rimpo' (Bird of Rimpo) (Jap. bef. 1926) SW, UW, WH. 4, 6.
 J IV 'Riu-shiko' (Shiko Dragon) (Jap. bef. 1900) SW, TY.
 C IV 'Robert Fortune' (For.-China) 6.
 III 'Rococo' (Rinz. bef. 1864) WH. 6.
 L IX 'Roman Gold' (Saund. 1941) MT, SW. 6.
 L X 'Rose Flame' (Saund. 1950) SW. 'Rubra Odorata Plena', 6.
 J VI 'Ruriban' (Indigo Purple Tray) (Jap. bef. 1893) MT, SW. 6.
 J II 'Saigyo-zakura' (Cherries of Saigyo) (Jap. bef. 1893) SW. 4.
 J II 'Sakura-gasane' (Drift of Cherry) (Jap. bef. 1929) 4, 6.
 J II 'Sakura-jishi' (The Lion in the Cherry Orchard) (Jap. bef. ????) 2, 4.
 C III 'Salmonea' (For.-China) 6.
 J III 'Salmon Perfection' (Ober. 1922) 6.
 L V 'Sang Lorrain' (Lemoine 1939).
 J 'Sango-kaku' (Coral Palace) (Jap. bef. 1937) TY. 'Santa Cruz' UW. 'Santa Maria' UW. 'Santa Monica' UW. 'Santa Teresa' UW.
 L V 'Satin Rouge' (Lem. 1926) SW, TY, WH. 1, 6, 8.
 L VI 'Savage Splendor' (Saund. 1950) SW.
 J III 'Sawa-no-taki' (Sawa Waterfall) (Jap. bef. 1919) TY.
 L X 'Segovia' (Saund. 1949) SW.
 J I 'Seidai' (Glorious Reign) (Jap. bef. 1929) 6.
 J I 'Seiryu' or 'Seiryu' (Dragon) (Blue Dragon) (Jap. bef. 1893) WH.
 J I 'Sekkaku' (Snowy Crane) (Jap. bef. 1932) SW, TY.
 J III 'Senshumon' (Gate of Senshu) (Jap. bef. 1932) 4.
 J III 'Sen-yomon' (Jap. bef. 1933) 2.
 J III 'Shichi-fukujin' (The Seven Gods of Fortune) (Jap. bef. 1896) 2, 4.
 J II 'Shichi-no-tategami' (Lion's Mane) (Jap. bef. 1890) WH. 6.
 J VI 'Shigyoku' (Purple Gem) (Imperial Opal) (Jap. bef. 1932) UW.
 J VII 'Shiko-den' (Palace of Violet Light) (Shiko Palace in China) (Jap. bef. 1926) MT, SW. 6.
 J III 'Shin-kagami' (New Mirror) (Jap. bef. 1926) 4.
 J III 'Shin-kagura' (New Sacred Music) (Jap. bef. 1905) WH. 4.
 J V 'Shin-kurobotan' (New Black Peony) (Jap. bef. 1931) SW.
 J II 'Shintenchu' (New Heaven and Earth) (Jap. bef. 1931) WH. 4.
 J II 'Shin-toyen' (The New Peach Orchard) (New Paradise) (Jap. bef. 1929) 6.
 J II 'Shira-giku' (White Chrysanthemum) (Jap. bef. 1896) SW, TY.
 J II 'Shiro-banryu' (Great Many White Dragons) (Jap. bef. 1931) SW.
 J I 'Shiro-tae' (All Over White) (Jap. bef. 1931) SW.

- J VII 'Shishiden' (Jap. bef. 1937) TY.
 J I 'Shogyomon' (Jap. bef. 1937) UW.
 J I 'Shuchiuka' (Flower in Wine) (Jap. bef. 1919) SW.
 J V 'Shugyo-kuden' (Palace of Gems) (Jap. bef. 1926) 5, 6.
 J II 'Shujakumon' (Gate of Shujuku) (Gate of the Scarlet Sparrow) UW. 4.
 J VI 'Shunkoden' (Temple of Good Fortune) (Jap. bef. 1939) 2.
 J VI 'Shunkyoden' (Palace of Spring Enjoyment) (Jap. bef. 1935) WH.
 L IX 'Silver Plane' (Saund. 1948-1950) SW.
 L IX 'Silver Sails' (Saund. 1940) SW. 4.
 J IV 'Somei' (Beginning of Creation) (Jap. bef. 1931) SW.
 'Souv. de Chas. Mechin,' UW, WH.
 C III 'Souv. de Chenonceau' (Mech. bef. 1889) 1, 6, 8.
 C VI 'Souv. de Ducher' (Duch. bef. 1889) SW, UW. 6, 8.
 C III 'Souv. d'Etienne Mechin' (Des. & Mech. bef. 1899) WH. 6.
 C V 'Souv. de Jules Dessert' (Des. 1908) WH.
 C I 'Souv. de M. Miren,' probably same as 'M. Miron' (Ober. 1941) 6.
 C III 'Souv. de Mme. Knorr' (V.H. about 1853) WH. 6.
 L X 'Souv. de Maxime Cornu' (Henry 1897 or 1920) MT, SW, UW, WH. 1, 6, 8.
 L IX 'Spanish Gold' (Saund. 1948-1950) SW.
 L X 'Spring Carnival' (Saund. 1944) SW.
 L IX 'Star Dust' (Saund. 1950) UW.
 J II 'Suigan' (A place name) (Intoxicating Face) (Jap. bef. 1931) TY, UW.
 J III 'Suisho-haku' (Crystal Palace) (Clear Crystal White) (Jap. bef. 1919) SW. 4.
 J V 'Suma-no-ichi' (Deepest Ink) (Jap. bef. 1927) SW, TY. 4.
 J V 'Sumina-gashi' (Stream of Indian Black) (Dark Streak) (Jap. bef. 1896) SW.
 L X 'Summer Night' (Saund. 1949) SW.
 L X 'Sunrising' (Saund. 1948) SW.
 X 'Surprise' (Lem. 1920) SW, TY, UW, WH. 1, 6, 8.
 J VI 'Taibo' (Great Hovering Bird) (Jap. bef. 1910) SW. 6.
 J V 'Taisho-no-hikare' (Honor of Taisho Dynasty) (Jap. bef. 1931) 2.
 J VI 'Taisho-no-hokori' (Pride of Taisho Dynasty) (Jap. bef. 1931) WH.
 J IV 'Taiyo' (Sun) (Jap. bef. 1931) WH. 2.
 J II 'Tama-fuyo' (Jeweled Lotus) (Jap. bef. 1919) MT, SW, UW, WH. 2, 4.
 J II 'Tama-jishi' (Jeweled Lion) (Jade Lion) (Jap. bef. 1926) TY.
 J IV 'Tama-midori' (Green Jade) (Jap. bef. 1926) SW.
 J I 'Tama-sudare' (Jeweled Screen) (Tracery of Precious Gems) (Jap. bef. 1931) SW, TY, WH. 2, 4.
 J I 'Tama-usagi' (Jeweled Rabbit) (Jap. bef. 1919) SW, TY.
 J I 'Tatio-shishi' (Lion with a Standing Tail) (Jap. bef. 1938) 6.
 L X 'Tea Rose' (Saund. 1948) SW. 4.
 J IV 'Tenjyo-no-mai' (Celestial Dancing) (Jap. bef. 1929) 6.
 J VIII 'Tenyo-no-hagaromo' (Wings of Heaven) (Jap. bef. 1929) 6.
 J II 'Terute-nishiki' (May be 'Hirute-nishiki') (Jap. bef. 1917) SW, TY.
 L V 'Thunderbolt' (Saund. 1948) SW.
 L IV 'Tiger Tiger' (Saund. 1948).
 L X 'Titania' (Saund. 1949).
 J II 'Toki-wadsu' (Eternal Color) (Also name of song) (Jap. bef. 1893) 6.
 C VIII 'Triomphe de Flandres.' See 'Triomphe de Vandermaelen.'
 C VIII 'Triomphe de Vandermaelen' (Vdm. 1849) WH. 1, 6, 8.
 L X 'Trophy' (Saund. 1942 or 1944) SW.
 J III 'Tsukasa-botan' (Leader of the Peonies) (Jap. bef. 1927) SW.
 J I 'Tsuki-sekai' (Moon World) (Jap. bef. 1934) SW, TY.
 J II 'Tsuya-sugata' (Lustrous Form) (Charming Figure) (Jap. bef. 1929) SW, TY. 6.
 J IV 'Tszure-nishiki' (Patched Brocade) (Gobel-in Tapestry) (Yok. 1919) SW, TY. 6.
 J V 'Uba-tama' (Pitch Black) (Jap. bef. 1929) SW, UW, WH. 4, 6.
 J III 'Ukare-jishi' (Jovial Lion) SW, TY. 4.
 J III 'Ukaregi-ohi' (Oberlin trans. Golden Center) (Jap. bef. 1930) MT, WH. 6.
 J III 'Usu-jishi' (Light Lion) (Jap. bef. 1926) SW, TY.
 C IV 'Versicolor,' perhaps 'Berenice' (Named Pai 1889) 6.
 L V 'Vesuvian' (Saund. 1948) MT, SW.
 C II 'Victoire d'Alma' (Named Pai. 1889), WH.
 C VI 'Victor Hugo' (Des. 1902) WH.
 J I 'White Peacock' (Jap. bef. 1936) 6.
 L IX 'Wings of the Morning,' formerly 'Aureole' (Saund. 1948) SW, UW. 6.
 J II 'Yachyo-tsubaki' (Long Hedge of Camellias) (Jap. bef. 1931) MT, UW, WH. 2.
 J II 'Yae-zakura' (Very Double Cherry) (Jap. bef. 1931) MT, UW, WH. 2, 4.
 'Yaku-tsura,' UW.
 J II 'Yamato-nishiki' (Japanese Brocade) (Jap. bef. 1929) 6.
 J I 'Yaso-no-mine' (White Hair of the Aged Man) (Jap. bef. 1930) 1.
 J I 'Yaso-okina' (Venerable Man) (Jap. bef. 1893) SW. 1, 2.
 C VII 'Yo-boku' (Distinguished Appearance) 2.
 J IV 'Yo-meimon' (The Most Gorgeous Gate of Japan) (Yomei gate of Nikko shrine) (Jap. bef. 1929) 6.
 J II 'Yomo-zackura' (Cherry Blossoms Everywhere) (Jap. bef. 1927) 2.
 J V 'Yoro-nishiki' (Authority Brocade) (Chin. bef. 1910) UW.
 J VII 'Yoyo-no-homare' (Glory of Many Generations) (Jap. bef. 1893) MT, WH. 6.

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