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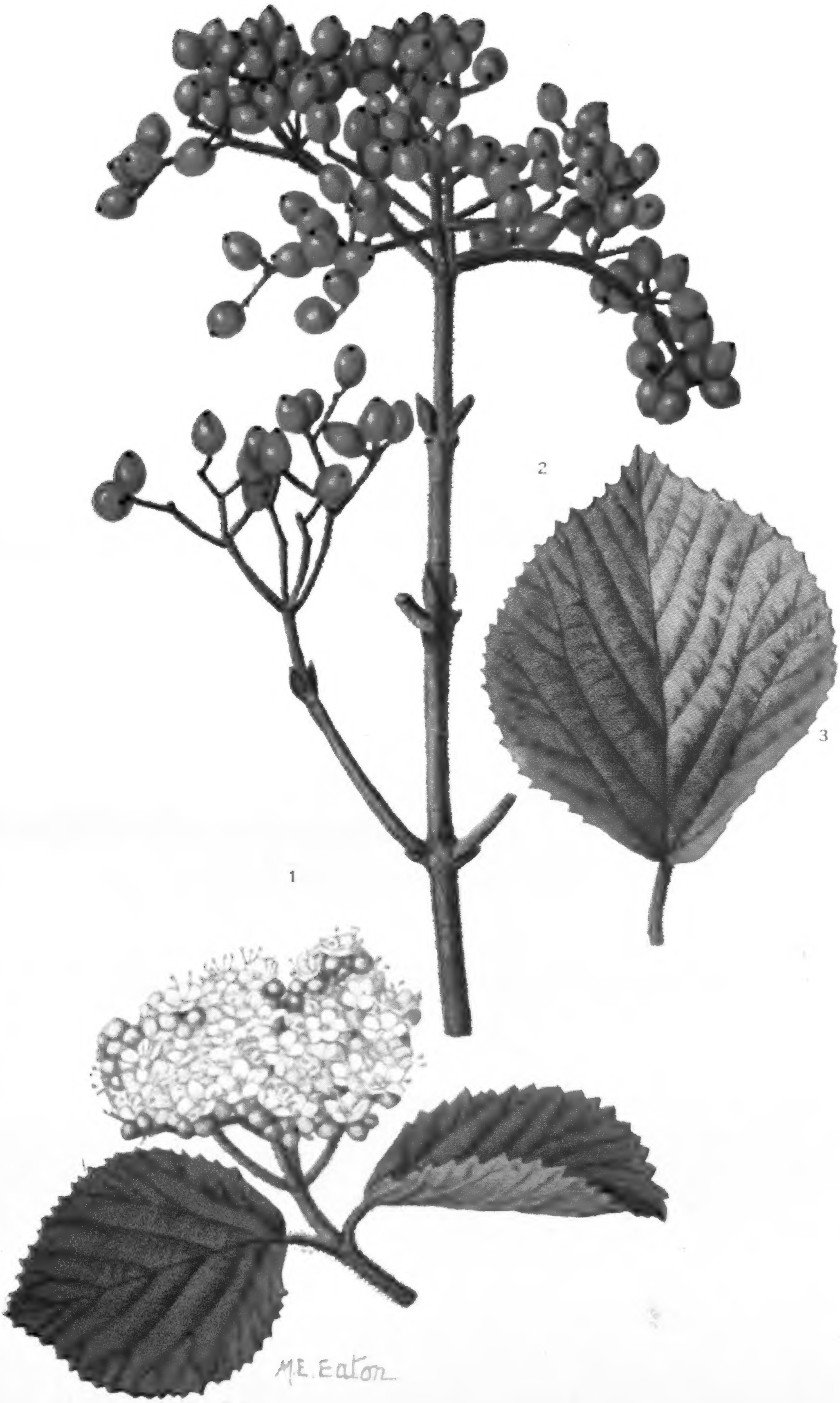


VIBURNUM DILATATUM

(Plate 161)

VIBURNUM DILATATUM

Thunberg's Viburnum

Native of China and Japan

Family CAPRIFOLIACEAE HONEYSUCKLE Family

Viburnum dilatatum Thunb. Fl. Jap. 124. 1784.

This is one of the most attractive viburnums of Japan, a country rich in members of this genus. Its flowers, which appear about the middle of June in the latitude of New York city, clothe it with a mantle of white, and in the early fall the fruit, which is borne in great profusion and lasts well through the winter, makes of the bush a mass of rich scarlet; the leaves also take on a rich fall coloration, so that this plant is an object of great beauty for many months of the year. It is of easy culture, thriving in almost any soil of ordinary fertility. Longevity is added to its other desirable qualities, as is indicated by the fact that the plant in the New York Botanical Garden from which the illustration was prepared was secured in 1895 from the Arnold Arboretum. *Viburnum dilatatum* was introduced into England about 1875 by the Messrs. Veitch, and has since then become widely spread in cultivation.

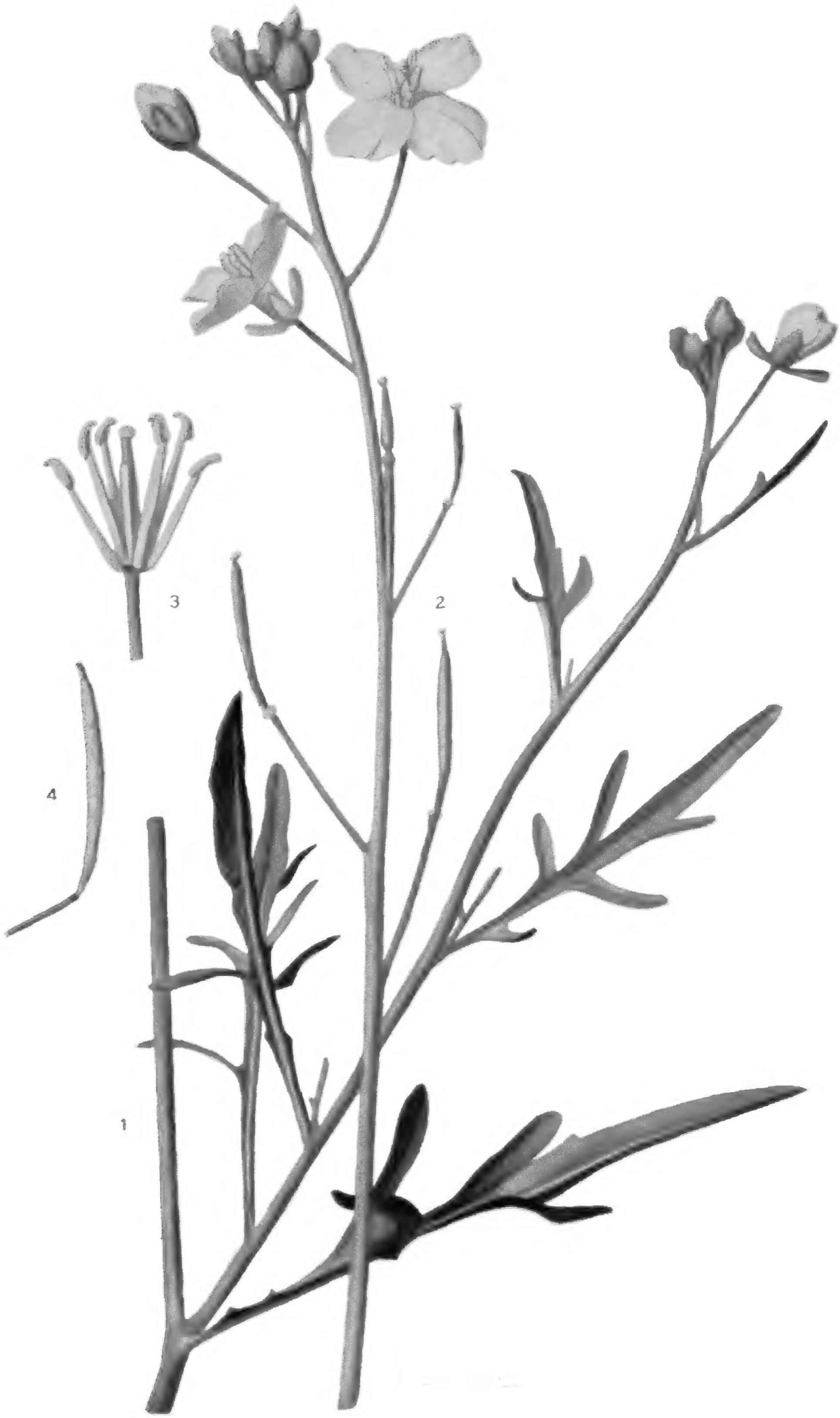
A general discussion of the genus Viburnum, including methods of propagation, will be found in volume 4 of this periodical, at page 55. To the information there presented it may be added that in the northeastern parts of North America there are fourteen species native, and three others in the southeastern United States, making a total of seventeen species for eastern North America. But it is in eastern Asia that the genus finds its greatest representation, about sixty-five species being known from that region.

Thunberg's viburnum in habit is an upright shrub up to ten feet tall, bearing its white flowers and scarlet fruit in broad flat-topped clusters. The branches of the year are clothed with a rather long dense pubescence, the older branches finally becoming glabrous. The leaves are opposite, each on a densely pubescent stalk commonly less than a half inch long. The outline of the blades is oval, broadly ovate or obovate, or orbicular or nearly so, the apex being abruptly pointed and the base rounded; they are densely pubescent on both surfaces, especially the lower, in age the pubescence becoming sparser; they measure commonly up to three

inches long, occasionally more, and have the margin, except at the very base, coarsely toothed, the ultimate veins excurrent as short points on the teeth. The flowers are in broad flat cymes up to six inches across, the stalk and branches densely hirsute. The corollas are about a quarter of an inch broad, pubescent externally, and are on short hirsute pedicels. The fruit is scarlet.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Fruiting branch. Fig. 3.—Autumn leaf.



DIPLOTAXIS TENUIFOLIA

(Plate 162)

DIPLOTAXIS TENUIFOLIA

Wall-rocket

Native of Europe

Family BRASSICACEAE MUSTARD Family

Sisymbrium tenuifolium L. Cent. Pl. **1**: 18. 1755.
Diplotaxis tenuifolia DC. Syst. **2**: 63. 1821.

In 1916, plants of a mustard-like character were grown at the New York Botanical Garden from seed received from the Zurich botanical garden, and they proved to be *Diplotaxis tenuifolia*. The pale green foliage and light yellow flowers made a rather pleasing combination of color, and the fragrance of the blooms was not unpleasant. The branching and floriferous habit suggested possible value as a flower garden subject, and the following year plants were raised from collected seed and placed in the flower borders near Conservatory Range 1. From these plants our illustration was taken.

The wall-rocket has inclined to spread over more than its allotted share of ground, and to become weedy in habit, but it has a long blooming season, and a plentiful supply of small flowers, giving, with the gray-green leaves, the same general color effect as the yellow alyssum, *Alyssum saxatile compactum*. It must be kept within bounds, especially by discarding seedlings which spring up within several yards of the old plants. The plant may readily be propagated by seeds.

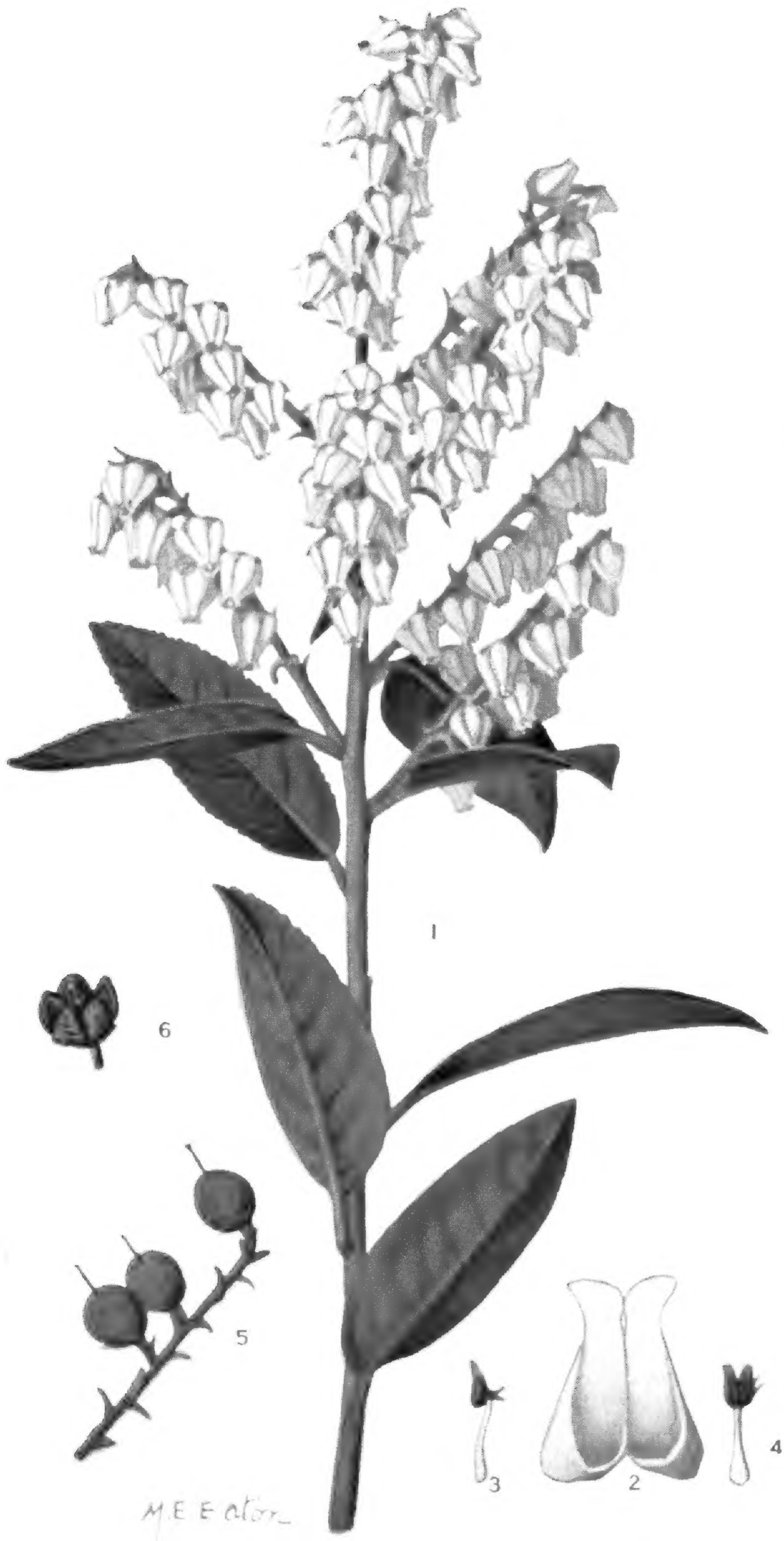
The wall-rocket, so called because it is found so often on old walls in England, with other related species, is the *Sisymbrium tenuifolium* of older botanies, described by Linnaeus in 1755, but later separated into the genus *Diplotaxis*, of which *tenuifolia* is the type species. It differs from *Sisymbrium* in having a flattened pod, and in the arrangement of the cotyledons in the seed; and from *Brassica* in having the seeds in two rows in each half of the pod. In this country it is adventive from Europe, occurring near the sea-coast in the northeastern States and California.

The wall-rocket is an annual or biennial herb, one to two feet high, bushy and branching, with smooth somewhat glaucous stems. The leaves are slightly glaucous, gray-green in color, pinnatifid, the lobes sinuately toothed, the lower ones three to four inches long, alternate, and sessile, the upper smaller and more

nearly entire. The flowers are half an inch or more in diameter, in terminal, many-flowered racemes: there are four deciduous green lanceolate sepals, four clawed yellow petals with spreading limbs, six stamens, and a pistil with slender style and persistent stigma. In fruiting the racemes lengthen, bearing on long slender pedicels the pods (siliques) with the styles persistent as slender, short beaks. The two-valved siliques are flat, one-nerved on each side, and about one inch long, with many seeds in two rows in each valve.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Portion of stem and leaves. Fig. 2.—Inflorescence. Fig. 3.—Stamens and pistil, ×2. Fig. 4.—Pod.



PIERIS FLORIBUNDA

(Plate 163)

PIERIS FLORIBUNDA

Mountain Fetter-bush

Native of the southern Alleghanies

Family ERICACEAE HEATH Family

Andromeda floribunda Pursh; Sims, Bot. Mag. **38**: under *pl. 1566*. 1813.
Portuna floribunda Nutt. Trans. Am. Phil. Soc. II. **8**: 268. 1843.
Pieris floribunda Benth. & Hook. Gen. Pl. **2**: 588. 1876.

That the flora of our southern Alleghanies should have a goodly number of rather locally distributed genera in common with Japan and China is interesting. Naturally, the species in these two widely separated regions are not identical, although they often parallel each other in a striking manner. The subject of the accompanying illustration is a plant that stands alone in our flora, but it has several relatives in eastern Asia. The heath family, to which it belongs, furnishes several other conspicuous examples.

This fetter-bush is one of those clear-cut species whose characters have become so fixed that they show scarcely any variation from generation to generation. In fact, the characters are so constant that the specimens from all parts of the geographic range look as if they might have been gathered from the same shrub.

The mountains ranging from Virginia to Georgia have developed and delivered many plants of the heath family. Most of them have at one time or another been introduced into cultivation, both in Europe and in America. The present shrub was discovered in the first decade of the last century in the mountains of Georgia, by John Lyon who was also responsible for the discovery and subsequent introduction of many American plants into Europe. Specimens were first grown in England in 1811. The plants bloomed, and an illustration was published in 1813; it was again illustrated in 1824 (Botanical Register, *plate 807*).

A mountain-slope clothed with this shrub, when in bloom, is a sight never to be forgotten. It is the more conspicuous because of its early flowering season—April and May—for there are fewer plants then blooming which would detract attention from it. Being evergreen it is always a prominent object, with the inflorescence conspicuous as well as the foliage. The flower-buds are formed about ten months before the flowers expand; the fruits form quickly after flowering and persist until well into the winter.

All things considered this fetter-bush is worthy of wide cultivation. It grows rapidly and is hardy far north of its natural geographic range.

A writer of the southern mountains, struck by the beauty of the subject of these notes, wrote of it in the following verses:

Down, where the valley's brooklet gushes,
Sweet Rose, bewitches with her blushes
In June all comers;
Fair Lily, too, so tall and slender,
Hath wooers who shall homage render
Through sunlit summers.
But not your gayest garden flowers
Can match with those I find above
On the high summits that I love,
Buds nursed to life by mountain showers.
There on the lofty heights that loom
Above the blue world far below you,
Pieris fair shall proudly show you
The wonder of her snows in bloom;
Finer than all your heath and heather,
A thousand milk white bells together.

The mountain low fetter-bush is an evergreen shrub, usually much branched, with the branches erect or strongly ascending. The branchlets and particularly the twigs are clothed with two kinds of hairs, one kind numerous, minute, and crisped, the other fewer, long, coarse, and appressed. The blades of the short-petioled leaves are thin-leathery, elliptic to elliptic-lanceolate, mostly one to two and a half inches long, acute or short-acuminate at the apex, serrulate and bristly-ciliate with a brown hair terminating each tooth, and obtuse, rounded, or subcordate at the base. The surfaces are finely reticulate, somewhat shining, deep-green, and sparingly pubescent above, except the copiously fine-pubescent midrib, dull, paler, and more pubescent beneath, especially on the midrib and on the veins. The panicle terminates a short leafy branch. The nodding buds are prominently five-angled, formed for the following year shortly after anthesis. The numerous, crowded flowers are nodding, each terminating a short curved pedicel. The five acute lobes of the persistent calyx are very small. The white corolla is conic-urceolate, scarcely a quarter of an inch long but more than twice as long as the calyx, much swollen at the base, contracted at the throat, with the five lobes somewhat spreading. The five stamens are included in the corolla, the anthers appendaged. The subglobose capsules are less than a quarter of an inch long, brown.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Portion of corolla, ×4. Fig. 3.—Stamen, side view, ×4. Fig. 4.—Stamen, front view, ×4. Fig. 5.—Fruit. Fig. 6.—Dehiscent capsule.

ROSA "DR. VAN FLEET"

(Plate 164)

ROSA "DR. VAN FLEET"

"Dr. Van Fleet" Rose

Garden Hybrid

Family ROSACEAE — ROSE Family

Among the climbing roses there is none other which can fill the place of this, for it is in a class by itself. A vigorous grower, with lustrous beautiful foliage and delightful blossoms, it is admired by all. A companion to "Silver Moon," illustrated at plate 71 of this work, it resembles it in habit and foliage, but there the resemblance ends. The flowers in that are white or nearly so, and are nearly single, in fact "Silver Moon" is the nearest approach we have in hardy roses to that prime favorite of the south, the Cherokee rose. In "Dr. Van Fleet" the color is a delicate flesh pink, deeper in the bud, and the expanded flowers are sometime three or four inches across; being borne on long stems they are valuable for cut flowers.

In response to an inquiry Dr. Van Fleet, to whom we are indebted for this beautiful addition to our rose gardens, writes that it was grown in 1907 from seed produced by pollinating with "Souvenir du President Carnot" a hybrid between *Rosa Wichuraiana* and *Rosa Safrano*. He adds that it bloomed the second year from seed, and that he grew it under the provisional name of "Daybreak," but that the introducers (Henderson & Co.) preferred to offer it under its present name. Although the rose bears the name of its producer, Dr. Van Fleet was not responsible for its application.

This rose was shown at an exhibition of the Horticultural Society of New York held in the Museum building of the New York Botanical Garden in 1908. It was with the permission of the exhibitor that the material shown was used for propagating purposes, and it is from this source that the plants in the New York Botanical Garden were secured; from one of these the illustration was prepared.

It will grow in any ordinary garden soil, of course in a sunny position and free from the environment of other vegetation. While primarily a climber, it can be grown also as a bush plant, but this of course requires more vigorous pruning.

The "Dr. Van Fleet" rose is a climber of vigorous habit, the stems attaining a length of fifteen feet or more, with firm shining

foliage, and delicate flesh-pink flowers. The branchlets are sparingly armed with flattened, somewhat curved spines. The alternate compound leaves are dark green and shining above and paler beneath, the sparsely glandular-pubescent rachis being sparingly armed with small spines; the stipules are about a half inch long, adnate to the rachis, with gland-tipped hairs on the margin, the free portion subulate. The thick firm leaflets, usually five and rather distant, are broadly oval or obovate, and usually an inch to an inch and a half long and an inch or a little more in width, with an acute or abruptly pointed apex and a rounded base; the margin, except usually at the base, is very coarsely toothed, the teeth pointed. The double flowers are solitary, or in clusters of two to four, rarely more, the stalks with a few gland-tipped hairs; the buds are at first somewhat pointed, finally expanding and spreading into a flower sometimes three or four inches across.

GEORGE V. NASH.

AMYGDALUS DAVIDIANA

(Plate 165)

AMYGDALUS DAVIDIANA

David's Peach

Native of China

Family AMYGDALACEAE PEACH Family

Persica Davidiana Carr. Rev. Hort. **44**: 74. 1872.
Prunus Davidiana Franch. Nouv. Arch. Mus. Paris II. **5**: 255. 1882.
Amygdalus Davidiana Nash.

Of all the known peaches this is the earliest to flower, its precocity in this respect frequently leading to its undoing, for the flower-buds are often killed by frost. Usually early in April, in the latitude of New York city, three to four weeks in advance of the common peach, this charming tree, of slender habit and willow-like, puts forth its single flowers of a blush or light pink; there is also a variety with pure white flowers. If the frost does not destroy the buds, its flowers are a welcome sight, for it is one of the harbingers of spring among our cultivated woody plants, in this respect vieing with some of our native shrubs and trees, such as the spice-bush, alder, and red maple. In hardiness it is the equal of the common peach, and can be grown where that survives and in similar soil and environment. It is a worthy addition to any collection of woody plants, and should be more generally grown. The plant from which the accompanying illustration was prepared was received from the Bureau of Plant Industry, Washington, D. C., in 1909, and is now in the deciduous arboretum of the New York Botanical Garden.

Amygdalus Davidiana was discovered about 1867 by the Abbé David in the neighborhood of Pekin, and by him subsequently introduced into the gardens of England. As a fruit tree it has no value, the fruit being thin-fleshed and of no economic importance. It is said that in China it is used as a grafting stock for many of the stone-fruits, and it may sometime prove of value in this country for the same purpose.

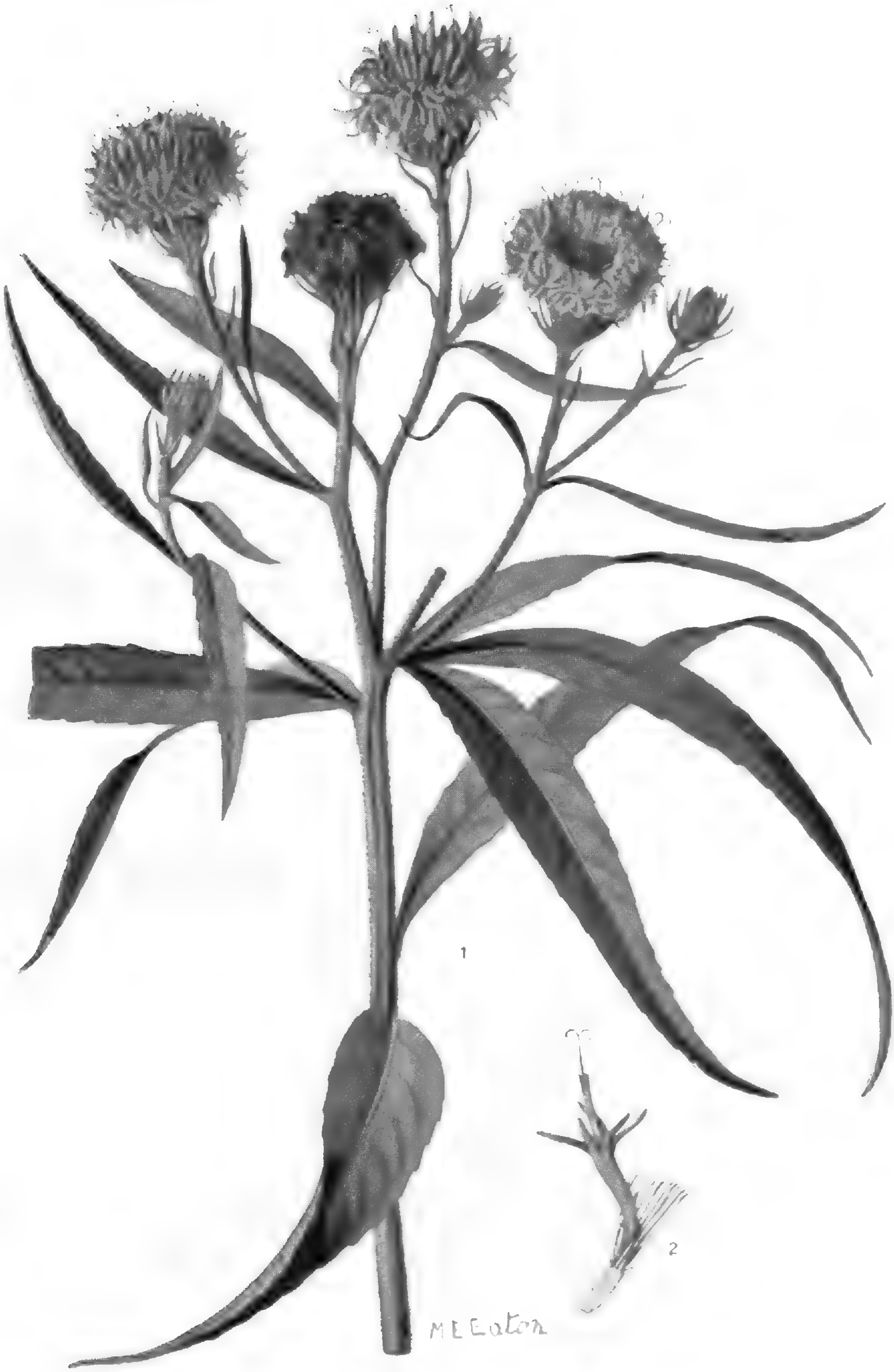
The genus *Amygdalus* is found in eastern Europe and Asia. There are about eight species in common cultivation, including the common peach and almond. *Amygdalus triloba,* of China, is of frequent occurrence in cultivation in its double-flowered form, under the name of the flowering plum; in full bloom it is one of the most charming and decorative of our garden shrubs. It,

however, like all its relatives, is subject to the attacks of borers, and it requires eternal vigilance to keep it free from these pests. They usually attack the base of the plant, and inspection just above and below the soil is necessary to detect this enemy. Their presence is usually indicated by the borings, and the best remedy is to cut out the offenders at once and exterminate them; if not removed they will soon girdle the plant, and its eventual death is certain. There are several double-flowered forms of the ordinary peach in cultivation, some with white and others with pink, rose or red flowers.

David's peach is a small tree of slender habit, rarely over ten or twelve feet tall, with blush or light pink, rarely white flowers, and willow-like foliage. The bark of the older branches is a dark purple-brown, turning this color from the gray or purplish wood of younger growth. The leaves, which are glabrous, have stalks commonly an inch or less long; the blades are lanceolate, elliptic, or elliptic-lanceolate, up to five inches long and an inch and a half wide, with the apex acute or with a long slender point; the margins are sharply serrate. The flowers have a diameter of about an inch, and are borne solitary or two or three together, as in other peaches, on the ends of ascending spurs, or short branchlets; the glabrous sepals are elliptic-lanceolate, acute; the petals are obovate-oblong, obtuse, blush or light pink, or rarely white; the stamens are numerous, with glabrous filaments. The hairy fruit, which is about an inch in diameter, is nearly globular and is grayish or yellowish, having a prominent suture; the small stone is nearly globular, and is free from the dry whitish flesh.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Portion of stem and leaf.



VERNONIA CRINITA

(Plate 166)

VERNONIA CRINITA

Great Ironweed

Native of the Ozark Region of the United States

Family CARDUACEAE THISTLE Family

Vernonia crinita Raf. New Fl. **4**: 77. 1838.
Vernonia arkansana DC. Prodr. **7**: 264. 1838.
Cacalia arkansana Kuntze, Rev. Gen. 969. 1891.

The great ironweed is one of a large group of species widely distributed over most of temperate and tropical America and the warmer parts of the Old World. Several others occur in the eastern United States, but the great ironweed is perhaps the largest species. It is at home in open woods and fields throughout the Ozark Mountain region from Missouri to Oklahoma, and thrives on dry, barren and stony soil, but reaches its largest size in more favorable situations. The plant is a perennial, persisting from year to year, and throwing up each successive summer a larger number of stems from the base. The first of the showy red-purple flower-heads open in midsummer, but are somewhat concealed by the leaves. The later ones are more exposed, until by the end of August the plant is a showy feature in its native haunts or in the herbaceous border. After the fruit has matured and scattered, the leafless stems, topped with the straw-colored remnants of the flower-heads, persist through the winter and are by no means unattractive in this condition.

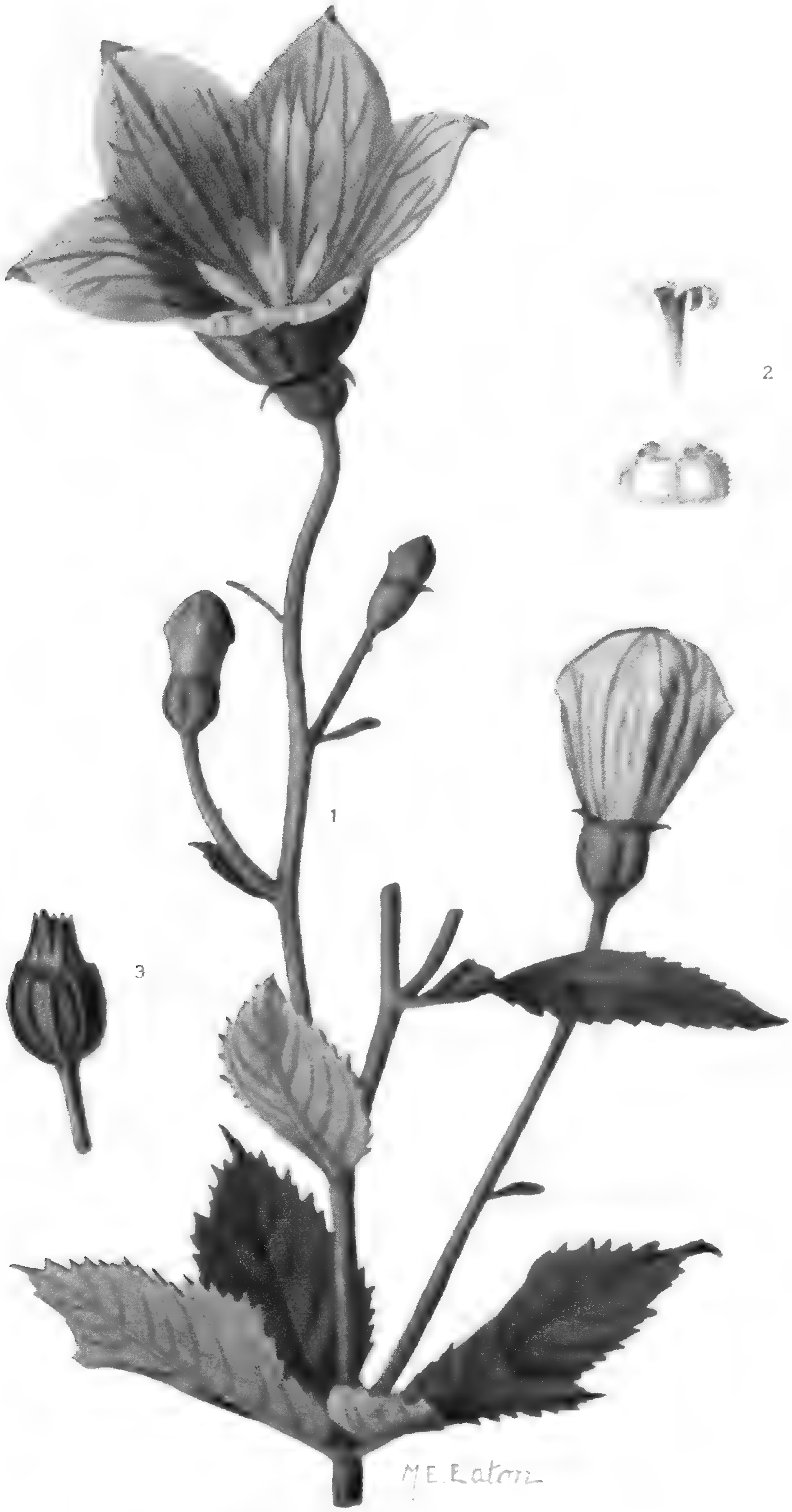
None of the ironweeds has become popular in cultivation because of their large size and coarse texture, rendering them poorly adapted to the small garden. The wild plants usually grow in masses, lining the roadsides or sometimes covering acres of hillside, meadow, or open forest, and in such circumstances are very striking. The great ironweed is especially adapted to poor soil, and should be naturalized along walls and fences, in front of the shrub border at the edge of dry woods, and in open places and clearings in the forest. It is not injured by extreme cold in winter or by continued drought in summer, and once established will maintain itself without further attention and without danger of becoming a pest.

The great ironweed is an erect, herbaceous plant, reaching a height of three to six feet or in unusually favorable conditions as much as ten feet. The stout, tough stem is unbranched below,

but branches freely above the middle, and each branch terminates in a cluster of flower-heads. The stems and branches are normally quite smooth and rather closely beset with long, narrow, bright-green leaves, three to eight inches long by less than an inch wide. Each leaf tapers gradually at base and apex, is smooth or nearly so on both surfaces, and is either entire at the margin or with small sharp scattered teeth. The flower-heads at the end of the stem and branches are grouped into a loose, irregular, rounded or flattened cluster, which varies from a few inches to over a foot in width and contains as many as a hundred heads. Some of the heads are almost hidden among the leaves; others are on stout stalks one to three inches long. The central head blooms first and is followed by the central heads at the end of the branches and later by the marginal ones, so that the period of bloom lasts for many days. Each flower-head is enclosed while in bud by an involucre, or cluster of specialized leaves known individually as involucral scales. These are very slender, spreading and curved, and as much as an inch long. As the head comes into bloom, these scales spread somewhat and from the center of the involucre appear the bright red-purple florets. There are from fifty to nearly a hundred of these in each head, and, as in most members of this family of plants, the conspicuousness of the flower-heads depends more upon the number of the florets than upon their size. As the fruit ripens, the involucre spreads widely, finally exposing the cluster of slender seedlike fruits, one from each floret, each a fourth of an inch long and surmounted by a tuft of dull-purple hairs, or pappus, by which the seeds are scattered through the agency of the wind.

H. A. GLEASON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Flower, ×2.



PLATYCODON GRANDIFLORUM

(Plate 167)

PLATYCODON GRANDIFLORUM

Japanese Bellflower

Native of eastern Asia

Family CAMPANULACEAE BELLFLOWER Family

Campanula grandiflora Jacq. Hort. Vindob. **3**: 4. 1775.
Platycodon grandiflorum A.DC. Monog. Camp. 125. 1830.

As early as the year 1775 a great Asiatic bellflower was grown in the botanic garden at Vienna, from seeds sent to Jacquin from Siberia. He described it as *Campanula grandiflora.* A few years later similar plants were introduced into England from Japan, and various forms, such as *autumnalis, chinensis,* and *sinensis,* were sent in from Korea, China, Japan, Manchuria, and Siberia. They are now considered to be forms of the same species. In 1843 Fortune introduced into England a duplex-flowered form, which is the one most frequently figured in horticultural publications. Maries collected a dwarf, large-flowered form for Veitch's nursery, and this, known as variety *Mariesi,* is now in cultivation. Some of the other forms are of horticultural origin, while others appear to be geographical varieties. The Japanese call *Platycodon* "kikio." The Chinese, according to Mr. E. H. Wilson, boil the roots and extract therefrom a medicine.

Platycodon, now considered to be a monotypic genus, differs from *Campanula* in its broadly bell-shaped flowers, the dilation of the base of the stamens, and the opening of the capsule at the top instead of at the side.

The Japanese bellflower and its varieties are among the most satisfactory of garden perennials. Bushy, hardy plants, blooming very freely in summer and early fall, they form when once established a permanent feature of the hardy garden. The flowers are large, blue or white according to the variety, of a firm texture, and strongly veined; especially interesting is the corolla before the five lobes separate to destroy the balloon-like bud. The plants from which our illustration was taken have been in the herbaceous borders at the New York Botanical Garden since 1913, and although originally supposed to be variety *albiflorum,* some are blue- and some white-flowered plants.

The best method of propagation is by means of seeds sown in the

greenhouse or hotbed. The seeds germinate very readily, and if sown too thickly the seedlings are liable to damp off from crowding. Division of the crowns is not readily effected, as the root-system is cumbersome, fleshy, and brittle.

The Japanese bellflower is a perennial herb with a fleshy, strong-crowned root-system, from which arise glaucous, purplish, brittle stems forming a bushy plant up to three feet in height. The lower leaves, arranged in whorls of usually three, are oblanceolate to nearly cordate with saw-toothed margins, and are two inches long and one inch wide, green above and glaucous-blue beneath. The alternate upper leaves are linear, acute, and in the inflorescence much smaller and bract-like. The flowers are solitary and have: a turbinate, smooth, glaucous calyx with five acute, triangular lobes; a large inflated corolla with five triangular acute spreading lobes; five stamens, whose filaments are slender, pale above but dilated at the base into a broad, orbicular, petaloid disk; linear anthers; and a five-celled ovary with a round style, and green, five-lobed stigma. The fruit is a five-valved capsule, opening at the top, and contains many seeds.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Upper portion of ovary and style, ×2. Fig. 3.—Capsule.

BENZOIN AESTIVALE

(Plate 168)

BENZOIN AESTIVALE

Spice-bush

Native of northeastern United States and Ontario

Family LAURACEAE LAUREL Family

Laurus aestivalis L. Sp. Pl. 370. 1753.
Benzoin aestivale Nees, Syst. Laur. 405. 1836.
Benzoin Benzoin Coulter, Mem. Torrey Club **5**: 164. 1894.

In moist woods and thickets and along streams the spice-bush is at home. In such surroundings, late in March or early in April in the vicinity of New York city, this shrub will be found covered with bright yellow blossoms. They come in advance of the foliage, and while not conspicuous as individuals, in their multitude they give a glimmer of gold to the landscape, and assume a prominence which would not be theirs did they come later, when foliage and flowers of more decorative mien would dwarf them by comparison. It is one of the harbingers of spring, and tells us of the near demise of winter; and anything which then gives us an uplift and a vision of flowers to come is welcome. Later come the leaves, which, like the bark, have a spicy fragrance (hence the derivation of the name), followed in August or September by the bright red fruit. The spice-bush is also known as spice-wood, Benjamin-bush, fever-bush, and wild allspice.

The natural habitat, a wet situation, will indicate the chief usefulness of this plant in cultivation, although it will grow in much drier situations. It is very effective in low woodlands or along streams, and is of special adaptation to the water garden. A piece of low swamp land may be much beautified by the introduction of this shrub and its natural associates. One of these is a plant with striking foliage, its early leaves of a bright crisp green, with the feeling of spring in its color; this is the skunk cabbage, a plant despised on account of its name. This, however, does not destroy its usefulness and effectiveness as a decorative plant of bold foliage and habit. Another associate of the spice-bush in its wild state is the marsh marigold, *Caltha palustris*. These three give beauty and brightness to a landscape, otherwise bleak and bare. The spice-bush is of frequent occurrence wild in the grounds of the New York Botanical Garden, and the accompanying illustration was prepared from such a plant.

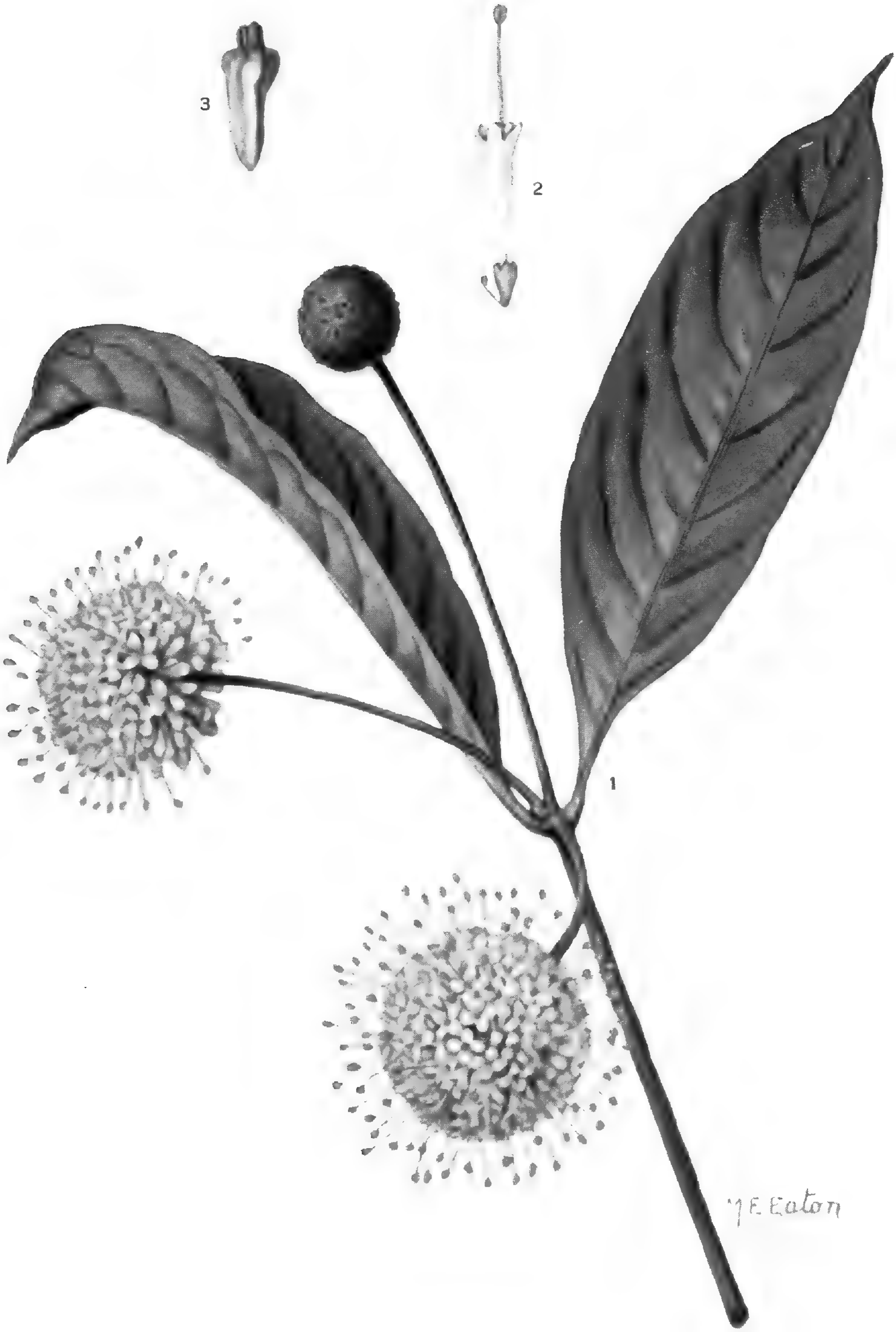
It is usually propagated by seeds which must be sown shortly after maturity, as they soon lose their vitality; propagation may also be effected by layers, which root best in a peaty soil; greenwood cuttings under glass may also be resorted to.

The genus comprises about seven species, natives of eastern North America and Asia. One other species, the hairy spice-bush, *Benzoin melissaefolium*, grows in a similar habitat in the southeastern United States.

The spice-bush is a shrub, sometimes attaining a height of twenty feet, with the stems erect or ascending, and having the bark smooth and the twigs slender. The foliage appears after the flowers, the leaves having stalks usually a half inch long or less. The blades are oval or elliptic to obovate, as much as five inches long and half as wide, and have the under surface paler; they are acute or short-acuminate at the apex, more rarely some of them rounded, and the base is narrowed. The fragrant yellow flowers are dioecious or polygamous, and appear before the leaves in sessile clusters which have at the base a deciduous involucre of four scales. The perianth, about an eighth of an inch in diameter, consists of six parts; in the staminate flowers there are three series with three stamens each, the filaments of the inner series being lobed and gland-bearing at the base; in the pistillate flowers there are twelve to eighteen staminodia and a glabrous ovary with a style of about equal length. The red fruit, a drupe, is sometimes nearly a half inch long and perhaps a quarter inch wide.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Branch with staminate flowers. Fig. 2.—Staminate flower, ×5. Fig. 3.—Stamen of inner series, showing basal glands, ×5. Fig. 4.—Stamen of outer series, ×5. Fig. 5.—Branch with pistillate flowers. Fig. 6.—Pistillate flower, ×8. Fig. 7.—Staminodium, ×8. Fig. 8.—Pistil, ×8. Fig. 9.—Fruiting branch.



CEPHALANTHUS OCCIDENTALIS

(Plate 169)

CEPHALANTHUS OCCIDENTALIS

Button-bush

Native of North America

Family RUBIACEAE MADDER Family

Cephalanthus occidentalis L. Sp. Pl. 95. 1753.

With the single exception of the plant here described and illustrated, all species of the madder family native in northern North America are herbaceous; in warm-temperate and tropical regions, however, this family is largely composed of shrubs and trees in many genera. The button-bush inhabits wet grounds, preferring swamps, often growing in water more than a foot deep. It does not yield kindly to transplanting, except when young, and then only to situations similar to those in which it naturally exists. Its range extends from New Brunswick to southern Florida, westward to western Ontario, Wisconsin, Kansas, Arkansas, and New Mexico.

Vaillant knew the plant as early as 1722 and called it *Platanocephalus*, with reference to the similarity of its flower-heads to those of the plane-tree. Plukenet, in his "Almagestum Botanicum" of 1691, illustrated and briefly described the plant, noting its common name as buttonwood. It was grown in England as early as 1735 and in Holland by 1740.

The similarity of the English names buttonball and buttonwood, applied to different plants resembling each other in their flower-heads, has led to some confusion; "buttonwood," used by Plukenet in 1691, has come to be generally applied to the American plane (*Platanus occidentalis*). Many other English names are used locally for *Cephalanthus*, among them honey-balls, globe-flower, pond-dogwood, pin-ball, swamp-wood, and river-bush. Our illustration was painted from a wild bush in the New York Botanical Garden.

The bark has been used in medicine as a supposed febrifuge.

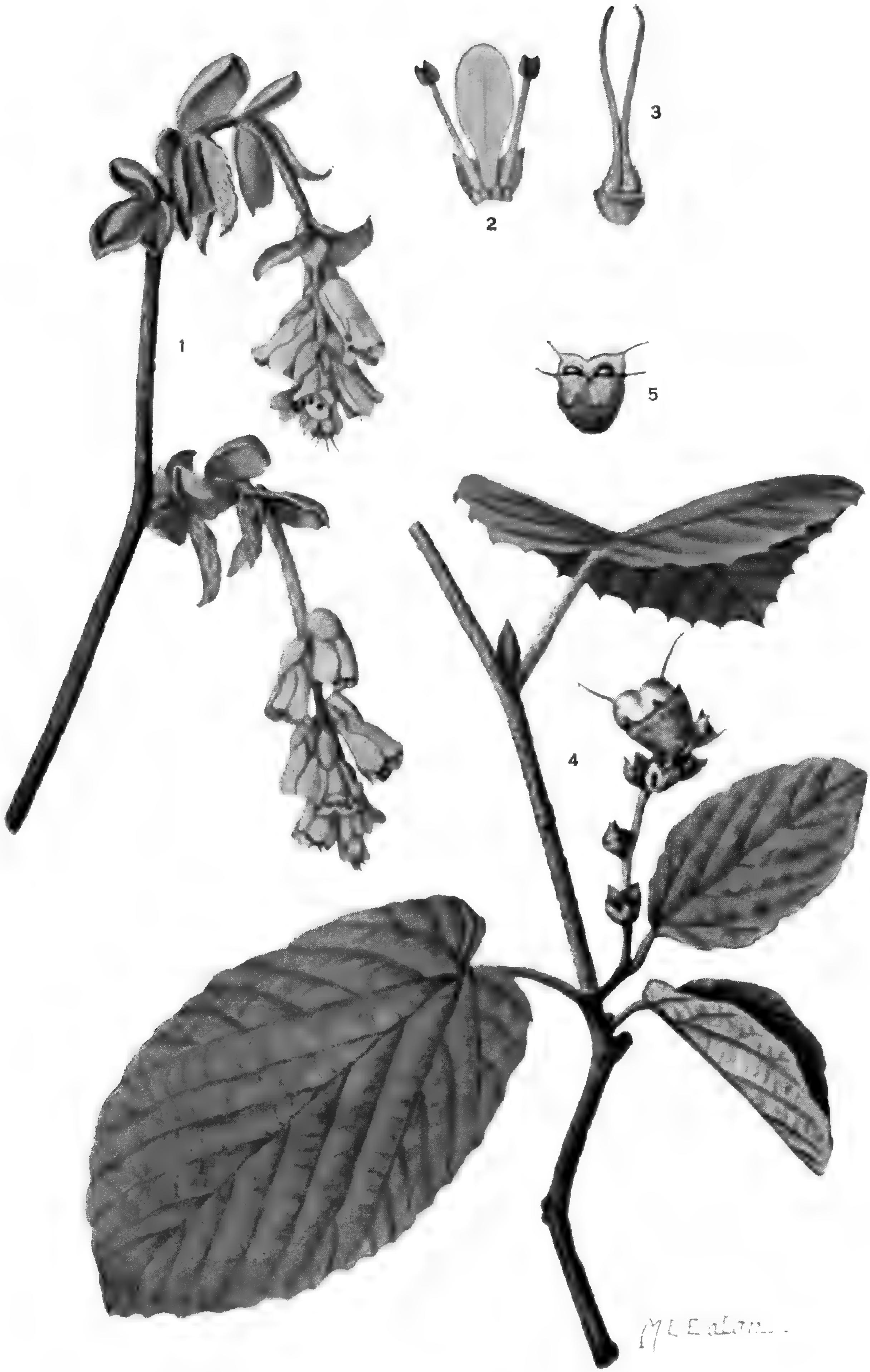
The genus *Cephalanthus*, characterized by dense globose heads of small flowers, whence the name (Greek, head-flower), has the plant here described as its typical species; another (*Cephalanthus Hanseni* Wernham) occurs in Arizona, California, and northern Mexico; there are two or three other Mexican species, one Cuban,

two Peruvian, and one in Paraguay and Argentina; two inhabit southeastern Asia and one is South African.

The button-bush is a shrub from three to twelve feet high, rarely becoming a tree up to twenty feet high (Jour. N. Y. Bot. Gard. 1: 54) with a trunk about six inches in diameter, the dark brown bark broken into low ridges; the branches are irregularly opposite or whorled, the twigs slender, and smooth or somewhat hairy. The leaves are thin, opposite or whorled, ovate to oval, entire-margined, smooth or somewhat hairy, from three to six inches in length and from one inch to about two and one-half inches wide; they are pointed at the tip, narrowed or rounded at the base and have a stalk less than an inch long. The small white flowers, which appear in late spring in the south and in summer in the north, are borne in dense round stalked heads about an inch in diameter, and are sessile upon a round receptacle; the calyx has four blunt lobes; the tubular-funnelform corolla is about a third of an inch long, with four pointed lobes; the four short stamens are borne on the corolla-throat; the ovary is two-celled, with a single ovule in each cavity and is tipped by a thread-like style which projects much beyond the corolla; the stigma is small and rounded. The fruits are small, dry, hard, obpyramidal, containing one or two seeds with narrow cotyledons.

N. L. BRITTON.

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



CORYLOPSIS SPICATA

(Plate 170)

CORYLOPSIS SPICATA

Common Corylopsis

Native of Japan

Family HAMMAMELIDACEAE WITCH-HAZEL Family

Corylopsis spicata Sieb. & Zucc. Fl. Jap. **1**: 47. 1836.

Those who are not acquainted with plant families would hardly recognize in this interesting Japanese plant a close relative of one of the most familar plants of our own woodland, the common witch hazel, one of the few autumn-flowering shrubs. Not as in the witch hazel do its flowers appear in the fall, but at the opposite season of the year, the early spring. Late in April or early in May, in the latitude of New York city, its golden tassels of fragrant flowers appear, making of it an object of grace and beauty. The flowers are all the more conspicuous, as they appear before the leaves or just at the time of their unfolding. A shrub of small size, rarely attaining a height of over four feet, and an equal spread, it is well suited to limited quarters where larger shrubs cannot be attempted. It prefers a peaty or sandy soil, but will grow in ordinary ground not too heavy. As the flowers fade the attractive foliage develops, the broad leaves being firm in texture. The specimen from which the illustration was prepared has been in the fruticetum collection of the New York Botanical Garden since 1912. Other and larger specimens, obtained in 1899, are in the same collection, indicating that a long period of usefulness may be expected.

The fact that it is a native of the mountains of the islands of Kiusin and Shikoka, in the extreme southern part of Japan, makes the hardiness of this plant north of New York city, except in sheltered situations, an uncertain matter. At the New York Botanical Garden, however, as indicated above, it has been in cultivation for about twenty-one years, proving there at least its perfect hardiness.

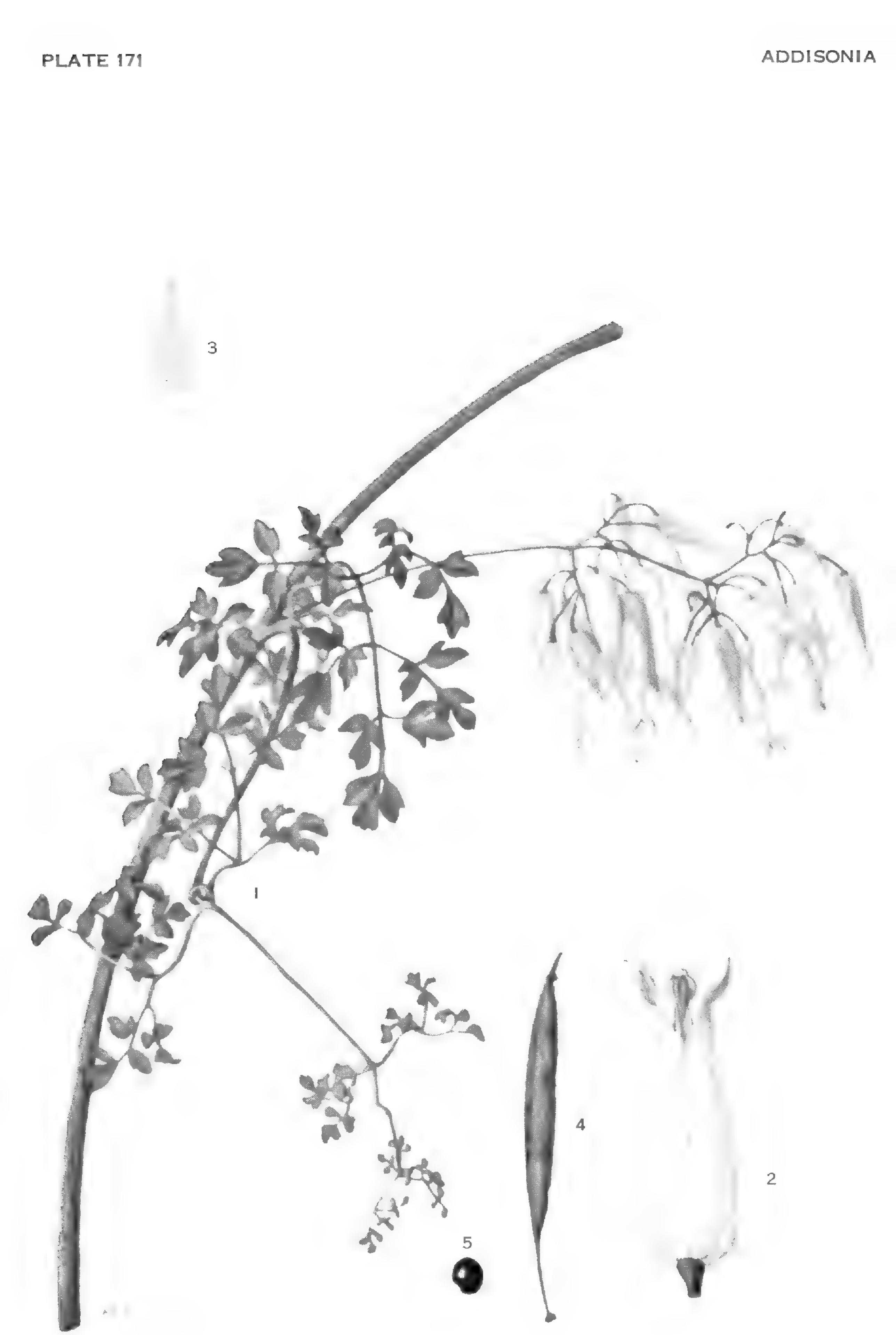
About a dozen species of the genus *Corylopsis* are known, half of them in cultivation; of these the one most commonly cultivated is that here considered.

Propagation may be effected by seeds, sown in the spring, the best results being obtained with a little bottom heat; by half-ripened wood under glass, the cuttings being made in the summer; the process of layering may also be employed, as rooting takes place readily in fairly moist peat soil.

The common corylopsis is a shrub of rather compact habit, rarely exceeding four feet tall and of equal width. The young twigs are pubescent, becoming glabrous later. The leaves, two to three inches long, are alternate, the mature ones having hairy stalks commonly less than an inch long; the blades are broadly oval or obovate, or nearly orbicular, inequilateral, especially at the cordate base, and acute at the apex; the upper surface is green and glabrous, the lower paler and whitish, pubescent, especially on the slightly curved nerves; the margin is sinuately toothed, the nerves extending into short points. The pendulous racemes are one to two inches long and have six to ten flowers, each flower being subtended by a conspicuous broad brown bract; there are also similar bracts and two or three leaves below the racemes. The flowers are three eighths of an inch to half an inch long; the calyx is hairy, the lobes short; the petals are bright yellow, obovate and obtuse, and are narrowed toward the base. The stamens are five, alternating with two-three-parted short staminodes. There are two styles, and the ovary is partly superior. The fruit is a two-celled dehiscent capsule, each cell with a beak and containing a single black seed.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Portion of calyx, with petal and two stamens, × 2. Fig. 3.—Pistils, × 2. Fig. 4.—Fruiting branch. Fig. 5.—Fruit open, exposing seeds.



ADLUMIA FUNGOSA

(Plate 171)

ADLUMIA FUNGOSA

Climbing Fumitory

Native of the northern and eastern United States and Canada

Family FUMARIACEAE FUMEWORT Family

Fumaria fungosa Ait. Hort. Kew. **3**: 1. 1789.
Adlumia cirrhosa Raf. Med. Rep. II. **5**: 352. 1808.
Adlumia fungosa Greene; B. S. P. Prel. Cat. N. Y. 3. 1888.

Unlike the other members of the fumewort family this graceful, slender annual is a vine, whose nearest relatives are found in Asia. The genus was named for Major John Adlum, whose memoir on the "Cultivation of the vine in America, and the best mode of making wine" was published in 1823. It contains a list of the grapes grown in his vineyard near Georgetown, D. C., where he established an experimental farm and grew many of our American species. The preface to this little book and the following quotations on the title-page are well worth reading in these days of agricultural research and prohibition!

"Wine is as good as life to man, if it be drunk moderately; what is life then to a man that is without wine? for it was made to make men glad.

"Wine measurably drank, and in season, bringeth gladness of the heart, and cheerfulness of the mind."

Ecclesiasticus, c. 31, v. 27, 28.

The genus *Adlumia* is monotypic and with the exception of one of the Himalayan species of *Bicuculla* is the only climbing member of the family. This species is also called the "mountain fringe" and "Alleghany vine," names which indicate the character of its habitat and range; it shows a preference for moist, cool woodland borders in rocky situations, and the delicacy of its texture and continuous blooming would make it an attractive plant in cultivation, whenever suitable conditions may be had. It grows readily from seed and comes up year after year in gardens where it has become established, preferring partial shade and moist soil among other plants, where it can climb. It is known to occur wild in New Brunswick, Ontario, and Michigan, and ranges southward along the Alleghanies to the mountains of North Carolina, having also been reported from Kansas, but is little known in cultivation,

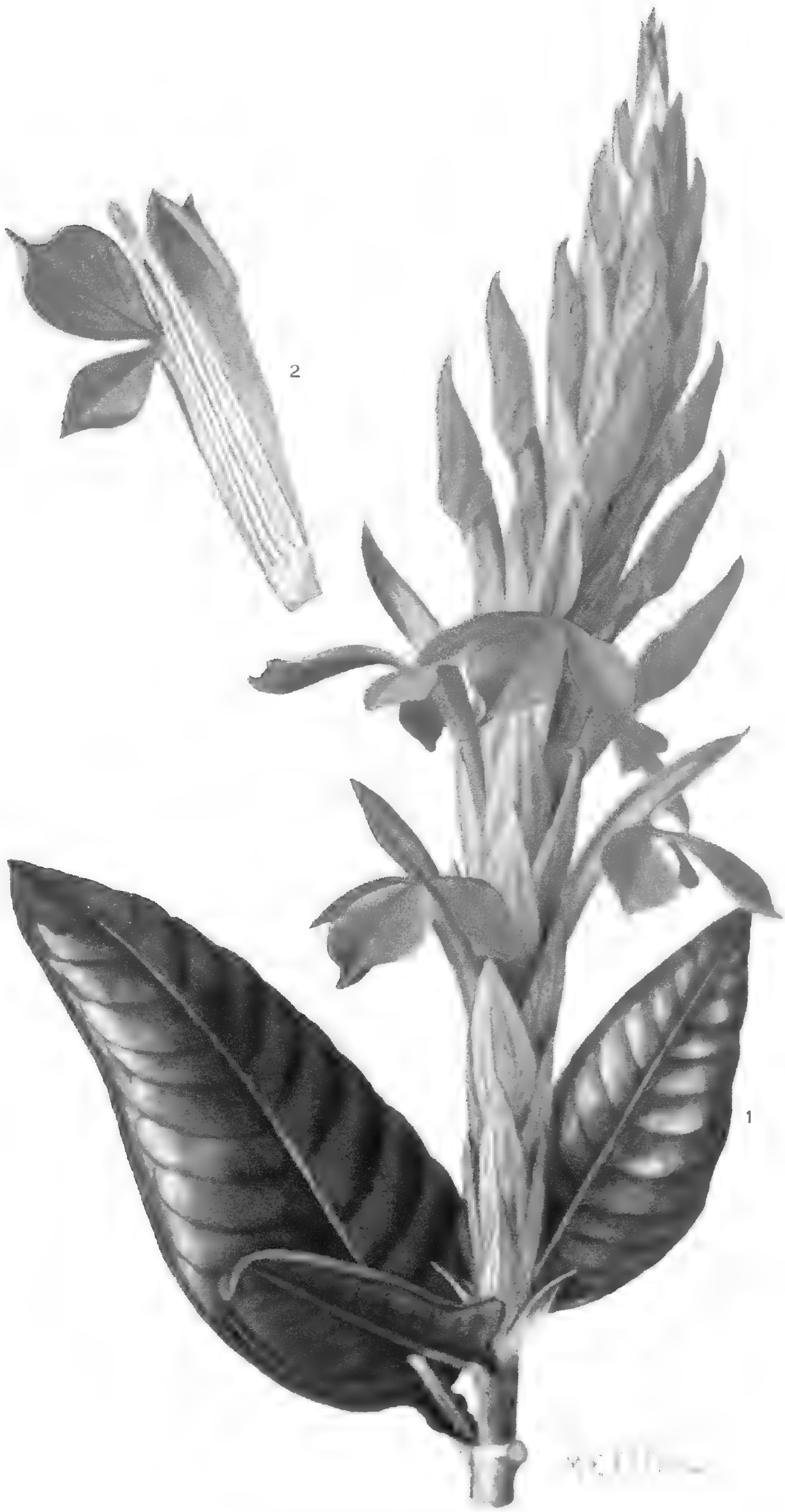
though its delicate beauty and grace entitle it to a place in every "well considered garden" along with the "bleeding heart," that old-time favorite.

The plants from which this illustration was made have been grown for many years in my garden from seeds obtained at Buckhill Falls, Pennsylvania, and seem to endure our hot summers and violent thunder storms and full sunshine, as well as strong winds. Furthermore it is an annual, reproducing itself readily from seed, and may readily be transplanted in early spring.

The climbing fumitory is a delicate glabrous plant with pale-green foliage; its three-parted, bipinnate leaves are divided into slender distant segments with cuneate toothed leaflets, which are thin in texture, with the petioles twisting around other plants, thus enabling it to reach to a height of eight to ten feet, making a tangle sometimes quite dense in growth. The stems are weak and brittle, of a pale red color, and seldom more than one-eighth of an inch in diameter. The flowers are borne in loose, axillary, drooping clusters, and are pale pink in color and slender in form. Each blossom is borne on a short curved stalk and is about three-fourths of an inch long by less than a quarter of an inch wide at base, tapering to the slightly opened mouth where the two united petals spread apart and show the stamens within. The sepals consist of two small bracts which usually fall off as the flower develops, as in many other members of the poppy family. The stamens are six in number, united below, diadelphous above and more or less adherent to the petals. The pods about equal the flowers in length, are pale green and slender, split in half when ripe and produce about ten to twelve small, glossy-black seeds which mature from June to October.

ELIZABETH G. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Flower, sepals absent, × 3. Fig. 3.—Sepal, × 8. Fig. 4.—Pod, × 3. Fig. 5.—Seed, × 3.



APHELANDRA NITENS

(Plate 172)

APHELANDRA NITENS

Shining Aphelandra

Native of Colombia

Family ACANTHACEAE ACANTHUS Family

Aphelandra nitens Hook. f. Bot. Mag. *pl. 4761.* 1868.

This is one of the most attractive members of a family furnishing many showy varieties for the conservatories. In flower the bright scarlet-vermilion of its blossoms makes it conspicuous in any collection, but its beauty is not confined alone to flowering time, for the foliage is striking in the richness of its color, a deep shining green above contrasting with the vinous purple of the lower surface. Its home is in Colombia; it was first known from Guayaquil, from which place specimens were sent about 1867 by Richard Pearce who was on a collecting trip for the Messrs. Veitch. Plants from this source flowered in May, 1868, in the Royal Exotic Nurseries, at Chelsea, and the species was described from this material. The plant in the collection of the New York Botanical Garden, from which the illustration was prepared, was secured from the conservatories of Mrs. Finley J. Shepard in 1919.

Its successful cultivation requires the conditions of a stove house, that is one where the temperature and humidity are high. It is readily propagated by cuttings; it is said to produce seed if placed in a cooler and drier house when in flower.

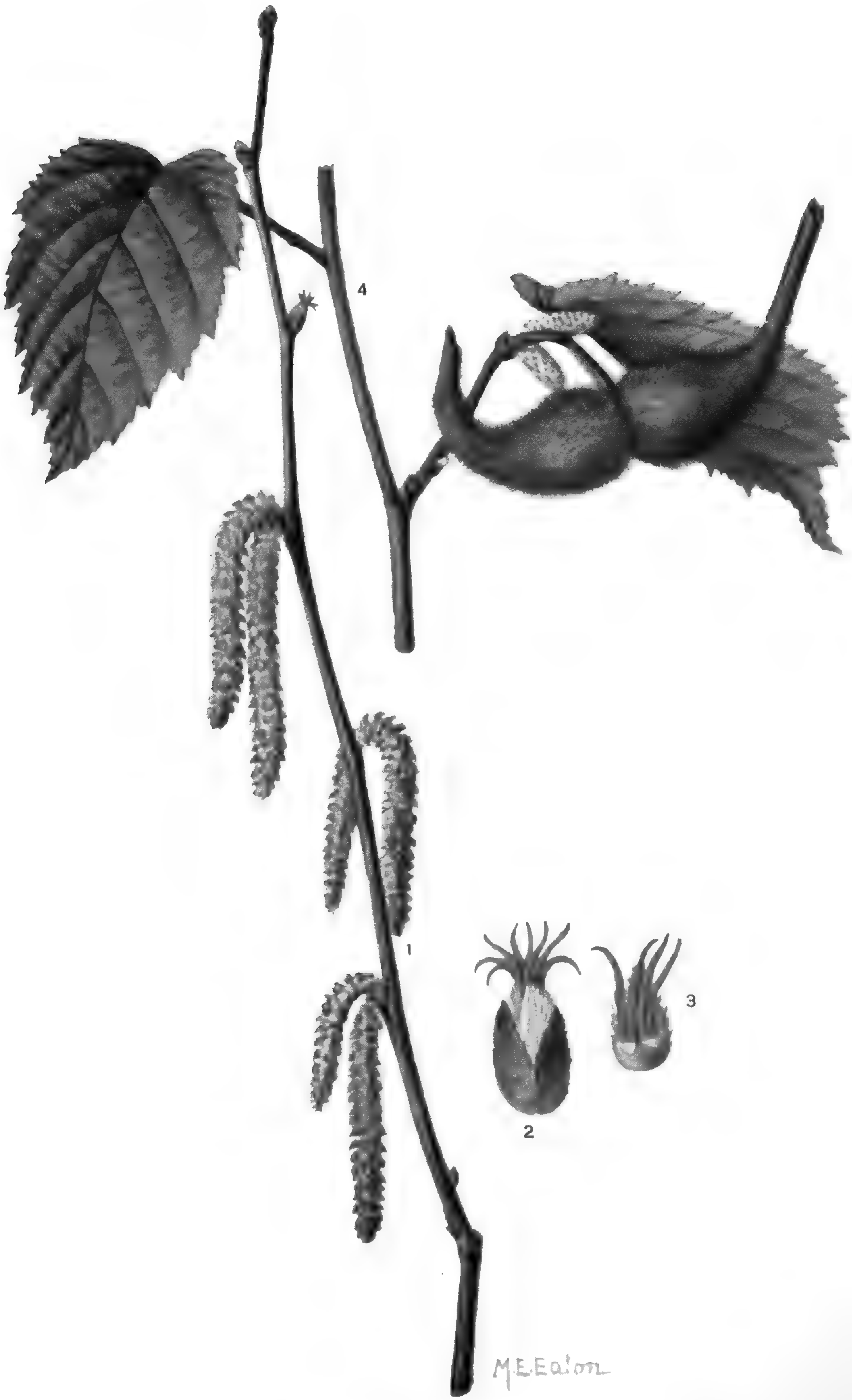
The family to which this plant belongs is a large one and widely distributed, mainly in tropical regions. The genus *Aphelandra* is confined to America, extending from Mexico southward to Peru and Brazil, being especially well represented in the Andean regions. Besides the present species there are six or seven others in cultivation.

The shining aphelandra, under greenhouse cultivation, is an erect herb, usually of dwarf and compact habit, with thick leaves of a deep green above and vinous purple beneath, and a spike of scarlet-vermilion flowers. The green stems are stout and round, and are sparingly branched. The ovate leaves are opposite, up to six inches long, with the margin recurved and the apex acute; the broad base is abruptly narrowed into a petiole a half inch long or less. The erect spike is usually about six inches long; the green erect bracts are ovate or elliptic and acute, an inch to an inch and

a quarter long, and somewhat pubescent. The flowers are erect; the sepals are linear-lanceolate; the corolla has the yellow tube longer than the calyx, the upper lip hooded and concealing the stamens, the lower lip of three spreading divisions, the middle one much the larger.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Flower, split open.



CORYLUS ROSTRATA

(Plate 173)

CORYLUS ROSTRATA

Beaked Hazel-nut

Native of North America

Family BETULACEAE — BIRCH Family

Corylus rostrata Ait. Hort. Kew. 3: 364. 1789.

This is one of the two hazel-nuts found in the more temperate parts of North America. It is a shrub or, at most, a small tree, and loves banks of rivers and small streams or the moist valley where it thrives in the companionship of larger trees that protect it from the too ardent heat of the sun and from the too violent force of the wind. However modest and retiring it may be, it comes to life very early in spring, and puts forth its flowers long before its leaves. The flowers are of two kinds, catkins, long, slender, and graceful, providing abundant pollen for the small but none the less beautiful flowers that produce the nut. These are worthy of a closer examination with a small glass. The delicate greens and browns of the outer coverings form a most satisfactory contrast to the bright red stigmas spread out to catch a few of the many millions of pollen-grains blown about by the wind.

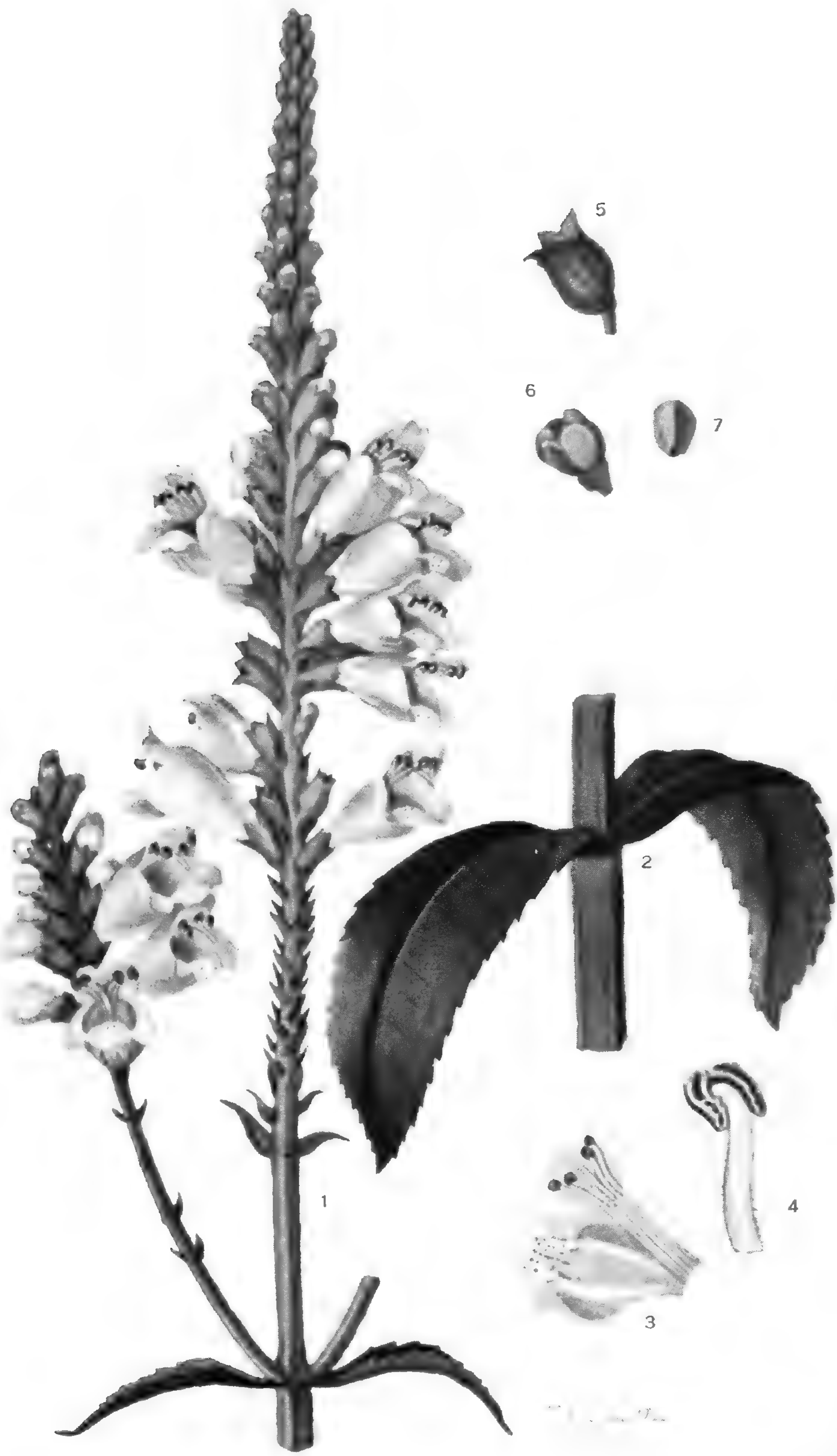
The fruit, a small nut, is edible like its more common relative, the hazel-nut. It ripens in autumn and may be gathered about the time of the first frost. The beaked hazel-nut differs in appearance from the common hazel-nut on account of its outer covering which is extended into a long, somewhat curved beak. Two fruits always grow from one stem. The plant is quite widely distributed throughout the more temperate parts of North America, being found from Quebec to British Columbia, and as far south as the mountains of Georgia.

The beaked hazel-nut is a shrub or small tree, with rather thin leaves, double toothed, smooth and dark green. The staminate flowers are borne in pendulous catkins, without sepals or petals, and with eight stamens, each of which has a one-celled anther. On the same twig, above the catkins, are borne the fertile or pistillate flowers. These are small, about a quarter of an inch in length. The calyx adheres to the ovary, and one of the lobes extends above it. The style is very short; the stigmas are long and bright red. The cotyledons, which form the main substance of the nut, come

to the surface on germination. They are edible and deliciously flavored.

ELBA E. WATSON.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch, showing staminate and pistillate catkins. Fig. 2.—Pistillate catkin, × 4. Fig. 3.—Scale with two pistillate flowers, × 4. Fig. 4.—Branch with fruit and leaves.



DRACOCEPHALUM SPECIOSUM

(Plate 174)

DRACOCEPHALUM SPECIOSUM

Showy Obedient Plant

Native of the northern Mississippi Valley

Family LAMIACEAE MINT Family

Dracocephalum speciosum Sweet, Brit. Fl. Gard. *pl. 93.* 1825.
Physostegia virginiana Benth. Monog. Labiat. 504, in part. 1834.
Physostegia formosior Lunell, Bull. Leeds Herb. 2: 7. 1908.
Dracocephalum virginianum Britt. & Brown, Ill. Fl. ed. 2. 3: 116, in part. 1913.

While the mint family contains many attractive plants, most of the native species of the eastern and central states have flowers of rather small size. The chief exceptions are the horse mints, of the genus *Monarda,* of which most are conspicuous and some exceedingly showy, and the interesting obedient plant illustrated in our plate, with its several closely allied species. In the north central states and Missouri Valley, the obedient plant is a common but not abundant denizen of the woods and thickets of rich, damp, alluvial soil along streams, seldom occurring in large patches, but rather scattered individuals and small colonies. Growing in habitats often not easily accessible and opening its pink-purple flowers in midsummer when the weather is hottest and mosquitoes most troublesome, the obedient plant is by no means as well known to many lovers of wild flowers as it should be. Neither has it become common in cultivation, although it grows freely in any rich soil, either in the open or in half shade, and blossoms there even better than in its native woods. Our illustration was prepared from a plant in cultivation in the New York Botanical Garden.

This species is offered for sale by some dealers in hardy perennials under the name *Physostegia virginiana.* This name rightfully belongs to a different plant, properly known as *Dracocephalum virginianum.* Although our species has been in cultivation for a century and was recognized as distinct in 1825, it has escaped further botanical scrutiny until recently. When the writer intended to describe it as new in 1906 he found that Mr. G. V. Nash had already assigned it a name. Before the latter was formally published, the name *Physostegia formosior* was given to it. It remained for Mr. Nash to show that it had already a name of long standing by which it is here designated.

The significance of the name "obedient plant" is shown by a statement in its original description: "The spikes of flowers in this species are regularly 4-sided, although, when growing in the garden, the flowers are often seen to be facing one way; this is owing to the short and weak pedicels, and the weight of the flower, keeping it so firm on the bracts, that whatever way the wind blows it, there it remains. . . . the flowers may be moved by the hand in the same manner, either all to one side, or some to one side, and some to the other, and wherever they are placed, there they will remain."

The obedient plant has the stem square, as in all mints, quite smooth, and two to three feet high. The leaf-blades are oblong or lance-shaped, sharply and evenly toothed, thick and somewhat fleshy in texture, and dark glossy green in color. There are few branches, and those all toward the summit of the stem, each terminating in a spike of flowers, of which the central one is always the longest and highest. The flowers are crowded closely on the spike, and the lowermost bloom first, others following in succession to its summit. Each flower has the structure characteristic of the mint family. The calyx is short, somewhat bell-shaped, terminating in five triangular teeth. The corolla is elongate, tubular, irregular, comprised of five partially united petals, of which the upper two and the lower three are more completely joined; the lower middle petal is usually spotted. The stamens are four, attached to the corolla at their base and located close under the upper two petals. The pistil consists of a deeply four-lobed ovary extending into a single style.

H. A. GLEASON.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence. Fig. 2.—Portion of stem and leaves. Fig. 3.—Flower, split open. Fig. 4.—Stamen, × 6. Fig. 5.—Fruiting calyx, × 2. Fig. 6.—Nutlets, × 2. Fig. 7.—Nutlet, × 2.

HYDRANGEA QUERCIFOLIA

(Plate 175)

HYDRANGEA QUERCIFOLIA

Gray-beard

Native of Georgia, Florida, Alabama, and Mississippi

Family HYDRANGEACEAE HYDRANGEA Family

Hydrangea quercifolia Bartr. Travels 380. 1794.
Hydrangea angulata Tausch, Flora **17**: 494. 1834.

Nearly a century and a half ago the son of the first native American botanist was travelling with a caravan of traders in a journey across Georgia. They were on their way to trade with the Indians in western Florida. When between the Okmulgee and Flint rivers, a little southwest of the site of the present city of Macon, William Bartram records "I observed here a very singular and beautiful shrub, which I suppose is a species of Hydrangea;" he described the plant and named it *Hydrangea quercifolia* on account of the resemblance of its lobed leaf-blades to those of some kinds of oaks. He also there published a good plate of it.

Specimens were doubtless procured at this early date by William Bartram for his father's garden at Philadelphia. Herbarium specimens are extant, gathered in Bartram's garden, presumably from the original cultivated plants, or from their descendents. Living specimens were taken to England about the beginning of the last century and were grown with success there. Although native not far from the Gulf region it is hardy a thousand miles further north.

By its numerous stems, arranged so that the leaves form a dome-like mass of green above which the large erect plumes of inflorescence stand, this plant is conspicuously excellent for making clumps on lawns. It is much better adapted to many cases in our country than some of the commonly used Asiatic kinds of hydrangea are; but, as some philosopher recorded long ago, "A prophet is not without honor, save in his own country."

Curiously enough, the other southern shrub suited for just such planting, and an associate in natural geographic range, is the small-flowered buckeye (*Aesculus parviflora*) which was illustrated and described at plate 63 of this journal. It, too, is hardy just as far north as the shrub under consideration.

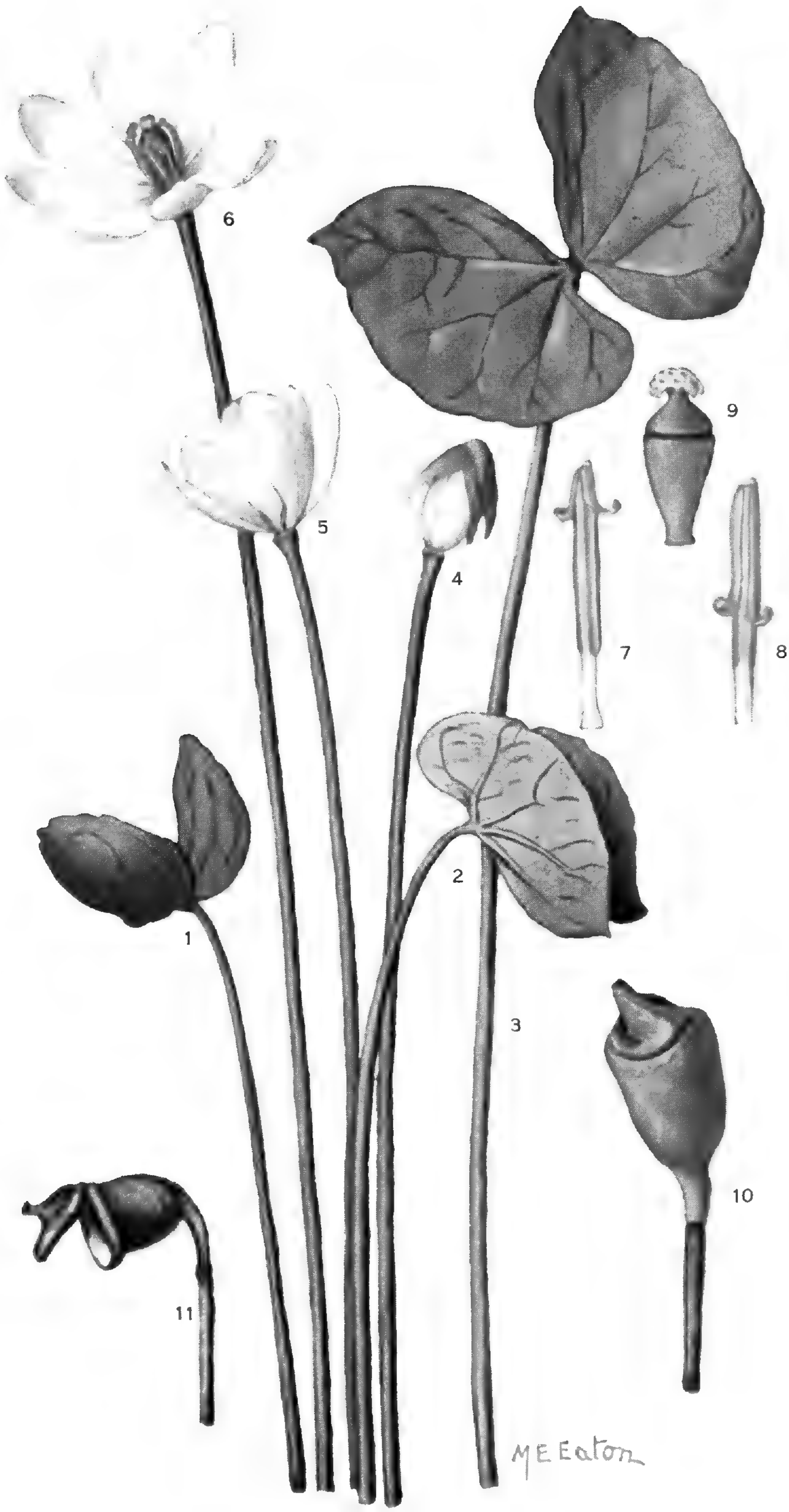
The gray-beard, or old man's beard, will thrive in almost any kind of soil, but a rich soil will naturally give a more luxuriant

growth. It is conspicuous in the landscape not only at flowering time, in the spring, but in fruit, on account of the ray-flowers which are persistent until after frost.

The gray-beard is a stout shrub about six feet tall or less, the twigs hairy with a felt-like covering of tangled reddish and white hairs. The leaves are large and conspicuous with rather long hairy petioles and five-lobed blades truncate or cordate at the base, deep green above, pale or white beneath with cobweb-like pubescence. The lobes are irregularly and sharply toothed and acute or acuminate at the tips. The panicle of flowers is large and showy; its branches mostly terminate in showy, white or highly colored sterile ray-flowers with usually 4 broad rounded veiny lobes. Fruit-producing flowers, small but rather conspicuous on account of their great numbers, are borne in compound clusters on the panicle-branches. The flower-receptacle is urn-shaped. The four or five sepals are ovate to deltoid, shorter than the receptacle, persistent. The four or five petals are white or pinkish, oval or rhombic, about twice as long as the sepals, early deciduous. The stamens are fully twice as long as the petals, thus much exserted. The anthers are sub-globose and two-lobed. The stigmas are knob-like, each with an introrse stigmatic line. The fruits are crowded together in the persistent panicle, urn-shaped, prominently ribbed, crowned with the persistent calyx from the mouth of which protrude as two horns the dried stout stigmas.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Top of flowering branch with young leaves and small panicle. Fig. 2.—Flower, × 3. Fig. 3.—Fruit, × 4.



JEFFERSONIA DIPHYLLA

(Plate 176)

JEFFERSONIA DIPHYLLA

Twin-leaf

Native of eastern United States

Family PODOPHYLLACEAE MAY-APPLE Family

Podophyllum diphyllum L. Sp. Pl. 505. 1753.
Jeffersonia binata Barton, Trans. Am. Phil. Soc. **3**: 342. 1793.
Jeffersonia diphylla Pers. Syn. Pl. **1**: 418. 1805.

Among the wild flowers of eastern North America there are two of strikingly similar habit, yet always classified as members of different families. These are the bloodroot (*Sanguinaria*) and the twin-leaf. They agree in having short, thick rootstocks, from which arise in early spring simple scapes, each with several sheathing scales and one or more basal leaves, and each bearing a single terminal flower about an inch in diameter. In both the sepals are fewer than the petals, and drop off as the flower expands, while the petals are white and are eight or more in number; the leaves are small at flowering-time, becoming several times as large later in the season. These remarkable points of resemblance may well make us wonder whether our "natural" system of classification is, in the present instance, so natural after all.

Linnaeus, in his historic work entitled "Species plantarum" (1753), attempted to enumerate all of the known kinds of plants, and assigned to each a double name, the first standing for the genus and the second for the species, a method never before consistently applied, but in almost universal use since that time. For the most part he merely gave new names to plants previously known; among the very few described as new, however, was the twin-leaf. He knew it only from fruiting specimens collected in Virginia by John Clayton, and was very doubtful of its relationship; he referred it, however, to the same genus with the may-apple (*Podophyllum peltatum*) calling it *Podophyllum diphyllum*. His botanical acumen is shown by the fact that all modern works recognize the close relationship of the two plants.

When Barton, with a far better knowledge of the twin-leaf, distinguished it as the type of a new genus, he named it *Jeffersonia*, in honor of Thomas Jefferson. This was seven years before the commencement of Jefferson's first term as president, while he was secretary of state in Washington's cabinet. Jefferson was noted

for his interest in natural science. He was acquainted with many of the scientists of his day, at home and abroad, and was interested in the introduction of useful plants into the United States.

The twin-leaf grows in rich woods, showing a decided preference for calcareous soils, from northern New York to Wisconsin and northeastern Iowa, and southward to Tennessee. It is not a native of the valley of the Hudson, but has been grown successfully in the herbaceous grounds of the New York Botanical Garden, and these cultivated plants have supplied the leaves, flowers, and fruits figured in our plate.

There is another species of *Jeffersonia* in eastern Asia. This peculiar distribution, in eastern North America and eastern Asia, with no known occurrence between, is shared by several genera of the may-apple family, and has been remarked in many other groups of flowering plants.

The twin-leaf is a low perennial herb. From near the tip of a short erect or ascending underground stem there arises in early spring a slender, erect, leafless flower-stalk, from four to ten inches high, with a cluster of sheathing scales and foliage-leaves at its base and bearing a solitary white flower; in rare instances the stem is forked and produces two flower-stalks, each with its group of scales and leaves. Each leaf consists of a long slender stalk surmounted by a cordate blade so deeply parted that it may fairly be described as consisting of two lateral leaflets each of which is the counterpart of the other, but with outline and venation reversed; hence the common name "twin-leaf." Each half of the leaf-blade is acute above and obtuse below, the margin wavy, toothed, or rarely even lobed. At flowering-time the leaves are shorter than the flower-stalk and the blades usually less than an inch long; later the leaf-stalks elongate, sometimes to more than a foot, and the blades often attain a length of four inches or more. There are from three to five sepals, which fall off as the flower expands; eight or more white petals, nearly half an inch long; as many stamens; and a solitary pistil; all of these floral parts being distinct from each other. Eventually the flower-stalk elongates, often to a foot or more in length, and the flower is succeeded by a pod half an inch to an inch long, the lower two-thirds turbinate and the upper third conic; it first opens by a transverse slit along the line of the greatest diameter, this slit extending and gaping open, until finally the conic tip is reflexed, and attached to the body of the pod merely by a narrow hinge.

J. H. BARNHART.

EXPLANATION OF PLATE. Figs. 1–3.—Leaves. Fig. 4.—Expanding flower, with sepals at apex. Figs. 5 and 6.—Flowers. Figs. 7 and 8.—Stamens, × 3. Fig. 9.—Pistil, × 2. Fig. 10.—Capsule. Fig. 11.—Dehiscent capsule.

CRATAEGUS PHAENOPYRUM

(Plate 177)

CRATAEGUS PHAENOPYRUM

Washington Thorn

Native of the southeastern United States

Family MALACEAE APPLE Family

Mespilus Phaenopyrum L. f. Suppl. 254. 1781.
Crataegus cordata Ait. Hort. Kew. 2: 168. 1789. Not *Mespilus cordata* Mill.
Crataegus Phaenopyrum Medic. Gesch. Bot. 83. 1793.

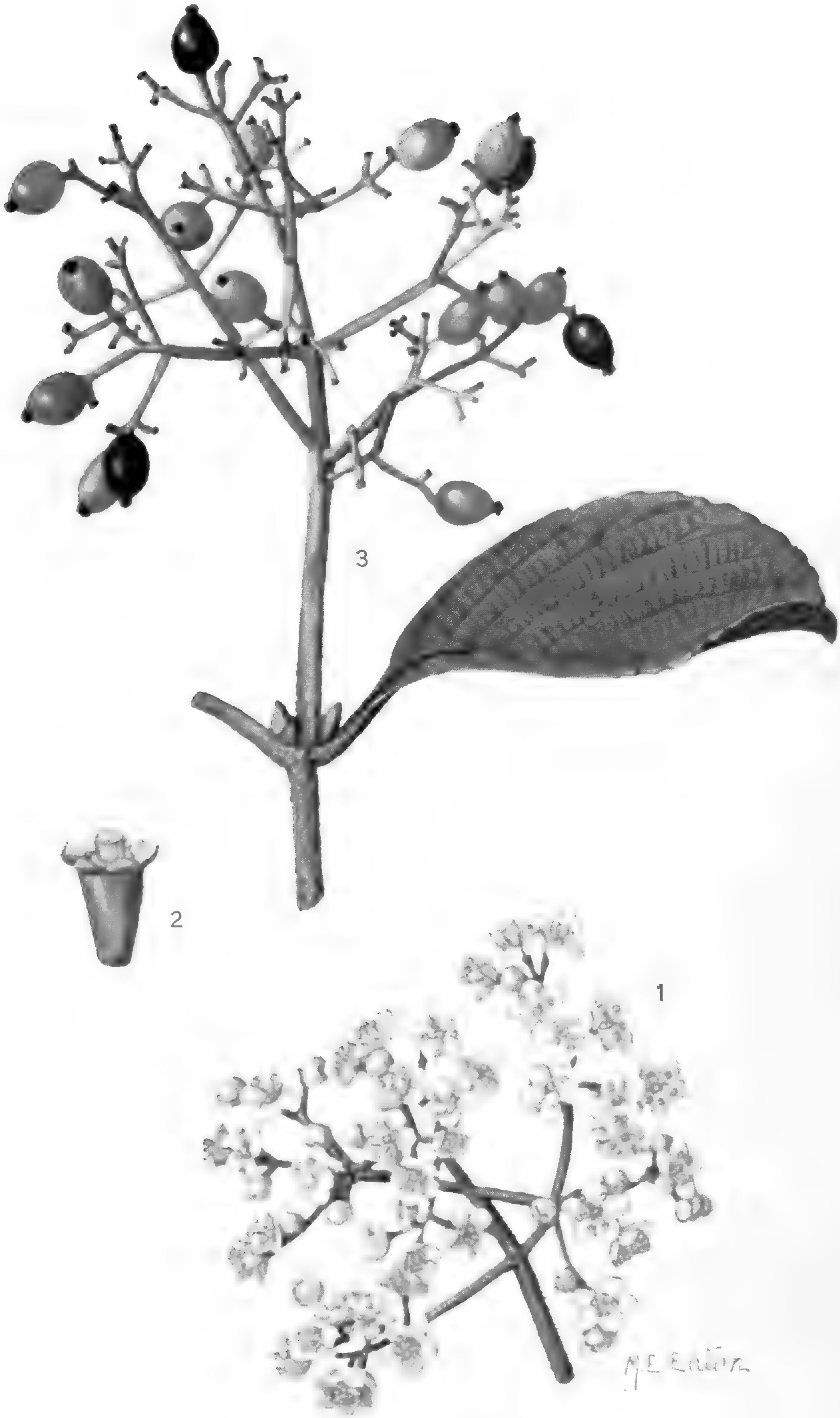
Of our native ornamental woody plants this is one of the showiest. Its flowers appear in great abundance, commonly early in June, later than any other of the thorns; in late fall the foliage changes to brilliant shades of scarlet and orange, which, with the brightness of the abundant fruit, make of this a striking feature in the landscape. It is of rapid and symmetric growth, unusually free from the attacks of fungous diseases, and is perfectly hardy. Its fruit is not as large as that of many other species, but its great abundance and the brilliancy of its coloring make this thorn more attractive than some of the larger-fruited forms.

This species was known in Europe toward the end of the seventeenth century. It is in cultivation in this country, but not to the extent that its beauty and attractiveness deserve. The plant from which the illustration was prepared was secured by exchange with the Buffalo Botanic Garden in 1901, and is now in the fruticetum collection of the New York Botanical Garden.

The Washington thorn is a tree often twenty feet or more tall, oblong in outline, with erect or strongly ascending branches. The branchlets are armed with slender spines up to two inches long, at first of a bright chestnut-brown, later darker. The leaves have petioles up to one and a half inches long. The blades are broadly ovate to triangular, up to two inches long and an inch and a half wide; they are acute at the apex, and truncate or slightly wedge-shaped or heart-shaped at the base; the margin is three-lobed or three-five-cleft and is sharply serrate, except at the base. The corymbs are few-flowered, and appear after the leaves are fully grown. The petals are obovate. The fruit is almost globose, up to a quarter of an inch in diameter, and is of a bright scarlet.

GEORGE V. NASH.

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



VIBURNUM SIEBOLDII

(Plate 178)

VIBURNUM SIEBOLDII

Siebold's Viburnum

Native of Japan

Family CAPRIFOLIACEAE HONEYSUCKLE Family

Viburnum Sieboldii Miq. Ann. Mus. Lugd. Bat. 2: 267. 1866.

This is a shrub or small tree of large and vigorous habit, and requires ample space for its development and display; a garden of limited area, therefore, could hardly accommodate it. As a background for small shrubs it is well adapted, its tall strong stems and large striking leaves lending much character to a group; the ample clusters of white flowers, which appear about the middle of May in the latitude of New York City, add much to its attractiveness at that time. The fruit, which passes through pink to its mature color, a bluish black, ripens in September; at the time of fruiting the branches of the cyme turn to a bright scarlet, adding much to the beauty of the plant. Where a large vigorous shrub is needed, attractive in flower and bright in fruit, there is none to excel this. The bruised foliage and wood exhale a disagreeable odor, but as this is not manifest under normal conditions, it is quite easy to avoid this unpleasantness.

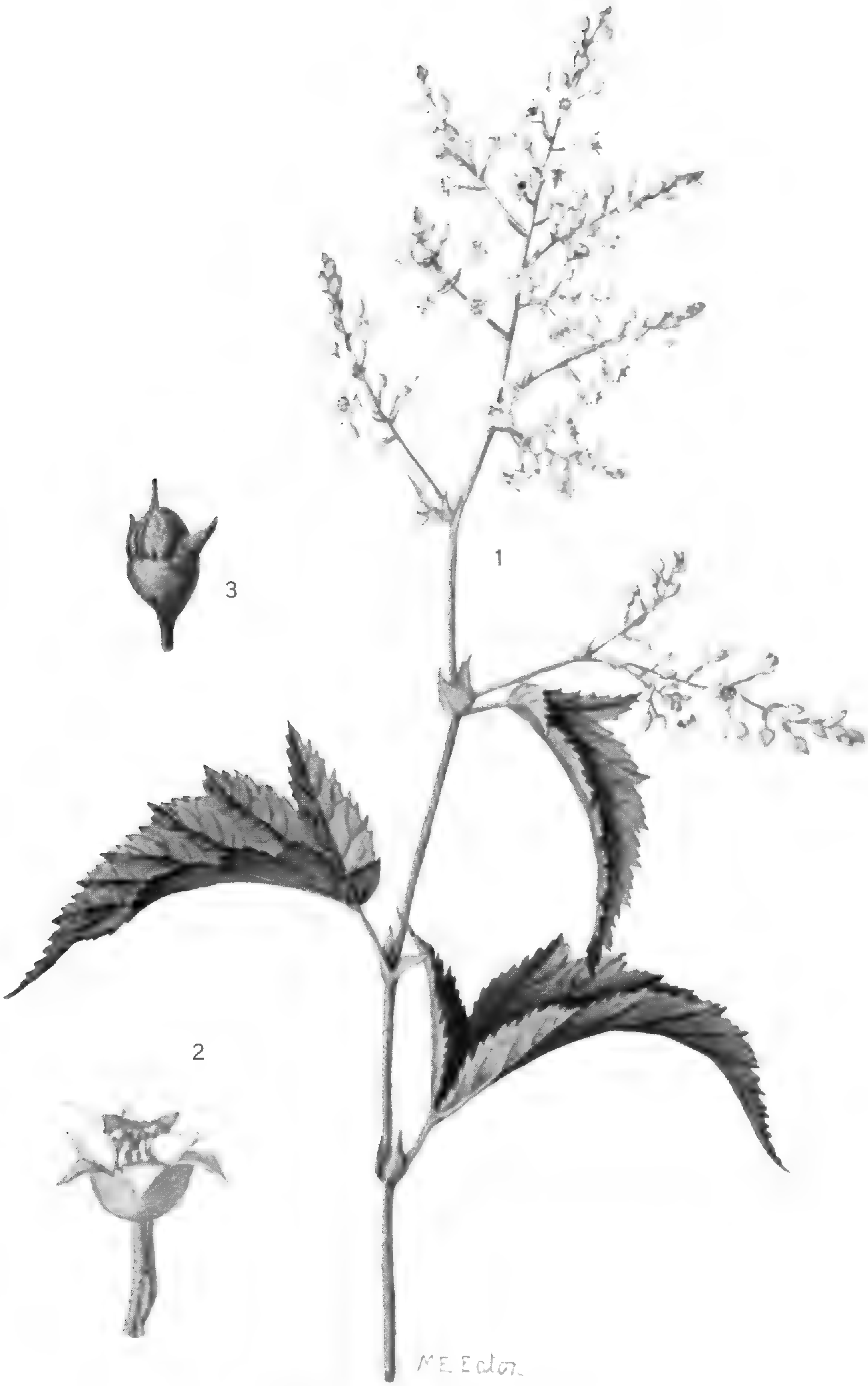
In its native country this viburnum grows along streams, at the foot of mountains in dense woods, so its habitat would suggest a plant suitable for shady and moist situations. It is of exceedingly easy culture, thriving in sun or shade. It is readily propagated, as are most of the viburnums, by seeds, or by greenwood cuttings under glass. It was introduced into cultivation in the latter part of the nineteenth century by Mr. S. B. Parsons, who brought into this country so many valuable Japanese plants. The illustration was prepared from a plant which has been in the fruticetum collections of the New York Botanical Garden since 1895.

Siebold's viburnum is a large shrub or small tree of vigorous upright habit, attaining a height of ten or fifteen feet. Its stout branches are pubescent when young with rusty hairs. The opposite leaves are deciduous and have stout petioles up to an inch long. The blades are oval to obovate-oblong, up to five inches long and an inch and a half or two inches wide, crenate-serrate, except at the base, acute at the base and rounded at the apex; the upper surface is dark green and sparingly pubescent when young, later glabrous; the lower surface is paler and permanently stellate-

pubescent; the nerves are conspicuous, especially on the lower surface. The flower-clusters are ample, up to four inches across, pyramidal or nearly globose, the opposite branches spreading and, with the axis of the inflorescence, pubescent. The flowers have very short hardly distinguishable calyx-lobes, and white rotate corollas about a quarter of an inch broad. The fruiting clusters have the branches a bright scarlet. The fruit is oblong, about a half inch long, turning at first pink, later to a bluish black, and is early deciduous.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1—Flower cluster. Fig. 2.—Calyx-tube or hypanthium. Fig. 3.—Fruiting branch.



STEPHANANDRA TANAKAE

(Plate 179)

STEPHANANDRA TANAKAE

Large-leaved Stephanandra

Native of Japan

Family ROSACEAE — ROSE Family

Stephanandra Tanakae Franch. & Sav. Enum. Pl. Jap. **2**: 332. 1879.

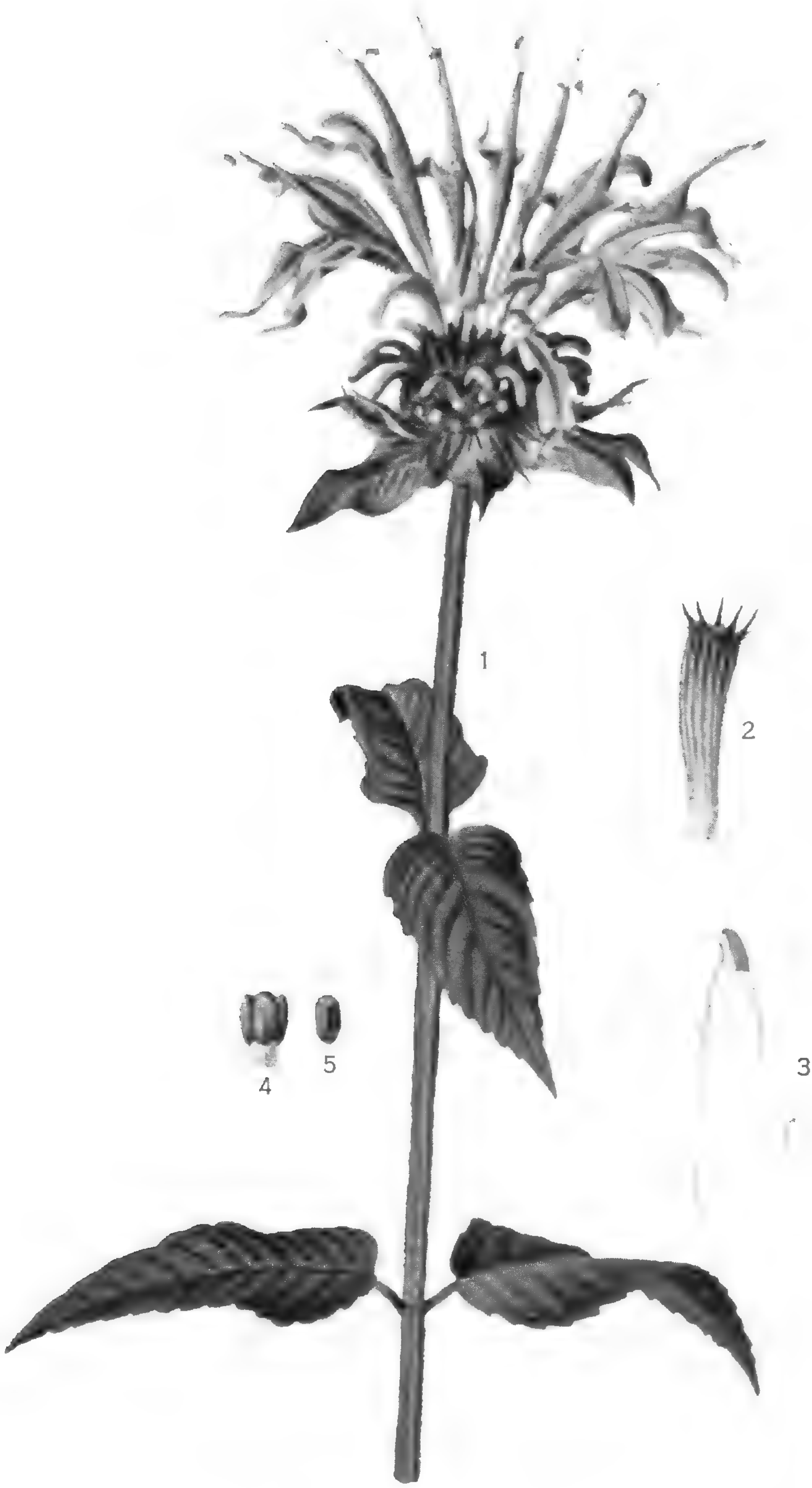
Of the two species of this genus in cultivation, the other being *Stephanandra incisa*, this is to be preferred on account of its more robust habit, larger leaves with more character, and greater clusters of larger flowers; at the New York Botanical Garden it has also proved somewhat hardier, the branchlets not killing back so much in winter. It is a graceful shrub, well adapted to shrub borders or rocky banks, and is of easy culture, its requirements being met by any ordinary garden soil. It may be readily propagated by seeds, or by greenwood cuttings under glass; also by division.

It is a native of the Hakone mountains in Japan, and was originally collected on the slopes of Fuji-yama. The specimen from which the illustration was prepared was secured by exchange with the Royal Gardens, Kew, England, in 1901, at which institution specimens flowered in 1897 raised from seed secured directly from Japan in 1893.

The genus *Stephanandra* contains four known species, three of these being natives of Japan and one of China. It is closely related to *Opulaster*, the nine-bark, and to *Spiraea*.

The large-leaved stephanandra is a graceful shrub of spreading habit, often attaining a height of four or five feet and as great a breadth. Its branches are ascending or spreading and have brown bark. The leaves are alternate on short petioles, which about equal the deciduous stipules. The blades are up to two inches long, not quite so broad, are broadly ovate in outline, and are three-lobed, the lateral lobes being smaller, all the lobes again lobed and serrate; they are glabrous on the upper surface, puberulous on the nerves beneath, and are membranous and light green, changing to a golden yellow in the fall. The small flowers are in pendulous panicles up to four inches long. The calyx is yellow, its five acute lobes ovate and pubescent. The five white petals, which are about as long as the calyx-lobes, are oblong-ovate, spreading and puberulous. The stamens are fifteen to twenty, the anthers on short filaments. The ovary has a terminal short style and a capitate stigma. The capsule is oblong, opening irregularly at the base, and is two-seeded. GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Flower, × 4. Fig. 3.—Fruit, × 4.



MONARDA MEDIA

(Plate 180)

MONARDA MEDIA

Purple Bergamot

Native of northeastern United States

Family LAMIACEAE MINT Family

Monarda media Willd. Enum. 32. 1809.
Monarda fistulosa media A. Gray, Syn. Fl. 2[1]: 374. 1878.

Species of *Monarda* have been cultivated in gardens for about three centuries. The horsemint or wild bergamot was well known in England before 1755, but in that year Peter Collinson brought a bright patch of color to the gardens by introducing *Monarda didyma*, our Oswego tea. About 1792 a purple-flowered form was brought into England, whence it was probably distributed to the continent. Willdenow described it as a new species from plants growing in the Botanic Garden in Berlin.

The robust weedy habit of growth of the monardas makes their cultivation easy. Spreading rapidly by the roots, they form great matted crowns, and the only cultivation they need is restrictive, to keep them within bounds, and to prohibit their running out other plants. The purple bergamot is propagated readily by division of roots, and grows in any soil, but may do better with one which retains moisture. If the plants are cut back after flowering, they will give more bloom later in the season. The illustration was prepared from a plant growing in the New York Botanical Garden.

The purple bergamot is a perennial herb, growing two or three feet high. The strong stems are four-angled, reddish in color, and slightly hairy. They bear many opposite, short-stalked, dark green leaves, with ovate saw-toothed blades acute at the tips. The flowers are in dense terminal clusters, subtended by showy purple bracts, some large and leaf-like, others long and narrow, with thread-like points. Each flower has a tubular, 15-ribbed calyx, with sharp, awl-shaped lobes, and spreading hairs in the throat; a purplish-red, hairy corolla, which is two-lipped, the upper lip short, concave, and the lower oblong, three-lobed, the middle lobe the most prominent. Only two of the stamens bear anthers, and these are exserted from the corolla and are very slender.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Calyx, × 3. Fig. 3.—Stamens, × 3. Fig. 4.—Fruit, × 3. Fig. 5.—Nutlet, × 3.

CLETHRA BARBINERVIS

(Plate 181)

CLETHRA BARBINERVIS

Asiatic Sweet Pepper-bush

Native of eastern Asia

Family CLETHRACEAE WHITE ALDER Family

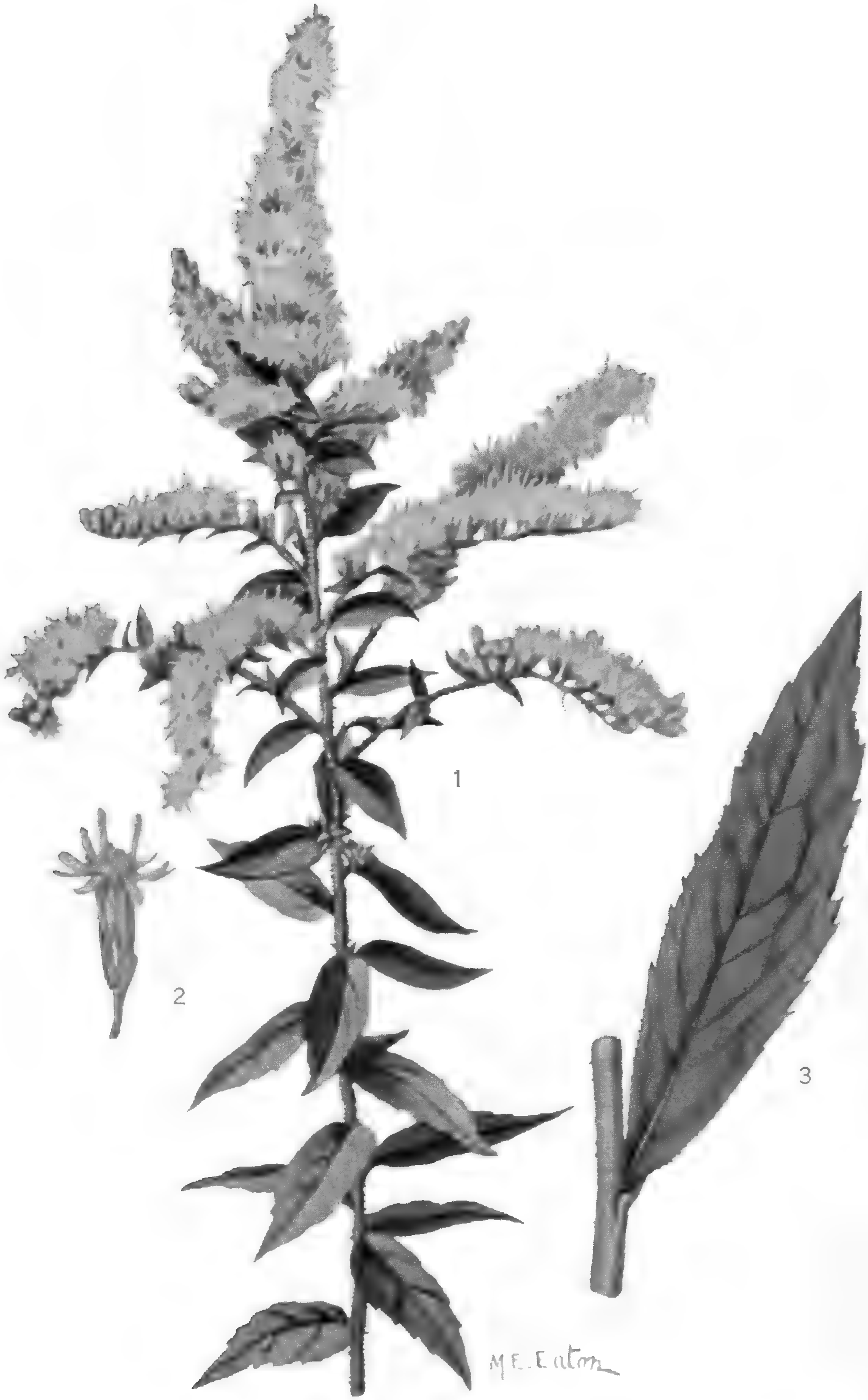
Clethra barbinervis Sieb. & Zucc. Abh. Akad. Münch. 4³: 128. 1846.

This is one of the most striking of the sweet pepper-bushes. It is of upright habit, and bears its racemes of fragrant blossoms in panicles. While this, as is the case with the remainder of the hardy species, does best in a moist peaty or sandy soil, it will also grow in dry situations, although not attaining there so great a size. It is as hardy as our native eastern species, *Clethra alnifolia*, illustrated at plate 12, and is larger and more showy. Propagation may be effected readily by seed, which should be sown in pans in the spring in sandy or peaty soil; it may also be propagated from greenwood cuttings under glass; resort may be had also to layering and division. The illustration was prepared from a plant which has been in the fruticetum collections of the New York Botanical Garden since 1899, when it was imported directly from Japan.

The Asiatic sweet pepper-bush is a shrub or small tree, attaining a height sometimes of thirty feet. Its glabrous branches are upright or ascending. The leaves are alternate, deciduous, with petioles a half inch long or less. The blades are obovate-oblong, oblong, or sometimes wedge-shaped, up to six inches long and nearly two inches wide, with a sharply serrate margin; they are acuminate at the apex and usually acute at the base; the upper surface is dark green, finally glabrous, the lower surface paler and permanently pubescent, at least on the nerves. The racemes are up to six inches long, have a pubescent axis and pedicels, and are borne in panicles. The flowers are three-eighths to a half inch in diameter and are on slender pedicels about a quarter of an inch long. The calyx-lobes are pubescent and rounded or obtuse at the apex. The lobes of the white corolla are oval and obtuse. The stamens are glabrous. The fruit is a little broader than high, and is hispid.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Figs. 2 and 3.—Stamens, × 3. Fig. 4.—Pistil, × 3. Fig. 5.—Fruit, × 2.



SOLIDAGO RUGOSA

(Plate 182)

SOLIDAGO RUGOSA

Wrinkle-leaved Golden-rod

Native of eastern North America

Family CARDUACEAE THISTLE Family

Solidago rugosa Mill. Gard. Dict. ed. 8. *Solidago* no. 25. 1768.

This, one of the brightest colored of our golden-rods, inhabits fields, roadsides, and fence-rows, making the landscape bright in September with its golden color. Flowering at about the time the New England aster comes into bloom, and growing in similar situations, it makes a striking combination with the rich purple of that plant. With the great wealth of golden-rods and asters which adorn our fields and woods, it is regrettable that so few of them are used to beautify our gardens. They stand transplanting well, and in any neighborhood a wealth of material may be secured, for the mere digging, which would add an autumn glory to the garden.

This golden-rod is of easy culture, thriving in any ordinary garden soil, but preferring an open sunny situation as its natural habitat would suggest. It may be readily propagated by division of the roots, or by seeds. The illustration was prepared from a wild plant collected in the grounds of the New York Botanical Garden, where it is common.

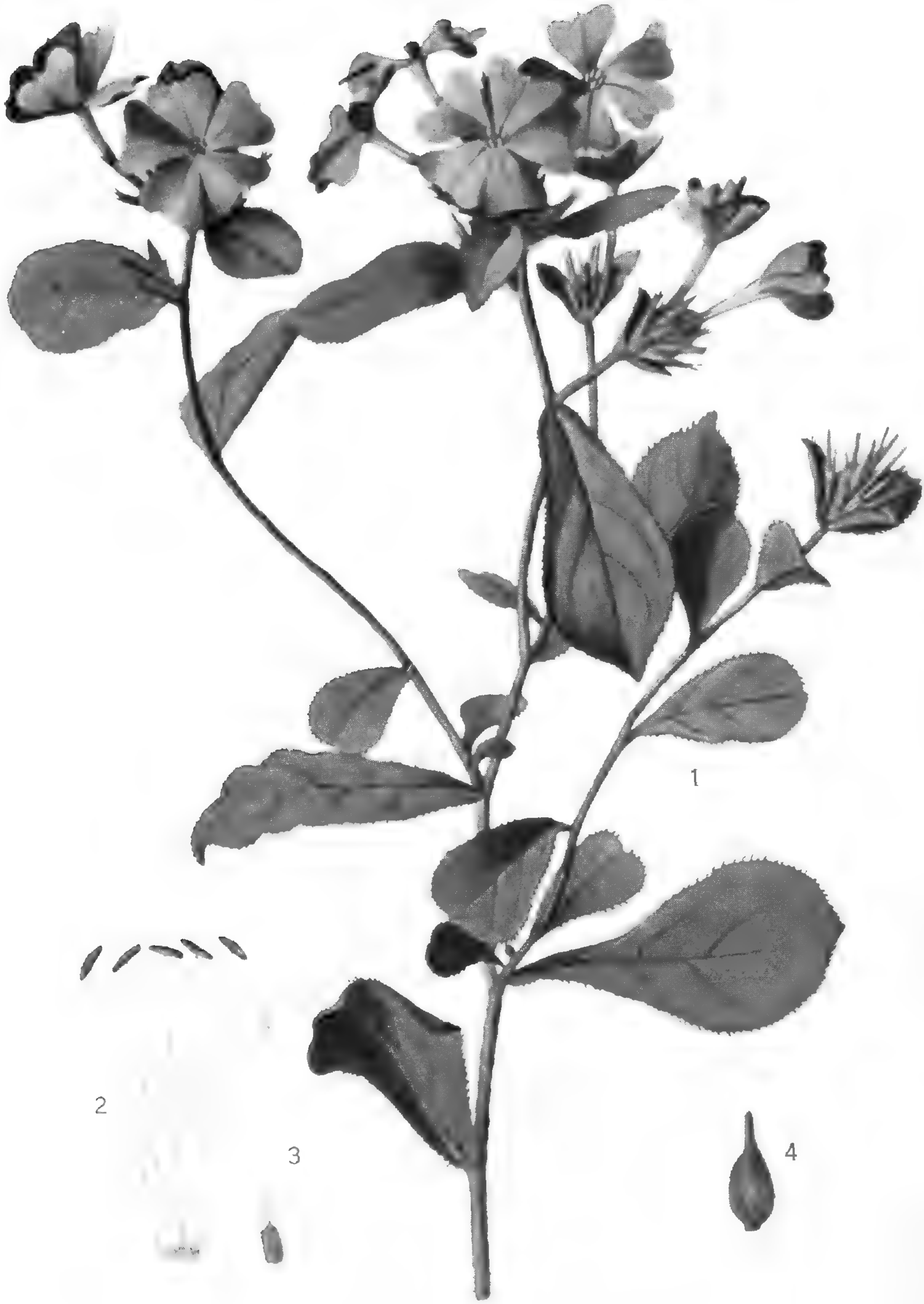
Referring again to the many kinds of golden-rods, it may be stated that there are growing wild in northeastern North America about fifty species, all but one, with white flowers, having blossoms of some shade of yellow; in addition there are many others in the southern and western states. The genus is typically North American, but two or three species being known from Europe, and a few from Mexico and South America.

The wrinkle-leaved golden-rod is one of the commonest of our eastern wild species, attaining a height usually of four to six feet, though sometimes exceeding this. The stems are simple, or branched at the summit, and are hairy or sometimes nearly glabrous. The alternate leaves are up to four inches long and an inch and a half wide, sessile, or the lowest sometimes narrowing into petioles. The blades are oval, ovate-lanceolate, or oblong-lanceolate, with the apex acute or acuminate, sometimes obtuse, and narrowed or obtuse at the base; the surfaces are more or less hairy, and the margin serrate. The flower-heads are from an eighth to a sixth of an inch high, and are borne on the upper side of spreading, some-

times recurved, branches which form a large terminal panicle. The involucre has appressed linear obtuse scales. The ray-flowers are bright yellow.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Head, × 3. Fig. 3.—Leaf.



CERATOSTIGMA PLUMBAGINOIDES

(Plate 183)

CERATOSTIGMA PLUMBAGINOIDES

Chinese Leadwort

Native of China

Family PLUMBAGINACEAE LEADWORT Family

Ceratostigma plumbaginoides Bunge, Enum. Pl. Chin. 55. 1833.
Plumbago Larpentae Lindl. Gard. Chron. **1847**: 732. 1847.
Valoradia plumbaginoides Boiss. in DC. Prodr. **12**: 695. 1848.

The subject of our illustration is one of the rarer of our border plants. The European leadwort has long been cultivated, and the South African one, *Plumbago capensis*, a slender, blue-flowered shrub, is found in many conservatories. The Chinese leadwort, which has been used as a bedding plant in the old world to some extent for over half a century, is used in this country as a hardy perennial. This species was discovered near Pekin by Bunge in 1831; in 1846 Fortune found it growing near Shanghai. Plants first sent to England failed to live, but in 1847 the gardener to Lady Larpent succeeded in growing a few flowers and exhibiting them. An English nursery firm introduced it to cultivation. Lindley described the species as *Plumbago Larpentae*, but it differs from *Plumbago*, lacking the sticky glands on the calyx, and having several short glands on the stigma.

The plants from which the painting was taken grew for two years in the flower borders of the New York Botanical Garden, and by late summer in 1919 had made a solid mass, about one foot high, of strong green foliage, and bore bright blue flowers profusely. All indications pointed to a desirable hardy perennial, of robust habit, with an abundance of flowers. The severe winter of 1919–20, however, saw the destruction of the entire group; but many other hardy plants suffered likewise, so perhaps it can be said to withstand normal winters. Cultural requirements are a sunny location, moderately rich soil, and ample winter protection. Propagation is effected by means of cuttings or division of the roots.

The Chinese leadwort has a perennial root, and flexuose, branching, red stems about one foot high. The alternate leaves have obovate, ciliate-margined blades, the lower ones narrowed at their bases so as to be almost stalked, the upper sessile. The flowers are in terminal clusters. Each has at the base two or three strawy red bracts. The calyx is long, tubular, ridged, and has five awl-

shaped teeth. The corolla-tube is longer than the calyx, and the flat limb has broad, bright blue lobes. The five stamens are united at the base and attached to the corolla. The short style bears five stigmas, which have a number of short horn-like glands.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Stamens, × 2. Fig. 3.—Pistil, × 2. Fig. 4.—Fruit, × 4.

GROSSULARIA CURVATA

(Plate 184)

GROSSULARIA CURVATA

Southern Gooseberry

Native of Georgia and Alabama

Family GROSSULARIACEAE GOOSEBERRY Family

Ribes curvatum Small, Bull. Torrey Club **23**: 295. 1896.
Grossularia curvata Coville & Britton, N. Am. Flora **22**: 221. 1908.

The southern part of the Atlantic prong of the American continent as it was sketched out at the "beginning" is the home of both endemic genera and species. Of course, the surface of the land has been changed continuously and perhaps it was wholly submerged after it was first elevated; but the present more or less prominent domes of granite that were intruded in this earliest land formation and were also exposed at an early period, harbor especially peculiar plants.

The subject of this note is one of the woody plants characteristic of the granite areas of the southern end of the Piedmont Plain. The unique vegetation of these isolated areas may represent the persistent remnants of a very old flora. For, although the vegetation was subjected to the vicissitudes of climate for a very long time, the plants there were not subjected to the more violent changes resulting from erosion which those in the adjoining regions were and are undergoing, and which may have obliterated all their earlier vegetation. For the granite, once bared of the decay of the sedimentary strata and other rocks, is slow to be disintegrated and shifted through the various meteoric agencies.

This graceful gooseberry was discovered by the writer of this note in the spring of 1905, growing in great abundance on the slopes and about the base of Stone Mountain near Atlanta, Georgia. Since then it has been introduced into cultivation and distributed commercially by nurseries.

There are about six kinds of native gooseberries in North America east of the Mississippi River. Five of these were discovered more than a century ago. Although some of them have long been cultivated for their fruits and have served as parents for various hybrids, none are particularly well adapted for ornamental purposes. The present one, however, is an ornamental shrub of the first order on account of several characters the other species lack. It thrives well in poor or rich soil, is vigorous in growth, and has a peculiar

habit on account of its very numerous gracefully recurved branches; its long-stalked drooping flowers, which appear before the maturity of the leaves, are very conspicuous for a gooseberry-bush, and the numerous vivid-green scalloped leaves seem to be wholly free from the disfiguring effects of diseases and animal pests.

Although not native north of middle Georgia, this shrub is perfectly hardy as far north as the latitude of southern Canada. It may be a southern plant whose ancestors survived the rigors of the ice age and whose adaptation to a colder climate still enables it to flourish in a latitude far north of its present natural geographic range.

The southern gooseberry is a spine-armed shrub about a yard tall or less. The branches are conspicuously recurved, clothed with a purplish bark which ultimately becomes loose and papery. The branchlets are reddish, wiry, and often drooping at the tips. The numerous small leaves are bright green, with suborbicular deeply lobed blades terminating pubescent petioles. The flowers are solitary, nodding, usually numerous. The flower-tube is glandular. The sepals are narrow, linear or linear-spatulate, about a quarter of an inch long, recurved, whitish and with hyaline edges. The petals are white, much smaller than the sepals, each with a pair of lateral teeth near the apex. The stamens are erect, conspicuous, with hairy filaments and red anthers. The style is pubescent. The berry is globose, often fully a quarter of an inch in diameter.

JOHN K. SMALL.

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

ROSA "EDITH CAVELL"

(Plate 185)

ROSA "EDITH CAVELL"

"Edith Cavell" Rose

Garden Hybrid

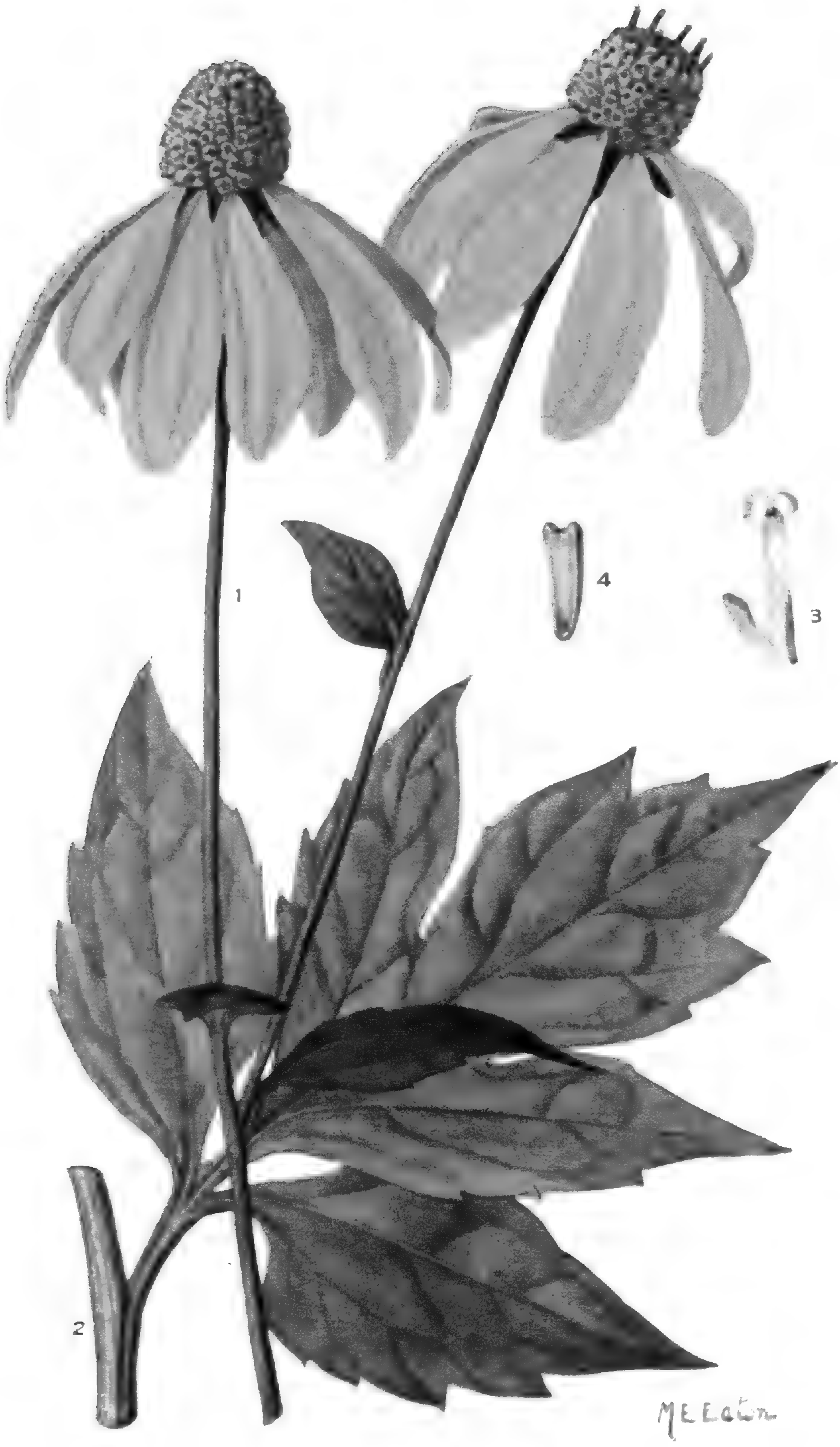
Family ROSACEAE ROSE Family

This is one of the latest introductions among the dwarf polyantha roses, and it is of first class merit. The growth is vigorous and clean, and the flowers, borne in great profusion in large clusters, are of a brilliant scarlet overlaid with deep velvety crimson, a unique color in its class; it should be neglected by none who favor this type of rose. It blossoms freely in the early summer, with scattering bloom following until fall, when it again flowers more freely. Specimens of this rose have been in the rose garden at the New York Botanical Garden since the spring of 1919; they were presented by Messrs. Bobbink & Atkins of Rutherford New Jersey, who inform me that this rose was originated in 1917 by Jan Spek, of Boskoop, Holland. It is from one of these specimens that the illustration was prepared.

The "Edith Cavell" rose is of bushy habit, attaining a height, under favorable conditions, of two feet. The stems are glabrous, with broad flat thorns a quarter of an inch long or less. The leaves are up to four or five inches long, the rachis, at least of the lower ones, with small spines; the ciliate-toothed stipules are adnate to the rachis, or sometimes the very apex is free. The leaflets are usually seven, or those of the upper leaves only five, on very short stalks; they are elliptic to oval and have the margins crenate-serrate; the base is rounded or somewhat acute, and the apex acute. The flower-clusters are large and showy, the branches, especially the flower-stalks, glandular-hispid; the bracts resemble the stipules. The double flowers are an inch and a half in diameter, or sometimes more. The sepals are toothed or lobed. The petals are broadly obovate, usually more or less retuse, and of a brilliant scarlet, overlaid with deep velvety crimson.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flower cluster. Fig. 2.—Portion of stem and leaf.



RUDBECKIA LACINIATA

(Plate 186)

RUDBECKIA LACINIATA

Tall Cone-flower

Native of the United States and Canada

Family CARDUACEAE THISTLE Family

Rudbeckia laciniata L. Sp. Pl. 906. 1753.

Few plants are better known than the rudbeckias or cone-flowers. After the common daisy or white-weed, the black-eyed susan, *Rudbeckia hirta,* is perhaps the favorite of our fields and roadsides. This and other kinds have been in our gardens many years, and in old world gardens are seen even more frequently. The most notorious member of the cone-flower group is the "golden glow," which is a "double" form of *Rudbeckia laciniata,* commonly seen in yards and gardens everywhere; it was introduced to cultivation from the nursery of John Lewis Childs, about 1894, and was said to have been found among specimens of the normal form. The double yellow form is useful as a cut flower, but its garden effect is no improvement upon that of the wild form. It is supposed that the cultivation of the tall cone-flower dates back to at least the year 1640, when it was grown in the garden of Charles I, by John Tradescant, his gardener. Other records refer to a "*Doronicum americanum,*" in the Parisian garden of Vespasian Robin, before 1623, which is supposed to have been *Rudbeckia laciniata.* Perhaps all of the cone-flowers are appreciated more as garden subjects in Europe than in their native country.

The cultivation of the tall cone-flower is very simple, as it is a hardy, robust grower, and thrives in almost any soil. It grows taller and more vigorously in a moist location reaching a height of 10 feet, with luxuriant foliage and many greenish-centered yellow flower-heads from August to October. With us this plant and the golden glow are subject to the attacks of a red aphis, which covers the stems, especially at the tops, and ruins the appearance of the plants. Whale-oil soap heavily applied has proved effective in smothering these plant lice. Our illustration was taken from a wild plant in the vicinity of the lakes east of the museum building of the New York Botanical Garden.

The tall cone-flower is a branching perennial herb, sending up strong smooth stems to a height of seven feet or more. The lower leaves are long-petioled, pinnately divided into five or seven parts

which are divided again into lobes and have deeply toothed margins; the upper leaves are smaller, three- to five-parted, with shorter petioles; the uppermost are three-parted or entire; all are light green in color, and are smooth or covered with a few short scattered hairs. The flowers are numerous in heads surrounded by an involucre of a few lanceolate, unequal, drooping bracts. The individual flowers of the head are of two sorts, the outer six to ten drooping yellow neutral ray-flowers, and the inner disk-flowers, with five-lobed corollas, five stamens, and slender styles with hairy tips. The disk consists of many of these crowded into a long, greenish yellow cone. The fruits of the disk-flowers are four-sided, brown, truncate achenes, surmounted by short crowns, and set in a pyramidal receptacle, the chaff of which surrounds each achene.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Portion of stem and lower leaf. Fig. 3.—Disk-flower, ×2. Fig. 4.—Fruit, ×3.

PENSTEMON SECUNDIFLORUS

(Plate 187)

PENSTEMON SECUNDIFLORUS

Lavender-pink Beard-tongue

Native of the east slope of the central Rocky Mountains

Family SCROPHULARIACEAE FIGWORT Family

Penstemon secundiflorus Benth. in DC. Prodr. **10**: 325. 1846.

This beautiful plant is a fit species with which to introduce the forms of *Penstemon* of the great home-land of the genus, the highlands of western temperate North America. As are its congeners previously shown, *P. secundiflorus* is luxuriant of bloom and its flower-form alone would arouse our interest. Peculiarly its own is the unusual flower-color, a shade of lavender-pink with a suggestion of violet.

No species better illustrates the appropriateness of the common name 'beard-tongue.' The genus *Penstemon* is distinguished by the presence within the corolla of a rudimentary or abortive stamen, of which the anther in the course of evolution has become wholly lost, while the well-developed filament lies like a 'tongue' along the lower side of the corolla throat. In our species this tongue is much enlarged, and on its upper side bears a dense beard of orange-golden hairs—a 'bearded tongue' conspicuous against the lavender ground-color of the flower.

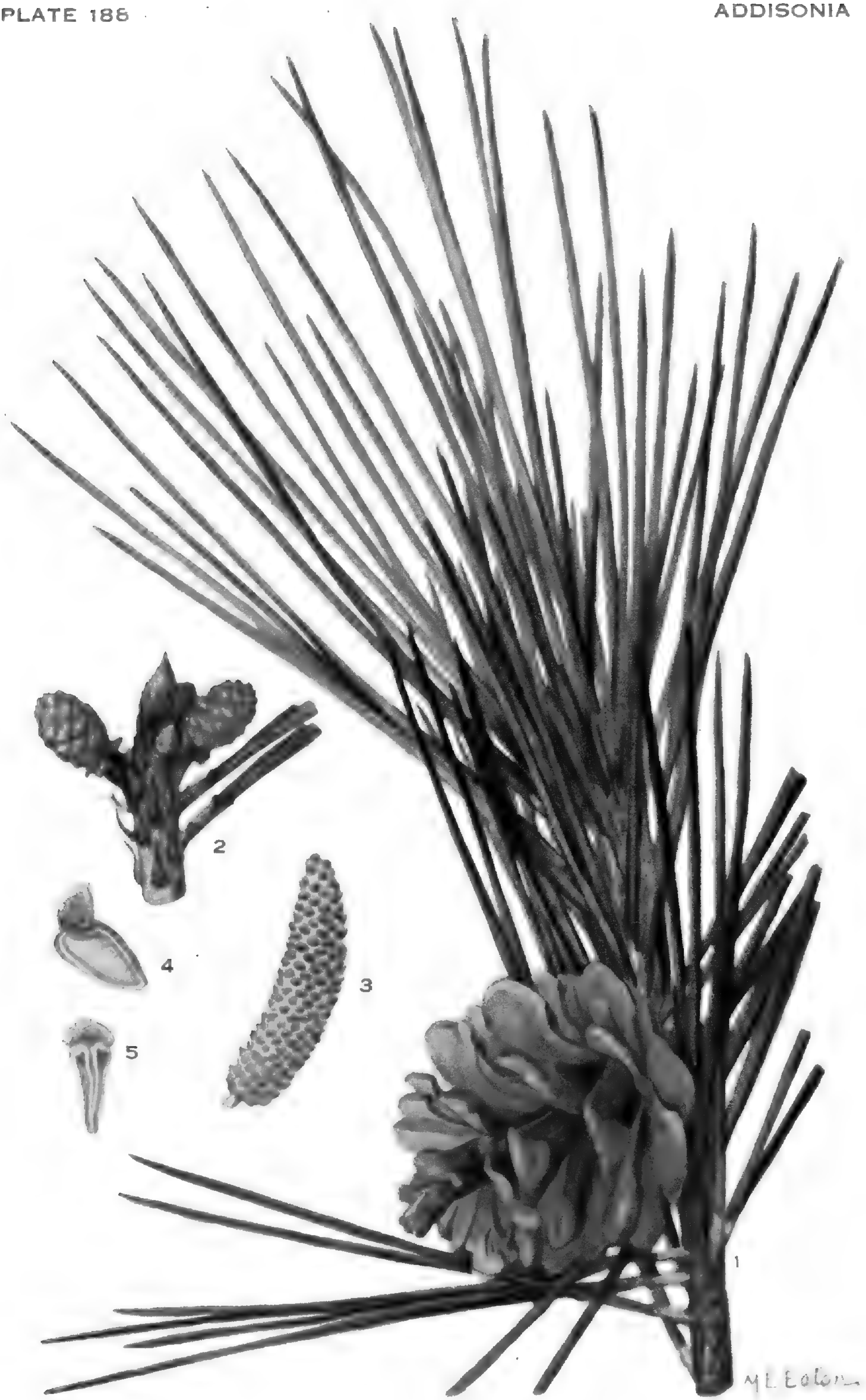
Penstemon secundiflorus is one of a group of closely related species, all distinguished by such a hairy tongue. They occur on the high plains, plateaus, and mountain foot-hills of the west, and the distribution of each is surprisingly precise. Our species I have seen in abundance on loose granitic slopes at different points in the eastern foot-hills of Colorado, yet its entire range follows this narrow belt of land from southeastern Wyoming to northeastern New Mexico. Some species of this genus are known from but a single park-like valley or a single mountain-range or isolated peak,—when we can read the lesson of such dispersal, what information such plants will give of the evolution of climate and land on our continent!

The lavender-pink beard-tongue is a quite smooth glaucous herbaceous plant, from a short rootstock sending up several stems, each terminating in a narrow panicle of lavender-pink flowers. The stems are erect, and nine to eighteen inches tall. The leaves of the winter rosette, persisting at the base of the stem until the

flowering season, are two to four inches long, the petiole shorter than the ovate blades; the stem-leaves are lanceolate and sessile, clasping by a rounded base; all are wholly glabrous, glaucous and somewhat fleshy-thickened, and quite entire. The panicle, sometimes becoming half the height of the plant, is strongly secund, strict and composed of six to nine nodes; the branching is of the type of *P. Digitalis* (Plate 130), but its structure is masked by the reduction of the lateral peduncles, so that the primary peduncle appears to bear a single cluster of three to six flowers; the bracts throughout are much smaller than the leaves and not at all conspicuous; the inflorescence is throughout glabrous. The stout peduncles are one fourth to one half inch in length, about equaled by the more slender pedicels. The sepals are ovate, acuminate, with erose scarious violet-whitish margins, and are about one fourth of an inch long. The corolla is nearly one inch long, its throat gradually expanding, arched above and rounded beneath, the mouth open; the lobes all spread widely, the two posterior being united less than one half their length; the corolla is lavender-pink, with red lines within the throat on the anterior side; externally it is glabrous, but within over the bases of the anterior lobes it is pubescent with slender white hairs. The stamens are essentially as in *P. hirsutus* (Plate 145), the anther-sacs oblong, violet, and glabrous. The sterile filament is conspicuously widened distally, and densely bearded to the apex with orange-golden hairs. The capsule is ovate in outline, acuminate, glabrous, nearly one half inch long, and the seeds are brown, curved and sharply angled, about one eighth inch long.

FRANCIS W. PENNELL.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Flower, split open exposing stamens. Fig. 3.—Anther, with part of filament, ×4. Fig. 4.—Fruit. Fig. 5.—Lower leaf.



PINUS THUNBERGII

(Plate 188)

PINUS THUNBERGII

Japanese Black Pine

Native of Japan

Family PINACEAE — PINE Family

Pinus Massoniana Sieb. & Zucc. Fl. Jap. **2**: 24. 1842. Not *Pinus Massoniana* Lamb. 1828.

Pinus Thunbergii Parl. in DC. Prodr. **16**[2]: 388. 1868.

Many species of pine have peculiarities of habit which permit their identification at a distance, and this is one of them. In a young state this peculiarity is not pronounced, but as the tree grows it becomes more and more emphasized. The Japanese black pine often has a characteristic leaning habit, which, with a contortion or bending of the trunk, gives it a striking and unique appearance in the landscape, this oddity providing it with a desirable place in landscape work. Of easy culture, being equally well adapted to poor or rich soils, it is especially valuable in horticulture, for it readily adapts itself to a variety of conditions. This pine has been in cultivation in the New York Botanical Garden since 1898, and it is from one of the specimens there that the illustration was prepared.

A native of Japan, except in the northern island of Yesso, it is also extensively cultivated there; the native use as a shelter-tree along the seacoast to protect cultivated lands from the sweep of the sea winds, and the employment of it for fixing sand dunes and on exhausted lands unfit for other crops, suggest valuable uses for it in this country.

It is associated with the religious life of Japan, for it is found there in temple enclosures and cemeteries. The Japanese employ this pine in exercising their instinct for formal training, remarkable examples, the result of years or even centuries of training, exist. In some specimens the branches have been artificially trained in a horizontal position so that they cover an area over two hundred and fifty feet in diameter. A most remarkable example, in a monastery garden, has been trained in the form of a junk, the central trunk forming the mast, opposite branches having been trained to represent the hull of the junk; the priests of the monastery claim that this is the result of over three centuries of training.

Pinus Thunbergii was introduced by Siebold into Europe in 1855, and it made its first appearance in Great Britain in 1861 through John Gould Veitch. At first it was considered identical

with the *Pinus Massoniana* of China, an error which has persisted up to the present day, for it is now sometimes offered for sale under that name. It was not until 1868 that the mistake was detected, and was rectified by Parlatore who gave to it the name it now bears.

There are two varieties of this species in cultivation: one is known as *Oculis-draconis*, in which the leaves are marked with two yellow bands, giving the tufts of leaves as seen from above, an appearance of alternate yellow and green rings—hence its varietal name, which means dragon-eye; and the other, *variegata*, which has the leaves wholly or partly yellow or yellowish white.

The genus *Pinus* contains about eighty known species, of wide distribution in the northern hemisphere, extending from the arctic circle to Mexico and the West Indies, and in the Old World to northern Africa and the Malayan archipelago. In tropical and subtropical regions it is confined mainly to the mountains. While some few species are dwarf and shrubby, most of them are trees, some tall, and, when mature, extremely picturesque. The needle-shaped leaves are usually in bundles of two to five, commonly with a scarious sheath at the base of the bundle. The flowers are of two kinds, borne on the same tree: the staminate in aments which appear in the spring and are conspicuous on account of their color and abundance; and the less conspicuous pistillate, which develop into cones.

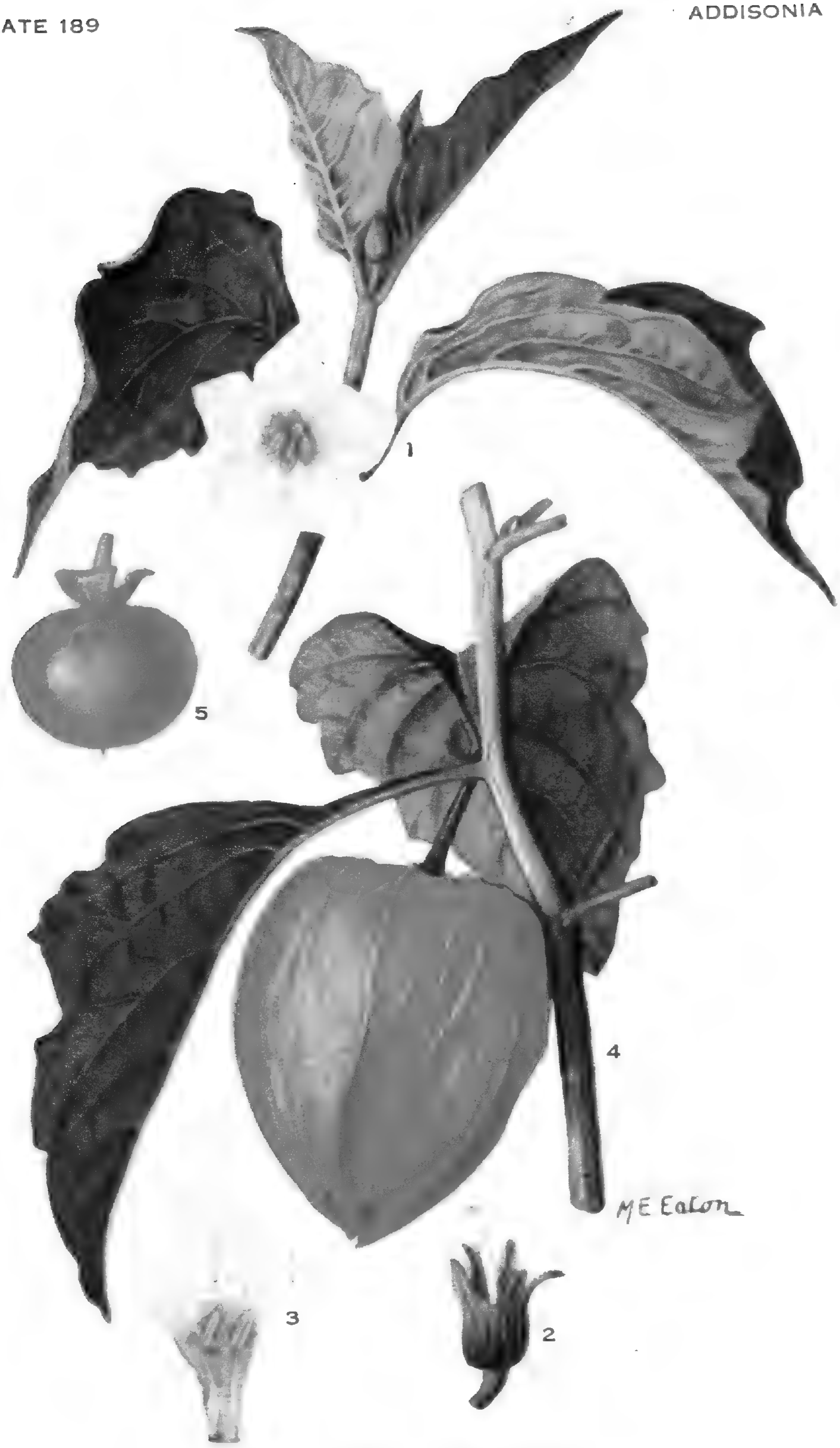
The Japanese black pine commonly attains a height in cultivation of fifty feet, rarely more, the trunk, in mature specimens, being flexuous or contorted and covered with a grayish brown deeply fissured bark; the head is usually open, owing to the naked condition of the lower parts of the branchlets, exposing the characteristic appearance of the trunk. The branches are also contorted or flexuous and usually somewhat pendulous; the branchlets, in whorls of three to five, have a pale reddish brown bark. The grayish white buds, abruptly acuminate at the apex, are sometimes up to three quarters of an inch long, and have acuminate linear-lanceolate scales which are ciliate with long silky hairs. The leaves, two in each bundle, with a whitish basal sheath, persist about three years; they are straight and stiff, of a dull grayish green, and have the margins serrulate; they measure up to four or five inches long. The staminate flowers are in aments up to an inch long. The ovate-conic cones, pale reddish brown, are about two inches long and an inch in diameter; the oblong scales have the apex rhomboidal, with a transverse depressed keel at the centre.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Apex of branch, showing terminal bud and young cones. Fig. 3.—Staminate aments. Fig. 4.—Scale of ament, side view, ×4. Fig. 5.—Scale of ament, front view, ×4.

PLATE 189

ADDISONIA



PHYSALIS FRANCHETI

(Plate 189)

PHYSALIS FRANCHETII

Chinese Lantern Plant

Native of Japan

Family SOLANACEAE POTATO Family

Physalis Franchetii Mast. Gard. Chron. III. **16**: 434. 1894.

This large-fruited winter-cherry of Japanese gardens has been called merely a form of *Physalis Alkekengi*, the common winter-cherry of Europe, the fruits of which are used in decoration and in making preserves. The Japanese plant, however, differs in habit, is smooth, and has larger more brilliantly colored fruiting calyces, which give the plant its common name of "Chinese lantern" plant. It was not found in cultivation in Europe until James H. Veitch sent seeds of it to his nursery establishment in England, about 1893. The plant was exhibited before the Royal Horticultural Society in October, 1894, and is now cultivated in gardens generally. Related plants are *Physalis peruviana* and *P. pubescens*, respectively the Cape-gooseberry and the strawberry-tomato of our vegetable gardens. In America we have about thirty native species, the ground-cherries, with smaller fruits and calyces. The flowers of the Chinese lantern plant are not showy, but the fruit and fruiting calyces are, and the stems may be cut and hung up for winter decorations, the glowing red "lanterns" being especially attractive to the children.

By means of creeping underground stems, which reach out in all directions, a considerable space of ground may be covered by a few plants, and their cultivation is simply a matter of cleaning, weeding, and mulching. Propagation is effected by division, or by seeds, which are freely produced. One large group of this *Physalis*, from a specimen of which our illustration was prepared, may be seen in flower borders near Conservatory Range No. 1, New York Botanical Garden.

The Chinese lantern plant is a perennial herb, with many short fibrous roots from slender stolons or underground creeping stems, from which arise simple, glabrous, zigzag stems to a height of two feet, bearing at a node one or two leaves and one flower. The leaves are glabrous and entire, or shallow-toothed near the apex, ovate or deltoid, acuminate at the apex and cuneate at the base; they measure from two to three inches across. The flowers are

pale yellow in color, with campanulate calyces which have five rounded lobes hairy at the margins, and funnelform corollas also with five rounded lobes. The five stamens are attached to the base of the corolla. The styles are slender and inconspicuous. In fruit the calyses are drooping on long colored stalks, reach a size of two to three inches long, and two inches wide, are bright red in color, leathery in texture, and strongly reticulated, completely enclosing the bright red, many-seeded fruits.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Calyx, ×2. Fig. 3.—Segment of corolla, ×2. Fig. 4.—Fruiting stem. Fig. 5.—Fruit.

PTEROSTYRAX HISPIDA

(Plate 190)

PTEROSTYRAX HISPIDA

Hispid Winged Storax

Native of Japan

Family STYRACACEAE STORAX Family

Pterostyrax hispida Sieb. & Zucc. Abh. Akad. Muench. 4³: 132. 1846.

Among the woody plants which are hardy in the latitude of New York this must be considered one of the most attractive, when in full bloom, on account of its profusion of fragrant cream-colored flowers in long pendulous clusters. In this latitude it is usually a large shrub, but in a situation which is congenial it will develop into a small tree, and he who possesses a healthy vigorous tree of this species may consider himself fortunate. It flowers in June, and is hardy as far north as Massachusetts in sheltered situations. There are several specimens of it in the New York Botanical Garden: in the form of a shrub at the fruticetum; but the best specimen is a small tree, about twenty feet tall, along a walk not far from the entrance to the elevated railway. Specimens of this were secured by exchange with the Royal Gardens, Kew, England, in 1897, and it is from one of these that the illustration was prepared. It is sometimes sold under the name *Pterostyrax corymbosa*, a species quite different and rarely seen in cultivation.

It will grow in any soil of reasonable fertility, but it does best in a moderately sandy loam. Propagation may be readily effected by seeds or by layering; also by greenwood cuttings under glass.

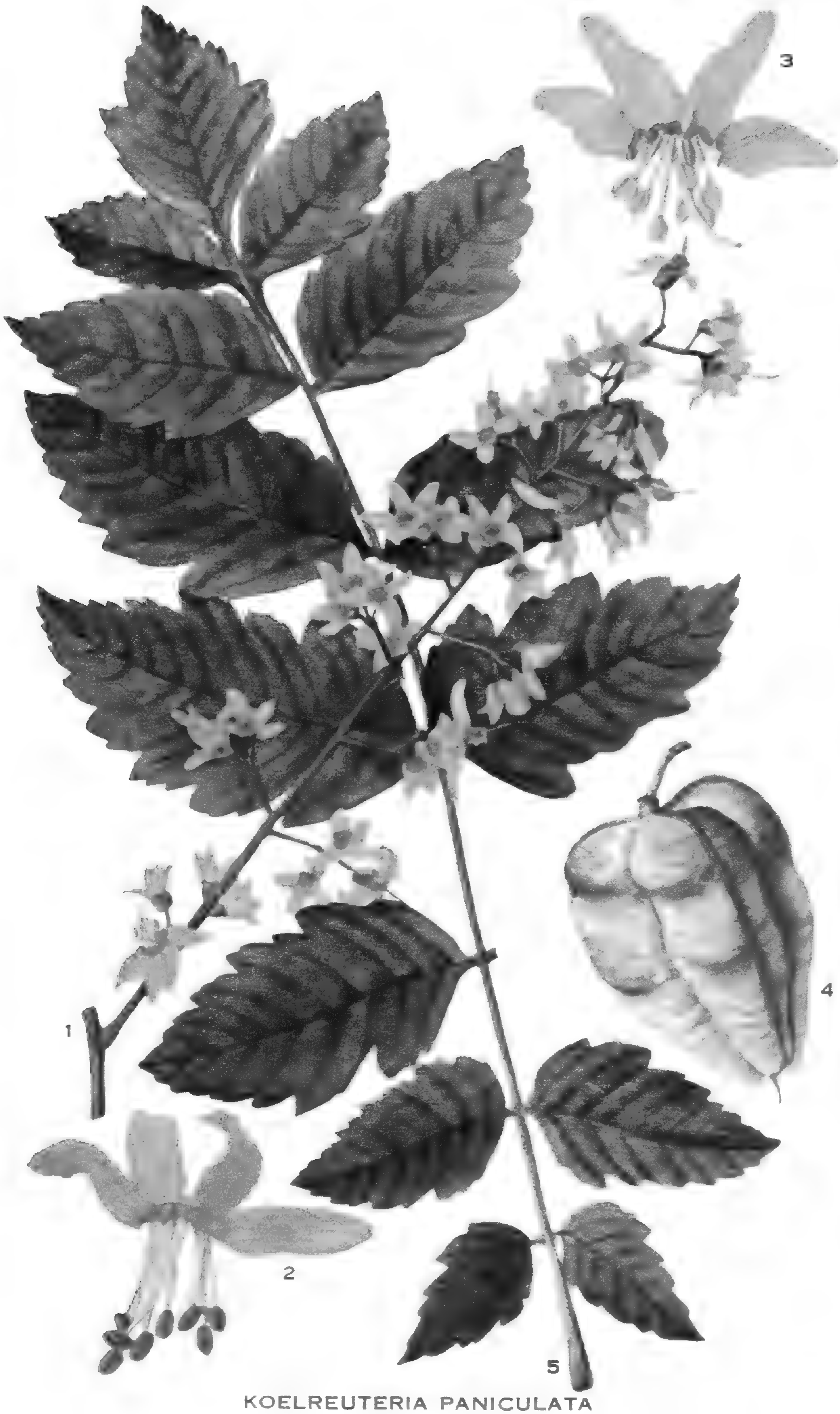
The genus *Pterostyrax*, native of China and Japan, has four known species, three found in both China and Japan, the fourth being confined to China. The genus was, and is sometimes now, united with *Halesia*, a group of plants peculiar to the southeastern United States. It differs in several essential characters, and is now considered distinct.

The hispid winged storax sometimes attains a height of fifty feet, but commonly much less than this in cultivation, often only a shrub. It has an ashy-brown bark, with glabrous branches. The alternate leaves are on petioles up to an inch long. The blades are elliptic, up to eight inches long and about half as wide, with an acute or shortly acuminate apex and a wedge-shaped base; the upper surface is glabrous, the lower paler and glabrous or finely white tomentose, the veins pubescent. The axillary panicles, with two or three leaves at the base, are pendulous, up to six inches long,

and the branches, which are again divided, are one to two inches long, spreading, and with the flowers on one side; the axis and branches are pubescent with spreading hairs. The fragrant flowers are on pedicels one twelfth of an inch long or less. The calyx is obconic, finely white pubescent, and five-toothed, the ovate-deltoid acute teeth very short. The cream-colored corrolla, which is finely pubescent both inside and out, is divided almost to the base into five oblong-elliptic obtuse lobes which are about a third of an inch long and half as wide, and are spreading or recurved. The ten stamens have pubescent filaments united below. The inferior ovary is three-celled, each cell containing four ovules; the pubescent style is longer than the stamens. The fruit is less than a half inch long, narrow, many-ribbed and densely hispid.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Flower opened and spread out. Fig. 3.—Leaf. Fig. 4.—Fruit.



KOELREUTERIA PANICULATA

(Plate 191)

KOELREUTERIA PANICULATA

Varnish Tree

Native of Japan, Corea, and China

Family SAPINDACEAE SOAPBERRY Family

Koelreuteria paniculata Laxm. Novi Comm. Acad. Petrop. **16**: 561. 1772.
Sapindus chinensis Murray, Syst. Veg. 315. 1774.
Koelreuteria chinensis Hoffmgg. Verz. Pfl. 70. 1824.

Here is a tree for our summer months, for it comes into bloom in July or August, when its large clusters of bright yellow flowers make it most attractive, especially so at that time as there are then few trees in flower. Its curious bladdery fruit follows in September, again making of the tree an interesting object. It has a round head and large compound leaves which make it distinctive in the landscape during the summer season.

It is not particular as to soil, and prefers a sunny situation; as it stands drought well and survives under hot winds, it is much grown in the central west, from Kansas and Missouri southward, where it is known as "Pride of India" or "China tree." This tree is hardy in the latitude of New York city, and as far north as Massachusetts, although there it sometimes kills back in severe winters. It has been in cultivation at the New York Botanical Garden for many years. Specimens of it will be found in the deciduous arboretum, and another specimen along the road near the viburnum triangle south of the Museum; it was from the latter, which has been in the collections since 1906, that the illustration was prepared. Propagation is effected by seeds, which may be sown in autumn or stratified; also by root cuttings.

There are five known species of the genus *Koelretueria,* that here considered being the only one commonly cultivated. Of the remaining species three are from China and one from Formosa.

The varnish tree in cultivation seldom attains a height of over twenty-five feet; it has a rounded rather dense head. The leaves are alternate, unequally pinnate, or rarely bipinnate, petiolate. The leaflets are seven to fifteen, shortly stalked; the blades are ovate, elliptic, or oblong-ovate, with the apex obtuse or acute and the base rounded and abruptly wedge-shaped, and the margin coarsely crenate-serrate, or lobed, especially at the base, the teeth or lobes serrate; they measure up to four inches long and over half as wide, and have the surfaces glabrous, except the pubescent

nerves, the lower surface paler than the upper. The inflorescence is terminal, ample, up to eighteen inches long, the axis, branches, and pedicels minutely pubescent. The irregular polygamous flowers are about a half inch in diameter; the sepals are unequal, obtuse or acute, about a twelfth of an inch long, ciliate; the four upturned petals are linear-lanceolate, obtuse or acutish, spreading, somewhat undulate, yellow, clawed, the claw with two small appendages which are at first yellow, later red; the disk is erect, lobed. The declined stamens are eight, or sometimes fewer, with long hairy free filaments. The ovary is oblong, three-angled, pubescent, with a long style; ovules in each cell two. The fruit is a bladdery three-lobed capsule up to an inch and a half long. The seeds are black, globose, up to a quarter of an inch in diameter.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Portion of flower-cluster. Fig. 2.—Staminate flower, ×3. Fig. 3.—Perfect flower, ×3. Fig. 4.—Fruit. Fig. 5.—Leaf.

EPIPHYLLUM HOOKERI

(Plate 192)

EPIPHYLLUM HOOKERI

Hooker's Epiphyllum

Native of Trinidad

Family CACTACEAE CACTUS Family

Cereus Hookeri Link & Otto, Cat. Sem. Hort. Berol. 1828.
Epiphyllum Hookeri Haworth, Phil. Mag. **6**: 108. 1829.
Phyllocactus Hookeri Salm-Dyck, Cact. Hort. Dyck. 38. 1842.

In tropical America there is found a very interesting genus of cacti known as *Epiphyllum*. Unlike the cacti from the desert regions of Arizona and Mexico with which we are most familiar, the plants of this genus do not grow in dry regions but are often found in dense rain-forests; like their desert allies they too must have xerophytic conditions, so they grow on the bark of trees and are known as epiphytes. These plants do not have leaves but the stems are flat, green and leaflike, functioning as leaves. The flattened stems were at one time supposed to be leaves upon which the flowers were borne, which is the origin of the name *Epiphyllum*.

The genus contains about twenty-four species, ranging from central Mexico through Central America to central South America. None are known to be native in the West Indies, except in Trinidad. One or more, however, have been described from Cuba, but these were doubtless based on cultivated plants. It is possible that there are species in the mountains of Santo Domingo or in the southern Antilles which will be found when those regions are more thoroughly explored. A number of epiphyllums are in cultivation and some of them are highly prized as ornamentals. Some are night-bloomers while others are day-bloomers; some have large sweet-scented flowers. *Epiphyllum oxypetalum*, generally known as *Phyllocactus bifrons* in the trade, is a great favorite.

The name *Epiphyllum* dates back to 1689 when it was first used by P. Hermann. Its use, however, as a generic name in the modern sense dates from 1812 when it was used by Adrian H. Haworth, who made it a new genus based upon *Cactus phyllanthus*. Some years later other plants were referred to *Epiphyllum*, and still later the type of the genus *Epiphyllum* was made the type of a new genus, *Phyllocactus*, and the name *Epiphyllum* was used for a totally different plant, namely *Epiphyllum truncatum*. *Epiphyllum* has recently been restored to its original type, while the "*Epiphyllum*"

of the gardens becomes *Zygocactus truncatus*. The species which is shown in our illustration is native to Trinidad and has long been in cultivation in gardens and conservatories.

Hooker's epiphyllum has stems at first erect, but soon drooping, often becoming pendent, and six to ten feet long; the branches are very variable, either long, slender and whip-like, or broad, thin and leaf-like. The lateral branches are sometimes three inches broad, with a crenate margin. The flowers appear at night, and are not sweet-scented; the flower-tube is very slender; the outer perianth-segments are lemon-yellow while the inner ones are pure white; the filaments are white. The fruit is oblong, about two inches long, and red.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Flower. Fig. 2.—Upper part of stem.

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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.

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ALPHABETIC INDEX TO VOLUMES 1 TO 5

The numerals refer to the plate-numbers