ADDISONIA

COLORED ILLUSTRATIONS

AND

POPULAR DESCRIPTIONS

OF

PLANTS

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IRIS VIOLIPURPUREA

(Plate 449)

IRIS VIOLIPURPUREA

Violet-purple Iris

Native of southern Louisiana

Family IRIDACEAE — IRIS Family

Iris violipurpurea Small, sp. nov.

The extraordinary richness of the iris flora of the Mississippi River delta was again emphasized by the receipt of live plants of the violet-purple iris in flower in March, 1927. They were sent in by Ruth and Arthur Svihla, who had learned of our interest in native North American irises. The original specimens came from a marsh near Chacahoula, Louisiana. The accompanying illustration was made from one of these plants, which have been growing at the Garden since their receipt in 1927.

The sepals of all the irises from the Mississippi Delta are striking subjects, owing to the varied arrangements, the blending, or the sharp contrasts in their color. *Iris violipurpurea* belongs to the last category. The golden crest cuts abruptly into the violet-purple ground-color of the sepal-blade, there being no intermediate area of pale flecks or veins such as surround the crest in many species. In this characteristic the present species is related to *Iris vinicolor* and *I. atrocyanea*, its regional associates.

There are three groups with a long-bracted inflorescence in the Mississippi River basin—one typified by *Iris fulva*, one by *I. foliosa*, and still another by the present species and its associates in structure. These groups are all quite distinct. The rigors of the ice age seem to have exterminated the ancestors and the connecting links between these groups, which grew in more northern regions. Thus driven southward by the slowly advancing cold and also by the floods that doubtless deluged the Mississippi basin, a few survivors found a last refuge in the relatively stable conditions in the delta of the Mississippi. The plants grow in the full sunlight in prairie-like places, on the low or middle grounds. They usually occur in large colonies unassociated with any other iris, in a thin turf of grass.

The plants sent to the Garden by Mr. and Mrs. Svihla survived the subsequent winter in the cold-frames, and a large colony collected in the late spring of 1927 by Charles A. Mosier and the writer were unharmed by the cold weather, although in the open with but little protection, and flowered profusely in several different shades of color during June, 1928.

The violet-purple iris has a very stout fleshy branching rootstock. The leaves are often five together at the base of the flower-stalk. The blades are linear-ensiform, slightly glaucescent, mostly three-quarters of an inch to an inch and a quarter wide. The flower-stalk is erect, two and a half to three feet tall, usually with one or two flower-bearing nodes below the terminal, the internodes with a rather sharp angle below the base of the foliaceous bracts. The terminal involucre is erect, of usually two or three bracts, the outer bract exceeding the flower, slenderly attenuate above the tight-fitting basal portion, keeled on the back, scarious on the edges, the inner (second) bract about equalling the base of the perianth, with broad scarious margins. The flowers are usually two together at the top of the stalk, and single or sometimes two in the axils of the leaf-like bracts below it. The primary terminal flower has a slender-columnar pedicel, slightly three-angled. The hypanthium covering the ovary is sharply six-angled, and together with the pedicel tightly surrounded by the involucre, bright-green. The flower-tube is slightly dilated upward, nearly or quite as long as the ovary, six-angled, the angles paired. The three sepals are remate, three and a half to four and a quarter inches long, arching. The claw is shorter than the blade, rather broad, but slightly narrowed near the base; without, green and green-striate; within, green and magenta-striate, with the heavy striae parallel to the greenish-yellow crest-like finely papillose midridge, the finer striae curving out to the edges. The blade is elliptic or ovate-elliptic, longer than the claw; without, violet-purple and obscurely dark-striate; within, violet-purple, except the yellow or golden crest in the base, often darker colored just in front of the crest, evidently dark-striate, undulate, usually notched at the apex. The three petals are spatulate, often rather broadly so, slightly shorter than the sepals. The claw is slender; without, with greenish margins and often median magenta striations; within, yellow or greenish-yellow at the very base, otherwise violet-purple. The blade is much longer than the claw, violet-purple without and within, but usually, slightly paler than the sepal-blade, notched at the apex. The three stamens are nearly or quite an inch and a half long. The filaments are subulate, yellow. The anthers are nearly white, longer than the filaments, sagittate at the base. The style-appendages are half-ovate, one half to three-quarters of an inch long, irregularly crenate or serrate-crenate and erose, magenta. The stigma is two-lobed. The capsule is oval or ovoid-oval, about three inches long, tinged deep-green and glaucescent, obscurely six-sided or bluntly six-angled, the faces slightly grooved, the three primary angles or lobes flattened, more sharply grooved than the faces, the capsule thus obscurely six-lobed. The seeds are numerous, in two rows in each cavity, usually somewhat over a half inch in diameter, half-orbicular, irregularly thickened, light-brown, corky-walled.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—A terminal inflorescence with an expanded flower. Fig. 2.—A petal. Fig. 3.—A sepal. Fig. 4.—A capsule. Fig. 5.—A seed.

PLATE 450

ADDISONIA

IRIS ALBISPIRITUS

(Plate 450)

IRIS ALBISPIRITUS

Ghost Iris

Native of southern peninsular Florida

Family IRIDACEAE — IRIS Family

Iris Albispiritns Small, sp. nov.

A white-flowered iris, considering the vast multitudes of colored ones, is really a rarity in eastern North America. Of course, we actually know many albinos and should expect them in all the colored-flowered species. Accordingly, when repeated reports of a white iris in the ponds and on the prairies along and near the Caloosahatchee east of Fort Myers reached the writer, it was provisionally considered that they referred to albino plants of the prairie-iris (*Iris savannarum*) which is the typical species of the prairie region thereabouts, its type locality being about twelve miles up the Caloosahatchee from Fort Myers. The irises of the Caloosahatchee region are early bloomers and opportunity to study them in the field while in flower, was never found. So the problem was attacked by a different method. Walter M. Buswell, naturalist of Fort Myers definitely located several colonies in the early spring of 1927 on the prairies on both sides of the Caloosahatchee. Later that year he visited these stations and secured a good supply of rootstocks for planting at The New York Botanical Garden and also specimens of the fruits. So far there was nothing to indicate that these colonies were not albinos of *Iris savannarum*. The plants grow in a usually dense turf of grasses and sedges among which are scattered, in season, various lowland primroses, mints, figworts, and composites.

To our great delight six or eight specimens among the several dozen set out in the plantations at the Garden in the spring, flowered the following October, permitting the accompanying illustration to be made. And to our surprise, the flowers showed marked differences from those of *Iris savannarum*, for the blades of the sepals and petals are crisped and finely many toothed, the style-branches are often toothed along the edges, and the style-appendages are more sharply cut. These characters, curiously enough, indicate a relationship to the white irises of the lower Mississippi Delta, although the capsule (pod) shows affinities with *I. savannarum;* the biological origin of the new species is just as hidden as that of the latter. Unless it originated *in situ*, it must have migrated from further north, but it has left no indication of its trail. Its general

floral characters justify the assumption that its ancestors and those of *Iris hexagona* had a common origin in the ancient highlands. The pods confirm this view, those of *Iris hexagona* being sharply six-angled, while those of *I. Albispiritus* are six-ribbed—merely opposite extremes of the same fundamental structure of the organ.

Other white-flowered irises of the Florida peninsula now assumed to be albinos of other species, invite further study. The type specimen of *Iris Albispiritus* is in the herbarium of The New York Botanical Garden.

The ghost-iris has stout, often much-branched fleshy root-stocks. The leaves are erect, two to three feet long, usually 3-5 together at the base of a flower-stalk, the blades are narrowly linear, usually one-half to three quarters of an inch wide, bright-green. The flower-stalk is erect, one and a half to four feet tall, usually two to three feet tall, with one flower-bearing node below the terminal or sometimes with two or three, the internodes slightly flattened, the side below the foliaceous bracts angled. The terminal involucre is erect, of two main bracts, the outer bract with a tightly involute base and a slender tip which exceeds the flower, the keel sharp, the edges slightly scarious, the inner (second) bract with broad scarious translucent margins. The primary terminal flower has a slender-cylindric pedicel one and a half to two inches long. The hypanthium surrounding the ovary, is sharply six-angled, light-green, shorter than the pedicel, together with the pedicel tightly enveloped in the involucre. The three sepals are remate, four to five inches long. The claw is shorter than the blade, very broad, somewhat narrower near the base; without, pale-green and faintly striate; within, yellow-green and plainly green striate on both sides of the lemon-yellow mid-ridge. The blade is elliptic or elliptic-ovate, longer than the claw; without, mainly white and sometimes tinged with green and with green lines at the base; within, white and faintly veined with greenish branching lines, with a yellow papillose, sometimes double crest at the base, crisped and unevenly crenate. The three petals are spatulate, three and a half to four inches long. The claw is cuneate, about as long as the blade, channeled; without, pale-green except the narrow scarious margins; within, greenish-white with several parallel green lines and ridges. The blade is narrowly elliptic, or ovate-elliptic; without, pale greenish-white; within, white, except the few green veins near the base, crenulate, and often crisped-undulate. The style-appendages are half-ovate to half-elliptic, one half to three-quarters of an inch long, laciniate and often somewhat fimbriate on the outer side. The stigma is two-lobed, pale-green or whitish. The capsule is drooping, ellipsoid, two and a quarter to three and a half inches long, six-ridged. The seeds are numerous, in one row in some cavities, suborbicular or lozenge-shaped; in two rows in other cavities and irregularly half-orbicular, all about a half inch in diameter, light-brown, irregularly thickened, corky-walled.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—A terminal inflorescence with an open flower. Fig. 2.—A petal. Fig. 3.—A sepal. Fig. 4.—A capsule. Figs. 5, 6.—Seeds.

PLATE 451

ADDISONIA

IRIS GIGANTICAERULEA

(Plate 451)

IRIS GIGANTICAERULEA

Big Blue Iris

Native of the Mississippi Delta

Family IRIDACEAE — IRIS Family

Iris giganticaerulea Small, sp.nov.

While driving along the bayous and canals between New Orleans and Houma, Louisiana, about dusk on April 9th, 1925, a blue iris was several times observed growing on the water's edge. Little attention was paid it, as we were making haste to reach the Rio Grande and western Texas. The iris' flowering season was nearly past, and casual observation suggested that the plant might represent *Iris Kimballiae* of northern Florida. But closer acquaintance with the plant seen on the trip referred to proved it to be quite different from any previously described species.

Although specifically well isolated, *Iris giganticaerulea* has taxonomic associates which collectively indicate a common ancestor. This presumably grew in the southeastern highlands during the latest general submergence of the continent, in the Tertiary Period. As the land later became elevated, descendants took different courses, radiating into the Coastal Plain through a sector of about a quarter circle. Thus we now find *Iris rivularis* in the Atlantic Coastal Plain in Georgia and northeastern Florida; *Iris savannarum* in the peninsular Florida Coastal Plain; *Iris Kimballiae* in the East Gulf Coastal Plain; and *Iris giganticaerulea* in the Mississippi Delta. If this theory of migration be correct, it is curious to notice that the two descendents that have migrated the greater distance have developed into the most showy plants—with the largest flowers and the largest fruits. As far as we know, this iris left no evidence in the trail it may have followed, however, for at present it is not known outside of the lower part of the Mississippi Delta. In its native habitat it grows mostly in the open and thrives best without any shade. Its rootstocks are usually imbedded in the soil that also supports a turf of grasses and sometimes asters.

The specimen from which the accompanying illustration was made was collected near Morgan City, Louisiana, by Charles A. Mosier and the writer on April 19, 1927. Plants survived the following winter at The New York Botanical Garden and flowered copiously in June, 1928. That this plant and its associated species of the lower Mississippi Delta can withstand the low temperatures of a

climate a thousand miles north of their present habitats seems to indicate that they once had a more northern distribution. The type specimen is in the herbarium of The New York Botanical Garden.

The big blue iris has a very stout fleshy branching rootstock. The leaves are erect, mostly four to six together at the base of the flower-stalk, firm. The blades are linear-attenuate, mostly an inch to an inch and a half wide, bright green and more or less glaucescent. The flower-stalk is erect, usually two and a half to four feet tall, rather stout, with usually two or three flower-bearing nodes below the terminal, the internodes rather prominently ridged or angled below the bases of the leaf-like bracts. The involucre is erect, of usually three main bracts, the outer bract narrowly lanceolate-attenuate, exceeding the flower, keeled along the back, with a very narrow pale margin, the inner (second) bract about equalling the base of the perianth with broad translucent scarious margins. The flowers are usually in pairs at the top of the stalk, and single or paired in the axils of the foliaceous bracts below. The primary terminal flower has a narrow-columnar pedicel one and a half to two inches long, nearly terete. The hypanthium covering the ovary is shorter than the pedicel, bluntly six-angled, bright-green, and together with the pedicel tightly enclosed in the involucre. The flower-tube is cylindric-prismatic, somewhat shorter than the ovary, with nine ribs and grooves. The three sepals are remate, three and three-quarters to four and a half inches long. The claw is broad, concave, somewhat narrowed to the base below the middle; without, light-green, several ridged and striate; within, with a yellowish green body and whitish margins, the ridge prolonged into a yellow crest in the base of the blade and with two or three lateral ridges which run into the yellow blotch in the base of the blade. The blade is broadly oval or orbicular-oval, longer than the claw; without, with a whitish and veined central area and bluish marginal area; within, mainly violet-blue with white streaks and flecks bordering the yellow blotch and more or less distinctly, but faintly flecked with white throughout. The three petals are somewhat shorter than the sepals, broadly spatulate. The claw is narrowly cuneate, involutely folded near the base; without, white or greenish-white at the base, violet-tinged and striate towards the blade; within, more prominently striate with greenish-brown near the base, violet-striate above. The blade is much longer than the claw; without, dull violet-blue and dark-veined; within, bright-violet-blue and dark-veined, entire, sometimes notched at the apex. The style appendages are half-ovate, nearly 2 cm. long, violet, and often whitish near the base without, sharply and irregularly serrate. The stigma is two-lobed, the lobes white-margined. The capsule is drooping, ellipsoid or slightly ovoid-ellipsoid, three to four inches long, bright-green, with six broad rounded ridges, thick-matted. The seeds are numerous, in two rows in each capsule-cavity, nearly a half inch broad, irregularly half-orbicular, sometimes very thick, brown, corky-walled.

JOHN K. SMALL

EXPLANATION OF PLATE. Fig. 1.—A terminal inflorescence with an open flower. Fig. 2.—A petal. Fig. 3.—A sepal. Fig. 4.—A capsule. Fig. 5.—A seed.

PLATE 452

ADDISONIA

Mary E. Eaton

IRIS CHRYSOPHOENICIA

(Plate 452)

IRIS CHRYSOPHOENICIA

Gold and Purple Iris

Native of southern Louisiana

Family IRIDACEAE — IRIS Family

Iris chrysophoenicia Small, sp. nov.

This iris was discovered on a day of penance and reward. We were up before daylight and at the ferry landing about dawn, ready to cross Lake Pontchartrain, only to learn that the ferry engine had broken down. There we were compelled to fight mosquitoes until the engine of the ferry boat was repaired. That was penance. But once we reached the southern side of the lake, the rewards began to appear. The first was a new palm tree—*Sabal Deeringiana*. Farther in towards New Orleans, many beautiful irises came into view in the swamps. Various hues of red, white, and blue were prominent and other colors were in evidence. Three distinct groups of the genus proved to be there represented, and new species with flowers of shades of colors never before recorded in American irises were more numerous than imagination would ever have suggested. One of the reds—*Iris vinicolor*—has already been described in Addisonia[1].

The present species has a larger flower than *Iris vinicolor* and also more intense coloration, but the ancestry of both is equally obscure. The general coloration and the six-angled capsule suggest a common origin of the two; but from what ancient plant reservoir or through what channels they entered the geologically young Coastal Plain and particularly the very recently formed lower delta of the Mississippi River is a mystery.

Iris chrysophoenicia was discovered then in the swamps between Lake Pontchartrain and New Orleans, Louisiana by Dr. Edgar T. Wherry and the writer on April 10th, 1925. The Specimens from which the accompanying illustration was made were collected in the same region by Charles A. Mosier and the writer on April 8th, 1927. These specimens grown at The New York Botanical Garden flowered in June 1928. They are hardy in cold-frames, although thoroughly frozen in winter, as well as in the open plantations with but little protection.

In its natural geographic area *Iris chrysophoenicia* grows in ditches both in the open and in swamps around the edges of thickets. In the open it often forms dense colonies, while in partial shade its development is more sparse. The rootstocks are usually copiously

[1]Addisonia **12**: 1. *pl. 385*. 1927.

intermixed with the roots of grasses and sedges and also those of shrubs and herbaceous plants about the thickets. The type specimen is in the herbarium of The New York Botanical Garden.

The gold and purple iris has a stout branching fleshy elongate rootstock. The leaves are erect, usually three or four together at the base of the flower stalk. The blades are linear-attenuate, mostly three-quarters of an inch to an inch wide, deep-green, but more or less glaucescent especially toward the base. The flower-stalk is erect, usually two and a half to three feet tall, rather slender, with one or two flower-bearing nodes below the terminal, glaucescent, the internodes rather sharply angled below the bases of the foliaceous bracts. The involucre is of two main bracts, the outer one elongate, exceeding the flower, the inner (second) bract usually with the tip reaching to the lower part of the perianth, narrowly scarious-margined, but otherwise green to the tip. The flowers are single or two together at the top of the stalk, single in the axils of the foliaceous bracts below the tip. The primary terminal flower has a pedicel one-half to three-quarters of an inch long. The hypanthium surrounding the ovary is sharply six-angled, bright-green, longer than the pedicel, which together with the hypanthium is more or less exposed to view between the bracts of the involucre. The flower-tube is columnar-prismatic, sharply six-angled, longer than the ovary in anthesis, shining. The three sepals are remate, three to three and a half inches long. The claw is much shorter than the blade, very broad, somewhat narrowed to the base; without, greenish and flatly several-ridged, the green extending halfway up into the blade; within, greenish-yellow, with a prominent midrib and several parallel ridges and green veins on both sides. The blade is oval, much longer than the claw; without, greenish and purplish-lined near the base, dull purple above; within, with the greenish-yellow of the claw extending up into about the lower fourth as a yellow blotch divided by the yellow or golden crest which extends up about half-way to the tip, the yellow prolonged into the adjacent violet-purple as lines and flecks, the rest of the blade dark violet-purple (plum-color), obscurely veined with black. The three petals are broadly spatulate, nearly as long as the sepals. The claw is cuneate; without, dark and light veined; within, involute-channeled, green, lined with magenta. The blade is much longer than the claw; without, dull violet and finely dark-lined; within, slightly paler than the sepal-blade, dark veined, often notched at the apex and slightly undulate on the margins. The three stamens are about an inch and a third long. The style appendages are half-ovate, one-half to three-quarters of an inch long, red-purple and veined with green, finely and unevenly toothed. The stigma is yellow, two lobed. The capsule is nodding, ovoid, or ellipsoid-ovoid, two and a half to three and a half inches long, bright-green, with six rather narrow but prominent ridges, thick-walled. The seeds are numerous, in one row in each capsule-cavity, about a half inch in diameter, suborbicular and lozenge-shaped, often very thick, brown, corky-walled.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Terminal inflorescence, with an open flower. Fig. 2.—A petal. Fig. 3.—A sepal. Fig. 4.—A capsule. Fig. 5.—A seed.

PLATE 453

ADDISONIA

IRIS MIRACULOSA

(Plate 453)

IRIS MIRACULOSA

Giant Iris

Native of southern Louisiana

Family IRIDACEAE — IRIS Family

Iris miraculosa Small, sp. nov.

To meet an iris in its native haunts, bearing strikingly beautiful flowers on stems reaching to the level of one's head is a rare experience, but we now know that it is to be expected in the lower Mississippi Delta. In March 1927 Ruth and Arthur Svihla collected and sent the writer a series of living specimens of such an iris, from one of which the accompanying illustration was made. The stature of the plant however, is not the only remarkable feature of *Iris miraculosa*, the flowers themselves being quite unusual. In the accompanying illustration only a lateral flower can be shown, as the terminal ones are unusually large. The perianth in this species is usually white, but colored forms like the one figured are occasionally met with. When and how the color was introduced in the course of the evolution of the species, may always remain a mystery, for it is a shade of lavender different from that in any other known American iris. But no doubt many colors, shades, and forms of irises were lost during the elevations and depressions, floods and droughts of the Tertiary Period and the alternate cooling and warming of the climate during the glacial epoch.

The direct or indirect ancestors of this species must have been harbored in the highlands during the latest general submergence of the continent. Then, however, the rigors of the ice age pushed it south almost to the limit of the land and into some of the most recently naturally laid-down alluvium of North America, and it never regained its lost territory.

Plants of *Iris miraculosa* are hardy at The New York Botanical Garden with the moderate protection of the cold-frames. A plantation of several dozen plants came through the winter of 1928, unscathed, with but slight protection, but curiously enough, only one plant flowered, whereas all the other Louisiana material flowered profusely.

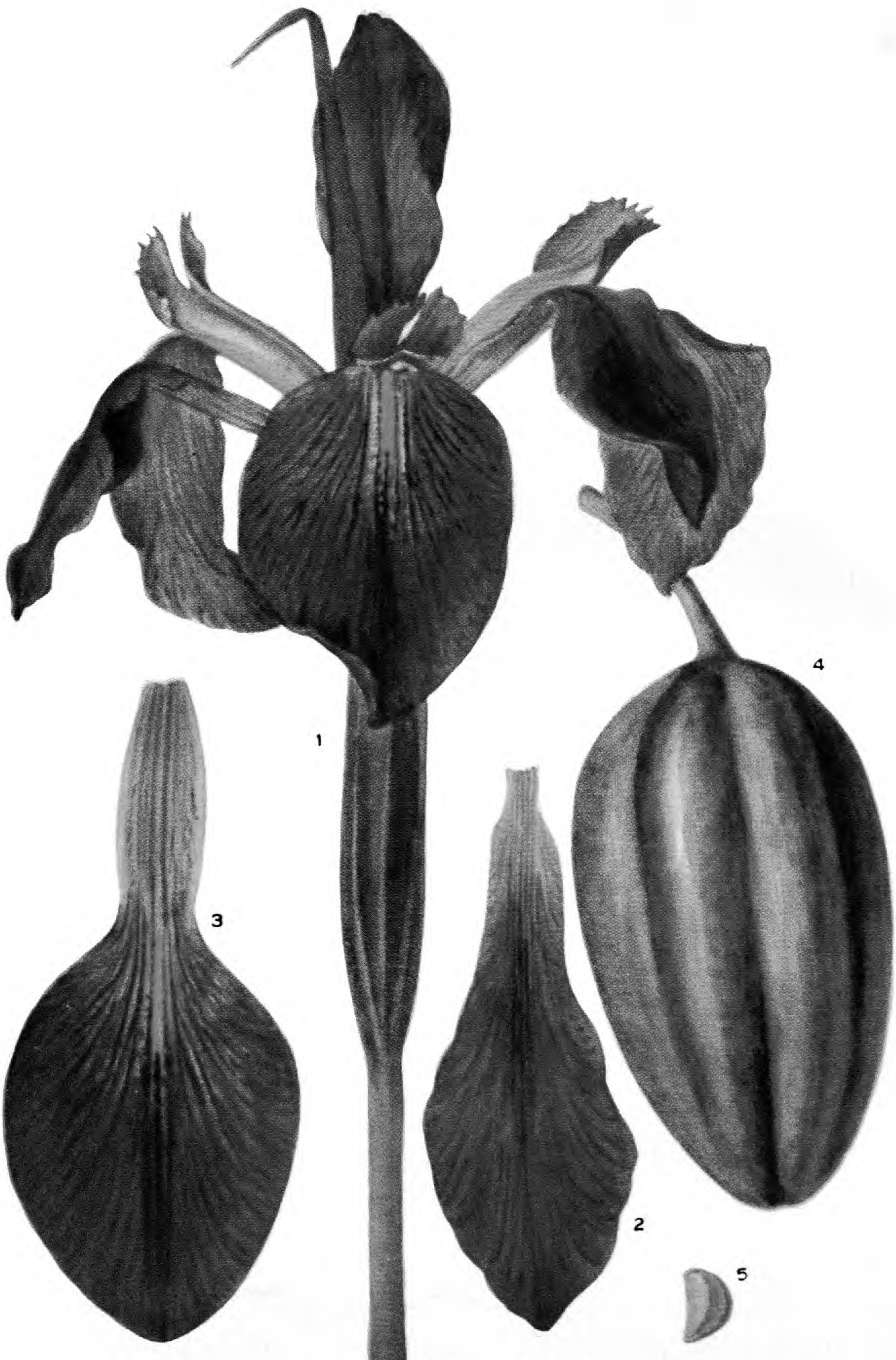
Iris miraculosa is not restricted to one kind of habitat, but it thrives in several types and apparently equally well. Its requisite is a rich alluvium. This may be in the open with a carpet of a

turf of grasses and small herbaceous plants or in the dense shade in a swamp with cypress trees and various clustered shrubs. The type specimen is in the herbarium of The New York Botanical Garden.

The giant iris has a very stout fleshy branching rootstock. The leaves are usually three to six together at the base of the flower-stalk. The blades are broadly linear-ensiform, mostly one to one and three-quarter inches wide, bright-green and often glaucescent. The flower-stalk is erect, three to six feet tall, stout, usually with three or four flower-bearing nodes below the terminal, the internodes somewhat flattened, angled below the base of the foliaceous bracts. The involucre is erect, of two or three bracts, the outer bract linear-attenuate, exceeding the flower, slightly scarious on the keel and the edges, the inner (second) bract equalling the lower part of the perianth, scarious margined. The flowers are usually two together at the tip of the flower-stalk and single or paired in the axils of the leaf-like bracts below. The hypanthium surrounding the ovary is shorter than the pedicel, sharply six-angled, together with the pedicel tightly enveloped in the involucre. The flower-tube is slightly dilated upward, slightly shorter than the ovary, six-ridged, the ridges in pairs. The three sepals are remate, three and a half to four and three-quarter inches long, arching. The claw is broadly linear, somewhat narrowed at the base; without, light-green and darker-green striate; within, yellow-green and with deeper-green striations on both sides of the median prominent ridge. The blade is broadly elliptic or elliptic-obovate, somewhat longer than the claw, mostly rounded or slightly notched at the apex; without, green at the base, dull lavender above; within, mainly lavender, deep-lavender about the margins, paler in the center and about the golden papillose crest which extends half way up into the blade, crenate above the middle or sometimes all around. The three petals are spatulate, nearly or quite as long as the sepals. The claw is cuneate, merging into the blade; without, greenish at the base, lavender and green-striate above; within, green-striate near the base, lavender on the margins. The blade is slightly broadened upward, more or less notched at the apex; without, rather pale lavender, with few green lines; within, bright-lavender, with few greenish lines. The three stamens are an inch and a half to two inches long. The style-appendages are half-ovate, about three-quarters of an inch long, incised-serrate, usually slightly acuminate. The stigma is two-lobed. The capsule is oval or obovoid, about two and a half inches long, bright-green, sometimes glaucescent, turgid, obscurely six-lobed, the ridges and grooves obscure. The seeds are numerous, in two rows in each cavity, usually between a half and three-quarters of an inch in diameter, irregularly half-orbicular, unevenly thickened, brown, corky-walled.

JOHN. K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—A lateral branch with an expanded flower. Fig. 2.—A petal. Fig. 3.—A sepal. Fig. 4.—A capsule. Fig. 5.—A seed.



IRIS CHRYSAEOLA

(Plate 454)

IRIS CHRYSAEOLA

Gold-embroidered Iris

Native of southern Louisiana

Family IRIDACEAE — IRIS Family

Iris chrysaeola Small, sp. nov.

Another reward, in addition to *Iris chrysophoenicia*, discussed in a preceding article, was the additional new species here described. It grew in similar situations and was a somewhat larger plant, and although the flower is no richer in color, it is more varied in shades. Our knowledge of this showy iris is, moreover, not confined to the original collection, for Charles A. Mosier and the writer found it in additional localities in the same region both in the spring of 1926 and that of 1927.

Everything about this species is a profound secret, its genetic, geologic, and geographic history being alike obscure. The flower is so different from those of our other irises, even its companions, that they can scarcely be assigned a common ancestor. The much suffused colors of the sepals and the nearly equally six-ridged capsule mark it off very distinctly.

We may safely assume that this iris is an immigrant in its present habitats, for it must be much older than the present lower delta of the Mississippi River, though how old geologically we, of course, cannot say. Whether it came to its present haunts from the east, from the north, or from the west, is its own secret, for its former trails are now absolutely blotted out.

This iris may have a long life before it, but geographically it is at its last stand for it is right up against the Gulf of Mexico on the south and does not seem able to advance northward. It may be able to spread eastward or westward or both, but there is no evidence that it will do so. The fact that this iris now occurs on both sides of the present channel of the Mississippi River is no evidence in favor of an east-west migration, but merely indicative of a vacillation of the channel of the river from one side of the delta to the other.

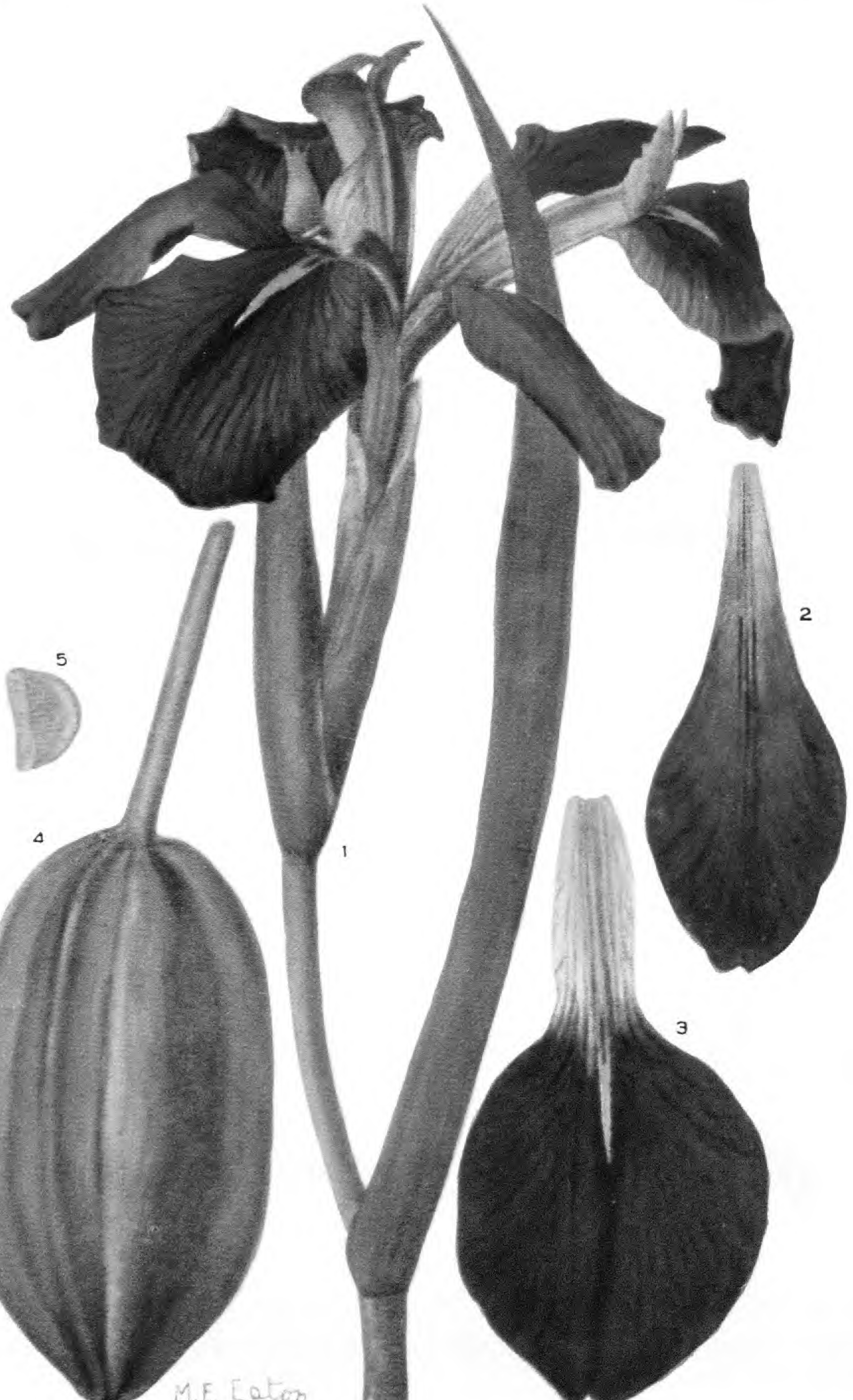
Plants of *Iris chrysaeola* have proved to be hardy in cold-frames at The New York Botanical Garden, although thoroughly frozen and are also hardy in the open with only slight protection in the winter. In its native haunts it thrives best in full sunlight, along ditches and damp prairie-like spots. However, it sometimes occurs

on the edges of the swamps in partial shade. The type specimen is in the herbarium of The New York Botanical Garden.

The gold-embroidered iris has a stout elongate rootstock which is often branched. The leaves are erect and more or less curved, mostly four to six at the base of the flower-stalk. The blades are linear-attenuate, mostly three-quarters to an inch wide, glaucescent, especially near the base. The flower-stalk is erect, about three feet tall, with one or two elongate leaves on the lower part and two or three shorter leaf-like bracts on the upper part, with the internodes somewhat flattened on the side opposite the leaves and the bracts, rounded on the other side, or angled below the base of the bracts, more or less glaucous. The involucre is of two main bracts, the outer one elongate and linear-attenuate, exceeding the flower, the inner (second) bract nearly or quite half as long as the outer one, scarious margined but green otherwise to the tip. The flowers are usually two together at the top of the stalk, single in the axils of the foliaceous bracts below the tip, the primary terminal flower with a pedicel one and a half to one and three-quarters of an inch long. The hypanthium surrounding the ovary is six-angled, dull, much shorter than the pedicel, which together with the hypanthium is completely enveloped by the involucre. The flower-tube is about as long as the ovary, several-ridged, shining. The three sepals are remate, three and a half to four inches long. The claw is shorter than the blade, broadest about the middle; without, yellowish-green and finely ridged; within, light-yellow or yellowish-green, finely ridged and more or less striate with greenish-purple on both sides of a rounded median ridge. The blade is oval-ovate, longer than the claw; without, the base and middle part greenish-yellow and purple-veined, the edges purplish and flecked with pale green; within, with a violet background, except the yellow median bearded crest and lateral parallel and thence radiating veins and flecks of yellow throughout except the terminal area. The three petals are broadly spatulate, two and three-quarters to three and one-quarter inches long. The claw is shorter than the blade, broad, cuneate, when spread out, above the short contracted base; without, striate, yellowish at the base, then green which merges into bluish-purple; within, yellow at the involute base, thence magenta-tinged, striate and slightly flecked below the blade. The blade is somewhat elliptic, longer than the claw, evenly violet except the dark veining and the often pale-flecked sides near the base. The style appendages are half-ovate, one-third to three-quarters of an inch long, unevenly toothed or jagged-toothed on the outer side and at the apex. The stigma is two-lobed, the lobes erose-toothed. The capsule is nodding, ellipsoid-ovoid, three to four inches long, bright-green, with six broad and rounded ridges, thick-walled. The seeds are numerous, in two rows in each capsule-cavity, one-third to one-half an inch broad, irregularly half-orbicular, uneven in thickness, brown, corky-walled.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—A terminal inflorescence with an open flower. Fig. 2.—A petal. Fig. 3.—A sepal. Fig. 4.—A capsule. Fig. 5.—A seed.



IRIS ATROCYANEA

(Plate 455)

IRIS ATROCYANEA

Dark-blue Iris

Native of southern Louisiana

Family IRIDACEAE — IRIS Family

Iris atrocyanea Small, sp. nov.

Among such a variety of colors and shades of color as are exhibited by the irises of the Lower Mississippi Delta it is difficult to decide which species has the most striking flowers. The pleasing element in the flower of the dark-blue iris that attracts the eye most promptly is the sharp contrast of two very decided colors, the narrow light-yellow or golden crest in the base of the very dark-blue sepal-blade. In most of the species there is an area of modified coloration between the crest and the dominant color of the sepal-blade, but in this case that feature is lacking. The colors are similarly contrasted in the sepals of *Iris vinicolor*.

The geologic and the geographic history of *Iris atrocyanea* is as obscure as that of many of its associates. Its ancestors certainly did not grow in the region to which it is now confined, for the lower Mississippi Delta has been quite recently laid down, geologically speaking. Why such gorgeous forms as now exist in southern Louisiana, or their ancestral forms, did not migrate to the Atlantic seaboard, or if they did why they subsequently disappeared is difficult to understand. That this species has been accustomed to a cooler climate than that of its present area of distribution is indicated by the fact that plants are hardy in the cold-frames at The New York Botanical Garden although thoroughly frozen in the winter. They are also hardy in the open with slight protection during the most severe winter weather.

Iris atrocyanea grows naturally equally as well in the open and in partial shade. Swamps and ditches under Cypress trees where water stands for long periods are its delight and marshes with a thin turf of grasses and small herbaceous plants support a luxuriant growth. The type specimen is in the herbarium of The New York Botanical Garden.

The dark-blue iris has a stout branching fleshy rootstock. The leaves are erect, three to five together at the base of the flower-stalk. The blades are narrowly linear-attenuate, usually three-quarters to one inch wide, deep-green. The flower-stalk is erect, two to three feet tall, with one or two flower-bearing nodes below the terminal,

the internodes slightly flattened, especially below the bases of the leaf-like bracts where they are usually sharply angled. The involucre is erect, of two or three main bracts, the outer bract lanceolate-attenuate, exceeding the flower, slightly keeled on the back, narrowly scarious margined, the inner (second) bract about equalling the base of the perianth, with a soft scarious tip. The flowers are usually paired at the tip of the flower-stalk, and single or paired in the axils of the leaf-like bracts below. The hypanthium covering the ovary is six-angled, together with the pedicel rather loosely enveloped by the involucre. The flower-tube is nearly cylindric, as long as the ovary. The three sepals are remate, two and three-quarter to three and three-quarter inches long, arching. The claw is shorter than blade, slightly narrowed to the base; without, green and obscurely striate; within, mainly green or yellowish-green, and green-striate on both sides of the prominent midridge, and also with short magenta striations curving out to the margins. The blade is orbicular-oval to orbicular-ovate, longer than the claw, obtuse or notched at the apex; without, dull violet-blue with darker veins; within, dark violet-blue and velvety, except the narrow bright-yellow or golden short-bearded crest at the base and the darker-almost black-line beyond the crest and the blackish fine veins. The three petals are somewhat shorter than the sepals, broadly spatulate. The claw is cuneate, somewhat shorter than the blade, involute at the base; without, mainly green, except the striate magenta margins; within, finely striate-ridged and magenta-tinted above the green or yellowish base. The blade is elliptic or oval-elliptic, longer than the claw, usually notched at the apex; without, rather dull deep violet-blue; within, bright deep violet-blue and sparingly darker-veined. The three stamens are about an inch and a half long. The filaments are greenish-yellow. The anthers are linear-lanceolate, white, longer than the filaments, sagittate at the base, usually acute or acutish at the apex. The three style-branches are linear-cuneate, about one and a half inches long, concave; without, magenta-purple, except the paler margins; within, magenta, paler on the sharp keel and the scarious erose margins which are sometimes sharply toothed near the base. The style-appendages are half-ovate, one half to three-quarters of an inch long, magenta, unevenly toothed on the outer side and at the tip. The stigma is two-lobed, whitish, the lobes finely erose-toothed. The capsule is ellipsoid or nearly so, about three inches long, bright-green and glaucescent, more or less prominently three-sided, the ridges flat or slightly concave, with more or less of a groove, the lobes (angles) rounded, flat, or slightly grooved, thus making the capsule somewhat six-angled. The seeds are numerous, in two rows in each cavity, somewhat over a half inch in diameter, irregularly half-orbicular, very unequal in thickness, brown, corky-walled.

JOHN K. SMALL

EXPLANATION OF PLATE. Fig. 1.—A terminal inflorescence with an expanded flower. Fig. 2.—A petal. Fig. 3.—A sepal. Fig. 4.—A capsule. Fig. 5.—A seed.

IRIS VERNA (MOUNTAIN FORM)

(Plate 456)

IRIS VERNA (MOUNTAIN FORM)

Mountain Violet-iris

Native of the higher altitudes of the southeastern United States

Family IRIDACEAE — IRIS Family

Iris verna L. Sp. pl. 34, 1753.

In most treatments of the genus Iris, the violet-iris, *Iris verna*, is indicated to have a range from the Coastal Plain to the mountains, with many herbarium specimens as evidence. That the plants from the two extremes of the range differ, has not been called attention to before; but the difference is so marked as to warrant the mountain plant as a distinct species but for the connecting forms occurring on the intermediate Piedmont region. Dr. Edgar T. Wherry, who has studied this plant in the field in some detail suggests the following to have been its geological history: During the several ice advances of the Glacial Period the southern Alleghenies no doubt had a considerably cooler climate than at present, and were largely occupied by plants of northern types. The finding of fossils of the tamarack (*Larix laricina* (DuRoi) Koch) in deposits of this age in Georgia, nearly five degrees of latitude south of its present southernmost native colony, brings this out clearly. Temperate climate plants were, however, able to survive on the Piedmont, and when the climate became warmer at the time of interglacial stages, so that the northern species largely died out, seeds from these piedmont refuges no doubt soon found their way into the higher altitudes, and started colonies in the unoccupied territory. Compared with the present-day members of this group in the mid-Piedmont, the mountain forms are decidedly denser in habit, with shorter and thicker rootstocks, and larger flowers sometimes quite lacking in odor. As the representative of this group which had occupied the Coastal Plain during the Tertiary showed opposite tendencies in these respects, the sum-total of the differences between them is considerable, and were not exact intermediates well developed in their ancestral Piedmont home, the two might well be classed as separate species. As it is, however, they seem best regarded as only geographical forms, as shown in the nomenclature proposed here.

The known range of the mountain violet-iris extends from South Carolina to West Virginia, usually at relatively high elevations, although it seems to mingle with the Piedmont form to some extent toward the inner edge of that province. The painting here repro-

duced was made from a plant collected on Panther Mountain, West Virginia, by Per Axel Rydberg in 1925. In its native haunts this iris is associated with small shrubs of the Heath and related families, especially *Epigaea* and *Galax*, in soils of rather high acidity and usually in open woodland. It begins to bloom in late April and often continues through the month of May, especially at the higher altitudes.

In the mountain violet-iris, the rootstock is torulose or alternately swollen and constricted, the nodes between the leaf-scars permanently close together, i. e., the internodes do not elongate and the roots are, borne freely along the entire length of the rootstock. The leaves are ten to fifteen inches tall, coral-pink at the base, with the color sometimes extending three to three and a half inches above the base, and colorless along the hyaline edges of the sheathing portion, persistent on the rootstock for three to five inches back from the growing tip; when finally they rot away, a raised light-brown ring remains on the rootstock: the blades are one third to one half an inch wide at maturity. The bases of the spent leaves are persistent on the rootstocks in brown tufts. The involucre is sessile, of usually seven to nine bracts, the outer two, three, or four scale-like, yellowish, the inner ones broad, successively longer, acute or slightly acuminate, and the two inner hooked at the apex, bright-green. The flower is erect, four to five inches tall, manifestly pedicelled, violet-scented. The hypanthium surrounding the ovary is slender spindle-shaped, three-angled, the angles and the faces with obscure median grooves. The free extended part (flower-tube) is stoutish, yellowish-green, with purplish stripes extending down from the base of the petals, between twice and thrice the length of the ovary, about equalling the involucre. The three sepals are one and three-quarters to two inches long, spatulate-cuneate, not distinguished into claw and blade, often abruptly acute, with a minutely papillose orange crest spotted with brown, and extending two thirds from the base, usually with flecks of white and lines of violet and brownish yellow between the crest and the violet margin and tip which is obscurely veined with deeper violet. The three petals are about as long as the sepals, broadly spatulate, with a very slender channeled claw which is pale-violet, becoming reddish-violet towards the base and an obovate deep-violet, abruptly acute blade. The three stamens are about three-quarters of an inch long. The style-appendages are half-ovate, nearly a half inch long, coarsely erose-lacerate. The stigma is entire. The capsule is oval or ellipsoid, varying to ovoid or obovoid, three-quarters of an inch to an inch and a quarter long, beaked, glabrous, long-stipitate, three-lobed, the lobes and the faces with slender ridges. The seeds are several in each capsule-cavity, the body is oval, about an eighth of an inch long, dark-brown, the aril is lateral and terminal, nearly or quite as long as the body, white or nearly so.

JOHN K. SMALL

EXPLANATION OF PLATE. Fig. 1.—Part of a plant in flower. Fig. 2.—A petal. Fig. 3.—A sepal. Fig. 4.—A capsule. Fig. 5.—A seed.

HEMEROCALLIS FLAVA

(Plate 457)

HEMEROCALLIS FLAVA

Lemon Daylily

Native of temperate Asia

Family LILIACEAE — LILY Family

Hemerocallis Lilio-Asphodelus var. *flavus* L. Sp. Pl. 324. 1753.
Hemerocallis flava L. Sp. Pl. ed. 2. 462. 1762.

The first mention of this daylily in botanical literature is by Pena and Lobel in 1570 under the name *Asphodelus luteus liliflorus*. The flower is described as yellow, the capsule as angular, and the seeds as black. Six year later Lobel gives the first illustration of this species in a wood cut showing an entire plant with the roots and rootstocks clearly indicating the habit of vegetative reproduction. At this early date it was recognized that there were two distinct types of daylilies in cultivation in Europe, one with yellow flowers and one with flowers tinged with cinnabar red.

During the next two hundred years various writers on botanical and horticultural matters make mention of this Lemon Daylily. Of these Linnaeus in his first edition of Species Plantarum (1753) used the name *Hemerocallis Lilio-Asphodelus* var. *flavus*, but later (1762) he reduced the name to *Hemerocallis flava*, a terminology that has been universally followed to the present.

The native home of this species is without doubt in the temperate areas of Eastern Asia. Evidently some of the best types of the wild species were taken into Europe at an early date for cultivation as a garden flower. In a few cases, writers speak of this plant as growing naturally in Austria, but it is most probable that it was and still is growing there as an escape.

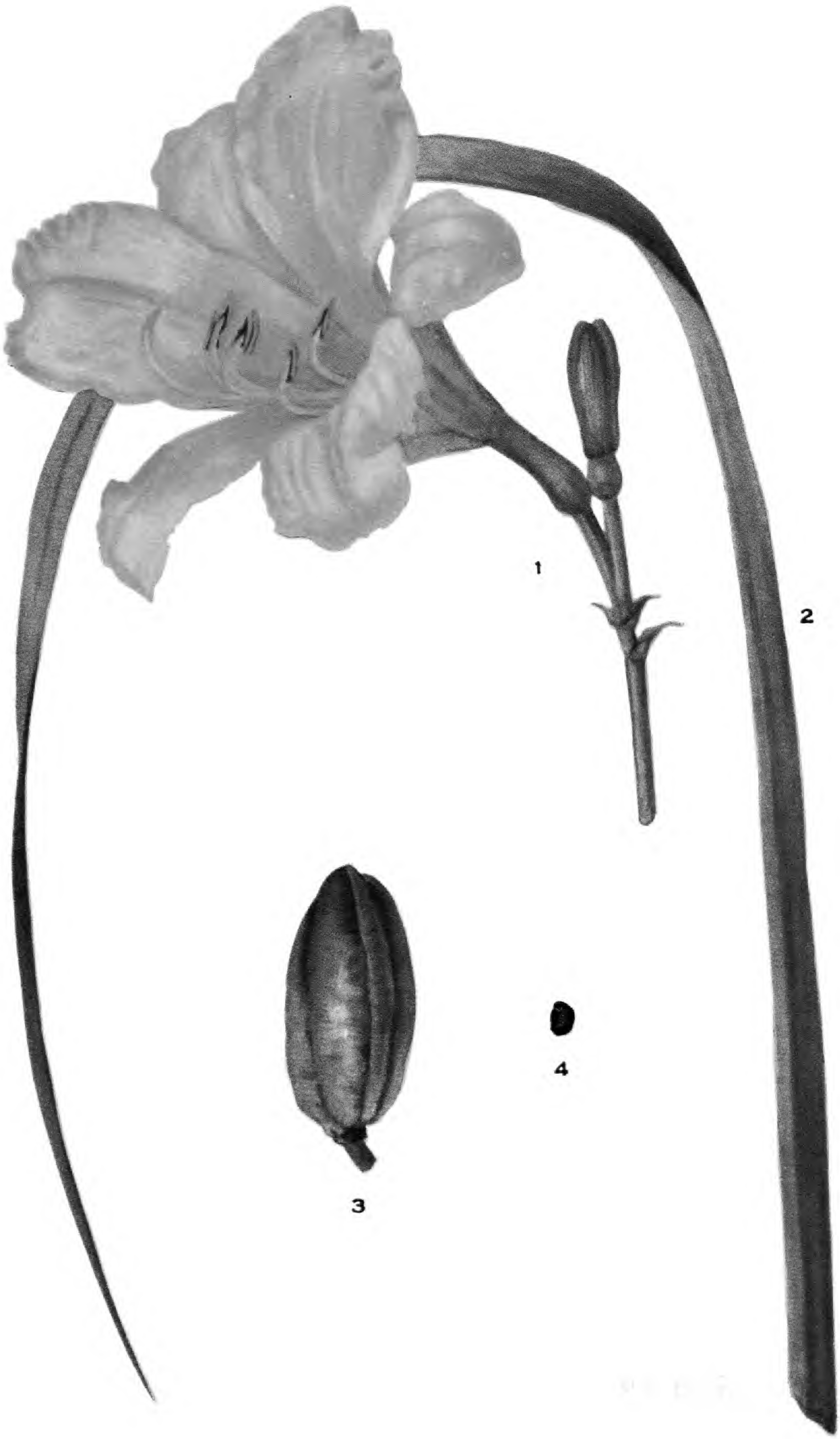
The plant here illustrated is of a stock grown at The New York Botanical Garden for at least twenty-five years. It is typical of the best strains of this species now in cultivation in America and is apparently very similar if not identical to the plants of the earliest descriptions.

Hemerocallis flava is the type of the genus and embodies the salient characters of all daylilies. The plant is a hardy perennial herb with fibrous-fleshy roots, and short underground rhizomes. The leaves are linear, radical, closely equitant below in two ranks, becoming nearly flat near the tip, and ascending-spreading and recurving in habit of growth. The foliage is medium dark green and stands at a general level of about thirty to thirty-six inches. The The flowers are on slender stiff scapes which arise directly from the

crown and stand at a height only a few inches above the foliage. The scape is usually few-branched, more or less grooved above, with flowers mostly sessile on the branches. The perianth is composed of three sepals and three petals which are united below into a tube, but are spreading above to make a flower from three to three and one-half inches wide. The color of the inner face of the flower is lemon chrome, a pleasing shade of yellow. The perianth tube averages three-fourths of an inch in length. The sepals reach a width of one-half inch and the petals are about twice this width. The flowers emit a pleasing odor and the segments are sufficiently large and overlapping to make a full flower. The six stamens are inserted on the perianth tube; they are protruding and upturned and slightly shorter than the pistil. The ovary is superior but enclosed within the perianth tube; the style is slender, upturned, shorter than the perianth, and the end is slightly enlarged into a glandular stigma. The capsule is three-celled, loculicidal, broadly elliptic in vertical outline, in median cross-section almost triangular, broadly and slightly grooved along the median line of each valve, and sharply but very shallowly-grooved along the lines of juncture between valves, the six grooves meeting at the apex in a slight indentation, The capsules measure as much as one and three-fourths inches long by one and one-fourth inches in diameter. The seeds are black, numerous, smooth, and irregularly rounded or somewhat appressed.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—Apex of scape with an open flower, flower buds, and the subtending bracts. Fig. 2.—Tip of a leaf. Fig. 3.—Capsule fully developed, drawn at natural size while still green to show shape. Fig. 4.—A seed.



HEMEROCALLIS MINOR

(Plate 458)

HEMEROCALLIS MINOR

Grass-leaved Daylily

Native of northern and eastern Asia

Family LILIACEAE — LILY Family

Hemerocallis minor Miller, Gard. Dict. Ed. 8, 1768.
Hemerocallis graminea Andr. Botanists Repository 4: plate 244, 1810.
Hemerocallis graminifolia Schlecht. Halle Abh. 1: III: 11. 1853.

The specific rank of *Hemerocallis minor* was bestowed by Miller in 1768. Previous to this date several writers had merely mentioned what they considered to be a variety "*minor*" of the species *H. flava*. Miller describes the plant as closely related to *H. flava* but as having shorter leaves, not more than half as wide as those of *H. flava*, and scapes that rise only one and one-half feet. He states that the flowers bloom in June and that the roots do not increase as fast as those of plants of *H. flava*.

In later descriptions and illustrations, the names *H. graminea* and *H. graminifolia* are applied to plants that may or may not have been the same as Miller's type. Thus a colored illustration in the Botanical Magazine 1805 plate no. 873 shows under the name *H. graminea* two types of flowers, one with reddish brown coloring on the perianth tube. Another illustration in color by Andrews (Botanical Repository 4: plate 244, 1810) shows, under the name *H. graminea*, flowers with the sepals decidedly reddish brown, a character strongly developed in *H. Dumortierii* and not at all present in *H. flava*. Absence of very complete data regarding these plants and lack of any data regarding their capsules make their identification uncertain. While Miller makes no mention of the capsules of his species *H. minor* it is clear that his plants very closely resembled *H. flava* but were smaller in stature.

Of several plants received at The New York Botanical Garden under various names the one here illustrated seems most conforming to the description of Miller. This plant is one of several plants identical in character received under the name *H. graminea* from Professor Karl Killian of the Universite de Strasbourg, France.

Hemerocallis minor, of the strain here described, has slender flower scapes from one and one-half to two feet tall. The longest leaves are usually from fifteen to eighteen inches in length but are somewhat weakly ascending and hence the flowers stand well above the foliage. The leaves are more slender and less ascending and erect than are the leaves of *H. flava*. Also the plant branches more

compactly in its crown and is without spreading rootstocks. The scapes are branching above, with some flowers almost sessile and others short-pedicelled. The perianth tube is greenish and the sepals are faintly tinged with brownish red; a feature not present in *H. flava* but shown in the illustrations by Andrews mentioned above. The largest flowers reach a width of three inches, which is slightly larger than flowers of *H. flava*. The petals are usually an inch in greatest width and are somewhat spatulate in shape. The color of the inside of the sepals and petals is uniform and near the shade lemon chrome. The capsule is narrow-elliptic in outline, somewhat triangular in cross mid-section, broadly grooved along the middle of each valve, and averaging one and one-half inches in length and usually not as much as one inch in greatest diameter. The capsule is slightly more deeply and much more narrowly grooved than the capsule of *H. flava*. The seeds average one-eighth inch in length, of the smallest size known for any species of *Hemerocallis*, and as many as fifty-three have been obtained from a single capsule. At The New York Botanical Garden the plants here described begin flowering about ten days later than do plants of *H. flava*.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—Flower with summit of scape. Fig. 2.—Upper portion of leaf. Fig. 3.—Capsule fully developed as to size. Fig. 4.—A seed.

HEMEROCALLIS THUNBERGII

(Plate 459)

HEMEROCALLIS THUNBERGII

Thunberg's Daylily

Native of temperate eastern Asia

Family LILIACEAE — LILY Family

Hemerocallis Thunbergii Baker, Gard. Chr. 8: 95. 1890.

The species *Hemerocallis Thunbergii* was first described in 1890 from living plants that were being grown in the Royal Botanic Gardens at Kew, England. When and where these plants were obtained is not known with certainty but it was thought that they came originally from the mountains of Japan. They first attracted attention as distinct from *H. flava* by the habit of blooming about a month later.

Through the courtesy of Dr. Albert N. Steward of Nanking University seeds of this species were collected from wild plants on Purple Mountain near Nanking, China. Mr. Henry H. White of the American Presbyterian Mission has also sent seeds of this daylily of which he says he has seen "thousands growing wild all over North China". From this seed more than one hundred plants have been grown to maturity at The New York Botanical Garden. These plants were rather uniform in the color of the flowers, in the general character of the capsules, and in having tall branching scapes. But the segments of the flowers varied greatly in shape, in size, and in width. None were better as garden plants than the clons of the species described by Baker and now in general cultivation. In the size and the fullness of flowers, in the relative height of leaves and scapes, and in general appearance the type in general garden culture is perhaps the best of the species. The plant here illustrated and described is one of several which have been growing in The New York Botanical Garden since the early days of its development. *Hemerocallis Thunbergii* is very distinct from *H. flava*, especially in the character of the capsules. It is most closely related to *H. citrina*.

Plants of Thunberg's Daylily have a robust and compact habit of growth, spreading in the crown by erect branches rather than by spreading rhizomes. The foliage is dark green in color. The leaves are rather slender with a width less than one inch, and are ascending-spreading to a general level of about thirty inches. The scapes are slender but stiffly erect to a height of as much as forty five inches which is well above the level of the foliage. They are much branched above, and the lower branches are in the axils of stiff bracts

as much as three inches long; The flowers are short-pedicelled, and average about three inches in spread. The petals are somewhat spatulate in shape. The perianth tube is decidedly green in color and tinges of green are rather strong on the outside of the sepals and in the throat of the flower. The general color is lemon yellow and is gold-glistening in sunlight. The flowers tend to wilt and fade in the afternoon of hot days. The capsule is about one and one-half inches long, about three-fourths inch in greatest diameter, broadly blunt and almost truncate at the apex.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—Flower with upper portion of scape. Fig. 2.—Portion of leaf. Fig. 3.—A capsule. Fig. 4.—A seed.

HEMEROCALLIS FULVA CLON MACULATA

(Plate 460)

HEMEROCALLIS FULVA CLON MACULATA

Maculata Daylily

Native of Central China

Family LILIACEAE — LILY Family

Hemerocallis fulva var. *maculata* Baroni, Nuovo giorn. Bot. Ital. 4: 306. 1897.
Hemerocallis fulva clon Maculata Stout, Clon nov.

A type of single-flowered daylily with cinnabar red coloring in the flowers was described by Lobel in 1576 and recognized by him as distinct from the yellow-flowered Lemon Daylily (*H. flava*). In 1601, Clusius states that this plant was being grown in many gardens throughout Austria and Germany. At first Linnaeus considered that this fulvous daylily was a hybrid but later (1762) he gave to it the specific rank and the name *H. fulva* which have since been accorded to it. This particular type of daylily never yields seeds to self-pollination but it has been propagated by vegetative means until it is widely distributed in Europe and America. Such a group of plants is known in horticulture as a "clon" to distinguish it from a variety that is multiplied by seed reproduction.

When botanical studies of the native wild flora of Japan and China were made the exact counterpart of the cultivated clon of *H. fulva* was not discovered. But plants somewhat similar to it were found and upon these were bestowed such names as *H. disticha* Donn, *H. longituba* Miq., and *H. fulva* var. *longituba* Maxim. Evidently the wild members of the species *H. fulva* are variable or there are several closely related species more or less intermingled in nature.

The plant from which the strain *H. fulva* clon Maculata was derived was sent from Shen-si, China, by Padre Giraldi to Florence, Italy, where it was soon grown in the Botanical Garden. In 1897 Baroni bestowed on it the varietal name "*maculata*," and soon thereafter living plants of it were obtained by C. Sprenger of Naples for propagation and distribution to the trade. The plant here illustrated and described was obtained as a gift from Willy Müller, a nephew of C. Sprenger, who was associated with him in nursery work in Naples and who still continues this business in Naples. The original plant obtained at Florence has been propagated vegetatively and our plant is merely a branch from that plant as are all others of this clon.

The clon *H. fulva* Maculata is here illustrated because it is a plant of known wild origin, because it has larger flowers than the older

type of *H. fulva* long in cultivation, and because it is new to American gardens. This clon does not yield seed to any kind of pollination within the clon and hence it can be propagated only by vegetative means, but it may be and has been employed in hybridization.

Plants of the Maculata Daylily are of robust growth with strong and spreading rhizomes and foliage as much as forty-five inches long. The leaves are pale green in color, slightly over an inch in width, strongly two-ranked and distichous in arrangement, and rather stiffly recurving at a general level of about three feet. The scapes are usually about four feet in height, stiffly erect, somewhat angled above, at the base much flattened on the inner side, and coarsely two- to four-branched at the apex.

The flowers are nearly sessile. The petals are oval in outline, as much as four and one-half inches long and a little more than one and one-half inches wide. Their color is cadmium in the throat, dragon's blood red in an arching band across the mid-section, and in the outer portion the general color is ferruginous with darker veins. A stripe of the cadmium color extends along the midvein. The surface is gold-glistening. The sepals are more narrow than the petals and a mid-zone of red is faint or lacking. The segments of the flower are strongly spreading and recurving and the expanded flower has a spread of nearly six inches. The pistil is somewhat shorter than the petals and the stamens are still shorter. The capsule (obtained only by cross-pollination) is broadly obovate, the apex broadly truncate and indented. The median line of each valve is somewhat sharply and deeply grooved and the groove between the valves is sharp and narrow. In shape, size and general character the capsule is typical for the cultivated *H. fulva* (capsules obtained by cross-pollination) and for many of the wild plants of this species or of the types named *H. disticha* and *H. longituba*. Compared with the cultivated single-flowered clon of *H. fulva* the clon Maculata is to be distinguished by the larger flowers, the somewhat shorter scapes, the slightly paler color of the outer part of the petals, and a slightly later season of blooming.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—Flower. Fig. 2.—Capsule and portion of scape. Fig. 3.—Seeds. Fig. 4.—Sketch showing a small plant at end of a rhizome with its fleshy roots and with only the basal portion of the leaves shown.

HEMEROCALLIS AURANTIACA

(Plate 461)

HEMEROCALLIS AURANTIACA

Orange Daylily

Native of Japan

Family LILIACEAE — LILY Family

Hemerocallis aurantiaca Baker, Gard. Chr. 68: 94. 1890.

The specific name *H. aurantiaca* was given by Baker in 1890 to a plant that was there growing in the Royal Botanic Gardens at Kew, England. He described this plant as "robust, with a large, deep orange, little-opened flower", and mentions that its native home was not known to him, and that he found nothing that "matches it amongst the large series of dried specimens in the Kew Herbarium" This plant which was observed growing at Kew was propagated by division and gave rise to the clon of plants now in cultivation in Europe and America under the name *H. aurantiaca*.

Whether this clon arose from a seedling that may have been a chance hybrid or whether it represents a true wild species is at present not known with certainty. All plants of *H. aurantiaca* thus far studied by the writer have been fully self-incompatible and hence there has been no opportunity to study their own seedlings for evidence of specific rank. The plants readily yield seeds to crosses with other daylilies and in crosses with such species as *H. Thunbergii* the offspring are only slightly variable among themselves. At the present time it is not certain to what extent the type *H. aurantiaca* is represented in the native flora of either Japan or China. In the Somoku-Dzusetsu, an early Japanese treatise on plants, there is an uncolored plate of a daylily which was later identified by Makino (3rd Edition of Somoku, vol. 6. plate 13) as the *Hemerocallis aurantiaca* Baker, and it is stated that this plant grew wild in the region of Mt. Ibuki.

It should be noted that Baker also described (Gard. Chr. **78**: 62. 1895) as *H. aurantiaca* var. *major* a plant which is somewhat similar to *H. aurantiaca* but which bears larger and finer flowers. It is known that this plant came from Japan where it was first found growing under conditions which suggest that it was a chance seedling of an accidental cross (See The Garden **48:** 400. 1895). Baker considered that the plant he described as *H. aurantiaca* stands most closely to *H. Dumortierii*, but the fulvous element in the coloring of the flowers suggests a close relationship to *H. fulva*.

Plants of *H. aurantiaca* possess rather dark green foliage of robust and strongly distichous habit. Individual leaves are as much as thirty inches long and one and one-half inches wide; they are stiffly ascending and recurving. The scapes are coarse, ascending rather than erect, coarsely branching above and reaching a height of as much as three feet. The flowers are grouped irregularly on the main scape and on its branches, and are either sessile or on short stout pedicels. The open flower has a spread of about five inches. The segments are stiffly recurving, of firm texture, and those on the lower side of the flower are less recurving and hence more protruding, which accentuates the asymmetry of flowers, which is a characteristic feature of the genus *Hemerocallis*. In the throat of the flower the color is orange, but outside of this area the petals and sepals are delicately tinged with English red and the surface is strongly gold-glistening in sunlight. The largest of the capsules obtained by cross-pollination are nearly two inches long and one inch in greatest diameter, oval in outline, broadly grooved along the median line of each valve, obtuse and slightly indented at the apex.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—A fully opened flower with portion of scape. Fig. 2.—Portion of a leaf. Fig. 3.—A capsule.

PLATE 462

ADDISONIA

HEMEROCALLIS DUMORTIERII

(Plate 462)

HEMEROCALLIS DUMORTIERII

Dumortier's Daylily

Native of Japan

Family LILIACEAE — LILY Family

Hemerocallis Dumortierii Morren, Hort. Belg. **2**: 195. 1834.
Hemerocallis rutilans Hort.
Hemerocallis Sieboldii Hort.
Hemerocallis graminea Schlecht. Halle Abh. **1**: III: 11. 1853.

Living plants of *H. Dumortierii* were first sent from Japan to Europe by M. von Siebold. These plants bloomed in the Botanical Garden at Ghent, Belgium in 1832, and two years later they were described as a new species and illustrated in a colored plate. Evidently this original type of this species has been kept in cultivation to the present time largely by vegetative propagation. There are, however, in cultivation somewhat different forms, some more dwarf than the type. For a time in certain quarters this species was confused with *H. Middendorffii* and in one case a fine colored plate of the latter (The Garden, plate 589, 1887) bears the name *H. Dumortierii*.

This species is readily to be distinguished from all other daylilies. It shares with *H. Middendorffii* in having a rather dwarf-like habit of growth and in possessing naked unbranched scapes, but it differs from this species in having a decidedly red coloration of flower buds, narrow petals, a globose capsule, and scapes that are mostly shorter than the leaves.

The plant here illustrated is one long grown at The New York Botanical Garden. This plant is identical to numerous plants of this species obtained from various points of Europe. Is is frequently reported that this species is the first of the daylilies to bloom in spring but at The New York Botanical Garden it is often several days later in blooming than plants of *H. flava*.

Plants of *H. Dumortierii* stand at a height of about one and one-half to two feet with many of the scapes slightly below the tips of the leaves. The plant spreads compactly and is without widely-spreading rhizomes. The foliage is rather stiffly ascending-spreading. The leaves are rather coarse, many being nearly an inch in width. The scapes are unbranched and the flowers are sessile or with short pedicels, and are compacted into a close inflorescence usually of from two to four flowers. Each flower is subtended by a leafy bract, the lowermost one being broadly clasping at the base, acuminate at the apex and usually as much as one and one-half

inches in length. The flower buds are strongly tinged with a brownish-red which persists on the back of the sepals after the flower is open. The petals average about one-half inch in greatest width and about two inches in length and the sepals are somewhat smaller. The segments are spreading but not strongly recurving. The color of the inner surface of the flower is almost orange. When well filled with seeds the capsules are slightly more than an inch in length, decidedly globose in shape, slightly grooved, and somewhat depressed at the apex.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—An open flower. Fig. 2.—A cluster of buds showing the sessile flowers, the character of the subtending bracts, and the red color of flower buds. Fig. 3.—A portion of the leaf. Fig. 4.—A capsule.

PLATE 463

ADDISONIA

HEMEROCALLIS MIDDENDORFFII

(Plate 463)

HEMEROCALLIS MIDDENDORFFII

Amur Daylily

Native of the Amur Region, Asia

Family LILIACEAE — LILY Family

Hemerocallis Middendorffii Traut. and May. Flor. Och. Phaen. p. 94. 1856.

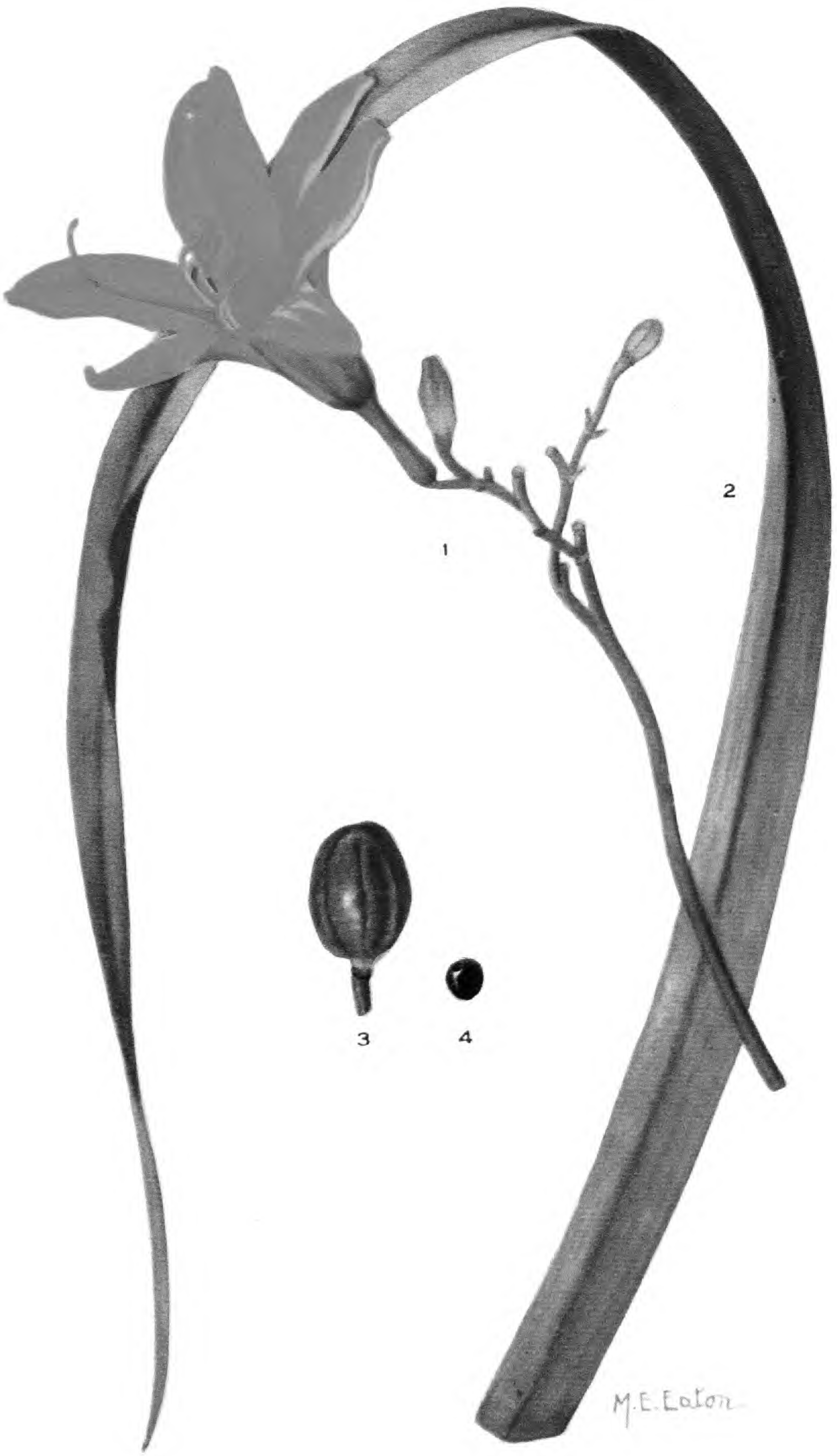
The name *Hemerocallis Middendorffii* was bestowed in 1856 on plants previously collected by Middendorf in the Amur region. The few and poor herbarium specimens of this collection did not admit of full and accurate description. The species is, however, one of such distinctive characters that the identity is certain. A description by C. J. Maximowicz in 1859 (Prim. Florae Amur.) adds very little to the earlier description. In 1866, E. Regel records that plants of this species were then in culture in the Royal Botanic Garden at St. Petersburg, and he describes the flowers as golden yellow in color. Regel also gives an uncolored plate (Gartenflora 15: plate 522) which shows the spatulate shape of the petals and the sessile grouping of the flowers. A very similar illustration is presented in the Revue Horticole of 1897, plate 139. A plate in color illustrating the flower of this species was published in The Garden (1887, plate 589) but this plate is wrongly labelled as *Hemerocallis Dumortierii*. There have, apparently, been no illustrations and description of the capsules of this species previous to those of the present article. The plant here illustrated and described was presented to The New York Botanical Garden in 1923 by Mr. Bertrand H. Farr, who was then president of the Farr Nursery Company.

The foliage of the Amur Daylily is medium dark green in color. The leaves are seldom more than three-fourths inch in width or more than two feet long. The plant spreads compactly by short lateral branches of the crown which arise directly, and not by spreading rhizomes. The scapes are unbranched and slightly taller than the leaves. The flowers are sessile and closely clustered with broad clasping bracts seldom more than one inch in length. The flower bud is slightly green but is without brown coloring, and is somewhat ridged or pleated. The sepals are about five-eighths inch wide and two and one-half inches long, and lanceolate in shape. The petals are spatulate in shape, an inch or more in greatest width, and delicated veined and reticulated. The segments spread widely, giving to the open flower a diameter of at least three inches. The color of the flower is a uniform orange, abundantly gold-glistening in sunlight. The capsule is decidedly triangular in cross-section, elliptic in longitudinal outline, and the surface is more or less cor-

rugated with lateral ridges. In its low-growing habit and in the simple unbranched scape and sessile clustered flowers this species stands close to *H. Dumortierii*, but the shapes of the petals and of the capsule are very different, and the scapes are taller in relation to the leaves. The capsules of *H. Middendorffii* are in general shape most similar to those of *H. flava* and *H. minor*.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—Open flower. Fig. 2.—Upper portion of a leaf. Fig.3.—Apex of scape showing sessile flower buds and subtending bracts. Fig. 4.—A fully matured capsule still green in color. Fig. 5.—Capsules that are dry and dehiscing. Fig. 6.—A seed.



HEMEROCALLIS MULTIFLORA

(Plate 464)

HEMEROCALLIS MULTIFLORA

Many-flowered Daylily

Type Locality, KiKungShan, Honan, China

Family LILIACEAE — LILY Family

Hemerocallis multiflora Stout, sp. nov.

During the autumn of 1925, Dr. Albert N. Steward, then a member of the faculty of The University of Nanking, China, obtained divisions of fifteen different plants that were growing wild at KiKungShan, Honan, China and shipped them to The New York Botanical Garden. Ten of these survived the transplanting and have proved to be very uniformly alike and so distinct from any of the known species of *Hemerocallis* as to merit specific designation. The description here given is for these plants as they grow at The New York Botanical Garden and it is based on three years of observation.

The type locality for this new species is described by Dr. Steward as a "brushy flat in the bottom of a rocky gorge, not far from a good-sized mountain stream, at an elevation of about 1500 feet."

The foliage of *Hemerocallis multiflora* is medium dark green in color. The leaves are as much as three-fourths inch in width and thirty inches in length. They are strongly recurving and reach a general level of fifteen to eighteen inches above the ground. The plant spreads compactly with short ascending branches in the crown rather than with wide-spreading rhizomes. The slender scapes are often four feet tall, rather weakly erect at first, and later bending under the load of flowers and fruit and even arching to the ground.

The scapes are abundantly branched above for a distance of about eighteen inches; the smaller branches are more or less fused and hence grooved; the primary branches are subtended by leafy bracts which are sessile, clasping at the base, keeled, and very slenderly acuminate; the lowermost as long as two inches. The first branch of each lateral is without a bract at the point of its separation. The flowers are numerous, as many as seventy-five to one hundred being produced on a single scape, and a plant may have numerous scapes, depending on its spread in the soil. The flowers are on short pedicels. The perianth tube averages about five-eighths inch in length. The largest flowers are those of the early and the midseason of blooming when the spread of flowers is almost three inches; their sepals are about two inches long and slightly more than one-half inch in greatest width; their petals average two and one-fourth inches in length and slightly more than three-fourths inch in greatest width. The sepals are almost lanceolate and the petals are somewhat spatulate in shape. The segments are spreading; the sepals are the more recurving. The color of the inside of the flower is of a shade

between chrome and cadmium yellow, and is abundantly gold-glistening. The perianth tube is tinged with green and the back of the sepals is slightly colored with brownish red. The stamens average a little less than two inches in length and the pistil is somewhat longer but not equal to the perianth. The capsules are seldom more than an inch in length, slightly ovoid as in the Plate or are more obovoid. The capsules are similar to those of *H. Thunbergii* but are smaller and usually more grooved toward the apex. The seeds are often three-sixteenths of an inch in greatest diameter and are rather large in comparison with the capsule. Two of the ten plants of *H. multiflora* grown at The New York Botanical Garden have bloomed during the month of July, but mostly the others begin blooming in August and continue until late in September or even into October after all other species of daylilies are through blooming. Of the known species of daylilies *Hemerocallis multiflora* has the smallest capsules and the greatest number of flowers to a scape.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—Flower with portion of scape. Fig. 2.—Upper part leaf. Fig. 3.—Capsule of mature size. Fig. 4.—A seed.

NARCISSUS "FAIRY"

(Plate 465)

NARCISSUS "FAIRY"

"Fairy" Narcissus

Of Horticultural Origin

Family AMARYLLIDACEAE AMARYLLIS Family

The eight plates of this number represent *Narcissi* or "Daffodils" of horticultural origin. They are all of them by now of what horticulturalists know as "standard" quality only two being of recent introduction to commerce in the United States. In each case a finer variety may have been produced to take its place but the new one is not yet available in sufficient quantity to cause those pictured here to recede to the Royal Horticultural Society's list of obsolete and superseded varieties. We may consider, then, that we have here eight varieties, representing seven groups of the classification which has been in use in late years for exhibitors in narcissus shows, and, each of these varieties is still to be recommended for general horticultural use, expected to give adequate return in bloom and increase with ordinary care and they are varieties that, if properly grown and shown, will not disgrace the exhibitor at the spring flower-show.

The collection from which the varieties illustrated were chosen was planted in the autumn of 1924, over thirty-seven thousand of the bulbs having been the gift of the Dutch Bulb Exporter's Association and about ten thousand having been purchased with money subscribed by Garden Clubs and others. Besides groups representing the original one hundred and thirty varieties arranged to follow The Royal Horticultural Society's classification, a large section of ground was "naturalized". The collection has since been added to and now represents over two hundred varieties. Those shown in this number were all in the original collection and are pictured in normal size for ordinary garden conditions in the vicinity of New York.

Narcissus "Fairy" belongs to the yellow "trumpet" section and was raised by John B. Vanderschoot of Hillegom, Holland, being introduced to commerce in 1906 and has received much of its popularity in this country through the efforts of Mr. Chester Jay Hunt, an excellent judge of *Narcissi* and whose selections are rarely wrong.

"Fairy" blooms very early and is superior to the older variety "Golden Spur". It is larger and of a clearer, light golden yellow, retaining its color after rain and in strong sunlight. This variety

will force well and persists when grown in grass which is unusual with trumpet daffodils, the variety "Emperor" being the only other reliable one for naturalizing purposes.

The flower of Narcissus "Fairy" is empire yellow and is held so the trumpet points upward rather than level. The perianth segments are one and three quarters of an inch long and pointed, being one inch broad at their widest which is one third of the way from their base. The three inner perianth segments are more pointed than the others and all curve slightly forwards. The trumpet is two inches long, flaring at the mouth which is one and three quarters of an inch in diameter. The edge of the trumpet is slightly serrate and turned back three eighths of an inch. The stamens are empire yellow. The pollen is the same color as the stamens. The style is all empire yellow. The stem is nine inches long, sturdy and half an inch in diameter at the ground and is French Green. The leaves are eleven inches long, three quarters of an inch wide, rigid, deep malachite green and twisted near the apex. They are very numerous but twisted away from the flowers and do not hide the bloom.

ETHEL ANSON S. PECKHAM.

NARCISSUS "PETER BARR"

(Plate 466)

NARCISSUS "PETER BARR"

"Peter Barr" Narcissus

Of Horticultural Origin

Family AMARYLLIDACEAE — AMARYLLIS Family

The trumpet daffodils are perhaps less changed than some of the other groups but the "white trumpet" section is a remarkable advance over everything that was known seventy-five years ago. The first flower to be considered a real improvement from a horticultural point of view was "Mme. de Graaff" which opens lemon yellow and fades to a creamy trumpet and a whiter perianth. "Peter Barr", larger than previous varieties and a purer white, has been extensively used for hybridizing, being the remote ancestor of many prize-winners. This famous narcissus was raised by the firm of Barr & Sons of London and named after the late Peter Barr, rightly known as the "Daffodil King", the person above all others responsible for the renewed interest in *Narcissi* during the Nineteenth and Twentieth Centuries. To him goes the crown; for he explored, travelled and brought together a great collection of species and horticultural varieties and he produced numbers of new daffodils superior to anything known before. By his enthusiasm and labors he popularized this flower so it is now, perhaps, next to the rose, the best-loved flower of the present time.

Narcissus "Peter Barr" received a First Class Certificate from the Royal Horticultural Society on the eighth of April 1902, and later the same honor from the Cornwall Daffodil Society. Awards of Merit were given to it by the Devon Daffodil Society and the Royal Botanical Society at London and Huntington. This variety was introduced by Messrs. Barr & Sons in 1903 and brought fifty pounds Sterling a bulb, an unheard of price up to that time, causing a sensation in the horticultural world. It is still worth growing, the only drawback being a short stature for the length of the trumpet.

The flowers of "Peter Barr" give the general effect of a creamy white. While the trumpet is drooped slightly as the flower opens, at maturity it is held horizontal and even has a tendency upwards. The perianth is creamy white; the segments curving forward, pinched and slightly twisted, are one and a half inches long and one inch in breadth, of papery quality. The cup or trumpet is one and three quarters of an inch long, of a pale chalcedony yellow with a serrate, fimbriate edge which turns slightly outwards. The base of the

throat, if viewed down the length of the trumpet, is strontian yellow and the outside of the tube, behind the perianth, is five eighths of an inch long, strontian yellow, flushed dull green yellow. The stamens, inserted at the base of the tube are, together with the style, and pollen, barium yellow. The perfume, of medium strength, has a flavor of Castile soap. The stem is twelve inches long and the leaves, of a rich bluish green, fourteen inches long, are five eighths of an inch wide, narrowing at the tip and have a slight twist two thirds of the distance from the ground, Although the leaves are so much longer than the flower-stems the flowers show well when growing because the leaves spread outwards instead of being held rigidly erect.

ETHEL ANSON S. PECKHAM.

PLATE 467

ADDISONIA

NARCISSUS "EDRIN"

(Plate 467)

NARCISSUS "EDRIN"

"Edrin" Narcissus

Of Horticultural Origin

Family AMARYLLIDACEAE — AMARYLLIS Family

Narcissus "Edrin" belongs to the yellow division of the "incomparabilis" section. This variety was raised by Mr. W. A. Watts of St. Asaph, Wales, and named and introduced by Mr. Chester J. Hunt of Little Falls, New Jersey, in 1922. "Edrin" is the result of a cross between "Sir Watkin" and *N. ornatus* and retains the yellow color, the height, strength of stem and massive foliage that characterize "Sir Watkin". The flower has no other resemblance to the parents. With the exception of its strong growing quality and aptitude for growing in grass, whether in sun or semi-shade, one would find nothing of *N. ornatus* present! A peculiarity of "Edrin" is the effect given of two triangles, one imposed upon the other. The curling of the perianth segments causes this.

The flower is held so it "looks one in the face" and is of thick enough substance to withstand rain and strong sun after a shower. This is a good daffodil for cutting and could be used for market purposes. The "incomparabilis" group is perhaps the largest of all those arbitrarily made by the Royal Horticultural Society. The two divisions, "all yellow" and "bicolor" comprise such a number of varieties and of such varied shapes and sizes it is easy for the amateur gardener to have an attractive collection of daffodils and have none but "incomparabilis" varieties. John Parkinson in 1629 spoke of the "great None such Daffodill, or Incomparable Daffodill—the cup doth very well resemble the chalice, that in former dayes with us, and beyond the Seas is still used to hold the Sacramentall Wine, that is with a narrower bottome and a wide mouth" . If we look at the picture in his "Paradisi in sole paradisus terrestris" we will see a close likeness to Sir Watkin and many others of the present "incomparabilis" section.

In Parkinson's time there were a number of daffodils known in gardens but he regrets the many varieties that had been in cultivation before his time and had disappeared. Apparently nothing was done to correct this until the middle of the Nineteenth Century when Mr. Backhouse and Mr. Leeds began seriously to hybridize. Their work was carried along by others, notably by the Rev. G. H.

Engleheart. Each of the hybridizers has had his specialty. The greatest success has been perhaps in one line and he becomes known for certain types of flowers, thus we associate "trumpet" varieties with the name Van Waveren, poeticus and dazzling white flowered sorts with Engleheart, red cups with Backhouse, snowy "Leedsii" varieties with A. Wilson and the Brodie of Brodie, and so it goes. All these marvelous varieties we have now originally came from six species. It has been said that if these six, *Narcissus bulbocodium*, *N. triandrus*, *N. poeticus*, *N. pseudo-narcissus*, *N. jonquilla* and *N. tazetta*, were to be taken and crossed and recrossed enough times we would reproduce all the known daffodils.

All the "incomparabilis" varieties are supposed to have originated from trumpet (*N. pseudo-narcissus*) crossed with *N. poeticus* and modern hybridists who wish to produce this class use the same combination. The red in the cups is judged to come from the poeticus side.

Narcissus "Edrin" has a flower four inches in diameter. The perianth segments, of citron yellow, are a quarter of an inch long. The three inner segments are slightly shorter, being curved up while the three outer ones are held flat. The lemon chrome cup, one and a quarter inches in diameter, is spread open and deeply ridged, waved at the edge. The centre is green and the pollen and style are lemon chrome to match the cup. The slightly curved tube is calliste green, the flower being held well up so there is never any appearance of nodding or drooping. A pleasant fragrance of sweet soap is given out on warm days. The fourteen inch long foliage, an inch shorter than the flower-stem, is of a deep, dull yellow green and three quarters of an inch wide, tapering to half an inch near the apex. It bends back with one twist at the top and terminates in a rather sharp point.

ETHEL ANSON S. PECKHAM.

NARCISSUS "WHITE QUEEN"

(Plate 468)

NARCISSUS "WHITE QUEEN"

"White Queen" Narcissus

Of Horticultural Origin

Family AMARYLLIDACEAE — AMARYLLIS Family

When the Narcissus classification was made after the Conference of 1884 the group with white flowers or with white flowers with lemon or sulphur cups was named by Mr. Barr, after Mr. Leeds, a stock broker of Manchester, England, who had raised many daffodil seedlings and who was one of the greatest enthusiasts about that flower during the Nineteenth Century. This section has two divisions, one with "incomparabilis" measurements, namely the cup measuring more than one third the length of a perianth segment and one with short or flat cups following the "Barrii" measurements.

Narcissus "White Queen" is a giant "Leedsii" and belongs to division A.

The Reverend G. H. Engleheart is perhaps the person responsible for the greatest number of good daffodils that are known to horticulturalists at the present time. He has raised many good poeticus varieties, many dazzling Barriis and several of the most startling of modern *Narcissi*, among the most famous being the white trumpet "Beersheba" and the Giant "Leedsii", "Tenedos". "White Queen" is not new for it received the coveted First Class Certificate of the Royal Horticultural Society in 1898, being first introduced in 1901. It is a good grower and comes into bloom just after the early varieties. Many of these finer varieties are good "forcers" and may be grown in pots. The forced-bulb show held in London each year is of great value to florists and amateurs, allowing them to see the newer varieties and also to know what may be forced successfully and the period of bloom. It is not difficult to force *Narcissi* if attention is paid to certain details. The bulbs should be potted up in August, suitable varieties being chosen. Broken pieces of charcoal should be placed in the bottom of pots or boxes (these boxes should have drainage holes in the bottom) then comes a layer of old, partly decayed sod upon which is put the mixture of good top soil, sharp sand and a small portion of wood ashes. A little soot will do no harm. The bulbs are put in quite closely together, varying the number according to their size and the size of the pot or box. They are watered well and the pots, etc., placed in a trench which has a

three-inch layer of coal ashes in the bottom. Fill in between the pots, etc., with ashes and if possible cover the pots with granulated peat moss or, if this is not to be had, cover two inches deep with ashes. After heavy frosts come, throw on some coarse hay or leaves and put a mat over the top to keep them down and part of the frost out. The pots will become filled with roots, the more the better. If there is a bad, dry spell in the autumn some water will have to be given as after the roots come they must not dry out. The bulbs should remain where they are for three months when some of the pots may be brought into a cool greenhouse or a cool room or porch in the house. Keep them partially shaded until the pale sprouts turn green and water thoroughly about three times a week. The pots may gradually be brought into more warmth but, remember, they cannot be forced rapidly as stems will be poor and weak. No real warmth should be allowed to come near the pots until flower buds show. There should be plenty of ventilation, and for tall varieties slender green stakes may be set around the outsides of the pots or boxes with a turn of fine green string to prevent too straggly an appearance. After the flowers are over water slightly, just keeping damp, until the leaves are ripe when the bulbs may be planted out or if danger from frost is gone by, gently shake the bulbs apart, being careful not to break the roots, and plant out at once. They will need no other care and after a year or so in the open the largest bulbs may be dug again for forcing.

The flower of "White Queen" narcissus is carried on a slender but strong stem fourteen inches high and is of a pale chalcedony yellow fading to almost white. The perianth segments overlap at the base, three of them being almond shape, one inch broad at the widest place. The three others are pointed; all are one and a half inch long. The cup is one inch deep, is delicately fringed and of a citron yellow. The whole flower is three and a half inches in diameter, has a fragrance akin to "Castile soap" and is held well up without any appearance of drooping. The leaves are the same length as the flower stem, are half an inch wide and pointed. They are sage green and are heavily ridged down the centre, being twisted slightly at the apex.

ETHEL ANSON S. PECKHAM.

NARCISSUS "BATH'S FLAME"

(Plate 469)

NARCISSUS "BATH'S FLAME"

"Bath's Flame" Narcissus

Of Horticultural Origin

Family AMARYLLIDACEAE — AMARYLLIS Family

"Bath's Flame" belongs to the bicolor "Barrii" section of *Narcissi* which means that the cup measures less than one third the length of the perianth segments. This flower was produced at the nurseries of Messrs. R. H. Bath Ltd., Wisbech, England, introduced in 1912, and is one of the largest and most showy of the daffodils brought into commerce in the United States. An Award of Merit for garden and market purposes was received at the Royal Horticultural Society's show in London in 1915. Although this flower closely resembles "Brilliancy" (Engleheart) it comes into bloom about a week later, prolonging the season. The flowers keep long in good condition, their rain and sun resisting qualities and sturdy stems make them ideal for garden, market, and show use.

In using such a daffodil as "Bath's Flame" in the garden consideration should be given to its height and shape. Carefully thought out combinations of plants are more successful than bulbs hurriedly thrust into flower-beds. The background of some foliage, anything rather than the strap-like leaves of daffodils will be better than nothing. An herbaceous border planted at intervals with groups of peonies, chrysanthemums, columbines, campanulas, etc., some of them being brought forward to form bays and irregular spaces, is a good basis for the introduction of groups of *Narcissi* with accompanying bulbous plants or other low, spring-flowering, subjects. The tall daffodils, "Bath's Flame", "Croesus", "Sirdar" and "Bernardino" may be combined with the shorter "Loveliness", "Peter Barr", "Great Warley", "Cleopatra", "Masterpiece" and "White Queen". Grape-hyacinths (*Muscari*) "Heavenly Blue" and "Polyanthum", both bright blue, and "Paradoxum", black purple, can be used with dwarf bearded irises "Lobelia" (purple blue), "Orange Queen" (bright yellow), "Bride" (white), "Azurea" (pale blue) and "Statellae" (cream). *Alyssum saxatile* "Lemon Queen", White Violets, some of the new mauve and lavender hybrids of *Phlox subulata* with here and there the moss-like carpet at daffodil's feet of a sedum to bloom later on may be added. The varied shapes of columbine, peony, and chrysanthemum foliage are needed to break the

monotony of form. The dwarf irises used will have sword-shaped leaves but they are not prominent, as under good cultivation the plants are very floriferous and give masses of bloom.

"Bath's Flame" is twenty-two inches tall, the flowers are five and a half inches in diameter. Each perianth segment is two and a quarter inches in length, primrose yellow, flushed at base, strontian yellow and with a ridge down the centre; reverse, primrose yellow. The segments are so set they would overlap half way up but are pinched enough to give a wingy effect. The cup, empire yellow, flushed at the edge with light cadmium yellow, is three quarters of an inch deep and one and a quarter inches in diameter at the mouth. It is ridged evenly and fimbriate, with a dark green centre. The style is pale green to paler. The stamens stand outwards and are pale green with yellow pollen. The fragrance is medium and pleasant. The leaves are half an inch wide, sword-shaped, pointed and slightly twisted, sixteen inches long, Russian green. The stem is dull yellow green. The sheath is scarious, of a vinaceous buff.

ETHEL ANSON S. PECKHAM.

NARCISSUS "BERNARDINO"

(Plate 470)

NARCISSUS "BERNARDINO"

"Bernardino" Narcissus

Of Horticultural Origin

Family AMARYLLIDACEAE — AMARYLLIS Family

To the bicolor division of the "incomparabilis" section belongs Narcissus "Bernardino", a seedling of "Duchess of Brabant" raised by Mr. P. A. Worsley and introduced in 1910 receiving an Award of Merit from the Dutch Bulb Grower's Society when shown at Haarlem by de Graaff Bros. in 1915. It is a great show flower and has won many prizes for its exhibitors. While a large flower it has that "quality" and lack of coarseness that is essential in the fine thing. The red edge to the cup will fade away in our hot sun and if we have a season of rain with heat the stems will lengthen out and become too weak to hold up the heavy flowers properly but in the normal season "Bernardino" is all that can be desired. A flower of this type will grow in grass but it is best to put the rarer and most expensive sorts in the flower-border in groups among herbaceous plants. It pays to give the better cultivation and treat such as "Bernardino" as show flowers.

The culture of *Narcissi* in the flower-border where flowers of full size and suitable for the small flower-show are desired is simple. The ground must be prepared well which means that deep digging is required and it is wise to do this the spring before the bulbs are to be put in. Manure should not be used unless well rotted and added to the ground the autumn before the bulbs are to go in. This means one year in the ground before the bulbs. Bonemeal is a good fertilizer for *Narcissi* and the prepared "rose bonemeal" is the best. The finely ground kind may be exposed to the air for six weeks and then used. Prepared bulb fertilizers are to be had and are generally good but expensive. A judicious mixture of bonemeal, wood ashes and a dash of soot will produce remarkable results. For the border bulbs should be in groups, never in rows and their depth is calculated according to their size, measuring from the bottom to the neck and digging the hole twice and a half the measurement. Replant *Narcissi* directly after digging or receiving them if possible, remembering that they deteriorate if left out of the ground. Digging and dividing should be done immediately after the foliage has turned yellow and ripened. *Shake* the plants apart, replanting the largest

for border and exhibition use. Where a group in the flowerbed is too crowded in some parts certain clumps of bulbs may be surrounded at blooming time with small pot labels so when lifting time comes the exact spot may be indicated. Insert the digging fork vertically and the colony can be brought up without damage to neighbors. One bulb may be replanted at once. A difficulty with bulbs in the herbaceous border is that after they die down they may be accidentally cut into. A sprinkling of seeds of annuals will help to prevent this or plants of annuals may be bought from the hot-bed and planted between the daffodils when their bloom is done. The daffodil leaves may be gathered together in a bunch, bent back on themselves and tied with raffia to ripen off, leaving space for the annuals to grow. A thin covering of well-rotted manure put on after the surface of the ground is frozen and gradually removed in spring as the leaves push up is very worth while. "Bernardino" will not force well and is a shy seeder so its value as a parent is lowered.

The flowers of "Bernardino" are carried on sixteen-inch stems and are three and a half inches in diameter. The perianth segments, one and three eighths inches long, are seafoam yellow. At the back where they join the tube they are citron green. The cup of strontian yellow with edge of light cadmium is deeply serrate-fimbriate, sometimes cut almost to the bottom, rigid, and is spread open one inch in diameter. It is one and a half inches deep with a dark green centre. The pollen is the same color as the cup. The filaments are pale green. The style is strontian yellow. The ovary is cress green and more rounded than is usual in *Narcissus*. The leaves are eighteen inches long, curved at the top and twisted. At the base they are three quarters of an inch broad, narrowing near the tip. They are a light elm green. The perfume is of the "sweet soap" type, is of medium strength and not disagreeable.

ETHEL ANSON S. PECKHAM.

NARCISSUS "QUEEN OF THE NORTH"

(Plate 471)

NARCISSUS "QUEEN OF THE NORTH"

"Queen of the North" Narcissus

Of Horticultural Origin

Family AMARYLLIDACEAE AMARYLLIS Family

"Queen of the North" is one of the most charming of the better known "Leedsii" daffodils. There is no effect of green in the flower so that the shadows are a beautiful grey. The plant is very floriferous, an excellent grower and thrives in full sun, in grass or in semi-shaded woods. For use as a cut flower it is invaluable and has good lasting qualities. This daffodil was produced by Messrs. Barr & Sons, being introduced to commerce in 1908. Perhaps the most attractive way to use daffodils of the "Leedsii" section is to "naturalize" them in grass. Here the plants can remain permanently and need no care whatever except that the grass may not be cut until the daffodil leaves have ripened. This is an excellent way to grow *Narcissi* in a public park as the people then have an opportunity to see the plants in what seems to be their natural habitat.

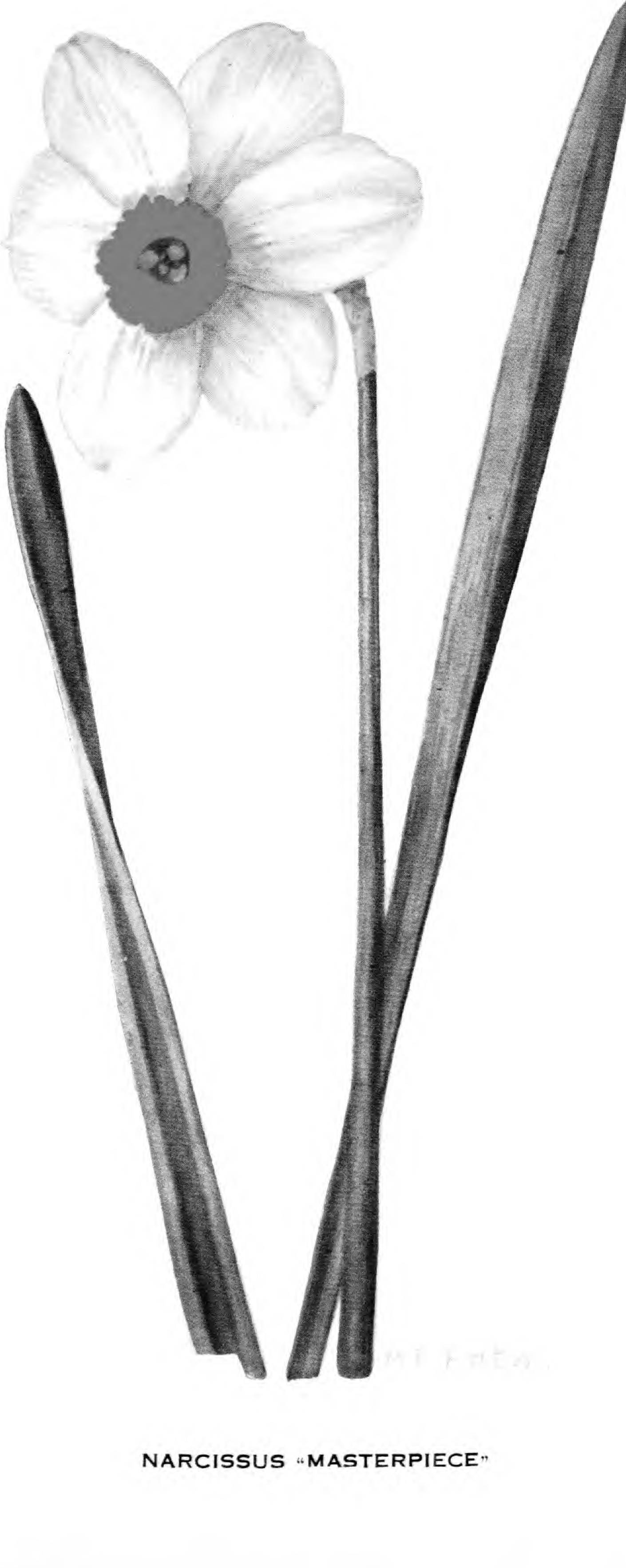
The naturalistic planting made in 1924 at the New York Botanical Garden has been increased until now it covers several acres. The ground comprises a meadow-like sweep from a group of rocks down into a valley edged with woods, the banks and sides of a wide driveway leading in from one of the principal entrances, a long bank opposite Fordham Hospital and the edges of paths leading from the rock-garden to the alphabetical iris garden, etc. The idea has been to make the planting look as if the daffodils had been growing there before any of the roads or paths had been cut. The "trumpet" varieties that were used were carefully placed in well-drained ground and sunny locations and, as some of them were likely to be difficult subjects part of the ground was dug. This gave the bulbs a start and their own foliage keeps the grass down so that only rather thin sod grows later and the daffodils have done very well. On the edges of the drive where it passes near the wood and where there is a great deal of shade "poeticus" varieties were used. On sloping semi-shaded ground with rather shallow soil and in the vicinity of birches and pine-trees "Leedsii" varieties have been wonderfully successful.

In "naturalizing", a plan certainly should be made beforehand, taking into consideration wind-sweep, slope of ground, depth of soil,

exposure, color-scheme, etc. The bulbs are then scattered and planted as they lie. Unless they are put in with a good plan leaving some open spaces and arranging them in colonies or drifts they will never be an artistic success. It is better to have them well arranged and rather sparse for a year or two than too thick. In the consideration of color care must be exercised that dead white and strong yellow are not next to each other and mixed bulbs should never be planted. Bulbs of the same variety but mixed in size are excellent. "Spotty" effects should be avoided.

"Queen of the North" narcissus has a flower of a cream white turning to white, with perianth segments one and a half inches long. All of them are waved, three being pinched back at the base, The substance is good, resembling thick white paper. The cup or crown is chartreuse yellow, three quarters of an inch in diameter, three eighths of an inch deep, fimbriate, waved with no reflex. The stamens are set just below the base of the cup, the filaments being very short. The pollen is chartreuse yellow. The style, one eighth of an inch longer than the stamens is citron green. The tube is one inch long, turtle green. There is a very slight "clean" perfume. The leaves, twenty inches long, are erect, half an inch wide, pointed, have one ridge and are pois green. The flower-stem is eighteen inches tall, narrowed at the apex, flattened, and chromium green in color.

ETHEL ANSON S. PECKHAM.



NARCISSUS "MASTERPIECE"

(Plate 472)

NARCISSUS "MASTERPIECE"

"Masterpiece" Narcissus

Of Horticultural Origin

Family AMARYLLIDACEAE AMARYLLIS Family

There are certain standards of excellence set up by which experts judge a flower. Narcissus "Masterpiece" is one to prove that a small flower may be just as perfect and may win over a large and badly formed daffodil. The perianth is so regular in shape, the segments overlap so neatly and are at right angles to the tube, the cup is absolutely a circle and when just opened under grateful conditions is of such a brilliant orange red that the real enthusiast is bound to be attracted to this flower. "Masterpiece" is another of the productions of the Rev. G. H. Engleheart that have made him deservedly famous among daffodil savants and was brought out in 1910 having been given an Award of Merit by the Royal Horticultural Society in 1906.

The hot sun we have here is apt to burn the color out of the cup which spoils "Masterpiece" as a garden flower in an exposed position but grown in semi-shade it will be quite satisfactory and in a collection for exhibition is often a winner. As the flower is small it is suitable for table decoration and if cut when just opening will retain the color and last some days in water. The use of daffodils for cut-flower arrangements is a thing that might be studied with advantage. As there is such a variety in the length of stem, size of flower, shape, etc., some thought should be given. The flowers we purchase at the florist's in spring should be easy to manage, especially the polyanthus varieties with their dainty little flowers but the stems are clumsy and, as we have little else at that time to combine with them, we fall into the trap of crowding too many stalks into one vase, spoiling the effect. Then, the foliage is awkward to manage in a hurry. Trumpet daffodils arranged in shallow dishes "in the Japanese manner" springing out of a pseudolake, are ridiculous to a person knowing the habits of those flowers. Nearly all trumpet varieties can be classed as "coarse" flowers when it comes to the point of putting them in a vase and we should choose other bulbous plants of about the same quality or sprays of flowering shrubs to combine with them. All this should be regulated by the variety of daffodil. As strong a yellow as "King Alfred" will need

another paler variety to blend in with it and the other flowers. Delicate bicolors such as "Weardale Perfection" may combine with shrubs or sprays from small trees like pale crab-apples, cherries, Japanese cherries, etc. The white and cream "Leedsii" sorts are best with pale pinks or blues, in fact with "pastel" shades. Small flowered and short-stemmed daffodils, varieties suitable to the rock-garden and rare species may be arranged in a low dish with rock-plants and even some stones to look as if they were growing. Some of the daffodil foliage should always be in the arrangement and by all means let it resemble that really belonging to the variety, though it is quite unnecessary to cut it from rare and expensive bulbs and better not to do so. Take it from common varieties belonging to the same group. This applies also at flower-shows.

Narcissus "Masterpiece" has a flower two and a half inches in diameter. The perianth segments are one inch long by three quarters of an inch broad, white, flushed at base with strontian yellow. The reverse is the same yellow with pois green at the base. It has a flat crown spread three quarters of an inch in diameter, frilled and crimped and waved at the edge. The centre is green and the rest of the crown cadmium orange. The stamens, three short, three longer, are the same length as the style. The pollen is a light orange yellow. The tube is one and a quarter inches long, pois green and flattened. The leaves are fourteen inches long, very erect and pointed, chromium green, one quarter inch wide, tapering to one eighth of an inch and ridged down center. The flower-stem is fourteen inches long, flattened, ridged and is asphodel green. The leaves and stem show strong leanings towards a "poeticus" parent.

ETHEL ANSON S. PECKHAM.

VANILLA PLANIFOLIA

(Plate 473)

VANILLA PLANIFOLIA

Vanilla Orchid

Native of Southern Mexico

Family ORCHIDACEAE — ORCHID Family

Vanilla planifolia Andrews, Bot. Repos. **8**: pl. 538. 1816.
Vanilla sativa Schiede, Linnaea **4**: 573. 1829.
Vanilla sylvestris Schiede, Linnaea **4**: 573. 1829.

The vanilla orchid has the distinction of being the only member of the immense orchid family which has any value other than the aesthetic. It was known to and used by the Aztecs as a flavoring for chocolate long before the discovery of America by Columbus. After the conquest of Mexico, it was used by the Spaniards, but it was long before the demand for vanilla led to its cultivation, and its introduction into various other tropical countries dates from the middle of the nineteenth century. For some unknown reason, vanilla seems to succeed outside of Mexico only on islands, and its chief centers of cultivation are Tahiti and various islands of the Indian Ocean. The product of each of these islands differs greatly in quality, and Mexican vanilla is still considered the best, although it amounts to only a fraction of the total production.

The plant requires a hot, moist climate. It is usually propagated by cuttings, and the vines are supported on trellises or small trees, flowering for the first time usually in their third year, and thereafter producing annually several thousands of flowers, of which only a few mature fruit. Hand pollination is often employed instead of depending on insect visits. The capsules, the size and shape of a thick lead pencil, have neither the odor nor the flavor of vanilla, which appears only after a complicated process of curing. The flavor is due to a substance known as vanillin, which is soluble in alcohol as our familiar vanilla extract. The same substance can be made synthetically for a thirtieth of the cost and synthetic vanilla has largely replaced the natural product.

The accompanying plate was prepared from a flowering specimen grown in the conservatories of The New York Botanical Garden.

The vanilla orchid is a branching climber, clinging to the bark of trees by aerial rootlets produced along the stem and reaching a height of perhaps twenty feet. The leaves are elliptic-oblong, bright green, thick and fleshy in texture, five to eight inches long

by a third as wide, and borne on a stout stalk about half an inch long. The flowers are produced in short, almost sessile spikes, appearing from the base of the upper leaves. A single spike bears eight to twenty flowers, each subtended by a small ovate bract. The individual flowers are actually sessile, the apparent stalk consisting of the inferior ovary, which is two to three inches long. At the summit of the ovary are the six segments of the perianth, differing considerably in shape. The upper one and the lower two are sepals, green, narrowly elliptic, and two to three inches long. The two upper lateral ones are petals, resembling the sepals, but a trifle shorter and narrower. The sixth segment is the third petal, known as the lip. It is erect, greenish-yellow, about two inches long, strongly concave, and somewhat expanded at the summit; at its base it is rolled around the column. The latter is a complex organ representing a fusion of the one stamen with the style and stigma; it is slender and shorter than the lip. The fruit is a straight slender capsule six to ten inches long, and a half inch in diameter, containing innumerable minute seeds.

HENRY A. GLEASON

EXPLANATION OF THE PLATE. Fig. 1.—A spike and subtending leaf. Fig. 2.—Lip unrolled to expose the column. Fig. 3.—Crest from center of the lip. Fig. 4.—Capsule.

PYCNOSTACHYS DAWEI

(Plate 474)

PYCNOSTACHYS DAWEI

Blue Bee-balm

Native of Central Africa

Family LAMIACEAE — MINT Family

Pycnostachys Dawei N. E. Br. G. C. III. 41: 18. 1907.

In April 1825, Hooker introduced the first *Pycnostachys* into cultivation. It was grown outdoors in England and flowered in August of the same year the seed was planted. Then the genus was lost sight of in gardens. There are more than thirty-five species, found in Abyssinia, Tropical Africa, Madagascar and South Africa, and many of them are attractive in flower. *P. Dawei* was discovered in Uganda in 1898 by Mr. A. Whyte, but the first garden material was raised from seed sent by Mr. M. T. Dawe to Kew in 1905.

Pycnostachys coerulea, from Madagascar, was cultivated, but abandoned or lost sight of; and *P. urticaefolia*, which was introduced by Livingstone in 1895, was grown for some time in botanical gardens but has not reached general cultivation.

The blue bee-balm is propagated by seeds or cuttings. Pieces of young shoots, placed in sandy soil in March in hotbeds of greenhouses with bottom heat make young plants. After potting up these may be pinched back to cause branchy growth. They should be planted outdoors in the summer, and brought in in September, where they will flower in a cool house in January and February. This subject has also been grown as a tender annual. Seeds should be sown in house or greenhouse in winter.

As cultivated for greenhouse the blue bee-balm grows about five to six feet tall, pyramidal, with stout, almost woody stems, and wide spreading branches bearing from fifty to one hundred spikes, bright blue in effect with brown tips of bracts showing through. Our illustration was taken from plants grown for the decorative collection of Conservatory Range No. 2. The stock originally came from Mr. Charles H. Totty, who introduced this plant in American horticulture as a winter blue flower, a companion to other conservatory subjects which he has long advocated, such as, the white butterfly-bush, *Buddleia asiatica*, *Erlangea tomentosa*, the winter ageratum, and *Moschosma riparium*, the Iboza. The white butter-

fly-bush is very fragrant, produces long gracefully drooped spikes of bloom, from felty foliage and stems; Moschosma has branching inflorescences giving a candelabra effect; and the winter ageratum has clusters of soft pink flowers. The blue bee-balm is another winter bloomer to combine with them for conservatory effects.

The blue bee-balm is a stout herb up to six feet high, of loose pyramidal habit. The stems are square, with rounded corners, bearing at distant nodes opposite leaves which are narrowly lanceolate, serrate, acute, attenuate at base, from six to twelve inches long by one to one and one half inches wide.

The flower spikes are terminal, nearly six inches long, densely flowered. The bracts subtending the flowers are lanceolate, incurving and ciliate. The flowers are declined when mature. The calyx tube is bell-shaped, densely glandular, with five spine-like, rigid, ciliate teeth which are spreading at maturity so that the fruiting spike is tassel-like. The corolla is two-lipped from a slender, sharply deflexed tube. The upper lip of the corolla is short, four-lobed, the two middle lobes concave. The lower lip is much larger, concave, boat-shaped, with obtuse apex abruptly inflexed. The four stamens are inserted at the base or the lower lip, curved upward. The style is long, slender, with a two-lobed stigma.

The seeds are four, rounded, enclosed in the mature calyx and concealed by the five inflexed margins between the spine-like teeth.

KENNETH R. BOYNTON

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Calyx and subtending bract. Fig. 3.—Corolla, laid open. Fig. 4.—Fruiting calyx. Fig. 5.—Seed.

BICUCULLA EXIMIA

(Plate 475)

BICUCULLA EXIMIA

Wild Bleeding-heart

Native of the Allegheny Mountains

Family FUMARIACEAE — FUMITORY Family

Fumaria eximia Ker. Bot. Reg. 1: pl. 30. 1815.
Diclytra eximia DC. Syst. 2: 109. 1821.
Dicentra eximia Torr. Fl. N. Y. 1: 46. 1843.
Bicuculla eximia Millsp. Bull. W. Va. Agr. Exp. Sta. 2: 327. 1892.

The plant was first described and illustrated by Kerr in the Botanical Register under the name *Fumaria eximia*. The description was drawn from cultivated specimens in Mr. Knight's nursery, Little Chelsea, King's Road. It had been introduced into England by Mr. Lyon about 1811 from North America. The original locality was unknown to Kerr. It is found in open places in the mountains from western New York to Georgia, perhaps most common in Virginia and West Virginia.

It belongs, together with *B. spectabilis* and *B. formosa*, to a group characterized by the red, heart-shaped flowers, and therefore known as bleeding-hearts. *B. spectabilis* is a native of Japan and *B. formosa* of the Pacific Coast from California to British Columbia. All three are in cultivation, but *B. spectabilis* is the most common and best known. Though that species surpasses the other two in heighth and perhaps in ease of propagation, it does not in delicacy and beauty, and *B. eximia* is one of the most beautiful native flowers the writer has seen. It is sometimes known as stagger-weed and turkey-corn. The former name is most inappropriate and the latter belongs to the white-flowered (sometimes merely tinged with purple) squirrel-corn, *B. canadensis*. The better name is wild bleeding-heart, to distinguish it from *B. spectabilis*, the more common bleeding-heart of the gardens. The latter is known in Sweden as Lieutenant's heart. If the outer pair of petals are removed the flower represents fancifully the image of a lady in a red dress (see plate *475*, *fig. 3*). Of course the lady is, like the Venus of Milo, without arms, and in *B. spectabilis* the head is more prominent than in our figure. If the petals and the stamens are removed the pistil resembles a champagne bottle (see *fig. 5.* inverted). When the pistil is more mature than in the drawing, the resemblance is more striking. The implication is that the heart of a young army officer, especially in peace-time, contains but a lady and a bottle.

The plant from which our drawing was made, grew in The New York Botanical Garden from rootstocks collected by the writer in the summer of 1925, near the summit of Spruce Knob, the highest mountain of West Virginia. An abandoned field in the middle of the wood was then almost covered by the rose-colored clusters of this gorgeous flower.

The wild bleeding-heart grows from a short, fleshy rootstock. The leaves are basal, long-stalked, ternately pinnatifid; the three primary divisions are short-stalked and twice pinnatifid into oblong or lance-ovate divisions. The flower-stalk is slender, leafless, one to two feet high, bearing at the top a drooping panicle, with lanceolate bracts; the branches consisting of short, two to four-flowered clusters. The sepals are two, greenish, small, lanceolate, falling off very early. The corolla is cordate at the base, three-fourths to five-sixths of an inch long. The petals are four, rose-colored, usually tipped with rose-purple; the outer pair are rounded-saccate at the, base and with spreading tip, the inner pair have short curved claws at the base; the blades are oblong, united by their edges and with wavy crests on their backs. The stamens are six, in two sets, placed opposite the outer petals; the filaments of each set are united, except at the base. The pistil has two parietal placentae; the ovary tapers gradually into the style, which ends in a two-lobed stigma. The capsule is flask-like, lanceolate in outline, many-seeded, splitting at maturity by two valves.

P. A. RYDBERG

EXPLANATION OF PLATE. Fig. 1.—Flower-cluster and leaf. Fig. 2.—One of the outer petals. Fig. 3.—The two inner petals. Fig. 4.—One set of 3 stamens with united filaments. Fig. 5.—Young pistil.

VIOLA PRICEANA

(Plate 476)

VIOLA PRICEANA

Confederate Violet

Native of the southeastern United States

Family VIOLACEAE — VIOLET Family

Viola Priceana Pollard, Proc. Biol. Soc. Wash. 16: 127. 1903.

To those of us who have sympathies with or were raised under the Stars and Bars, this violet of rather recent discovery can well be a symbol of the Lost Cause, for its flowers when growing *en masse* have the bluish gray effect of the Confederate uniform, and the fact that the plant was first found in Kentucky and later in several other southern states gives it an added attraction for those sentimentally inclined, who might wish to believe that from the soil of the south has come a plant which can be easily grown in every garden, thus perpetuating the memory of the Confederacy far outside of its bounds, and its blooming period extends over Decoration Day, giving it still more endearment for those to whom it has a meaning.

The writer has seen several fields of it in North Carolina, and it is indeed a handsome plant when growing in solid stands, for it is never mixed with *V. papilionacea*, of which Brainerd calls it a color form, though it often grows near it, but always in pure stands. In all the many plants and colonies of it the writer has seen, there has never been any tendency towards a uniform color of violet, nor do any of its seedlings vary from the parent plant, so that it seems best to consider it a distinct species, and one we may well be proud to call a native.

The plant is perfectly hardy in the latitude of New York and doubtless further north, even tending to escape where conditions are favorable. It is extremely free-flowering, even small or young plants being completely covered with flowers during its blooming season. The flowers are borne on long stems and last well in water, making it a very desirable plant for garden and decorative purposes; and its distinctness from other violets is an outstanding feature for those who wish something different.

This plant grows in fields and around old walls, preferably in partial shade. It has been found wild in Kentucky, Arkansas, North Carolina and Georgia, and is grown in gardens and is used

in civic plantings in these states and doubtless others of which no information has been received. It is also probably in other states that would normally be included in such a range. The blooming period is May.

The name *Viola* is the ancient Latin name of the genus.

The confederate violet is an acaulescent, perennial herbaceous plant, the leaves and flowers arising from a thickened rootstock. The leaves are bright green, on long petioles with stipules at the base. The leaf-blades are glabrous on both surfaces, deeply cordate at the base, and abruptly acute at the tip, the margins crenate-serrate. The flowers are borne on scapes four to six inches long, each scape bearing two bracteoles above the middle and curved at the top into a horizontal position. The calyx is green, stained purplish, glabrous. The sepals are five in number, nearly equal in length, ovate-lanceolate, all auricled. The flowers are about an inch long and three quarters of an inch broad. The five petals are gray-white, veined near the base with brilliant violet-blue, giving a pansy-like appearance to the flower. The spurred petal is keel-shaped, beardless. The two lateral petals are heavily bearded in the throat, the beard greenish. The five stamens closely surround the pistil, and are sometimes slightly coherent. The filaments are short and stout, green; the two lower spurred, which spurs fit into the spur of the corolla. The anthers are brilliant orange-yellow, opening introrsely. The stigma is capitate, with the conical fertile portion turned to one side. The style is dilated upward into the stigma. The ovary is stout-conical, slightly humped on the upper side. The ovules are numerous, borne on parietal placentae, one in each of the three valves of the one celled ovary. The seeds are dark-brown, scattered by the three valves of the green capsule spreading out flat and then the sides constricting together, which action shoots the seeds a short distance away. Besides these flowers, others are produced later, known as cleistogamous flowers, which are borne on short, prostrate peduncles. These flowers do not have petals, nor do they open, but are fertilized in the bud and bear more numerous seeds than the showy blooms.

EDWARD J. ALEXANDER

EXPLANATION OF PLATE. Fig. 1.—Plant, in flower. Fig. 2.—Lateral view of flower in bud. Fig. 3.—Above, showing position of stamens around the pistil.—Below, the pistil and stamens separate. Fig. 4.—A spurred petal. Fig. 5.—Capsule of a petaliferous flower. Fig. 6.—Capsule of a cleistogamous flower.

PLATE 477

ADDISONIA

GELSEMIUM SEMPERVIRENS

(Plate 477)

GELSEMIUM SEMPERVIRENS

Yellow Jessamine

Native of Southeastern North America

Family LOGANIACEAE — LOGANIA Family

Bignonia sempervirens L. Sp. Pl. 623. 1753.
Gelsemium nitidum Michx. Fl. Bor. Am. 1: 120. 1803.
Gelsemium sempervirens Ait. f. Hort. Kew. 2: 64. 1811.

One of the first harbingers of Spring in the Southern lowlands is the yellow jessamine, which with its great profusion of brilliant yellow flowers and its widespread and scrambling habit of growth lights up great areas which have lain under the sombre cloak of winter with a suffused yellow glow which causes the great tangles of swamp and thicket to appear as if they had made prisoners of the Spring sunbeams, and even on the treetops, where the jessamine often climbs, hang great streamers of golden yellow which wave in the March winds and suffuse the air for great distances with their delicious perfume, for this is one of the most fragrant of our native plants—a fragrance which always carries with it haunting memories of mile after mile of low country splashed with gold and sunshine and heavy with delightful perfume and where the trees are heavy with long festoons of spanish moss (*Dendropogon usneoides* (L.) Raf.) which contrasts splendidly with the golden flowers and dark green leaves of the jessamine—a contrast of youth and old age; and the pools of water and sluggish streams on whose margins all this color runs riot, reflect it back into the air to the accompaniment of the rippling waves of light imparted by the water, which only serves to spread the glow of color more widely into the air.

To the Southerner the yellow jessamine is almost his national flower, for it is one of the most widespread and best loved flowers of the south which is its natural range, and its extremely early blooming season, coupled with its color and fragrance has endeared it to the heart of everyone who has seen or known it in its native environment.

Beautiful as the plant is, it is also useful medicinally, for which purpose the rootstock is used, the collecting season being just after the plant comes into flower. The drug when given internally acts as a powerful depressant to the respiratory, circulatory and nervous systems. It has been found useful in the treatment of diseases and conditions depending upon localized muscular spasm, since in large

doses it paralyzes the motor nerves. Such a drug is of course, lethal when given in sufficient amount. The effect at first is languor, relaxation and muscular weakness, followed by paralysis. Respiration becomes slow and feeble, death resulting from centric respiratory failure, which stops the heart simultaneously. The treatment for such poisoning consists in prompt evacuation of the stomach and in the early administration of ammonia, strychnine, atropine and digitalis.

The plant is native from Virginia to Florida and west to Texas mostly on the Coastal Plain, but quite often it is found well into the Piedmont. Specimens from Mexico and Guatemala are known, but are doubtful as to species. The blooming season is through March, sometimes extending into April towards the northern limit of the range.

The name *Gelsemium* is from *Gelsomino*, the Italian name for the jessamine.

Other common names are Carolina jessamine and evening trumpet flower.

The yellow jessamine is a twining evergreen shrub, the stem and branches glabrous and covered with a thin, reddish brown bark. The leaves are opposite, entire, evergreen, coriaceous, and glabrous; dark green and shining above, pale beneath, the blades one and a half to three inches long, lanceolate elliptic, acuminate. The stipules are minute and deciduous. The petioles are very short. The flowers are dimorphous, one to two inches long, borne in sessile clusters of one to five in the leaf-axils. The pedicel is covered with bracts shorter than the calyx. The calyx is glabrous, green, five lobed. The sepals are oblong, about one fourth inch long, the tip obtuse. The corolla is bright golden-yellow, open funnel-form with a spreading limb. The five corolla-lobes are imbricate in the bud, ovate-orbicular, emarginate, shorter than the tube. The few stamens are adnate at the base of the tube. The filaments are slender of two lengths as shown in the plate, the short filaments accompanying the long pistil, the long filaments accompanying the short pistil. The anthers are lance-sagittate, the sacs opening lengthwise. The stigmas are four, spreading, flattened. The style is slender. The ovary is free, two celled, each cell bearing two rows of ovules on axial placentae. The capsule is oblong, three fourths of an inch long, flattened contrary to the septum, greenish-brown, prominently veined, and with a very short beak. The seeds are flat, winged upwardly.

EDWARD J. ALEXANDER

EXPLANATION OF PLATE. Fig. 1.—flowering section of the stem. Fig. 2.—The pistil of a flower with exserted stamens, showing the calyx and bracts. Fig. 3.—The pistil of a flower with included stamens, the calyx laid open to show the ovary. Fig. 4.—A sepal. Fig. 5.—Section of the corolla accompanying Fig. 2. Fig. 6.—The corolla accompanying Fig. 3., laid open. Fig. 7.—A capsule.

LOBELIA SESSILIFOLIA

(Plate 478)

LOBELIA SESSILIFOLIA

Violet Lobelia

Native of Asia

Family LOBELIACEAE — LOBELIA Family

Lobelia sessilifolia Lamb. Trans. Linn. Soc. 10: 260. 1811.

That there is a hardy blue counterpart of our Cardinal flower available for American gardens will be welcome news to horticulture generally. Since 1927 The New York Botanical Garden has tested this lobelia in the Herbaceous Grounds, the plants being grown from seed sent to us from The Royal Botanic Garden at Kew. From these plants the colored drawing was made, and seeds were collected in order to further test out the value of this lobelia to our gardens, and seedlings grown for decorative planting and for plant breeding work.

The violet lobelia does not seem to be new to botanists, but from the material sent in by collectors there were no living plants or seeds made available for sufficient distribution to acquaint plant lovers of its existence. Mr. Aylmer Bourk Lambert read in 1908-09, "Some account of the Herbarium of Prof. Pallas," before the Linnean Society, and the Kamtschatkan specimen of Pallas furnished Lambert with the description of the species. Later facts concerning the introduction of it are meagre. In the herbarium of the New York Botanical Garden are specimens collected by Henry in China, by Maximowicz and others in Japan, by Henry in Formosa, and in the Himalayas.

The violet lobelia seems to endure if not to prefer a rather moist location. We do not yet know if shade conditions would be better for successful cultivation, but its behaviour for the limited time it has been grown here suggests that the open border, the banks of ponds or streams, and shady pathsides, where the bedding lobelias, the Cardinal flower, and the great blue lobelia flourish should all be tried to find the most favorable location.

Occasional attempts to grow the Cardinal flower in borders and woodland wet spots, long cultivation of the varieties of *Lobelia erinus*, for the thick carpets of blue and pink they give to our summer gardens, and the recent inclusion of *Lobelia tenuior*, a slender Australian species, in our list of annuals, form the branches of lobelia culture our gardens have known. In Europe, red, half-hardy

lobelias and a great many hybrid perennials have been grown. The Cardinal flower was introduced in English gardens in 1626, and *Lobelia syphilitica* in 1665, *L. splendens*, one of the red Mexican kinds, was grown there first in 1814, and *L. fulgens*, red-flowered with bronze leaves, soon after. By crossing these species, many beautiful varieties were obtained, and exhibited at various flower shows. Mr. B. Ladhams and later Mr. Ernest Ladhams were successful with hybrid lobelias, and Rev. Joseph Jacob, distinguished English horticulturist, wrote about them and their lobelias in garden publications. Some of the varieties were "Purple Emperor", with reddish leaves; "Kimbridge," with magenta flowers and dark foliage; "Salmon Queen," pink; "Mrs. Hubert," pink; "B. Ladhams," with bright scarlet flowers and the rich foliage of *L. cardinalis;* and "Shirley Beauty," a deep mulberry red. A white variety of our *Lobelia syphilitica* and an improved strain of the blue were also grown in English gardens, and half hardy sorts derived from the brilliant Mexican species, *L. fulgens* such as "Queen Victoria," were striking bedding plants.

The violet lobelia can be propagated by dividing the crowns. This is best done in spring, and lifting and dividing each year, as suggested for the hybrid perennial sorts, would probably benefit this new species also. Seeds sown at various times during the year have been germinated quickly and successfully.

The violet lobelia is a smooth stemmed, erect, perennial herb with sessile, lanceolate, serrate leaves, the lower obtuse, the upper acute. The flowers are in virgate racemes, which are nearly a foot long. The flower is about one and one half inches long, with a rounded calyx tube and linear to subulate lobes. The corolla is two lipped, with the lobes of the lower lip lanceolate and the two linear lobes of the upper lip separated by the staminal tube splitting them. The stamens are five, inserted on the hypanthium, their filaments cohering to form a tube, and the anthers are also united. The stigma is fringed. The fruit is a five celled capsule with many small red-brown seeds.

KENNETH R. BOYNTON

EXPLANATION OF PLATE. Fig. 1.—Inflorescence. Fig. 2.—Hypanthium, with united filaments and anthers surrounding the gynoecium. Fig. 3.—Stamens removed, showing the gynoecium.

KLEINIA ARTICULATA

(Plate 479)

KLEINIA ARTICULATA

Candle Plant

Native of South Africa

Family CARDUACEAE — THISTLE Family

Cacalia articulata L. f. Suppl. 364. 1781.
Kleinia articulata Haw. Syn. Succ. 315. 1812.

The genus *Kleinia* was named in honor of J. Th. Klein, a German zoologist, to include portions of the large genus *Senecio*, species with conic style tips, absence of ray flowers, and other minor differences. It is only in general habit that they are distinct from most of the senecios.

The candle plant is one of the kleinias, which have been long cultivated in collections. Berger, in his studies of these succulents, of living material, placed it in the section Anteuphorbium, which includes several African and Canary kinds with thick cylindrical stems and flat, oblong, rounded, or lobed leaves. The older succulent collections of Europe accorded a prominent place to this kleinia, and it was honored by being placed in Jacquin's Rare Plants, De-Candolle's History of Succulent Plants, and Lamarck's Dictionary.

At home the candle plant is a prominent member of the Karroo vegetation, found in colonies separated by sand, stone and desert.

In collections of succulents the kleinias are prominent. The simple method of culture and ease of propagation favor the gradual distribution of good kinds through exchange and many in The New York Botanical Garden have come from stock of the original introductions from Africa. The two common scarlet flowered varieties, *K. Grantii* from Tropical East Africa, with large showy blooms on long stems and oval leaves, and *K. fulgens*, with large flowers on short stems, and oak-like, thick gray leaves, are favorites. The creepers, *K. radicans* and *K. diversifolia*, send slender stems over the soil, which root at each node. The leaves of these are short cylindrical, sharp-pointed, in one species green and in the other species glaucous in color. *Kleinia cylindrica* and *Kleinia neriifolia* are tall, branching and tree-like, with thickened cylindrical stems and oleander-like leaves. *Kleinia chordifolia* has onion-like leaves, and attractive yellow flowers. There is a series of tubular-leaved green and gray kinds of similar woody-stemmed, bushy habit of growth which may be seen in most collections. The species of this series are hardy in Southern France and Italy.

The candle-plant is a succulent plant, glabrous and glaucous, spreading over the ground by jointed stems. The stems are turgid, swollen at the upper ends of the joints and marked. The leaves are alternate, long petioled, glaucous, flat, and fleshy, pinnatifid or three to five-lobed, the lobes acuminate, the terminal lobe larger. The flowers are in corymbs or solitary, on long, slender pedicels, white or pale yellow in color. The flower-heads are many-flowered, with all tubular-disk, with no ray flowers. The corollas are tubular, 5 lobed, the lobes short obtuse, and spreading. The involucres are bell-shaped, with one series of 10-20 lanceolate bracts, and with occasionally one or two small bracts at the base. The style branches are tipped with a short cone, ciliate at the base.

KENNETH R. BOYNTON

EXPLANATION OF PLATE. Fig. 1.—Branch, with leaves and flowering stem. Fig. 2.—Individual floret.

DAHLIA MAXONII

(Plate 480)

DAHLIA MAXONII

Maxon's Dahlia

Native of Guatemala

Family CARDUACEAE — THISTLE Family

Dahlia Maxonii Safford, Jour. Washington Acad. Sci. **9:** 371, *f. 4.* 1919.

Dahlia Maxonii was originally described about ten years ago from herbarium specimens collected at Socoyocté, in the mountains of the Department of Alta Verapaz, Guatemala, by Dr. William R. Maxon, now Associate Curator, Division of Plants, of the United States National Museum. Further particulars as to the habits of this handsome plant in its native region were supplied a little later by Mr. Wilson Popenoe, Agricultural Explorer of the United States Department of Agriculture (Journal of Heredity **11:** *264-268. f. 20-22.* Jl-Au 1920). It appears that the species is extremely abundant and conspicuous, both wild and cultivated, in many parts of the Guatemalan highlands, mostly at elevations of 3,000 to 7,000 feet. It attains heights of nine to eighteen feet and the stems become quite woody at the base, so that it qualifies for admission to the group sometimes known as the "tree dahlias", the other members of the group being *Dahlia excelsa* Bentham and *D. imperialis* Roezl, both natives of Mexico, where also, in the state of Chiapas, *D. Maxonii* is alleged to occur. *Dahlia imperialis* and *D. Maxonii*, grown in the open and under glass in The New York Botanical Garden, have the appearance of being perfectly distinct species, both in foliage and flowers. *Dahlia Maxonii* differs from *D. imperialis* in the more conspicuously enlarged and connate bases of the petioles, which emphasize the nodes of the stem, in the larger, more elongate, more slender-pointed leaflets, in the less nodding, less campanulate flowers (heads), and in the ovate or elliptic, obtuse or blunt-pointed, rather than elliptic-lanceolate taper-pointed rays, which are lavender-rose rather than white with carmine streaks at base.

From *Dahlia excelsa* Bentham, described and figured in 1838 (Maund, The Botanist **2:** *pl. 88*), but not mentioned by Safford, *Dahlia Maxonii* would appear to differ little except in the more elongate and more slender-pointed leaflets. Bentham's description of the "general petioles" as "broadly connate around the stem" and his allusion to "dried Mexican specimens of the flowers, both single and double, which were produced by the same plant" would indicate a very close affinity with the plants described by Safford and by Popenoe as *Dahlia Maxonii*. The type of *Dahlia excelsa*

was "anemone-flowered" and by a curious departure from modern nomenclatural custom, Betham named the type of his species "var. *anemonaeflora*". Popenoe publishes photographs of single, anemone-flowered, and fully double heads from the same individual plant grown in a hedgerow at Tactic, Guatemala. He states, however, that "as a wild plant, upon the mountain-sides removed from cultivation", he has never seen "any other than the typical form with eight lilac-pink ray-florets and a compact group of small yellow disk-florets".

Dahlia Maxonii was first grown at The New York Botanical Garden in 1927 from seed sent from Guatemala by Mr. Wilson Popenoe, with the information that it was collected on the slopes of Volcan de Agua at an elevation of 8,000 feet. Young plants from seeds started under glass in March were set out in the dahlia border in June, some of them in tubs, which were brought back before the first frost to the greenhouse, where the plants bloomed late in November. Like *Dahlia imperialis*, this species evidently does not bloom in the open in the New York climate, even when started early under glass. Like *D. imperialis*, it should prove a valuable ornamental plant in the coastal region of southern California and perhaps also in certain parts of our Southern States. All of the plants from the Guatemalan seeds supplied by Mr. Popenoe were essentially alike and all that bloomed bore "single" eight-rayed heads of uniform color, indicating that the stock was of a "pure species" rather than of a "hybrid strain".

Maxon's dahlia is a tall plant, commonly eight to eighteen feet high, with, in the state of nature, lilac-rose "single" flower-heads. The stems are stout, percurrent, and two to three inches in maximum diameter. The older leaves are bipinnate, often two feet long, horizontal or the lower more or less deflexed, the strong common petioles conspicuously enlarged and connate around the stem. The primary pinnae are usually in four to six pairs, the leaflets are lanceolate, mostly two and a half to three and a half inches long, including the long slender point, very sparingly pubescent above or nearly glabrous, sparingly pilose on veins and veinlets below, the margins crenate-dentate, the teeth mucronate. The flower-heads are mostly three to four inches broad, nearly erect or slightly nodding; on peduncles four to six inches long, the form and position of the rays giving the head as a whole a flattened or saucer-shaped contour. There are five or six ovate-spatulate bracts in the outer involucre; the bracts of the inner involucre are about ten, membranous-diaphanous, rounded-obtuse. The ray-florets are eight; their ligules are ovate or elliptic, mostly one and a half to two inches long, obtuse or blunt-pointed, lavender-rose or lilac.

MARSHALL A. HOWE

EXPLANATION OF PLATE. Fig. 1.—Two flower-heads and a typical well-developed leaflet. Fig. 2.—A section of the stem, much reduced, showing characteristic enlargement and connation of bases of a pair of petioles.

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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.