ADDISONIA

COLORED ILLUSTRATIONS

AND

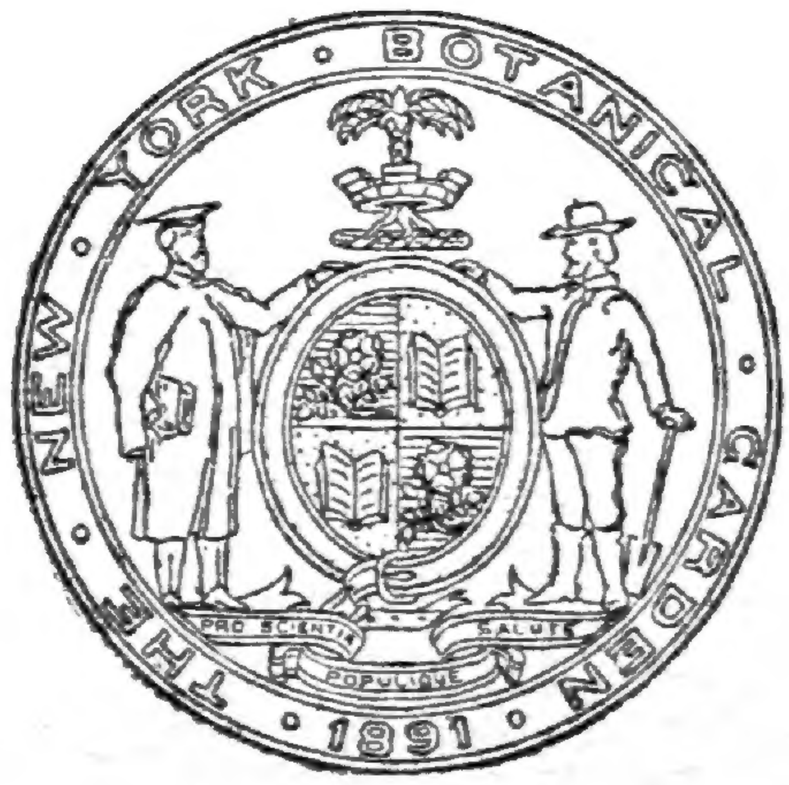
POPULAR DESCRIPTIONS

OF

PLANTS

VOLUME 1

1916



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PREFACE

Addison Brown, for twenty years United States District Judge for the Southern District of New York, was an enthusiastic amateur botanist and patron of science. He was a member of the Torrey Botanical Club for nearly forty years, and its president from 1893 to 1905. He was keenly interested in the establishment and development of the New York Botanical Garden; was a member of the Board of Managers from its organization until his death, and President of the Garden from 1910.

Judge Brown's interest in plants centered largely on their proper illustration, and he has hitherto been best known to the botanical world as one of the authors of the "Illustrated Flora." Upon his death, in 1913, he left a bequest to the New York Botanical Garden establishing the ADDISON BROWN FUND, "the income and accumulations from which shall be applied to the founding and publication, as soon as practicable, and to the maintenance (aided by subscriptions therefor), of a high-class magazine bearing my name, devoted exclusively to the illustration by colored plates of the plants of the United States and its territorial possessions, and of other plants flowering in said Garden or its conservatories; with suitable descriptions in popular language, and any desirable notes and synonymy, and a brief statement of the known properties and uses of the plants illustrated."

The magazine established in accordance with the provisions of this bequest has been named ADDISONIA in honor of its founder, and upon the completion of this first volume it seems appropriate to place on record this brief statement of its origin and its scope.

JOHN H. BARNHART,
GEORGE V. NASH,
Editors of this volume.

NEW YORK BOTANICAL GARDEN,
December 30, 1916.

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RHODODENDRON CAROLINIANUM

(Plate 1)

RHODODENDRON CAROLINIANUM

Carolina Rhododendron

Native of eastern Tennessee and western North and South Carolina

Family ERICACEAE HEATH Family

Rhododendron carolinianum Rehder, Rhodora **14**: 99. 1912.

A low compact evergreen shrub, with numerous branches, and rose-colored flowers in terminal clusters, the flowers opening before the development of the leaf-shoots. The winter flower-buds are less than half an inch long, ovoid, acute, the scales densely ciliate and scaly. The leathery leaves are two to four and a half inches long and up to two inches wide, elliptic to oval, wedge-shaped at the base, acute or shortly acuminate at the apex, deep yellowish-green, paler beneath, the upper surface at first sparsely scaly but soon smooth, the lower surface densely scaly, the petiole not more than half an inch long. Umbel-like clusters of four to ten flowers terminate the branches, each flower on a scaly pedicel about half an inch long. The sepals are short, equaling or shorter than the calyx-tube, nearly orbicular to broadly ovate, scaly and often ciliate. The corolla is rose-colored, sometimes paler or nearly white, about an inch long and one and a half inches broad, glabrous, or sometimes rather sparingly scaly, the tube bell-shaped, equaling or a little shorter than the lobes, which are broadly ovate and without spots, or the upper lobe sometimes sparsely spotted. There are ten stamens, which are a little shorter than the corolla, the filaments rose-colored, hairy at the base. The glabrous style is purple, a little shorter than the stamens. The ovary is scaly. The narrowly oblong capsule is brown and about half an inch long.

For many years this interesting plant has been known as *Rhododendron punctatum.* In 1912 Alfred Rehder announced that there were really two species which had been bearing this name. It has been pretty well established by him that the original *Rhododendron punctatum* of Andrews is the same as *Rhododendron minus* Michx., a name published in 1792, six years earlier, and to be used on account of its priority. That plant is distributed from South Carolina to Georgia and Alabama. The other species which has been included in *Rhododendron punctatum* is the one here illustrated. Its range is more restricted, being confined apparently to the mountainous region of eastern Tennessee and western North and South Carolina. It resembles the other species, but can be readily distinguished by the short bell-shaped corolla-tube, not exceeding

the lobes, by the upper lobe, which is either unspotted or much less spotted, and by the more compact habit of growth. This habit and the corolla, usually broader in proportion to its length than in the other, make this the more desirable evergreen. In *Rhododendron minus* the tube of the corolla is cylindric at the base, broadening gradually above, while in this it is much shorter and broadens from very near the base.

This is a charming rhododendron, one of our most desirable evergreens with attractive flowers. It should be planted in masses to secure the best effect, and a plantation of this kind, established in 1910, may be found in the New York Botanical Garden on the south bank of the upper lake, just to the west of the bridge driveway. There are all too few broad-leaved evergreens which are hardy and have showy flowers, and every encouragement should be given to the cultivation of those we have. This one is a delight in its charming flowers, and there is an added pleasure in their early appearance, for they come late in May or early in June, two or three weeks in advance of those of *Rhododendron catawbiense*, another species from the mountains of our southeastern states. Then come, toward the end of June or early in July, the flowers of *Rhododendron maximum*, a species more extended in its distribution, found from Nova Scotia and Ontario to Ohio, Georgia, and Alabama.

It must always be remembered that rhododendrons, as well as most other members of the heath family, are intolerant of alkaline soils, and this prevents their use, of course, in limestone regions. Their intolerance of fresh manure is equally strong and for the same reason, the presence of alkali, and on this account it must be used neither in the initial preparation of the soil nor as a mulch later. Old and well-rotted manure, preferably cow manure, may be employed. But a slightly acid soil is their delight, so the best material is leaf-mold, not too old, produced by the rotting of the leaves of deciduous trees, especially those of the oak. An annual mulch of four to six inches of freshly fallen leaves of this kind, applied in the fall, is excellent, as such a mulch, slowly disintegrating, produces the kind of humus in which rhododendrons thrive. Most rhododendrons require a northern exposure and partial shade for their best development.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Fruiting cluster.

CASSIA POLYPHYLLA

CASSIA POLYPHYLLA

Many-leaved Senna

Native of the West Indies

Family CAESALPINIACEAE SENNA Family

Cassia polyphylla Jacq. Coll. 4: 104. 1790.

Usually a shrub nine feet high or less, or a small tree up to twelve feet high, but recorded as sometimes becoming a tree forty-five feet high. The branches are slender, and the young twigs loosely and sparingly hairy. The leaves, which are from three quarters of an inch to nearly three inches long, are hairy when young, but nearly smooth when old, almost sessile, and clustered at the nodes of the twigs; they have minute stipules about one eighth of an inch long, and five to fifteen pairs of small obovate or oblong leaflets not more than one quarter of an inch long, which are blunt or notched at the apex, three-nerved and few-veined. The showy yellow flowers are borne one or two together on slender axillary peduncles, which are shorter than the leaves. The somewhat unequal sepals are oval and blunt. The spreading petals are obovate, short-clawed, and about half an inch long. The narrowly linear, flat, drooping pods are nearly straight, six inches long or less, about one quarter of an inch wide, stalked, short-tipped, brown, becoming black and shining, at length splitting into two thin valves. The seeds are flat and nearly round.

The species was first described from plants derived from Porto Rico, which flowered prior to 1790, in April and May, in the greenhouse of the Royal Garden at Schönbrunn, near Vienna. As a shrub, it is a common element of the vegetation of the southern and southwestern dry portions of Porto Rico, where it glorifies hillsides and plains in the spring by its profuse bright yellow flowers. It has been taken into gardens in that region, growing there readily and blooming freely; in gardens at Guanica, flowering masses were seen which were as strikingly golden as any yellow-flowering plant could be. The plant which furnished the spray for the accompanying illustration was grown from seed collected by us near Ponce in 1906, and is now about five feet high.

Cassia polyphylla has been found in Hispaniola, and inhabits also the Danish islands St. Thomas and St. Croix; I further observed it in 1913 on Anegada, the most eastern of the Virgin Islands, where it grows on a low rocky plain. I have never seen the plant higher than about twelve feet; the statement that it attains much

greater size is taken from the record by Professor Urban in his "Flora portoricensis."

In Porto Rico, it is known as "Retama" or "Retama prieta," but the name "Hediondilla" is also applied to it there. The botanist Bello y Espinosa mistook the plant for *Cassia biflora* Linnaeus, and so recorded it in his "Apuntes para la flora de Puerto-Rico," published in 1881.

While in nature a plant of relatively dry regions, it grows well in moist greenhouses, commencing to flower with us in late December or early January; it would perhaps live in southern Florida, and should be tried there, for, if successfully established, a most attractive additional winter feature would be supplied.

A flowering spray was depicted on *plate 460* of Jacquin's rare and valuable "Icones plantarum rariorum," published in three folio volumes toward the end of the eighteenth century, in which this and many other rare plants grown in the Schönbrunn garden were illustrated.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Fruit.

ROBINIA KELSEYI

(Plate 3)

ROBINIA KELSEYI

Kelsey's Locust

Native of North Carolina

Family FABACEÆ — PEA Family

Robinia Kelseyi Cowell, Cycl. Am. Hort. 1538. 1902.

A compact spreading shrub up to six feet or more tall, with rather dark green foliage and rose-purple flowers. The leaves are pinnate, three to six inches long, the rachis sparingly hairy, grooved on the upper surface, with subulate pubescent stipules. The leaflets are usually nine to eleven, glabrous, with prominent venation beneath when mature, elliptic to elliptic-lanceolate, rather firm, the stalks one eighth of an inch long or less, sparingly pubescent, the blade three quarters of an inch to one and a half inches long, one quarter to five eighths of an inch wide, acute and apiculate at the apex, usually rounded at the base. The racemes consist commonly of four to six flowers and are one and a half to three inches long, with the rachis glandular-hairy. The flowers are about three quarters of an inch long, on glandular-hairy pedicels which are less than one quarter of an inch long. The calyx is glandular-hairy outside and soft-hairy within, and has a campanulate tube a little over an eighth of an inch long, with the triangular-subulate teeth, which are nearly equal in length, an eighth of an inch long or a little more, very acute. The corolla is rose-purple, the standard orbicular, up to an inch in diameter, the wings elliptic-oblong, less than an inch long, the keel three quarters of an inch long or less. The staminal tube is glabrous. The ovary is glandular-hairy, the style curved, hairy at the apex. The fruit is oblong-linear, one and a half to two and a half inches long and up to five eighths of an inch wide over all, densely bristly with glandular hairs.

This is related to *Robinia hispida* L., a species distributed from Virginia and Kentucky to Georgia and Alabama. It differs in the more compact habit, the absence of glandular hairs on the leaf-rachis (a character conspicuous in the other species), the narrower leaflets, and the somewhat smaller flowers.

This interesting shrub was discovered by Harlan P. Kelsey, who offered it for sale for the first time in his catalogue of 1900–01. The following quotation is from a letter recently received from Mr. Kelsey in response to a request for information as to the locality and habitat of this plant: "*Robinia Kelseyi* was found growing on the Blue Ridge range south of Pineola, North Carolina.

Its range so far as I know is not wide, although very possibly it might be found in other places. It is found growing with kalmias and rhododendrons on the sunny exposures on comparatively dry ridges, and is found with the typical ericaceous growth including *Vaccinium*, *Gaylussacia*, *Galax*, *Leucothoë*, *Xolisma*, and azaleas. Of course this is a non-alkaline soil and the plant seems to thrive in fairly sunny locations. The altitude is about 3700 to 3900 feet elevation."

There are in the fruticetum of the New York Botanical Garden two of these shrubs, between four and five feet high, purchased from Mr. Kelsey in 1903; they blossom at the end of May or early in June. It is one of the most attractive shrubs flowering at that time of the year, and is certainly worthy of more general cultivation. The information furnished by Mr. Kelsey, quoted above, indicates that it thrives under conditions favorable to rhododendrons. The flowers resemble in color those of *Rhododendron carolinianum*, illustrated at plate 1 of this work, and appear at about the same time. From its preference for a non-alkaline soil, as indicated by its environment of ericaceous plants, its successful cultivation in a limestone soil is uncertain.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Fruit.

PACHYPHYTUM LONGIFOLIUM

(Plate 4)

PACHYPHYTUM LONGIFOLIUM

Long-leaved Pachyphytum

Native of central Mexico

Family CRASSULACEAE ORPINE Family

Pachyphytum longifolium Rose; Britton & Rose, N. Am. Fl. **22**: 12. 1905.

The simple stems are usually short, very leafy, terminated by an elongate raceme, the pink corollas nearly hid under the large leafy bracts and leaf-like sepals. The leaves are elongate, very fleshy and turgid, but somewhat flattened, two to three inches long, one fourth to three fourths of an inch broad, one fourth to one half of an inch thick, narrowed from below the acute apex to the base and into short round petioles, glaucous, tinged with purple, the lower ones spreading at right angles to the stem, the upper ones erect. The flowering raceme is six to ten inches long, erect below, nodding above, leafless except just below the flowers. The large flowering bracts are cordate at the base, arranged in two rows, at first imbricate. The sepals are large, glaucous, the two outer ones nearly equal, broadly oblong, about half an inch long, the three inner ones smaller. The corolla is much smaller than the calyx, about two-fifths of an inch long, pale on the outside, red on the inside. The five nearly distinct petals are erect below, spreading above, broad and rounded at apex but with a short abrupt point. The stamens are ten in number, five free and five borne on the petals. The five distinct carpels, each with a broad scale at its base, are erect, and each is terminated by a short style. The seeds are numerous, minute, oblong.

This species is nearest *Pachyphytum bracteosum*, a well-known greenhouse plant, but has much narrower leaves. The foliage resembles that of the well-known garden plant, *Echeveria clavifolia*, otherwise quite distinct. This plant was introduced into the collections of the New York Botanical Garden through specimens collected in 1904 by C. A. Purpus, in central Mexico, but no definite locality was given.

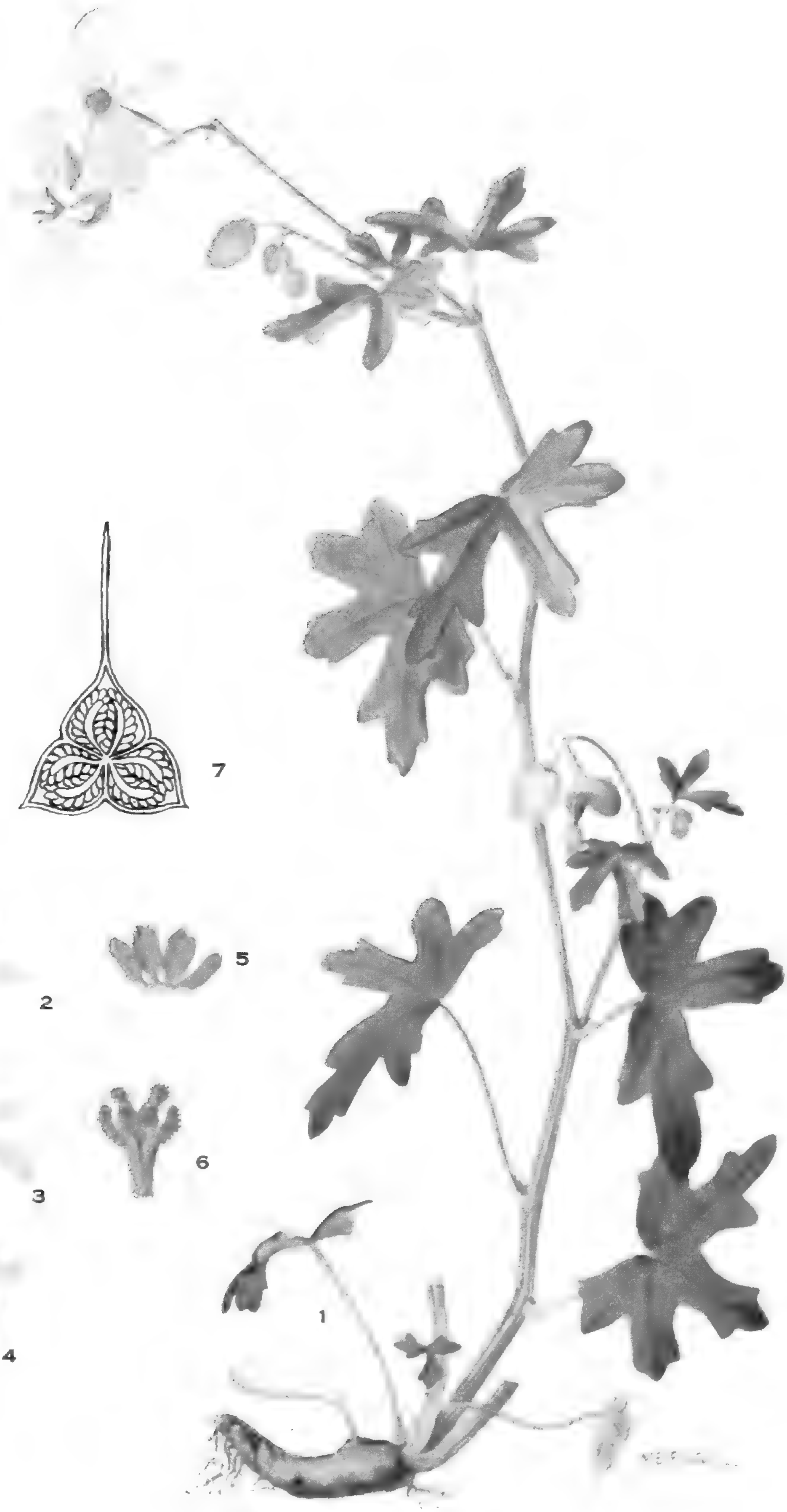
The species is easily propagated by seeds or cuttings, and the leaves will give off new plants from their bases when put into the cutting-bed or even allowed to lie on top of the soil where they drop from the plant.

Pachyphytum, known only from Mexico, and comprising seven described species, is characterized by very fleshy leaves, large leafy sepals, rather thin petals, and curiously appendaged stamens.

The genus was first described in 1841, but in 1853 Lindley & Paxton referred it to *Echeveria*, while in 1865 Bentham & Hooker combined it and *Echeveria* with the South African genus *Cotyledon*.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Flower, seen from above. Fig. 3.—Flower, lateral view, with the calyx removed. Fig. 4.—Flower, opened, exposing stamens and pistil.



BEGONIA COWELLII

(Plate 5)

BEGONIA COWELLII

Cowell's Begonia

Native of eastern Cuba

Family BEGONIACEAE — BEGONIA Family

Begonia Cowellii Nash, sp. nov.

A perennial plant with slender stems of a beautiful rose color striated with darker rose, lobed leaves, and white flowers flushed with rose. The stems, which measure up to sixteen inches tall and are sparingly branched, arise from a short, stout, fleshy, creeping rootstock. The scarious brown stipules are broadly oval or nearly orbicular, about an eighth of an inch long, toothed and ciliate, one-nerved, the nerve extending into a bristle. The leaves, of which there are usually six or eight on each stem, are spreading. The petioles, which equal or exceed the blades in length, those of the basal leaves being much longer, are colored like the stem, and are sparingly pubescent, especially toward the apex, with long brown hairs. The blades are broader than long, an inch to an inch and a quarter long and an inch and a quarter to two and a half inches broad, shining, somewhat fleshy, rather dark green and sparingly pubescent with short appressed hairs on the upper surface, paler and glabrous or with a few brown hairs on the nerves beneath; they are unequally three- to five-lobed, the divisions extending to or below the middle, the lobes sparingly toothed or lobed. The flowers are in clusters of two or three, all staminate, or one flower in each cluster pistillate. In the staminate flowers the perianth is of four parts, of which the two outer are oval to broadly obovate, about half an inch long and three eighths of an inch wide, obtuse, the two inner shorter and much narrower. The stamens, of which there are twenty or twenty-five, are yellow, and are united below into a glabrous column which is shorter than the cluster of anthers. The mature anthers, about one twelfth of an inch long, and less than one half as wide and several times as long as the free part of the filaments, are oblong-linear, the rounded connective extending beyond the anther-cells. The pistillate flowers have a perianth of five, or sometimes six, obtuse parts, which are about a half inch long and vary from narrowly oblanceolate and less than an eighth of an inch wide to elliptic or obovate and a quarter of an inch wide. The three-celled and three-angled ovary is unequally winged, one of the wings much longer than the others. The placentas are deeply two-parted, the divisions bearing ovules on both surfaces. The yellow styles are about an eighth of an inch long and finely pubescent, and bifid, the divisions spirally papillose. The body of the capsule is about a quarter of an inch long and broad, the largest wing being nearly a quarter of an inch long. The seeds are brown, oblong-elliptic, obtuse.

This interesting plant was collected by Britton and Cowell in the early spring of 1912, along a rocky stream near Ensenada de Mora, Province of Oriente, Cuba. Living plants only were obtained, and these consisted of the fleshy rootstocks and a few leaves. Flowers were produced for the first time in October of the same year. It is named in honor of one of the collectors, the late John F. Cowell, for many years director of the Buffalo Botanic Garden. It is of easy culture, and thrives well under conditions required by others of the fibrous-rooted begonias.

It belongs to the section *Begoniastrum* A. DC., in the broad sense in which that is now regarded, subsection *Eubegonia* Warburg. There are between twenty-five and thirty species of *Begonia* known from the West Indies, all but two of which belong to this section. The seventy-five or one hundred species comprising this section are all natives of America from Mexico and the West Indies to South America. Many of these are in cultivation, including such well-known plants as *Begonia nitida* and *Begonia semperflorens*.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Staminate flower. Fig. 3.—Pistillate flower, seen from above. Fig. 4.—Pistillate flower, lateral view. Fig. 5.—Portion of stamen cluster, × 4. Fig. 6.—Styles, × 6. Fig. 7.—Cross-section of ovary, × 4.

ECHEVERIA SETOSA

(Plate 6)

ECHEVERIA SETOSA

Setose Echeveria

Native of southern Mexico

Family CRASSULACEAE ORPINE Family

Echeveria setosa Rose & Purpus, Contr. U. S. Nat. Herb. **13**: 45. *pl. 10.* 1910.

A stemless perennial. The numerous leaves, one hundred or more, form a dense, almost hemispheric rosette, three or four inches in diameter. The leaves are fleshy but flat, spatulate to oblanceolate, acute, one to two inches long, covered on both sides with setose hairs. The flowering stem is usually simple, sometimes branched, fifteen inches long or less, covered with purple hairs, and bearing numerous small leaves. There are eight to fifteen flowers, arranged in a one-sided raceme on setose pedicels sometimes an inch or more long. The five sepals are linear, green, setose, and spreading. The five petals are about one half of an inch long, red at base, yellow at tip. The ten stamens are white. The carpels are five in number.

This differs from all the other known species of *Echeveria* in having the leaves and inflorescence setose, a peculiarity which makes it a very striking plant and a most interesting introduction to our conservatories. The plant in the collection of the New York Botanical Garden was collected by C. A. Purpus in the mountains of Puebla, Mexico.

The genus *Echeveria*, of more than sixty species, is confined to the New World and chiefly to Mexico. Only one species has been reported from the United States and that from near the Mexican border. One or two are known from Central America, while one occurs as far south as central Peru. Many form dense rosettes of highly colored leaves and for this reason are admirable plants for carpet and formal bedding. *Echeveria secunda, Echeveria glauca,* and various hybrids have long been familiar favorites.

Recently many new species with highly colored leaves have been discovered in Mexico, some of them as attractive as those now in cultivation.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Flower, opened to expose stamens and pistil.

COLUMNEA GLORIOSA

COLUMNEA GLORIOSA

Scarlet Columnea

Native of Costa Rica

Family GESNERIACEAE — GESNERIA Family

Columnea gloriosa T. A. Sprague, Bot. Mag. *pl. 8378.* 1911.

An epiphytic herbaceous perennial, clothed with a copious spreading pubescence which is usually colored, giving the plant a reddish hue, and with pendent or creeping stems and large axillary scarlet flowers. The stems are up to two feet long and produce branches near the base. The spreading opposite leaves, on petioles less than one eighth of an inch long, are fleshy, and measure up to one and a quarter inches long and two thirds of an inch wide, rarely larger; they are ovate, with unequal sides, usually rounded or somewhat heart-shaped at the base, acute at the apex, revolute on the margins, dark green above, dull purple beneath, with three or four nerves on each side. The flowers are single and erect in the axils of the leaves, and are borne on stout often curved pedicels up to three quarters of an inch long. The five sepals are slightly united below, elliptic to ovate, spreading, fleshy, one quarter to one half of an inch long, acute, with revolute margins. The corolla, which is crimson in bud, is rather sparingly covered with long hairs on the outside; it is two or three inches long, with a pronounced enlargement on the back of the tube near the base. The corolla-tube, which is yellow on the under side, is about three quarters of an inch long. The limb of the corolla is two-lipped, the lower lip about one inch long, narrow, oblong, obtuse or acutish, entire, the upper lip arched, one and a half to two inches long, about one and a half inches wide, spreading, four-lobed, with the lobes obtuse, the lateral ones larger. There are four stamens, which are shorter than the upper lip, with the filaments curved at the apex, glabrous, slender, united below into a short sheath which is partly adnate to the tube. The ovary is appressed-pubescent. The curved style is shorter than the upper lip, is hirsute above, and has a two-lobed stigma. The white fruit, which is about half an inch in diameter, is depressed-globose and appressed-pubescent.

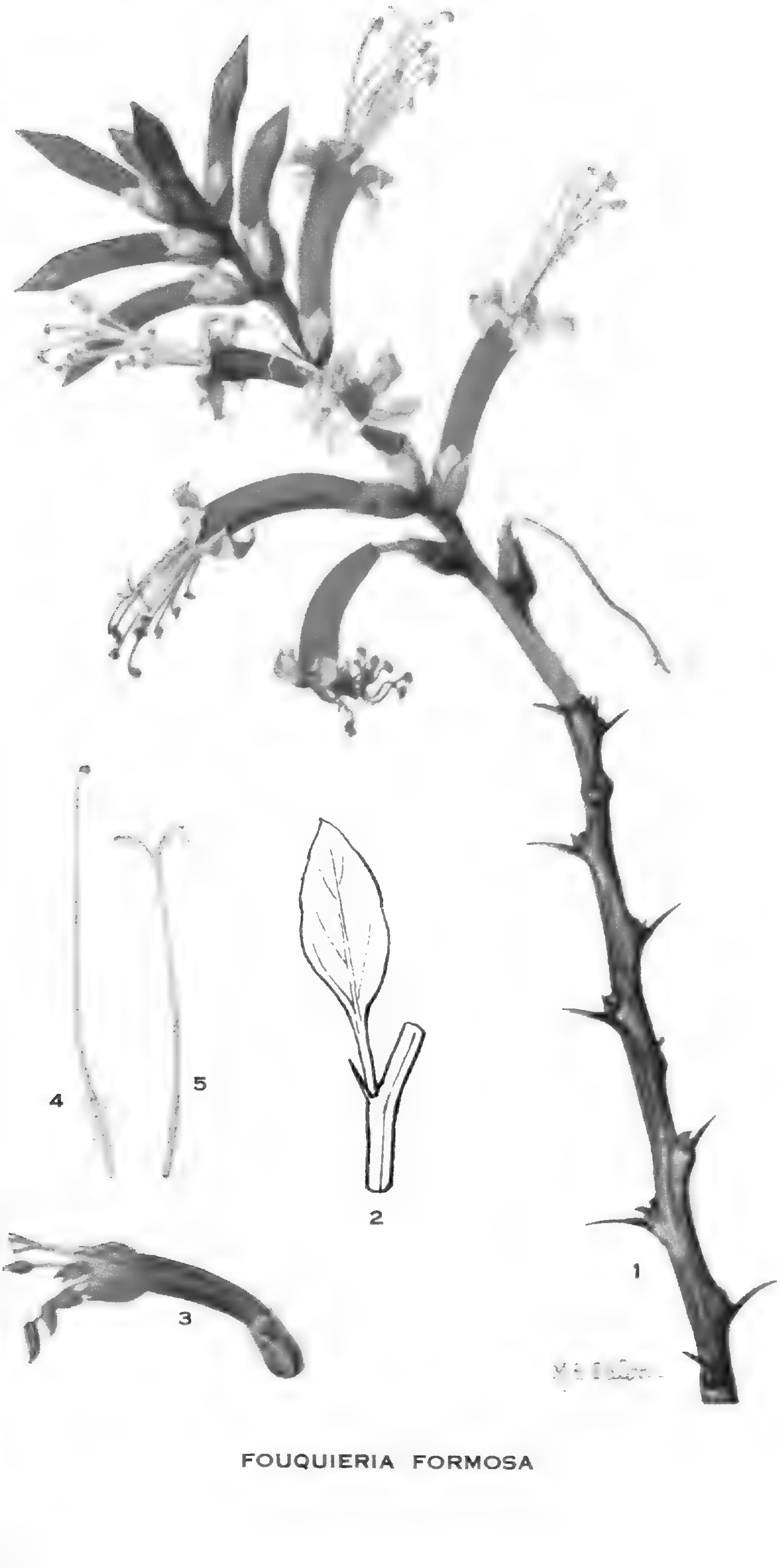
This is perhaps the handsomest species of *Coumnea*, with its glorious scarlet flowers. Like many other members of this genus it grows on trunks of trees in tropical woods, where the humidity is great, and for this reason its successful cultivation demands a tropical house well shaded from the direct rays of the sun. The stems creep over the bark, the branches pendent. It is therefore

successfully cultivated in a basket suspended from the roof of a low house; the hanging branches, bearing a succession of beautiful blossoms during the summer, make it a valuable addition to any collection; it should be prized especially by those who delight in graceful and charming basket plants. Our illustration is from a plant collected in Costa Rica by C. Wercklé, in 1905.

The genus *Columnea* is widely distributed in tropical America, and more than one hundred species are known. These vary considerably in habit; some have erect stems, while others, as in the example before us, have creeping stems with pendent branches. *Columnea gloriosa* belongs to the section *Eucolumnea*, and subsection *Macrocalyces*. *Eucolumnea* is characterized by the usually small leaves, arranged in pairs, with one sometimes smaller than the other, and a strongly two-lipped corolla which has a narrowly cylindric tube, the upper lip being hood-shaped and formed of the four united lobes. The subsection *Macrocalyces* is distinguished primarily by the large calyx-lobes, and by the thicker hairy corolla with shorter tube. There are some ten or a dozen species of this subsection known, mostly natives of Central America, the most familiar species being perhaps *Columnea Schiedeana* Schlecht., from Mexico.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Leaf, under surface. Fig. 3.—Fruit.



FOUQUIERIA FORMOSA

FOUQUIERIA FORMOSA

Spiked Candlewood

Native of southern Mexico

Family FOUQUIERIACEAE CANDLEWOOD Family

Fouquieria formosa H. B. K. Nov. Gen. & Sp. **6**: 83. *pl. 527.* 1823.
Echeveria spicata Moc. & Sessé; DC. Prodr. **3**: 349. 1828.
Philetaeria horrida Liebm. Vidensk. Selsk. Skr. V. **2**: 283. *pl.* 1850.

A branching spiny shrub up to twelve feet tall, the bright red flowers borne in spikes. The leaves of the new growths are about one and one half inches long, including the petiole which is about one third the length of the leaf. The blade is about an inch long and half an inch wide, elliptic, abruptly short-pointed at the apex, wedge-shaped at the base. Later leaves, which are fascicled in the axils of the spines, are smaller, sessile or nearly so, elliptic, about an inch long, usually less than half an inch wide, rounded at the apex, wedge-shaped at the base. The spikes are six inches long or less, usually bearing not more than a dozen flowers. The green sepals are more or less flushed with red and are broadly oval to orbicular, about three eighths of an inch long. The corolla-tube is about one inch long and somewhat curved, the orbicular lobes spreading or reflexed, abruptly pointed, one quarter of an inch long. The stamens, which are sometimes twice the length of the corolla, are unequal in length, the filaments glabrous except for a short pubescent area near the base. The anthers are oblong-ovate, heart-shaped at the base, acute at the apex, about a quarter of an inch long. The styles are united except at the apex and are shorter than the longest stamens.

This differs from all the other known species of *Fouquieria* in having the flowers in a spike instead of a panicle. The plant in our collection, which furnishes this illustration, was collected in 1906 by D. T. MacDougal and J. N. Rose in Tehuacan, Puebla, and first flowered with us in February, 1913. Herbarium specimens had been obtained there by C. G. Pringle in 1895, on calcareous hills, at an elevation of 5500 feet; he also collected others at Guadalajara, Jalisco, six years earlier. Unfortunately the precise locality of its first collection by Humboldt and Bonpland was not recorded.

There are eight or nine known species of this genus, all inhabiting arid regions in the southwestern United States and Mexico. The New York Botanical Garden has three under cultivation, *Fouquieria splendens* Engelm. and *Fouquieria Macdougalii* Nash, in addition to the one here illustrated. They are grown in the greenhouse with

other plants of arid regions, such as cacti and century plants. The leaves of all the species drop periodically, and the plant goes through a resting stage, when it needs little water in its cultivation.

The relationship of the family is doubtful. By some it has been treated as a tribe of the tamarix family, while others have regarded it as a closely related but distinct family. To the writer its relationship appears to be with the phlox family, Polemoniaceae, as indicated some years ago in a general discussion of this subject (Bull. Torrey Club **30**: 449. 1903).

Some of the species are used as hedge plants, and for the formation of barriers. Some of the houses of the poorer classes of Mexicans are constructed by making the walls of branches of these plants and thatching the roof with other materials. The Mexican name ocotilla or ocotillo, a diminutive of ocote, a pine tree, is applied to resinous splints of pine wood which are used for torches and candles. The stems and splints of several species of *Fouquieria*, owing to the presence of resin and wax in the bark, are used for the same purposes, and the Mexicans apply to them the same name. These splints are called ocotillas, and burn with an aromatic fragrance, being carried at funerals and used as candles in illuminating churches.

The development of the spines, which are found on all known species of the genus, is interesting and peculiar. In the petioles of the primary leaves, which are produced on the new shoots, a hard tissue is formed, which, upon the withering and separation of the leaf-blades, remains as the spine; it is in the axils of these spines that the fascicles of secondary leaves appear. A detailed account, by Winifred J. Robinson, of the development of these spines was published in the Bulletin of the Torrey Botanical Club (**31**: 45. 1904).

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Portion of stem, with a leaf. Fig. 3.—Flower just opened, the stamens not yet fully developed. Fig. 4.—Stamen. Fig. 5.—Style.

PLATE 9

ADDISONIA

MAXILLARIA RINGENS

(Plate 9)

MAXILLARIA RINGENS

Gaping Maxillaria

Native of southern Mexico and Central America

Family ORCHIDACEAE — ORCHID Family

Maxillaria ringens Reichb. f.; Walp. Ann. 6: 523. 1863.

An epiphytic orchid with pseudobulbs about three quarters of an inch long, somewhat compressed, one-leaved, with the sheaths at the base up to twice as long as the pseudobulb, brown. The leaves are elliptic-oblong, up to seven inches long and one and a quarter inches wide, and are of a rather dark yellowish-green, acute at the apex, folded at the sessile base. The flower stalk is four to five inches long, many times longer than the pseudobulb, but shorter than the leaves, and is clothed with many-nerved sheaths which touch each other or overlap toward the summit of the stalk, the upper sheaths more or less tinged with dark purple, the uppermost one equaling or a little shorter than the ovary. The stalk bears a single large somewhat nodding flower about one and three quarters across, the chin at its base about three sixteenths of an inch long, blunt. The sepals and petals are prominently many-nerved, at least when dry, yellow, reddish-brown on the outside, the former all over, the latter at the apex only. The dorsal sepal is oblong-linear, somewhat arched, abruptly narrowed into an acutish point, a trifle over one inch long. The lateral sepals are oblong-linear, the apex twisted and curved forward, about one and a quarter inches long, somewhat narrowed toward the acutish apex. The petals are similar in shape to the lateral sepals and about as long as the dorsal sepal. They are falcate, with the apex bent well forward. The lip is yellowish-white, about five eighths of an inch long and three eighths of an inch wide and oblong-elliptic when spread out. The lateral lobes are about half an inch long, obtuse, the middle lobe being quadrate and much thickened, rounded at the apex, crenulate on the margins, of a deep red-brown color, channeled down the center. There is a thickened grooved callus with an acute apex running along the middle of the lip from just below the apex of the lateral lobes to the base.

The plant which furnishes this illustration was secured by W. R. Maxon at Navarro, Costa Rica, in 1906, and has flowered several times in the conservatories of the New York Botanical Garden. *Maxillaria ringens* was described from herbarium specimens secured by Karwinsky in Oaxaca, Mexico, and by Warscewicz in Guatemala; Navarro is several hundred miles further south, and it is with some hesitation, therefore, that our plant is referred to

this species. In the original description measurements and color notes are lacking, but certain details of structure agree with this plant, and it is upon this basis that the association of the plant and name is made. *Maxillaria ringens* is said to be related to *Maxillaria ochroleuca* Lodd., differing in the acute, not acuminate, sepals and in the middle lobe of the lip being much shorter.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Flower.

NOPALEA AUBERI

NOPALEA AUBERI

Auber's Nopal

Native of Mexico

Family CACTACEAE — CACTUS Family

Opuntia Auberi Pfeiff. Allg. Gartenz. **8**: 282. 1840.
Nopalea Auberi Salm-Dyck, Cact. Hort. Dyck. ed. 2. 233. 1850.

A tall cactus, sometimes thirty feet high, with a nearly cylindric jointed trunk, not very spiny, but the areoles bearing tufts of brown barbed bristles. The branches are relatively short, and form broad angles with the stem; their joints are narrowly oblong or oblong-oblanceolate, from four to twelve inches long, about two and one half inches wide, and three quarters of an inch thick, bluish-green, and slightly glaucous; the areoles, scarcely elevated above the surface of the joints, are circular, bearing short white wool and tufts of brown barbed bristles, spineless, or with one or two needle-shaped spines, which become about an inch long and are white or nearly so, with brownish tips. The leaves of this cactus, appearing at young areoles, are minute, awl-shaped, and fall away soon after they appear. The flowers appear singly at areoles near the upper edges of the joints and, when fully developed, are from three to nearly four inches long. The sepals are ovate, pointed, about half an inch long. The rose-pink petals, closely appressed to the stamens, are ovate-lanceolate, long-pointed, and from three quarters of an inch to an inch and a half long. The filaments are about half an inch longer than the petals, the lower part white, but the exposed part pink. The long style is light pink with a white circular disk just above the base; the stigmas are greenish. The ovary is nearly two inches long, with low tubercles, each bearing many brown barbed bristles which are sometimes nearly half an inch long. The young fruit is deeply concave at the top.

Our illustration is from a plant now about five feet high, grown from a cutting collected by J. N. Rose in a canyon near Inguala, State of Guerrero, Mexico, in 1905, and communicated by him; he informs us that the plant was apparently native at this locality.

Pfeiffer, at the place of the original description of this plant, attributes it to Cuba, and this habitat is cited by subsequent authors; we have been unable, however, to obtain any evidence that it is native in Cuba; it is sometimes grown in Cuban gardens, as in tropical gardens elsewhere. Neither Juan T. Roig, Botanist of the Cuban Agricultural Experiment Station at Santiago de las

Vegas, nor Brother Leon, of the Colegio de la Salle in Havana, have ever seen the plant growing wild in Cuba, nor has it been seen outside of gardens during any of our Cuban expeditions. Its collection by Dr. Rose in a wild state at the locality mentioned in Mexico seems to prove that that country is its home.

This cactus grows readily and flowers freely under dry greenhouse conditions, and its rose-pink flowers are attractive, but its barbed bristles are quite the reverse. In addition to the plant which furnishes our illustration, our collections contain others obtained from M. Simon, of St. Ouen, Paris, and a fine plant presented by Mr. John S. Holbrook.

The genus *Nopalea* consists of about seven recognized species, all, so far as known, natives of Mexico and Central America. The generic name is from Nopal, the Mexican name of the cochineal cactus, *Nopalea cochenillifera*, which is also applied to other species and to some prickly pears of the genus *Opuntia*. *Nopalea* differs from *Opuntia* in having the petals appressed to the stamens and shorter than them; in *Opuntia*, the petals spread away from the stamens, and exceed them in length.

In so far as our examination of literature has gone, we have found no previous illustration of this species. Its fruit is undescribed, and none of our plants have, as yet, produced mature fruit.

N. L. BRITTON.

CRINUM AMERICANUM

(Plate 11)

CRINUM AMERICANUM

Florida Swamp-lily

Native of the southern United States and the West Indies

Family AMARYLLIDACEÆ Amaryllis Family

Crinum americanum L. Sp. Pl. 292. 1753.

A smooth, somewhat fleshy herbaceous plant with a bulbous base from which arise six or more arching strap-shaped leaves and a scape bearing an umbel of conspicuous, nearly sessile, creamy white, fragrant, lily-like flowers. The bulb, buried deep in the mud, is ovoid, about three to four inches thick with a short neck formed by the long-persistent leaf-bases. The leaves are dark-green, one to two feet long, one half to two inches broad, or occasionally longer and broader, and usually denticulate on the margin, the teeth inconspicuous and often remote. The scape is moderately stout, one or sometimes two feet in height. The flowers are from two to six, commonly four; the tube is greenish, slender, straight, and as long as the lobes of the perianth or longer; the lobes are linear-lanceolate or lanceolate, commonly two and one half to three and one half inches in length and acute at the apex. The six stamens are spreading, with pinkish or sometimes reddish-pink filaments and linear anthers.

This, the only species of *Crinum* native to the southeastern United States, grows in shaded river swamps or open marshes from Florida to Louisiana and Texas; it is also found in some parts of Cuba and on the Isle of Pines.

The species of the genus *Crinum* occur throughout the warmer regions of both hemispheres; they require widely different greenhouse conditions of culture, some preferring a tropical atmosphere, while others thrive best at lower temperature. The Florida swamp-lily grows best in a rich soil and may be cultivated most successfully at a subtropical temperature in tubs or boxes submerged in water. The accompanying illustration is from a specimen originally collected by N. L. Britton, J. F. Cowell, and F. S. Earle, in a bog along the Rio Damuji in the province of Santa Clara, Cuba, in March, 1911; it first flowered at the New York Botanical Garden in August, 1913.

The genus *Crinum* differs from *Amaryllis* in the long tube of the flowers, which are nearly sessile in the umbel instead of stalked. The natives of India consider the leaves and bulbs of certain species to be of medicinal value.

PERCY WILSON.

CLETHRA ALNIFOLIA

(Plate 12)

CLETHRA ALNIFOLIA

Sweet Pepperbush

Native of eastern North America

Family CLETHRACEAE WHITE ALDER Family

Clethra alnifolia L. Sp. Pl. 396. 1753.

A loose, spreading shrub, up to fourteen feet high, the branches covered by a thin red-brown bark, and the twigs minutely canescent. The foliage is light green and the flowers are white and deliciously fragrant. The leaves, borne on short petioles, measure up to four inches in length by half as broad, are obovate, with a tapering base and acute or obtuse apex; the margins are sharply serrate and the veins conspicuous beneath, usually glabrous. The flowers are in terminal racemes 4–5 inches long, with a few small leaves at the base; they are slightly crowded and spreading. The pedicels, calyx and capsules are covered with short gray hairs. The petals are five, slightly united at base and longer than the blunt sepals. The ten stamens have pink anthers. The ovary is 3-angled, becoming a three-lobed capsule, which ultimately splits into six valves and remains on the plants all winter.

This plant was first figured by Leonard Plukenet on plate 15 of the "Phytographia, seu stirpium illustrium et minus cognitarum icones," published in London in 1691, without indication of the source of his specimens. Subsequently Mark Catesby in his "Natural history of Carolina, Florida and the Bahama islands," also published in London, in 1731, figured the catbird sitting on a spray of this bush and stated that it endures the climate at Fulham in Christian Gray's garden. Gronovius in his flora of Virginia also described it, and early records show that it must have been sent to England from Pennsylvania, Virginia and Carolina by various collectors. It is known to grow in the eastern states from Maine to Florida, mostly near the coasts in swamps and wet woods, but it does well in cultivation in dry soil, producing its fragrant clusters of white flowers in July and August.

There are only two other species of this genus known in the United States, one, *Clethra acuminata*, being found in mountain woods of the southern Alleghanies from Virginia to Georgia, and the other, *Clethra tomentosa*, along the coast from North Carolina to Florida and Alabama. Other species occur in the high mountains of Cuba and Jamaica, forming dense masses of shrubbery to the exclusion of almost everything else. Others occur in Mexico and Central America and down through South America to Peru and Chile, while there are still other species in Japan, China and Java.

ELIZABETH G. BRITTON.

2

1

ECHEVERIA CARNICOLOR

ECHEVERIA CARNICOLOR

Flesh-colored Echeveria

Native of eastern Mexico

Family CRASSULACEAE ORPINE Family

Cotyledon carnicolor Baker, in Saund. Ref. Bot. **3**: *pl. 199.* 1870.
Echeveria carnicolor E. Morren, Belg. Hort. **24**: 158. 1874.

A stemless plant, forming a small dense rosette of twenty or more leaves. The leaves are highly colored, flat but fleshy, oblanceolate to spatulate, up to one and a half inches long, half an inch broad, more or less glaucous, acute. The flowering branches, at first spreading, then ascending, are six to eight inches long, and bear numerous narrow fleshy, easily detached leaves. The six to twelve flowers are borne in the axils of small deciduous bracts. The pedicels are short, not more than half an inch long. The five sepals are unequal, fleshy, spreading, acute. The rigid, five-angled corolla is bright red, pointed, a half inch long, the five lobes acute and spreading at the tips. The ten stamens are included in the corolla-tube. There are five carpels.

When first cultivated and for a long time afterward the home of this species was not known, but J. G. Baker, who figured and first described it in 1870, suggested that it probably came from Mexico. In 1906 the plant was again introduced into cultivation by C. A. Purpus, who collected it at Barranca de Tenampa, Vera Cruz, where it grows on steep rocks; the plant in the New York Botanical Garden, which forms the basis of our illustration, came from this collection.

This species is easily propagated, especially from the small leaves on the flowering stem, which, on falling to the ground, take root readily.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Flower, opened, showing stamens and pistil.

MINA LOBATA

MINA LOBATA

Lobate Mina

Native of southern Mexico

Family CONVOLVULACEAE MORNING-GLORY Family

Mina lobata Llave & Lex. Nov. Veg. Descr. **1**: 3. 1824.

Quamoclit Mina G. Don, Gen. Hist. **4**: 259. 1837.

Ipomoea versicolor Meissn. in Mart. Fl. Bras. **7**: 220. 1869.

A glabrous vine, climbing after the manner of the morning-glory, up to twenty feet long. The leaves are on long petioles, the blades up to four inches long and as broad, entire, ovate to orbicular, heart-shaped at the base, acuminate at the apex, or three–five-lobed, the lobes broad and acuminate, entire or somewhat toothed. The slender curved racemes, in the axils of the leaves, are two and a half to five inches long, simple or sometimes branched at the base. The flowers are all on one side of the raceme, from three quarters of an inch to an inch long, and on short pedicels. The calyx is about three eighths of an inch long, the tube short, the lobes rather unequal, very acute. The five-angled corolla is at first bright red, passing through orange and yellow to nearly white as it matures, the short tube broadening abruptly into the sac-like limb which narrows gradually upward into a small mouth surrounded with five short rounded lobes. The stamens are about twice the length of the corolla.

The illustration was made from a plant which flowered late in November, 1915, in the conservatories of the New York Botanical Garden. This plant was grown from seed collected at Chihuahua, Mexico, by A. de Lautreppe. It is a very decorative plant, much cultivated in Mexico for its showy flowers. Until the flowers appear, it does not look unlike an ordinary morning-glory vine, the manner of growth and the leaves bearing a striking resemblance to that plant. When it blooms the resemblance ceases, for the blossoms are very unlike those of the morning-glory, as the accompanying illustration makes manifest. It is apparently an annual, as are many other members of the morning-glory family. It can be grown readily from seed.

GEORGE V. NASH.

M.E. Eaton

CLERODENDRON TRICHOTOMUM

(Plate 15)

CLERODENDRON TRICHOTOMUM

Japanese Clerodendron

Native of Japan

Family VERBENACEAE VERVAIN Family

Clerodendron trichotomum Thunb. Fl. Jap. 256. 1784.
Clerodendron serotinum Carr. Rev. Hort. **1867**: 351. 1867.

A branching shrub up to ten feet tall, with the numerous flowers in cymes, the calyx old-rose, the corolla cream-white. The new growth is woolly with brownish hairs, as are also the branches of the cyme. The opposite leaves are pubescent with brownish hairs, the petioles two to three inches long. The blades are four to six inches long, two to three inches wide, ovate, wedge-shaped or heart-shaped at the base, gradually long-pointed at the apex. The divisions of the flower-cluster are woolly, the pedicels slender, one quarter to a half inch long. The calyx is five-angled, about one half inch long, brownish woolly at the base and sparingly so above, its lobes acute. The tube of the cream-white corolla is flushed with rose, a half to three quarters of an inch long, a little exceeding the calyx, glabrous, the lobes spreading, about three eighths of an inch long, linear-oblong, obtuse. The slender stamens are exserted much beyond the mouth of the tube. The fruit is bright blue.

Although this plant, in the vicinity of New York, is sometimes killed to the ground in severe winters, it readily recovers, breaking from the roots quite vigorously. Flowering in September and October, a time when there are few shrubs in blossom, it is a valuable addition to any collection of woody plants. The old-rose calyx forms a pleasing contrast with the white corolla, the combination being quite unusual. South of the latitude of New York it should prove entirely hardy. In the fruticetum of the New York Botanical Garden there are two specimens of this plant which have been in the collections since 1900.

There are few woody genera of the vervain family which are hardy in the latitude of New York City, this and three others, *Vitex*, one species of which is figured at plate 18 of this work, *Callicarpa*, and *Caryopteris*. *Clerodendron* comprises about one hundred species, distributed for the most part in tropical and warm temperate regions. Those in cultivation are mainly shrubs; a few are woody vines, one of these, *Clerodendron Thomsonae*, being a popular greenhouse plant. The species here under consideration is the only one which will endure the climate of New York.

GEORGE V. NASH.

NOTYLIA SAGITTIFERA

(Plate 16)

NOTYLIA SAGITTIFERA

Arrow-head Notylia

Native of Panama and northern South America

Family ORCHIDACEAE ORCHID Family

Pleurothallis sagittifera H.B.K. Nov. Gen. & Sp. **1**: 364. *pl. 91.* 1816.
Notylia multiflora Lindl. Bot. Reg. **11**: under *pl. 930.* 1823.
Notylia sagittifera Link, Kl. & Otto, Ic. Pl. Rar. 43. 1840.
Notylia pentachne Reichb. f. Bonplandia **2**: 90. 1854.

An epiphytic orchid with pseudobulbs up to an inch long, each bearing one leaf. The elliptic-oblong leaves, up to six inches long and an inch and a quarter wide, are rather dark green; they are somewhat narrowed toward the sessile and folded base, and are abruptly narrowed to an obtuse or somewhat acute apex. The numerous flowers, about a half inch in diameter and on reflexed pedicels about a half inch long, arise from the axils of awl-shaped short bracts, and form a somewhat drooping raceme about six inches long; the raceme is on a stalk about half its length, provided with a few scales. The spreading sepals are apple-green, about three eighths of an inch long, the dorsal sepal somewhat arched and concave, acute, the lateral sepals united into a somewhat arched concave body, the tips free and recurved. The petals, acute and nearly erect, are about five sixteenths of an inch long, and a little more than a sixteenth of an inch wide, pale yellowish green with two large yellow spots on the lower half, curved, flat. The lip is about a quarter of an inch long, ascending, half its length a rather stout claw; the blade is triangular-hastate, about an eighth of an inch wide, fleshy, acute, white. The column, which is a little shorter than the lip, is minutely pubescent, with the acute beak recurved. There are two pollinia on a slender stalk which is broadened toward the apex.

Related to *Notylia incurva* Lindl., a native of Trinidad, in the abruptly incurved beak of the column, but differing in the shape of the lip and in the recurved, not straight, free tips of the lateral sepals.

Notylia sagittifera was first collected by Humboldt and Bonpland at Turbaco, Colombia, near the mouth of the Magdalena River, where it was found growing on trees at an elevation of about one thousand feet. By its discoverers it was placed in the genus *Pleurothallis*. Lindley, recognizing that it was not congeneric with *Pleurothallis*, in 1823 established the genus *Notylia*, basing it upon *Pleurothallis punctata* Ker, a native of Trinidad, and *Pleurothallis*

sagittifera, renaming the latter *Notylia multiflora*. In 1854 Reichenbach published a *Notylia pentachne* which had been collected by a Mr. Keferman at Chagres, Panama; this plant proves to be the same as that collected by Humboldt and Bonpland. The plant from which our illustration was prepared was collected by A. J. Corbett at Limon, Panama, in 1914; it flowered for the first time in the conservatories of the New York Botanical Garden about the middle of December of that year.

Notylia is distributed from southern Mexico to Bolivia and south-central Brazil, with a few in the West Indies. There have been about forty species described, but perhaps not all of these will prove valid. Few of them are in cultivation. *Notylia sagittifera* is apparently an inhabitant of the low-lying hot regions near the coast, and should be grown in the tropical orchid house.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Flower, the petals and dorsal sepal removed, × 2. Fig. 3.—Flower, from above, × 2.

EXOGONIUM MICRODACTYLUM

EXOGONIUM MICRODACTYLUM

Slender Red Exogonium

Native of Florida and the northern West Indies

Family CONVOLVULACEAE MORNING-GLORY Family

Ipomoea microdactyla Griseb. Cat. Pl. Cub. 204. 1866.

Ipomoea fuchsioides glabra Griseb. Cat. Pl. Cub. 205. 1866. (According to House.)

Exogonium microdactylum House, Bull. Torrey Club **35**: 102. 1908.

Exogonium microdactylum integrifolium House, Bull. Torrey Club **35**: 103. 1908.

A glabrous, slightly succulent, trailing or climbing vine, sometimes spinulose, with flattened triangular short spines near the base, sparingly branching, and attaining a length of ten feet or more, arising from a thick, tuber-like root which is sometimes six inches long. The slender-petioled, alternate leaves are various in form and outline, ovate to lanceolate or oblong, and either entire or palmately lobed or almost divided, or with a pair of short basal lobes; the blades are longer than the petioles, sometimes four inches long, usually shorter. The pedicelled flowers are in small clusters or solitary at the leaf-axils; these clusters are often numerous and close together along the upper part of the plant. The green calyx is about a quarter of an inch long, composed of five round-ovate, obtuse sepals. The scarlet, deep red, or carmine salverform corolla has a slender tube one inch to one and a half inches long, somewhat thicker above than below, and a widely spreading limb about one inch across, with five broadly ovate, pointed lobes. The five stamens and the stigmas project somewhat beyond the corolla-tube. The ovary is two-celled. The fruit is a nearly globular, pointed capsule about half an inch thick, containing about four flat seeds about one-quarter of an inch long, each of which bears a tuft of cotton-like, brownish hairs.

This vine inhabits poor soil, rocky, gravelly, or sandy, in southern Florida, nearly throughout the Bahama Islands, and in all provinces of Cuba, extending to the Isle of Pines. A similar, perhaps identical, species occurs on the limestone plateau of Mona Island, in the Mona Passage, between Santo Domingo and Porto Rico, but the specimen collected there is not complete enough for certain identification (Ann. Missouri Bot. Gard. **2**: 47). On Inagua Island, Bahamas, it is called " wild potato." In Florida its distribution is wholly or mainly in pinelands, as also on the Isle of Pines, but in the Bahamas and Cuba it grows over large areas in which pine trees do not exist.

The flowers are showy and when many on a vine are expanded at the same time form an elegant floral display; they appear more or less abundantly nearly throughout the year, and resemble those of the cypress-vine.

It was first described as a distinct species from specimens collected by Charles Wright in western Cuba about 1865. On the Bahamas it was collected much earlier by Swainson, and thence, apparently erroneously, recorded by Grisebach (Fl. Brit. W. Ind. 472) as *Ipomoea arenaria* Steudel, a plant of Porto Rico, Hispaniola and the northern Lesser Antilles. Its occurrence in Florida was determined by J. K. Small and J. J. Carter in 1903.

Our illustration is made from a plant collected on rocky hills near the city of Camaguey, Cuba, by N. L. Britton and J. F. Cowell, in April, 1912, which flowered at the New York Botanical Garden in November, 1914.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Flower. Fig. 3.—Capsule. Fig. 4.—Seed.

VITEX AGNUS-CASTUS

VITEX AGNUS-CASTUS

Chaste Tree

Native of the Mediterranean Region and the Orient

Family VERBENACEAE — VERVAIN Family

Vitex Agnus-castus L. Sp. Pl. 638. 1753.

A freely branching shrub, rarely a small tree, four to six feet tall in cultivation, with palmately divided leaves and lavender flowers in spike-like clusters. The stems are densely pubescent with short hairs. The leaves are opposite, the upper surface dark green, changing to a beautiful purplish-bronze in the autumn, the lower surface grayish with a velvety pubescence; the petioles are one to two inches long. The leaf-blades are divided into five or seven lanceolate segments with entire margins, the central segment the largest, up to three or four inches long or more and about one half inch wide, the others decreasing in size, the smallest ones often less than an inch long. They are gradually narrowed above into a sharp point and are acute at the base, on short stalks a quarter of an inch long or less. The flower-clusters are long and narrow, up to six inches in length and three quarters of an inch wide, composed of somewhat distant fascicles of flowers. The calyx is broadly bell-shaped, less than one twelfth of an inch long, gray-green, finely pubescent, with five minute teeth. The corolla is about one third of an inch long, lavender, grayish-tomentose outside, the tube gradually broadened above into a spreading five-lobed limb, the lobes obtuse or acutish. The stamens and style are exserted from the corolla-tube. The fruit is nearly globular, about an eighth of an inch in diameter.

One of the best of our summer shrubs, bearing in terminal and axillary clusters a profusion of lavender flowers. It is at its prime in the months of August and September, the bronze-purple coloration of the foliage which appears in the latter month adding to its beauty. During severe winters it is not quite hardy in the latitude of New York City, the branches sometimes being killed, or the whole shrub destroyed to the ground. It soon recovers, however; the plant from which the accompanying illustration was made has been in the collections of the New York Botanical Garden since 1907. It will grow in almost any kind of soil, but prefers situations dry and sunny. It may be propagated by seeds sown in the spring, by green-wood cuttings under glass, and by layers.

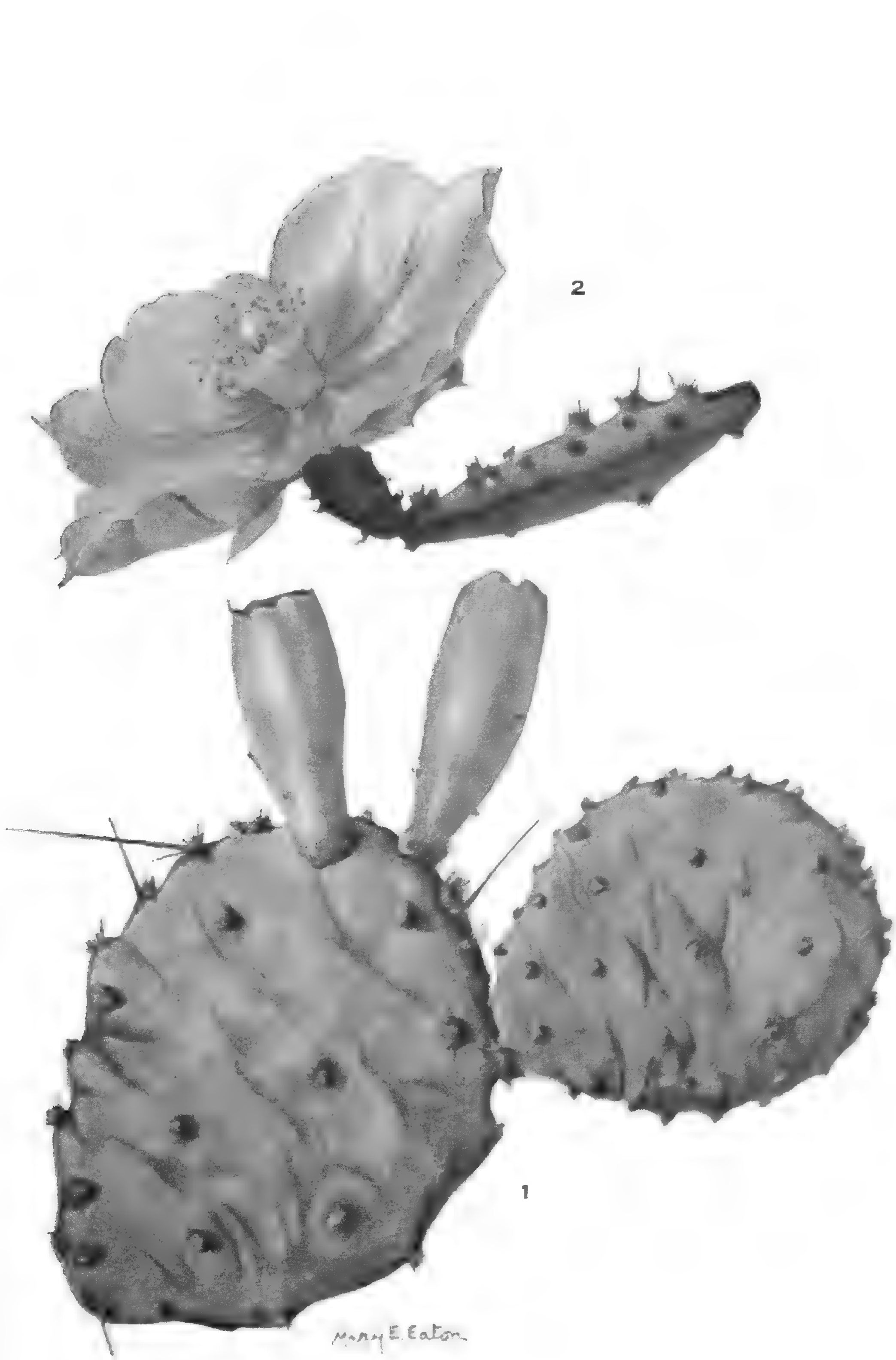
A number of common names are applied to this plant. In addition to the one above it is also known as Abraham's balm, hemp

tree, monk's pepper-tree, chaste-lamb tree, sage tree, and tree of chastity. The specific name, *Agnus-castus*, is supposed to mean chaste lamb.

About one hundred species of *Vitex* are known, distributed mainly in the tropical and subtropical regions in both hemispheres. Some of them are trees, contributing valuable timber; one of these is *Vitex Lignum-vitae*, the lignum-vitae of Queensland; another is *Vitex litoralis*, known as New Zealand teak or puriri, the timber obtained from which is considered indestructible in water. In the New World there is *Vitex capitata*, of Trinidad, Guiana and Brazil, known there as "bois lézard"; another American species is *Vitex umbrosa*, of the West Indies, one of the trees known there as box-wood or fiddlewood.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Fruit, × 3.



OPUNTIA MACRORRHIZA

OPUNTIA MACRORHIZA

Large-rooted Prickly Pear

Native of the south-central United States

Family CACTACEAE — CACTUS Family

Opuntia macrorhiza Engelm. Bost. Jour. Nat. Hist. **6**: 206. 1850.
Opuntia fusiformis Engelm. & Bigel. Proc. Am. Acad. **3**: 297. 1856.
Opuntia Rafinesquei fusiformis Engelm. Pacif. R. R. Rep. **4**: 43. 1857.
Opuntia mesacantha macrorhiza Coulter, Contr. U. S. Nat. Herb. **3**: 430. 1896.
Opuntia xanthoglochia Griffiths, Rep. Missouri Bot. Gard. **21**: 166. 1910.
Opuntia Roseana Mackensen, Bull. Torrey Club **38**: 142. 1911.

A low cactus about a foot high or less, branching from the base, the branches nearly or quite prostrate, or ascending, forming clumps up to three or four feet in diameter. The roots are thick, tuber-like, often clustered, sometimes two inches in diameter or more. The flattened joints are obovate or nearly orbicular, dull green, from two inches to about six inches long, usually a little longer than wide and about half an inch thick, with slightly scalloped margins. The leaves, which as in most prickly pears fall away soon after appearing, are awl-shaped, pointed, half an inch long or less. The areoles, situated in the axils of the leaves, on the sides and the edges of the joints, are from a quarter of an inch to an inch apart, and but slightly elevated; they bear numerous, yellow or brown, barbed bristles (glochides), and sometimes one to four, needle-like, white to brownish spines an inch long or less. The flowers, appearing in May and June, which are borne singly at areoles near the top of the joints, are about three inches broad when fully expanded. The ovary is somewhat club-shaped, about one and one half inches long, bearing a few areoles with glochides. The sepals are lanceolate to ovate-lanceolate, pointed, three quarters of an inch long or less; the six to eight thin petals are orbicular-obovate, tipped or notched, yellow, with a red or purplish base. The numerous stamens are much shorter than the petals, with greenish or yellowish filaments and small, yellow anthers. The five or six nearly white or pale green stigmas are shorter than the slender style. The fruit, ripe in autumn, is narrowly obovoid, red or purplish, two inches long or less, half an inch to nearly one inch thick. The seeds are about one sixth of an inch broad, and margined.

Opuntia macrorhiza has its nearest relatives in *Opuntia austrina* Small, of southern Florida, an erect species with strongly scalloped joints, and in *Opuntia tortispina* Engelm., which has a wide range in the central United States, and is usually much more spiny, and with fibrous roots. It is a member of the series *Tortispinae*, to which

belongs the Prickly Pear of the Eastern States, *Opuntia Opuntia* (Linnaeus) H. Karst., the type of the genus.

It inhabits poor soil in Texas and Arkansas, has been reported to extend northward into Missouri and Kansas, and may range eastward into Louisiana. It was discovered by Ferdinand Lindheimer in 1847, in naked, sterile, rocky places on the Upper Guadalupe River, Texas. It does not respond well to greenhouse cultivation, and is not hardy at New York; it has long been grown in gardens of southern Europe. The plant from which our illustrations were made was sent from Kerrville, Texas, by Mr. B. Mackensen, in 1910, and flowered at the New York Botanical Garden in February, 1912, ripening its fruit in May; it is a part of the collection which Mr. Mackensen named *Opuntia Roseana*.

Recently (Plant World **19**: 141–144. 1916) Dr. David Griffiths has expressed the opinion that the type of this species has been misinterpreted by botanists since its original description in 1850 by Dr. Engelmann and that the name *macrorhiza* belongs to another Texan species, *O. Mackenseni* Rose, which also grows at Kerrville, Texas. References to the type specimen, however, preserved in the herbarium of the Missouri Botanical Garden, and to the original description do not satisfactorily support his contention. The plant was well illustrated by Dr. Engelmann on plate 69 of the United States and Mexican Boundary Survey report, published in 1859, and has since been depicted in several other publications, but not hitherto in color. *Opuntia leptocarpa* Mackensen (Bull. Torrey Club **38**: 141. 1911), a plant found at San Antonio, Texas, which has flowered several times at the New York Botanical Garden, appears to be a natural hybrid between this species and *Opuntia Lindheimeri* Engelm.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Joint with fruit. Fig. 2.—Joint with flower.

COMMELINA COMMUNIS

COMMELINA COMMUNIS

Asiatic Day-flower

Native of eastern Asia

Family COMMELINACEAE SPIDERWORT Family

Commelina communis L. Sp. Pl. 40. 1753.

An annual, rather fleshy herb, nearly glabrous and bright green throughout, forming in late summer and early autumn dense luxuriant colonies adorned with odd seemingly two-petaled sky-blue flowers. The jointed stems are much branched; from a creeping base, rooting at each joint, they soon become ascending or upright, one to three feet in length. The numerous spreading alternate leaves are borne on petioles which form about the stem loose sheaths half an inch long, with margins fringed with whitish hairs; the blades are slightly fleshy, three to five inches long, with numerous parallel veins, smooth or roughish and deep green above, rough on the margins, smooth and slightly paler beneath, lanceolate in outline, tapering gradually to an attenuate point. The flowers are in peduncled clusters. Each cluster bears at its base a sheathing orbicular or heart-shaped leaf, the spathe, the two halves of which fold together so as to enclose the maturing and mature fruit. The inflorescence is of two stalks, one erect, projecting from the spathe, bearing a flower which opens the first but never sets fruit, the other horizontal within the spathe, bearing an umbel of three or four short-pedicelled flowers. These flowers open serially on successive days; as buds they are decurved below the common peduncle, as flowers they are slightly exserted from the spathe, and as maturing fruits they are reflexed above the peduncle; they all mature fruit. The three sepals of each flower are ovate, rounded at apex, greenish-white, less than a quarter-inch long, the upper smaller and narrower. The two upper petals are nearly one half inch long, spreading, broadly rounded, rich caerulean blue, borne upon stalk-like bases; the lower petal is much smaller, lanceolate, translucent white. There are six stamens, two of which have long upcurved filaments and narrow two-celled brownish anthers; one a shorter filament and a larger anther, partly functional, but partly transformed into sterile golden yellow lobes, the two cells of the anther spreading widely below; three of the filaments shorter still, one of these slightly the shortest, all bearing anthers almost wholly converted into sterile golden-yellow lobes. The style is slender, upcurved, and bears a minute stigma. The fruit is an oblong glabrous two-celled capsule, each cell of which contains two roughish gray seeds.

This interesting plant was known in European Gardens before 1700, and by Dillenius, who knew it in the Sherard garden at Eltham,

in Kent, England, was supposed to have come from America. Linnaeus, who assigned the species its scientific name in 1753, supposed it American. The plant was long unknown in a wild state, until it was discovered to be a characteristic plant of China; doubtless native to the Eastern and not the Western Hemisphere. About the middle of the past century it was noted as a rare introduction in gardens near Philadelphia; it has since spread and become an abundant weed in many parts of the eastern United States. It prefers moist rich loam, and is known from Massachusetts to the Carolinas and westward at least to Missouri. The plant here illustrated was collected by the artist, Miss Mary E. Eaton, along a roadside near the New York Botanical Garden, in 1913.

There is something odd, almost grotesque, about the unsymmetrical blue flowers of the common or Asiatic day-flower, especially when, as often happens, the first two flowers of each inflorescence, placed one precisely above the other, peer at you from a mass of luxuriant foliage like alert but most unnatural faces. The flowers last but a few hours during the morning of a single day; by noon in sunshine the petals have deliquesced into a crumpled watery mass.

Commelina is a large tropical genus, and may be known by the peculiar flowers clustered within spathe-like leaves. At times the third petal is blue and but little smaller than the others. Such is the case in two species of our southeastern states; *C. virginica* L., a large broad-leaved perennial species of river-banks and shores, and *C. longicaulis* Jacq., a small-flowered widely creeping weed of southern and tropical gardens. *Commelina erecta* L., and a few near allies, with flowers similar to that here illustrated, but frequently much larger, and to be known by their hairy sheaths and cup-like spathes, complete, except for the rare *C. caroliniana* Walt., the number of our native eastern species. These are all southern, but *C. erecta* has been found as far north as New York City.

The species of *Commelina* are all easily grown in loam or sand.

FRANCIS W. PENNELL.

ADOXA MOSCHATELLINA

ADOXA MOSCHATELLINA

Moschatel

Native of North America, Europe, and Asia

Family ADOXACEAE MOSCHATEL Family

Adoxa Moschatellina L. Sp. Pl. 367. 1753.

A weak, glabrous perennial herb, three to six inches tall, with slender stems and scaly rootstock. There are from one to three long-petioled, ternately compound, glossy root-leaves; their segments are broadly ovate to orbicular, thin, three-cleft or three-parted, and again cleft or lobed, the ultimate lobes obtuse and mucronulate. The two opposite stem-leaves are similar to the root-leaves but smaller, less cut, and comparatively short-petioled, and usually borne above the middle of the stem; they are merely three-cleft, the segments lobed. The flowers are three to six, green or pale yellow-green, forming a close round head which is borne at the summit of the erect stem. The terminal flower of the head usually has a two-toothed calyx, a four-lobed corolla, eight stamens, and four styles; the lateral flowers usually have a three-toothed calyx, a five-lobed corolla, ten stamens, and five styles. The calyx-tube is hemispheric and adnate to the ovary. The wheel-shaped corollas are almost a quarter of an inch in diameter, the lobes elliptic to ovate. The stamens are borne in pairs opposite the sinuses of the corolla. The filaments are adnate to the corolla at the base, distinct or partly united to each other, with one-celled anthers. The ovary is four- or five-celled, rarely three-celled, with one pendulous ovule in each cavity. The style is four- or five-parted, or occasionally three-parted. In fruit the summit of the stem is often spirally twisted and the head becomes pendulous. The fruit is a small greenish drupe with three to five nutlets.

One might readily pass this interesting plant in the woods, as at a casual glance it somewhat resembles clumps of the wind flower, *Anemone quinquefolia*. Its flowers are said to have a musky smell in the evening, or early morning, when moist with dew.

It is found from Arctic America south to New York, Iowa, and Wisconsin, and in the Rocky Mountains to Colorado; also widely distributed in Europe and Asia.

Specimens were collected by Miss Fanny A. Mulford at Arkville, Delaware County, New York, in July, 1903, and again in June, 1912. On the mountains at Arkville, *Adoxa* grows luxuriantly in moist rich soil along some of the trails or in leaf-mould covering rocks on

some of the slopes. The region about Arkville is the only known locality for this plant in the state of New York.

The accompanying illustration was made from living specimens obtained at Arkville, New York, by Miss Mulford and the writer in May, 1915.

PERCY WILSON.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Apex of fruiting stem.

SISYRINCHIUM BERMUDIANUM

(Plate 22)

SISYRINCHIUM BERMUDIANA

Bermuda Iris

Native of Bermuda

Family IRIDACEAE — IRIS Family

Sisyrinchium Bermudiana L. Sp. Pl. 954. 1753.
Sisyrinchium iridoides Curtis, Bot. Mag. **3**: *pl. 94.* 1787.

The stem is rather slender, ten to twenty inches high, smooth, flattened and winged, usually branched. The leaves are linear, smooth, one sixth of an inch to nearly half an inch wide, acuminate, the basal ones four to twelve inches long, those of the stem shorter. The peduncles are flattened and winged like the stem, but more slender, the spathes about one inch long, acute, narrowly scarious-margined, several-flowered, the pedicels filiform, longer than the spathe. The perianth-segments are obovate, emarginate, long-aristulate, bright violet-blue with yellow bases, half to three quarters of an inch long, the filament-column about one third as long, the anthers yellow. The capsule is globose-oblong, blunt, a quarter to a third of an inch long, splitting into three valves and long-persistent.

In dry sunny places, very abundant in Bermuda, and the most characteristic herbaceous plant of those islands, where it is endemic, flowering in spring.

For many years, and until the many continental species of *Sisyrinchium* were known to botanists, mainly through the studies of Eugene P. Bicknell, the Bermuda plant was regarded as the same as North American kinds, a view which has been proven quite erroneous. As pointed out by Hemsley in 1884 (Jour. Bot. **22**: 108–110), the Bermuda species does not grow wild elsewhere, but the early botanists were right in considering it distinct; it doubtless originated however from seed of one of the continental species brought to Bermuda by a bird or on the wind, the plant becoming differentiated through isolation from its parent-stock. Among living species it more resembles *Sisyrinchium alatum* Hooker, of Mexico, than any of the species of the eastern United States or the West Indies, but it would not be safe to conclude that *S. alatum* was its immediate ancestor.

The oldest known specimen of this beautiful and interesting plant is one collected by J. Dickenson about 1699, preserved in the Sloane herbarium at the British Museum of Natural History.

Early illustrations of it are given by Plukenet (Phytographia *pl. 61, f. 2*) and by Dillenius (Hortus Elthamensis *pl. 41, f. 48*), who denominated it "Bermudiana iridis folio, radice fibrosa," and a fine colored picture by Redouté (Liliacées *pl. 149*).

The iris-like equitant leaves begin to appear in September. The plant is not hardy in England nor in the northeastern United States, but it would probably grow well in southern Florida. Plants taken to the New York Botanical Garden flowered freely under glass, and from one of these the painting for our illustration was made.

N. L. BRITTON.

COLUMNEA HIRTA

COLUMNEA HIRTA

Hairy Columnea

Native of Costa Rica

Family GESNERIACEAE GESNERIA Family

Columnea hirta Klotzsch & Hanst.; Hanst. Linnaea **34**: 403. 1865.

As in many other members of the genus, the stems of this plant, which are covered with long brown hairs tinged with purplish, creep upon tree-trunks, the tips hanging free. The hairy opposite leaves have petioles one quarter to three eighths of an inch long; the entire or obscurely toothed blades are narrowly elliptic, up to two inches long and a half inch wide, the apex obtuse, narrowed below into an acutish base. The flowers are single in the axils of the leaves, up to three inches long. The hairy calyx is three quarters of an inch long or a little less, its lobes lanceolate, acute and entire. The hairy corolla is vermilion, marked with orange, and is two-lipped; the upper lip of four lobes, the two upper united into an erect arching hood to which the other two are somewhat attached at the base; the lower lip of one spreading lobe. The tube, which occupies a little more than one half the corolla, is curved, gradually broadened upward. The stamens are a little shorter than the corolla, the filaments glabrous. The style is curved and hairy above.

In 1900 C. Wercklé sent living plants, without data indicating the exact locality, from Costa Rica to the New York Botanical Garden; the illustration was prepared from one of these which flowered in the conservatories of this institution in March, 1915. Herbarium specimens of the same species were collected in 1906 by W. R. Maxon at Finca Navarro, about seven miles to the southeast of Cartago, at an altitude of about 4,500 feet.

This species belongs to the section *Eucolumnea*, and is closely related to *Columnea gloriosa* T. A. Sprague, figured at plate 7 of this volume. Its cultural requirements are the same, and it forms, as does that species, an admirable basket plant.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Flower in bud. Fig. 3.—Pistil.

PEDILANTHUS SMALLII

(Plate 24)

PEDILANTHUS SMALLII

Small's Boot-flower

Native of Florida

Family EUPHORBIACEAE — Spurge Family

Pedilanthus Smallii Millsp. Field Mus. Bot. 2: 358. 1913.

A profusely branching shrub about six feet high, with branches and branchlets more or less strongly zig-zag; the branchlets are slender and bear plainly evident stipular glands. The leaves vary from ovate to ovate-lanceolate, are acute, and densely crisp-puberulent when young, retaining some of this pubescence in age; they are sessile and bear an inconspicuous keel along the midrib beneath. The bright pink or salmon-colored "flowers" are clustered at the tips of the young branchlets where they spring from leaf-like bracts which are ovate-lanceolate, attenuate to the apex, pilose, and longer than the flower stems; the flower-like involucres are glabrous without and within, about five-eighths of an inch long and have an upper fissure opening back to the appendix and a shallow lower cleft; the main lobes of the tube are ovate, rounded at the ciliate-fimbriate margin and folded along the borders of the fissure; the lateral lobes of the tube are free only at their tips while the fifth (superior) lobe is strap-shaped, blunt, and free except at its very base. The pedicels of the male and female flowers are glabrous; male flowers about ten; style long-protruding and deeply five-lobed. The appendix is about one third the length of the tube; its lobe is deltoid and not ciliate on the margin, retuse at the apex and strongly marked by a longitudinal channel as if nearing bilobation, or even deeply bilobed; the four appendicial glands are grouped in pairs, the inner pair withered and minute. The fruits have not been seen.

It is stated above that this peculiar species is a native of Florida, as it has been found wild only in pinelands near Miami, where John K. Small discovered it in 1904. It has however been collected from plants cultivated in gardens at Antilla and Havana, Cuba, and may yet be found wild in some remote and so far botanically unexplored part of that island. This shrub and in fact all of its congeners may readily be grown, under proper temperature conditions, from cuttings, even though these cuttings may have been deprived of moisture for weeks, as the stems and branches are filled with a sticky milk which quickly seals up the cut surface and effectually prevents evaporation of the natural moisture within.

The *Pedilanthi* or Boot-flowers form a very interesting and striking group of peculiar and ornamental shrubs or shrubby herbs

mostly native of tropic and subtropic America, only two of the thirty-five known species having been found on the Eastern Hemisphere (Madagascar). The peculiar, bright-colored "flowers" are really but an investment of the true flowers known as the involucre; the true flowers, as in most of the spurge family, consist of a few naked stamens and a single, also naked, pistil. The boot-shaped involucre comprises a posterior inflated portion termed the appendix and a more or less prolonged anterior tube made up of five parallel lobes from the apical orifice of which the flowers protrude. Several of the species are leafless, while a number of others put forth but apologetic foliage.

A peculiar fact came under my observation while collecting the Bahamian boot-flower (*Pedilanthus bahamensis* Millsp.) on Grand Turk Island, where this leafless species often covers areas of an acre or more. Here, as upon all other islands upon which it grows, it has never been known to produce leaves, not even in localities and years when the rainfall was greater and more prolonged than usual. In making inquiries concerning this character one of the older natives informed me that while the plants never produced leaves naturally yet if cuttings were placed in water for a few weeks leaves would appear. In order to prove the statement I placed three cuttings in a pitcher of water in my room; in less than two weeks leaves were put forth by all of them. This was my first knowledge of aphyllous plants being artificially induced to become leaf-bearing.

C. F. MILLSPAUGH.

PLATE 25

ADDISONIA

CREMNOPHILA NUTANS

(Plate 25)

CREMNOPHILA NUTANS

Drooping Cremnophila

Native of south-central Mexico

Family CRASSULACEAE — ORPINE Family

Sedum nutans Rose; Britton & Rose, Bull. N. Y. Bot. Gard. **3**: 43. 1903.

Cremnophila nutans Rose; Britton & Rose, N. Am. Fl. **22**: 56. 1905.

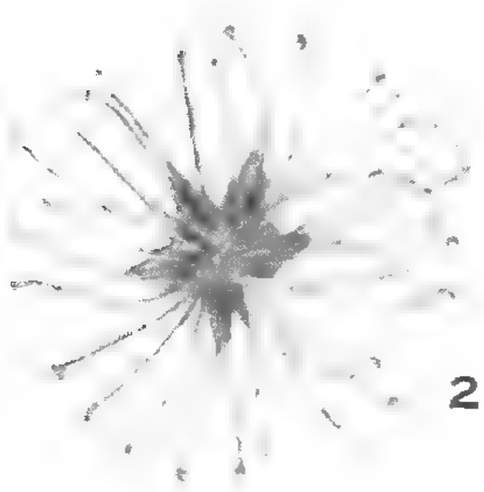
A perennial with a thick, woody caudex two to five inches long, when growing in a wild state hanging on the sides of cliffs, but in cultivation spreading or erect. The basal leaves on wild plants form a broad compact rosette, but on greenhouse plants they are more or less scattered along the upper part of the stem, thick, obovate, one to three inches long, up to one inch or more broad at widest point, very fleshy, glabrous, long persistent. The flower-stem is axillary, curved or bent, four to eight inches long, bearing small, thick, alternate leaves. The inflorescence is a narrow panicle about four inches long. The flowers are numerous. The five calyx-lobes are green, acute, and nearly one fourth of an inch long. The five petals are bright yellow and a little longer than the sepals. The ten stamens are free to the base. At the base of the ovary there are five retuse scales. The five carpels are erect.

This species when originally described from herbarium specimens was placed in the genus *Sedum*, but after studying living plants it was seen to be very different from any species even in that very polymorphic genus. It differs especially in its paniculate inflorescence and erect carpels. In its thick leaves it suggests the genus *Pachyphytum*, but has different inflorescence and flowers. In its foliage and inflorescence it resembles the old and well-known *Echeveria linguaefolia*. It grows in damp, mossy situations, preferring the sides of high cliffs, often in nearly inaccessible places. It has been collected only on the cliffs of Tepoxtlan, in the high mountains between the City of Mexico and Cuernavaca. Living specimens, collected at El Parque, Morelos, by J. N. Rose and J. H. Painter, in 1903, were obtained by the New York Botanical Garden in 1905; from this source was obtained the plant from which our illustration was made.

Culturally it requires the same treatment as other plants from that region, thriving at the New York Botanical Garden in a house devoted to desert plants.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Flowering plant, showing habit; much reduced. Fig. 2.—Apex of stem. Fig. 3.—Flowering stem. Fig. 4.—Flower.



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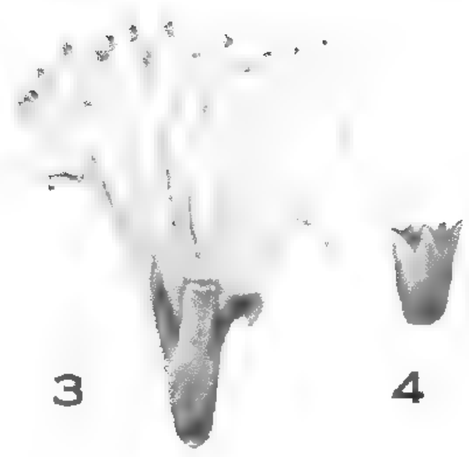

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PITHECOLOBIUM GUADALUPENSE

(Plate 26)

PITHECOLOBIUM GUADALUPENSE

Black-bead

Native of southern Florida and the West Indies

Family MIMOSACEAE Mimosa Family

Pithecolobium guadalupense Chapm. Fl. S. U. S. 116. 1860.

An erect or irregularly spreading shrub, or a small tree with usually a crooked trunk and with the branches irregularly bent and spreading in all directions. The twigs are without hairs, but they are roughened with numerous unevenly elevated wart-like projections on the bark. The bright-green leaves are evergreen and are twice pinnately compound, with usually four, or sometimes eight, leaflets which are borne in pairs. The leaflets are variable, mostly an inch and a quarter to two inches and three quarters in length, and with entire, leathery, sessile blades ranging in shape from cuneate or obovate to oblong, oval, or nearly circular. Their surfaces are glabrous, and rather prominently veined when old. The numerous flowers are borne primarily in globose heads which are fully an inch in diameter. The heads terminate slender but stiff stalks, singly, or usually few or very many in loose clusters, at the ends of the rigid branchlets. The flower-heads are light pink or salmon-colored, but the very numerous stamens become more or less tawny before they fall away. The calyx is a short five-lobed cup. The corolla is much longer than the calyx and has a narrow tube which is closely invested by the calyx, and five lobes. The numerous stamens are exserted far from the corolla by their long and slender filaments which terminate in very small yellowish anthers. The filaments are united, near the base, into a tube. The ovary is elevated from the bottom of the calyx on a stalk and the body is closely invested by the filament-tube. A thread-like style, almost like one of the filaments, terminates the ovary. The pods hang in clusters from the ends of the branchlets. They are curled and brown or reddish-brown. The sides are swollen and the edges are often uneven. The seeds are black, shining, and seated in a colored, often purplish, aril.

The black-bead grows naturally in southern Florida, nearly throughout the Bahamas, and on the northern coast of Cuba. It was collected in the earlier half of the last century on Key West, and subsequently on many of the Florida Keys. Later it was discovered on the mainland of Florida in the vicinity of Miami.

In the high pine woods, and in the hammocks where more or less crowded by other shrubs and trees, the plants of the black-bead are usually unsymmetric; but on the more open sand-dunes quite symmetric shrubs and trees are not uncommon.

When in flower this plant presents an exceedingly beautiful object. The myriads of bright-colored flower-heads spreading in all directions often nearly hide the rest of the plant from view.

Another species of *Pithecolobium* grows naturally in Florida. It is *Pithecolobium Unguis-cati* or, as it is popularly known, cat's-claw. Both the botanical name and common name have reference to the spines with which the plant is armed. The black-bead received its common name from the small bead-like seeds it bears. It and the cat's-claw grow together on the Florida Keys; but the cat's-claw alone extends northward on the western coast of the peninsula, while the black-bead alone occupies the eastern coast.

The specimen from which the accompanying illustration was made was brought to the New York Botanical Garden from southern Florida by N. L. Britton in the spring of 1904, and flowered in the conservatories in November, 1907.

J. K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Flower, looking from above. Fig. 3.—Flower, looking from the side, calyx removed. Fig. 4.—Calyx. Fig. 5.—Androecium. Fig. 6.—Androecium opened, showing gynoecium. Fig. 7.—Pod.

PLATE 27

ADDISONIA

ANTHURIUM GRANDIFOLIUM

(Plate 27)

ANTHURIUM GRANDIFOLIUM

Large-leaved Tail-flower

Native of the West Indies and Venezuela

Family ARACEAE — ARUM Family

Pothos grandifolia Jacq. Coll. **4**: 121. 1790.
Pothos macrophylla Willd. Sp. Pl. **1**: 686. 1797.
Anthurium grandifolium Kunth, Enum. **3**: 77. 1841.
Anthurium amplum Kunth, Enum. **3**: 77. 1841.

A short-stemmed, succulent, glabrous aroid, the leaves and scapes forming large tufts. The stems are usually eight inches long or more and from two to three inches thick; they send out many stout aerial roots sometimes a yard long. The petioles are stout, one foot to two feet long and half an inch to three-quarters of an inch thick, channeled on the upper side, the groove rather deep and with sharp margins, rounded beneath, somewhat enlarged at the base; the leaf-blades are broadly ovate, firm in texture, bright green, somewhat shining above, often two feet long and a foot and a half wide, short-tipped at the apex, rather deeply and broadly cordate at the base, the basal lobes rounded; the midvein and the several lateral veins are prominent on the under surface, and on the upper side are lighter green than the body of the leaf and scarcely elevated; the ultimate venation is very slender and coarsely reticulate. The scape is stout, nearly erect, usually shorter than the leaves but sometimes nearly as long, and not quite as thick as the petiole; the spathe, which is divergent, is narrowly lanceolate, acuminate, sometimes long-tipped, from three to seven inches long, its base partly clasping; the spadix is densely many-flowered, scarcely stalked above the spathe, six to fifteen inches long, and about half an inch thick, greenish-orange when young, but brownish-violet when the minute individual flowers appear. The fruits are obovoid, violet berries nearly half an inch long.

Jacquin records the type locality of the plant as in mountain forests near Caracas, Venezuela, whence it was obtained for cultivation in Europe prior to 1790. It is abundant in rocky forests of Jamaica at middle and higher elevations, growing on rocks, banks, or sometimes on trees, where its large leaves form a conspicuous element in the vegetation, and it may be seen there in flower during the greater part of the year. It also inhabits mountain forests of Dominica, and is recorded by Engler (Pflanzenreich 4^{23B}: 84) as having been collected on St. Thomas in 1881, but it was not detected on that island during our expedition there in 1913, the forest area having been much reduced. The closely related, if

really different, *Anthurium cordatum* (Willd.) G. Don, occurs on St. John and on Tortola, and is recorded as having been found on St. Croix.

A fine colored illustration was published by Jacquin about 1793 in his Icones Rariores, *plate 610;* another by Hooker in Botanical Magazine, *plate 2801*, published in 1828, apparently represents *A. cordatum*. The earliest illustrations associated with the species are those of Plumier, published in 1693, in his Description des Plantes de l'Amérique, on *plate 51, figure 1*, where it is shown growing on a tree, and on *plate 63*, but that author does not record the locality whence the plant figured was obtained; he denominated it "Dracontium amplis foliis, cordatus, radice nodosa rubra."

The plant which furnished our illustration was obtained by me between Clydesdale and Chester Vale, Jamaica, in September, 1906, and frequently forms spadices in the conservatories of the New York Botanical Garden, but has not ripened much fruit.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Young spadix and spathe. Fig. 2.—Leaf. Both figures are somewhat reduced in size in engraving.

EPIDENDRUM PALEACEUM

EPIDENDRUM PALEACEUM

Chaffy Epidendrum

Native of southern Mexico and Central America

Family ORCHIDACEÆ Orchid Family

Dinema paleaceum Lindl. Bot. Reg. **26**: Misc. 51. 1840.
Epidendrum aureum Lindl. Bot. Reg. **29**: Misc. 4. 1843.
Epidendrum paleaceum Reichb. f. Beitr. Orch. Centr. Am. 80. 1866.

An epiphytic plant, the scaly stem creeping, the pseudobulbs arising at rather distant intervals. The pseudobulbs are an inch long or a little longer and a half inch or less wide, compressed, oblong-elliptic, with two or three brown scales at the base, these decreasingly shorter and merging into the smaller scales of the short stalk. Each pseudobulb bears a solitary leaf up to five inches long and a half inch wide, broadly linear, obtuse, or sometimes acutish. From the apex of the immature pseudobulb arises the flowering stem which bears commonly from three to six pale yellow flowers, each flower arising from a brownish bract which is longer than the pedicel and ovary. The flowers are about three fourths of an inch wide. The sepals and petals are acute, the former about one half inch long and one eighth inch wide, the latter similar but a little shorter. The oblong lip, which is entire and slightly contracted just below the acute apex, is about one third of an inch long and one twelfth of an inch wide, and yellow, with two longitudinal red lines near the base. The column is about three sixteenths of an inch long.

The plant which furnished the material for this illustration was collected by Percy Wilson near Puerto Sierra, Honduras, early in 1903. Shortly after its arrival it flowered in the conservatories of the New York Botanical Garden. A tropical house suits its cultural requirements.

The genus *Epidendrum*, in its broad and generally accepted sense, comprises about five hundred species, and is widely distributed from Mexico to South America, in the West Indies, and in the southeastern United States; it is not known outside of America. About nine species have been found within the United States, one of these ranging from South Carolina to Florida and Alabama, the others being confined to peninsular Florida and the keys.

The genus, as usually understood, is extremely polymorphic, embracing plants which differ much in habit and structure. They are largely epiphytic, some of them, however, growing on rocks. Many of them have short thick stems, somewhat resembling bulbs

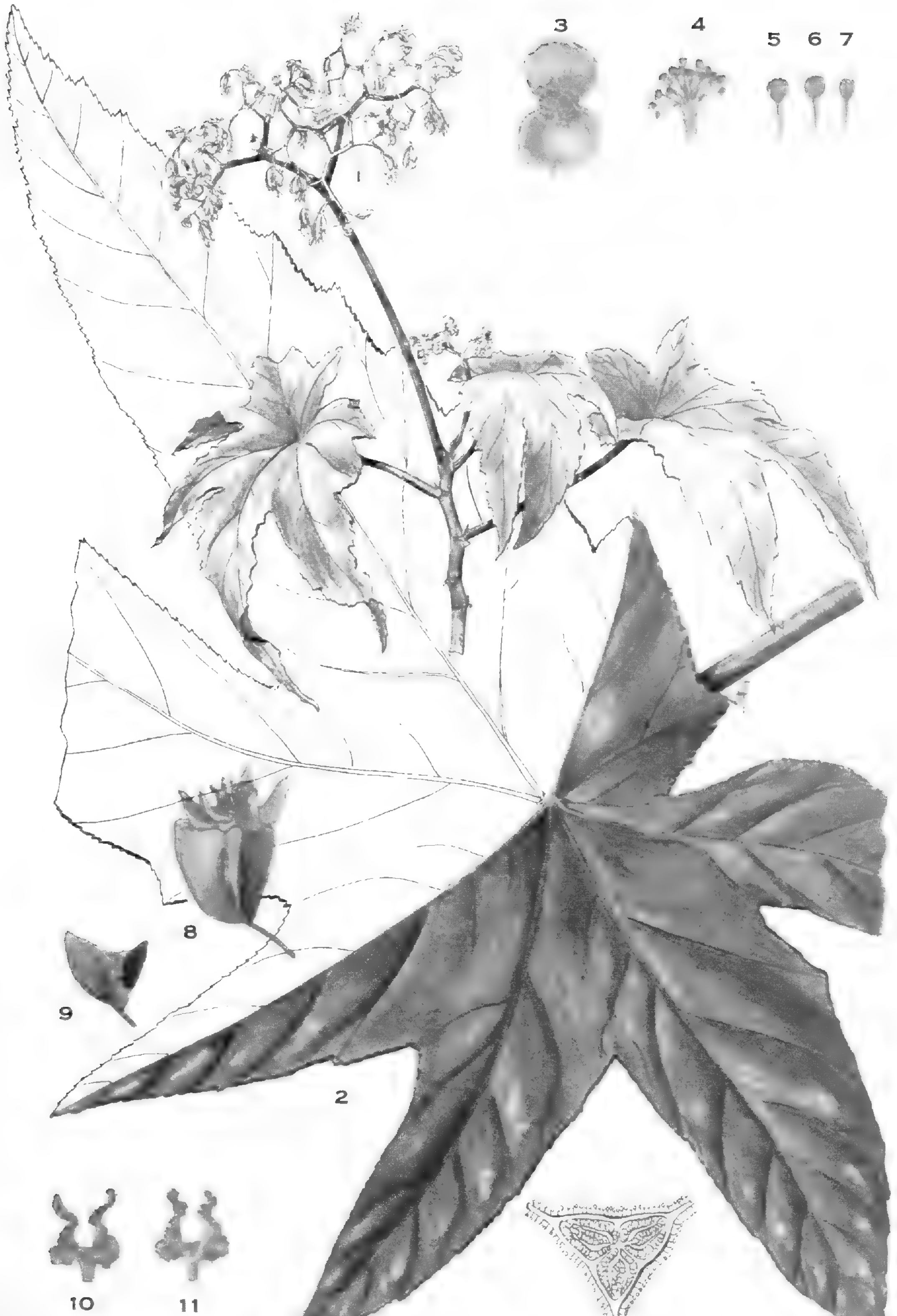
in form, and hence the name of pseudobulbs applied to these organs, which bear leaves at the apex; others have leafy stems, either erect or long and creeping. The leaves are fleshy, and these or the pseudobulbs, or both, serve as storage organs for the plants during periods of dryness.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Flower, × 2. Fig. 3.—Dorsal sepal, × 2. Fig. 4.—Lateral sepal, × 2. Fig. 5.—Petal, × 2. Fig. 6.—Lip, × 3. Fig. 7.—Column, × 3.

PLATE 29

ADDISONIA



BEGONIA WILLIAMSII

(Plate 29)

BEGONIA WILLIAMSII

Williams' Begonia

Native of Bolivia

Family BEGONIACEAE — BEGONIA Family

Begonia Williamsii Rusby & Nash; Nash, Torreya **6**: 47. 1906.

The stems, which are usually eight to ten inches tall, arise from a tuberous base. The leaves rarely exceed eight on a stem; they have glabrous petioles two to three inches long. The peltate, palmately veined blades are glabrous on both surfaces, the upper surface marked with silvery spots; they are up to four inches long, the greatest diameter being about six inches, and are lobed. The lobes are usually five or six, lanceolate-triangular to lanceolate, acuminate, the teeth cuspidate. The cyme is glandular-pubescent, as is also the peduncle which is up to five inches long. The staminate flowers have a perianth of two parts (or rarely with one or two smaller and narrower inner ones) which are pellucid, green, orbicular or nearly so, and about one half inch in diameter or a little less. The orange anthers are borne on short salmon filaments. The pistillate flowers, on pedicels a half inch long or less, have five ovate to broadly ovate perianth-divisions which are acute and about a quarter of an inch long. The glandular-pubescent ovary is a third of an inch long or a little less, three-celled, three-winged, two of the wings truncate at the apex and narrower than the third wing which has the upper edge somewhat ascending, all the wings merging toward the rounded base of the ovary. The placentas are divided to the base into two somewhat curved blades, ovule-bearing to the base on both sides. The styles are persistent, about a fifth of an inch long, two-branched, each branch broadened and flattened at the base, and these margined by the stigmatic surface which continues spirally to the apex, and is continuous at the base between the two branches often as a pronounced undulation. The capsule, including the wings, is about a half inch long and a little broader.

This plant was discovered by R. S. Williams during his travels in Bolivia in 1901–2. It was found growing among moss on a damp shady bluff, at an altitude of 1400 feet, a short distance to the north of the little town of San Buena Ventura, situated on the Beni River which unites with the Mamore River at the southern boundary of Brazil to form the Madeira, one of the tributaries of the Amazon. Plants were raised at the New York Botanical Garden from seed secured from capsules on the herbarium specimens collected by Mr. Williams. These flowered in January 1906, and it is from one of these plants that the illustration has been made.

The plant is odd and pleasing in its flowers of pellucid green with the deep orange anthers in contrast. Its habitat suggests its cultural requirements—shade, moisture, and heat.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch, much reduced. Fig. 2.—Leaf. Fig. 3.—Staminate flower, seen from above. Fig. 4.—Stamen-cluster, × 2. Fig. 5.—Stamen, frontal view, × 4. Fig. 6.—Stamen, dorsal view, × 4. Fig. 7.—Stamen, lateral view, × 4. Fig. 8.—Pistillate flower. Fig. 9.—Cross-section of same. Fig. 10.—Style, dorsal view, × 4. Fig. 11.—Style, frontal view, × 4. Fig. 12.—Cross-section of ovary, × 4.

ONCIDIUM UROPHYLLUM

(Plate 30)

ONCIDIUM UROPHYLLUM

Tail-leaf Oncidium

Native of Antigua and Brazil

Family ORCHIDACEAE ORCHID Family

Oncidium urophyllum Lodd.; Lindl. Sert. Orch. under *pl. 48.* 1841.

An epiphytic plant with long stiff leaves, which are equitant and crowded at the base of the stem, and a racemose inflorescence. The leaves are rather fleshy, almost conduplicate, very acute, and with a sharp keel on the back; they measure up to six inches long and nearly a half inch wide. The peduncle is slender, up to eight inches long, with several scarious distant bracts, and is terminated by a loose raceme of six to eight yellow flowers, sparingly marked with chestnut. The acute sepals are about one fifth of an inch long and a third as broad, and are marked toward the base with chestnut; the dorsal sepal is linear-spathulate; the lateral sepals are united almost to the apex into a two-toothed body. The petals are obovate-oblong, obtuse at the apex, apiculate, sometimes a little longer than the sepals and about half as broad as long, marked at the base with chestnut. The glabrous lip is sessile, a little over a half inch long and about a half inch wide at the rounded base, and is deeply three-lobed; the basal or lateral lobes are small, about three sixteenths of an inch long, narrow, obtuse at the apex; the terminal lobe is large, with a rather long and broad claw, broadly reniform, up to a half inch long and three-quarters of an inch wide, cordate at the base, and with the apex notched; the crest is white, marked with chestnut. The column is about three-sixteenths of an inch long, and the obtuse wings about one eighth of an inch long.

The plant from which the illustration was made was collected in 1913 by J. N. Rose on the island of Antigua, and flowered at the New York Botanical Garden in April, 1915. This species belongs to the section *Equitantia,* characterized by the rather fleshy conduplicate leaves which are equitant at the base. In addition to the one here under consideration, fourteen other species of this section are accredited to the West Indies by Cogniaux. In cultivation the plant requires a rather warm house, not too moist.

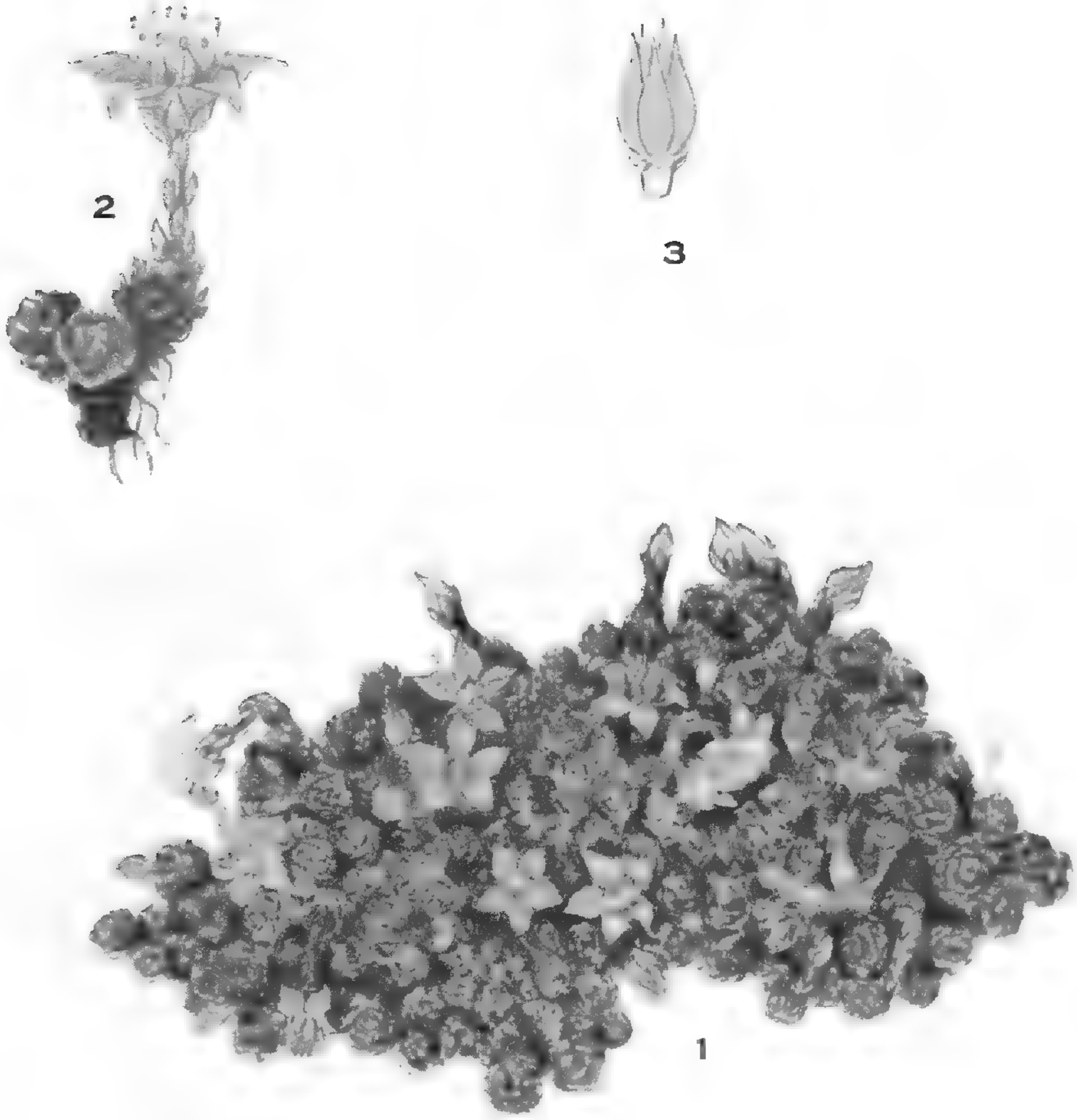
The American genus *Oncidium,* comprising about three hundred and twenty-five species, is widely distributed from Mexico to South America, in the West Indies, and peninsular Florida, the greatest number of species being confined to the mainland. Only three are known to occur within the borders of the United States, and these in southern peninsular Florida. Most of the species are provided

with pseudobulbs, while some are devoid of these organs, being furnished instead with large fleshy leaves which serve, as do the pseudobulbs in the other plants, as storage organs. All have a lateral inflorescence, that is one arising from the base of the pseudobulb or leaf; this flower-cluster may be short, with but a few flowers, or it may be ample and with numerous blossoms, when these plants are often referred to as butterfly orchids, from the resemblance of the numerous yellow blossoms to a flock of those insects.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Column and crest of lip, frontal view, × 2. Fig. 3.—Same, lateral view, × 2.

A. SEDUM DIVERSIFOLIUM



B. SEDUM HUMIFUSUM

(Plate 31)

A. SEDUM DIVERSIFOLIUM

Diverse-leaved Stonecrop

Native of central Mexico

Family CRASSULACEAE ORPINE Family

Sedum diversifolium Rose; Britton & Rose, Bull. N. Y. Bot. Gard. **3**: 44. 1903.

A low, much branched perennial, producing at the base and sometimes on the stems short compact rosettes composed of pale roughened leaves which are very different from the ordinary leaves. The flowering branches are elongate, usually less than three inches long, weak, glabrous, bearing scattered leaves. The leaves are fleshy, pale green, one quarter to one half inch long, somewhat curved backward. The flowers are usually solitary, sometimes two or three, at the ends of the branches. The five leaf-like, obtuse sepals are about one fourth of an inch long. There are five acute, spreading, pale yellow petals twice as long as the sepals. The ten stamens are much shorter than the petals. The carpels, five in number, are somewhat spreading.

This species is known only from the single collection made near Tultenango, State of Mexico, Mexico, in 1901, by J. N. Rose, through whom it was obtained by the New York Botanical Garden. It is one of the many interesting new species of *Sedum* which have been discovered in Mexico in recent years, and which are now growing in the collections of the New York Botanical Garden.

There are about two hundred and fifty species in the genus *Sedum*, distributed mainly in temperate and cold regions, in both the Old World and the New. They grow largely in dry or semi-arid situations, and are abundantly represented in Mexico and the parts of the United States adjacent thereto.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Flowering plant. Fig. 2.—Carpels.

B. SEDUM HUMIFUSUM

Humble Stonecrop

Native of central Mexico

Family CRASSULACEAE ORPINE Family

Sedum humifusum Rose, Contr. U. S. Nat. Herb. **13**: 298. *pl. 55.* 1911.

A low creeping perennial, forming a dense moss-like carpet, and sending off hundreds of short branches, each of which bears a

compact rosette of leaves. The leaves are closely imbricate, nearly orbicular, one sixth inch or more in diameter, fleshy, ciliate. The flowering branches are erect, short, and leafy. The flowers are solitary and terminal. The sepals are distinct or nearly so. The corolla is about one half inch broad. There are five yellow, spreading petals. The ten stamens are erect, as are also the five carpels.

This species, now growing in the New York Botanical Garden, was obtained through J. N. Rose and C. G. Pringle, who collected it in central Mexico in 1905. It is related to *Sedum compactum*, also from Mexico. Both of the species have a compact carpet-like effect, and may prove valuable plants for bedding purposes.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Flowering clump. Fig. 2.—Single flowering plant. Fig. 3.—The carpels.

CATASETUM SCURRA

(Plate 32)

CATASETUM SCURRA

Green-veined Catasetum

Native of British Guiana and Panama

Family ORCHIDACEAE ORCHID Family

Catasetum Scurra Reichb. f. Gard. Chron. **1872**: 1003. 1872.

An epiphytic orchid with petioled leaves, and with the flowers, which are white marked with green and red, in pendulous racemes. The ovate pseudobulbs are an inch to an inch and a half long and bear acute oblong-lanceolate leaves. The pendulous raceme is usually three to four inches long, the flowers, commonly less than a dozen, measuring a little under an inch across, and standing at a right angle to the stem. The sepals and petals, about a half inch long, are white, veined with green. The sepals are oval, the dorsal one obtuse and somewhat hooded at the apex, the lateral ones obtuse or acutish. The petals are similar in shape to the sepals, with the margins obscurely denticulate and the apex obtuse. The lip, somewhat compressed laterally, is three quarters of an inch to an inch long, spurred, and three-lobed; the lateral lobes, partially enclosing the column, are erect with the margins recurved and fimbriate-toothed; the middle lobe is fimbriate, about three eighths of an inch long and one half inch wide, connected with the body of the lip by a short broad isthmus; the blunt spur is about a quarter of an inch deep with two lateral interior projections partially closing its mouth, the interior of the cavity being veined with red. The column is white and about three eighths of an inch long. The pollinia, with their attached stalk, are a little less than one eighth of an inch long.

The drawing, from which the illustration was prepared, is of a plant collected by the late J. C. Harvey at Veragua, Panama, at an elevation of about 1,200 feet; it has been in the collections of the New York Botanical Garden since the fall of 1913, and flowered in February, 1914. As its habitat would indicate, this species requires the conditions in a tropical house for its successful cultivation.

The genus *Catasetum* contains about forty known species, distributed from Mexico to Brazil and Peru, with one recorded from Trinidad. Many more have been described, but owing to the eccentric variability in the form of the flowers, a large part of them must be referred to other species. This variability consists in a trimorphic condition of the flowers, each form so different from the others that as many genera have been founded upon them. The genus first established was *Catasetum*, published by L. C. Richard in

1822, having a pouch-like lip with the opening in it turned down, two tail-like appendages, known as antennae, to the column, and the pollinia well-developed; this represents the staminate form. Another, almost exactly resembling this, has the pollinia imperfectly developed, no appendages to the column, and represents the pistillate form; this was the basis of the genus *Monachanthus*, published by Lindley in 1832. Upon still a third form of flower Lindley in the same year established his genus *Myanthus;* in this the lip is flat, spreading, with a well-pronounced spur, and the column is provided with appendages; this represents the perfect form of flower. In 1836, however, a plant of *Myanthus cristatus* in the collection of the Duke of Devonshire put forth a cluster of flowers which shattered the opinions previously held by botanists. This flower-cluster had upon it flowers of all three forms, thus clearly demonstrating that the three genera were in reality only forms of one. The presence of the appendages to the column in the perfect and staminate forms makes quite evident that these organs play an important part in the fertilization of the plant. An irritation of these appendages results in an immediate and violent expulsion of the pollinia, which fasten themselves, by means of the sticky gland at the end of the stalk, to the first object they encounter. *Cycnoches*, belonging to the same tribe and closely related to *Catasetum*, exhibits a similar variability in flower-form.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Vertical section of flower, somewhat enlarged. Fig. 3.—Column, front view, × 2. Fig. 4.—Pollinia, front view, × 4. Fig. 5.—Pollinia, dorsal view, × 4.

CHIONODOXA LUCILIAE GIGANTEA

(Plate 33)

CHIONODOXA LUCILIAE GIGANTEA

Large-flowered Glory-of-the-Snow

Native of Asia Minor

Family LILIACEAE — LILY Family

Chionodoxa gigantea Ware, Garden **35**: 300. 1889.
Chionodoxa grandiflora Ware; W. Robinson, Garden **37**: 321. 1890.
Chionodoxa Luciliae gigantea " D.K." Garden **42**: 210. 1892.
Chionodoxa Luciliae grandiflora " D.K." Garden **42**: 211. 1892.

A small herb, seven to nine inches high. From a brown-coated, oval bulb about an inch long, arises a slender stem bearing two linear-lanceolate, green, brown-edged leaves, four to five inches long and about one inch wide, enfolding the stem at its base and spreading out above. The stem bears at its summit a raceme of usually two, or rarely three flowers. The flowers measure nearly two inches across, and are light blue shading to a white throat, into which run dark lines in the center of each perianth-segment. The six perianth-segments are about one inch long, ovate-lanceolate, acute, their bases united into a tube about one-fifth their length. Six yellow anthers are borne on white filaments, which are dilated, and prominent in the throat when the anthers have disappeared. The ovary is small and three-celled.

The glory-of-the-snow is a spring-flowering bulb which accompanies the snowdrop, squill and crocus in March and early April, and with the latter two furnishes garden color for those months. The variety *gigantea* is one of the many forms of *Chionodoxa Luciliae* Boiss., from the mountains of Asia Minor and Crete. The variety differs from the species principally in the number of flowers borne on a single scape, having usually two or rarely three, while *C. Luciliae* has five or more; also in the color and larger size of the flowers.

This plant was introduced into English gardens from Smyrna in 1887. Bulbs of it were collected in the mountains above Allah Cheir (the ancient Philadelphia) by Edward Whittall (see Garden **35**: 367), and distributed in England.

Our illustration was made from a specimen grown in the New York Botanical Garden, where several plots bloom profusely each spring-time. It is quite hardy, and its blooms appear uniformly a glistening carpet of light blue. The bulb is found exceptionally far below the surface of the soil, where the plant has been long

established, leaving a nearly colorless portion of the scape and leaves under ground. Unlike the Siberian squill, which has nodding flowers, the large-flowered glory-of-the-snow opens its flowers upward, so that one can see the white throats.

The bulbs should be planted about three inches deep and two or three inches apart. They flourish in any fertile soil, and are suitable for use in grassy places. Like many other spring bulbs they improve with succeeding seasons until the sixth or seventh, when it may be necessary to renew them. Seeds are formed freely, and may be used to propagate new plants.

K. R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Flower opened, exposing stamens.

AGAVE SUBSIMPLEX

(Plate 34)

AGAVE SUBSIMPLEX

Seal Island Maguey

Native of Seal Island, Gulf of California

Family AMARYLLIDACEAE AMARYLLIS Family

Agave subsimplex Trelease, Rep. Missouri Bot. Gard. **22**: 60. *pl. 63, 64.* 1911.

A rather small glabrous perennial with very tough and fleshy leaves crowded over a short thick trunk and persisting until flowering time. The leaves are broadly oblong, about two inches wide and five inches long, smooth, and very glaucous but marked by occasional greener bands across the back; they are gradually narrowed to an abrupt hard strong very sharp gray spine three-quarters of an inch long, and their margins are deeply repand at intervals of about half an inch, each of the fleshy prominences ending in a sharp hard tooth a quarter of an inch long which passes from yellow, red, or purple into a dull gray as it matures. After several years of vegetation a slender scape two to three feet long develops, bearing a few scattered bracts which pass into the leaves below by a gradual transition, and become much smaller and thinner above. From the axils of a few of the upper bracts short branches develop and end in several flowers each, or the flowers are nearly sessile and reduced to two above each bract. The flowers are greenish yellow, about an inch long, with six nearly distinct and similar perianth-segments arising from the summit of an oblong ovary half an inch long. The six claret-colored filaments are borne in the very short tube of the perianth, and are nearly an inch long, each terminating in a short versatile yellow anther. The fruit is a loculicidal three-celled oblong woody capsule about two inches and a half long, narrowed into a stipe at its base, and each cell contains many thin flat black seeds in two rows.

Agave subsimplex is one of a group of small maguey or mescal species that occur in the desert region of the Colorado river and the adjoining parts of continental and peninsular Mexico. It was collected in fruit by J. N. Rose, and was described originally from this material. With the herbarium specimens, small living plants were brought in, and it is one of these, which flowered in the New York Botanical Garden, that is figured on the accompanying plate and has furnished material for the description of the flowers.

The genus *Agave*, as it is limited by botanists today, comprises two types. The usually broad-leaved species that bear their flowers in an ample panicle, of which the "century plant" of greenhouses and the "pulque magueys" of Mexico are examples,

constitute the subgenus *Euagave*. The usually narrow-leaved species with flowers condensed in a wand-like spike, represented by the "lechuguilla" of western Texas, belong to the subgenus *Littaea;* usually the flowers of a *Littaea* are in pairs. Normal plants of *Agave subsimplex* form unmistakable if reduced panicles and the species is clearly a *Euagave*. The transplanted specimen now figured not only lacks characteristic leaves, which have fallen from its bulb-like trunk, so that it possesses only the transition stage that is found about the base of the scape, but its flowers have been reduced to two at each node, quite as in *Littaea*. Misunderstanding of a similar depauperate inflorescence caused another of the Mexican species, the "espadilla" of Tehuacan, *Agave macroacantha*, to stand for many years in the spicate group, though, like *A. subsimplex*, it is clearly a *Euagave* in flowers and fruit, and also in its normally developed panicle.

WILLIAM TRELEASE.

EXPLANATION OF PLATE. Fig. 1.—Lower portion of plant. Fig. 2.—Inflorescence. Fig. 3.—Plant, much reduced.

DASYSTEPHANA PORPHYRIO

(Plate 35)

DASYSTEPHANA PORPHYRIO

Pine-barren Gentian

Native of the southeastern United States

Family GENTIANACEAE GENTIAN Family

Gentiana purpurea Walt. Fl. Car. 109. 1788. Not *G. purpurea* L. 1753.
Gentiana Porphyrio J. F. Gmel. Syst. Nat. 2: 462. 1791.
Dasystephana Porphyrio Small, Fl. SE. U. S. 931. 1903.

A glabrous herbaceous plant, from a cluster of fleshy roots sending up one or several slender stems, each with a few narrow leaves and one or a few large blue flowers. The stems are erect, six to eighteen inches tall. The leaves are opposite, sessile, linear and acute, or the lower narrowly oblanceolate and more or less rounded at the apex; they are bright green, mostly slightly over two inches in length and one eighth of an inch or less in width. The flowers are solitary and terminal, or if two to four in number the additional flowers occur on slender pedicel-like branches borne in the axils of the upper leaves. Below the sepals of these axillary flowers are found two linear bracts corresponding to the upper pair of leaves which on the terminal stem may be either close under or remote from the calyx of the flower. The five sepals below are united into a campanulate tube, above they extend as free linear lobes somewhat irregular in length; connecting the bases of the lobes is a whitish scarious membrane. The corolla in the bud is spirally twisted to the right; when fully expanded it is narrowly campanulate with lobes widely spreading. The petals, over an inch and a half long, are firm in texture, externally bronze-green, shading toward the apex slightly blue, within the throat yellow-green, shading above and on the widely spreading lobes into a bright sky-blue, and thickly dotted with fine bronze-green spots; between the petals and connecting them for over two thirds their length, thus forming the corolla-tube, extends a thin deep-blue membrane which at the apex is produced into lacerate fringes. The stamens, five in number, attached to the base of the corolla and alternating with its lobes, do not project beyond the corolla-tube; the narrow anthers consist of two parallel cells, each of which opens its entire length. The ovary is large, filling the center of the flower, and is crowned at the apex by two widely spreading linear stigmas. The fruit is a one-celled capsule filled with numerous minute seeds.

This is one of the most beautiful of all gentians. Certainly few flowers show such a pleasing contrast of color as does *Dasystephana Porphyrio*. The brilliancy of its flaring lobes, the depth of color of the alternating fringes between these, the delicacy of the spotting

within the throat, the rare bronze-green of the buds and corolla externally, all give individuality and distinction. Such a plant does not seem to belong to the everyday world of flowers.

In fact this gentian is not a daily or a frequent botanical acquaintance, but, quite the contrary, is one of the least seen and least collected of all the attractive plants of the eastern United States. It is a native of the sandy pine-land along the Atlantic seaboard and has been found from New Jersey to South Carolina; either a form of this or else a closely related species grows in Florida. In southern New Jersey it occurs, sometimes in great numbers, always in localities far in the heart of the pine-barrens. There it prefers rather moist sand, in the open, the edges of pine-land depressions suiting it perfectly.

Like our other gentians, this is a late bloomer, and in New Jersey is at its best in mid-September. The plants from which our illustration has been made were collected by the writer at Parkdale, Camden county, New Jersey, September 18, 1916.

In his " Plants of Southern New Jersey," Dr. Witmer Stone says of the discovery of this species: " It was apparently first discovered by William Bartram, who sent a drawing of it to Edwards, the British naturalist, who published it in his Gleanings of Natural History, vol. V, p. 98. 1758, as the 'Autumnal Perennial Gentian of the Desert'." Its first recognition as a species was somewhat later by Thomas Walter, who doubtless found the plant in what is now Berkeley County, South Carolina.

The plant is given in the Standard Cyclopedia of Horticulture as being in cultivation, and that work may be consulted for instructions as to culture. All gentians require peculiar care, and in response most are but uncertain. This species, perennating by fleshy roots, should be relatively reliable.

FRANCIS W. PENNELL.

PLATE 36

ADDISONIA

1

2

3

4

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6

CYMOPHYLLUS FRASERI

(Plate 36)

CYMOPHYLLUS FRASERI

Fraser's Sedge

Native of the southern Alleghanies

Family CYPERACEAE SEDGE Family

Carex Fraseri Andr. Bot. Rep. **10**: *pl. 639.* Je 1811.

Carex Fraseriana Gawler; Bot. Mag. **34**: *pl. 1391.* Jl 1811.

Cymophyllus Fraseri Mackenzie; Britt. & Brown, Ill. Fl. ed. 2. **1**: 441. 1913.

A perennial sedge with short rootstocks sending up culms six to eighteen inches long, clothed at base with four to six overlapping bladeless sheaths. After flowering one large blade-bearing leaf is developed, without sheath, ligule, or midrib. The blade is very thick, long-persistent, and with strongly undulate margins; the larger ones are nearly two feet long and more than an inch and a half wide. The flowers are borne in a bractless spike a half inch to an inch long. The lower flowers are pistillate and some fifteen to thirty in number and the upper flowers are staminate. The scales and perigynia are milk-white in color, the anthers yellowish-white, and the long slender filaments and the stigmas reddish-brown. The perigynia are rather less than one fourth of an inch in length, elliptic-ovoid in outline, faintly nerved and very short-beaked. The achenes are triangular and not jointed to the very slender style. The three stigmas are rather short and thick.

This sedge has been in cultivation in the New York Botanical Garden since 1900. Plants of it may be found at the base of the rocks, just south of the pergola in the herbaceous grounds; the large leaves remain green well into the winter. Our illustration was prepared from a drawing of one of these plants.

It was first brought to the attention of botanists by Fraser, who collected it in the autumn of 1808 near Table Mountain and upon the banks of the Catawba River in the neighborhood of Morgantown, North Carolina. Since then it has been collected in a number of localities in the mountains of western North Carolina, and has also been found in the mountains of eastern Tennessee, southwestern Virginia and West Virginia. It was apparently first described by Andrews in 1811 in the Botanists' Repository, but he was little ahead of Gawler (afterward Ker), who in the same year described the plant in Curtis's Botanical Magazine (**34**: *pl. 1319*) as *Carex Fraseriana.* Both Andrews and Gawler published very fair colored plates. Since their time no other colored

plates have been published as far as I know, but it has been otherwise illustrated several times, the best figures being probably those by Boott (Ill. Carex **4**: 150. *pl. 484*) in 1867.

From its first discovery authors have felt that this plant did not fit in with the members of the vast and widely distributed genus *Carex* and have expressed themselves to this effect. Thus we find Gawler rather quaintly saying " the character of our plant does not entirely agree with that of the *Uncinia* of Mr. Brown, and we have placed it under *Carex*, leaving its transposition, if necessary, to some one better acquainted with its kind than we profess to be." It has accordingly seemed better to make it the type of a separate genus, which has been named *Cymophyllus*, in allusion to the undulate-margined leaves. This genus differs from *Carex* in producing but one blade-bearing leaf to a culm, which leaf is entirely without sheath, ligule, or midvein.

A most careful and detailed study of the anatomy and morphology of this species was made by Dr. Theodor Holm in 1897 (Am. Jour. Sci. IV. **3**: 121-128. *pl. 4*).

KENNETH K. MACKENZIE.

EXPLANATION OF PLATE. Fig. 1.—Plant. Fig. 2.—Scale. Fig. 3.—Pistil. Fig. 4.—Achene. Fig. 5.—Fruiting head. Fig. 6.—Tip of leaf.

RHUS HIRTA DISSECTA

(Plate 37)

RHUS HIRTA DISSECTA

Fern-leaved Staghorn Sumac

Native of Massachusetts

Family ANACARDIACEAE SUMAC Family

Rhus typhina laciniata Manning; Rehder, Deuts. Gärtn.-Zeit. **15**: 211. 1900. Not *Rhus typhina laciniata* A. Wood, 1847.

Rhus hirta laciniata C. K. Schneid. Ill. Handb. Laubh. **2**: 154. 1907.

Rhus typhina forma *dissecta* Rehder, Rhodora **9**: 115. 1907.

Rhus typhina filicina Sprenger, Mitt. Deuts. Dendr. Ges. **16**: 67. 1908.

Rhus hirta dissecta Nash.

Commonly a much-branched broad shrub, with the young branches covered with a pink velvety pubescence, and with the rachis of the compound leaves hairy. The leaves are up to a foot or two long and eight to twelve inches wide, with as many as thirteen pairs of leaflets which are cut to the midrib, at least below, into somewhat distant linear or lanceolate lobes, having the margin often toothed or pinnatifid, the apex of the leaflets merely lobed or toothed; the leaflets are up to six inches long, dark green and hairy above, much paler and more hairy beneath, especially on the nerves. The flowers are of two kinds, staminate and pistillate, each on a different plant. The dense and narrowly ovate flower-clusters are on the ends of the branches and are from six to twelve inches long. The green flowers have a diameter of about one eighth of an inch, with the pointed calyx-lobes hairy. In the staminate flowers the petals are reflexed, in the pistillate ones erect or slightly spreading. The fruit clusters, of many small hairy fruits, are of a rich red-brown and up to eight inches long.

The illustration is prepared from a plant in the fruticetum of the New York Botanical Garden, obtained in 1904 from the nursery of Hicks & Son. In *Rhus hirta* the leaflets are lanceolate to oblong-lanceolate and are merely sharply toothed; this variety differs mainly in the leaflets, which are again divided into separate lobes.

This is the plant described as *Rhus typhina* var. *laciniata* in Bailey's Cyclopedia of American Horticulture, and the one offered for sale under that name in nursery catalogues. It was discovered about twenty-five years ago in Massachusetts (the exact locality not recorded), by J. W. Manning, of Reading, in that state. The *R. typhina* var. *laciniata* described by Wood (Class-Book ed. 2. 203. 1847) nearly seventy years ago differs in having the leaflets merely pinnatifidly lobed, much in the manner of the terminal portions of

the leaflets in the variety *dissecta*. It was discovered in 1846 by Truman Rickard (afterward Dr. Rickard), near Hanover, New Hampshire.

This variety, in the collections of the New York Botanical Garden, forms a broad spreading shrub up to eight feet tall and about as wide. Planted in masses it adds a striking feature to the landscape, the feathery foliage giving it a graceful appearance, not noted in the species, which often grows into a small tree thirty or forty feet high. In a wild state *Rhus hirta* usually occurs on hillsides, preferring a dry soil, although sometimes growing on the borders of swamps. In cultivation, like other hardy members of the genus, it flourishes in dry soil, and both the species and variety are excellently adapted to such situations. The species, when old, is bare of foliage below, and is better suited therefore for the rear portions of decorative plantings, while the variety, more compact and of dwarfer habit, is adapted for use in front of the species or groups of other taller growing shrubs and trees. The rich green of its summer foliage, persisting even throughout long dry spells, offers a striking contrast, during late summer and early autumn, to the warm color of its fruit; and its value as a decorative shrub is further enhanced by its autumn mantle of vivid and glowing color.

GEORGE V. NASH.

OPUNTIA VULGARIS

(Plate 38)

OPUNTIA VULGARIS

Tall South American Prickly Pear

Native of eastern South America

Family CACTACEAE — CACTUS Family

Opuntia vulgaris Mill. Gard. Dict. ed. 8. Opuntia no. 1. 1768.
Cactus monacanthos Willd. Enum. Pl. Suppl. 33. 1813.
Opuntia monacantha Haw. Suppl. Pl. Succ. 81. 1819.
Cactus indicus Roxb. Fl. Indica **2**: 475. 1832.
Opuntia Lemaireana Console; A. Weber, in Bois, Dict. Hort. 894. 1898.
Opuntia paraguayensis Schum. Monatsschr. Kakteenk. **9**: 149. 1899.
Opuntia bonaerensis Speg. Contr. Fl. Tandil 18. 1901.
Opuntia Arechavaletai Speg. Anal. Mus. Nac. Buenos Aires III. **4**: 520. 1905.

An erect, often much branched cactus, sometimes twelve feet high, in greenhouse cultivation seldom over six feet high, the branches ascending or spreading, the well-defined and nearly cylindric trunk six inches in diameter near the ground, or less. The flattened ultimate joints are bright green and shining, thin, ovate to elliptic or oblong in shape, from four to twelve inches long, and average about twice as long as wide; they are rounded at the top and narrowed at the base. The leaves, which may be seen on young joints, are awl-shaped and about one eighth of an inch in length; as the joint grows these leaves soon fall away. The areoles of the joints are rather widely separated from each other and usually bear one or two yellowish-brown, stiff spines, usually with dark brown tips which are one half to one and one half inches long or less, and the glochides are brownish; the areoles of the main stem sometimes bear more spines than those of the joints, up to ten in number. The flowers, which appear singly at areoles of the joints, are yellow or reddish, and about three inches broad; the sepals are greenish with a red longitudinal stripe; the petals spread widely and are obovate; the slender filaments are greenish, the style and the stigma-lobes white; the ovary is somewhat club-shaped, about an inch and a half long, and its areoles are spineless but bear glochides. The fruit, which remains attached to the plant for a considerable period of time, is obovoid and sometimes proliferous.

This cactus is indigenous in eastern Brazil, Paraguay, Uruguay, and Argentina, where it runs into several races, differing in the number and length of spines, shape of the joints, and color of the flowers. The synonymy above cited does not include all the names which have been associated with it.

The plant is widely distributed through cultivation in tropical regions of both the Old World and the New, and is recorded by Burkill (Rec. Bot. Surv. India 4: 292. 1911) as thus the most widely distributed of this genus. It is completely naturalized in Australia and in India, and there sometimes appears as if a native plant. It grows readily in southern California, southern France, and Cuba, and, presumably, may be grown successfully in southern Florida. In India and in South Africa, it was formerly much utilized as a host plant of the cochineal insect, before cochineal was replaced by other dyes.

A race of the species with variegated joints, some green, others blotched with white or yellow, and others wholly white or yellow, is common in greenhouse cultivation.

The name *Opuntia vulgaris*, as given by Miller as above cited, refers to this plant rather than to the wild prickly pear of the eastern United States, with which it has been associated in much botanical literature. The name *vulgaris* was based on the illustration by Bauhin (Hist. Pl. 1: 154. 1650), copied from Lobel's figure (Icones 2: 241. 1581). It was thus one of the first cactuses known to European botanists, and, as it has a wide range in eastern South America, the name *vulgaris* is not at all inappropriate.

The collections of the New York Botanical Garden contain plants of this species obtained from a number of places where it has been grown both in greenhouses and in the open, and also plants obtained by J. N. Rose in eastern South America during his exploration of that region in 1915. Our illustration is made from a plant obtained in California by Walter T. Swingle in 1905.

N. L. BRITTON.

TILLANDSIA SUBLAXA

(Plate 39)

TILLANDSIA SUBLAXA

Slender-spiked Tillandsia

Native of the West Indies

Family BROMELIACEAE PINEAPPLE Family

Tillandsia sublaxa Baker, Jour. Bot. **25**: 280. 1887.

A stemless epiphytic herbaceous plant with relatively few narrow leaves in a utriculate rosette. The narrowly lanceolate reflexed leaves with long attenuate tips are relatively few, moderately firm in texture, four to seven inches or more in length, and taper from a broadened base; they are clothed with grayish scales which give the plant a silvery hue. The unbranched flowering stem is erect and four to seven inches or sometimes more in length. The flowers, which exceed the oblong-lanceolate bracts, are about six or eight on each side of the stem. The three oblong or oblong-lanceolate sepals are rather rigid and about half as long as the corolla. The three petals are lilac. The stamens and pistil are exserted. The seeds are narrow and erect. The oblong capsule is about one inch long. The linear seeds are produced at the base into a long-stalked appendage with silky threads resembling pappus.

The plant which furnished the accompanying illustration was collected by George V. Nash in the vicinity of Mt. Maleuvre, Haïti, on July 24, 1905, and flowered in the conservatories of the New York Botanical Garden on February 5, 1907.

Tillandsia sublaxa was described from specimens secured by William Purdie on logwood trees in the plains of Westmoreland, Jamaica. It is also rather common in parts of Porto Rico. Like most of the other members of the genus it prefers to grow on trees and is commonly referred to as an air-plant. In cultivation, most species of *Tillandsia* delight in a warm, moist temperature, and should be placed in houses where they will get plenty of sunlight and syringing during the growing season, which is during the late spring or summer months. Many of the species may be grown to best advantage in a fibrous loam with rotted manure added; others thrive best in a mixture of loam, peat and leaf-mould, while a few kinds prefer to be fastened to blocks of peat or cork or branches of trees and suspended on wires from the roof of the conservatory.

There are three hundred or more described species of *Tillandsia*, most of them epiphytes and all natives of America. Compara-

tively few species of the genus are offered in trade catalogues, but many are to be found in private collections or in the conservatories of botanical institutions.

By means of the soft hairs, the seeds of *Tillandsia* are frequently carried by the wind for great distances, and, alighting on the moist branches of tall trees, or on insulated telephone wires, develop into new plants.

PERCY WILSON.

EXPLANATION OF PLATE. Fig. 1.—Basal rosette of leaves. Fig. 2.—Flower. Fig. 3.—Flower-spike.

ECHEVERIA AUSTRALIS

(Plate 40)

ECHEVERIA AUSTRALIS

Southern Echeveria

Native of Costa Rica

Family CRASSULACEAE — ORPINE Family

Echeveria australis Rose; Britton & Rose, Bull. N. Y. Bot. Gard. **3**: 6. 1903.

A fleshy perennial herb, with flowering stems about a foot or fifteen inches high, and bluish-green, glaucous leaves in tufts at the end of the short branches. The leaves of the tufts are broadly spatulate or obovate, from one and one half to three inches long, rounded or short-tipped at the apex, narrowed at the base, and very faintly veined; the lower leaves of the tufts fall away as the branch develops, leaving small scars. The flowering stems are stout, simple or few-branched, and are clothed with small, oblong to obovate leaves, rather closely set, obtuse or acute, and about one inch long or less. The flowering stems are terminated by a dense raceme or narrow panicle of showy bright red flowers. The pedicels are somewhat ascending, and less than half an inch in length; the bracts are linear, somewhat longer than the pedicels, and early fall away. The somewhat unequal sepals are ovate-oblong, purplish, the longer ones about six lines long. The petals are lanceolate, acute, and somewhat longer than the sepals. There are ten stamens, which are about the length of the sepals. The capsule is about one third of an inch long.

This plant inhabits rocks and stone walls in the vicinity of San José and Cartago, Costa Rica, and was originally described from living plants collected by H. Pittier at San José in December, 1902. William R. Maxon collected living plants in the vicinity of Cartago in 1906. Both the San José and Cartago plants have since flowered frequently at the New York Botanical Garden, and the Cartago plant is the basis of the accompanying illustration.

The Echeverias, long favorites in greenhouse cultivation and for summer bedding plants, number some sixty species or more, most abundant at middle and higher altitudes in the drier portions of Mexico, but extending southward through Central America, and one of them, *E. strictiflora,* extending north into western Texas; a few kinds occur in the Andes of South America. The genus was established by DeCandolle in 1828, the type species being *Echeveria coccinea* (Cav.) DC., which was cultivated prior to that time in the Royal Gardens at Madrid and was first described as *Cotyledon*

coccinea Cavanilles. The genus has by many authors been referred back to *Cotyledon*, which it much resembles, but the true Cotyledons are natives of South Africa, with different flowers. Some of the species of the related genera *Pachyphytum*, *Oliveranthus*, *Villadia*, *Courantia*, *Urbinia*, *Dudleya*, *Gormania*, and *Stylophyllum*, all of Mexico and the western United States, have also been called Cotyledons by various authors.

Nearly all the species of *Echeveria* respond readily to dry and relatively cool greenhouse conditions, and are easily propagated and increased by cuttings. The rosettes of leaves are beautiful, and the red, orange, or yellowish flowers are in many species very showy.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Branch with whorl of leaves. Fig. 3.—Flower-bract. Fig. 4.—Sepal. Fig. 5.—Petal, exterior view. Fig. 6.—Petal, interior view. Fig. 7.—Pistil.

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Bold-face type is used for the Latin names of plants illustrated; SMALL CAPITALS for Latin names of families illustrated and for the names of the authors of the text; *italics* for other Latin names, including synonyms.