PLANT HUNTING

—

ERNEST H. WILSON

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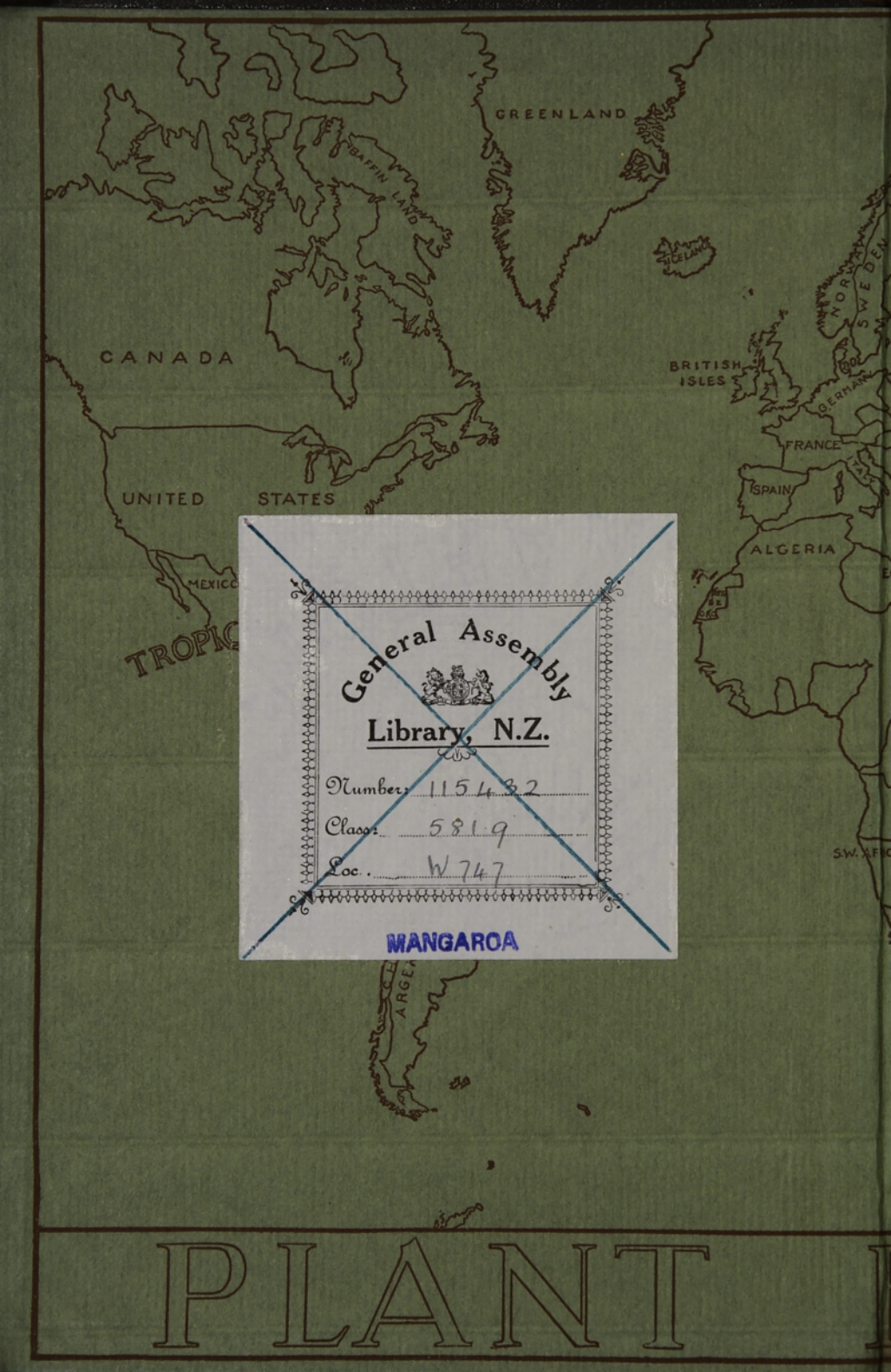

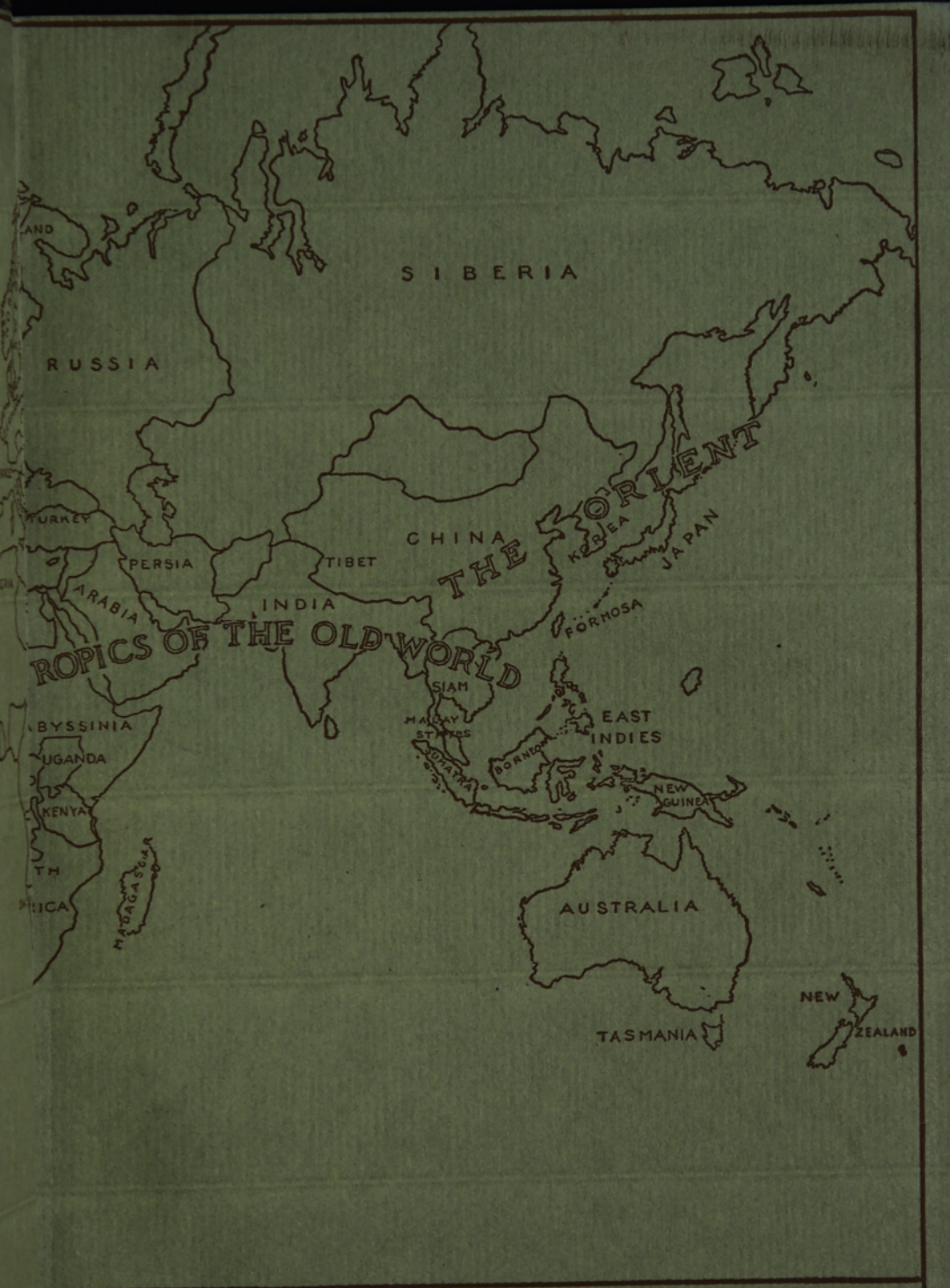
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BORNEO
NEW GUINEA
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PLANT HUNTING

By

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Author of
America's Greatest Garden, Aristocrats of the Garden,
The Lilies of Eastern Asia, and other works

WITH 128 ILLUSTRATIONS

MOSTLY FROM PHOTOGRAPHS TAKEN BY THE AUTHOR

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THE TROPICS

CHAPTER XXX.

Nature's Luxurious Extravagance

EOPLE whose lives are spent in the cool temperate regions of the world have in general exaggerated ideas of the tropics. The great heat of which they hear or imagine impresses them unpleasantly, and visions of noxious wild animals and deadly diseases arise until the picture becomes a nightmare. A visit to the hothouses of botanic gardens or those of private estates filled with strange plants bearing noble and handsomely marked foliage or brilliantly colored blossoms, gives another aspect to the tropics yet such a scene is apt to warp our ideas just as much as the thoughts of excessive heat, wild animals and diseases. It is doubtful if any article or book no matter how truthfully written can give any real idea of the tropics.

As a matter of fact, compared with temperate regions where such kaleidoscopic changes are wrought by the change of the seasons the tropics are deadly monotonous. Perpetual summer reigns and the only

change of season is that of wet and dry and this is not always fixed and recognizable as such. Trees, shrubs and herbs flower and fruit throughout the year and leaves are shed at any time. Where wet and dry seasons prevail drought induces a periodic fall of the leaf. Young unfolding leaves are often delicately and beautifully colored but the tropics boast nothing comparable with the wondrous autumnal tints of the north.

To the embellishment of our hothouses all parts of the tropics have contributed but for the proper appreciation of our subject it is necessary to distinguish between the equatorial regions of the Old and New Worlds. It is only the lesser plants of the tropics that can be successfully accommodated in our stoves and palm-houses, be these ever so vast. The climbers and major trees of the tropics are almost unknown to dwellers of the North, since they need greater room than even such giant glass structures as the Palm-house at Kew affords. In many parts of the tropics to which steamers regularly ply there have been established fine botanic gardens and parks. One so fortunate as to visit these will get a liberal education into the luxuriant vegetation of the tropics. If the visit be extended to several of these gardens, no matter in which Hemisphere, the same trees and

LORD OF THE TROPIC STRAND — COCOS NUCIFERA

climbers will be seen planted over and over again. Among climbers the traveller will never be out of sight of the Bougainvillea with its intensely colored bracts, of rich magenta or brick red according to the species. Of Palms the Cocoanut and Royal are omnipresent. These and others are of the New World and have been carried everywhere, the Cocoanut by ocean currents, others by the hand of man. Many other American plants now universally planted in the tropics shall receive their full recognition in due course but first let us survey the tropical plants of the Old World.

One of the trees most widely planted in the tropics for ornamental purposes is *Poinciana regia,* the Flamboyant tree, a native of Madagascar. The farthest north I have seen this tree in flower is Port Said, at the entrance to the Suez Canal. The Flamboyant is a member of a branch of the familiar Pea-family which, by the way, is within the tropics the family richest in tree forms. This Poinciana is a flat-topped, deciduous leafed tree usually from 40 to 50 feet tall with a short trunk and wide-spreading crown of thick branches. Its leaves, which are finely divided and Mimosa-like, are shed at any time in the year. So precocious is this species that I have seen three trees side by side one naked and laden with old fruits,

one in full flower and the third crowded with green foliage. The flowers are borne in large clusters usually at the end of naked shoots, occasionally with the unfolding leaves, and have large, intense scarlet petals flushed with yellow at their base. In full flower this tree is a blaze of scarlet so intense as to dazzle and even hurt the eyes. When bare of flowers and foliage and with only its black-brown flattened woody pods, each well over a foot long, the tree is ugly, but in blossom it is among the most gorgeous members of the tree-world. It is one of the most familiar sights in the tropics and one which every traveller admires.

Much more beautiful but more rarely seen is *Colvillea racemosa,* another Madagascan tree also belonging to the Pea-family. I first saw a large tree in full flower in the Brisbane Botanic Gardens and was captivated immediately by its beauty. It has leaves like the Flamboyant tree, similar in size but with rather smaller pinnae, and terminal compound panicles two feet and more high and more than a foot broad of wondrous orange-yellow flowers. A flat-topped tree, not more than 50 feet tall but more through the crown, this Colvillea is in flower a marvellous spectacle of loveliness.

Another tree much planted in the tropics is *Spathodea campanulata,* native of Africa. This is a rela-

EDGE OF THE JUNGLE

tive of the Indian Bean-tree (*Catalpa speciosa*) and has pinnate leaves and panicles of large, scarlet suffused and edged with yellow flowers. The African Baobab is among the wonders of the vegetable world. In bulk of trunk it probably exceeds all other trees. In height it is seldom more than 100 feet but the trunk is enormous, yet so soft and full of pith that a rifle-bullet easily passes through the largest specimen. When leafless the Baobab is perhaps the ugliest of all trees but when clad with leaves and flowers is a noble example of vegetable growth. The huge egg-shape, pointed fruits are full of a powdery mass which tastes like cream-of-tartar and this name is often applied to the tree.

But gorgeous and wonderful as they are these and other tropical trees of similar character have no value to the greenhouses of northern lands. Here they may serve to give a glimpse of tropical tree-growth before we discourse on those of lesser size but to us of greater value.

Palms are a feature of the tropics and are so associated in the minds of all folk. A few species are found in the warm temperate regions but the family is essentially equatorial. The indispensable *Kentia Belmoreana* and *K. Fosteriana* hail from Lord Howe Island off the east Australian coast. The exquisite

Phoenix Roebelinii comes from southeastern Asia, the older *P. reclinata* is African and *P. rupicola* is indigenous on the foot-hills of the eastern Himalayas; the familiar fan-leaved *Livistona chinensis* or *L. borbonica* hails from the Liukiu and Bonin Islands. There are many hundreds of species, the majority of them local in their distribution but some, like the Cocoanut, which fringes the ocean-girt lands of all the tropics, are wide-spread. All are beautiful and possessed of characters by which the veriest tyro recognizes a Palm immediately, never mistaking it for some other plant. Many are of great economic importance yielding fibres, oils, edible fruits, starch and sugar, and, to the peoples of the tropics Palms are the most important of all the families of the vegetable kingdom. Their uses are indeed legion. The Tamil people of India have a song which enumerates eight hundred and one uses of the Palmyra Palm (*Borassus flabellifer*). Perhaps the chief use of this Palm, however, is the production of palm-wine or toddy, which is obtained by tapping the sap flowing to the inflorescence and fermenting it. For this purpose the Palmyra is cultivated in enormous quantities in India and elsewhere.

The Talipot Palm (*Corypha umbraculifera*), native of Indo-Malaya and Ceylon, grows 100 feet tall

and has the distinction of bearing the largest inflorescence known in the whole Vegetable Kingdom. This gigantic, much-branched, panicled mass of tiny white flowers terminates the life of the tree and is often as much as 10 feet high and broad. The Sago Palms (*Metroxylon Rumphii* and *M. laeve*) have an inflorescence fully 6 feet broad and die after flowering, but from an underground shoot other stems are produced so that the clump of Palms does not cease to exist. Sago is obtained by cutting down the trees as the inflorescence appears, splitting the trunks and crushing and washing the pith.

Voyagers of the Middle Ages told many wondrous tales of the marvels of the tropics, but none more fabulous than that of the Coco-de-mer or Double Cocoanut (*Lodoicea sechellarum*). The fruit is bilobed, is the largest known among Palms and takes fifteen years to ripen. It grows naturally only on the Seychelles, a small group of islands in the Indian Ocean. Long before its habitat was known the fruit was found floating in the Indian Ocean and was supposed to be the product of some submarine tree. On account of their mysterious origin and remarkable shape these fruits were for centuries regarded with awe and wonder, considered of enormous value and esteemed a universal antidote against all ills, finding

a place of honor in temples and churches, especially in the Spanish colonies of South America. The discovery of the habitat of this Palm, combined with the over-enterprise of a certain sea captain who loaded his ship with them, caused the bottom to fall out of the market. Today these fruits are only objects of curiosity. The tree itself grows 100 feet tall and has enormous fan-shape leaves; it is one of the noblest of all Palms.

A feature of the tidal, muddy shores of the tropics, where they form thickets and help to reclaim land, are various species of Mangroves. In the Old World some twenty-two species occur, in America four. These plants present a great similarity in habit and other characteristics though they belong to several families. They are in general much-branched bushes or low trees with a great development of aerial roots, both buttressing roots from the main stem and supporting pillar roots from the branches. Some, like Bruguiera, Avicennia and Sonneratia, have in quantity erect colorless aerating roots rising out of the mud, suggesting a mass of stout bristles of weird aspect. The seeds of many Mangroves germinate in the fruit whilst still attached to the tree and develop long primary roots which hang down often a foot in length. In due season the seedling falls and the root

SENTINEL OF TROPIC SOLITUDE — DIPTEROCARPUS ALATUS

sticks in the soft oozing mud and escapes the danger of being carried away by the tide. Mangrove swamps, though of great interest, are the most unhealthy places in the tropics.

The coming of the white man with his boundless energy and enterprise, his plantations of Tea, Coffee, Cocoa, Rubber, Cinchona and other plants of great economic value is fast changing the face of the tropics even as his settling has caused wholesale changes in colder climes. The forests which with few unimportant exceptions once formed a broad equatorial belt thousands of miles wide are fast disappearing, destroyed by fire and axe to make way for crops of more immediate commercial value. Those of us who have been privileged to drink in the solitude and grandeur of forest depths whether in the tropics or in temperate lands may well be envied, for to generations of a no very distant future such experiences will be impossible, since the forests will have vanished. Cultivated crops of trees, be they for timber, rubber or what-not, are not more interesting than those of wheat or potatoes.

Sometimes friends have said "You must have endured much hardship wandering in out of the way corners of the earth." I have. But such count for nothing, since I have lived in Nature's boundless halls

and drank deeply of her pleasures. To wander through a tropical or temperate forest with tree-trunks more stately than gothic columns, beneath a canopy of foliage more lovely in its varied forms than the roof of any building fashioned by man, the welcome cool, the music of the babbling brook, the smell of mother earth and the mixed odors of a myriad of flowers—where does hardship figure when the reward is such?

The tropical jungle is impassable and aggravating in the extreme but the virgin forest of the tropics is sublime. A typical tropical forest is mixed in character with broadleaf, chiefly evergreen trees placed widely apart, their tall trunks mostly clothed with smooth barks, and often buttressed at the base or above and below the main limbs, bearing aloft a broad mass of branches interlocking with those of their neighbors and crowded with epiphytic plants in wondrous variety. Vast climbers with rope-like stems hundreds of feet long hang looped in serpentine coils, their leafy shoots sprawling over the tree-tops, binding all into an interminable tangle. Looking down on such forests from some favorable eminence flowers may be seen but to what they belong it is often impossible to tell. From the forest floor little but a tangled mass of stems and foliage is discernible

BETEL-NUT PALM — ARECA CATECHU

even with the aid of strong field-glasses. Palms are the common understorey in these forests and with them are Tree-ferns, Bananas and other shade-loving things with broad sombre green and curiously mottled leaves. Herbaceous plants—save Ferns, Mosses and Selaginellas—are rare in tropical forests; shade-loving, low shrubs with pretty but rarely conspicuous flowers may be there aplenty but much of the floor in most of the forest depths is completely bare of vegetation and is massed with decaying leaves, twigs, fallen flowers and fruits.

In the tropics the sun is vertical overhead, or nearly so, the whole year round and the complete absence of shadows at noon strikes the traveller from the North as strange. Dawn breaks about half-past five and in a quarter of an hour it seems full daylight. Suddenly the rim of the sun appears above the horizon and all nature is waked into activity—birds chirp and scream, monkeys chatter, butterflies flutter lazily around, and every creeping, crawling thing moves along; the air is cool and refreshing and it feels good to be alive. The sun rises rapidly, the heat manifests itself and in a few hours drowsiness pervades the whole forest; about noon every voice is hushed and the forest stillness can be felt. More often than not a thunderstorm of short duration oc-

curs in the afternoon and disappears as suddenly as it came, but leaving the forest greatly refreshed; and toward evening life revives again, sound and music thrill the forest scene. About six o'clock the sun sets and within half an hour darkness is complete, silence reigns, save for the croaking of some frog or noise of an occasional nocturnal animal. Next day the same phenomena repeat themselves. There is perfect equilibrium and monotony in the march of nature under the equator.

TROPICS OF THE OLD WORLD

CHAPTER XXXI.

Leaves of Motley Hue

N OUR hothouses we cultivate a number of plants for their variegated or brilliantly colored foliage and among them pride of place is given to Codiaeum, Acalypha, Pandanus and various Aroids. The Aroids are mostly South American but the others are Old World plants. Codiaeums, familiarly known as "Crotons," are among the gayest colored foliage plants known. The leaves vary enormously in form, being flat or curled and twisted like a corkscrew, the blade may be broad or narrow and some have two blades separated by a length of naked midrib. Yellow and shades of red with little or no green are the dominant colors. Of forms there are legion but all are considered to belong to one species, *C. variegatum,* native of islands of the Pacific.

Most of the forms from which the present races of our stoves have been raised were introduced between 1865 and 1866 by John Gould Veitch. In the topics Codiaeums are the common hedge-plants and

one gets as tired of them as of Laurel and Aucuba in England or Privet and Thunberg's Barberry in America.

Another handsome foliage plant introduced from New Caledonia by John Gould Veitch is *Acalypha Wilkesiana,* of which many forms are now cultivated. The leaves are of intense shades of orange and crimson and are variously blotched. This, like the Codiaeum, is abundantly planted as a hedge-plant or garden shrub in the tropics. A more recent introduction is *A. hispida* with green leaves and long, pendent, cylindric tassels of crimson flowers.

A favorite plant with which Veitch's name is associated is *Pandanus Veitchii* from the South Sea Islands with serrated, Sedge-like leaves, each from 2 to 4 feet long, pale green in the centre margined with bands of the purest white. Another popular species is *P. Sanderi,* whose leaves are almost entire and margined with golden yellow. The Pandanus or Screw-pines, from the spiral arrangement of the leaves on the stem, are chiefly plants of the seashore and oceanic islands, where they often form impenetrable thickets. More than fifty species are known but only a few are grown outside of botanic gardens. The fruit is a conglomerate mass, often as large as a child's head, and usually with red or orange pulp and

DEADLY MANGROVE SWAMP — RHIZOPHORA MUCRONATA

edible nut-like seeds. Flying-squirrels, bats, monkeys, parrots and other birds, are particularly fond of them.

Associated with the above in our hothouses are Cordylines and Dracaenas, generally under the latter name. The Cordylines have foliage of scarlet and crimson edged and veined with white and are mostly derived from *C. terminalis,* wide-spread from south China through Malaya and much cultivated in the Pacific islands. These are as widely planted in the tropics as Codiaeums and Acalyphas and many of the finest sorts were introduced by John Gould Veitch. The Dracaenas have leaves in which the green is associated with mottlings of white or yellow, and these with red markings may also appear as stripes.

Of Old World Aroids the most important in our stoves are species of Alocasia from the East Indies. These have large, more or less heart-shape, leaf-blades borne on long petioles, green, often blotched with dark shades, with white or red veins and a metallic or velvety lustre, and dark red-purple on the underside. Among the best are the Bornean *Alocasia metallica, A. Lowii, A. Thibautiana* and *A. zebrina,* the last from the Philippines.

Dealing with China in later chapters it is stated

that Rhododendron finds its headquarters in that land. On the mountains of Malaysia grow members of a peculiar section of the genus from which have been evolved by hybridization a race of everblooming greenhouse Rhododendrons. The species of this section grow either epiphytically or in humus on cliffs and boulders. They are of straggling habit with tufted leaves and clusters of salver-shape flowers each with a long slender tube, the shape suggestive of a Stephanotis or a Jasmine flower. Typical species are *R. jasminiflorum, R. multicolor* and *R. javanicum.* The colors are most brilliant and include white, pink, yellow, orange, red and intense scarlet to crimson. From the hybridization of the above three and other species many forms of greater value than the parent species have been produced. Indeed, though not easy of culture these Rhododendron are among the most beautiful flowering shrubs that the Old World tropics have given to our greenhouses.

From New Caledonia came *Coleus Gibsonii* and *C. Veitchii,* pretty in themselves and parents of most of the familiar Coleus of our gardens whose leaves are of every color. Both were introduced by John Gould Veitch in 1865. From Uganda in the heart of equatorial Africa came the blue-flowered *Coleus thyrsoideus,* sent to Kew in 1898 by John Mahon,

BANANA, JUTE AND BAMBOO

who died, one of the first white victims of the dreadful sleeping sickness.

In Hongkong and south through the Philippines and Malaysia are found many species of Ixora. Some of these like *I. macrothyrsa, I. acuminata* and *I. floribunda* have been introduced and with hybrids from them are among the first ornaments of our stove or tropical greenhouses.

The pretty *Plumbago rosea* hails from Ceylon, while Aeschynanthus with their fleshy leaves and bright colored flowers are common epiphytes in Malaysia. The climbing Hoyas, of which *H. bella* and *H. carnosa* with waxy flowers are familiar examples, are Indo-Malayan with outlying members in south China. The common *Ficus elastica* is a large tree in Indo-Malaya where it yields an inferior rubber. Various species of Aralia with finely divided and pleasingly marked foliage, and of which *A. Veitchii* is a well-known example, are from the South Sea Islands.

From the dank forests of Assam came *Begonia rex* with its handsomely marked foliage. The pretty blue-flowered *Saintpaulia ionantha* is East African. Many noble Ferns we owe to the tropics of the Old World, including all the epiphytic Platyceriums, *Asplenium nidus-avis,* many Tree-ferns and others too

numerous for record here; Club-mosses, too, including the remarkable *Selaginella grandis, S. Lobbii, S. atroviridis, S. caulescens* and the favorite *S. Kraussiana.*. These with many Ferns carpet the forest-depths of Malayan forests, others grow among the tree-tops.

From the lakes and sluggish rivers of Africa have come the rose-red *Nymphaea Lotus* and the blue-flowered *N. stellata,* but the finest jewel is *N. gigantea* from Queensland with large, lovely blue flowers. The sizable and but little familiar island of Madagascar, known to the ancient as "the Island of the Moon," has given quite a number of remarkable plants to gardens but none more so than the extraordinary Lattice-leaf plant (*Ouvirandra fenestralis*). This is an aquatic plant which grows slightly submerged in fresh water and has a skeletonized leaf. It was introduced into Europe in 1855 by the Rev. William Ellis who presented the plant to Kew and other botanic gardens. It is a plant of great interest and always excites admiration but is difficult to grow and good specimens are rarely seen.

Of fruits the eastern tropics have a plentiful variety but only the Banana is really known to people of the North. The Mango is cultivated in hundreds of sorts and by some esteemed king of tropical fruits.

AROID LEAVES AND FLOWERS OF RICE-PAPER PLANT — ALOCASIA MACRORHIZA, TETRAPANAX PAPYRIFERA

Among the many others is the Durian with fruit as large as a child's head, all stout spikes without, pure white and custard-like within, and of a flavor undescribable, though to my palate too impregnated with the taste of garlic. The proper relish of tropical fruits is mainly an acquired taste and especially is this true of the Durian but the Mangosteen is, in my opinion, when eaten in Java or Singapore, fruit for gods.

CHAPTER XXXII.

Plants That Kill and Eat

ITH the exception of Orchids most of the Old World tropical plants grown in our hothouses are cultivated for the sake of their handsome foliage; but the members of one not unimportant genus (Nepenthes or Pitcher-plants) are grown for the remarkable leaf-appendages known as pitchers. Few if any vegetable productions more excited the minds of early voyagers to the eastern tropics than the Nepenthes, and many were the curious speculations indulged in respecting the purpose of the pitchers. The name Nepenthes was given by Linnaeus and in itself is interesting and most applicable. The word "nepenthes" is of Greek origin and occurs in Homer's "Odyssey" (Book IV. line 221) where it signifies a freeing from and causing an oblivion of grief. Translated the passage reads: "She (Helen) threw a drug into the wine, from which they drank that which frees men from grief and from anger, and causes an oblivion of all ills." Linnaeus, alluding to the pitchers, writes "If this is not Helen's Nepenthes it certainly will be for all botanists. What botanist would not be filled

SCREW-PINE — PANDANUS BONINENSIS

with admiration if, after a long journey, he should find this wonderful plant. In his astonishment past ills would be forgotten when beholding this admirable work of the Creator." The truth of this prophecy is from the pen of F. W. Burbidge, who introduced several fine species. He writes in his "Gardens of the Sun" (p. 100); "All thoughts of fatigue and discomfort vanished as we gazed on these living wonders of the Bornean Andes. To see these plants (Nepenthes) in all their health and vigor was a sensation I shall never forget."

The genus is pre-eminently Malayan with headquarters on the mountains of Borneo, where grow species like *N. rajah, N. Edwardsiana, N. Lowii, N. Northianae* and others which have the largest and most handsome pitchers. One species (*N. phyllamphora*) is found as far north as the neighborhood of Canton in southern China and several occur in the Philippines; one species (*N. khasiana*) grows in Assam, one (*N. distillatoria*) in Ceylon, another (*N. Pervillei*) on the Seychelles Islands. The most eastern species is *N. Viellardii,* peculiar to New Caledonia, and in north Australia grows *N. Kennedyana.* Most extraordinary of all in the point of distribution is the fact that one species (*N. madagascariensis*) is indigenous on the island of Madagascar. This

was the first species discovered, being found in 1661 by P. Commerson, the first European traveller in Madagascar. To this the name of "Amramatica" was given by Flacourt. This Madagascar species was lost sight of by botanists until 1797, when Poiret published its name in Lamarck's famous "Encyclopedia" but it was not introduced into cultivation until 1879, when Messrs. Veitch of Chelsea received it from their collector, Charles Curtis. It was upon the Ceylon species that Linnaeus based the genus.

The story of *N. Northianae* is worth recording. This fine species was revealed to science through a painting made by Miss Marianne North, whose life was largely spent travelling over the world with paint-box, brush and canvas. The results of her skill are many hundreds of accurate pictures of flowers painted in every land and which, bequeathed to the nation, are one of Kew's proudest possessions.

The sketch made in Sarawak was shown in 1880 to Mr. Harry Veitch, who at once recognized it as representing a new species of Nepenthes. Miss North said the specimens had been brought to her by an employee of the North Borneo Company "who traversed pathless forests amid snakes and leeches to find and bring them down to her." Charles Curtis was about to start on a collecting trip in Malaysia

NEPENTHES OR PITCHER-PLANTS

for Messrs. Veitch and he received special orders to try and introduce this Nepenthes into England. Curtis experienced much difficulty in finding the plant. After searching vainly for several days he decided to give up the task in the belief that Miss North had been wrongly informed as to the locality in which it grew. When on the point of leaving it occurred to him to look over a steep escarpment, which he accomplished by lying prostrate on the ground, and to his great joy he discovered the plant growing at some distance below him. On reaching the plants he found ripe fruit capsules and lost no time in transmitting the seeds to Messrs. Veitch, with whom they soon germinated. Later the species was named for the estimable lady who first brought it to our knowledge. It has proved to be one of the most tractable under cultivation and it is one of the handsomest of the genus.

Some Nepenthes are low sub-shrubs, others climbers with stems 30 feet and more long; they grow in humus-filled niches on the face of cliffs or on the top of rocks, or, epiphytically in the forks of trees. The flowers are insignificant and are pollinated by the wind but the pitchers, so striking in their shape, color and size, are the most reliable organs with which to discriminate between the species.

These pitchers on different species may be tubular, cylindric, urn- or flask-shape and are close-capped by a lid when young. The pigmy of the genus is *N. phyllamphora* with pitchers no larger than a man's thumb; the giant is *N. rajah* whose pitchers hold as much as two quarts of water. Between these extremes are found every gradation. In color the pitchers are usually some shade of red without and darker, often purple, within; many are mottled and striped and blotched in a striking manner; a few are green without. The ridged rim of the pitcher, which always curves inward, is variable in width and the channelling is often very remarkable. These pitchers at their entrance secrete honey which acts as a decoy to entrap insects and small animals whose bodies are decomposed by a fluid secreted from the walls of the pitchers and supply the plant, in part at least, with its nitrogenous food. In other words these extraordinary plants, by the aid of their pitchers, capture and eat insects and small animals.

On Mt. Kina Balu, in 1851, Sir Hugh Low discovered *N. rajah* and other noble species but the bulk have been introduced by the house of Messrs. Veitch, to whom we owe most of the handsome hybrid Nepenthes which, on the whole, are more easily cultivated than their wild parents.

CHAPTER XXXIII.

The Toilers

HE tropics of the Old World were first broached by Vasco da Gama and his ships in 1498, followed by the Spaniards to the Philippines in 1543 and by the Dutch to Malaysia in 1595. The spices and other products of the Indies soon became famous and many were the strange tales and fables told of the marvels of tropical vegetation.

From earliest down to latest times plants have been carried to western lands by voyagers of all sorts and descriptions but it was the Nineteenth Century that saw most of the ornamental tropical plants brought into our hothouses. The agencies have been manifold but no one house has done more than that of Veitch, the famous nursery firm of Chelsea, England, now, alas, no longer in existence. Its travellers have been many but for the Old World tropics I content myself by mentioning John Gould Veitch, F. W. Burbidge, Charles Curtis and David Burke. Veitch, after much useful collecting work in Japan, visited the South Sea Islands and Australia and sent home many fine Codiaeums, Dracaenas, *Pandanus Veitchii, Aralia*

Veitchii and many other plants now deemed indispensable. Stricken with lung affection, hemorrhage set in and he died in August, 1870, at the early age of thirty-one.

F. W. Burbidge travelled in Malaysia during 1877-78 and sent home a number of good things, including the wonderful *Nepenthes rajah* and *N. bicalcarata,* several Orchids and Ferns. In 1879 Burbidge was appointed Curator of the Botanic Gardens at Trinity College, Dublin, and held the position until his death in December, 1905.

Charles Curtis' name is inseparably associated with the history of Nepenthes, many fine species of which he introduced, including *N. Northianae, N. madagascariensis* and *N. Curtisii.* He also sent home Orchids and valuable stove plants during the years 1874 to 1884, in which he travelled for Messrs. Veitch. In 1884 he was appointed Superintendent of the Botanic Gardens, Penang, from which he retired in 1903, when with health broken by long residence in the tropics he returned to England.

David Burke was born in Kent in 1854 and collected for Veitch from 1881 to 1897. He visited both Old and New World tropics and enriched gardens with a host of fine plants of which many were Orchids. He died on the island of Amboina on April

11, 1897. It is recorded of Burke that he was one of those curious natures who prefer to live with native people more or less as a native and his early death was partly due to lack of proper attention to matters of food and health. In this connection it may be added that a plant hunter's life is a rough and lonely one and living under the conditions he has to live it is easy to become morose and eccentric. Not all of us are endowed with a sense of humor sufficient to banish gloom and loneliness and maintain complete sanity among all sorts and conditions of people.

TROPICS OF THE NEW WORLD

CHAPTER XXXIV.

Gifts Bestowed

N THE tropics of the New World the land area is much less than that of the Old World but the climatic conditions are virtually the same. The vast valley of the mighty Amazon and those of other only slightly less South American rivers are regions of magnificent forests. The insular areas are much less than those of Malaysia but are none the less equally rich in luxuriant vegetation.

The wonderful forests of the Amazon valley and those of other parts of the American tropics have been ofttimes described in books and he who will may read the story. The major trees have the usual gigantic trunks often buttressed at the base and bear aloft wide-spreading crowns. Huge climbers interlace them into one vast canopy and the branches are laden with a multitudinous variety of epiphytic growths. From the trees dangle the rope-like stems of huge climbers; there is an understorey of Palms, Tree-ferns and other shade-loving plants, and the

forest floor is similar to that of the forests of the Old World tropics. In general character and luxuriance the vegetable growth of the tropics of the two Hemispheres are singularly alike. The aspect of the forests and the forest scenery presents no striking contrasts although the forest elements are specifically distinct and, as a rule, the genera also are different.

Of plants of economic importance the tropics of the New World have given a goodly quota to the world. They include that indispensable drug quinine, obtained from the bark of certain species of Cinchona, the Para Rubber (*Hevea brasiliensis*) now abundantly planted in Malaysia and elsewhere and the rubber-producing tree above all others, the Avocada Pear (*Persea gratissima*), the Brazil-nut (*Bertholletia excelsa*), most familiar of tropical nuts; the Pineapple (*Ananas sativa*); Cassava (*Manihot utilissima*) from which is obtained, by special preparation, tapioca, the well-known foodstuff, and also the Potato, Sweet-potato and Maize.

Though the land area is so much less, the American tropics have contributed largely to our hothouses and to the Parks and Botanic Gardens of the tropics in general. One American tree, *Jacaranda mimosifolia*, has been planted in great plenty throughout the warmer parts of the world. It is a rather small

tree with finely divided Mimosa-like leaves and terminal panicles of violet-blue, Foxglove-like flowers. In South Africa and Australia it is much used as a street tree and is entitled to rank in the forefront among the world's most lovely trees.

The Cocoanut Palm (*Cocos nucifera*), universally found gracing tropic strands, is considered to be of American origin, having spread over the world through its fruit being floated by ocean currents. Among all the great Palm family there is none so useful to mankind or more beautiful than the sea-loving Cocoanut—King of Palms. Moreover, it is the only Palm whose edible fruit is known to the multitudes who live in temperate lands. Another American Palm (*Oreodoxa regia*), the Royal Palm, is everywhere to be seen planted in the tropics. This noble, rapidly growing Palm with stout, smooth, gray trunks and long, dark green, plume-like leaves is a wonderful avenue tree and is much used for this purpose in many lands. One of the finest avenues I have seen of this Palm is in the Botanic Gardens, Calcutta. The Coquito Palm of Chili (*Jubaea spectabilis*), which will grow in quite cool lands, is also much planted. This Palm has a massive trunk and a fine crown of pinnate leaves. Though the American tropics are rich in Palms of great variety, very

ROYAL PALM — OREODOXA REGIA

few are familiar tenants of our greenhouses. One, however (*Cocos Wedelliana*), with slender stem and finely pinnate leaves is a popular favorite, though less so today than formerly.

Of climbing plants the American tropics have been generous to our greenhouses. The most common and widely cultivated are *Bougainvillea glabra, B. lateritia* and *B. spectabilis,* though the last two are seldom seen flowering in northern gardens. The first-named, of which there are several forms, is, in spite of its harsh-colored bracts, a popular plant with our florists and their customers. Allamanda with its gaudy yellow flowers is much planted all over the world, especially varieties of *A. cathartica.* These handsome plants are found in greenhouses under such names as *A. Schottii, A. Hendersonii* and *A. Williamsii.* Less frequently seen is *A. violacea,* well distinguished by its reddish purple flowers. Another favorite climber is *Solanum Wendlandii* with dark green pinnate leaves and large clusters of blue flowers. This plant is native of Costa Rica and was introduced into cultivation in 1882. A very pleasing yellow-flowered climber is *Stigmaphyllum heterophyllum,* native of Brazil, and sent to Europe from Buenos Ayres in 1841. The foliage is bronzy green

and the genus derives its name from a curious green appendage to the stigma.

Planted almost everywhere in the tropics is the lovely *Bignonia venusta,* whose wealth of orange-colored flowers presents a never-to-be-forgotten sight. It is fairly vigorous-growing and loves to ramble over fences, buildings and old trees, draping them with green foliage, and in season, with gorgeous trumpet-shape blossoms. As it thrives in Honolulu, Hongkong and elsewhere, there is no more gorgeous climbing plant. It is native of Brazil and has been known in gardens since 1815. Very pretty and pleasing is *Antigonum leptopus* with festoons of pink or white blossoms wreathing buildings or fences. This is also a favorite plant in tropical gardens where it is often known as the Honolulu Creeper. Wayward in habit under our northern skies it is the princess of its family, that of the lowly Polygonum and Rumex.

Old favorites in our stoves and whose successful culture is looked upon as a test of the gardener's skill are the various species of Dipladenia which hail from Brazil, Bolivia and other parts of South America. One of the finest species is the white suffused with pink flowered *D. splendens,* introduced in 1841. Others are *D. acuminata* with large, deep rose-colored

flowers, *D. boliviensis* with white, yellow-throated flowers, *D. atropurpurea* and the salmon to purple flowered *D. urophylla.* The curious genus Aristolochia is wide-spread in both hemispheres and includes many tropical species with large and remarkable flowers. The most extraordinary is *A. gigas* var. *Sturtevantii,* native of Guatemala, with enormous uterus-shaped flowers, white without, cream-color splashed and mottled with velvety maroon purple within, and a long caudex hanging from the lip. The flowers are pendent on long stalks and are from 1½ to 2 feet wide, from 2 to 2½ feet long with the tail over a yard in length. They emit a strong foetid odor and are fertilized by flies and other carrion-loving insects.

From Peru, in 1847, came *Cantua dependens,* a greenhouse climber, with long, drooping, orange-colored flowers of great beauty and known to the Peruvian Indians as the Magic-tree. There are other species of Cantua and many other climbers of great merit but the above will serve to illustrate clearly our indebtedness to American tropics for greenhouse-climbing plants.

To the great family of Aroids our hothouses owe many of the finest foliage plants they possess and not a few with striking flowers. Among them no genus

has contributed more splendidly than Anthurium, which is wholly American. Of the many handsome species in cultivation *A. Veitchii,* native of Colombia, has the noblest foliage. The leaves are of extraordinary appearance, often attaining a length of 5 feet with a breadth of over a foot; the principal veins are sunk and the waved appearance thus caused is further enhanced by a deep glossy green color and a brilliant metallic lustre. Very beautiful, too, is *A. Warocqueanum,* another Colombian species with leaves each from 2½ to 3 feet long, deep green with prominent, almost white veins. Another splendid species with round, heart-shape dark green leaves and white veins is *A. magnificum.* A striking inhabitant of our stoves is *A. Scherzerianum,* the Flamingo-plant, with its brilliant scarlet bract and twisted, protruded spadix and relatively narrow, dull dark green leaves. It is very floriferous, lasts in bloom a long time and always excites admiration. Very similar is *A. Andreanum* with paler, lustrous green rather longer leaves, larger bract and a straight orange-yellow spadix.

These among other tropical Aroids are epiphytes and some of them begin life as climbers, sending down into the humid air of the forest whip-like aerial roots

which on reaching the ground develop a branching root-system, become stretched taut and resemble hempen strands. A fine example of climbing Aroid is *Philodendron Andreanum,* native of Colombia. This species has leaves resembling those of *Anthurium Veitchii* which are often from 4 to 5 feet long and are deflected vertically from a stout erect footstalk. When young the leaves are scarlet tinged with brown, when older bronzy red-brown finally changing to velvety green; the midrib and primary veins are whitish through all the stages of leaf-development. In this species the leaves are simple and entire, in others they are pinnated or curiously incised and often full of round holes. Most remarkable in this connection is the related *Monstera deliciosa,* the fruit of which is edible. When very young the leaves of this plant are entire but as it develops some of the tissue between the veins ceases to grow, becomes dry and tears away, this leaving holes between the ribs.

With smaller, thinner foliage than the Anthurium we have many species of Dieffenbachia with bright or dull green leaves mottled and striped with white or yellowish color. Among those most frequently seen in cultivation are *D. Bowmanii* and *D. picta* from Brazil, *D. Jenmanii* from British Guiana and *D. Pearcei* from Ecuador. The stems of these plants

contain a very acrid principle and one species (*D. seguine*) is known as the Dumb-cane of the West Indies, since it renders speechless anyone chewing a piece of the stem. It was formerly used in torturing slaves.

No species of Banana is native of America but there are very many members of closely related families with handsome foliage. Such, for example, are Calathea and Maranta which have simple leaves, purple on the underside, dark green, mottled or blotched with dark brown and paler green on the upper side. One of the finest species is *Calathea Veitchiana* with leaf-blades 14 inches long and 9 inches broad on erect petioles 1½ feet tall. From the thickened rootstock of *Maranta arundinacea* West Indian arrowroot is obtained by grinding and washing to free the starch. But from a garden standpoint the most important American genus of this group is Canna, from the various species of which have been derived the wonderful race of Cannas our gardens boast today. The wild types are very ordinary looking plants with red or yellow flowers and it is difficult to realize that they could have produced by hybridization and selection the brilliantly colored plants we know as Cannas. The common *C. indica,* now naturalized in many parts of the tropics of both

PRIDE OF COLOMBIA — ANTHURIUM VEITCHII

hemispheres, is familiarly known as Indian-shot from its hard, small, round seeds.

One of the most gorgeous flowering plants of our gardens is the Poinsettia (*Euphorbia pulcherrima*), a gift of Mexico. The so-called flower of this plant is really an inflorescence of many flowers and the showy part is the surrounding whorl of scarlet bracts. Familiar as we are with this plant in our greenhouses and florist shops its real size and brilliancy is best seen in tropical lands. Quite naturally such an exceptionally showy plant is abundantly planted throughout hot countries. It is often used as a hedge-plant though more usually it is accommodated in beds and borders. The finest I have seen grew in the Botanic Gardens, Brisbane, the capital city of Queensland.

A pretty flowering plant is *Amasonia punicea*, native of British Guiana, in which each shoot terminates in a raceme of many white tubular flowers each an inch long and subtended by a bright red bract which persists for a couple of months after the flowers have fallen. Very pleasing, too, are the various species of Aphelandra, native of Brazil, Peru and elsewhere. Among the best are *A. nitens* with dark, lustrous green leaves and terminal spikes of orange-scarlet flowers and *A. variegata* whose large orange-

yellow bracts, from which bright yellow flowers protrude, are closely imbricated and form a stout spike resembling a fir-cone. Closely related is the genus Sanchezia from Ecuador, of which one of the best known is *S. nobilis,* introduced into gardens in 1863. This has clear yellow flowers in dense terminal racemes with bright red bracts. The form *variegata* with the midrib and primary veins of the leaf colored yellow is more generally cultivated than the type. Even finer is *S. longiflora* with rich vinous purple tubular flowers in drooping panicles.

A useful greenhouse plant is *Streptosolen Jamesonii* from the mountains of northern Peru and Colombia, where it was discovered by William Lobb in 1846. It has orange-colored flowers and may be grown either as a bushy plant in pots or as a climber. Very handsome, too, are the various species of Tibouchina with their broad dark blue to violet-purple blossoms, of which *T. semidecandra* is perhaps the most widely grown.

The familiar Nasturtium or Indian Cress of our gardens (*Tropaeolum majus* and *T. minus*) are natives of South America. They are much used as annuals wherever gardening is practised and in places their buds and young fruits are employed as a condiment instead of capers. There are several other

CHASTE EUCHARIS LILY — EUCHARIS GRANDIFLORA

species, of which mention may be made of *T. umbellatum* with clustered not solitary flowers and *T. violaeflorum* with blue flowers and tuberous roots. Another species (*T. tuberosum*) furnishes a farina from the tubers which mixed with molasses is made into a jelly and eaten by Peruvian Indians. The gem of the genus is *T. speciosum* which is native of Chile.

Our greenhouses Fuchsias are largely the progeny of *F. speciosa,* which is supposed to be a hybrid between *F. magellanica* and *F. fulgens.*. The first-named is native of Peru and southward and is said to have been introduced to Kew Gardens in 1788 by a Captain Firth. *F. fulgens* is Mexican and reached England about 1838. There are several other species of Fuchsia in the New World, some of them in the more temperate parts, and one or two outlying species occur in New Zealand.

The waters of the Amazon and Orinoco rivers have given us the *Victoria regia* which has the largest leaves and flowers of any aquatic plant. The floating leaves of this plant are round, from 5 to 6 feet in diameter, and the edge is turned up to a height of from 4 to 6 inches; on the lower side the ribs project very far and are armed with formidable spines. The fragrant flower is like that of a Water-lily but 15 inches across, white with a pink centre and lasts for

a day only. This noble member of the vegetable kingdom was discovered in 1801 but was not introduced until 1846, when Thomas Bridges successfully brought home seeds in wet clay.

Though perhaps less interesting than the Old World family of Nepenthes, that of the Bromeliads is worthy of notice and is peculiarly American. The bulk of the species are tropical but one (*Tillandsia usneoides*) the Old-Man's-Beard, is abundant in Florida and Louisiana, hanging from the trees in long grey festoons. Though many are epiphytes of the forests, especially those of the Amazon Valley, quite a few are terrestrial plants growing among rocks, often in dry situations. The best-known member of the whole family is the Pineapple, now universally cultivated in tropical countries. Most of the species have a short stem bearing a rosette of leaves, often fleshy and channelled on the upper surface, their bases fitting closely together so that the whole plant forms a sort of funnel which is usually full of water. The leaves may or may not be armed along their margins, are often pleasingly mottled and barred with different hues and in some the upper leaves are brilliantly colored. The inflorescence usually rises out of the centre of the funnel and is furnished with closely imbricated bracts, often brightly colored, which add

to the conspicuousness of the flowers. Among the more common members of this family in hothouses are species of Bromelia, Billbergia, Aechmea, Tillandsia and Ananas. The Pineapple (*Ananas sativa*) is among the finest of tropical fruits, and other members of the family are valuable fibre-yielding plants.

CHAPTER XXXV.

Hippeastrums and Begonias

N BULBOUS and tuberous plants the tropics are not rich since these plants are adapted to live where climatic extremes obtain. Nevertheless, types with such underground storehouses do occur in the tropics and from South America our gardens have obtained several conspicuous ornaments. The chaste Eucharis Lily (*Eucharis grandiflora*) with dark lustrous leaves and pure white flowers with chalice and spreading segments is one of the finest stove flowering plants. There are several other species, all natives of Colombia, but the above is the best known and also the finest.

The greatest gift of tropical America, among true bulbous plants, to gardens has been the various species of Hippeastrum, from which by hybridization and selection has been evolved the marvellous race of plants popularly known as Amaryllis. Quite a number of species of Hippeastrum are known, some for more than a century, but though nearly all have been employed by the hybridist only a few have proved specially valuable. The first introduced seems to

have been *H. reginae* which flowered in England in 1728. In 1769, *H. vittatum* and in 1777, *H. reticulatum* were introduced and another, *H. equestre,* is said to have been introduced into England from the West Indies by William Pitcairn in 1778. In 1814, *H. psittacinum* and in 1821, *H. rutilum* flowered in England and in 1866 the beautiful *H. pardinum* was sent home by Veitch's collector, Richard Pearce, from Peru; later from Brazil came *H. aulicum.* A remarkable species named *H. solandraeflorum* with a greenish white tube and almost regular segments was introduced about 1820, but most valuable of all has proved *H. Leopoldii* which flowered for the first time in England in 1870. The flowers of the last named species are large and widely expanded, the tube is short and the segments broad and of much substance, and as a parent this species has exerted the most influence in the production of the race our gardens enjoy today.

The first cross made was between the species *H. vittatum* and *H. reginae* by a Mr. Johnson, a shoemaker, or according to others a watchmaker, of Lancashire in 1811, and the hybrid received the name of *H. Johnsonii.* In the same year, Dean Herbert, an enthusiastic horticulturist and churchman, made the same cross and named it *H. regio-vittatum.* The

good Dean's name is indissolubly associated with our garden Amaryllis. He labored long among the genus and assiduously cultivated and experimented with every species he could procure, publishing the results of his investigations from time to time in the periodicals of the period devoted to horticulture and botany. He did magnificent work in plant-breeding in many fields and in doing so incurred no small amount of reproach from his contemporaries for tampering with nature. Dean Herbert is indeed entitled to be called the "Father of plant-hybridizing." As early as 1824 the Dean recorded thirty-five hybrid Hippeastrums, thirty of which had been raised by himself.

The first hybrid *H. Johnsonii* or *H. regio-vittatum* was remarkable for the length of time it retained its character under cultivation, and its potentiality over other species and varieties when used as a breeder greatly influenced the offspring. In 1850, Messrs. Garraway & Sons of Bristol flowered a plant obtained by crossing *H. aulicum* with the hybrid *H. Johnsonii* which they named *H. Acramannii pulcherrima.* This was undoubtedly the finest hybrid raised up to that date and is of great interest as one of the parents used by Messrs. Veitch some years later in the production of the first Hippeastrum raised at

RARE GIFT OF PERU — HIPPEASTRUM LEOPOLDII

Chelsea. The work of improving this flower was carried on for thirty-five years by Messrs. Veitch and their success is shown by the some two hundred certificates of merit awarded the beautiful forms produced by them. Soon after the appearance of *H. Acramannii pulcherrima,* Louis van Houtte and other horticulturists in Belgium and France took up the culture of these plants and produced many fine seedlings remarkable for brilliance of coloring though usually lacking form, having narrow, pointed petals of unequal size. The Leyden house of De Graaff afterwards surpassed Van Houtte's productions especially with one named *H. Graveana.* Later this plant crossed with a dark form of *H. psittacinum* produced the well-known H. Empress of India, still in cultivation. The advent of *H. pardinum* in 1866, with flowers nearly 7 inches across, each with a very short corolla-tube, broad, recurving and spreading segments, spotted all over with vermilion on a yellowish ground, as in the skin of a leopard, gave a new impetus to the cultivation of Hippeastrums. Yet with all its fine qualities *H. pardinum* did not realize expectations and with the introduction of *H. Leopoldii* it was virtually discarded as a parent. The work of the breeders mentioned above has been supplemented by those of

many firms, notably Messrs. Kerr & Sons of Liverpool and such amateurs as the late Sir George Holford and Sir George Kendrick and many others, with the result that our gardens now possess a race of plants with gorgeous colored flowers of every hue and shade of red, crimson, almost pink, and white—flowers of perfect form and wondrous substance.

Although it has apparently had nothing to do in the production of our garden Amaryllis mention must be made of *H. procerum,* introduced into France from Brazil about 1863, which from the color of the flowers is called the Blue Amaryllis. It is a very handsome species and often goes by the name of Empress of Brazil. This account of true bulbous plants may well close by mention of the old Jacobaea Lily (*Sprekelia formossissima*), native of Mexico and known in European gardens for centuries. It is figured by Parkinson in his "Paradisus," 71 (1629) and reached England by way of Spain somewhere about 1590.

Among tuberous plants we owe our present-day race of Gloxinias to Brazil. These are not true Gloxinias but Sinningias and appear to have been derived by crossing and selecting from *S. speciosa,* which was introduced into England about 1817, and forms of it like var. *macrophylla,* whose advent was

about 1841. This species has hanging purple flowers spotted and striped within the corolla-tube. By patient selection the race with upright flowers and flowers at right angles with the peduncle and of all colors has been brought into being. The first hybrid is said to have been with *S. guttata,* a leafy upright plant with white spotted with red flowers, but neither this species nor the hybrid appears to have had any marked influence on our present-day race of Gloxinias. The true Gloxinias have no tubers and differ somewhat in the structure of their flowers. It is doubtful if any are now in cultivation in North America.

The most important race of tuberous garden plants we owe to South America is that of Begonia. The genus itself is universally distributed in the tropical and warm-temperate regions of the earth but from the Andes came the species from which have been evolved that most popular section known to gardeners as Tuberous-rooted Begonias. The story of the production of this most valuable race is a fascinating one but too long to be told in detail here. Seven species, all natives of the Peruvian Andes, have been employed in the breeding of the modern summer-flowering Tuberous Begonia. Two of these (*B. Clarkei* and *B. cinnabarina*) were introduced

into England by E. G. Henderson and five (*B. boliviensis, B. Pearcei, B. rosaeflora, B. Veitchii* and *B. Davisii*) by Messrs. Veitch, the first four by their collector, Richard Pearce, in 1865-66. The flowers of all are shades of red except in *B. Pearcei* which has bright yellow flowers. The first hybrid Begonia was raised by Messrs. Veitch's employee, John Seden, the result of a cross between *B. boliviensis* and an unnamed Andean species. It flowered in 1869 and was named *B. Sedenii*. Working on the seven species mentioned, some eighteen hybrids of sterling merit and many seminal forms were raised by Messrs. Veitch and the foundation of the Begonias of today was well and truly laid. Since then many hybridists and breeders in all parts of the world have been engaged on the work of improvement and the result is familiar to every gardener and plant-lover the world over.

The mating by John Heal, also an employee of Messrs. Veitch, of certain Tuberous Begonias with the curious peltate-leaved *B. socotrana,* native of the forbidding and barren island of Socotra in the Indian Ocean, resulted in a race of winter-flowering Begonias of great merit but not easy to grow. This same *B. socotrana* mated with the South African *B. Dregei* by Lemoine gave to the world *B. Gloire de*

Lorraine, perhaps the most all-round useful and beautiful Begonia ever raised—but that is another story.

And now this tale of our indebtedness to the tropics of the New World must end. It is scrappy, incomplete and disjointed; but it is difficult to compress into a few pages what a thick volume could not properly set forth. Very many men have labored and given their lives to enrich our hothouses with the jewels of the New World tropics. The name of Messrs. Veitch is inseparably connected with this exploration work and this chapter may fittingly end with a few words about their collector, Pearce, one of the greatest of all plant hunters.

Richard Pearce was born at Stoke Devonport, and in February, 1859, entered into engagement with Messrs. Veitch to visit South America and collect plant material. The first expedition lasted three years and was renewed in 1863 for a similar period. His first expedition was mainly to Chile and the temperate regions to the south and does not directly concern us, although in 1862 he travelled in Peru and sent home a number of good things, including the handsome *Calathea Veitchii*. His second trip was confined to the tropics and the results were more than satisfactory. Among the many fine plants he

introduced mention may be made of *Sanchezia nobilis, Aphelandra nitens, Mutisia decurrens, Hippeastrum pardinum, H. Leopoldii, Begonia Veitchii, B. boliviensis, B. Pearcei* and *B. rosaeflora.* In 1867 he agreed to travel and collect in South America for Mr. William Bull but on arrival in Panama he was taken ill on July 13th and died on the 17th of that month, of a bilious remittent fever. His name is indissolubly connected with the history of the Tuberous Begonia and with the present day Hippeastrums and his untimely death was a great loss to the world of horticulture.

TROPIC ORCHIDS

CHAPTER XXXVI.

Butterflies of the Vegetable Kingdom

ORCHIDS are the Butterflies of the vegetable world, the aristocrats of the greenhouse and the most envied of tropical plants. Their cult has waxed enormously during the past three-quarters of a century and they have their ardent devotees in every land. A collection of tropical orchids and their hybrids is largely a hobby of the rich man, since their wants and maintenance are costly. Many of them are so rare as to be almost priceless and in a manner these are in the same category as masterpieces of painting, porcelain and other art objects.

The cultural requirements of many Orchids are exacting and the study of Orchid growing has brought into being a race of garden specialists devoted to them alone. Little by little their proper requirements have come to be understood; and this knowledge, together with the well-found modern glass-house structure, has made comparatively easy the successful growing of these remarkable plants.

Hybridists in great numbers have worked on the family and today Orchid hybrids in cultivation are more numerous than the species. Moreover, many of these hybrids have better constitutions and finer flowers than their parents, and in consequence are more permanent plants in collections. But my theme is of the wildings, and beyond paying tribute of hearty praise to the Orchid-breeders of every land I have nothing to do with the results of their skill.

The Orchid family is one of the most natural and also one of the largest in the vegetable kingdom. Linnaeus, in 1753, knew only about a dozen exotic Orchids; whereas, today, fully 5000 species and more than 400 genera are known! They are most abundant in the tropics but the family is universally distributed; one species, the little *Calypso borealis*, being found as far north as 68° north latitude.

In the temperate regions of this country are found many terrestrial species, including such lovely plants as *Cypripedium acaule, C. spectabilis, C. candidum* and *C. pubescens*. In Europe and northern Asia, too, grow many interesting Orchids, among them being *Cypripedium calceolus, C. macranthum, C. japonicum* and *C. tibeticum*, all with large and showy flowers. Many species are native of the temperate parts of Australia; and not a few belong to South

ARISTOCRATS OF THE GREENHOUSE — TRICHOPILIA FRAGRANS

Africa where, on dripping rocks on Table Mountain, is found the wondrous *Disa grandiflora,* perhaps the most showy of all terrestrial Orchids.

In the cool regions of both the northern and southern hemispheres nearly all the Orchid species grow in the ground after the manner of ordinary plants but in the tropics, where the great concentration of species occurs, nearly all grow epiphytically upon trees; though not a few are found among humus on rocks and mountain tops. Comparatively few terrestrial species are cultivated, and, strange to say, when attempted their cultivation has been found more difficult than that of their epiphytic tropical relatives. A few, of which the Bird's-nest Orchid (*Neottia nidus-avis*) of Europe and northern Asia is a well-known example, are saprophytes, have no leaves and live on decaying vegetable matter. A few are climbers but it is doubtful if any are true parasites.

Orchids are especially remarkable for the curiously varied shapes and colors of their flowers, which resemble all sorts of dissimilar objects such as a bee, fly, beetle, slipper, helmet, small monkey, moth, miniature swan, dove, cradle, and so forth, and the relative sizes are extraordinarily different. Some like Liparis, the Tway-blades, have flowers so small as to require

close searching to detect, while others, like the Cattleyas, have flowers 6 inches and more across. The flowers are of every hue from inconspicuous green through all the colors of the spectrum and of every conceivable shade. Nearly all emit an odor and very many are extremely fragrant. The variability in the form of the flowers is considered an adaptation to insure cross-pollination by insects and honey-loving birds.

The flower is irregular in shape with six usually petal-like segments inserted above the ovary. The three outer ones, called sepals, and two of the inner ones, called petals, are often nearly alike; but the third inner segment, called the lip or labellum, differs from the others in form and in direction. Properly the lip should be at the top of the flower as it is in *Disa grandiflora;* but usually it is at the bottom, being brought into this position by the twisting of the ovary. Opposite the lip and overhanging it in the axis of the flower is what is called the column, which consists of one, rarely two, stamens combined with the pistil; the one- to four-celled anther or anthers being variously situated on the style itself. The pollen is rarely granular and free, being almost invariably glutinous or agglomerated into two, four or eight masses, termed pollinia, which are fixed either

directly or by means of a tiny stalk (caudicle) to a viscous gland below the anther. The style is produced at the top into a prominence or fleshy beak termed a rostellum. The seeds are minute, multitudinous and easily dispersed by wind. So much for the structure of an Orchid flower.

Now a word or two about the plant in general. A feature of most Orchids is the storage tissues for reserves of water and food stuffs. In many terrestrial species, like Orchis itself, this warehouse is represented by two or more small tubers at the base of the stem and below the ground; in epiphytes, like Cattleyas, Dendrobiums and others, the aerial stems are thickened to serve the purpose and are known as pseudo-bulbs. In Phalaenopsis and other genera the leaves are thick and leathery, and serve as storehouses.

Again the roots of epiphytic Orchids are of three kinds, each fulfilling a separate function. In the first place, to fasten the plant to its support there are clinging roots which are insensitive to gravity. Secondly, the niche between the plant and its support, and the network formed by the clinging roots, acts as a reservoir for humus; into this absorbing or feeding roots project. Finally there are true aerial roots which hang down in long festoons. The skin of these is colorless and perforated and acts as a sponge

to absorb water trickling down over the roots. Their internal tissue is green as may be seen on wetting a root. Orchids have a host of peculiarities, some of which will be mentioned later but the above may serve as a sort of introduction to the family in general.

Since our subject is a large one it is convenient to divide it and deal separately with the Orchids of the Old and the New Worlds. Moreover, as the genera are so numerous I content myself with brief mention of those most commonly seen in greenhouses.

CHAPTER XXXVII.

Orchids of the Old World Tropics

IN THE forests of Malaysia, epiphytic Orchids are extraordinarily abundant and they extend southward to northern Australia and northward through the Philippines to Formosa. On the mainland they abound in Indo-Malaya and northward to southern China. On the other hand, the Indian peninsula and Africa are poor in epiphytic Orchids. The species mostly have a very limited range, being often confined to a single small island or to a particular mountain. They grow clustered together often in large numbers and the branches of the major trees of the steamy forests of Malaysia and Indo-Malaya are laden with Orchids of many kinds. Although there is a peculiarity of habit that enables one soon to detect an orchidaceous plant even when not in flower, yet they vary greatly in size and appearance. Some of the small creeping species are no larger than Mosses while the Grammatophyllum of Borneo, which grows in the forks of trees, forms a mass of leafy thickened stems 10 feet long and the whole plant weighs many hundreds of pounds. Owing to the

great monetary value of certain Orchids and the vigor and enthusiasm with which their cultivation has been prosecuted the world has been ransacked for these plants. Much human energy has been expended and many lives given in their quest and a halo of romance surrounds the whole topic. More has been made of the subject than of any other branch of plant introduction.

As a matter of fact Orchids, at least the epiphytic ones, are easily transported from their homes to our conservatories. With their pseudo-bulbs and thickened leaves they are capable of withstanding a considerable amount of dessication, though careful and expert handling is needed to properly establish them on arrival at their destination.

Owing largely to the fact that they require great heat, an extensive group, of which Vanda may serve as an example, is known as East Indian Orchids. Another large group of Old World Orchids flourishes best under moderate heat. Of these many Coelogynes, Dendrobiums and Cypripediums are familiar examples.

The first epiphytic Orchids I saw wild in any quantity were *Dendrobium chrysanthum* and *D. chrysotoxum* in the forest of Yunnan, and I may as well begin with this particular genus. It is a large

GIANT ORCHID — GRAMMATOPHYLLUM SPECIOSUM

and popular one in gardens and its members are found in great plenty from north Australia throughout the Malay Archipelago and north to Japan; on the mainland it abounds in Indo-Burmah, Assam and south China. The most northern species is the pleasing little *D. moniliforme* which is abundant on the mighty Cryptomerias, planted as an avenue to the shrines at Nikko. One of the most popular of all is *D. nobile* which is common and wide-spread in western China south to Burmah and for centuries has been a favorite medicine among the Chinese. From Burmah came the splendid *D. thyrsiflorum* with large, broad racemes of flowers with rich yellow lip and white sepals and petals. *D. formosum* with its broad, pure white flowers, the lip blotched with yellow, hails from Indo-Burmah and *D. Phalaenopsis,* with racemose spikes of finely colored Phalaenopsis-like flowers, from north Australia. The fine *D. Dalhouseanum* with its tinted gray sepals and petals and velvety crimson fringed lip is Indian; and *D. Brymerianum* with scented, deep yellow flowers and remarkably fringed lip is a native of Burmah. One of the best Australian species is *D. superbiens* and another good one is *D. bigibbum,* both from the region of Torres Straits. A number of handsome species are natives of New Guinea, one of the best being *D.*

atroviolaceum with primrose-yellow, spotted with dusky brown sepals and petals and the lip deep violet-purple with a few paler radiating lines near the margin; on the outside the lip is green with a large dark violet irregular blotch on either side. The flora of New Guinea is very little known and we may expect it to yield, some day, many fine Orchids and other plants.

More than 300 species of Dendrobiums are known. The pseudo-bulb exhibits much variation, being only slightly swollen and stick-like, relatively stout, cylindrical, or even swollen at the joints and tubercled in appearance.

One of the most popular classes is that of the Cypripediums, the Lady-slipper Orchids, characterized by their united lateral sepals and pouch-like lip. Under this name are grouped in the popular mind species found in the cool temperate region of America, Europe and Asia, in tropical Indo-Malaya and south China and in tropical America. But there are sufficient technical differences to divide this composite group into four genera.

Strictly speaking, the true Cypripediums are confined to the temperate regions mentioned; the tropical American species are referred to the genera Phragmopedilum and Selenipedium; and those of the east-

ern tropics to that of Paphiopedilum. This explanation is necessary but for the purpose of this chapter we may adhere to the old accustomed usage of the generic name Cypripedium.

Some of the temperate species were mentioned in the introductory paragraphs and space forbids of any further reference. There are, however, in south China and Indo-Malaya a whole host of species many of which are among the most popular and best known Orchids. Prominent among these is the familiar *Cypripedium insigne,* native of the eastern Himalayas, one of the most easily grown of Orchids and one that revels under cool conditions. The flowers are erect, of varying shades of polished yellow, brown, white and green delightfully blended. There are very many named forms of this, differing in the color of the flowers and all very lovely. Another favorite Burmah species is *C. villosum* which has been so largely used by the hybridist. The mountains of Bhutan and adjacent Sikkim are the home of the pretty *C. Fairieanum* with decurved, ciliated lateral petals. It was first introduced in 1857, and flowered and was figured in the "Botanical Magazine" (t. 5024) of the same year and subsequently lost. For fifty years its habitat remained unknown and a large reward was offered for its re-

discovery but all efforts failed until 1904. It became famous as the "Lost Orchid" but its re-introduction was bungled and very little monetary reward fell to those who succeeded in winning anew this plant into gardens.

Those just named and others with scapose flowers have green leaves, but there is another and more tropical section having leaves beautifully marbled with white and dark green. Among them may be mentioned the handsome *C. callosum,* of which there are many named and winsomely colored forms—also *C. Curtisii* of Sumatra and *C. Lawrenceanum* of Borneo. The latter has a dark red-brown pouch and a broad white, striped with red-brown standard. The limestone-loving Burmese *C. bellatulum* and its yellow-flowered confrére *C. concolor,* have marbled leaves and are found as far north as south China. Another species of the same group is the delightful *C. niveum* which is native of the Malayan Islands and first introduced in 1868. Another group with large flowers in racemes and long green leaves is represented by a number of species, of which *C. Rothschildianum, C. Stonei, C. superbiens, C. barbatum, C. Parishii* and *C. argus* are fine representatives. These have long, often arching and usually bearded lateral petals, frequently marked with eye-like dots;

AN OLD FAVORITE — COELOGYNE CRISTATA

and the flowers are more or less dark colored. Most of them are Malaysian but several grow in the Philippines.

I shall long remember the pleasure I felt on first beholding in a wild state the well-known *Coelogyne cristata*. It was in the forests of Sikkim above the Teesta River where hungry leeches swarmed on all sides. The plants grew on moss-clad rocks and at an elevation where snow lies during the winter months. Greater heat is required for *C. Massangeana* and *C. Dayana* with their pendent racemes of orchreous yellow and brown flowers. These are natives of Borneo, whilst *C. Veitchii* a related species, with flowers of the purest white, is from New Guinea.

Closely related to Coelogyne, and by some authors united with it, is the genus Pleione often called Himalayan Crocus. These are curious tufted plants with flattened disc-like pseudo-bulbs and grow among moss on humus-clad rocks or tree trunks. They are deciduous and most of them flower before the leaves appear. The best known are *P. lagenaria* *P. maculata* and *P. humilis*. The genus extends northward and eastward into China, where one species (*P. pogonioides*) is common in Hupeh province, growing on rocks in the forest and covered with snow in winter.

A genus of Orchids which in quite recent years has been enormously developed by the hybridist is Cymbidium. The genus is widely distributed in the eastern tropics with members extended into the temperate regions of China and Japan. Some of the species are truly terrestrial, some grow in the tops of rocks and others are true epiphytes, growing usually in the forks of trees. One of the oldest and best known species is the Himalayan *C. grandiflorum* with long, spreading racemes of flowers splashed and barred with rufous brown, the lip yellow and crimson. Quite different in appearance are *C. eburneum* and *C. Sanderae* with their ascending almost upright flower-stems and few flowers, white in the former, spotted and barred with rose-red in the latter. These have proved of great service to the hybridist who, by crossing them with some of the older sorts which have spreading, many-flowered racemes, has evolved a race of useful plants of wondrous beauty whose flowers last for a month or six weeks. Perhaps the most inconspicuous member of the genus is *C. ensifolium*, a terrestrial species common in many parts of China. This the Chinese regard as the king of flowers, its modest appearance and the delicate odor of its blossoms being considered to represent the very essence of refinement.

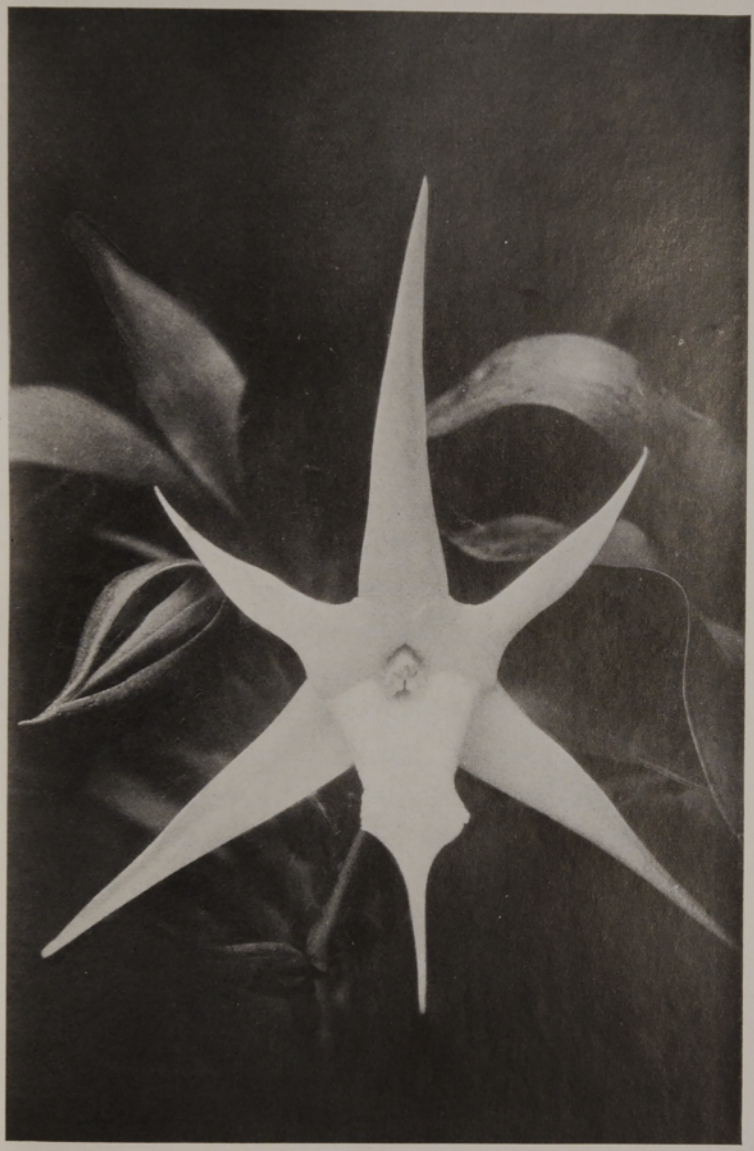
A common terrestrial Orchid in China is *Bletilla hyacinthina,* occasionally cultivated in our greenhouses and interesting as the plant in which Robert Brown discovered the cell-nucleus. Another and more widely known terrestrial Orchid is *Phaius grandiflorus,* which grows in moist and boggy places from Hongkong southward through Malaysia to northern Australia and presents much variation in the color of its flowers. In Yunnan and southward to Burmah grows *Thunia Marshalliana* and, in the neighborhood of Rangoon, *T. Bensoniae* with amethyst-purple flowers and frilled lip.

The genus Calanthe is widely dispersed in the Orient and quite a number of species grow in the forests of China and Japan, but the species most generally cultivated are from Burmah. From the neighborhood of Moulmien came *Calanthe vestita* in 1848 and *C. rosea* in 1850 which, hybridized by John Dominy in 1856, resulted in *C. Veitchii,* the most popular Calanthe of our gardens. This genus Calanthe is of exceptional interest since by crossing *C. falcata* and *C. masuca* was raised the first hybrid Orchid to flower. The work was done by John Dominy for Messrs. Veitch of Exeter. The plant flowered in 1856 and was named *C. Dominii*

by Lindley who commented that such work would drive the botanists mad.

Very similar in appearance and quite closely related are Bulbophyllum and Cirrhopetalum to which belong several hundred species, found from China south to Australia. They are epiphytes but frequently grow on humus-clad rocks where their dwarf habit suggests an incrustation of Lichen or small pebbles. The leaves are often mere scales and their functions are performed by the tuber-like pseudo-bulbs. In an Australian species (*B. minutissimum*) the pseudo-bulb is hollow and has breathing pores (stomata) on the inner surface. The flowers are not showy but those of species like *B. barbatum* are fascinatingly curious. This has a small dull-colored flower with a relatively large fringed and ciliated lip so delicately poised that it moves up and down at the slightest air disturbance. Another and similar species is *B. mandibulare,* native of north Borneo. Some of the Cirrhopetalums have attractive small flowers arranged umbellately in a circle at the top of a short stalk and have a protruded straight lip suggesting the beak of a Pelican.

No group of Orchids is more beautiful in blossom than the Phalaenopsis or Moth Orchids, of which some thirty-five species are known. One of the best



WONDER OF MADAGASCAR — ANGRAECUM SESQUIPEDALE

known is the white-flowered *P. aphrodite,* native of the Philippines and south Formosa. Very lovely, too, is *P. Schilleriana* with rose-pink blossoms. The oldest known is *P. amabilis* which grows in Java, Borneo and other islands and has large handsome flowers. This species was known to Rumphius as early as 1750, and is figured by him in his "Herbarium Amboinense." A common Philippine species is *P. rosea* which grows in the hot valleys in the neighborhood of Manila and has been much used by the hybridist. Less frequently seen in collections are the Sumatran *P. violacea* and *P. sumatrana.* All the Phalaenopsis have lovely flowers and in many species the strap-shaped leaves are reddish below and prettily mottled on the upper side.

Another fine genus is Vanda, with conspicuous fragrant flowers of many hues. Perhaps the most exquisite of all is *V. coerulea* with large flowers of soft, light blue tessellated with azure. This is one of the gems of the Orchid world and captivates all who see it. It was discovered by William Griffith in 1837 on the Khasia Hills, but all attempts to introduce failed until 1850, when Thomas Lobb sent living plants to Messrs. Veitch of Exeter. A related species with pale lilac-blue flowers is *V. coerulescens,* native of upper Burmah.

The well-known *V. suavis* and *V. tricolor,* natives of Java, were introduced into cultivation by Thomas Lobb in 1846. Both have axillary racemes of thick fleshy flowers with a strong spicy odor. In *V. suavis* the flowers are white spotted with red-purple and the basal half of the lip is deep purple. The flowers of *V. tricolor* are similarly spotted on a yellow ground. From the Moluccas came *V. insignis* with tawny yellow flowers spotted with dark brown and bright rose-purple lip. A Philippine species is *V. Sanderiana* with handsome flattened flowers, white flushed with buff-yellow and reticulated with dull crimson. Very distinct in habit are *V. teres* and *V. Hookeriana,* both rambling plants with round cylindric leaves as thick as an ordinary pencil. These have red, white and purple flowers in racemes but rarely appear in flower under northern skies. In Botanic Gardens of the eastern tropics they are seen to advantage but the finest I have ever seen were growing in tubs and pots in the garden of Raffles Hotel in Singapore—scores of large plants receiving little or no care but bearing hundreds of racemes of their brightly colored flowers.

Another plant I saw thriving to perfection in the same garden was *Renanthera coccinea.* The Javan *R. matutina,* with reddish and crimson flowers toned

with yellow and changing with age to orange-yellow, has long been known in gardens though it is not common; while *R. Imschootiana,* a newcomer, is more generally known today.

Closely related to Vanda is Arachnanthe, of which *A. Cathcartii* from the shady valleys of the eastern Himalayas and *A. Lowii* from Borneo are in cultivation. The last-named has a comparatively small cluster of leaves and flower-stems which hang down like cords to a length of from 6 to 8 feet and are covered with numbers of star-shaped, crimson-spotted flowers of two kinds.

The giant among Orchids of the eastern tropics is *Grammatophyllum speciosum* with leafy stems from 6 to 10 feet long and racemes of many flowers, clear yellow spotted with deep red-purple, each flower 6 inches across, and occasionally as many as one hundred on a raceme. It first flowered in England with Messrs. Loddiges at Hackney in 1852.

Very pleasing are the different species of Aerides with their many flowered, often cylindric racemes. One of the best known is *A. multiflorum,* native of Burmah, of which there are many forms, including one named *Veitchii* with rose-purple lip and white dotted with rose petals and sepals. To *A. Fieldingii,* also of Burmah, the name of Foxbrush Aerides has

been given in allusion to the shape of the inflorescence. Very similar to Aerides is Saccolabium of which the Javan *S. Blumei* with waxy, fragrant rose-pink flowers is well known. The lip resembles the keel of a ship and the flowers are densely crowded in cylindric racemes. Other species are *S. Huttonii, S. giganteum* and *S. bigibbum,* the latter with yellowish flowers each with triangular, fringed white lip.

Africa is remarkably poor in epiphytic Orchids and there are very few with showy flowers known from that vast continent. There are a number of terrestrial species, especially in the extreme south and the most remarkable of all, *Disa grandiflora,* has been mentioned as peculiar to Table Mountain.

Of showy epiphytic species the finest hail from Madagascar. Two species of Eulophiella (*E. Elisabethae* and *E. Peetersiana*) are worthy of special mention. The first named has many flowers in a raceme, each flower 1½ inches across, the lip white with golden disk and white sepals and petals, the former marked with rose-color on the outside. In *E. Peetersiana* the racemes are more dense and the flowers, each about 3 inches across, are rose-purple with a golden blotch on the lip. Several species of the spur-flowered Angraecum are indigenous in different parts of Africa. The pretty little *A. Kotschyi* grows in

AMERICAN MEMBER OF A FAR-FLUNG TRIBE — CYPRIPEDIUM LONGIFOLIUM

Zanzibar and on the adjacent mainland. On Reunion Island is found *A. fragrans,* the Faham, whose leaves, known as Bourbon Tea, taste of bitter almonds and were at one time used medicinally to stimulate digestion and in pulmonary consumption. *A. hyaloides,* with small white semi-transparent flowers, and the better-known *A. citratum* are of Madagascar. So, too, is the handsome *A. sesquipedale,* the aristocrat of the genus and one of the most wonderful of Orchids. This species has strap-shaped, distichously arranged leaves and in habit resembles certain species of Vanda. The flowers, two to several on a raceme, are star-shaped, each from 6 to 9 inches across, waxy in texture and pure white; the base of the labellum is projected into an enormous hollow spur from 12 to 14 inches in length, at the bottom of which honey is secreted. Indigenous in the same island is a moth with a tongue sufficiently long to suck the nectar from the bottom of this spur and it is the only insect that can remove the pollinia and effect the fertilization of the flowers. This is a marvellous example of mutual adaptation of flower and insect for their common benefit.

CHAPTER XXXVIII.

Orchids of the New World Tropics

ROM the tropics of the New World gardens have received some of the showiest and most popular Orchids known. The Cattleyas, Laelias, Oncidiums, Odontoglossums, Miltonias, Masdevallias and many other favorite genera are all natives of the American continent. The first exotic Orchid introduced into Great Britain was *Bletia verecunda* from the Bahamas in 1731, and the species still finds a place in the collection at Kew Gardens. It is a comparatively insignificant thing with erect racemose purple flowers but of great historical interest.

The only Orchid of real economic importance is *Vanilla planifolia,* a climbing plant native of Mexico but now much cultivated in the tropics of the Old World. It is a member of a small genus mostly South American. The well-known spice or flavoring agent (vanilla) is obtained from the fruit, which is a long fleshy capsule slightly yellow when ripe, but before the pods are ready for market they are subjected to a curing process during which the characteristic odor is developed. The aroma and flavor

are chiefly due to the presence of a substance, known as vanillin, contained in a balsamic oil which gradually permeates the whole fruit and slowly accumulates as crystals on the outside of the cured pods. The plant has a round green stem, fleshy elliptic leaves and insignificant flowers and is an inhabitant of hot swampy regions.

The giants of the American Orchid world are the Sobralias which are found on mountains from Mexico to Peru. They have slender cane-like stems from 6 to 12 feet tall, well furnished with rather thin, dark green lance-shaped leaves, which terminate in large Cattleya-like flowers. One of the best-known species is *S. macrantha* with rich red-purple to crimson flowers. The Costa Rican *S. leucoxantha* has white sepals and petals and a yellow flushed with orange lip.

King of the Orchid world is Cattleya, a small genus of probably less than fifty species, mostly natives of Central America to Brazil. All have large and brightly colored flowers the lip of which possesses much character, being often fringed and intensely colored. The lip encloses the column but is not united to it and from its base a nectary runs down into the ovary. The familiar *C. labiata* is one of the finest of all species and very amenable under cultiva-

tion. Native of Brazil, it produces flowers in October and November. It and its numerous forms are among the most common Orchids grown and need neither description nor praise. The variety *Warneri* with its rich crimson, fringed lip is also Brazilian; the variety *Gaskelliana* which flowers in the early autumn is sweet-scented, and the variety *Percivaliana* which flowers in January and February, are natives of Venezuela. The favorite *C. Mossiae* with foot-long furrowed pseudo-bulbs hails from La Guayra and is in flower from March to August. Of *C. labiata* and indeed of all the species, there are many fine forms which have received distinctive names.

The winter-blooming, pink-flowered *C. Trianae* hails from Colombia and is represented by many named varieties and forms. One of the best is the var. *Mendelii* with richly colored magenta lip. From Colombia also comes *C. gigas* with short one-leafed pseudo-bulbs and large flowers, the sepals and petals of which are pink, the lip large and broad, rich purple or violet with a large yellow eye-like blotch on either side of the throat. Another grand species is *C. Warscewiczii* whose large flowers with white flushed with purple sepals and petals and rich crimson lip are produced during the winter months.

The Costa Rican *C. Dowiana* is recognized as one

CATTLEYA IS KING OF THE ORCHID WORLD

of the very finest of all Cattleyas. It has foot-long, furrowed, club-shaped, one-leafed pseudo-bulbs and bears a spike of five to six flowers. The sepals and petals are bright buff-color suffused with crimson and the lip dark velvety crimson streaked with golden-yellow. The variety *aurea* has primrose-yellow sepals and petals and is native of Colombia. Very distinct in appearance from any of the above is the Brazilian C. *Aclandiae* with olive-green flowers heavily barred and blotched with dark purple, the lip magenta-purple.

Orchid enthusiasts will recall dozens of others but this sketch of Cattleya must end with mention of the remarkable C. *citrina* from southern Mexico. This has bright yellow fragrant flowers produced from between a pair of gray-colored leaves which top the small egg-shaped pseudo-bulb. The leaves and flowers both hang down, contrary to the usual manner of plant growth.

The mention of Cattleya immediately conjures up the closely related genus Laelia which differs in having eight pollen masses instead of four. Laelia is a smaller genus than Cattleya and the species are mainly from the hotter parts of Mexico, Guatemala and Brazil. The first that demands notice is the Brazilian *L. purpurata* whose magnificent flowers are among

the finest of all American Orchids. The pseudo-bulbs are 2 feet and more long, furrowed, more or less spindle-shaped, with a pair of oblong leaves notched at the apex and bear a truss of from three to seven flowers. The sepals are recurved and spreading and with the broader petals are pure white; the lip is rich crimson, sometimes tipped with white, passing to rose-color at the base and yellow within the throat. It flowers during the early summer. From the same country hails *L. harpophylla* with slender, round, one-leafed pseudo-bulb and racemes of from six to eight flowers with lance-shaped orange-vermilion sepals and petals, the lip of the same color edged with white.

Very different in habit is the Mexican *L. anceps* with clusters of from three to six flowers at the end of a long slender but rigid stem. The flower is about 4 inches across with purple to rosy lilac sepals and petals and a crimson lip marked with yellow toward the base. It blossoms in December and January. As is the case with other species there are lovely pale-colored and albino forms of this charming Orchid. Somewhat similar, but a dwarfer plant with recurving petals and sepals and broader lip, is *L. autumnalis,* also from Mexico.

A truly superb Orchid is *L. superbiens,* a vigorous

species with a flower scape from 3 to 9 feet long, produced in winter and bearing sometimes as many as twenty flowers. The sepals and petals are deep rose-color paler toward the base, the lip crimson in front, yellowish on the sides. This is a Mexican plant and so, too, is the dwarf *L. majalis* whose flowers are from 7 to 8 inches across with rosy lilac sepals and petals, and three-lobed purplish marked with white lip. It flowers from the young growths during the summer months. The whole plant is only a few inches high and the size of its flowers is in consequence most surprising. There are other fine species of Laelia and the crossing of this genus with that of Cattleya has produced the bigeneric Laelio-Cattleyas in all their astonishing variety and beauty.

On the Organ Mountains in Brazil grow some half-a-dozen species of Sophronites, a genus of diminutive plants with large flowers that have been of immense service to the Orchid-breeders. Crossed with Cattleya and Laelia it has given rise to some glorious hybrids. The finest species is *S. grandiflora* with one-leafed pseudo-bulbs and flowers each 2 inches across. The sepals and petals vary from cinnabar to dark scarlet and the lip, which has pointed and incurved sides, is yellow streaked with bright red. It

flowers in November and December. A related species with violet-colored flowers is *S. violacea.*

Another genus which has been crossed with the above three genera, much to the advantage of the Orchid lover, is Brassavola. One of the handsomest and most used species is *B. Digbyana* from Honduras. This has Cattleya-like flowers with the edge of the lip broken up into long hair-like fringes which character has been transmitted to its hybrid progeny. The sepals and petals are greenish white tinted with purple and the lip cream-colored stained with purple at the tip. The gray-colored *B. glauca* from Mexico differs chiefly in its white lip which is not fringed.

The genus Epidendrum, of which over 400 species are known, has also been united with Cattleya and the other genera by the hybridist. An old but very beautiful species is *E. vitellinum* with erect racemes of orange-vermilion flowers with segments, the lip especially sharp pointed, and the column yellow. The form called *majus* is superior to the type. This Orchid is Mexican but also grows in Guatemala.

Very different in habit are *E. evectum* and *E. radicans* which have tall slender leafy branching stems and which terminate in racemose clusters of flowers, magenta-purple in the first named, orange-scarlet in *E. radicans.* The flower is small with a deeply lobed

GRAVITATION'S LAW OBEYED — CATTLEYA CITRINA

and toothed lip, but lasts for a long time and the plants themselves are in flower well-nigh the year round. These and others are natives of Mexico and other parts of Central America.

From the mountains of Colombia came *E. Wallisii,* another leafy, thin-stemmed species that grows 2 feet tall and has flowers 2 inches across, yellow spotted with purple, the lip flattened, whitish, prominently streaked with purple. This again is in flower for most of the year and is a very attractive species. The West Indian *E. fragrans* with rather small cream-colored flowers, the tip streaked with crimson, deserves mention on account of its delightful fragrance.

Of the many others I have only space to name *E. prismatocarpum,* a striking species of vigorous habit and foot-long leaves crowning stout pseudo-bulbs. The flowers are racemose, creamy yellow, the sepals and petals marked with dark purple blotches and the free part of the lip rose-colored margined with pale yellow. It is native of Central America and blossoms in June and July.

Very closely related to the Epidendrums is the handsome *Diacrium bicornutum,* native of Trinidad and Demerara. It is distinguished by the lip being free at the base and spreading, with two hollow horns

between its lateral lobes. The pseudo-bulbs are fusiform about a foot high; the flowers are pure white each about 3 inches across with a few crimson spots in the middle of the lip and produced from six to twelve in a raceme. A lover of strong heat and abundant moisture it is seldom seen to perfection under cultivation.

The Oncidiums are a very large group comprising about 300 species, found from Mexico and the West Indies southward to Brazil. Many have beautifully colored flowers produced, in some species, many hundreds together in large much-branched paniculate inflorescences. Such a species is the Guatemalan *O. leucochilum,* whose flower stems are sometimes as much as 10 feet long and bear a multitude of greenish yellow barred and blotched with dark brown flowers each with a lobed white lip. The Brazilian *O. flexuosum* with its showy yellow, spotted with brown flowers produced in abundance is a favorite Orchid with many folk.

Lovely, too, is *O. varicosum* and its variety *Rogersii* with rich clear yellow lip, 2½ inches across, insignificant sepals and petals; the inflorescence is much branched and bears a hundred and more flowers in the late autumn. Yet another with flower-stems of similar character is *O. tigrinum* from Mexico and

adjacent lands, with yellow lip 2 inches across and greenish yellow marked with shining, chestnut-brown sepals and petals. The flowers have the odor of Violets and open in late autumn and winter. The very similar *O. splendidum,* native of the same countries, flowers in spring and early summer. Very different in appearance is *O. macranthum* with large sepals and petals, each with a distinct claw and a very small, pointed lip. The color is varied and attractive; the upper sepal is olive-brown suffused with gold, the two lateral ones orange-yellow, the petals bright yellow and the lip white marked with brown on the sides. The blossoms are from 3½ to 5 inches across and are borne on twining, branching, many-flowered stems several feet long.

From the Organ Mountains, Brazil, came *O. crispum* with its large and remarkably handsome flowers borne some fifty or so together in a panicle. The blossom is from 2 to 3 inches across, greenish brown to reddish brown with yellow stripes, and the parts are beautifully crisped. This Orchid seems to have no set period of flowering and is in bloom at different times through the year.

There are scores of other species worthy of description but *O. papilio,* the Butterfly Orchid, must not be forgotten in the briefest of lists. This species with

its singularly attractive flowers is native of Trinidad and Venezuela and has dark colored flattened pseudo-bulbs each capped by a single purple-brown leathery leaf. The flower-scapes which arise from the base of the plant are slender, erect, about 2½ feet tall and continue to bear through a long season flower after flower, though seldom is more than one open at the same time. The back sepal and the two petals are each about 3 inches long, linear and erect, dark green without, purple within; the lateral sepals are oblong, tapering, wavy and arched downward, bright yellow with transverse bands of orange-red; the lip is roundish about 1½ inches across, yellow mottled all over with brown and waved along the edge. Its common name well describes the appearance of the flower.

Some Oncidiums like *O. varicosum* have ordinary looking pseudo-bulbs, in others like *O. papilio* they are flattened and make humus-collecting niches against the support; in others like *O. Cavendishianum* they are absent and their function is served by thick, fleshy, erect leaves.

A favorite genus is Odontoglossum with curiously blotched flowers, of which about 100 species are known from the high mountains of Mexico south to those of Peru. They require cool conditions and are not easy to grow at sea-level under our hot summer

MODEST EPIDENDRUM EVECTUM

sun but in England they thrive amazingly. The hybridist has been very successful with this genus and the outcome of his work is seen in hundreds of named sorts, many of which have flowers of extraordinary coloring.

Queen of the genus and one of the most useful of all Orchids is the Colombian *O. crispum* of which there are many named forms. The flowers are fragrant and are borne in arching racemes which are sometimes panicled and vary from white to yellow and pink; some of the forms are wondrously spotted and marked with chocolate-brown, purple and yellow. It has been introduced in vast quantities and no Orchid has been more diligently searched for by collectors. It blossoms at various seasons of the year but most freely from February to April.

Native of the same country is a sister species, *O. Pescatorei,* also a great favorite. Likewise *O. Harry-anum* whose flowers are very different in appearance with their petals curving sharply downward. The sepals and petals are chestnut-brown, barred and edged with yellow; the lip is white and yellow, heavily feathered with bluish purple. A very showy species is the Guatemalan *O. grande,* an old denizen of Orchid houses. This has gaily colored yellow barred with chestnut-brown flowers, each from 5 to

7 inches across with rounded lip, white with a few concentric bands of chestnut-red.

Very sweetly scented are the golden yellow blotched with red-brown flowers of the Colombian *O. odoratum.* The Mexican *O. Rossii* is a pretty and well-known species with white and purple flowers freely produced during the winter season.

First cousin to Odontoglossum is Cochlioda of the Peruvian Andes of which four or five species only are known. The best known is perhaps *C. vulcanica* with erect racemes of bright rose-colored waxy flowers each 2 inches across; *C. sanguinea* is similar but has drooping racemes. In *C. rosea* the flowers are less brightly colored but in *C. Noezliana* they are a wonderful orange-scarlet with a violet-purple column in marked contrast. These Cochliodas crossed with Odontoglossums have given rise to the hybrid genus Odontioda, whose remarkable reddish flowers are among the choicest and most highly prized products of the orchid-breeders' skill.

Miltonias with their relatively huge, flat flowers with bilobed lip are greatly appreciated wherever Orchids are grown. The genus is a small one of about a dozen species found from Costa Rica south to Brazil. One of the very finest is *M. vexillaria* from Colombia with pink flowers, of which half-a-dozen

PANSY-FACE — MILTONIA VEXILLARIA LYOTH

or so are borne on a slender raceme; there are many forms, some with white others deep rose-colored blossoms. The Brazilian *M. spectabilis* has white flowers with a finely colored lip, deep violet-purple at the base, rosy crimson in the centre. Beautiful are the flowers of *M. Phalaenopsis* with their fiddle-shaped lip, blotched and striped with crimson; whilst those of *M. Roezlii* are delightfully fragrant.

Very useful plants are the Lycastes, and *L. Skinneri* and its forms rank among the finest ornaments of Orchid-houses. The pink to white flowers are from 6 to 7 inches across, the lip is three-lobed and variously spotted with rose-red or crimson. It flowers in the winter months and is native of Guatemala.

Panama is the home of *Peristeria elata,* the Dove Orchid, from the resemblance of the column of the flower to a dove hovering with expanded wings, somewhat like the conventional dove seen in artistic representations of the Holy Ghost. The flower stems are erect, from 3 to 5 feet tall, and bear racemosely many white, waxy almost globose blossoms from July to September.

Very curious is Catasetum with hood-like flowers of three different forms which sometimes appear on the same plant. For a long time these forms were regarded as belonging to different genera but it is now

known that they represent merely the male, female and hermaphrodite forms of one genus. The lip is uppermost in the flower and the column is provided with a pair of horns or antennae which in many species cross one another diagonally. When one of these antennae is touched the pollinia are ejected with great violence. Among the best-known species are *C. macrocarpum, C. tridentatum, C. Bungerothii* and *C. saccatum.*

Even more remarkable are the flowers of the related genus Stanhopea which are borne on pendent racemes or solitary and hanging. The flowers are massive in texture, beautifully barred and spotted with color, and strongly fragrant. Perhaps the handsomest of all is *S. tigrina* with flowers 8 inches across. The lip and the column form a cage, narrowing toward the mouth and as smooth and slippery as glass. The base of the lip is like a bucket and is covered with juicy hairs. Other fine species are *S. Wardii* and *S. gibbosa,* the latter with flowers 6 inches across, yellow barred and spotted with crimson.

Another close relative is Cycnoches, the Swan Orchid, of which *C. pentadactylon* may serve as an example. The flowers are racemose, of two sexes, resembling those of Catasetum, greenish yellow,

sometimes white, barred and blotched with chocolate-brown and the lip in parts white spotted with red. The species was introduced in 1841, from Rio de Janeiro into England, by William Lobb.

But the most extraordinary of all of this group is Coryanthes, the Helmet Orchid, a tropical South American genus of four or five species. The flowers are pendulous and wonderful in appearance, not easy to describe, clearly without figures. The sepals are fairly large and bent backward, the petals are small; the lip is of a most complex shape; projecting horizontally from the base of the column is a bar bearing a dome on the end from which is suspended a bucket-like organ; the mouth of the bucket faces upwards and the edges are incurved; there is also an overflow pipe projecting towards the sepals and closely covered in by the bent end of the column with the stigma and anther. From the base of the column project two horns which secrete a thin watery fluid that drips into the bucket keeping it full to the overflow pipe. The dome above the bucket is composed of succulent tissue very attractive to bees who fight for places on it whence to drill the tissue; every now and then one of them gets pushed off and falls into the bucket. It can neither fly nor climb out and has to squeeze through the overflow pipe. In so doing the bee passes

the stigma, fertilizing it if it carries any pollen and then passing the anther is loaded with new pollinia to be transferred to other flowers.

One of the best-known species is *C. macrantha* from Caracas whose flowers are rich yellow dotted with red; the hood and part of the bucket is brownish red. Another is the Venezuelan *C. maculata* with dull yellow flowers, the bucket blotched with dull red within.

The winter-blooming genus Zygopetalum, of which some twenty species are known, has handsome flowers often with a good deal of blue in their coloring. Such a species is *Z. Mackayi* with erect racemes from 1½ to 2 feet tall which bear from six to ten flowers, each with purplish brown sepals and petals and a flattened rounded lip, white heavily striated with blue. This species is a native of Brazil and so, too, is *Z. crinitum* with its bearded lip, *Z. Gautieri*, whose lip varies in color from rose to blue-purple, and several others, including the well-known *Z. maxillare*.

The Mexican *Chysis bractescens* with nodding racemes of thick, fleshy white marked with yellow flowers must not be omitted. Its yellow-flowered sister *C. aurea* is Venezuelan.

A noteworthy Orchid is *Schomburgkia tibicinis*

QUAINT AND CURIOUS — CHYSIS AUREA

with horn-shaped pseudo-bulbs each 1½ feet long and a terminal mass of flowers on a stem 5 feet in length. The blossom is about 3 inches across with many pink, spotted with chocolate sepals and petals, and lip white spotted with rose on the lobes which are erect. There are several other species and all are fond of sun and strong heat.

The Masdevallias are a large and varied group though very few have conspicuous flowers. A characteristic feature of the genus is the drawn-out apex of the three sepals which is often decidedly tail-like; the petals and lip are usually small. The flowers vary greatly in form and many of them are grotesque in appearance. Such species as *M. coccinea* and its variety *Harryana, M. Lindenii, M. ignea, M. tovarensis* and *M. Veitchiana,* have erect scapes from 8 to 15 inches tall bearing one, rarely two, pleasing flowers. These species are very free-blooming and deservedly popular. Another section, to which belong *M. chimaera, M. bella* and *M. nycterina,* has singular flowers with extraordinarily long tails to the sepals; in color the flowers are more or less yellow heavily blotched with purple-brown.

The tropical American Cypripediums are now referred to the genera Phragmopedilum and Selenipedium but here it is convenient to mention them under

their old and more familiar name. Many of the species have remarkable flowers but none more so than the noble *C. caudatum* of Peru. This has tufted leaves and from the centre of the plant, after the leaf growth is finished, arise flower stems each from 1 to 1½ feet tall. The lateral petals are narrow, tail-like from 2 to 2½ feet long and pendent, giving the flower an extraordinary appearance. The color is yellowish marked with brown. With this wonderful Orchid we may contrast *C. Schlimii* with its racemose bright rose-colored flowers, each 2 inches across with a globose pouched lip.

The sins of omission here are many, as the Orchid enthusiast will be quick to note, but no attempt at finality is intended. These discursive sketches of a few of the prominent types of a wonderfully polymorphic family will have served their purpose if they impress upon the minds of readers the debt we owe to the tropics of both Old and New Worlds for the wonderful plants we know as Orchids.

Part IV.

The Orient

MOTHER OF GARDENS WHOSE BOUNTEOUS GIFTS ENRICH THE WORLD

ROBERT FORTUNE — 1813-1880

THE ORIENT

CHAPTER XXXIX.

The Mecca of Early Voyagers

T IS a singular fact that the shrubs and trees with conspicuous blossoms hardy in the colder parts of this country and in Europe which are first to open their flowers in the spring are natives of the Orient. The Forsythias, which inaugurate the gladsome season with a galaxy of golden bells, are of Chinese origin, and in friendly rivalry we enjoy the Japanese *Magnolia stellata* with its lovely pure white stars. Often these spring jewels are harshly buffeted by late frosts ere winter is finally banished, but the wonder is that such delicate beauty can brave the wintery blasts of the cold North. The native woody plants which blossom in early spring have inconspicuous flowers and it is not until the Shadblows (Amelanchiers) burst into bloom that West vies with East in floral beauty.

Whilst winter's hand is yet heavy on the land the Witch-hazels boldly put forth their star-shaped yellow blossoms but the native *Hamamelis vernalis* is

over-shadowed by its more brilliant Chinese and Japanese relatives. The European Forsythia opens its flowers at the same time as its Asiatic sisters but is dimmed by their greater beauty. Not until the Lilacs blossom does Europe compete with eastern Asia in wealth of showy flowers. The Peach, the Almond and the Apricot are Asiatic; the white-flowered Cherries of Europe are cold in comparison with their pink-flowered Asiatic sisters, the Magnolias and Crabapples of America flower after their Asiatic relatives. Wistaria, the most glorious climber northern gardens enjoy, is also from the Orient. And our indebtedness is just as great at other seasons of the year. All our most popular races of Roses are of Oriental origin and so, too, are Chrysanthemums, the glory of the autumn blossoms. Paeonies and Primroses, Lilies and China Asters are very largely of east Asiatic origin. Indeed, our debt to the Orient for hardy plant material is greater than to any other part of the world. The two most common hedge plants in America, Thunberg's Barberry and the so-called California Privet, are natives of Japan. The Peach and Apricot hail from China and this same country has given us the Orange, the Lemon and the Grapefruit trees. To tell in detail of all the plants the Orient has given to our gardens would require a

bulky volume but as we proceed some glimmering of the rich dowry showered upon us will be seen.

My object, however, is not so much to describe the plants as to tell the means by which they reached us. Earlier we bade good-bye to South Africa and to Australia, and from either of these lands it seems a far-cry to China and Japan. Deep oceans and many thousands of miles separate these regions and yet the same chain of events led to their discovery and to the introduction of plant material.

The nations of the East are old, very old, and the peoples enjoyed a high standard of civilization and were cultured when those of western and northern Europe were sunk in savagery. China was a nation when the Pharaohs ruled in Egypt. Of the first intercourse between China and the nations of the Levant we have no knowledge. In the first century of the Christian era Chinese armies penetrated as far west as the Caspian Sea and Chinese sway was maintained there for at least a couple of centuries. Probably during this period the Walnut (*Juglans regia*) and the Grape (*Vitis vinifera*) were brought from that region into China and such fruit trees as the Peach and the Apricot carried to Persia, together with silk and other Chinese articles. The wealth of China reached the peoples of Persia and the Levant, but how

much intercourse there may have been is not known.

In A. D. 65 a deputation was sent to India to obtain the sacred books and authorized teachers of Buddhism, which the Emperor intended to publicly introduce into China. This religion has exercised an all powerful influence over the peoples of China, Korea and Japan, moulding their culture, inculcating and fostering a love for flowers. Buddha himself made famous the Bo-tree of India (*Ficus religiosa*), and his disciples in succeeding generations and in other lands have done the same for other trees like the Ginkgo (*Ginkgo biloba*), a Linden (*Tilia Miqueliana*), *Juniperus chinensis, Thuja orientalis;* such shrubs as *Paeonia moutan* and such herbs as *Nelumbium speciosum.* From China, Buddhist apostles carried to Korea, and from Korea to Japan, a great many flowers still favorites in all three lands. Further, they introduced cereals, vegetables and fruits and did much to improve the material life of the people they proselyted among. This grand old religion is now somewhat decadent in these lands, but in the temple-grounds everywhere are still to be found fine trees of many kinds and shrubs and herbs in choice variety.

To the illustrious traveller, Marco Polo, who lived many years in China during the latter part of the Thirteenth Century, we owe the first authentic

GIFT OF THE ORIENT — CHRYSANTHEMUMS

account of that mighty empire and of many of the vegetable productions used there for economic purposes. His account sounded so marvellous that it was unbelieved by the Venetians; indeed, it was not until late in the Nineteenth Century that his veracity was established. After his memorable travels and the wanderings of Friars Odoric and Marignolli in eastern Asia early in the Fourteenth Century, China was shut off from European access until the arrival of the Portuguese in 1516.

In May, 1498, Vasco da Gama reached India and the Portuguese established themselves at Goa on the west coast. For a century they enjoyed a monopoly of trade with India and the countries to the eastward, the richest regions of the known world—the Indies. The wealth of the Indies was the lodestone of geographical enterprize in the Fifteenth and Sixteenth centuries, the greatest era in voyages of discovery in the world's history. Columbus in 1492, striving to find a westerly route to the Indies, discovered America and the "New World" was added to western knowledge.

After establishing themselves in India the Portuguese pushed their discoveries eastward. In 1511 they conquered Malacca and from there, in 1516, one of them, Captain Raphael Pestrello, took passage

in a Chinese junk and reached Canton. In 1517 a small Portuguese fleet under the command of Ferdinand Andrade reached Canton and was permitted to trade there. In 1537 the Portuguese established themselves at Macao and have maintained themselves there ever since. During the height of their sea-power they had other trading stations on the coast of China—Amoy and Ningpo, for example—but these holdings were precarious and temporary.

If the Portuguese introduced any ornamental plants into Europe from China history has no record of them, but of the famous medicines and drugs of China the Portuguese traded largely in camphor, cassia-bark, rhubarb, china-root, galangal and others. They also introduced the Sweet Orange from China into Portugal. Tradition says that Juano de Castro, Viceroy of India from 1545 to his death in 1548, sent a living tree of this Chinese Orange to Lisbon to the garden of Count St. Laurent. The value of the most estimable fruit, the orange, is probably more highly appreciated today than ever before, but it is difficult for the present age to understand the enormous value the Middle Ages attached to medicines of vegetable origin.

In this connection it should be remembered that Botanic Gardens originated as gardens to cultivate

PL. LXXXIX.

FROM THE KINGDOM OF FLOWERS CAME SALIX BABYLONICA

medicinal plants. The earliest botanical writings are "herbals" and treatises very largely devoted to extolling the curative properties possessed by plants in general. To the cultivation and classification of these plants for medicinal purposes both gardening and botany owe their origin. The wonderful old Chinese herbal, the "Pun Tsao," is one of the most famous works on medicinal plants in any language. The development of gardens to adorn the home surroundings and the growing of flowers purely for aesthetic reasons came into being as nations developed culture and leisure. Thus it is that the love of flowers and gardens is innate in such old peoples as the Chinese and Japanese. And it is fitting that China (whose medicines were favored above all others), should also possess a wealth of flowers, many of which today are the most familiar and most prized possessions of western gardens. That my readers may obtain an accurate idea of our indebtedness to both China and Japan I tell of each country separately; but geographical discoveries and trade intercourse by western nations in a large measure synchronized.

The Spaniards conquered the Philippines in 1543, and made several more or less ineffectual attempts to obtain trading posts in China, but our gardens owe

nothing to this race. The Dutch were the next great sea-power to arise and one by one Portuguese possessions were taken by them. In 1580 the power of Portugal began definitely to wane; in 1655 Ceylon was captured from them by the Dutch and this nation became mistress of the Indian seas. The Dutch made many attempts to establish themselves in China and had resort to much that was both obsequious and undignified, but little success attended all their efforts. They established themselves in Formosa and built Fort Zeelandia, the modern Takao. In Japan they were more successful and for a couple of centuries enjoyed, along with the Chinese and under galling restrictions, a monopoly of the trade with that land.

Thirty-six years after the re-discovery of China by the Portuguese the first Christian missionaries made their appearance there. In 1552, Francis Xavier, a Jesuit, started from Goa in a royal vessel and landed at Sancian, an island near Macao, where the Portuguese had a settlement. But he was disappointed in his hope of beginning missionary work among the Chinese and died a few months after his arrival. Thirty years later the Jesuits succeeded in establishing themselves in China, and among them

WELCOME TO OUR MIDST — PÆONIES

PL. XC.

was Matthaeus Ricci who holds one of the most conspicuous places in the history of Chinese missions.

To the Jesuits the world is profoundly indebted for its knowledge of things Chinese, and not least are garden-lovers under obligation to them for making known the rich floral wealth of that land. Quite naturally the economic plants and medicines were the first vegetable products the Jesuits wrote about and the information they supplied was duly set forth by the early writers of books on China. All the early works on China give prominence to the many valuable economic plants the country is remarkable for. In 1656, Michael Boym, a Jesuit, and a Pole by birth, published a work entitled "Flora Sinensis," but this gives an account of only twenty-two plants of which the majority belong to the Indian Archipelago. Twenty-one are represented by engravings, and three of the plants figured, the Pineapple (*Ananas sativa*), Guava (*Psidium Guajava*) and Custard-apple (*Anona squamosa*) are American. The presence of these plants in China at this early date is a most interesting fact, especially since they already possessed established Chinese names.

The first seeds of plants from northern China and the first dried specimens from that region were sent by a Jesuit, Father d'Incarville, a Frenchman, who

is commemorated by the genus Incarvillea, well-known for its beautiful flowers. Father d'Incarville was born in 1706 and was a pupil of the great French botanist, Bernard de Jussieu. In 1740 he joined the Chinese mission of Jesuits and died at Peking in 1757. D'Incarville applied himself assiduously to the study of Chinese plants and amassed a fine collection of dried specimens which were sent to Paris. A few only were described at the time and the bulk remained undetermined for over a century, until 1882 to be exact. It was d'Incarville that sent to Paris seeds from which were raised in Europe the first of such famous trees as *Sophora japonica, Ailanthus altissima, Cedrela sinensis, Koelreuteria paniculata, Gleditsia sinensis* and such well-known shrubs as *Syringa villosa, Caragana chamlagu, Lycium chinense, Vitex incisa* and the invaluable China Aster (*Callistephus chinensis*).

Another Jesuit, Joannis de Louriero, a Portuguese, published in 1788 the first post-Linnaean flora of southern China, under the title of "Flora Cochinchinensis." These most worthy men were typical of many others of their own and other orders of the Roman Catholic faith who have contributed so largely to the world's sum of knowledge. Their footsteps have been worthily followed by others and

especially in the latter half of the Nineteenth Century by such French priests as Armand David, J. M. Delavay, J. A. Soulié, P. Farges, E. Bodinier, and an Italian, G. Giraldi. All are dead, but their names recur in many garden plants; the work they did lives and our gardens are the more beautiful in consequence.

CHAPTER XL.

These Gifts They Did Bring

EA-POWER, trade and religion are the three forces that have made the great lasting world conquests and this is well shown by the story of plant introductions. As Britain rose to be mistress of the oceans, so she pushed her trade and established herself warden of the Seven Seas. In 1637 English ships first visited Canton and in 1684, by force of arms, England obtained a foothold in Canton and this she has never relinquished. Slowly but inexorably she forced trading concessions at other points on the China coast, few of which ever have been abandoned.

On December 31, 1600, a Royal Charter to the English East India Company was granted by Queen Elizabeth. To this old trading company, parent of many others, our gardens are immensely indebted. Its business was trade, but in furtherance of that it acquired and administered vast areas in India, lesser ones in Malaya, and several posts in China. It traded in all and every sort of marketable commodity, adding both wealth and prestige to England. All concerned in its development waxed prosperous and its

CHERISHED BY BUDDHISTS — GINKGO BILOBA

directors became patrons of art and science. With Sir Joseph Banks directing the development of Kew Gardens and President of the Royal Society of London, the services of the East India Company were enlisted to introduce useful and ornamental plants from India and China. The close of the Eighteenth Century saw plants pouring into England from all parts of the world, and not least, where merit be considered, from China.

The first dried specimens of Chinese plants to reach Europe were gathered by surgeons of the East India Company's ships. One Samuel Brown seems to have been first, followed by Messrs. Cunningham, Kerr and Barclay. Many of these were sent to James Petiver and Leonard Plukenet, who describe and figure a number of them in their books published early in the Eighteenth Century. The largest collection was that of James Cunningham, who reached the Chusan Islands in 1701 and remained there until 1703. Among his plants, figured by Petiver, are the familiar *Gardenia florida,* Vegetable Lamb (*Cibotium barometz*), the early flowering, fragrant *Chimonanthus fragrans,* the Chinese Persimmon (*Diospyros kaki*), the well-known *Sophora japonica, Cryptomeria japonica,* and *Cunninghamia lanceo-*

lata, named for Cunningham and the most valuable Chinese Conifer.

The earliest plant introductions from China were from Canton into India during the latter part of the Seventeenth and early in the Eighteenth centuries. Among them were the China Monthly Rose (*Rosa chinensis*) and its small flowered variety *semperflorens,* which were afterward erroneously taken to be natives of India and became generally known as Bengal Roses. In India, under a different climate, these Roses gave rise to other forms. These were carried to the Mauritius Islands in the Indian Ocean and, later, to Europe, where they became part parents of the Hybrid-perpetual and Hybrid-tea Roses of the present era.

During the latter part of the Eighteenth Century, ships plied directly between Britain and Canton by way of the Cape of Good Hope and carried many plants to England which passed into the possession of the more famous gardens. By this means came such familiar plants as *Gardenia florida, Lagerstroemia indica, Malus spectabilis, Camellia japonica, Dianthus chinensis, Lychnis coronata, Osmanthus fragrans, Celosia coccinea, Amarantus cruentus, Cordyline terminalis, Rhapis flabelliformis, Pteris*

SACRED LOTUS LILY — NELUMBIUM SPECIOSUM

serrulata, the Yulan (*Magnolia denudata*) and its purple-flowered relative *M. liliflora*.

In those days the various nations of Europe were constantly at war with one another and all ships were armed. Fights at sea were of common occurrence. It is told of the Japanese Sago Palm (*Cycas revoluta*) that Richard Warner of Woodford in Essex received the plant from Captain Hutchinson about 1758. His ship being attacked by the French, the head of the plant was shot off but the stem, being preserved, produced several heads which being taken off produced as many plants.

The greatest name in connection with the East India Company's plant introduction work is that of John Reeves, who was born on May 1, 1774, the youngest son of a clergyman, at Westham near London. Left an orphan at an early age, John Reeves was educated at Christ's Hospital and afterward entered the office of a tea broker. In 1808 he joined the service of the East India Company, and in 1812 proceeded to China as an Assistant, and subsequently became Chief Inspector of Tea in the Company's establishment at Canton. John Reeves was a remarkable man, very keenly interested in natural history and in the varied natural productions of China. His principal correspondent for some years after his

arrival in China was Sir Joseph Banks. During the whole period of his residence in China, 1812-31, he contributed largely to English horticulture and to the Horticultural Society of London in particular; not only by his own direct shipments, but also by collecting plants during the spring and summer, establishing them in pots previous to the shipping season and then commending them to the care of the captains of the Company's ships, to whom he succeeded in communicating the enthusiasm which animated himself. He was indefatigable in his zeal and sent home all that he found most rare and beautiful among living plants in the gardens of Canton and the vicinity. He was either the immediate or indirect source from which western gardens derived the first Chinese Azaleas, Camellias, Chrysanthemums, Moutan Paeonies, the Chinese Primrose, the famed *Dendrobium nobile,* that most glorious hardy climber *Wistaria sinensis,* and many other treasures.

Not a Company's ship at that time sailed for Europe without her decks being decorated with the small, portable greenhouses which preceded the Wardian case. If we think for a moment what these plants have meant to gardens we can agree that John Reeves was truly one of the Nestors of horticulture. He died on March 22, 1856, as widely regretted as

LEGACY OF JOHN REEVES — WISTARIA SINENSIS

he was known and respected. The genus Reevesia, of which *R. thyrsoidea* is a well-known species, was named for him by Lindley; in ornithology he is commemorated by the wonderful Reeves' Pheasant (*Syrmaticus Reevesii*), which has remarkably beautiful plumage and a tail over five feet long.

Not the least important event in the history of horticulture and plant introduction was the founding of the Horticultural Society of London in 1804. During its long and honorable career this famous Society has probably done more toward developing every phase of horticulture than any other similar body in the whole world. Of necessity it has suffered vicissitudes of fortune but it never was more influential than it is today. Familiarly known the world over as the "R. H. S.," its work is esteemed by all who love plants in every land and long may it flourish is the heart-whole sentiment of all gardeners of every race and creed!

This Society has sent collectors to many lands and its work in China is memorable. We have seen that many of the plants introduced by the agency of John Reeves went to this Society. In 1821, the first collector, John Potts, was sent to China, and in 1823 another, John Damper Parks. Both collectors went to Canton and, aided by Reeves, brought home many

fine plants, some new, others very rare in gardens. Among other things Potts introduced a very fine herbaceous Paeony which was named *Paeonia albiflora* var. *Pottsii*. Parks brought back twenty varieties of Chrysanthemum, sixteen of which were new, the double-flowered yellow Banksian Rose (*R. Banksiae* var. *lutea*) and a Tea Rose (*R. odorata* var. *ochroleuca*) with yellowish flowers.

In 1843, Robert Fortune was despatched to China and a new era was inaugurated. The time was propitious, since four new treaty ports on the China coast had been opened to foreign trade and Hongkong ceded to the British in 1842. Fortune visited China four times (1843-45, 1848-51, 1853-56 and 1861). His first journey was for the Horticultural Society of London, the next two for the East India Company, to introduce the Tea industry into India, his fourth was his own private enterprise. All were successful and gardens owe a great debt to this eminent plant hunter. India owes even a larger debt and it is not to the credit of the Tea industry that the labors from which it has waxed so strong should have gone unrequited and unrecognized. Monuments in India are mainly erected to men mighty in war, but of the wealth surely a little could be spared to erect a fitting memorial to the man who

PL. XCIV.

RHODODENDRON HAS ITS HEADQUARTERS IN CHINA — R. MOUPINENSE

successfully laid the foundation of one of India's greatest industries, Robert Fortune.

Robert Fortune was Scotch, born in Berwickshire on September 16, 1812, and was educated in the parish school of Edrom. He was apprenticed as a gardener and afterward entered the Botanic Garden, Edinburgh, under the elder McNab. In 1842, he was appointed superintendent of the hothouse department of the Horticultural Society at Chiswick, and the next year was offered and accepted the post of plant collector in China at the magnificent salary of two hundred dollars per year all found.

Fortune published four interesting books on his travels in China and all who will may familiarize themselves with his wanderings. In those days travel beyond the limits of the treaty posts was exceedingly hazardous. Disguised as a Chinese, Fortune made one or two trips into the interior from Ningpo and won from the wilds such valuable plants as *Clematis lanuginosa, Rhododendron Fortunei* and *Pseudolarix amabilis,* the Chinese Golden Larch. Of perforce nearly every plant he introduced came from some Chinese garden, nursery or temple-ground. His industry was great, his judgment of the garden value of a plant infallible, and his ability to pack his collections so that they successfully with-

stood the vicissitudes of the long voyage home round the Cape of Good Hope, calls for the admiration of all who have tried this none too easy task.

Among the garden plants introduced by Fortune were many varieties of Moutan Paeonies, Chrysanthemums, Camellias, Peaches, Roses, Azaleas and Clematis, and such indispensable plants as *Anemone japonica, Aconitum autumnale, Akebia quinata, Dicentra spectabilis, Skimmia Fortunei, Citrus japonica, Ilex cornuta, Indigofera decora, Wistaria sinensis* var. *alba, Prunus triloba plena, P. japonica alba-plena, Spiraea prunifolia, S. cantoniensis, Exochorda grandiflora, Rosa Fortuniana, Saxifraga Fortunei, Deutzia crenata plena, Viburnum tomentosum, V. macrocephalum, V. dilatatum, Syringa oblata, Lonicera Standishii, Diervilla rosea, Campanula punctata, Jasminum nudiflorum, Forsythia suspensa* var. *Fortunei, F. viridissima, Chionanthus retusa, Ligustrum sinense, Trachelospermum jasminoides, Torenia concolor, Cupressus funebris, Torreya grandis, Cephalotaxus Fortunei, Pinus Bungeana* and *Trachycarpus excelsa* var. *Fortunei.* Their garden value is so generally known that comment is unnecessary. On his four visits, the last of which extended to Japan, Fortune introduced into English gardens for the first time about 190 species and varie-

YELLOW EXQUISITE — ROSA HUGONIS

ties of plants, of which more than 120 were entirely new to botanists and horticulturists while the remainder up to that time had been known in Europe only from herbarium specimens. He died on the 13th of April, 1880, at Brompton.

The doyen of living botanical collectors in China is Professor Augustine Henry. For fairly obvious reasons these pages mainly concern themselves with the labors of those who have passed on, but it is permissible to state that no one in any age has contributed more to the knowledge of Chinese plants than this scholarly Irishman. Space forbids that I pursue this subject further and it may well end with reference to work done by a Russian, Dr. E. Bretschneider, who for many years was physician to the Russian Legation at Peking. This gentleman during his sojourn in China, among other good works sent seeds of native plants to many Botanic Gardens in Europe and also to the Arnold Arboretum of Harvard University.

From these seeds were raised some of the finest plants now growing in the Arnold Arboretum, and of them I am mentioning four Lilacs (*Syringa villosa, S. pubescens, S. oblata* and *S. pekinensis*), such Pear-trees as *Pyrus Bretschneideri, P. ussuriensis* var. *ovoidea, P. betulaefolia,* the Manchurian Crabapple

(*Malus baccata* var. *mandshurica*), the wild form of the Apricot (*Prunus armeniaca*) and the single-flowered form of *Prunus triloba*, David's Peach (*Prunus Davidiana*), the Chinese Hawthorn with large, edible fruits (*Crataegus pinnatifida*), and such plants as *Hydrangea Bretschneideri, Deutzia parviflora, Ampelopsis aconitifolia, Celastrus articulata, Sorbus discolor, Philadelphus pekinensis, Viburnum Sargentii*, that exquisite gem among early flowering plants, *Rhododendron dauricum* var. *mucronulatum*, and many others. These seeds were received in 1882 and have proved one of the most important gifts the Arnold Arboretum has received. Since the Twentieth Century dawned many hundreds of valuable plants have been introduced from China and of the men who have aided in this work three (Messrs. Frank N. Meyer, Reginald Farrer and William Purdom) have paid the supreme price.

CHAPTER XLI.

Crabapples of the Orient

DIFFERENT species of Crabapple grow wild in the temperate regions of Asia, North America and Europe. The greatest number are native of the Orient, where they are a feature of the margins of woods, thickets and valleys in China, Manchuria, Korea and Japan. Indeed, of the many floral gifts the East has lavished on the gardens of the West few, if any, excel the Oriental Crabapples, which possess all the qualities necessary in hardy woody plants. No trees flower more profusely in spring or fruit more abundantly in autumn. Moreover, the fruit is beautiful in itself, hangs long on the trees and is much appreciated by birds. I propose limiting this chapter to the Oriental species but before dipping properly into our subject just a word about the generic name of Crabapples. It has become a custom with many to unite the Apples, Sorbs and Pears under the name Pyrus which, properly speaking, belongs to the Pears alone. Such classification is both cumbrous and misleading. No good purpose is served by this drastic lumping together of trees which are obviously dis-

tinct, and there are good and sufficient technical characters distinguishing them. In the European records that have come down to us from the earliest times the Apple is known as Malus and this name from every viewpoint is correct.

Many of the Oriental Crabapples are essentially trees for the larger garden and park but there are sorts well suited for the flower-garden and the suburban lot. Their great merits, notwithstanding, Crabapples are far from occupying the position they are entitled to hold in gardens. Odd trees or bushes are often seen and there are a few notable collections. Fitly enough there is one in the Arnold Arboretum and another at Kew where, in an unpromising sandy soil, the returns the trees give are nothing short of marvellous. A good loam, rather on the stiff side, is ideal and Crabapples do not by any means object to lime. As to site, provided it is open and exposed, they are not particular, though a hillside or slope is preferable. The common pests of Crabapples are scale-insects and a white woolly aphis known as American Blight. The former may easily be kept down by spraying in late winter with lime-sulphur or Imperial Soap (one gallon to eight gallons of water). The Blight is destroyed by spraying in summer with Imperial Soap (one gallon to thirty

PL. XCVI.

LILACS APLENTY CHINA HAS GIVEN — SYRINGA MICROPHYLLA

gallons of water). Several of the Oriental Crabapples can withstand greater cold than the common Apple-tree and where this thrives its oriental relatives will be found to flourish. They love to have the wind and sunlight play freely through them and under these conditions are long-lived and suffer little from pests of any kind.

Near the house no tree could be more attractive than the shapely *Malus Halliana* with clustered rose-pink, pendent, more or less double flowers; on a bank with its bottom branches hugging the ground the low, broad, white-flowered *M. Sargentii* is a jewel above price. For the flower-garden many sorts are good, none more so than the old favorite *M. spectabilis* with pink semi-double blossoms, and the new *M. theifera* with white flowers, rose-pink in the bud. As a flowering tree in the park the Siberian *M. baccata,* especially its hairy variety *mandshurica,* with an oval crown full 50 feet tall, the lower branches sweeping the ground and pure white, fragrant flowers, cannot be excelled. This and other tall kinds may also be planted with advantage on the edges of woods and copses, especially where Oak and Maple trees predominate. An occasional Pine, Fir or Spruce well to the rear adds greatly to the landscape effect.

All Crabapples are deciduous and most of them mentioned here open their blossoms before the leaves unfold, though in some the foliage is partially developed ere the petals fall. The flowers are followed by an abundant crop of small fruits, in most species scarcely larger than a good-sized marrow-fat pea, either crimson, wine-red, yellow or red and yellow, but in a few dull greenish red. To those who breed pheasants or love birds in general Crabapples have double or rather treble values, since to the aesthetic qualities of flowers and attractive autumn fruits they add the utilitarian value of providing winter food in quantity for feathered friends.

The flowers of many Oriental Crabapples are bright rose-pink in the bud, changing to white as they expand. Such are those of *M. floribunda* and *M. theifera*. Some, like *M. Sargentii, M. toringoides, M. baccata* and its forms, are pure white. In *M. spectabilis* the flowers are pink, fading to nearly white, and in *M. Halliana* they are bright rose-pink, becoming slightly paler as they age. All are slightly and pleasantly fragrant but this pleasing quality is most highly developed in the delightful *M. baccata* var. *mandshurica*. The flowers last about a week; the fruits for several months, indeed, in several species they remain fresh in appearance throughout the

winter. Intense productiveness tends to exhaustion and so Crabapples have their off years like everything else. In a good season, and that is usually every other one, the branches from tip to base are densely studded with flower-clusters and are transformed into plumes or wands of blossom. About mid-May I have in many years revelled in the beauty of *M. theifera* with 12-foot long plumes of flowers, the blossoms so densely set on all sides of the branches that it was not possible to insert a finger without touching the petals.

Crabapples are so susceptible to pollen from their neighbors and hybridize so freely that few breed true from seeds. Some beautiful chance hybrids, like *M. arnoldiana,* have originated this way but the danger of worthless mongrels arising from attempts to raise them from seeds is very great. Fortunately they may be propagated easily and quickly by budding and grafting and in so far as the Oriental species mentioned here are concerned the Common Apple is a good stock. But I would warn garden-lovers against using this stock for such anomalous east Asiatic species as *M. yunnanensis, M. Prattii, M. kansuensis* or *M. Tschonoskii,* or, for any of the American species. To use the common Apple-tree for these is to court disaster.

The first of the Crabapples to open its blossoms in the spring is *Malus baccata* var. *mandshurica.* This is a native of Manchuria, Korea and northern Japan, where it is a common and striking feature of the landscape. Where it has proper room to develop this is a tree about 50 feet tall with a broad, bell-shape crown and branches sweeping the ground. The flowers are pure white, an inch or rather more across, and are more fragrant than those of any other Old World species of Malus. The fruit is yellow or lustrous red. The typical *M. baccata* is native of the more interior regions of northern Asia and is distinguished by being everywhere glabrous. There are forms with erect branches (*fastigiata*) and with slender, semi-pendent branches (*gracilis*).

The typical *M. baccata* with pea-like, round, naked fruits was introduced into England in 1784 but the varieties mentioned are comparatively newcomers. With the exception of the fastigiate form, *M. baccata,* its varieties and hybrids, are the best suited of Oriental Crabapples for planting in the park, open landscape, or on the edge of woods where there is plenty of room for them to develop to their maximum size and display their full beauty. Many of the so-called Siberian Crabapples of gardens are hybrids between *M. baccata* and the Chinese Apple

CHINESE DOGWOOD — CORNUS KOUSA CHINENSIS

(*M. prunifolia* var. *rinki*). The most familiar in gardens is the handsome *M. robusta,* more generally known as *M. cerasifera,* with fruits about one-third of an inch in diameter, some crowned with the remains of the calyx, some quite naked, others are hybrids of the Common Apple.

The first known of the Oriental Crabapples is the well-named *M. spectabilis.* This is a tree of from 25 to 35 feet tall with a vase-shaped crown of numerous rigid, ascending-spreading branches and short branchlets. The flowers vary from pure to pale pink and are more or less semi-double, the fruit is yellow, nearly globose and about three-fourths of an inch in diameter. There are several forms of this old favorite, differing in the number of petals and degree of color; the habit is rather stiff but the wealth of flower-clusters is amazing.

Undoubtedly related to the above, and also of unknown origin, is *M. micromalus,* more generally known as *M. kaido.* It is a tree of similar habit but with less rigid branches, darker leaves, slightly larger and deeper rose-pink flowers. Supposed to be of Chinese origin this Crabapple is known only as a planted tree in Japan where it is far from common. It is the second Crabapple to open its blossom each

season making a close race with the fragrant *mandshurica.*

The Japanese and many people in eastern North America consider *M. Halliana* the finest of all Oriental Crabapples. Certainly it is the most handsome of all with colored flowers. It is a tree-like shrub sometimes 15 feet tall with a broad bushy crown of ascending-spreading branches and twiggy branchlets and rather sparse, comparatively thick, dark green leaves deeply tinged with bronze-color when they unfold. The flowers, each on a long slender stalk, are borne in clusters and are bright rose-color but the pea-like fruit, which ripens late, is greenish red and unattractive. The flowers vary from nearly single to semi-double and the central one of each cluster is usually male. This favorite of the Japanese has been cultivated by them for many centuries but its origin is unknown.

Widely dispersed in central and western China and a feature of the thickets and margins of woods on the mountains of western China is *M. theifera.* This is a small tree, seldom exceeding 20 feet in height, with sparse, upright spreading crown of rather zigzag branches which are densely studded with short spurs. The flowers are rose-pink in the bud and pure white where fully expanded; the fruit is dull

greenish red and not showy. I have told of the plumes of flowers and will only add that among the many plants it has been my privilege to add to gardens I count this the most beautiful of the deciduous small trees. The illustration tells its own story and grateful am I of the honor of being the fortunate introducer of this Crabapple. The specific name is derived from the fact that in China the peasants collect the leaves and from them prepare a palatable beverage which they call red tea.

Perhaps the best known and by some considered the finest of Oriental Crabapples is *M. floribunda.* This was introduced from Nagasaki into Holland by Von Siebold in 1853, yet its origin remains unknown and Japanese botanists and gardeners of today are unacquainted with this plant. It is a broad, round-topped tree, sometimes 30 feet tall and more in diameter of crown, with a tangle of branches and masses of slender, arching and pendent branchlets. The clustered flowers are white when fully expanded and bright rose-pink in bud and as they open in succession the contrast is singularly beautiful. A cascade of myriad flowers symbolizes this Crabapple when in full bloom. In 1883 there appeared in the Arnold Arboretum among some presumed seedlings of *M. floribunda* a distinct plant which has since been

named *M. arnoldiana.* This is probably a hybrid between *M. floribunda* and *M. robusta.* It has the habit and abundant blossoms of the former but the flower and ovoid fruit are nearly twice as large.

Another Crabapple introduced by Siebold in 1853 is the bushy *M. Sieboldii,* often known as *M. toringo,* with small flowers which open late, and lobed leaves on the free shoots. It is really a dwarf form of a Crabapple very common on the mountains of Japan and on the Korean island of Quelpaert, to which the name *M. Sieboldii* var. *arborescens* has been given. This is a rather slender tree often 30 feet tall with ascending, wide-spreading branches which are densely studded with clusters of white tinged with rose-color flowers and small fruits, red on some trees yellow on others. The flowers though small are produced in great abundance and the tree has the advantage of flowering later than most of the other Oriental Crabapples.

The pigmy of the Crabapple family and pre-eminently suited for planting on banks is *M. Sargentii.* This plant forms a rounded mass 5 feet tall but is often twice that much through with rigid, spreading branches, the lowest of which lie on the ground. The flowers are saucer-shaped, of the purest white with conspicuous yellow anthers, and are borne in

PLUMES OF BLOSSOM — MALUS THEIFERA

umbellate clusters produced in utmost profusion. The fruit is wine-red covered with a slight bloom and is long persistent. This most distinct Crabapple is native of salt marshes near Muroran in north Japan, where it was discovered and introduced into the Arnold Arboretum by Professor Sargent in 1892.

The latest to flower and the most beautiful in fruit of all Oriental Crabapples is *M. toringoides*, a recent introduction, having been discovered and introduced by myself into England in 1904 and into America in 1908. At maturity this is a tree from 25 to 30 feet tall with a short trunk and a broad tangled crown of branches and spiny branchlets. The leaves are partly entire and partly incised and lobed, resembling those of the Hawthorn, and are well expanded when the clustered white flowers open. The fruit is conspicuous and handsome, being exactly like a whiteheart cherry only somewhat smaller. This grand acquisition is growing in a few gardens and its fortunate possessors never tire of sounding its praise.

In the garden of the Imperial Summer Palace near Peking the well-known *M. spectabilis* is a planted tree and I have seen it in a few other old gardens in eastern China. It was introduced into England from Canton about 1780 through the agency of the old

East India Company and was the first Oriental Crabapple to reach England. Very rare in China and known only as a planted tree and quite unknown in Japan, the origin of this beautiful plant is a mystery.

There are other Crabapples of merit and several fine hybrids that have originated in Europe, such as *M. Scheideckeri, M. atrosanguinea* and the new *M. purpurea, M. Eleyi* and *M. aldenhamensis,* but my tale must end with mention of *M. sublobata.* A hybrid of uncertain origin, this tree grows to a large size and has bright yellow fruit an inch in diameter. Its parents are probably the Chinese Apple (*M. prunifolia* var. *rinki* and *M. Sieboldii* var. *arborescens*) but, whatever its origin, it is in the autumn the finest of the larger fruited Crabapples.

No race nor creed have made the Crabapple their favorite flowering plant. I have often wondered why Buddhists have not taken it as an emblem of abundance. Much mystery surrounds the origin of these Crabapples, indeed, there is no group of familiar plants concerning which our ignorance is more profound. Of those mentioned here five only are known in a wild state. By devious channels and many agencies the Oriental Crabapples have reached our gardens. The first to arrive was *M. spectabilis,*

the last *M. toringoides,* both from China. The others came at different times between 1780 and 1904. All are worthy, and, although we cannot tell the origin of many, we can be thankful that such beauty has fallen to our enjoyment.

CHINA

CHAPTER XLII.

Treasure-Trove

HINA proper and without its dependencies is a very large country, occupying about twenty degrees of latitude and twenty degrees of longitude, being equal to about two-thirds of the United States. The south is just within the tropics whereas the north enjoys a climate similar to that of New England. The country is well watered and is rich and fertile to an extraordinary degree. It has many fine rivers navigable for very long distances. Rich alluvial valleys, plains and plateaux and a complex mountain system make up its physical formation. The western boundaries, separating it from Thibet, are a series of high parallel ranges with their major peaks clad with snows eternal. The highest exceeds 25,000 feet in altitude. Except in the treeless areas of the northeast, China enjoys a good rainfall, evenly distributed throughout the year, though in many parts there is a decided leaning toward a summer rainfall.

China is densely populated and the people are es-

sentially agricultural. All suitable land is under crops, and forests (except in inaccessible parts) have been all destroyed. In spite of this the Chinese flora is the richest temperate flora in the world. Fully 20,000 different species are known to grow there and we are far from knowing the full richness of this remarkable land. Enjoying a climate congenial to plant life, every kind of soil and altitude ranging from sea-level to perpetual snows, China is of course highly favored. Moreover, the country was not glaciated during the Tertiary times and though agriculture, practised as it has been for several thousand years, has wrought the destruction of we know not how many species and genera of plants, the flora as it exists today is really an epitome of that of the whole north temperate region in times prior to the last glacial epoch. This itself is of great interest, but the fascination to us lies in the fact that it contains such a wealth of different plants pre-eminently suited to the embellishment of our outdoor gardens.

No other country has given us so many ornamental trees and shrubs and a majority of the most prized woody plants of hardy gardens are native of China. The woods and forest-remains of China are in the main composed of plants generically the same

as those of North America, indeed, there is a very close relationship between the floras. In China we find Pine, Fir, Spruce, Larch, Juniper, Oak, Ash, Elm, Maple, Willow, Poplar, Birch, Alder and so forth, even as in North America and Europe but the species are different. In short, the aspect of the forest is similar though in detail they differ greatly. However, the flora is in general familiar and not wholly alien like those of Australia and South Africa.

I do not wish these chapters to degenerate into mere lists of plant names but it is difficult to do any sort of justice to the Celestial Empire's contributions to gardens of the West without enumerating such names by the score. The outstanding feature of Chinese flora is its great richness in plants with showy flowers which blossom at every season of the year except winter in the cold North. Our spring-flowering Forsythias and Magnolias, summer-flowering Roses, Buddleias and Lespedezas, and autumn-flowering Chrysanthemums are all Chinese in origin. Space is too limited for any proper analysis, but a few words may be given to some of the principal groups which characterize the flora of China.

Broadleaf evergreen trees and shrubs are prominent in the milder parts of China and chief among them are Rhododendrons. If we ignore for the moment

JEWEL ABOVE PRICE — MALUS SARGENTII

the section familiarly known as Azaleas, the first species of Rhododendron proper was discovered in Hongkong in 1849 and was named *R. Championae*, after the wife of Colonel Champion, its discoverer. Robert Fortune found on the mountains of Chekiang, in 1855, a second species which was named *R. Fortunei*, and this fine plant has been of great value to Rhododendron breeders. The next discoveries were made by Père David in western Szechuan, followed by those of Père Delavay in Yunnan and Augustine Henry in Hupeh. In more recent times a couple of hundred other species have been discovered in western China and that region established as the headquarters of the genus.

The rank and file among Chinese Rhododendrons are as hardy as the well-known *R. ponticum* but, unfortunately, none are hardy in the colder parts of this country. In England, on the other hand, these Chinese Rhododendrons have proved most adaptable and are among the most useful and acceptable gifts China has given to gardens. Different species of Rhododendron grow on the mountains in every one of the eighteen provinces of China but their greatest concentration is found in the extreme west. In height they vary from prostrate or tufted plants a few inches high to forest trees 60 feet and more tall

with trunks from 4 to 6 feet in girth, but the majority are wide-spreading bushes from 6 to 15 feet tall. On alpine moors they grow gregariously in the same manner as does the Heather in Europe, and Phyllodoce and various species of Vaccinium in this country. The flowers vary in size from tiny saucers not half an inch in diameter to huge bells from 4 to 6 inches across the mouths. The colors are of every known hue and include some quite good yellows, and the different species are to be found in bloom from the New Year until well into August. The distribution of nearly all the species is quite local, many of them occupy definite altitudinal zones on the mountains and this gives rise to belts of color. To traverse the mountains of western China in the Rhododendron season is to enjoy a feast of beauty not excelled the world over. On the mountains not far from Peking and north-eastward into Korea and beyond grows the lovely *R. dauricum* var. *mucronulatum,* a deciduous plant whose wealth of rose-pink to rose-purple blossoms open the first warm days of spring. For the gardens of New England there is no more satisfactory spring-flowering shrub.

Azaleas mentioned earlier demand a few words. From the coast to the extreme west, from sea-level to about 5000 feet on the mountain slopes, *Rhododen-*

dron Simsii, parent of the modern "Belgian" or "Indian" Azaleas, luxuriates. This red-flowered Azalea is a gregarious plant seldom exceeding 8 feet in height and in season its mass of blossoms dazzle the eyes with their intensity of red. The fragrant, yellow-flowered *R. molle* is also abundant in the milder parts and well deserves a word of praise. Unfortunately, this plant is not quite hardy in the climate of New England.

A feature of the moist rich woodlands of China are different species of Magnolia, several of which open their large flowers before the leaves unfold. Foremost among these must be placed the Yulan, well-known wherever hardy trees are cultivated in the temperate regions of both hemispheres. This handsome flowering tree, which grows naturally on the mountains of central China, for more than a thousand years has been a favorite tree in Chinese gardens. It was introduced into England in 1789, being the first Asiatic species to reach Europe. In a wild state both white and pink-flowered forms are known but the latter was introduced into gardens only some twenty-five years ago.

The Rose family is abundantly represented in China and its trees and shrubs are among the most beautiful flowering plants of the woodlands, moun-

tain-slopes and valleys. In thin woods the pink and white blossoms of various Cherries are a conspicuous feature of early spring as in the open are those of *Prunus tomentosa.* Crabapples, too, in variety there are but these have a chapter unto themselves. In early summer Spiraea in many species adorns low thickets with arching sprays of white and none are more comely than *S. Henryi* and *S. Veitchii.* The related genus Sorbaria favors moist woodlands and the sides of streams where after mid-summer is past its members are conspicuous with large, terminal panicles of white flowers standing well above the pinnate leaves each a foot long. The handsomest of the genus is the lush-growing *S. arborea.* A Quince, (*Chaenomeles lagenaria*), with white to pink and scarlet flowers and large fragrant fruits is a feature of rocky places. The true Chinese Quince, (*C. sinensis*), is a small tree with smooth, flaking bark, and rose-pink blossoms which appear at the time the leaves unfold. It is a favorite of the priests and is commonly seen in temple grounds throughout the Orient.

Conspicuous in the valleys and open mountain-slopes everywhere in China are Roses and from that land have come the principal parents of the races of Roses we cultivate today and also some of our most

prized Rose species. Very common in southwest China is *Rosa odorata* var. *gigantea,* prototype of the Tea Rose, with white and pink fragrant blossoms. In central China, though not common, is found the red-flowered *R. chinensis* var. *spontanea,* parent of the China Monthly Rose. In the same region and partial to alluvial river-flats *R. multiflora* var. *cathayensis,* parent of the Crimson Rambler and the Polyantha Roses, is abundant. The wilding has pink flowers and conspicuous yellow stamens and is more lovely than many of its offspring cultivated under fancy names.

These and other Roses have been cultivated for we know not how many centuries by the Chinese, in whose gardens forms in variety have originated, and it was these that toward the end of the Eighteenth Century and early in the Nineteenth were introduced into Europe, some by way of India and some by that of Mauritius, whither they had been carried by early voyagers. These products of Chinese gardens received names, became the accepted types of species and by crossing and intercrossing with the Roses long grown in European gardens have given us the modern Rose in all its multifarious forms. The discovery of the wild forms of these Chinese garden

Roses is of recent date and all the facts concerning them are far from being fully known.

Abundant everywhere at low altitudes in central China is *R. laevigata* with its large pure white flowers. This Rose was first named by Michaux in 1803 from plants growing wild in this country, where it is familiarly known as the Cherokee Rose. When and by what means it first reached America is one of the unsolved problems of plant introduction. In the heart of China in extraordinary plenty grows the wild Banksian Rose with fragrant, single, white flowers arranged in umbels. This Rose, by clinging and scrambling, covers trees from 40 to 50 feet tall and in the early summer its festoons of blossoms are among the loveliest pictures of the countryside. With it grow several species with musk-scented flowers, of which none is finer than *R. Helenae.* To travel through the mountains of China when the Roses are in bloom, and especially in the cool of the morning or evening when the air is laden with the fragrance from their myriad flowers, is to taste of paradise. On the highlands of the extreme west grows *R. Moyesii,* of which no species has flowers of richer shades of red or more brilliantly colored hips in autumn. The open mountain slopes of north-central China and westward is the home of *R.*

PL. C.

MANCHURIA'S CRABAPPLE — MALUS BACCATA MANDSHURICA

Hugonis, most exquisite of all the yellow-flowered hardy Roses. There are many other species—dozens of them—but I cannot attempt to mention all. Everywhere in China Rose species are to be found and as individuals no shrubs are more plentiful, more floriferous or more lovely.

In the gardens of the colder parts of eastern North America Lilacs hold an undisputed place, for they are satisfactory shrubs and deservedly popular. Most of the familiar sorts grown are derived from *Syringa vulgaris,* considered to be native of the mountains of Bulgaria. In China grow many other species and their beauty is greater than that of the prototype of the common Lilac; moreover, their season of blossoming extends over a period of six weeks. Many of them are quite recent introductions and have scarcely been employed by the breeders of new Lilacs. All so far introduced, and there are a dozen and more, have proved perfectly hardy in the Arnold Arboretum, where in the early summer of each year they may be seen in flower. An older species is *Syringa villosa* of neat, rounded habit and erect masses of rosy purple flowers. Among the newcomers I shall mention only *S. reflexa,* which has the flower-trusses hanging after the manner of those of the Wistaria.

Different kinds of shrubs and trees bearing orna-

mental fruits are plentiful in China and many of these have conspicuous flowers and gay autumnal foliage. Bush-Honeysuckles, Barberries, Viburnums and Cotoneasters there are in scores of species, worthy of a place in any garden. The deciduous-leafed Cotoneasters are a particularly valuable gift to the gardens of New England, where they have proved themselves most adaptable. Of them all none is finer than *C. racemiflora* var. *soongorica,* which has a profusion of relatively large, pure white flowers and bright coral-pink fruits. This is a perfectly hardy shrub with rigid, zigzag branches and grows from 5 to 8 feet tall and twice as much in diameter. For clothing banks nothing is better than *C. horizontalis* and its forms. In milder climates such evergreen Cotoneasters as *C. pannosa, C. salicifolia, C. Henryana* and *C. Franchetii,* either for hedges or as specimens, are valuable plants, having bright red fruit in autumn. In China Cotoneasters are a feature of scrub-clad mountain-slopes and valleys where they enjoy full exposure to sun and winds and they do best when given the same conditions in gardens.

Earlier it has been mentioned that *Wistaria sinensis* came to us from China, but this plant is less often seen in gardens than its Japanese relative, of which more anon. A group of hardy climbers which our

gardens are justly proud of is Clematis and from the Orient came the parents of the familiar large-flowered race of hybrids much grown today. Among climbing plants of recent advent none is more beautiful than *Clematis montana* var. *rubens*, which is native of the margins of the woods and thickets of central China. There are fifty and more other species of Clematis native of China, including the handsome *C. tangutica* with grayish green foliage and top-shaped, rich yellow flowers.

In the matter of herbs China also has been most generous. The Chrysanthemum has already been mentioned and so, too, has *Primula sinensis*, but the well-known *Primula obconica* and the Baby-primroses *P. malacoides* and *P. Forbesii* are also natives of China, so are *Anemone japonica, Dicentra spectabilis, Incarvillea Delavayi, Rehmannia angulata, Lilium Brownii, L. concolor, L. Sargentiae* and many others, including the magnificent Regal Lily (*L. regale*), many Paeonies, Aconitums, Poppyworts, *Senecio Clivorum, Artemisia lactiflora* and the China Aster (*Callistephus chinensis*). The alpine regions of the Chino-Thibetan borderland are gardens of vivid colors in the summer, where Gentians and Primroses and hosts of other pretty things carpet square mile upon square mile from the tree-limit to

the edge of perpetual snows. In woodland glades grow many tall herbs and on cliffs and steep mountain slopes Lilies in variety luxuriate.

In China many fruits are grown and most of them have during centuries of effort been evolved from native plants. Such is the history of the Apple, the Pear, the Cherry and the Plum grown in China for they have not common origin with ours which are of Eurasian birth. The Apricot, the Peach, the Orange, the Lemon, the Pomeloe, including the Grapefruit, are natives of China. The Walnut and Grape-vine (*Vitis vinifera*) have been introduced into China from the Caspian and central regions of Asia but her other fruit- and nut-trees are her own. To China we owe of fruits the various Citrus and the Peach, among economic vegetable products tea, vegetable-tallow and wood-oil and the medicine rhubarb.

There is not a season of the year when flowers are open in the hardy garden but what some jewel from China calls forth admiration, from the first blossoms of the Forsythias in early spring to those of the Chrysanthemum in the late fall. Whether it be among trees or shrubs, climbers or herbs, whether they be grown for the beauty of their flowers, their fruit or their foliage or for all three, the plants native

of China are to be found in the gardens of temperate regions of both Hemispheres. They have been won to us by all sorts of agencies and by all sorts and conditions of men. To no part of the world do gardens owe more than to China—the Kingdom of Flowers.

CHAPTER XLIII.

Advent of the Lily Royal

ow many people know the size of a mule's hoof? Quite a number have felt the strength of a mule's leg and the sharpness of his teeth; his obstinacy is a proverb. But the size of his hoof is another matter. Frankly, I do not know with mathematical exactness but as I lay on the ground and more than forty of these animals stepped over my prostrate form the hoof seemed enormous, blotting out my view of the heavens. The instinctive surefootedness of the mule is well-known and I realized it with my gratitude as these animals one by one passed over me and not one even frayed my clothing.

It happened in the No-man's land of the Chino-Thibetan borderland and my predicament had been brought about by a rockslide, a common occurrence in that part of the world. I had left Boston, Massachusetts, at the end of March, 1910, and having crossed to Europe reached Peking by way of the Trans-Siberian Railway early in May. From Peking I travelled by devious routes across China to Sung-pang Ting, in the extreme west-northwest, which

was reached toward the end of August. My quest was the Regal Lily which I had discovered some years earlier but had failed to successfully introduce into American gardens. Its beauty of blossom and richness of fragrance had won my heart and I was determined that it should grace the gardens of the western world. That such a rare jewel should have its home in so remote and arid region of the world seemed like a joke on Nature's part. However, there it was and my business in life was to effect its transference to lands where its beauty would find proper recognition.

Throughout an indefinite past generations of the Regal Lily had lived unsung and unseen save by the rude peasants of a rude land. But few white men had passed that way when first I made discovery and none had noted my royal lady. This had been preserved for me. And what of the Regal Lily? Journey in thought with me for a moment or two, westward, until "west" becomes "east," although we still chase the setting sun. Across the broad American continent, across that wide ocean misnamed "Pacific" to Shanghai, gate of Far Cathay; onward and westward up the mighty Yangtsze River for 1800 miles, then northward up its tributary the Min, some 250 miles to the confines of mysterious Thibet; to that little-known hinterland which separates China

proper from the hierarchy of Lhassa; to a wild and mountainous country peopled mainly by strange tribesfolks of unknown origin; to a land where Lamaism, Buddhism and Phallism strive for mastery of men's souls; to a region where mighty empires meet. There in narrow, semi-arid valleys, down which torrents thunder, and encompassed by mountains composed of mud-shales and granites whose peaks are clothed with snow eternal, the Regal Lily has her home. In summer the heat is terrific, in winter the cold is intense, and at all seasons these valleys are subject to sudden and violent windstorms against which neither man nor beast can make headway. There in June, by the way side, in rock-crevice by the torrent's edge and high up on the mountainside and precipice this Lily in full bloom greets the weary wayfarer. Not in twos and threes but in hundreds, in thousands, aye, in tens of thousands. Its slender stems, each from 2 to 4 feet tall, flexible and tense as steel, overtop the coarse grasses and scrub and are crowned with one to several large funnel-shaped flowers, each more or less wine-colored without, pure white and lustrous on the face, clear canary-yellow within the tube and each stamen filament tipped with a golden anther. The air in the cool of the morning and in the evening is laden with delicious

HER MAJESTY, LILIUM REGALE

perfume exhaled from every blossom. For a brief season this Lily transforms a lonely, semi-desert region into a veritable fairyland.

Sungpang Ting is a military town situated on the head-waters of the Min River on the very edge of the grasslands of northeastern Thibet. It is a very important outpost of Chinese civilization and a trade entreport of considerable magnitude. Medicines in great variety, including the famous Rhubarb and Musk, are brought in by tribesfolk from the neighboring mountains and bartered to Chinese merchants. I knew the town well and on former occasions had rested within its walls and beneath the clear blue skies it enjoys had recuperated after arduous journeys. So, too, on this occasion. Rested and reprovisioned I and my followers sallied forth and for seven consecutive days plunged down the seemingly interminable gorge of the Min River. The mountains on either side are so high that the summits were usually hidden from view. Here and there where some tributary stream flows in a glimpse of snow eternal met our gaze. Habitations are few and far between but wherever possible patches of the mountainside are under agriculture. It was frightfully hot and travelling was most fatiguing. In many places the narrow track is hewn and blasted from

the solid rock and here and there tunnelling has been necessary. In several places Chinese characters of huge size carved in the rocks warn those who can interpret them of the dangers of the road and urge all not to tarry in particular places. This road, difficult and narrow as it is, is the artery of ingress and egress to Sungpang Ting from and to the cities of wealthy Szechuan. There was in consequence much traffic, largely coolies, but several mule-trains taking up brick-tea and cotton cloth in particular, and various merchandise in general and bringing down medicines, hides and deer horns. The road is narrow, sometimes it skirts the edge of the river's turbulent waters but more usually ribbon-like it winds along from fifty to 300 feet above. The passing of mule-trains is a difficult business, often possible only at particular places when one caravan comes to a standstill and allows the other to pass.

I travelled mostly on foot but had with me a light sedan chair made of rattan and my Boy or principal servant was similarly favored. A sedan chair is an outward and visible sign of respectability without which no traveller is properly equipped. In those days it was of far more importance than a passport, for it inspired confidence and insured the respect of the people. Whether one rode in it or walked

was immaterial; the important thing was its presence.

On the seventh day we were down to 5500 feet altitude and the following extract from my diary seems worth recording: "A bad road through barren, desolate country and abnormally long miles sums up the day's journey. Barring absolute desert no more barren and repelling country could be imagined than that traversed today. But it is really only the narrow valley and precipitous mountain-sides that are so desert-like. On the upper slopes trees and cultivation occur and small villages and farmhouses are frequent. In the valley houses are far between and what few there are are in ruinous condition. A fierce up-river wind blows regularly from about eleven o'clock in the morning and it is difficult to make headway against it. The leaves on the Maize plants are torn to shreds by the wind's violence. The houses are of mud and flat-roofed, as protection against the winds. The Regal Lily occurs here and there in abundance on the well-nigh stark slate and mudstone cliffs."

The eighth day I camped and for several days was busy arranging to secure in October, the proper season of the year, some six or seven thousand bulbs of the Regal Lily. Plans completed we set out for Chengtu Fu, the capital city of Szechuan. The hard-

ship of a four months' journey were beginning to tell on me and dysentery in a mild form had troubled me for days. Yet it was with a light heart and a satisfied mind that I rode in my chair. Soon after starting we passed a mule-train breaking camp and bound our way. With the thoughts of the flesh pots of Chengtu Fu only four days' distance, all were in a cheerful mood. We were making good progress, my chair leading, with personal attendants and man carrying my large camera immediately behind; my black spaniel dog wagging his tail ahead of us all. The Chinese characters of warning carved in the rocks did not afright us, we had seen so many and passed all well. Song was in our hearts, when I noticed my dog suddenly cease wagging his tail, cringe and rush forward and a small piece of rock hit the path and rebounded into the river some 300 feet below us. I shouted an order and the bearers put down the chair. The two front bearers ran forward and I essayed to follow suit. Just as I cleared the chair-handles a large boulder crashed into the body of the chair and down to the river it was hurled. I ran, instinctively ducked as something whisked over my head and my sun hat blew off. Again I ran, a few yards more and I would be under the lea of some hard rocks. Then feeling as if a hot wire passed

HOME OF THE REGAL LILY

through my leg, I was bowled over, tried to jump up, found my right leg was useless, so crawled forward to the shelter of the cliff, where the two scared chair-bearers were huddled.

It was only a small slide and our lives had had a providential escape. The man carrying my camera could not run back so fast as others and suffered a bad scalp wound. I was the biggest sufferer but, fortunately, was not knocked unconscious. If I had been the men would probably have deserted from fright, as it was they behaved well. The pigskin puttee on my right leg was cut slantingly as with a knife and forced round my leg, the toe cap of my boot was torn off and with it the nail of my big toe; the right leg was broken in two places below the knee and the side of my calf was badly lacerated. Not a pleasant situation to find oneself in alone with Chinese and four days from the nearest medical assistance!

As soon as it was safe to do so the men came along, terrified and solicitous. My Boy with his chair also came soon afterward but was quite ignorant of the whole affair. With the legs of my camera tripod I improvised splints and while these were being bandaged to my leg the mule-caravan passed in the morning loomed into view. The road was too narrow for

them to turn back and they dare not stand still until I could be moved forward, since we knew not when the rock slide would re-commence. There was only one thing to do. I lay across the road and the mules stepped over my body. Then it was that I realized the size of the mule's hoof. There were nearer fifty than forty of them and each stepped clearly over me as if accustomed to such obstacles. Nevertheless, I breathed freely when the last was over!

My own chair being smashed I requisitioned the Boy's, had a piece of wood laid cross-wise and lashed the leg in splints to the right pole. At considerable risk to themselves the men salvaged my wrecked chair and we started on our journey to Chengtu Fu. We made it in three days, marching early and late, and three agonizing days they were for me. At Chengtu Fu I was carried to the house of Dr. Davidson of the Friends' Presbyterian Mission and all that could be done was done. The leg had become infected. In spite of every care, at the end of six weeks there was no signs of the bones uniting. The question of amputation was pressed but somehow I never felt this would be necessary. Other doctors were called in, including a French army surgeon named Dr. Mouillac. Some cutting and slitting was done and the infection stayed. At the end of three months I

was out on crutches. Soon afterward I hired a boat and started down the river toward Ichang, where steamers were available for Shanghai and thence for America. At every place on the river where there was medical missionaries I received attention. On crutches I crossed the Pacific Ocean and the American continent to spend a couple of weeks in a hospital in Boston, Massachusetts. Afterward, fitted with a special boot I was able to limp about with a cane and in just a year from the date of the accident walked freely once again. Owing to the infection it was impossible to fit the leg in a cast and so the bones just grew together. The leg is crooked, fifteen-sixteenths of an inch short but is strong and sound and has since carried me many, many thousands of miles.

The accident notwithstanding, I got my Regal Lily and brought the bulbs safely to Boston. The arrangements I had made with the local peasantry to dig the bulbs were carried out under the supervision of my trained collectors. The bulbs were encased in clay, packed in charcoal, shipped at silk rates, and reached Boston a few days after myself. Planted in a garden in Roslindale, Massachusetts, they flowered freely in the June following and some even ripened seeds. From this stock has sprung the millions now happily acclimated in American gardens

and other gardens across the seas. Its beauty captured all hearts at sight. Mrs. Francis King, the well-known enthusiast, wrote to me saying, "Nothing so fair or so beautiful has ever before blossomed in my garden." A poem on the Regal Lily was published in the "Boston Transcript," Gouverneur Morris wrote of it aptly as the "Incandescent Lily" in the "Saturday Evening Post." Its merits have been lauded far and wide by many scribes. It loves this country and the climate and from the Atlantic to the Pacific is grown wherever gardens are loved. Each year it adds to the pleasure of millions of folk. The price I paid has been stated. The Regal Lily was worth it and more.

Royal is this Lily and regally it has taken its place and added lustre to gardens. Proud am I to have discovered, introduced and christened the Regal Lily. Did what?

"God forgive me! No, I didn't.
'Tis God's present to our gardens.
Anybody might have found it but—
His whisper came to me!"

(With apologies to Kipling.)

CHAPTER XLIV.

Jewels of Her Alpine Meadows

THE flowers of the alpine regions of the world are justly famed for their brilliant blossoms. On these storm waifs of the mountains Goddess Flora lavishes her brightest pigments and masses them in mile-wide sheets of ravishing color. From the forest limits on the mountains upward to the cradle of eternal snows stretch these alpine gardens strewn with a galaxy of plants. The Rocky Mountains of North America, the Alps of Europe, the Himalayas of northern India, the alps of New Zealand and elsewhere, each and several, have their alpine regions carpeted in loveliness. So, too, has that remote hinterland which separates western China and the Thibetan plateau. This is a region of stupendous mountains far flung, in a series of more or less parallel snow-capped ranges, from the borders of Assam northward some 2000 miles. A wild and savage land is this, and little known, for much of it the white man's foot has never trod.

Hidden among these mountain ramparts are thousands of alpine valleys, known only to shepherd

tribesmen or nomad cattle-herders on their summer visits with sheep and cattle. Above these lonely valleys stretch herb- and scrub-clad slopes of a hundred unnamed and unscaled snowy peaks. Into a few isolated points of these fastnesses the plant-hunter has penetrated, to be rewarded by a rich harvest of new plant treasures. But most is virgin territory awaiting the coming of the investigator. Here and there between the frontier towns of Tachien-lu and Sungpang Ting, some 600 miles apart, I have known these flower-clad mountain ranges since 1903, when search of red and yellow Poppyworts lead me to them. 'Tis foolish attempt to paint the Lily, yet would I strive to give a glimpse of a floral paradise in all its wealth of beauty.

To picture these alpine regions during the short summer that is theirs one must visualize mile upon mile of color spuming like foam about a storm-tossed shore—seas of yellow, red, orange, blue, violet and purple. From sun-kissed snows of dazzling whiteness, treacherous glaciers and hummocked moraines, downward stretch green grassy areas decked with a million flowers of every hue. Herbs, low and tall in stature, but mostly low, predominate, but entangled shrubs in variety struggle until reduced to flat mat-

ALPINE MEADOWS OF THE CHINO-THIBETAN BORDERLAND

like growths. Gray-green Juniper, Willow, Buckthorn and spiny, pink-blossomed Caragana flounder gamely in an ocean of rose-purple and magenta blossom borne by low-growing, fragrant leafed Rhododendrons, which lord the mountain slopes like Heather lords fair Scotland's moors. The wetter places herbs claim solely unto themselves and transform them into lakes and seas of vivid color. Carpeted with Anemones, Primroses, Gentians, Poppyworts, Delphiniums, Androsaces, Orchids, Groundsels, Lilies, Irises, vari-colored Pedicularis, and a multitude of other flowers these rainbow-hued alpine meadows rivet and fascinate attention.

Above an elevation of 10,000 feet around Tachien-lu a Cowslip (*Primula sikkimensis*), a most remarkable Rhubarb (*Rheum Alexandrae*), and a Globeflower (*Trollius yunnanensis*) demand a foremost place. The Sikkim Cowslip is well known to plant-lovers but I would that they could see it as it grows there. In moist meadows, and by the sides of streams and ponds, it occurs in thousands and hundreds of thousands. like Cowslips in an English meadow. On many a plant may be counted twenty scapes, each with large umbels of flowers filling the air around with soft delicious odor. The Rhubarb forms pale pyramidal towers,

a yard high, of inflated reflexed bracts that conceal the flowers, and, overlapping one another like tiles, protect them from the wind and rain; a mass of dark-green ovate leaves spread on the ground in marked contrast with the yellow transparent bracts. Whilst I am not prepared to grant *Rheum Alexandrae* first place amongst the herbs of these alpine regions its right to a foremost place cannot be denied. I have in mind as I write, a sloping mountain-side, somewhat spongy and boggy with boulders jutting out here and there, whereon grew thousands of these plants with their pale yellow pyramidal towers upthrust. *Trollius yunnanensis* is also peculiar to these alps. Imagine *Ranunculus cortusaefolius* with small leaves and slightly larger flowers, and you visualize this Trollius. It is essentially a social plant, and to see thousands massed together forming sheets of rich yellow is to remember it.

Pedicularis is the genus *par excellence* of these alpine meadows. About 130 species are recorded from China and of these two-thirds occur in the far west. Many are prostrate plants, some are a few inches high, others, again, grow a foot or more tall. They grow socially in thousands, having a mass of flowers which embrace every color save blue. It is a great pity we cannot cultivate this most charming genus;

the difficulty is that all are more or less parasitic on the roots of grasses and other herbs.

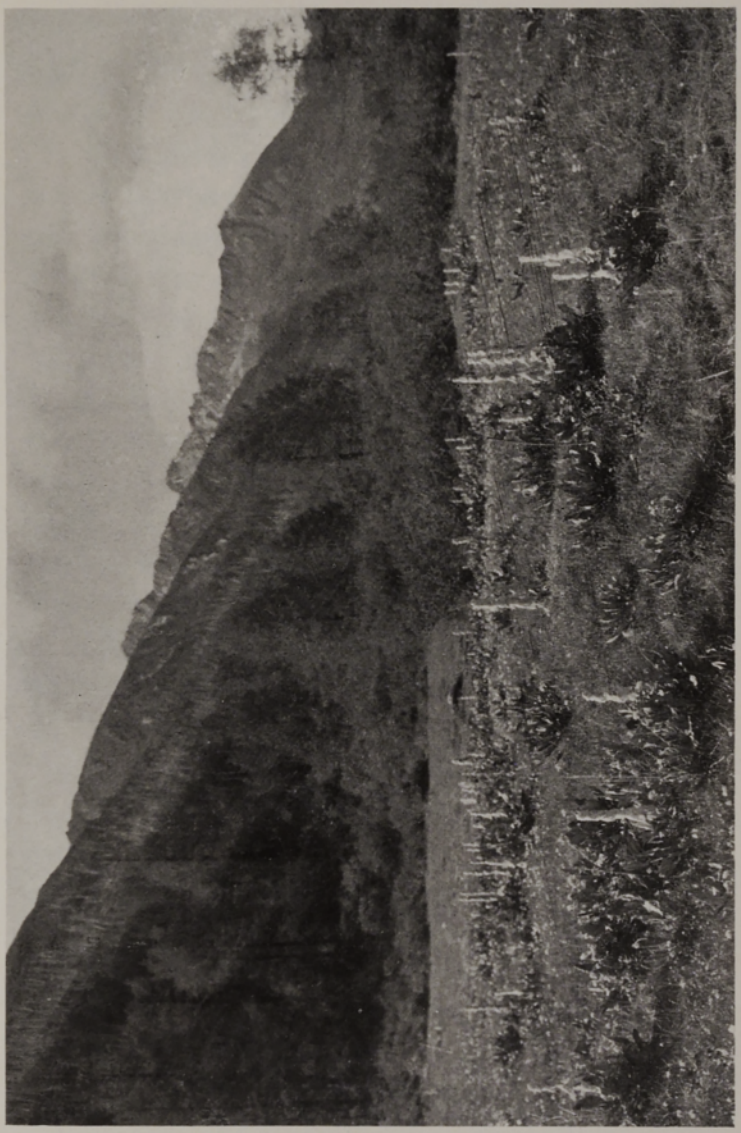
Another genus which deserves more than mere passing reference is Corydalis. Some fifty-eight species have been recorded from China, of which fully half are found in the alpine districts where the majority favor rocky or heathy places. All the cardinal colors, save green, are represented in this genus. A lovely species growing from 4 to 8 inches high, with deep blue flowers, is one of the features of the highland flora around Tachien-lu.

That favorite flower, the Gentian, in multitudes forms pools of blue on every side. Some sorts are tiny tufted plants clustered with starry blossoms, others carry tubular flowers clustered at the ends of upright and leaning leafy stalks, but most conspicuous are those that sprawl over the ground upthrusting large, intense blue or striped blue and white funnels. On sunny days the alpine meadows are filled to overflowing with Gentian blossoms but on dull or wet days not one is to be seen. The funnels, tubes and stars are all close shut to protect the delicate pollen. Yes, lovers of fine weather are these bright-hued children of the alps.

Nor must mention of the upland Orchids be omitted. They are all terrestrial sorts with blossoms

white and varying shades of red, or pink, or yellow. They may be only a couple of inches to a foot tall but what they lack in size they atone for in quality. So abundant are they in the meadows of these regions that one cannot move without treading down their pretty flowers. Listera and Goodyera, Orchis and Herminium, Platanthera and Habenaria, Satyrium and Hemipilia, all are there in many species and numbers countless; and Cypripedium, with large slipper-like flowers—pink, dark red and yellow, like guardians stare placidly or nod benignly over the entire family. Many of these Orchids are wide-spread through Asia, but greatest wanderer of all is my Lady's Tresses (*Spiranthes australis*), who so pertly rears slender spikes crowded with tiny fragrant white and pink-lipped spirally arranged blossoms. From the borders of eastern Europe to the Pacific, and south to Ceylon, Java, Australia and New Zealand this little plant is found; it has the distinction of being the most widely distributed member of the whole Orchid tribe.

I have mentioned one Primula but must enumerate a few others which are striking constituents of this alpine flora, such as *Primula involucrata* and *P. amethystina*. Acres of moist grassland are carpeted with the pink flowers of the former, and even larger



PALE YELLOW TOWERS — RHEUM ALEXANDRAE

areas of heath-land with the dark blue or purple flowers of the latter. Then in quantity there is *Primula Cockburniana* with unique orange-scarlet flowers arranged in tiers on slender scapes. Also, tiny little things like *P. Prattii, P. pinnatifida* and *P. kialensis,* only an inch or so tall but damsels of the daintiest type clad with laughing blossoms. And in wet, stony places high up luxuriate several of the snow-loving Primroses, typified by *P. nivalis* and *P. orbicularis,* with flowers of varying shades of blue, violet, purple and yellow, and oblong leaves coated on one or both surfaces with a meal-like waxy bloom. Coy and difficult to cultivate in gardens are these gems of the Primrose family.

Alongside streams and on the moors grow several species of Groundsels, some with handsome flowers and foliage. One fluviatile species (*Senecio nelumbifolius*), with enormous rounded leaves and large cymose clusters of small yellow flowers, is particularly striking. In moist places *Iris chrysographes* rears aloft its handsome royal purple streaked with yellow blossoms, and in drier land the blue-flowered *I. ensata* is found. Higher on the mountains are other kinds but Iris is less plentiful than many other herbs.

In bog and meadow and among the scrub *Lilium*

Duchartrei with marble-white spotted and splashed with wine-purple Turk's cap blossoms, luxuriates in thousands; and in drier areas the cinnabar-red spotted black flowers of David's Lily flaunt their brilliance. The dwarf *Lilium lophophorum,* with quaint, nodding, top-shaped, cream-colored flowers abounds and various Anemones, with white, blue and yellow flowers, many leguminous herbs and sub-shrubs add to the gaiety of the scene.

Above 12,000 feet an occasional plant of the medicinal Rhubarb (*Rheum officinale*) may be seen. This is a handsome and conspicuous plant, its much-branched inflorescence of white flowers being often 7 feet high. It occurs as high up as 14,000 feet, the highest altitude of any tall-growing herb in Szechuan. On dry, heathy ground, several typical Thibetan plants are found, such as stemless Saxifragas, the tiny *Ephedra Gerardiana* var. *sikkimensis,* and the pretty *Stellera Chamaejasme* with terminal globular heads of vari-colored flowers on slender tufted stems a foot high, and very ornamental. Beneath the gnarled and twisted stems of Rhododendrons, *Cassiope selaginoides* occurs aplenty; on bare exposed rocks, *Potentilla fruticosa* is redundant. Three forms of the latter are distinguishable with white, lemon

YELLOW POPPYWORT — MECONOPSIS INTEGRIFOLIA

and deep yellow flowers respectively; the white form attains the highest altitude.

Around 14,000 feet grow such interesting plants as *Spenceria ramalana, Meconopsis horridula, M. sinuata* var. *Prattii, Incarvillea Principis, Braya sinensis, Trollius ranunculoides,* species of Fritillaria, Cyananthus, Oxytropus, various Composites and the curious Himalayan Trefoil (*Parochaetus communis*). The Meconopsis grow in the niches of bare granite cliffs and have sky-blue flowers; the Incarvillea has bright crimson flowers and abounds in grassy places. At 15,000 feet, which is virtually the limit of vegetation hereabouts, is found *Meconopsis horridula, Ranunculus glacialis,* Arenarias, Drabas, Primulas, Saxifragas, Sedges, some curious Composites and the lovely *Myosotis Hookeri,* all small, tufted plants. Hooker's Forget-me-not forms cushions a foot or more across of lovely blue and is a most bewitching alpine.

I have stated that the quest of certain Poppyworts first took me to the alpine regions of the Chino-Thibetan borderland. On the mountains beyond Tachien-lu, at 11,000 feet above sea-level, on July 18th, 1903, I came across the first plant of the yellow Poppywort (*Meconopsis integrifolia*). It was growing amongst scrub and was past flowering. At

12,000 feet and upwards miles and miles of the alpine meadows were dotted with this plant, but only a few late flowers remained. Associated with it is found in thousands *Meconopsis Henrici*, a charming plant with dark violet-purple flowers of medium size borne on scapes 6 inches to a foot high.

I will not attempt to record the feelings which possessed me on first beholding the object of my search in these wild mountains. My journey was for the sole purpose of finding and introducing this, the most gorgeous alpine plant extant. I had travelled some 13,000 miles in five and a half months and to be successful in attaining the first part of my mission in such a short time was a sufficient reward for the difficulties and hardships experienced. The second part of my mission was easily accomplished in due season, and today this plant, with 8-inch broad flowers, blossoms every year in British gardens and is known to all readers of horticultural journals.

Of another highland area in this savage hinterland my diary records:—"The flora of the grassy ridge leading to the Pan-lan shan pass is strictly alpine in character, and the wealth of herbs truly amazing. Most of the more vigorous growing had yellow flowers, and this color in consequence predominated. Above 11,500 feet altitude, the gorgeous *Meconop-*

sis integrifolia, with huge, globular, incurved, clear yellow flowers, emblazon miles of the mountain-side. On stems from 2 to 2½ feet tall myriad flowers of this wonderful Poppywort presented a magnificent spectacle. Nowhere else have I beheld this plant in such luxuriant profusion. The deliciously fragrant pale yellow Sikkim Cowslip (*Primula sikkimensis*) is rampant in moist places. Various kinds of Senecio, Trollius, Caltha, Pedicularis and Corydalis add to the overwhelming display of yellow flowers. On boulders covered with grass and in moderately dry loamy places *Primula Veitchii* is a pleasing sight with bright rosy pink flowers. All the moorland areas are covered so thickly with the Thibetan Lady-slipper Orchid (*Cypripedium tibeticum*) that it was impossible to step without treading on the huge dark red flowers reared on stems only a few inches tall. Yet the most fascinating herb of all was the extraordinary *Primula vincaeflora,* with large, solitary, violet flowers, in shape strikingly resembling those of the common Periwinkle (*Vinca major*), produced on stalks 5 to 6 inches tall. This most unprimrose-like Primrose is abundant in grassy places. The variety of herbs is indeed legion, and the whole country-side was a feast of color. Silence reigns in these lonely regions, a silence so oppressive

as to be almost felt and broken on rare occasions only by the song of some lark soaring skyward."

The search for the Red Poppywort (*Meconopsis punicea*) took me to the valley which leads to the Kungala Pass beyond Sungpang Ting in northwest Szechuan. This valley is flanked by high mountains, whose upper parts are bare, barren and uninviting. The lower parts were clothed with coniferous forests, which here and there reach down to the river's edge. Two species of Picea (*P. asperata* and *P. purpurea*), and a Juniper (*J. saltuaria*)—all three handsome trees—are the sole constituents of these forests. The tree-limit is about 12,000 feet. Near the bed of the river small trees of Birch occur. In the distance, to the right, tower a range of vicious-looking peaks, barren and flecked here and there with snow.

Where free of forest, as it mostly is, the valley is covered with a dense low scrub composed almost entirely of *Potentilla fruticosa, Clematis tangutica, Daphne tangutica, Berberis Vernae, B. brachypoda, B. diaphana, Lonicera syringantha, L. hispida, Hippophae rhamnoides, Sibiraea laevigata,* Caraganas, Astragalus, Spiraeas and Willows. The Spiraeas form fully fifty per cent. of the whole scrub.

These moorland heaths merge into grassland,

PL. CVI.

THIBETAN LADYSLIPPER — CYPRIPEDIUM TIBETICUM

which extends in north-westerly direction for hundreds of miles into the Amdo Country, a region of undulating prairies which support vast flocks of sheep and herds of yak, and are peopled with nomadic Thibetan tribes. The meadows and bog-lands around the head of the pass are gay with herbs, blue and yellow being the predominating colors. Species of Senecio, *Saxifraga diversifolia* and other species, Hypericums, and various Composites furnish the yellow, several Gentians, the dwarf *Delphinium Souliei* and others supply the blue—acres upon acres are alternating carpets of blue and yellow.

Other herbs growing there are species of Caltha, Parnassia, Corydalis, Erigeron, Swertia, Pedicularis, Ranunculus, Allium, Adenophora, Sedum and Saussurea, with *Vicia cracca, Epilobium angustifolium, Hieracium umbellatum, Polemonium coeruleum, Taraxacum officinale, Carduus crispus, Polygonum aviculare* and various others. In ripe fruit I gathered *Primula tangutica* and *Meconopsis racemosa.* Compared with the alpine meadows around Tachien-lu the wealth in species is limited but in numbers and intensity of color the flora of the Kungala Pass is no whit less rich and fascinating.

At 11,800 feet above sea-level on August 31, 1903, amongst scrub and long grass, I stumbled on

the first plants of my Red Poppywort (*Meconopsis punicea*). As if to assure me of its identity, a couple of plants were in flower! Now, since I had deliberately travelled from Tachien-lu nearly 600 miles in search of this plant, guided solely by the following scrap of information, culled from a label on a specimen of this plant preserved in the Kew Herbarium: "Potanin, China borealis, Prov. Szechuan septentrionale, '85," I will leave it to the reader to imagine and appreciate my delight. From 12,000 feet to the head of the pass (12,200 feet) this Meconopsis was abundant; the capsules were just ripe and a rich harvest of seed rewarded the day's labor. The seeds were transmitted to England and many plants were successfully raised. It flowered for the first time under western skies in September, 1905, but did not take kindly to cultivation, and the original stock with its descendants are now lost to gardens. This is to be regretted, for it is beautiful with solitary, dark scarlet flowers, 6 inches in diameter, nodding from stalks 2 feet tall. The flowers are produced in quantity but the petals are rather flimsy in texture. The storm-swept mountains have claimed it back but the memory of its loveliness still gladdens his heart who first bore it forth on that memorable August day.

FORMOSA

CHAPTER XLV.

Pearl of the Orient

ELL, if they take a fancy for my head during the night I do not see what is to prevent them from taking it" With this lugubrious soliloquy, I rolled myself in a blanket and prepared for sleep beneath the shelter of a fallen tree. A recent storm had blown down one of the giants of the forest and there was plenty of room for a dozen people in the cavern beneath its base. Some pieces of old tent canvas strung across the front shielded us from without and the clayey earth adhering to the roots of the tree formed a roof. Gathered around several fires were two score half-naked ex-head-hunters, armed with bows and arrows, long knives and guns, who had struggled all day up the mountain slope carrying our belongings. It was a weird scene in the heart of the mountains of Formosa. The night was fine but dark with a darkness that could almost be felt. The savages had finished their frugal meal washed down with the crude Chinese wine of which they are fond. Some

were smoking and sharpening their knives, others were pleasantly crooning songs of the chase. As I lay on the ground this scene of savages grouped around camp-fires, in the light of whose flames their faces showed clearly through rents in the canvas, the gloom and mystery of the forest immediately beyond, brought forth my soliloquy and became indelibly written on my memory. It had been a hard day's tramp and soon my Japanese companions and self were sound asleep.

Formosa or Taiwan is an island about 100 miles off the east coast of China and is lapped by the waters of the Pacific Ocean. South are the Philippines, and the tribesfolk of these islands are closely akin. The savages of Formosa are divided into several tribes and many clans and are in constant enmity. They dwell in small villages among the mountains and are hunters all. Many of their quarrels have to do with game rights and are relentlessly pursued. Head-hunting is still the pastime of many tribes in the mountain fastnesses and the skulls of strangers and enemies are tangible proofs of the prowess of young braves, giving them favor in the eyes of maidens and of the clan. Agriculture, such as it is, is the business of the women and children, who burn off a patch of the mountainside and there grow millet and a few

HEART OF FORMOSA — LAKE CANDIDIUS

vegetables. In a few years the area ceases to be fertile and another clearing in the forest is made. But untutored as these savages are they are not unobservant. Some time in the distant past they learned that on their abandoned and exhausted clearing an Alder-tree (*Alnus formosana*) was first to spring up and lo! in a few years, the land was again fertile. They now plant this tree for the avowed purpose of restoring the fertility of their millet patches. In recent years scientists have discovered that on the roots of the Alder among other trees a nitrifying mycorrhiza is found, which has the power of fixing free nitrogen and combining it with oxygen to form the nitrates so necessary for raising crops. The intimate processes of this remarkable action are scarcely known, but without any knowledge of science the Formosan savage appreciates the fact and makes good use of it. To him his native Alder is a miracle among tree-growth and a blessing above other trees.

Today Formosa is part of the Japanese Empire, having been ceded by China in 1895, at the close of the Chino-Japanese war. Rich in many minerals, in camphor, rice-paper and useful timber, this magnificently forested island is the Pearl of the Orient. Nominally a Chinese possession for many centuries it has had a chequered history, and its aboriginals

have waged constant warfare against Chinese and others far back into history. Camphor obtained by distillation from the wood of Camphor-tree (*Cinnamomum Camphora*) has for centuries been the lode-stone of the Chinese invaders. In quest of this product they pushed their way deeper and deeper into the mountains and waged perpetual warfare against the savages. The tribes resenting their intrusion were ever on the alert, and how many thousands of heads they have taken in their forays there is no telling.

The Dutch founded settlements and named the island Formosa, in 1624, and maintained themselves at Fort Zeelandia until 1662, when they were driven out by Chinese. The Dutch farmed the island to the advantage of themselves and attempted to Christianize the aboriginals, but there is nothing to prove that their rule brought any blessings to the savages. The Japanese, more thorough than previous conquerors, have striven hard and with measurable success to bring the savages under control. At first they pursued a rather ruthless method of conquest and extermination, in which they were not very successful, but in more recent years other and more peaceful methods have been adopted. Roads have been built, blockhouses installed and a large police patrol placed in

MOUNTAIN GRACES — ALSOPHILA LATEBROSA

charge. The more irreconcilable tribes are segregated and surrounded by wire fences charged with a heavy electric voltage. Trading, allowed only through barter at police offices, has been installed, much to the benefit of the savages. This more peaceful penetration has brought better results and in a few decades head-hunting in Formosa will cease to exist save as an occasional criminal outburst.

Except in the north there are few good harbors in Formosa and boarding and landing from ships is exciting. At Koshun in the south a tub lashed to a bamboo raft served to convey me to a vessel. On reaching the ship's side one had to be agile to get safely from this raft to the Jacob's ladder and clamber aboard. Landing through the surf, as we did at Pinan on the east coast, is a wet and thrilling experience. Here the full force of the Pacific breaks on the shore and steamers anchor well off. Half-breeds of Chinese and savages work the boats ashore, yelling as loudly as possible all the time. They manoeuvre the boat so as to get it carried stern first on the crest of the wave well to the shore. As the wave recedes one jumps ashore and races to safety.

To carry produce from the valleys among the foot-hills a splendid system of push trolley lines has been inaugurated. These trollies, operated by man-

ual labor, of course, are an invaluable aid to the traveller in Formosa. The lines are roughly laid and frequently out of repair, but many a pleasant day have I spent aboard these trollies. Up-grade is slow work and one usually walks, but down hill is quite exhilarating. The savages love operating these vehicles but they are reckless in their exuberance of spirits. Accidents are frequent though they are rarely fatal. We were one day coasting down a long but fairly easy grade and the trolley jumped the rail. Gathering myself up from the ground I found that the whole crew had come to grief. We suffered none but minor cuts and abrasions, but our police guard quickly had a doctor on the scene solicitous for my welfare.

Though little known to the world at large, Formosa is rich in interest. It boasts the loftiest peaks between the Californian Sierras and mountains of extreme western China, the highest sea-cliffs in the world, and in its forests are found the tallest and the biggest cone-bearing trees in the Old World—giants related to and comparable with the Sequoias and Yellow Cedars of western North America. It was the spring and autumn of 1918 that I was in Formosa to investigate the forests in general and in particular to secure seeds or living plants of these

YOUTH — TAIWANIA CRYPTOMERIOIDES

remarkable trees. The Japanese Government, ever solicitous to advance science, had granted me full facilities of travel and detailed as guides two of the best informed forestry officials, Messrs. Kanehira and Sasaki. From the town of Kagi on the west coast a railway, built for the purpose of carrying down lumber, and a marvellous piece of engineering withal, had brought me to Arisan, 7000 feet up the ranges which form the back-bone of the island. At Arisan our caravan had been gotten together and the quest began in earnest.

Like many other unsophisticated people, the Formosan savage is not partial to manual labor, neither is money an over-weening incentive to work. A bribe of Chinese wine is much more potent but even this is not always sufficient. Being a born hunter of game as well as human heads, the savage dearly loves a gun and to be allowed to carry a rifle with a nice shining barrel, to aim it, pull back the breech and kill as his imagination wills, is irresistible. So pleasing his fancy in this matter, but allowing him dummy cartridges only, and adding a goodly number of kerosene tins filled with Chinese wine, we had little difficulty in securing some two-score savages as porters. A squad of armed Japanese police, my faithful and most efficient Japanese boy, Morita, with Messrs.

Kanehira, Sasaki and myself, completed the party. We had tents but the over-hanging base of a fallen trees was a simpler lodging for the first night out. The famous trees were easily found once we got well into the forests, but fruiting examples of the Taiwania were extraordinarily rare. Months later a fine specimen was discovered full of cones and felled. Some bushels of fruit were gathered but not one seed germinated. However, a few young plants were secured and safely transported to the Arnold Arboretum. These have been successfully propagated by cuttings and distributed throughout the five continents.

The Taiwania, named for the island, is the loftiest tree in the forests, rearing its small, mop-like crown well above all its neighbors. The average height of this tree is from 150 to 180 feet but specimens exceeding 200 feet are known. The trunk is sometimes as much as 30 feet in girth, quite straight and bare of branches for 100 to 150 feet. It is a strikingly distinct tree, singularly like a gigantic Club-moss or Lycopod. In the dense forests the crown is small, dome-shaped or flattened, the branches few and short and one wonders how so little leafage can support so large a tree. When the top is broken by storms, the lateral branches assume an erect position. In the more

open forest the branches are massive, wide-spreading, and the crown oval or flattened, and on small trees the branchlets are often pendent. When young it is singularly beautiful in habit of growth.

The Big Tree of Formosa is a White Cedar, technically named *Chamaecyparis formosensis* and is found throughout the middle forest zone but most plentifully between the altitudes of from 6000 to 8000 feet. Its maximum height is about 180 feet and the girth of the largest known tree is 64 feet; the average height is from 120 to 150 feet and the girth from 30 to 40 feet. One old felled specimen showed 2700 rings of growth, so if this be any guide the age of the trees must be from 2500 to 3000 years, and very few trees of a younger generation are to be found. The trunks of many of the trees are hollow, some mere shells, but very few dead trees occur, either standing or on the ground. Some 50 feet or so above the base the trunks divide into from three to several erect stems. The lateral branches are slender, short and spreading, the crown thin and tapering and much of the foliage is usually brownish. These old trees are far from handsome but the bulk of their enormous trunks is most impressive. At one time the Taiwania and White Cedar probably formed pure forests but, unable to

withstand the competition of aggressive broad-leaf trees ascending from below, they have lost supremacy. Neither beneath their own shade nor in the dense forests are seedlings or young plants of these trees to be found, but in glades, where landslides have taken place, and on the Arisan, where clearings have been made to accommodate a railroad, young seedling plants of the White Cedar in particular are quite common.

Formosa is only some 244 miles long and of varying width, from seven to seventy-five miles. Its backbone is a range of mountains averaging nearly 10,000 feet in height, the highest peak being Mt. Morrison or Niitakayama, athwart the Tropic of Cancer. At the time of my visit less than half a dozen white men had stood on the peak of this remarkable mountain so the temptation to ascend it was very great.

But I had a more definite object than that of personal vanity. To ascend to the summit was to traverse all the forest zones of the island and gain much needed information on the altitudinal distribution of the principal components of the forests. Much knowledge must result from such a trip and so it was undertaken and accomplished. The savages led the way and blazed the trail but the climb was four days

OLD AGE — TAIWANIA CRYPTOMERIOIDES

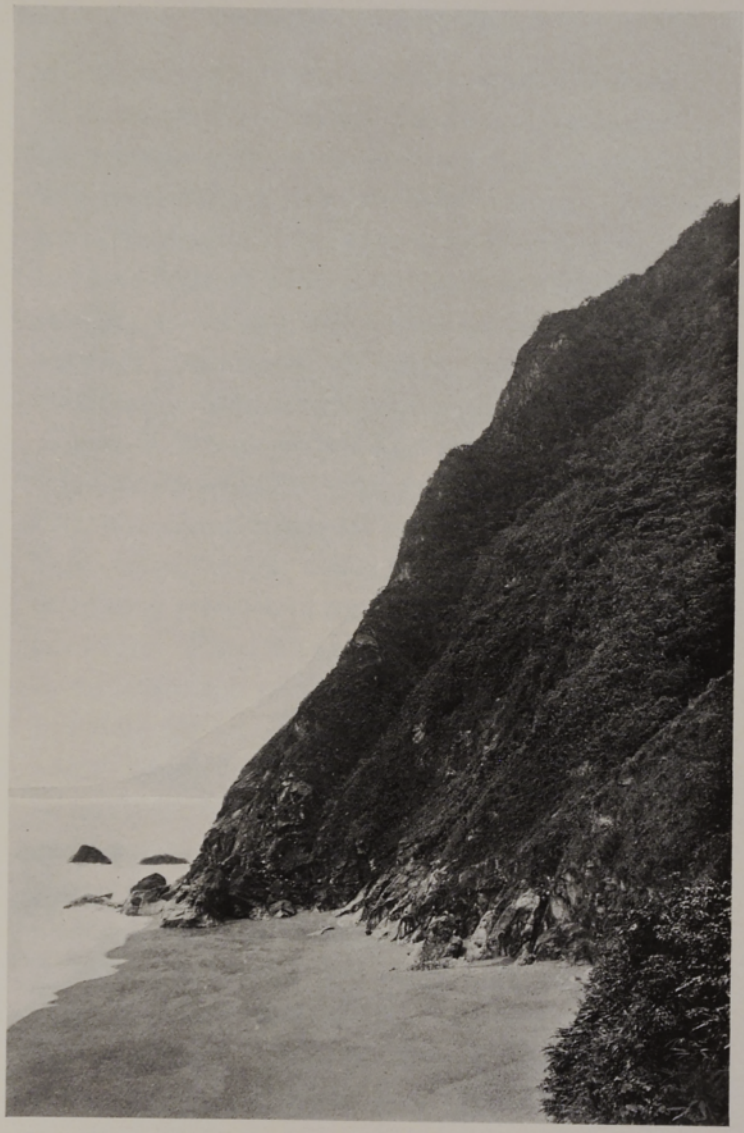
of physical fatigue and exhaustion such that only enthusiasm can overcome and that with every ounce expended. We did it, but I can't tell how, and we got back safely to Arisan, but I do not think I could be tempted to repeat the journey.

For three days the weather was glorious and I garnered a rich harvest of botanical specimens, took many photographs of trees, and my notebook fairly bulged. Down from 12,500 feet elevation through a forest of Balsam and Juniper we plunged 1500 feet into a ravine—the final chasm separating us from the peak of our goal. There beneath overhanging cliffs we camped in high spirits for the morrow. Scarcely had night fallen when rain began to fall and for three long days it never ceased. We were held prisoners, later to learn that a typhoon had lashed the whole island from south to north with a welter of wind and rain, causing much damage along the coasts. The fourth morning opened dull and threatening but we sallied forth, to encounter a light fall of sleet driven by a strong and bitter cold wind. In the teeth of this gale we struggled onward and upward along the crumbling ridge and finally gained the summit.

The peak of Mt. Morrison or Niitakayama, 13,-072 feet above the sea, is reached from the ridge above

the ravine by a dangerous path, but the climb is not difficult above the trees. It is bare, save for a few herbs, among which an Edelweiss is prominent, occasional low bushes of the evergreen *Rhododendron pseudochrysanthum*, the tiny *Gaultheria borneensis* with snow-white bells, prostrate mats of Juniper and an alpine Willow. From the summit a wonderful view, embracing the Pacific Ocean on the east, the Formosan Channel on the west and much of the island to the north and south, is to be had. This in clear weather. We could not see more than fifty feet in any direction and the strong gale and sleet storm made almost inaudible the cheers with which my Japanese companions and police announced our conquest of the highest mountain in the Japanese empire and the loftiest peak between the Californian Sierra Nevada and the snow-clad peaks of the Chino-Thibetan borderland. I had brought along a pint bottle of champagne with which to celebrate our conquest, but so cold were we that I dared not risk opening the bottle until we had gained the shelter of some Junipers a thousand feet below the summit.

Success in scaling Mt. Morrison and the fascination of the island determined me to attempt to cross the famous sea-cliffs of northeastern Formosa, heretofore untraversed by any white man. These cliffs



FRAGMENT OF FORMOSA'S SEACLIFFS

stretch northward from near the town of Karenko on the shores of the Pacific. They are of hard crystalline schistose rock and as seen from the sea appear to be vertical walls of rock fully 8000 feet tall. Arriving at Karenko in 1918, a few days after the armistice had been declared, I found the Japanese authorities in excellent spirits and with a little tact and adroitness obtained permission to carry out my object. Equipped with an armed guard and sufficient savages as porters, it took me five days to make this pioneer trip over the sea-cliffs. The road is exceedingly difficult, not to say dangerous, and the weather was far from favorable, but a rich harvest of specimens of interesting plants well repaid me for the fatigue and hardships. From the sea only can a proper estimate of the height and grandeur of these cliffs be obtained, but only by struggling over them can the forest wealth which clothes all but the most vertical walls be realized. Nearly all the trees are evergreen; Oaks and Laurels predominate and their canopy of green almost shuts out the heavens. Camphor trees are also plentiful, *Calamus Margaritae, Mucuna ferruginea, Bauhina Championii* and other huge lianas cling about the tallest trees and with rope-like stems bind them together. The forest-floor is choked with a dense growth of Ferns in great variety from moss-

like carpets on wet rocks to trees 15 feet tall. *Alocasia macrorrhiza* with huge dark green leaves is plentiful and the Rice-paper plant (*Tetrapanax papyrifera*), with huge panicles of snow-white flowers, was conspicuous in the dim, subdued light of the forest-depths. Everything was dank and luxuriant, and the tense silence was broken only by the dull roar of the waves of the Pacific Ocean dashing themselves against the cliffs thousands of feet below. Occasionally a bird flitted across the path or a monkey was seen in the tree-tops, but these were rare events. The armed Japanese police and the savages who carried our baggage were all silent as we trudged slowly through the wondrous primeval forests which clothe the upper parts of the world-famous sea-cliffs of northeast Formosa.

KOREA

CHAPTER XLVI.

Land of the Morning Calm

OREA, Land of the Morning Calm, as the people poetically call it, is overshadowed by its greater and richer neighbors, China and Japan, and until comparatively recently its vegetation was virtually unknown. But since the dawn of the Twentieth Century attention has been given to it and quite a number of valuable plants have been won to our gardens. The clove-scented *Viburnum Carlesii,* which reached us by way of Japan in 1902, is rightly esteemed the aristocrat of its family, and if Korea had given us none other than this lovely plant it would be entitled to our gratitude.

This Viburnum is a broad, round-topped shrub from 4 to 6 feet tall and more in diameter. The flower-clusters are formed in the autumn and, though naked, with flower buds clearly discernible, pass unscathed through the severest of New England winters. The flowers are rose-colored in the bud, pure white and of waxy texture when fully expanded

and as they do not all open at once the contrast is singularly pleasing. Added to these qualities is the delightful fragrance of cloves, which in the early morning and evening can be detected a hundred yards away.

Many of us have but a limited knowledge of geography and our ideas of the size and location of distant countries are often vague. In regard to the Orient we are prone to forget that they are lands other than those of Japan and China and, moreover, that these lands are not only peopled by indigenous races but also possess their own peculiar flora. Those who are fond of gardens may add much to their knowledge of geography in both interesting and profitable ways by inquiring into the origin of the flowers they tend so lovingly. I am minded of this by Carles' Viburnum, for it is one of the plants whose home writers persist in referring to either Japan or China, or, to both countries, where, as a matter of fact, it is quite unknown. Let me state it most emphatically, *Viburnum Carlesii* is native of Korea only, and is there confined to a few islands and to the coast and is a purely littoral shrub. It has been my privilege to travel extensively in Korea and to gather this shrub wild on the sea-cliffs in several localities and I would like to see honor given where

honor is due. This is perhaps in itself but a small matter, yet, it is a fact, and it is facts that we should treasure, for real knowledge is but an accumulation of truths small and great.

Korea, or Chosen as it is now designated by the Japanese, is a peninsula bounded on the east by the Japan Sea, on the south and west by the Yellow Sea, and on the north by Manchuria and the Primorsk province of eastern Siberia, from which it is separated by the Yalu River, Paiktu mountains and Tumen River. Until quite recently it was styled the "Hermit Kingdom" by peoples of western lands and it had little or no intercourse with the outside world. The whole peninsula (including adjacent islands) is confined within Lat. 33° 12′ and 43° 2′ N. and Long. 124° 13′ and 130° 54′ E., and has a total area of 84,173 square miles.

Geologically speaking nearly four-fifths of Korea is of granites and highly metamorphosed rocks of Pre-Cambrian age. In the central parts between Lat. 38° and 40° N. and stretching almost from sea to sea is an area of Paleozoic rocks, chiefly mud-shales, slates, and a little limestone; in the southeast is an area of Mesozoic limestones with intrusive porphyritic rocks, and isolated outcroppings of this combination of rocks obtrudes itself in other parts of

Korea. Basalt underlies much of the peninsula and in the volcanic areas—Paiktu mountains, highlands south of Gensan, the islands of Quelpaert (Sai-shu-tō) and Dagelet (Ooryongtō)—it has been forced to the surface and is surmounted by trachyte lavas. Each of these geological formations has certain plants peculiar to it. For example, Larch (*Larix dahurica* var. *Principis-Rupprechtii*) grows only on the recent volcanic soils of the Paiktu region and there forms vast forests; a Birch (*Betula Schmidtii*), one of the most valuable of Korean hardwood trees, is confined to the granites and metamorphic rocks; a Lilac (*Syringa dilatata*) is found only on the Paleozoic rocks of north-central Korea.

The climate is the best in the Far East and the country is destined to become the health resort of the Orient. It is essentially continental in character but in the extreme south and east-southeast, near the coast it is moderated by the influence of the Japan current—a warm ocean stream similar to our Gulf Stream. On Quelpaert, the Camphor and Orange trees grow at sea-level and the temperature there seldom falls below the freezing-point; in the extreme north in the valleys of the Yalu and Tumen rivers it falls as low as twenty below zero Fahrenheit—that is 52° F. of frost; round Keijyo or Seoul, the capital

CLOVE-SCENTED — VIBURNUM CARLESII

of Korea, the rivers freeze solid or nearly so and in winter all vehicular traffic crosses on the ice where bridges are not available.

Korea is a very mountainous country; there are no plateaux nor plains worthy of the name and the only flat land is confined to narrow valleys and river estuaries. The mean height of the broken country is from 900 to 3000 feet and that of the mountains from 1800 feet to 5500 feet; the highest peak is Paiktusan 8300 feet but there are many above 6000 feet high. Agriculture is the staple industry of the people and the whole of the fertile soils in the most accessible and climatically best parts of the country have been brought under cultivation.

Since the winters are very cold much fuel is necessary and unfortunately coal is found in one or two places only so the people are almost entirely dependent upon wood for fuel. These facts, and especially the absence of coal, have been mainly responsible for the disappearance of the forests from the greater part of the peninsula. It is true that in the extreme north, which is very difficult of access and the population sparse, magnificent forests of great extent remain and on mountains, like the Diamond Mountains, where Buddhist monks have managed to maintain their influence, and around the royal

tombs the vegetation has been very little disturbed, but over fully two-thirds of the whole country the forests have been destroyed and where no cultivation is today attempted coarse grasses, shrubs and scrub Pine are all that remain. These constitute the chief fuel supply of the country. The scrub Pine is *Pinus densiflora* and has been extensively planted, both under the old Korean regime and by the present Japanese government, and to the casual observer appears to be almost the only tree in the country. It is hacked and maimed annually to supply fuel, yet it manages to maintain itself under the most adverse conditions in the poorest of soils and on the barest of rocks; where left alone it develops into handsome trees. From the railway which traverses the country from southeast to northwest the impression left on the minds of nearly all travellers is of treeless, scrub- and grass-clad hills, bare rocks, low scrub Pine scattered over mountain-slopes with patches of cultivation in the valleys. In winter when the crops are harvested and the grass is shorn and brown, the whole countryside looks cold, drab and cheerless. However, a more intimate acquaintance, a closer study will show that, in spite of the naked appearance in winter and the marked absence of trees from accessible areas and routes, Korea can really boast a

fairly extensive flora comparatively rich in trees, shrubs and herbs having conspicuous and beautiful flowers.

Compared with that of its neighbours, China and Japan, the flora of Korea is much less rich and varied, yet in individuals of striking merit it has many claims, and these none the less strong for remaining virtually unknown until quite recently. For, although small collections have been made from time to time since 1854, when Baron Alexander Schlippenbach gathered the first plants in Korea, no real investigation of the flora had been undertaken prior to the country's annexation by Japan in 1910. Since that date the Government-General has systematically undertaken an investigation of the natural resources of Korea placing the botanical work in the hands of Dr. T. Nakai. So far 2822 species, varieties and forms, belonging to 780 genera, representing 151 families, have been recorded, but the work is by no means completed. About one-fourth of these are woody. Most of the families which occur in Japan, north China and northeast Asia are present but often much reduced in number of representatives. For example, the Magnolia family is represented by two genera (Magnolia and Schisandra) with three species. The most prominent family that is missing is that of

the Witch-hazel (*Hamamelidaceae*). A genus that one might expect to be present, and which is not, is Cercidiphyllum.

Now whilst the seas are natural phytogeographical barriers the political boundaries of Korea—*i.e.* the Yalu and Tumen rivers and the Paiktu mountains—are not, and the flora is essentially part of that of the great region of northeast Asia, including Manchuria and the northernmost parts of China proper as far west as Mt. Wutai in Shansi. Of woody plants at least two genera (Pentactina and Abeliophyllum) and a limited number of species (*Abies koreana, Thuja koraiensis, Viburnum Carlesii, Cornus officinalis, Forsythia ovata* and others) are endemic, quite a number, such as *Abies holophylla, Rhododendron Schlippenbachii,* do not cross the Yalu watershed to the plains of Manchuria, but the majority are widespread on the continent of northeast Asia and many cross to Hokkaido and to northern Hondo in Japan proper. Of the latter, mention may be made of *Alnus japonica, Rhododendron brachycarpum* and *Styrax obassia.* Further, a few species, including five (*Quercus acutissima, Q. aliena Q. dentata, Q. serrata, Q. variabilis*) of the six species of deciduous leafed Oaks, are widely distributed in China and Japan.

The two volcanic islands, Quelpaert off the extreme south and Dagelet off the east coast in the Japan Sea, are peculiar. The first-named, with its peak, Hallai-san, 5875 feet high, has largely a Japanese flora and is marked by the presence of broad-leaf evergreens in variety. A few species, for example, *Maackia Fauriei,* are possibly endemic and pure woods of Hornbeam (*Carpinus laxiflora* and *C. Tschonoskii*) with *Daphniphyllum macropodum* and *Taxus cuspidata* as conspicuous undergrowths, are a characteristic feature between 3000 feet and 4000 feet. Such woods are unique in the Orient. The trifoliolate Orange (*Poncirus trifoliata*) is indigenous, growing in the beds of torrents or among boulders; nowhere else in my travels have I seen this plant truly wild. No species of Spiraea, Deutzia nor Philadelphus grows on Quelpaert, yet they are common shrubs on the mainland. On the other hand, *Hydrangea petiolaris, Schizophragma hydrangeoides* and *Ostrya japonica,* unknown on the mainland, are common on this island. Two other common plants are *Rhododendron Weyrichii* and *R. poukhanense*; the first-named does not grow elsewhere in Korea, whereas the latter is wide-spread through the peninsula. Such typical Japanese trees as *Pinus Thunbergii, Torreya nucifera, Myrica rubra, Machilus*

Thunbergii and *Magnolia kobus* are indigenous in Quelpaert but grow nowhere else in Korea. The Fir on the island is *Abies koreana,* which is similar in habit to *Abies Veitchii,* has cones like *A. sachalinensis,* but less resinous, and bark like that of *A. nephrolepis.* It just crosses to the mainland and finds its northern range on Chiri-san. This range is interesting phytogeographically, since it is the southern limit of such characteristic Korean plants as *Rhododendron Schlippenbachii, Pinus koraiensis, Abies holophylla, A. nephrolepis* and the widely-spread *Picea jezoensis* and *Alnus hirsuta* var. *sibirica;* also it is the only region in Korea where grows *Rhododendron Tschonoskii,* a typical Japanese plant.

The flora of Dagelet Island is most singular, being much more closely related to that of Japan than to that of Korea. The Japanese *Pinus parviflora* and Hemlock (*Tsuga Sieboldii*), find their western limits on the island, and woods of an endemic Beech (*Fagus multinervis*) are a feature of the forests high up on the mountains. No Beech grows on the mainland of eastern Asia east of the province of Chekiang in China. Among other endemic species worthy of mention are *Acer Okamotoi, Abelia coreana, Sambucus pendula* and *Cotoneaster Wilsonii.* The Keaki, *Zelkova serrata,* common to Japan and Korea, is also

AMONG KOREA'S MOUNTAINS — ABIES HOLOPHYLLA

indigenous on Dagelet Island and so, too, is *Pinus densiflora*. The Chinese Juniper (*Juniperus chinensis*) is wild on the sea-cliffs and has a huge short trunk though the trees are not tall. The lovely *Viburnum Carlesii* is also indigenous, but so far has not been found on the adjacent east coast of Korea although it grows in one or two localities on the west coast and on Quelpaert. These two insular outposts of the Japanese flora are the more remarkable when it is remembered that, although both are volcanic, their basalt and trachyte lavas prove they belong to the Korean and not to the Japanese system of volcanoes.

The whole flora of the Korean peninsula is essentially boreal in character and its outstanding feature is the almost complete absence of broad-leaf evergreens. Of these, fourteen species—*Zanthoxylum alatum* var. *planispinum, Ilex cornuta, Evonymus radicans, Buxus microphylla* var. *koreana, Rhododendron brachycarpum, R. micranthum, R. chrysanthum, R. parvifolium, R. Redowskianum, Ledum palustre, Vaccinium vitis-idaea, Phyllodoce coerulea, Empetrum nigrum* and *Sasa spiculosa* only are found there. The first six are confined to central and southern Korea, the Sasa, although wide-spread, is nowhere very abundant; the others are alpine plants and grow only in central and northern Korea. Ex-

cept the social, alpine plants and the Sasa these broad-leaf evergreens are local in their distribution, few in numbers and nowhere a conspicuous feature of Korean vegetation. Mistletoe both with greenish white and reddish fruit is a pest everywhere.

The deciduous broad-leaf trees which compose the woods and forests belong to familiar northern genera and include several species each of Willow, Alder, Birch, Poplar, Hornbeam, Elm, Oak, Maple, Cornel, Hackberry and one or two each of Cherry, Bird-cherry, Crabapple, Wild Pear, Ash, Walnut, Sweet-chestnut, Spiny Elm, Honey-locust, Linden, Apricot, Sophora, Koelreuteria, Phellodendron and Keaki. The woods and forests of these trees are left on steep, rocky mountains unsuited to agriculture and where the soil is poor, so they are not large when compared with trees of America, Europe or Japan. Occasionally, when for religious or sentimental reasons groups of trees or individuals have been allowed to remain in valleys and by roadsides, good specimens may be seen, but in general Korean broad-leaf trees are small and their timber of less value than that of the same species in Manchuria or Hokkaido.

The largest of Korean trees is *Populus Maximowiczii*, which in the sparsely peopled north is often 100 feet tall with a trunk 20 feet in girth. A Black

Ash (*Fraxinus mandshurica*) ranks next, but I have seen in Hokkaido far larger trees of this species, and logs rafted down the Yalu from its Manchurian tributary show that in Manchuria it is also a larger tree. The Mongolian Oak (*Quercus mongolica*) probably ranks third in size but on a part of the Diamond Mountains only did I see any really noteworthy examples of this Oak. The most widely distributed trees are *Quercus mongolica, Betula Ermanii* and *Prunus serrulata* var. *pubescens,* which are common from Quelpaert to the Manchurian border and northward. Almost as common are *Alnus hirsuta* var. *sibirica, Populus tremula* var. *Davidiana, Betula davurica, B. japonica, Quercus dentata, Phellodendron amurense, Ulmus japonica, Acer pictum, Salix koreensis* and *Maackia amurensis.* Trees with the least distribution are *Cornus officinalis* and *Sophora japonica,* which are spontaneous on a mountain slope about thirty miles northeast from Keijyo and nowhere else in Korea.

The genus Salix is richest in species and some, like *S. nobilis, S. cardiophylla* and *S. koreensis,* are large and handsome trees; Betula and Acer with nine species each come next, followed by Quercus and Cornus, each with six species and Ulmus with five. The Birches, except the shrubby *Betula fruticosa* and

B. chinensis, which is always a small tree, are handsome and grow to large size. The most remarkable is *B. Schmidtii,* which has hard, close-grained wood, heavier than water, and much exported to Manchuria and China for making axle-trees and felloes for carts. This species grows on steep, rocky slopes and the trees though not tall have a short, stout trunk, clothed with thick, dark bark which flakes off, and a broad crown of no particular shape made up of massive branches. Curiously, the wood and bark of the very different *B. chinensis* is almost identical with that of *B. Schmidtii,* but the tree is always small and is found in lower altitudes and on any kind of soil. On the Diamond Mountains I saw the best examples of *B. chinensis.* Of true Maples only *Acer pictum* grows to any great size and this calls for no special comment. Another (*A. pseudo-sieboldianum*) makes a poor looking tree of medium size but is abundant, and in autumn its foliage assumes wonderful tints of orange, scarlet and crimson and is responsible for much of the autumn beauty of the forest.

In open country and especially by riversides and in swamps *A. ginnala* is abundant as bushes or low, shapeless trees. Its leaves have considerable economic value; they are gathered in late summer and after

drying in the sun are packed in bales and exported to China, where blue, black and khaki-colored dyes are prepared from them. Of the eight Maples two are Negundos, both handsome trees. The oldest known of the two is *A. mandshuricum,* which grows 80 feet tall, has a shapely crown and a straight trunk clothed with firm, pale gray, slightly fissured bark. The other, *A. triflorum,* is of about the same size, has thicker branches and a thin, papery, gray-brown bark which shreds off. The autumn tints of both are yellow, orange and salmon and singularly beautiful.

Of the Oaks *Quercus mongolica* is the best and most valuable and where the soil is good, as on Nemonrei in the Diamond Mountains, it is a fine tree, in habit and size resembling the White Oak (*Q. alba*) of eastern North America. As usually seen in Korea, however, the Mongolian Oak is not attractive, being of moderate size and frequently stagheaded. The less abundant *Q. serrata* is usually a better-looking tree, and in the autumn its ruddy tinted foliage makes it conspicuous. Of the Cornels, besides the well-known *Cornus kousa* and *C. controversa,* both strikingly beautiful in summer when in full flower, the less known *C. coreana* deserves mention, if only on account of its bark which, on adult trees, is almost black and deeply fissured into tiny squares like that

of *Diospyros virginiana.* The Korean Cornel grows 60 feet high and has a trunk from 4 to 5 feet in girth; the leaves are opposite, but the flowers and fruit are similar to those of *C. controversa.* It is interesting to note that the old *C. officinalis,* long known as a cultivated tree in Japan, is endemic in Korea, where it is often 35 feet tall with a trunk from 4 to 5 feet in girth clothed with thin, pale gray bark which scales off in loose, papery sheets. The common Elm is *Ulmus japonica* but nowhere did I see large trees of this species such as are common in Hokkaido; indeed, the largest Elm in Korea is *U. pumila,* which in the valleys of the north is often 80 feet tall with a trunk as much as 12 feet in girth.

Trees with conspicuous flowers and striking objects in the landscape are *Prunus mandschurica,* distinguished among Apricots by its large size and by its thick, corky, black bark which is red beneath, a Cherry (*Prunus serrulata* var. *pubescens*), Wild Pear (*Pyrus ussuriensis*), Crabapple (*Malus baccata* var. *mandshurica*), Tree-lilac (*Syringa amurensis*), *Maackia amurensis* and *Aralia chinensis, Acanthopanax ricinifolius,* and two Lindens, *Tilia amurensis* and *T. mandshurica.* These trees all grow in plenty and when in flower their effect on the landscape can be imagined. The Pear in particular is noteworthy

HARBINGER OF SPRING — RHODODENDRON MUCRONULATUM

as the most cold resisting of Asiatic species and as growing to a larger size than any other—trees from 60 to 70 feet with crowns as much in diameter and trunks from 10 to 14 feet in girth are not uncommon. It is wide-spread in Korea and is frequently found in the forest depths, though more usually by the side of streams and on the edge of woodlands. The fruit, which is depressed-globose and from one-third to one-half an inch in diameter, may be ruddy or green and with or without the remains of the calyx; the leaves, which vary in shape and serration, assume rich bronze and purple tints in autumn. Cultivated forms of this species are grown in gardens in Korea, Manchuria and north China and yield palatable fruit of good size. The Crabapple is a tree of moderate size and its wealth of white blossoms in spring is followed by an abundance of small, greenish red to scarlet fruits. It loves a cool soil and is particularly happy in thickets on the banks of mountain streams.

As in other boreal floras Conifers are abundant. Besides the Red Pine (*Pinus densiflora*), whose prominence has already been alluded to, the Korean Nut Pine (*P. koraiensis*) is a very common tree on the mountains, and the Creeping Pine (*P. pumila*) clothes the upper slopes and summits of most of the higher peaks from Kangaku-san, about Lat. 38° 30′

N., northward, except that of Paiktu-san itself from which it is entirely absent. Two Firs (*Abies holophylla* and *A. nephrolepis*) are both plentiful, the first-named being indigenous and confined to the low-levels and the other a mountain species. A third species restricted to Quelpaert and Chiri-san has been referred to already. A flat-leaf Spruce (*Picea jezoensis*) and another with four-angled leaves (*P. Koyamai*) grow in Korea. The latter is confined to the north and more especially the northeast but the flat-leaf species grows as far south as Chiri-san. A species of Thuja (*T. koraiensis*) is common on high non-volcanic land from the Diamond Mountains northward; in the forest it is a sturdy shrub or small tree, often 30 feet tall, but on high treeless slopes it is an undergrowth to *Pinus pumila*. One Juniper (*Juniperus rigida*) is very common, more especially in open country and thin woods of Red Pine or Oak; another (*J. communis* var. *montana*) grows only in the north, whilst a third (*J. chinensis* var. *Sargentii*) is confined to rocky places high up on the mountains, but is distributed from the extreme north to Quelpaert, where it grows on Hallai-san at 4800 feet upwards. To complete the list of Conifers indigenous on the peninsula it remains to mention a Larch (*Larix dahurica* var. *Principis-Rupprechtii*), which

covers much of the volcanic area of the north and is not found elsewhere. This Larch with the two Spruces, the Nut Pine and the Mountain Fir, either grow together or form more or less pure forests and the wood of one and all is of good quality. The other Fir (*Abies holophylla*) is of little value as a timber tree but for garden purposes it ranks with the Japanese *A. homolepis* as the best of the east Asiatic species. The branches are moderately stout, spreading or ascending-spreading, and crowded with dark green leaves. Trees 100 feet tall with trunks 12 feet in girth are not uncommon in fairly open country where the soil is rich and moist.

Of Taxaceae only *Cephalotaxus drupacea* and *Taxus cuspidata* grow on the mainland of Korea. The Cephalotaxus as a small shrub of no particular shape is scattered here and there from the vicinity of Keijyo, the capital, southward; the Yew is much more widely spread, growing as far north as the upper waters of the Yalu River. It is not a common tree, through on the Nemonrei in the Diamond Mountains it is more plentiful and of greater size than I have seen it anywhere else in the Japanese Empire.

At this point it seems opportune to say a little about the natural rotation of forests, or the succes-

sion of forest growth as it may be termed—a subject little understood but clearly demonstrated in and by the virgin forests of north Korea. To appreciate this succession and to properly understand what follows, it is necessary to state that in the temperate regions of northeast Asia (and probably everywhere in the world) there are aggressive northern and southern types that are ever extending their geographical range at the expense of (a) types already in occupation of intervening regions, (b) those that flourish under peculiar conditions only, (c) themselves finally. Of these aggressive northern types in Korea may be mentioned Aspen (*Populus tremula* var. *Davidiana*), Alder (*Alnus hirsuta*), Birches (*Betula davurica, B. Ermanii* and *B. japonica*), Creeping Pine (*Pinus pumila*), Fir (*Abies nephrolepis*), Spruces (*Picea jezoensis* and *P. Koyamai*). Of southern aggressive trees Red Pine (*Pinus densiflora*), Oaks (*Quercus mongolica, Q. dentata* and *Q. serrata*), Hornbeam (*Carpinus laxiflora* and *C. cordata*), Ash (*Fraxinus rhynchophylla* and *F. mandshurica*) may be instanced; of types in possession, that is, species endemic or nearly so, Fir (*Abies holophylla*), Nut Pine (*Pinus koraiensis*), Birch (*Betula Schmidtii*), Maple (*Acer pseudo-sieboldianum*), Box-elder (*Acer triflorum* and *A. mand-*

shuricum), Wild Pear (*Pyrus ussuriensis*) and Apricot (*Prunus mandshurica*) may serve as examples.

After forest fires or deforestation by man, Birch, usually *Betula davurica* or *B. Ermanii* less commonly *B. japonica,* is the first tree to appear in almost any part of Korea. In the south and at low altitudes and to a less degree in central Korea the Birch may be forestalled by coarse grasses (Miscanthus and relatives) and natural reafforestation long retarded, but normally, Birch is soon joined by other broad-leafed deciduous trees and frequently by Red Pine and Fir (*Abies holophylla*) and in the course of time develops into pure broad-leaf forest, mixed forest, or pure Pine-forest, according to the type which becomes dominant. On the east side of the Diamond Mountains, where man has much thinned the former pure forest of Red Pine, broad-leaf trees are rapidly changing the whole character of the forest. On the west side of the same mountains, especially around the monastery of Choanji, the broad-leaf forests are being displaced by Nut Pine and Fir. In central Korea and northward coarse grasses are less aggressive and Birch is associated with Aspen in increasing quantity, until the volcanic areas of the Paiktu-san region are reached where Larch becomes a prominent companion of the Birch and Aspen.

It is in this Paiktu-san region that the succession of forest types is most clearly shown. The cycle is roughly as follows: In the course of time after volcanic activity in that region had ceased, as after forest fires at the present time, seedlings of Birch, Aspen and Larch sprang up from seeds transported from the north by wind. Then, as now, the three kinds of trees grew well together for a few years, the Birch and Aspen the faster at the commencement, but the Larch, though it needs when young a certain amount of shade, just such as the twiggy branches of Birch and Aspen afford, is a light-demanding tree and after twenty or thirty years it outstrips its fellows in pace of growth, finally kills them and pure forests of Larch remain. Such forests are thin, open and park-like in aspect and the trees almost of the same age, for no Larch seedlings will vegetate in such forests except by the side of well-tramped paths, or on fallen, rotting trunks, but where fire breaks through they thrive exceedingly. As the Larch trees increase in size, so the forest floor beneath becomes more and more shady and invites the presence of shade-loving trees, such as Fir and Spruce. When the Larch is from sixty to 100 years old seedlings of Fir and Spruce establish themselves, in the course of time grow into trees and, finally, kill out the Larch and

form pure forests of themselves. Like the Larch the trees are of about the same age, for in such forests seedlings do not vegetate under the dense shade of the parent trees either because the shade is too great, because there is too much humic acid in the soil from the constant accumulation of rotting vegetation, or because of both. On the edges of these forests, in glades or on fallen rotting trunks only are young seedlings of Spruce and Fir to be found.

Larch with its deciduous leaves and trunks clear of branches for a considerable distance from the ground, is in much less danger from fire than evergreen Fir and Spruce, which keep their branches from near the ground upward and, moreover, have very resinous bark and leaves. However, sooner or later, either from electrical storms or through human agency, fire sweeps through the forests and the cycle is repeated.

The Larch forests being of open character are easy to traverse and have quite a rich undergrowth of shrubs, among which Birch (*Betula fruticosa*), Blueberry (*Vaccinium uliginosum*) and *Ledum palustre* in many forms are prominent. The Fir and Spruce-forests are less rich in woody undergrowth and those of pure Red Pine have none at all. The broad-leaf forests on the other hand are rich in shrubs

and climbers of an ornamental character, although these reach their greatest exuberance where trees are fewest. Most abundant are Azaleas, Roses, Magnolias, Honeysuckles, Lilacs, Mock-orange, Deutzia, Forsythia, Spiraea, Indigofera, Symplocos, Viburnum, Berberis, and the climbers Actinidia, Celastrus, Pueraria, Smilax and Vitis, whilst in central and south Korea on boulders, cliffs, walls, ramparts and trunks of forest trees the familiar Ampelopsis Veitchii (*Parthenocissus tricuspidata*) luxuriates. In the rocky beds of summer torrents and on the banks of streams the Gray Willow (*Salix gracilistyla*) is superabundant.

The tops of the higher mountains in north Korea are clothed with such alpine shrubs as Creeping Pine (*Pinus pumila*), dwarf Junipers (*Juniperus chinensis* var. *Sargentii* and *J. communis* var. *montana*), *Thuja koraiensis*, dwarf Willows in variety, Cowberry and other Vacciniums, the red-fruited variety of Arctous (*Arctous alpinus* var. *ruber*), Crowberry, Dryas, *Rhododendron chrysanthum*, *R. parvifolium* and other species. On the barest and most rocky hills and mountain slopes a few woody plants may be found. In spring, late May and early June, according to latitude, the whole countryside is gaily decked with myriad flowers. Wild Pears, Crabapples,

PINK BEAUTY — RHODODENDRON SCHLIPPENBACHII

Cherries, Plums, Apricots and other flowering trees which enliven the glades, edge of the forest, river bank, and open country must not be forgotten in this attempt to visualize Korea in spring, nor the young unfolding leaves of the forest trees, from the pure green of the Larch, through the grays of some Oaks to the ruddy tints of other species of Oak and Maple. The undergrowth in the woods and the shrubberies when the trees have been destroyed are splashed with masses of white, yellow, pink, rose and purple. Not even in the richest parts of China or Japan have I seen such extensive displays of pure pink and white as on the Diamond Mountains, where *Rhododendron Schlippenbachii* and *Magnolia parviflora* dominate the undergrowth for miles and bloom to perfection.

On the bare hillsides and mountain slopes of central Korea Forsythia is plentiful and its yellow bells in spring are conspicuous. On mudshales and limestone a little to the northwest of Keijyo grows a Lilac (*Syringa dilatata*), which opens panicles of fragrant pale, lilac-tinted flowers early in spring. It is of good habit, often 12 feet high and nearly as much broad, with dark green, leathery foliage which colors finely in autumn. Bushes 2 feet high bear flowers. In the woods and thickets grow two other Lilacs, *S. velutina* and *S. Wolfii*, and these produce

their nearly white to ruddy purple flowers in early summer; the fragrance of *Syringa velutina* is delightful. In early summer, too, a lovely Weigela (*Diervilla florida* var. *venusta*) and the Rose Indigofera (*Indigofera Kirilowii*) bear a wealth of attractive flowers and since the plants are plentiful the display is conspicuous. Very abundant in open country and thin woods is that harbinger of spring, *Rhododendron mucronulatum,* and so, too, is the less well-known *R. poukhanense* which, with its compact, twiggy growth and wealth of fragrant, rosy mauve flowers, is a feature of the countryside in late April and May from Quelpaert northward to the latitude of Pingyang. On rocky, grass-clad slopes it covers areas which on the foothills of Chirisan are acres in extent; on Quelpaert it grows in great plenty from sea-level to the summit of Hallai-san. The white-flowered Rambler Rose (*Rosa multiflora*) and its northern and handsome relative, *R. Maximowiczii,* are also features of the early summer flora of Korea.

Since Pine and Fir are the dominant trees in the landscape over much of Korea the flowering shrubs and trees are well provided with a setting which enhances their beauty, whether it be the flowers in spring and summer or the tinted foliage in autumn.

Often in thin woods of Red Pine the undergrowth is almost entirely of pink, rose or rosy mauve Azaleas and rose-colored Indigofera; such places are perfect gardens.

In species of climbing plants Korea is poor and it boasts no Wistaria nor anything approximating in beauty. However, climbing plants are plentiful if not varied, and in autumn the tints of Veitch's Ampelopsis and of the Amur Grape (*Vitis amurensis*) are not exceeded in brilliancy anywhere. In early summer two Actinidias (*Actinidia kolomikta* and *A. polygama*) with fragrant, white flowers in clusters hidden beneath the leaves, a great many of which are pure white or half white and half green, are striking objects on the mountain slopes. The white leaves change to pink and rose as the flowering period passes. In summer the most noteworthy climber is *Tripterygium Regelii,* with bright brown, lenticellate branches, large panicles of pure white flowers which are followed by white changing to pink, bladder-like fruits. It is abundant, sprawling over shrubs and trees.

Korea from early times has been the highway over which many Chinese plants of economic value and of ornamental character have travelled to Japan. For example:—Chinese Persimmon (*Diospyros kaki*),

Sand Pear (*Pyrus serotina* var. *culta*), Korean Apple (*Malus asiatica*), Japanese Plum (*Prunus salicina*), Bush-cherry (*P. tomentosa*), Varnish-tree (*Rhus verniciflua*), Moutan Paeony (*Paeonia suffruticosa*), the Paulownia (*Paulownia tomentosa*) and others, all indigenous in China, reached Japan by way of Korea. Likewise certain Korean plants were long ago introduced to Japan and reached Europe and America from there at a later date. Among older examples may be instanced *Pinus koraiensis*, *Cornus officinalis* and *Diervilla florida;* in more recent times *Rhododendron Schlippenbachii* and *Viburnum Carlesii*.

By roundabout ways plants from China have found their way to western lands from the Sixteenth Century if not earlier, and from Japan since the Seventeenth Century, though in each case often with long breaks in the periods. Yet the Twentieth Century had almost dawned before any seeds or living plants direct from Korea reached the Occident. In 1897, a Russian Botanist, Vladimir L. Komarov, made a trip through northern Korea, collected herbarium material and probably some seeds, for in the "Gardener's Chronicle" ser. 3, XLIV, 210 (1908) there is a figure and note about *Rodgersia tabularis*, a typical Korean herbaceous plant, flowering in Kew

gardens from seeds received from the Imperial Botanic Garden, Petrograd, in 1905. In December, 1904, the Arnold Arboretum received, through the Imperial Botanic Gardens, Tokyo, some seeds collected in Korea by T. Uchiyama, which resulted in the introduction of *Abies holophylla* and *Hemiptelea Davidii*. In 1905, J. G. Jack, of the Arnold Arboretum staff, was in the Orient and visited Korea. The Russo-Japanese war was is progress and it was impossible to travel freely in Korea. Mr. Jack's main purpose was not plant collecting, nevertheless he sent back living material of quite a number of plants which have proved to be of exceptional interest and value. To him we owe such Korean plants of merit and hardiness as *Rhododendron poukhanense, Diervilla florida* var. *venusta, Tripterygium Regelii, Malus baccata* var. *Jackii, Rosa Jackii, Evodia Daniellii,* an Oak (*Quercus aliena*) and the plants in the Arnold Arboretum of the lovely *Indigofera Kirilowii.*

JAPAN

CHAPTER XLVII.

Land of the Rising Sun

ND what of Japan, land of the Cherry Blossom, with whose name every garden-lover is familiar? Japan has drawn freely on the civilization of her ancient neighbor — China. Her written language, art and culture are borrowed and modelled on those of China. The love for flowers is, today, more universal in Japan than in China, yet in all probability it was in emulation of the Chinese that flowers began to enter so largely into the life of the Japanese people. Whether this regard for flowers antedates the coming of Buddhism into Japan I do not know, but in any case this religion has done much toward developing and fostering it. Many flowers and trees — the Moutan and Ginkgo, for example,—were introduced by Buddhist priests. The style of gardening practised in Japan and the art of dwarfing trees are Chinese, and many of the flowers grown in Japan are natives of China and old favorites with the Chinese people. Bamboo and Wistaria are common to both

LOFTY GREEN SPIRES — CRYPTOMERIA JAPONICA

countries but of indigenous plants appreciated by the Japanese there are Cherries, Maples, Azaleas, Iris, Pine, Cryptomeria, *Enkianthus perulatus* and various Arbor-vitae.

Japan, or the group of islands which form the country, in length is about the same as that of the Atlantic seaboard of this country from Nova Scotia to the Florida Keys. Nowhere is the width considerable but the coastline is much indented and broken. There is a backbone of high mountains, chiefly volcanic, the loftiest of which is sacred Mt. Fuji rising to a height of 12,000 feet above the sea-level. In the central part of the main island there are granite peaks well-nigh 10,000 feet high, but limestone is rare. Many of the volcanoes are still active and in a yet greater number the highest parts are bare cones of ashes and volcanic débris. The rivers of Japan are short and swift with broad rock-strewn mouths where they debouche from the mountain-valleys. The land surface of Japan is therefore very broken and rugged, plains of any size are almost wanting except such as have been made by ashes ejected from the major volcanoes. The alluvial flats and valleys are highly cultivated but land suitable for agriculture is insufficient to supply the needs of the people. Over the greater part of Japan the soil is excessively

poor and incapable of producing vegetables, root-crops or cereals. The forests of Japan are the country's greatest indigenous wealth and to them and her rugged land-surface Japan owes her natural beauty. And Japan is from the scenic view-point an extraordinarily pretty country rivalled only in this connection by New Zealand.

The climate of Japan is very similar to that of the Atlantic seaboard of this country. It is strongly influenced by a warm ocean current which flows along its shores to as far north as the latitude of Tokyo, the capital of the Empire. South of Tokyo broad-leaf evergreen trees, chiefly Oaks and Laurels, with Pines and other Conifers are the dominant trees of the forests. North of Tokyo deciduous-leafed trees (Oak, Maple, Birch, Beech, Alder), with Pine, Larch, Fir and Spruce are the prevailing forest elements; the autumnal tints of the deciduous trees are a striking feature everywhere in Japan.

The flora of Japan is, of course, closely related to that of China though there are very few species common to both lands. There is also a marked affinity with that of eastern North America. The absence of lime in Japan is most favorable to the development of the Rhododendron and Vaccinium family and this numerically, both in genera and individuals, is the

ILLUMINES DARK RAVINES — RHODODENDRON QUINQUEFOLIUM

richest group of plants found there. This family of Ericaceae, as it is technically called, boasts no lofty trees and no herbs. It is essentially a family of shrubs, which carpet the ground, form low thickets or grow from 5 to 12 feet tall and as much in diameter. A few in Japan are small trees and elsewhere in the world are found trees of moderate size. This group possesses many attributes which are pleasing to the garden-lover. The flowers of nearly all are pretty or handsome and produced in very great quantities; the foliage of all is good and many, very many, are evergreens with lustrous leaves; quite a host of them are ground-covers of great beauty. If Vaccinium be included, edible fruits of pleasant flavor are another feature but it is to the aesthetic rather than the utilitarian spirit that this family most strongly appeals.

In the forests and far up on the mountain-sides in Japan grow two species of broad-leaf Rhododendron (*R. Metternichii* and *R. brachycarpum*), which are handsome in foliage and flower, and most suitable for the gardens of New England and elsewhere, though they are but little known. It is, however, in species of Rhododendron with rather small and deciduous leaves and familiarly known as Azaleas that Japan is so astonishingly rich. From the ex-

treme south northward far into Hokkaido on mountain-slopes, in thickets and on the edge of forests grows the red-flowered *R. obtusum* var. *Kaempferi*. This is perfectly hardy as far north in this country as Boston, Massachusetts, and is one of the finest plants ever introduced into New England gardens. Though known for over two centuries and everywhere abundant in Japan it was not introduced into cultivation in the West until 1892, when Professor Sargent sent seeds to the Arnold Arboretum. Why earlier collectors omitted to send seeds home is a mystery.

Another species (*R. japonicum*) with large flame-colored flowers grows with Kaempfer's Azalea in many places, but nowhere is this more common than around Mt. Fuji and in the Nikko region. This is also perfectly hardy in the Arnold Arboretum, where each year it puts forth a wealth of blossoms. On the higher slopes of the mountains in the south of Japan grows a small-flowered Azalea, of which the forms *amoena* and *obtusa* have long been familiar in western gardens. By selection and raising from seeds and vegetative sports during the past hundred years there has been originated in the town of Kurume a race of Azaleas so remarkable as to entitle them to a separate chapter.

WHITE PENDENT URNS — ENKIANTHUS PERULATUS

There are many other species, so many, in fact, that there is a book written about them; all are meritorious and not least *R. quinquefolium,* whose pure white bells illumine the margins of woods and the dark recesses of ravines high up in the Nikko region. In truth, much of the brilliant color of the landscape in Japan during early summer is due to the abundance of Azalea bushes which flourish everywhere except in the depths of the forests. One of the very first plants sent to Europe was *Azalea indica,* which reached Holland by way of Batavia before 1680, and was subsequently lost; one of the last was the Kurume Azaleas and in no group of plants with handsome flowers has Japan given more freely than of her Azaleas—the pride and glory of her scrub-clad mountain-sides.

A Mayflower (*Epigaea asiatica*) grows on the mountains of north Japan and is just as coy and lovely as her American sister. Several species of the Heather-like Phyllodoce clothe the higher mountain-slopes where also Vacciniums in variety luxuriate. In dry woods in the south the well-known *Pieris* or *Andromeda japonica* is plentiful. There are others, but since this is not an article on the Erica family in Japan I will close with reference to Enkianthus, a genus whose merits are far from being properly

known to garden-lovers. They are shrubs from 5 to 20 feet tall, with many rigid, slender, ascending branches, and small leaves which change to glorious tints of orange, yellow and crimson before they fall in the autumn. The flowers are borne in clusters or on short racemes in extraordinary profusion; they are either urn- or bell-shaped with prominent anthers; the color is white to red, often salmon or maybe striped with yellow or crimson, and are wonderfully attractive. Of the several species the tall-growing *Enkianthus campanulatus,* of which there are many forms, is perhaps the best. The Japanese favor the low round-topped *E. perulatus* which has white urns and is planted in almost every garden in Japan. On a dry windswept bank in the Arnold Arboretum all the species so far introduced from Japan have proved perfectly hardy and either for their flower in early summer or their tinted foliage in the autumn are worth coming a long distance to see.

By the side of rivers and lakes and to a lesser extent on the margins of woods throughout the length and breadth of Japan grows *Wistaria floribunda,* which with its Chinese relative is the finest hardy climber our gardens possess. The Japanese are properly proud of their Wistaria and it is much planted in temple grounds and gardens, usually alongside of

IRIS OF MANY COLORS — IRIS KAEMPFERI

ponds. Under cultivation varieties with white, pink and violet-purple flowers have arisen and have been brought into our gardens. So, too, has the long racemed form (var. *macrobotrys,* better known as *W. multijuga*), which in Japan is vastly superior to anything seen in western lands. In an old garden some miles north of Tokyo I measured racemes 64½ inches in length! The plant was a very old one and bore tens of thousands of such flower clusters.

Among the other valuable plants gardens owe to Japan may be mentioned the Japanese Quince (*Chaenomeles japonica*), the Witch-hazels (*Hamamelis japonica*) and its var. *arborea*), the parent stocks of our garden Weigelas, very many Maples with colored and curiously incised leaves, the well-known Hydrangeas, *H. paniculata, H. hortensis,* and the wonderful climbing *H. petiolaris,* and that most indispensable shrub and hedge plant *Berberis Thunbergii.* The only substitute for Ivy hardy in the gardens of New England, *Evonymus radicans* and its variety *vegeta* are Japanese and so, too, are *Lonicera japonica* and *Vitis Coignetiae* with noble, massive foliage brilliantly colored in the fall.

Of herbs we have the Japanese Iris of many colors, and among Lilies the wondrous *Lilium auratum* and the even more useful *L. speciosum,* both with many

forms; also the charming *L. japonicum* and *L. rubellum* to mention no others. From the dependency, Liukiu Islands, came that most indispensable species *L. longiflorum*.

Many magnificent Conifers form forests in Japan and several are established in our gardens. The noble *Abies homolepis* and the Red Pine (*Pinus densiflora*) are two of the best evergreens for the gardens of New England. The two Chamaecyparis (*C. obtusa* and *C. pisifera*) are most useful to us and some of their forms exceptionally so. One of the finest ground covers we possess is the Japanese *Juniperus chinensis* var. *Sargentii* whilst the Japanese Yew (*Taxus cuspidata*) is the most useful exotic evergreen tree and the most valuable gift Japan has made to the gardens of the colder parts of North America.

CHAPTER XLVIII.

Heralds of Spring

APAN holds flower festivals during many months of the year, beginning with that of the Plum Blossom (*Prunus mume*) in February and ending with that of the Chrysanthemum in November, but the most popular is that of the Cherry Blossom which falls in early April. The floral treasures of the Orient are indeed many, but none is more renowned than the Cherries of Japan. And justly so, for no language can exaggerate their loveliness. Some are small, others large trees with wide-spreading crowns; some have pendent and others quite erect branches. All are beautiful. Cherry trees grow wild in the woods and thickets throughout the length and breadth of Japan and they are everywhere planted in vast numbers—in temple and castle grounds, by pond and by riverside. In Japan no peasant is too humble, no prince too proud to plant and cherish the Cherry tree.

At Koganei, a village some ten miles from Tokyo, there is an avenue three miles long of Cherry trees planted in 1735 by command of Shogun Yoshimune.

Many of the trees are from 60 to 75 feet tall with trunks 10 to 12 feet in girth and crowns from 50 to 60 feet through. The avenue has been well cared for and when the trees are in blossom the scene presented is a never to be forgotten one. The flowering of the Cherries is made the occasion of a national holiday in Japan, annually decreed by the Emperor. And right merrily do the people enjoy the festival. It signifies that spring, the season of gladness, has come. Old and young, rich and poor put on their best raiment, visit and entertain their relatives and friends. There is something peculiarly gay and cheery about these white and pink Cherry blossoms and the prodigality of flowers and joyousness of color is ravishing.

It is sixty years since the first Japanese Cherry was introduced into western gardens, but where are the fine specimen trees that one might reasonably expect to see? Here and there where trees directly imported from Japan have been planted, fair examples are to be seen, but it is only within the last twenty-five years that such trees have been available in any quantity, and they are still all too rare. The early importations were nearly all used for purposes of propagation by budding and grafting on European stocks. This has been a curse. In the practice of gardening the art of grafting and budding is useful, nay it is

ROSEBUD CHERRY — PRUNUS SUBHIRTELLA PENDULA

essential, but it is greatly abused. As a means of perpetuating fruits and certain flowering plants it may be deemed indispensable. By the trade the art is often practised as a means of quickly producing saleable plants, but results in much disappointment to the purchasers. Too little attention has been paid to finding out the right kind of stocks to use, and especially is this true in regard to flowering trees and shrubs. With the Japanese Cherries it has been the practice to graft or bud them upon the Gean (*Prunus avium*) the Wild Cherry (*P. Cerasus*) and other western species, and the results are far from being satisfactory. In fact, such stocks are quite unsuitable, and the sooner this fact is accepted the better. Many of the Japanese Cherries may be rooted from cuttings; all the species and their wild forms may be raised from seeds. The double-flowered and anomalous garden forms should be budded or grafted on their wild prototypes. Planted closely together for a year or two and pruned to a single stem, young trees suitable for any required purpose are soon obtained. Confused nomenclature has also acted as a deterrent. In fact, this and unsuitable stocks for their propagation are largely responsible for the subordinate position Japanese Cherries occupy in our gardens at the present time.

I do not recommend indiscriminate or even general planting of the double-flowered forms. Even in Japan they are neither large nor long-lived trees. Short-stemmed, at the most 30 feet tall and as much through the crown is their maximum and such trees are rarely seen. Prematurely old, lichen-clad and decrepit trees one often sees, and such the people of Japan admire; not so ourselves. Near buildings and out of the wind—for, being surface rooting they are easily blown down,—an occasional double-flowered cherry is all right: but for avenues, margins of woods or the pleasure grounds it is the single-flowered species and their wild forms, which grow into large and long-lived trees, that should be planted. The Japanese have a keen eye for detecting points of difference among their favorite flowers. They recognize more than 100 forms of Cherries, but for all practical purposes the distinct double-flowered forms may be included in a couple of dozen kinds.

The Cherries of the Orient may be used for many purposes in the embellishment of our gardens and parks. For avenues there are no finer deciduous trees with pleasing blossoms than the Sargent Cherry (*P. serrulata* var. *sachalinensis*) and the Tokyo Cherry (*P. yedoensis*). As a specimen on the lawn or in the park, none is finer than the Rosebud Cherry (*P. sub-*

hirtella var. *pendula*)—I mean real trees not the stunted apologies one usually sees. For any purpose where small trees are in request none could be more beautiful than the Spring Cherry (*P. subhirtella*) with its myriad soft pink blossoms. Seen in the early morning against a blue sky, with the dew still in evidence, it is a vision of perfect beauty. The cult of the Rhododendron is vastly on the increase and devotees should plant Cherry trees in association with their broad-leafed favorites, for these give just the requisite amount of shade and are added beauty. Raise the Cherry trees from seeds—plant them in quantity —there will be no regrets. In central China Cherry trees are a feature of mixed woods and beneath them luxuriate evergreen Rhododendrons. Often have I fondled the opening flower-trusses of *R. sutchuenense* intermingled with the white and pink petals of *Prunus Conradinae, P. serrulata* var. *spontanea,* its pretty sister, var. *pubescens,* and *P. subhirtella* var. *ascendens.*

Cherries are sun-loving trees and enjoy a warm, light loamy soil. Against a foil of evergreens the flowers are seen to best advantage. In the forests of evergreen Oaks and Laurels which clothe the higher mountains of interior Formosa the red-flowered *Prunus campanulata* is indigenous, and, as I write,

the picture it presented in February, 1918, with its perfect setting comes vividly to mind. But this Cherry, most richly colored of all, is only for those who garden on the Pacific slope and other favored spots. Not long ago from Pasadena, in sunny California, a letter reached me extolling this Cherry and claiming it to be the best of my introductions there.

In Japan nine species with several varieties are indigenous. All are worthy, most of them excellent. Several kinds grow also in the forests of Korea and China, but their distinctiveness and the garden merit of those introduced have yet to be fully demonstrated. Such as *P. concinna, P. pilosiuscula* and *P. Conradinae,* all small trees, are undoubtedly acquisitions, while *P. serrula* is worth growing for its handsome yellow-brown bark; but the rank and file are inferior to those about to be described.

The first Oriental Cherry introduced into the Occident came from Canton in 1819, and was named *P. pseudocerasus.* This species is wild in Hupeh and is cultivated in many parts of China for its fruit. Long ago for the same purpose it was introduced into Japan where it may occasionally be seen today; there is also an old tree in the Cambridge Botanic Gardens, England. The flowers are white, freely produced and pretty, but the tree is tender and of no

outstanding merit as an ornamental. I would not mention it here but for the fact that its name has been promiscuously applied to the flowering Cherries of Japan, with which it has absolutely nothing to do. The next Cherry introduced also came from Canton and had double white flowers. This was named *P. serrulata* in 1830. Good trees of this kind I have not seen in America but in the Cambridge Botanic Gardens, England, and also at Kew there are fine specimens. These are low, thanks to grafting, with rigid, horizontal, spreading branches and, out of blossom, are more remarkable than beautiful in appearance. This Cherry is simply a double-flowered form of a species common in the woods and forests of central China and of northeastern Asia generally, and now known as *P. serrulata* var. *spontanea*. In the north of Japan it is replaced by the larger-flowered variety *sachalinensis*. Associated with both and having a wider distribution than any other Asiatic Cherry, is the variety *pubescens*, distinguished by its hairiness. Where and when the double-flowered *P. serrulata* originated is unknown and the same is true of its pink counterpart var. *rosea*. They are well distinguished from all other forms by their smaller flowers crowded with narrow petals.

The wild varieties *spontanea* and *pubescens* are the

common Cherries of the Far East and in Japan are both called Yama-zakura, that is, Mountain Cherry. The trees grow to 75 feet in height, with a trunk sometimes 12 feet in girth; they have stout ascending branches and pale to rose-pink blossoms an inch or less across. The young foliage is a bronze, metallic green and in the autumn changes to shades of yellow, orange and crimson, which adds much to the attractiveness of these trees. The more northern form (var. *sachalinensis*), the Sargent Cherry, is distinguished by its larger flowers, each from 1 to 1¾ inches across, often rose-pink, rarely white, in color. This is the most hardy and the largest growing of all Asiatic Cherries, and if one kind only can be planted it should be this. The finest of the pink and rose-colored double-flowered Cherries are forms of this variety. The six best are "Kirin," "Horinji," "Ichiyo," "Fugenzo," its white form "Shirofugen" and the late-flowering "Sekiyama" (or "Kanzan," as it is usually called in Japan).

The principal parent of the cultivated Japanese Cherries is *P. Lannesiana* var. *albida,* which is native to the volcanic Seven Isles of Idzu, the Boshu peninsula and elsewhere in the warm parts of Japan. It is a tree of moderate size with pale bark and white or pale pink, fragrant flowers. It is not a very hardy

RIGHTLY PLACED — "OGON" CHERRY

tree nor long-lived, though of rapid growth. Of the scores of named forms of this Cherry the following dozen are among the best: "Amanogawa," "Sirotae," "Ariake," "Jonioi," "Sumizome," "Senriko," "Ogon," "Yayeakebono," "Botanzakura," "Miyako," "Hatazakura" and "Grandiflora," known to the Japanese as "Ukon" or "Asagi" and remarkable for its pale yellow flowers. Another species with double flowers is *P. Sieboldii,* often called in the trade Waterer's Cherry, which is characterized by the soft, appressed, fulvous gray hairs which clothe the leaves. This is a tree of moderate size, and, though commonly cultivated in Japan, has not yet been reported in a wild state. Like *P. Lannesiana* and its forms, this Cherry may also be rooted from cuttings.

Of the Spring or Rosebud Cherries there are four distinct types. The wild form is *P. subhirtella* var. *ascendens,* which is indigenous in the woods of central China, Formosa and Japan. It is a large tree with a wide-spreading crown, but is less beautiful in blossom than its sisters. The variety *pendula* is well described by its name, and the tree in size equals that of the wild form. What has to bear the specific name of *P. subhirtella* is a small tree, probably of garden origin, and is the most floriferous and, per-

haps, the most pleasing of all Japanese Cherries. It is the "Higan-zakura" or Spring Cherry. The fourth form has semi-double flowers which are sometimes most freely produced in the autumn and, in consequence, is named var. *autumnalis*. Very often it flowers sparsely in the spring and freely in the autumn; in other seasons the very opposite prevails. All the forms of *P. subhirtella* should be worked on the type; they will also root from cuttings. From seed a percentage come true, but the tendency of the varieties is to revert to the wild form, *ascendens*. All have pink blossoms, deeper in the bud, hence the name Rosebud Cherries. They are very hardy and remarkably floriferous and, with their branchlets more slender than those of other species, they have a grace and charm peculiarly their own.

A quick-growing and handsome tree is the Tokyo Cherry (*P. yedoensis*) whose opening blossoms herald the Cherry festival. Though abundantly planted in Tokyo and elsewhere this Cherry is of unknown origin, and is, very possibly, a hybrid. It has a short but thick trunk and large spreading branches which form a broad, rounded crown. The flowers are white to pale pink and are characterized by their hairy, cylindric cupula and flower-stalk. It is a magnificent tree for avenue planting and may be

readily raised from seed. Three other Japanese species, *P. Maximowiczii, P. nipponica* and *P. apetala,* are of less merit.

The chapter may well end with mention of *P. incisa,* a species abundant on the lower slopes of sacred Fuji-yama and one of the most pleasing of all, yet virtually unknown to western gardens. Usually a bush from 5 to 15 feet tall, it will, under favorable conditions, form a small tree from 25 to 30 feet tall with a neat crown of spreading and ascending twiggy branches. The flowers are usually nodding and vary in color from white to pale pink; the cupula and sepals are vinous red and the stamens are tinged with the same color; the anthers are golden. No Cherry is more hardy, more floriferous or more lovely than this, the "Mame-zakura"—Pigmy Cherry—of Japan.

CHAPTER XLIX.

The Princess Kurume

 E HAVE the honor to announce that Princess Kurume, reigning beauty of the Azalea Kingdom, is in town and will hold court throughout Easter. Further, I have to declare the Princess' intention of becoming a permanent resident, also, that in each succeeding year her court will be held continuously from Christmas to Easter. The doors are open to all. Her handsome debonair Chinese cousin, under the pseudonym of Indian Azalea, has been long a favorite in the floral courts of America and Europe and so, too, have other relatives, but endowed with radiant beauty this youthful, winsome Princess is bound to capture and hold the stronghold of public affection and esteem. She first came to these shores as a baby in 1916 and in 1920 a few favored folk were permitted to peep at this charming damsel in conservative Boston, Massachusetts. The effect was magical, all who saw forthwith became her devotees. Her first lover in this part of the world, her sponsor and guardian, I immediately found myself a mere atom in her universe. A crown of gold was by unani-

mous consent placed on her head and with loud acclamation she was proclaimed mistress royal of her clan. Pleasing speeches were made and nice things said of me for the part I had played in prevailing upon her to leave her island home of the Rising Sun to grace these western shores. Her conquest was too spontaneous and complete for jealousy to wing dart. Hard-headed nurserymen fell in love with her at first sight even as I had done, and she was surrounded by chaperons intent upon providing for her well-being and proper education into western modes of life. I relinquished my trust and went abroad not disconsolate, however, since I knew she was in safe hands.

Since that epoch-making date Princess Kurume has, except on rare occasions, remained in the seclusion of educational cloisters. Her education completed the pleasant task of announcing the coming of age of this royal debutanté has fallen to me.

More than royal is this lovely Princess, for is she not descended from Ninigi, grandson of the Sun-goddess, Amaterasu? History tells that her ancestors sprang from the soil on which Ninigi alighted when he came down from heaven to found the Empire of Japan. If sceptics there be they have but to visit Mt. Kirishima, in south Japan, where they them-

selves can see in wondrous beauty the kinsfolk of this damsel in countless thousands embellishing the slopes of this sacred and still active volcano. How many generations of the Princess' family displayed their beauty to the sun, the moon and the stars, to the birds of the air and the four-footed friends that walk the earth we do not know. But about a century ago a wandering pilgrim of the genus Homo became enraptured with them and lovingly carried a few away to his home in the town of Kurume and a new era in the family history dawned.

I was first introduced to the Kurume family in 1914 when, at the invitation of my lamented friend, the late Mr. H. Suzuki, the foremost Japanese horticulturist of his time, I accompanied him on a visit to the nursery district of Hatagaya, a few miles north of Tokyo. There in a garden I saw thousands of tiny plants bearing white and colored flowers of nearly every hue. With the courteous consent of the owner I secured a set of fragments and dried them for the Arnold Arboretum. In 1917, at my suggestion, Mr. John S. Ames secured a number of small plants from this collection and these were the first ever brought into the eastern States. They were midgets, indeed, but grew amazingly and flowered profusely

H. R. H. PRINCESS KURUME

and soon became one of the floral delights of the Ames Estate, a joy to the owner and his friends.

What I saw in 1914 whetted my appetite and I was hungry to see and learn more about these delightful plants. Opportunity came in 1918, and to my great good fortune my friend, Suzuki, was able to accompany me to the headquarters of the family, the city of Kurume. This city is on the island of Kyushu, situated some 800 miles south by west of Tokyo and is quite an important place. But the fame of its Azaleas will make it universally known. There we arrived on a fine May morning, to find the Azaleas in the pink of perfection. I went prepared to see a display of blossoms, but the entrancing beauty of myriad delicately colored flowers clothing a multitude of shapely grown plants surpassed my most sanguine expectations. The gardens of two leading specialists were veritable fairy-lands and I gasped with astonishment when I realized that garden-lovers of America and Europe knew virtually nothing of this wealth of beauty. Most of the plants were trained into low standards, each about 20 inches high with flattened or convex crowns some 24 inches through, and were monuments to the patience and cultural skill of the Japanese gardener. Other shapes there were but this was the favorite and most effec-

tive. The flowers, each about one-half to three-quarters of an inch across and borne in clusters of from two to several at the end of the twigs, were in such profusion as to almost completely hide the leaves. If a fault could be found, it was that the flowers were too numerous! Some have bizarre-colored flowers but such I do not favor. A great many have the calyx petaloid and the flowers are hose-in-hose. The stamens, always five, and pistil are perfect and there is no malformation as in ordinary double-flowers. The anthers are light to dark, varying with the color shades, tip the straight filaments and add not a little to the pleasing appearance of the flowers. They are, in truth, the roguish eyes of laughing, dimpled and blushing blossoms.

At Kurume the Azaleas are grown in a number of gardens but the oldest and best collection is that of Mr. Kijiro Akashi, who for more than forty years has assiduously devoted himself to the development of these charming Azaleas. He has raised from seeds and perpetuated by cuttings nearly all the kinds in cultivation. In his garden is the finest of all collections, and the loving pride with which this grand old gardener pointed out to us the particular merits of this or that pet can be appreciated only by those whose lives have been lived in close companionship

with plants. In this garden I made a selection in duplicate of fifty of the best kinds. Making the selection was much easier than the persuading later of Mr. Akashi to part with them, though, with true old-time Japanese politeness, he had offered me any or all that he had. He loved his plants and I fully understand his diffidence when the time to part with them actually came.

I think that Kurume Azaleas are the loveliest of all Azaleas. Small of stature but sturdy they are rich in attractive features. The branches are very numerous and twiggy, clothed with small neat rich green leaves and crowned with clusters of small slightly fragrant flowers, which on different individuals embrace all the delicate shades of color familiar to us in Sweet Peas. The individual flower suggests the frilled petticoat of a dainty lady. In many the calyx, green and inconspicuous in ordinary flowers, grows to the same size and has the same color as the corolla and here we get two frilled petticoats, one over the other, of exquisite grace and finish. Such arrangement is called hose-in-hose, that is one flower within another. These hose-in-hose flowers have none of the ugliness usually associated with the double flowers and, moreover, last in perfection much longer than the ordinary sorts.

The colors so pure and exquisite, are of every hue and shade—pure pink to rose-color, cerise, lavender, vermilion, salmon, bright red to scarlet, crimson and the richest magenta; others the purest white.

At Kurume the plants are often trained as low standards with a compact umbrella-shaped crown; less commonly they are dense and globose, or open and irregular in form. They are extremely floriferous, and in season the blossoms often completely hide the leaves. The leaves are of two forms and they vary considerably in size, in shades of green, in their autumn-coloring and in their degree of persistence. In a great measure these variations are correlated with the color of the flowers, and experts in Japan can with ease distinguish each variety by its foliage and general appearance.

Japanese experts recognize by name more than 250 kinds of Kurume Azaleas but the differences are often infinitesimal. The two leading experts, Messrs. Akashi and Kuwano, at my suggestion named six as the pick of them all:

"Takasago"	"Kumo-no-uye"
"Azuma-kagami"	"Kurai-no-himo"
"Kirin"	"Kureno-yuki"

For the sake of completeness I give a full list of

RADIANT BEAUTY — KURUME AZALEAS

the sorts I brought over. The Japanese names have priority and in all fairness should be kept as the proper names for these Azaleas. Unfortunately, however, it is well-nigh impossible for the western tongue to pronounce them accurately, moreover, they are untranslatable being, as a rule, picturesque phrases. As a compromise, therefore, I propose to add to the Japanese name an English name and I hope this will be acceptable to friends, both in the Orient and Occident.

Seikai	Madonna	white, hose-in-hose
Kureno-yuki	Snowflake	white, hose-in-hose
Shin-seikai	Old Ivory	cream-white, hose-in-hose
Yoro-zuyo	Purity	white
Nani-wagata	Painted Lady	white suffused lavender
Tancho	Seraphim	flesh-color, hose-in-hose
Hachika-tsugi	Prudence	white suffused lavender
Iro-hayama	Dainty	white margined pale lavender
Hoō	Appleblossom	white tinged with pink
Sui-yōhi	Sprite	flesh-color
Takasago	Cheeryblossom	cherryblossom pink, hose-in-hose
Kasumi-gaseki	Elf	pale pink
Bijinsui	Little Imp	pale pink
Asa-gasumi	Rosy Morn	rose-pink, hose-in-hose
Kimigayo	Cherub	pink
Azuma-kagami	Pink Pearl	deep pink, hose-in-hose
Osaraku	Penelope	white suffused and margined lavender
Otome	Maiden's Blush	blush pink
Aya-kammuri	Pinkie	rose-color
Shintoki-no-hagasane	Rose Taffetas	rose shading to pink, hose-in-hose
Saotome	Peachblossom	rose-color
Kirin	Daybreak	deep rose shading to silvery rose
Tamafuyo	Fancy	white striped peach-color
Kiritsubo	Twilight	rosy mauve
Omoine	Dame Lavender	pale lavender
Oinō-mezame	Melody	deep rose-color
Katsura-no-hana	Ruth	rose-color
Shin-utena	Santoi	pale salmon

Kumo-noito	Betty	pure pink
Kumo-no-uye	Salmon Prince	pure salmon
Benifude	Sunbeam	salmon
Kasane-kagaribi	Rosita	dull salmon-red
Tsuta-momiji	Cardinal	bright red
Suetsumu	Flame	crimson
Fudesute-yama	Poppy	light red
Ima-shojō	Fascination	bright red, hose-in-hose
Rasho-mon	Meteor	scarlet
Waka-kayede	Red Robin	red
Yaye-hiryu	Scarlet Prince	bright scarlet, hose-in-hose
Kurai-no-himo	Carmine Queen	carmine, hose-in-hose
Agemaki	José	carmine
Hinodegiri	Red Hussah	bright crimson
Aioi	Fairy Queen	almond blossom pink, hose-in-hose
Sakura-tsukasa	All-a-Glow	rosy mauve
Tama-no-utena	Flamingo	pale salmon
Gosho-zakura	Vanity	white striped peach-color
Ukamuse	Princess Delight	vermilion, hose-in-hose
Hinode-no-taka	Ruby	crimson
Osaraku seedling	Winsome	white suffused lavender
Hana-asobi	Sultan	red

As to the origin and history of these plants, Mr. Akashi kindly furnished me with the details. They were originated by a Japanese gentleman named Motozo Sakamoto, who lived in the city of Kurume about one hundred years ago. The parent stock came from sacred Mt. Kirishima, but whether brought from there by Sakamoto or given to him by some pilgrim is uncertain. At any rate, he cultivated several varieties and raised and selected seedlings, including one he named "Azuma-kagami" from which it is claimed have descended all the pink-colored forms. After his death, Sakamoto's collection passed into the hands of K. Akashi. The original plant of

"Azuma-kagami" is still healthy. I photographed it but failed to purchase it, though I tried hard to do so. Mr. Akashi showed us a gold medal awarded to him for an exhibit of thirty plants, in a dozen kinds, of Kurume Azaleas at the Panama Pacific Exposition, San Francisco, in 1915. The plants were afterwards sold, and Akashi's pride in the gold medal seemed a little saddened when he thought of the loss of those thirty plants.

Next it was determined to visit Mt. Kirishima, the place tradition says the parents of the plants came from. I had visited this mountain early in March, 1914, and remembered that an Azalea grew there and that I had gathered leafless specimens. We spent a night near the base of Kirishima and starting early the next morning soon reached an altitude of 3000 feet above sea-level, where forests abruptly give place to grassland and saw before us the mountain slopes dotted with blossoming Azalea bushes in quantity. They grow in volcanic soil on wideswept grassy slopes and among rocks. In size the bushes are from nearly prostrate to a yard high, and hardly two plants have flowers of the same shade of color. We gathered specimens of forms with pink, salmon, mauve to rich magenta-colored flowers and at a little higher altitude red-flowered forms and an occasional

white one. We found much variation in the size and shape of the flowers and leaves and also that the anthers varied in color. The evidence was complete in every detail, and no shadow of doubt as to the origin of the wondrous race of Azaleas we had seen in Kurume remained in our minds.

To a place so sacred as Kirishima pilgrimages have been made by the Japanese from immemorial time. With their profound love for flowers some of the pilgrims would certainly take back as souvenirs living plants of this charming Azalea. Naturally it was named for the mountain, and in the course of time was distributed widely in the gardens of Japan. It is easily understood that a plant bearing flowers of an unusual color would be that selected as a souvenir by the average pilgrim. It is such forms that reached gardens first, and so we find the red *obtusa,* the magenta *amoena,* the white *alba* to be the earliest known.

The reader may think it strange that a race of Azaleas so rich in forms and of such decorative value should have remained so long unknown to us, yet the explanation is simple. Interior Kyushu is little known to the western world, and even to those Japanese whose homes are on the other islands. The feudal system of government which until compara-

PL. CXXIV.

STAR MAGNOLIA — MAGNOLIA STELLATA

tively recently obtained in Japan created and preserved this aloofness. Further, Kurume is remote from the horticultural centres of Osaka and Yokohama, from whence we have drawn the bulk of our garden plants and where business is made of growing for export. Nagasaki is much nearer, but in the days of early explorers, intercommunication was difficult and, for foreigners, impossible. And so it has resulted that the product of Sakamoto's hobby, richly developed by Akashi, has remained hidden from the outside world until now. During the last fifteen years the fame of the Kurume Azaleas has reached Osaka, Tokyo and other places, and growers have obtained stocks and are propagating them apace. Unfortunately, every grower and enthusiast names the plants according to his fancy and the result in a few years will be chaos. And this is helped by the fact that every slight sport or variant is kept and named and no attempt at selection made. I do not see how it is possible to improve upon the strain grown in Kurume unless yellow could be injected. What is needed is rigorous selection and the reduction of the named forms to fifty or less. In the past seedling selection and preservation of sports by vegetative propagation have been the sole means employed in the evolution of the race of Kurume

Azaleas, but now attempts at hybridizing them with the large flowered "Indian" and "Ledifolia" types are in progress. This may result in a new race, but whether it will be as lovely and fascinating as the present one is doubtful.

Just how hardy this race will prove remains to be seen, but I am of the opinion that under the genial influence of the Gulf Stream from Cape Cod southward many places will be found where they will be at home and flourish in perfection. They root readily from cuttings and in conservatories may be had in blossom from Christmas until Easter. Good-natured, adaptable, at home in any surroundings, brightening and cheering us with a glow of color and beauty—the divine Princess Kurume is assured of a lasting welcome in the land of her adoption. Proud am I of being the fortunate one to introduce this exquisite damsel to the gardens of eastern North America.

CHAPTER L.

The Rainbow's End

THE story of plant introduction from Japan is simple compared with that of other lands dealt with. It has, however, particular interest to the American people inasmuch as Japan was the first non-European country from which America received plants direct. The real opening of Japan to foreign intercourse was due to the vigorous action of the United States Government, through Commodore Perry, which resulted in a treaty being signed in 1854.

In 1861, the first Japanese plants reached this country. They were sent by Dr. George R. Hall, through Gordon Dexter, and handed over on arrival to Francis Parkman, the historian, living at Jamaica Plain, Massachusetts. Among them were the Golden-rayed Lily of Japan (*Lilium auratum*), a Wistaria with double flowers (*Wistaria floribunda* var. *violaceo-plena*), the Parkman Crabapple (*Malus Halliana* var. *Parkmanii*), two forms of *Lilium speciosum*, many variegated plants, Hall's Amaryllis (*Lycoris squamigera*), *Chamaecyparis pisifera*,

Rhododendron brachycarpum and other valuable plants.

In 1862, Dr. Hall brought home a much larger consignment, which he handed over to the nurserymen, Parsons & Company, Flushing, Long Island. This second consignment contained such indispensable plants as *Hydrangea paniculata* var. *grandiflora*, two Magnolias (*M. kobus* and *M. stellata*), Hall's Honeysuckle (*Lonicera japonica* var. *Halliana*), the the fine evergreen *Evonymus patens*, four Wistarias, including the white and long-racemed varieties, many varieties of Japanese Maples and Wiegelas, the Keaki, (*Zelkova serrata*), the most valuable hard-wood timber tree in Japan, certain Oaks, many forms of Arbor-vitae, Pines and Spruces, the most useful *Juniperus procumbens*, the remarkable Umbrella Pine (*Sciadopitys verticillata*), and that most valuable of evergreens for New England gardens the dwarf form of the Japanese Yew (*Taxus cuspidata* var. *nana*). These by no means exhaust the list of Hall's introductions, indeed, up to that date no more valuable consignment of hardy woody plants had reached the shores of North America.

George Rogers Hall was born at Bristol, Rhode Island, in March, 1820, and died on Christmas Eve, 1899. After graduating from Harvard Medical

JAPAN'S RED PINE — PINUS DENSIFLORA

School in 1846, Hall went to China and commenced the practice of medicine in Shanghai. In 1855 he visited Japan and later lived there for a period. In Japan he was able to gratify the love for plants with which he was early imbued and his plant introductions have made a lasting impression on the gardens of eastern North America.

Another American, William Smith Clark, President of the Massachusetts Agricultural College, was granted leave of absence from 1876 to 1878 to establish an agricultural college at Sapporo, in Hokkaido, north Japan. On the very year of his arrival there, Clark sent back seeds of native trees and shrubs to America, and of these the Arnold Arboretum received a large share on December 20, 1876. From these were raised for the first time in America the Tree-lilac (*Syringa japonica*), the Saghalien Corktree (*Phellodendron sachalinense*), the northern Magnolia (*M. kobus* var. *borealis*), the white-leafed Cat-vine (*Actinidia polygama*), and the evergreen Bittersweet (*Evonymus radicans* var. *vegeta*); also a plant in cultivation but very rare at that time—the handsome *Actinidia arguta*. In 1878 he sent seeds of the rare *Cercidiphyllum japonicum*, interesting as being the largest broad-leaf tree in eastern Asia and very beautiful in spring and fall.

A Portuguese adventurer, Mendez Pinto, discovered Japan in 1542 and Francis Xavier introduced Christianity in 1549. The first Dutch ships visited Japan in 1600 and eleven years later a Dutch trading factory was established at Hirado, followed soon afterward by others belonging to the Portuguese, Spaniards and English. Christianity made rapid progress in Japan, greatly to the alarm of the feudal lords, military men and Buddhist priests, and much persecution ensued. In 1624 Christianity was proscribed and Japan closed to foreigners, except the Dutch and Chinese, and so remained until America forced open the door by treaty signed in 1854.

It is to the Dutch that the world owes its first knowledge of Japanese botany and it was they who introduced the first plants into Europe. The Camphor tree (*Cinnamomum Camphora*) was probably the first, for Jakob Breyne, in his "Prodromus" I. 4, published in 1678, records a fine specimen growing in van Beveringk's garden; in 1680 *Azalea indica* and in 1689 the Tea-plant and six varieties of Chrysanthemum were growing in the same garden.

The Dutch East India Company employed people of many nationalities in their East Indian possessions and trading ports, especially medical men. Such was Andreas Cleyer, a German, born at Cassel, who

ROOTCLIMBING SCHIZOPHRAGMA HYDRANGEOIDES

passed some years in Dutch employ in Java and also visited China and Japan, returning to Europe about 1680. Cleyer was the first European to study Japanese plants and is commemorated by the genus Cleyera. Much more important was the work of another German, Engelbert Kaempfer, for many years in Dutch service at Batavia in Java. From Batavia he went to Japan with the embassy which the Dutch Company sent annually to that country. He resided at Nagasaki from the autumn of 1690 to that of 1692 and during that interval visited Tokyo. In his work entitled "Amoenitates Exoticae," published in 1712, Kaempfer gives an admirable account of Japanese plants with many good figures under their vernacular names, and among them one of an Azalea which now bears his name.

The first "Flora" of Japan was the work of C. P. Thunberg, published in 1784, and still of great value to students. Thunberg was a Swede, born in 1743, and a pupil of the great Linnaeus, whom he afterwards succeeded at the university of Upsala. In 1771 he obtained an appointment as surgeon on one of the Dutch East India Company's ships. He landed at the Cape of Good Hope where he spent two winters investigating the natural history. From the Cape he went to Java where he remained five years

except for a voyage to Japan. Thunberg travelled overland from Nagasaki to Tokyo, tarrying there for two months, during which he devoted himself assiduously to the collecting and study of plants. He died in 1828.

Greatest of all the employees of the old Dutch East India Company from our viewpoint was Philipp Franz von Siebold, a Bavarian, born in 1796, who resided in Japan from 1823 to 1829. To Siebold we owe the magnificent "Flora Japonica," and he introduced into Europe quite a number of plants from Japanese gardens, among them *Lilium elegans* and *L. speciosum,* and twenty years later several others, including two Crabapples (*M. floribunda* and *M. Sieboldii*), and a few flowering Cherries. In 1830 he returned to Europe, quitted the Dutch service and employed himself in arranging the rich store of scientific material he had collected in Japan. About 1850 he established a nursery and "Jardin d'Acclimatation" at Leiden, for the cultivation and distribution of new plants from the Orient. He revisited Japan for a few months in 1856 and made arrangements whereby a large number of plants previously unknown in European gardens were successfully introduced and disseminated by his nursery. Siebold died at Munich in October, 1866. As a

physician he won a high reputation among the Japanese and in consequence enjoyed greater freedom in the land than his predecessors. For his contributions to our gardens his name will always be held in esteem wherever Japanese plants are grown.

Nurserymen have quite naturally played a prominent part in the work of plant introduction and from 1840 until the end of the first decade of the twentieth century a leading place was taken by the famous house of James Veitch & Sons. Their collectors have gone to all parts of the world and much that is best of our present-day garden material has been introduced into commerce by this firm. The name of Veitch is indelibly associated with the plants of many lands but perhaps with none more than those of the Orient.

In 1860, John Gould Veitch, a member of the firm, visited Japan and was among the first to ascend Mt. Fuji. He sent to England seeds, lily-bulbs and living plants of many choice species and varieties, including many forms of Japanese Maple (*Acer palmatum*), several forms of *Chamaecyparis obtusa* and *C. pisifera*, the Japanese Umbrella Pine (*Sciadopitys verticillata*), *Abies firma*, *Tsuga diversifolia*, *Picea polita*, *P. jezoensis*, *Pinus densiflora*, *P. Thunbergii*, *Cryptomeria japonica* var. *elegans*, *Primula japonica*,

P. cortusoides, Lilium auratum, and that most popular of all vines, Veitch's Ampelopsis or Boston Ivy (*Parthenocissus tricuspidata*).

In another chapter I have said more of the work of this remarkable man who died in August, 1870, at the early age of thirty-one. His son, the late James Herbert Veitch, visited Japan in 1892, and among other plants introduced the lovely pink-flowered Azalea known as *Rhododendron Schlippenbachii.*

In 1877 Messrs. Veitch despatched Charles Maries to the Orient in quest of new plant material. The expedition lasted three years and was quite successful. Maries visited China, Formosa and Japan. From China he sent home the now well-known *Primula obconica,* the best of the Witch-hazels (*Hamamelis mollis*), the related *Loropetalum chinense* and a fine Lily (*L. speciosum* var. *gloriosoides*). From Formosa he sent the red-flowered *Rhododendron Oldhamii* and *Lilium philippinense* var. *formosanum.* It was, however, in Japan that Maries made his chief successes, traversing the length and breadth of the land and shipping home many valuable plants. Apart from many plants found in Japanese nurseries and gardens, Maries introduced *Abies Veitchii, A. Mariesii, A. sachalinensis, Styrax obassia, Trocho-*

WREATHED IN WHITE — VIBURNUM TOMENTOSUM MARIESII

dendron aralioides, Viburnum tomentosum var. *Mariesii, Daphniphyllum glaucescens, Platycodon grandiflorum* var. *Mariesii, Enkianthus campanulatus, Rodgersia podophylla,* the hardest of the Bananas (*Musa basjoo*), the wonderful *Lilium auratum* var. *platyphyllum,* numerous Ferns, including *Davallia Mariesii,* and other useful plants. Maries was born in Stratford-on-Avon, and educated at the Grammar School, Hampton Lucy. After his engagement with Messrs. Veitch terminated he settled in India, in 1882, and died there as Superintendent of the Gwalior State Gardens on October 11, 1902.

Of other illustrious men who have labored in Japan to enrich our knowledge and gardens and have passed into the great beyond one more must be mentioned—Carl Maximowicz, a Russian. To Maximowicz we owe the first intimate account of the forest flora of Japan and also that of much of eastern Asia; he also introduced a number of living plants into the Botanic Gardens at Petrograd. He was born at Tula, in the interior of Russia, in 1827 and died in February, 1891. In 1853 he first visited northeastern Asia, and from 1859 to 1864 he travelled in Japan, Manchuria and adjacent regions. The rest

of his life was spent in the study of the flora of these regions and that of China and Mongolia. Maximowicz was a great scholar and all his writings are remarkable for their clearness and precision and are a lasting monument to his eminent attainments.

THE END

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