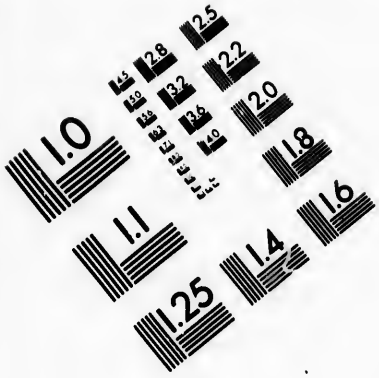

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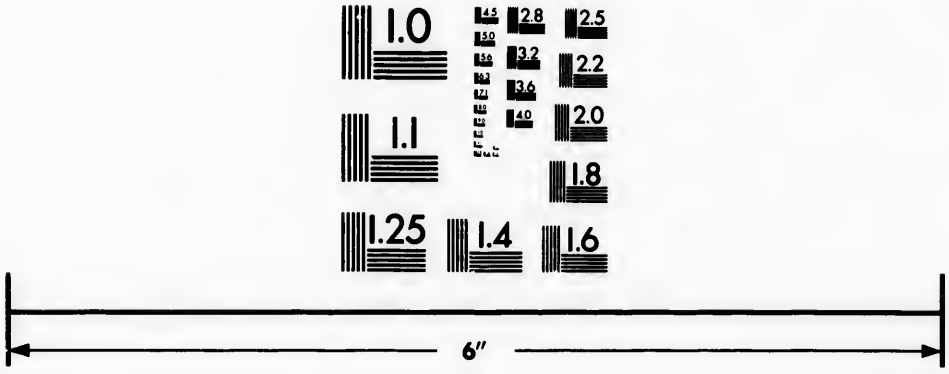

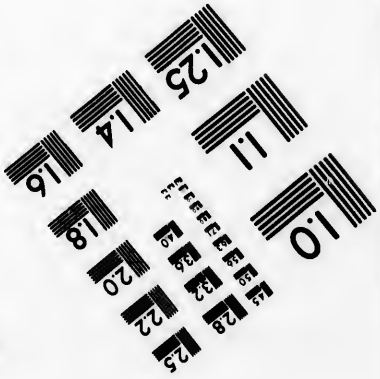

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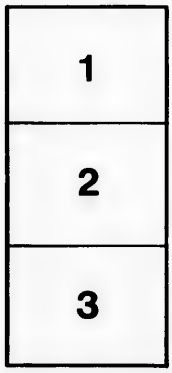

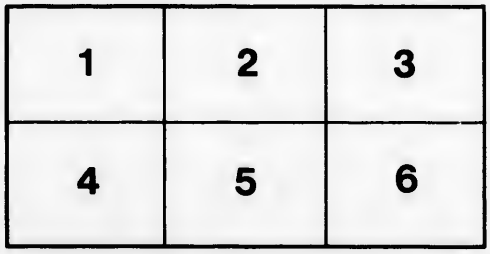

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THE

NORTH AMERICAN SYLVA;

OR

A DESCRIPTION OF THE FOREST TREES

OF THE

UNITED STATES, CANADA, AND NOVA SCOTIA,

CONSIDERED PARTICULARLY WITH RESPECT TO THEIR USE IN THE ARTS AND THEIR INTRODUCTION INTO COMMERCE;

TO WHICH IS ADDED

A DESCRIPTION OF THE MOST USEFUL OF

THE EUROPEAN FOREST TREES.

ILLUSTRATED BY 156 COLOURED ENGRAVINGS.

TRANSLATED FROM THE FRENCH OF

F. ANDREW MICHAUX,

MEMBER OF THE PHILOSOPHICAL SOCIETY OF PHILADELPHIA ETC. ETC.,

WITH NOTES BY J. JAY SMITH,

MEMBER OF THE ACADEMY OF NATURAL SCIENCES, ETC.

IN THREE VOLUMES.

VOL. II.

ROBERT P. SMITH, PHILADELPHIA:
G. P. PUTNAM, NEW YORK.
1850.

Kite & Walton,
Printers.

THE

NORTH AMERICAN SYLVA.

MAGNOLIAS.

Magnoliaceæ. Juss.

The trees and shrubs which compose this genus are, without exception, natives of Asia and America, where they are found nearly in the same latitude, being included between the 28th and 42nd parallels.

All the Magnolias are adorned with beautiful foliage, and most of them with magnificent flowers. The species which are indigenous to North America, and particularly those which grow in the southern part of the United States, are in these respects the most remarkable; hence, for more than half a century, they have been highly esteemed in Europe as ornamental vegetables. In the climates of London and Paris, several of the Asiatic and one of the American species require to be sheltered in the winter, to secure them from the danger of perishing by cold.

Of thirteen species of Magnolias which have hitherto been distinctly ascertained, five belong to China and Japan. Of these, the Magnolia Yulan is the largest. It attains the height of 30 or 40 feet, and its flowers, which are nearly 6 inches in diameter, diffuse a delicious odor. It has been cultivated during several centuries, and serves particularly for the embellishment of the Emperor of China's gardens. In Chinese poetry it figures as the symbol of candor and of beauty.

Of the eight remaining species, which are natives of the New World, one belongs to the West Indies, and seven to the United States: others will

perhaps be discovered in the Floridas and in the country west of the Mississippi.

Soil, situation, etc.—[The Magnolia family proper, contains about 30 species in several genera.

Many magnificent species yet remain to be introduced into Europe and America, one of which, the *Manglietia insignis* discovered and figured by Wallich, in his splendid work *Plantes rariories asiaticæ*, under the name of *Magnolia insignis*, grows in the mountains of Nepal from 6 to 12000 feet above the sea. He says, " It is in blossom in April and May, at which period it is impossible to behold a more magnificent object. The flowers are produced in vast numbers; they are very beautiful, large and fragrant, of a yellowish white color, with the apex of the petals pink, and the reflexed leaves of the calyx brownish red, and elegantly reticulated with pale green nerves and veins. The capsules are purple, and disposed in large erect oblong cones, from which the scarlet seeds hang down in all directions, being suspended on delicate white threads. The leaves are dark green and leathery, and form a very umbrageous crown. The tree attains a vast size, its trunk frequently measuring 4 or 5 feet in diameter."

The *Aromadendron elegans* of Blume, grows in the forests of Java, from 80 to 120 feet in height, with beautiful large leaves and flowers, having a penetrating agreeable aroma. Several others of the family, particularly of the genus *Michelia*, grow in the mountains of Java; and are remarkable for the beauty and fragrance of their flowers. The *Michelia champaca* of India and the Molucca Islands, is a beautiful tree about 30 feet high, with large glossy green leaves, and yellow flowers which emit a delicious perfume. It blooms the whole year, and is cultivated around the houses of the Hindoos and Malays, who make a sweet scented pomatum of its flowers with cocoa nut oil. Like our magnolias it is also much used as an antiintermittent. Several fine species of the family are also found in Brazil and the West Indies, one of which the *Talauma Plumieri*, attains a height of 60 or 80 feet with large coriaceous leaves, and white flowers as large as those of our *Magnolia grandiflora*.

The wood of most species is solid and fine-grained. The bark and sometimes the leaves are aromatic and bitter, and hence their use as stomachics, anti-intermittents, emmenagogues and carminatives.

The forests of North America contain two genera of this tribe, distinguished readily by the carpels, viz.:

MAGNOLIA Linn. Carpels dehiscent, or opening for the seed to escape.

LIRIODENDRON Linn. Carpels indehiscent, or not opening to permit the escape of the seed.

A deep sandy soil, and a situation sheltered from the north and east, suits most of the species, though some, as M. Glauca, for example, thrive naturally best in a moist peaty soil.

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P. J. Redouté del. Gabriel sculp.

Large Magnolia *or* Big Laurel.

Magnolia Grandiflora.

Gabriel sculp.

In ornamental planting the magnolias are extremely important, both for their variety and great beauty; an assemblage of all the species that will grow in a given climate should by no means be omitted.

The seeds of the different kinds of magnolia should be sown immediately after being ripe, or be preserved in damp sand or earth till March, for if kept dry till that time, very few, if any, will vegetate till a year or two following. They may also be propagated by layers and suckers, and by inarching, budding, and grafting upon one another.]

LARGE FLOWERED MAGNOLIA,

OR

BIG LAUREL.

Magnoliaceæ. Juss. Polyandria polygynia. Linn.

Magnolia grandiflora. *M. foliis perennantibus, ovalibus, rigidè crassèque coriaceis; pistillis lanatis, petalis dilatato-ovalibus, abruptè in unguem angustatis.*

Of all the trees of North America, east of the Mississippi, the Big Laurel is the most remarkable for the majesty of its form, the magnificence of its foliage, and the beauty of its flowers. It is first seen in the lower part of North Carolina, near the river Nuse, in the latitude of 35° 31′; proceeding from this point, it is found in the maritime parts of the Southern States and of the Floridas, and as far up the Mississippi as Natchez, 300 miles above New Orleans; which embraces an extent of 2,000 miles.

At Charleston, S. C., and in its vicinity, this tree is commonly called Large Magnolia; but it is more generally known in the country by the name of Big Laurel; the French of Louisiana call it *Laurier Tulipier.*

The Large-flowered magnolia claims a place among the largest trees of the United States. It sometimes, though rarely, reaches 90 feet in height, and 2 or 3 feet in diameter; but its ordinary stature is from 60 to 70 feet. Its trunk is commonly straight, and its summit nearly in the shape of a regular pyramid. Its leaves are entire, oval, sometimes acuminate and sometimes obtuse at the summit, 6 or 8 inches long, and borne by short petioles.

They are ever-green, thick, coriaceous, and very brilliant on the upper surface.

The flowers are white, of an agreeable odor and seven or eight inches broad. They are larger than those of any other tree with which we are acquainted, and on detached trees they are commonly very numerous. Blooming in the midst of rich foliage, they produce so fine an effect, that those who have seen the tree on its native soil agree in considering it as one of the most beautiful productions of the vegetable kingdom.

The fruit is a fleshy, oval cone, about 4 inches in length: it is composed of a great number of cells, which, at the age of maturity, open longitudinally, showing two or three seeds of a vivid red. The seeds soon after quit the cells, and for some days remain suspended without, each by a white filament attached to the bottom of its cell. The red, pulpy substance, which surrounds the stone, decays and leaves it naked. The stone contains a white milky kernel. In Carolina, this tree blooms in May, and its seeds are ripe about the beginning of October.

The trunk is covered with a smooth, grayish bark, resembling that of the Beech. The wood is soft, and remarkable for its whiteness, which it preserves even after it is seasoned. I have been informed that it is easily wrought and not liable to warp, but that it is not durable when exposed to the weather: and for this reason, is used only in joinery in the interior of buildings. In trees from 15 to 18 inches in diameter, I discerned no mark of distinction between the sap and the heart of this wood, except a deep brown point, six or eight lines in diameter, in the centre of the trunk. The trees from which I drew this observation had been felled about three weeks, and I remarked that some of the chips, after a slight fermentation, had changed to a rose color. I have taken notice of an analogous fact in the Poplar or Tulip Tree, which will be particularly mentioned in the description of that tree.

This magnolia grows only in cool and shady places, where the soil, composed of brown mould, is loose, deep and fertile. These tracts lie contiguous to the great swamps, which are found on the borders of the rivers and in the midst of the *pine-barrens*, or form themselves a part of these swamps; but they are never seen in the long and narrow marshes, called *branch-swamps*, which traverse the *barrens* in every direction, and in which the miry soil is shallow, with a bed of white, quartzy sand beneath. In the situations mentioned above, it is generally accompanied by the Swamp Chestnut Oak, Spanish Oak, Beech, Wahoo and Devil Wood. I have uniformly remarked that wherever the Big Laurel grows it is accompanied by the Umbrella Tree, but that the Umbrella Tree, which endures an intense degree of cold, is not always accompanied by the Big Laurel.

The seeds become rancid less speedily than those of other species of Magnolia; they may be kept several months before they are sown. This

species also furnishes the greatest number of young stocks, which are as thriving as plants carefully raised in the nursery, and so numerous in the districts where the tree abounds, that several hundreds of them may be plucked up in an hour.

Insulated trees bear a proportionally greater number of blossoms and of cones than those which are enclosed in the forests: a single tree sometimes yields 300 or 400 cones, each of which contains 40 or 50 seeds.

This Magnolia is deservedly esteemed in Europe by the curious in foreign trees. It is valued, not only for the magnificence of its foliage and of its flowers, but also for its insensibility to cold. It is hardier than the Orange Tree, and in America it grows five degrees further north: the Orange Tree does not multiply in the American forests above the 28° of latitude. In Europe, the most northern point at which the Big Laurel passes the winter securely in the open air is about Nantes, in the latitude of 47° 14′; but it begins to yield ripe fruit near Grenoble, in the latitude of 45° 11′. In the garden of the late Mr. W. Hamilton, near Philadelphia, I saw a Magnolia which bore uninjured the rigorous climate of this part of Pennsylvania, which is much more severe than that of Paris and of London. From these facts it may be inferred that, with time and perseverance, this tree may be habituated to a degree of cold far exceeding the temperature of its native skies, and that it will one day become the finest ornament of our parks and gardens.

PLATE LI.

A leaf of the natural size. Fig. 1, *A flower of half the natural size. Fig.* 2, *A cone of the natural size.*

[Several varieties of this tree are to be found in the nurseries of London and Paris, differing only in the shape of the leaves and size of the flowers, both of which are modified by cultivation and sometimes greatly increased in size. A deep sandy loam, dry at bottom, and enriched with vegetable mould, suits all the varieties of this species, and it is best propagated by layers, those raised from seed requiring a long time to flower. The shoots should be laid down in autumn, and require two years to become sufficiently rooted for separation; they are then potted, and kept in pits or under glass during winter, and set in the open air during summer, till wanted for final planting. A few specimens have thriven very well in the vicinity of Philadelphia, but further north they require protection. Planting against a south wall with projecting eave boards, would probably be advantageous; in such situations I have seen them in excellent condition in England. See Nuttall's Supplement, vol. 1, p. 81.]

SMALL MAGNOLIA,

OR

WHITE BAY.

MAGNOLIA GLAUCA. *M. foliis æqualiter ovalibus, vel ovali-oblongis: subtus glaucis.*

THIS tree, though inferior in size to the preceding species, and less regularly formed, is interesting on account of its beautiful foliage and flowers. The Small Magnolia has lately been found near Cape Anne in Massachusetts, in the latitude of 45° 50′. It is common in Lower Jersey, and becomes more so in proceeding toward the south. In the maritime parts of the Southern States, in the Floridas and in Lower Louisiana, it is one of the most abundant among the trees which grow in wet grounds. It is not found far in the interior of the country, and in New York, Pennsylvania and Maryland, disappears 30 or 40 miles north of the capitals of these States. In the Carolinas and in Georgia, it grows only within the limits which I have assigned to the *pine-barrens*. I do not remember to have met with it in the back parts of these States, nor in the country west of the Mountains. In Philadelphia and New York, and in their vicinity, this tree is called Magnolia, which denomination has entirely superseded those of Swamp Sassafras and Beaver Wood, which were in use among the Swedish settlers who first fixed themselves in the country. In the Southern States, it is generally called White Bay or Sweet Bay.

In the lower parts of New Jersey and Pennsylvania, and further south, the Small Magnolia is seen only in the most miry swamps, which, during the greater part of the year, are so wet as to be impassible. Here it is accompanied by the White Cedar, and by the different species of *Andromeda* and of Whortleberry. In the Carolinas and in Georgia, it is rarely found in the large swamps which border the rivers; but it grows abundantly, I may almost say exclusively, in the long and narrow marshes which traverse the *pine-barrens*, and of which the black and miry soil reposes upon a bed of sterile sand: with the Loblolly Bay and Red Bay, it constitutes the mass of these woods. In the last mentioned States, the Small Magnolia sometimes rises to the height of 40 feet, with a diameter of 12 or 14

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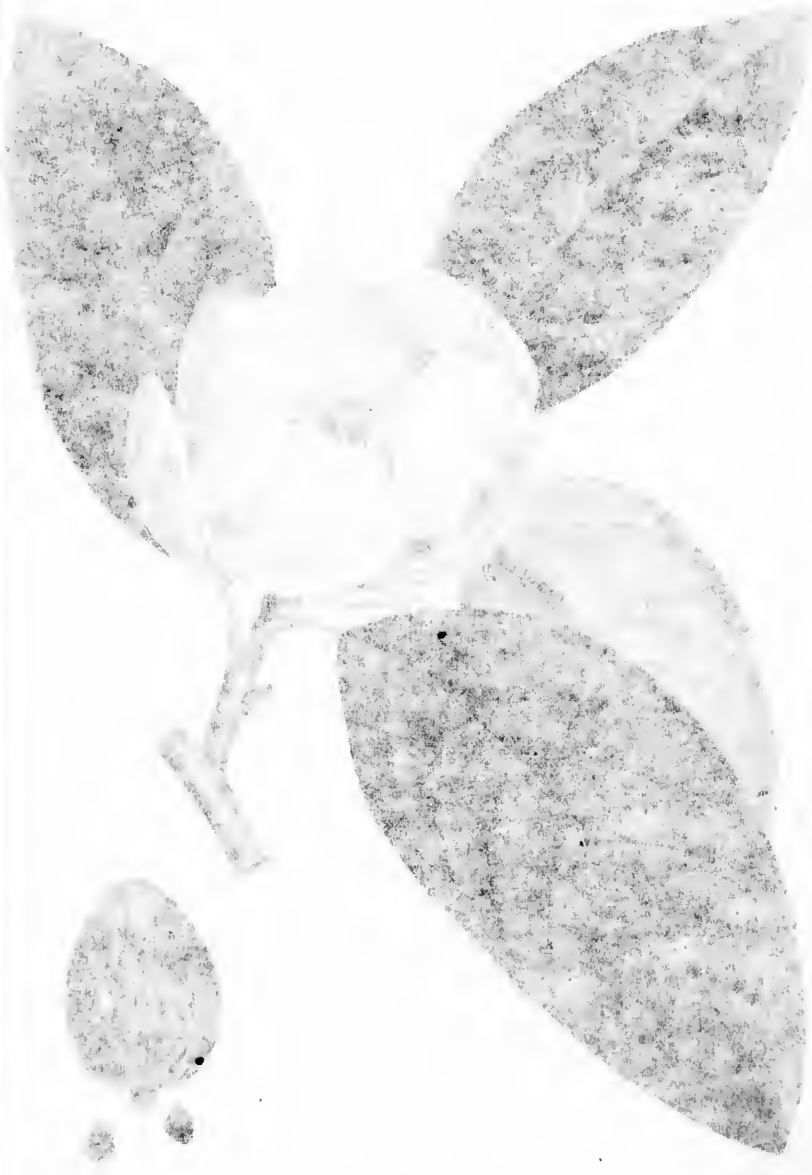

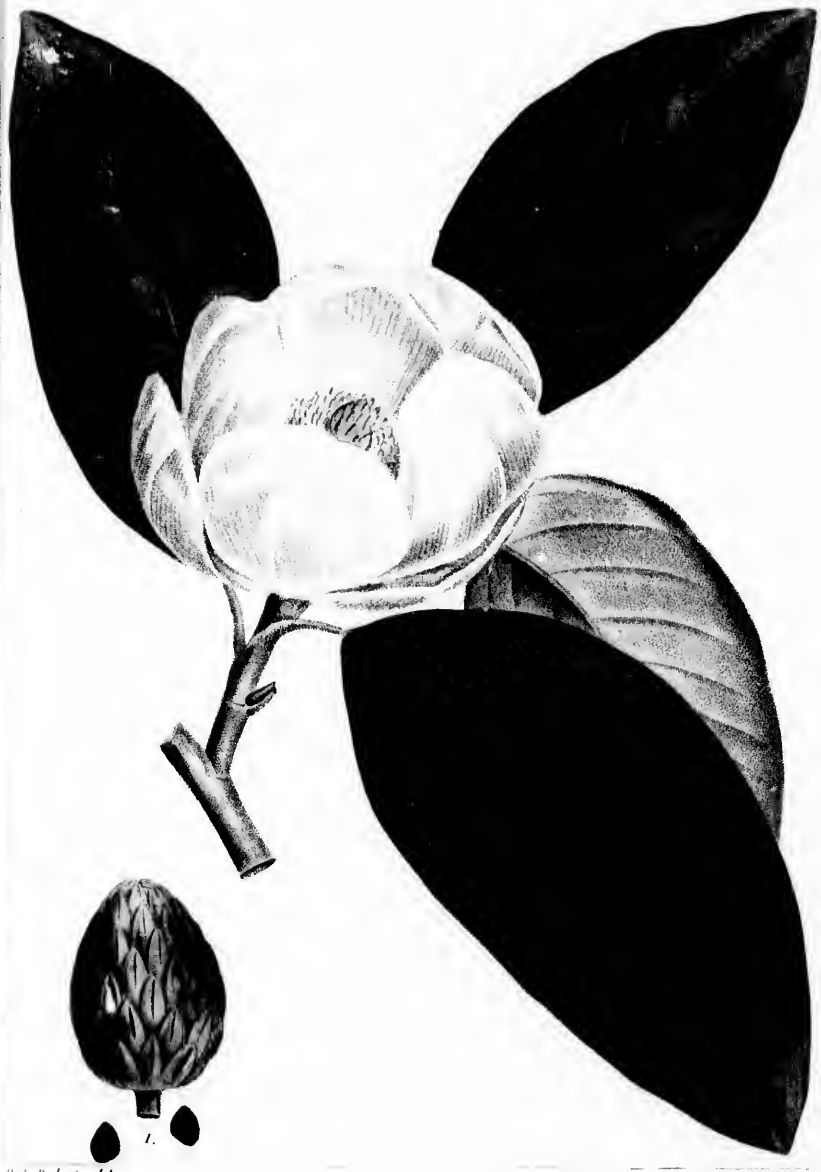

P. J. Redouté del. — Gabriel sculp.

Small Magnolia or White Bay.
Magnolia glauca.

inches; but it does not ordinarily exceed 20 or 30 feet. It is still smaller about New York and Philadelphia, where it yields fruit at the height of 5 or 6 feet.

The leaves are 5 or 6 inches long, petiolated, alternate, oblong-oval and entire. They are of a dark, shining green above, and glaucous underneath, thus presenting an agreeable contrast in the color of the two surfaces. The leaves fall in the autumn, and reappear early in the spring.

The flowers, which are single and situated at the extremity of the branches, are 2 or 3 inches broad, white, and composed of several concave, oval petals. Near Charleston, S. C., the tree blossoms in May, and a month later in the neighbourhood of Philadelphia and New York, where the women and children penetrate into the swamps and gather its sweet-scented flowers to sell them in the markets.

The fruit is small, green and conical, composed of a great number of cellules, and varying in length from an inch to an inch and a half. When ripe, the seeds, which are of a scarlet color, burst their cells, and remain some days suspended without, by white, lax, slender filaments.

The seeds of the Small Magnolia very speedily become rancid. To preserve for a length of time their faculty of germinating, they must be placed as soon as they are gathered, and before the pulp which envelops the stone is withered, in rotten wood or in sand slightly moistened, where they are kept cool till they are committed to the ground: this is the only mode of obtaining the tree from the seed. Although the Small Magnolia is so abundant in Lower Louisiana, in the Carolinas and in Georgia, young plants are very rarely met with.

The bark of this tree is smooth and grayish, and its trunk is always crooked and divided into a great number of divaricating branches. Its wood, which is of a white color and very light, is employed for no use. The name of Beaver wood formerly given to the Small Magnolia, proves that the Beaver once inhabited those parts of the Middle States to which this tree is indigenous, and that on account of its softness it was felled by these animals in preference to other trees, for the construction of their dams and houses. The bark of the roots has an aromatic odor and a bitter taste. Some of the inhabitants drink an infusion of it in brandy, in rheumatic affections, as a slight sudorific. In Lower Jersey, the country people steep the cones in rum or in whisky, and this liquor, which is very bitter, is regarded by them as a preservative against autumnal fevers.

The Small Magnolia possesses the advantage of successfully resisting the rigorous winters of France, Germany and England. In 1811, a great number of trees of this species yielded ripe seeds in the environs of Paris. Of all indigenous and exotic trees capable of enduring an equal degree of cold, there is none which rivals it in the beauty of its foliage and of its flowers. It is deservedly in great request among the amateurs of garden-

ing, to whom its multiplication, for the embellishment of their country residences, cannot be too warmly recommended.

PLATE LII.

A branch with leaves and a flower of the natural size. *Fig.* 1, *A cone with seeds of the natural size.*

[Since Michaux wrote, this tree has been found in Essex, Massachusetts. Though growing naturally in wet ground, it may easily be made to thrive in dry, but will not then remain long in flower; a good plan is to plant it near a gutter, or in a spot shaded and sheltered by larger trees, but not overtopped by them.]

CUCUMBER TREE,

MAGNOLIA ACUMINATA. *M. foliis ovalibus, acuminatis, subtus pubescentibus: floribus flavo-caerulescentibus.*

In all parts of the United Stotes where this tree is found, it is known only by the name of Cucumber Tree. It is a beautiful vegetable, equal in height and in diameter to the Large Flowered Magnolia. Among the trees of this genus hitherto discovered in North America, these two species alone exhibit very large dimensions. The most northern point at which I have myself observed the Cucumber Tree, is on the Niagara river, near the celebrated cataract of that name, in the latitude of 43°; and I believe it does not exist far beyond this limit. It abounds along the whole mountainous tract of the Alleghanies, to their termination in Georgia, over a distance of 900 miles. It is also common on the Cumberland Mountains, which divide the State of Tennessee. The situations peculiarly adapted to its growth are, the declivities of mountains, narrow valleys, and the banks of torrents, where the air is constantly moist, and where the soil is deep and fertile. At the distance of 40 or 50 miles from these mountains, either eastward or westward, the Cucumber Tree is met with only accidentally upon the steep banks of rivers, where the atmosphere is constantly refreshed by the evaporation from their surface.

We may conclude, then, that this tree is a stranger to all the regions

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Fig. 1, *A cone with*

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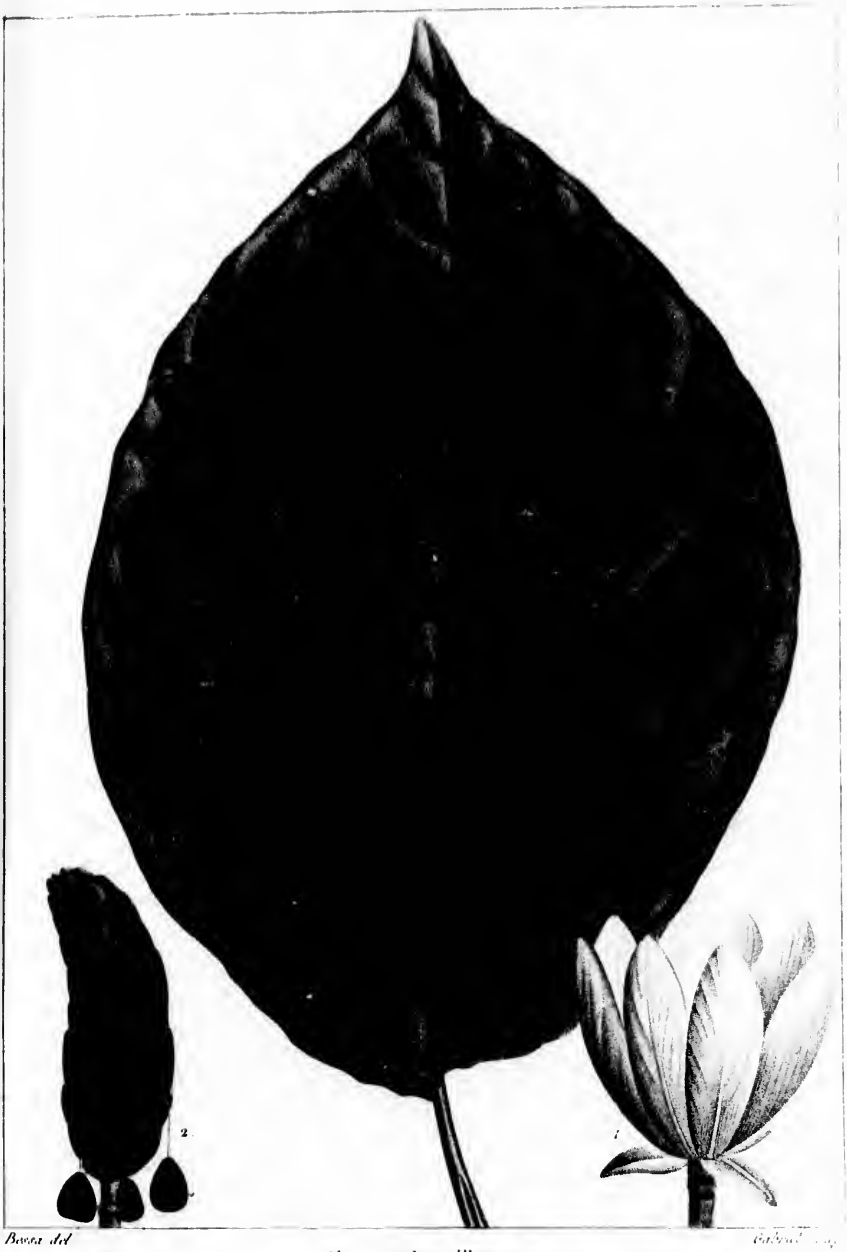

Bowen del

Cucumber Tree.

Magnolia acuminata.

north of the river Hudson, and to all the Atlantic parts of the United States, to the distance of 100, 150, and 200 miles from the sea; the nature of the soil, and the extreme heat of the climate in summer, being utterly uncongenial to its growth. It is also rare in the parts of Kentucky and West Tennessee which are most remote from the mountains, where the face of the country is less uneven.

The leaves of the Cucumber Tree are 6 or 7 inches long, and 3 or 4 inches broad, upon old trees; upon saplings growing in moist places, they are twice as large. Their form is oval, entire, and very acuminate: they fall in the autumn and are renewed in the spring.

The flowers which are 5 or 6 inches in diameter, are bluish, and sometimes white with a tint of yellow. They have a feeble odor, but as they are large and numerous, they have a fine effect in the midst of the superb foliage.

The cones or fruit are about 3 inches long, 8 or 10 inches in diameter, of nearly a cylindrical shape, and often a little larger at the upper end than at the base. They are convex on one side and concave on the other, and when green they nearly resemble a young cucumber, whence the tree has derived its name. The cells are arranged as in the other species of this genus, and each of them contains one rose-colored seed, which, before it escapes, remains suspended like those of the Great and Small Magnolias. Most of the inhabitants of the country bordering on the Alleghanies gather the cones about Midsummer, when they are half ripe, and steep them in whiskey: a glass or two of this liquor, which is extremely bitter, they habitually take in the morning, as a preservative against autumnal fevers. Its efficacy I do not deny, but it has not been made sufficiently evident to induce any physician to attempt its verification.

The Cucumber Tree sometimes exceeds 80 feet in height, and 3 or 4 feet in diameter at the same number of feet from the ground. The trunk is perfectly straight, of a uniform size, and often destitute of branches for two thirds of its length. The summit is ample and regularly shaped, and the tree is one of the finest in the American forests. On old stocks the bark is grayish and deeply furrowed. The heart or perfect wood is soft, and of a yellowish brown color, bearing in this respect, some analogy to the Poplar or Tulip Tree. Like the poplar wood, it is fine grained and susceptible of a brilliant polish; but it is less strong and less durable when exposed to the weather. Being a rare tree, it is only accidentally employed in the arts. Sawn into boards, it serves in joinery for the interior of wooden houses, and, for its size and lightness, it is selected for large canoes. As its wood possesses no properties which fit it for any determinate use, the Cucumber Tree is esteemed only because its foliage and flowers render it ornamental, and because, like the other trees of this genus, it blooms at an early age. Like the Small Magnolia, it endures uninjured the rigorous

winters of England, Germany and the North of France, and flourishes and blooms in the open fields. The seeds, it is true, seldom ripen; but when the trees become a little older, if proper attention is bestowed upon selecting for them a shaded southern exposure, we may hope to see their fruit arrive at maturity.

PLATE LIII.

A leaf of the natural size. Fig. 1, *A flower of half the natural size. Fig.* 2, *A cone with seeds of the natural size.*

[Propagation the same as in the other species. The layered plants bloom sooner than seedlings, but the latter make more durable trees. It thrives well at Philadelphia.]

HEART-LEAVED CUCUMBER TREE.

Magnolia cordata. *M. foliis cordatis, subtùs subtomentosis; floribus flavis.*

This species of Magnolia, which, in its general appearance and in the form of its fruit, very nearly resembles the preceding, has been confounded with it by the inhabitants of the regions in which it grows; hence it has received no distinguishing name, and, to supply the defect, I have given it that of Heart-leaved Cucumber Tree.

The banks of the river Savannah, in Upper Georgia, and those of the streams which traverse the back parts of South Carolina, are the places where my father and myself particularly observed this tree. The nearest point to the sea at which I have found it, is the plantation of *Good-rest*, 12 miles from Augusta, where, in my last journey in the United States, I noticed it along the sides of *Horn Creek*. The Heart-leaved Cucumber Tree is 40 or 50 feet in height, and 12 or 15 inches in diameter. Its trunk is straight, and covered with a rough and deeply furrowed bark, very much resembling that of the Sweet Gum and of the young White Oak. Its leaves, which are borne upon long petioles, are from 4 to 6 inches in length, from

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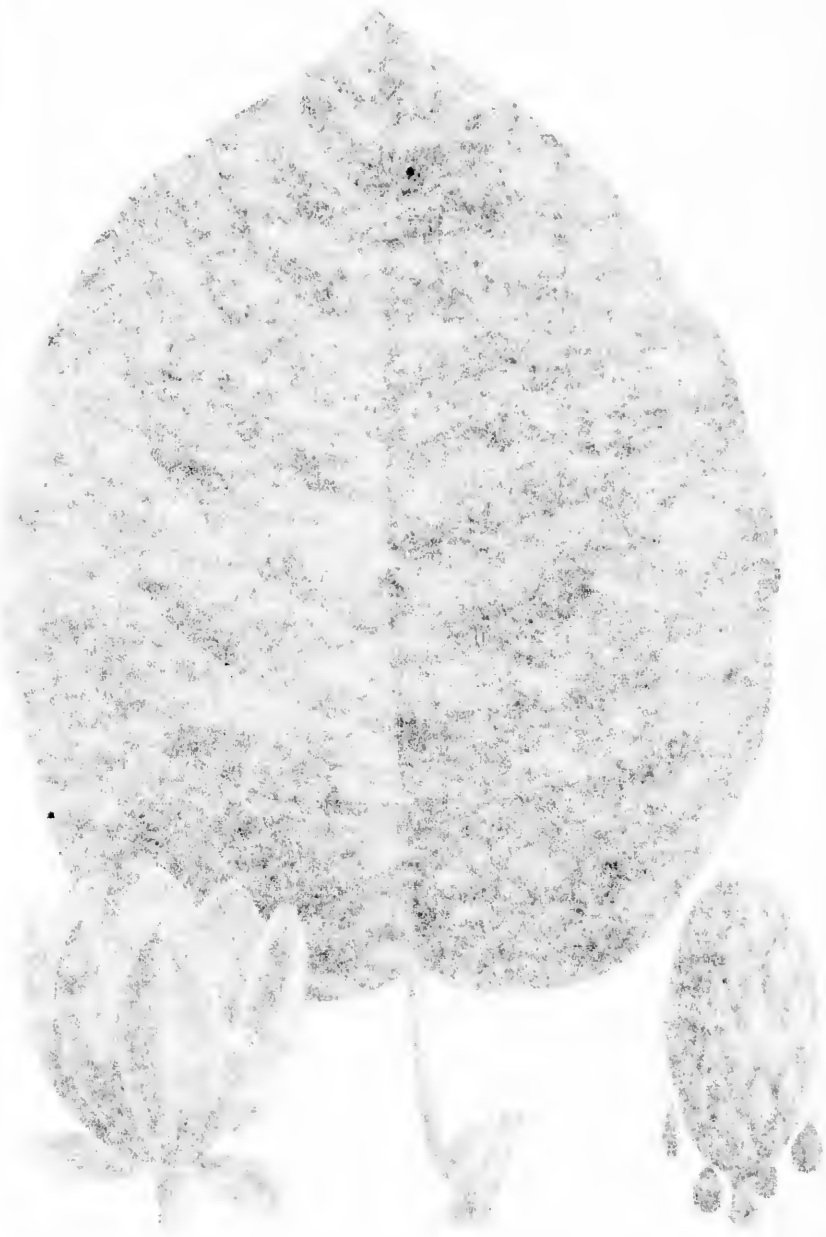
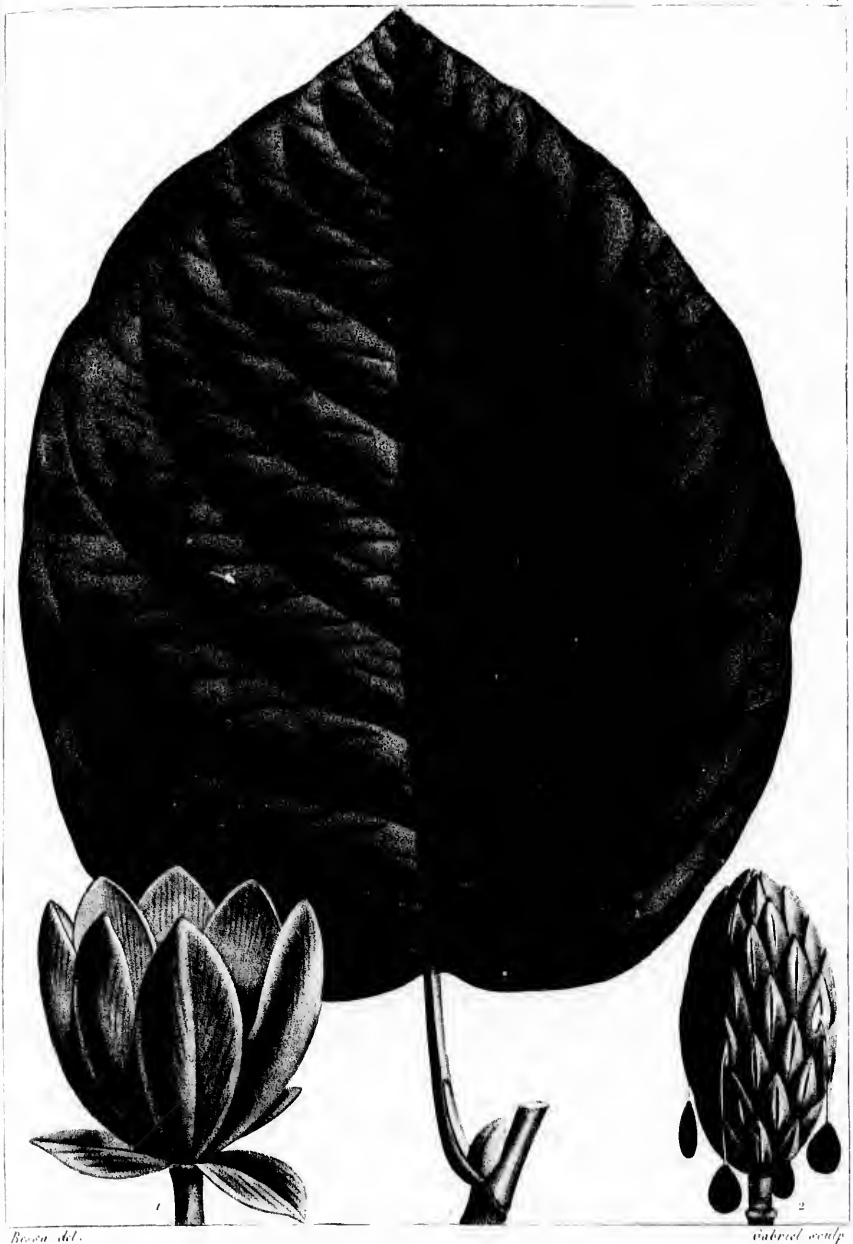
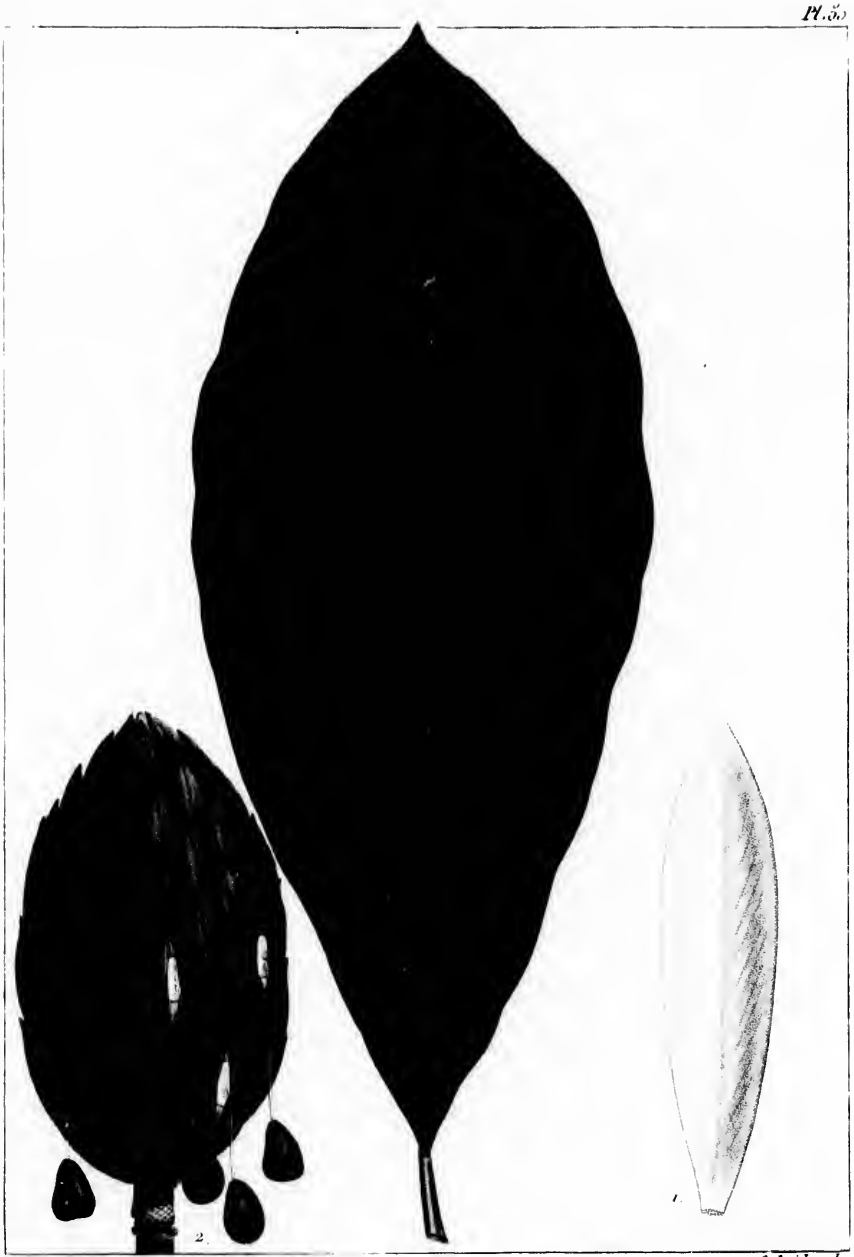




Bessa del. Gabriel sculp

Heart leaved cucumber Tree.
Magnolia cordata.



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Umbrella Tree.

Magnolia tripetala.

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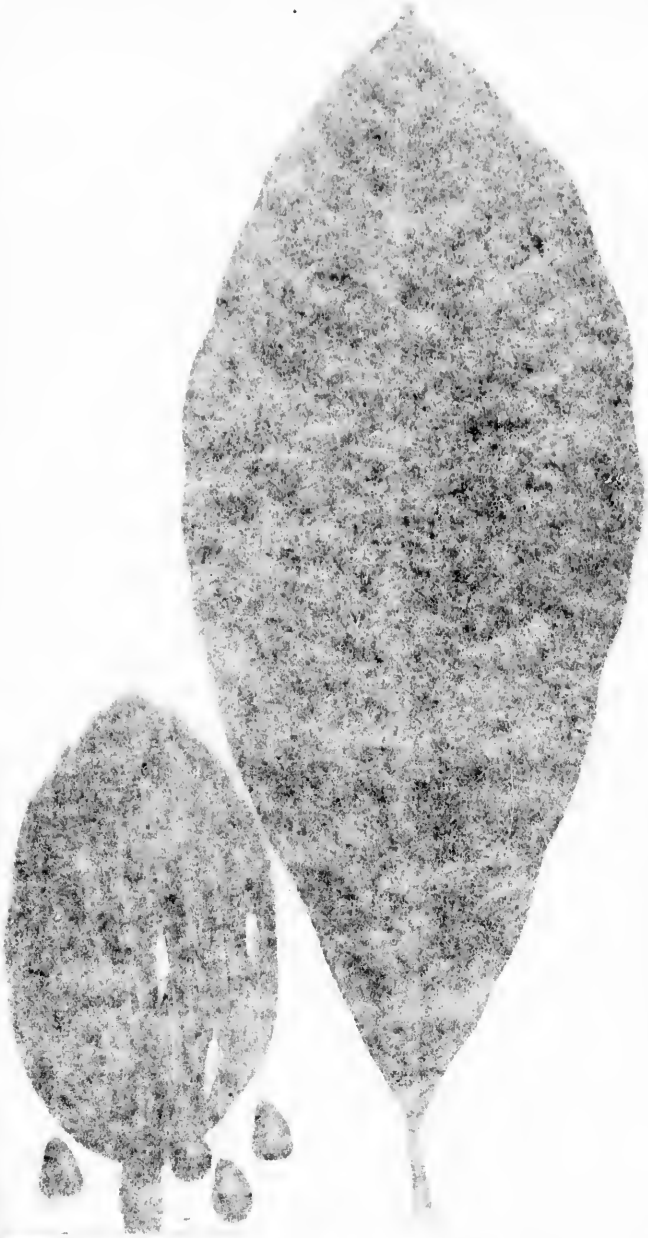

3 to 5 inches wide, smooth and entire. The flowers, which appear in April, are yellow, with the interior of the petal longitudinally marked with several reddish lines. These flowers, though somewhat smaller than those of the Cucumber Tree, are nearly 4 inches in diameter. The cones are about 3 inches long, and 10 or 12 lines in thickness, of a cylindrical form, and of a similar construction to those of the other Magnolias. The seeds also are similar in color and arrangement.

The wood of the Heart-leaved Cucumber Tree resembles, in every respect, that of the Cucumber Tree. From its softness and its readiness to decay, it is not employed for any determinate use. Besides, the tree is rare even in Upper Georgia, being found, as has already been observed, only on the elevated banks of the rivers, and never making its appearance in forests composed of Oaks, Walnuts, etc. The beauty of its yellow flowers, which form an agreeable contrast with its luxuriant foliage, and the advantage of resisting an intense degree of cold, are its only recommendations to amateurs: but in these respects it deserves, as well as any other species of the genus, to figure in parks and gardens.

PLATE LIV.

A leaf of the natural size. Fig. 1, *A flower of half the natural size. Fig.* 2, *A cone with seeds of the natural size.*

UMBRELLA TREE.

MAGNOLIA TRIPETALA. *M. foliis amplioribus, oblongis, subcuneato-obovalibus, calice reflexo.*

OBS. Petala solito novem.

THE Umbrella Tree is first seen in the northern part of the State of New York; but it is more multiplied further south, and is common on some of the islands in the river Susquehanna, and is still more so in the Southern and Western States. It is found in the maritime parts of the Carolinas and of Georgia, and 300 miles from the sea, on that part of the Alleghanies which traverses these States. The forests which cover the banks of the

river Nolachuky, in East Tennessee, may be particularly mentioned as abounding in the Umbrella Tree. Though this tree grows naturally over a great extent of country, it is not met with at every step in the woods like the Witch Hazel, the Dog Wood, and certain species of Oak: it appears only in situations perfectly adapted to its growth, which are always shady, and where the soil is deep, strong and fertile. Thus, in the lower parts of South Carolina and of Georgia, it is found only near the great swamps which lie along the rivers, or which are enclosed in the *pine-barrens*. Here, it is almost invariably accompanied by the Big Laurel, Swamp Chesnut Oak and Sweet Leaves, and never by the Small Magnolia, Red Bay and Loblolly Bay, which grow in the small swamps that intersect the *barrens*, and of which the soil is shallow, black, and often miry.

The Umbrella Tree, like the following species of this genus, is remarkable for the largeness of its leaves and of its flowers. The dimensions of the tree are such as to form a connecting link between the larger shrubs and trees of the third order; for though it sometimes rises to the height of 30 or 35 feet, with a diameter of 5 or 6 inches, it rarely attains this size. Its leaves, which are thin, oval, entire and acuminate at both extremities, are 18 or 20 inches long, and 7 or 8 inches broad; they are often disposed in rays at the extremity of vigorous shoots, and thus display a surface of 30 inches in diameter; whence is derived the name of Umbrella Tree. I have almost uniformly remarked that the trunk grows in an inclined direction; the young and feeble stock being laden, before it is as large as the little finger, with ample foliage, is bent by the winds, even when growing in sheltered situations.

The flowers are 7 or 8 inches in diameter, white, composed of several oblong, concave petals, and situated at the extremity of the branches; they are beautiful, though less regularly shaped and of a less agreeable odor than those of the other species of Magnolia.

The conical fruit is 4 or 5 inches long, and about 2 inches in diameter; it ripens in the beginning of October, and is of a beautiful rose color, with seeds of a pale red. Well grown and perfectly formed cones contain 50 or 60 seeds, which, as they speedily become rancid, should be sown immediately after they are gathered. A great number of young plants may in this way be easily obtained. By keeping the seeds in moss constantly moist, they may be preserved for several months.

The wood of the Umbrella Tree is soft, porous, and unfit for use. The bark upon the trunk is gray, smooth and polished: if cut while green, it exhales a disagreeable odor.

This Magnolia, which resists an extreme degree of cold, has long been cultivated in pleasure grounds in France and England. It is remarkable among all the indigenous trees of Europe, for the size and form of its leaves and flowers. For many years it has yielded prolific seeds in this quarter

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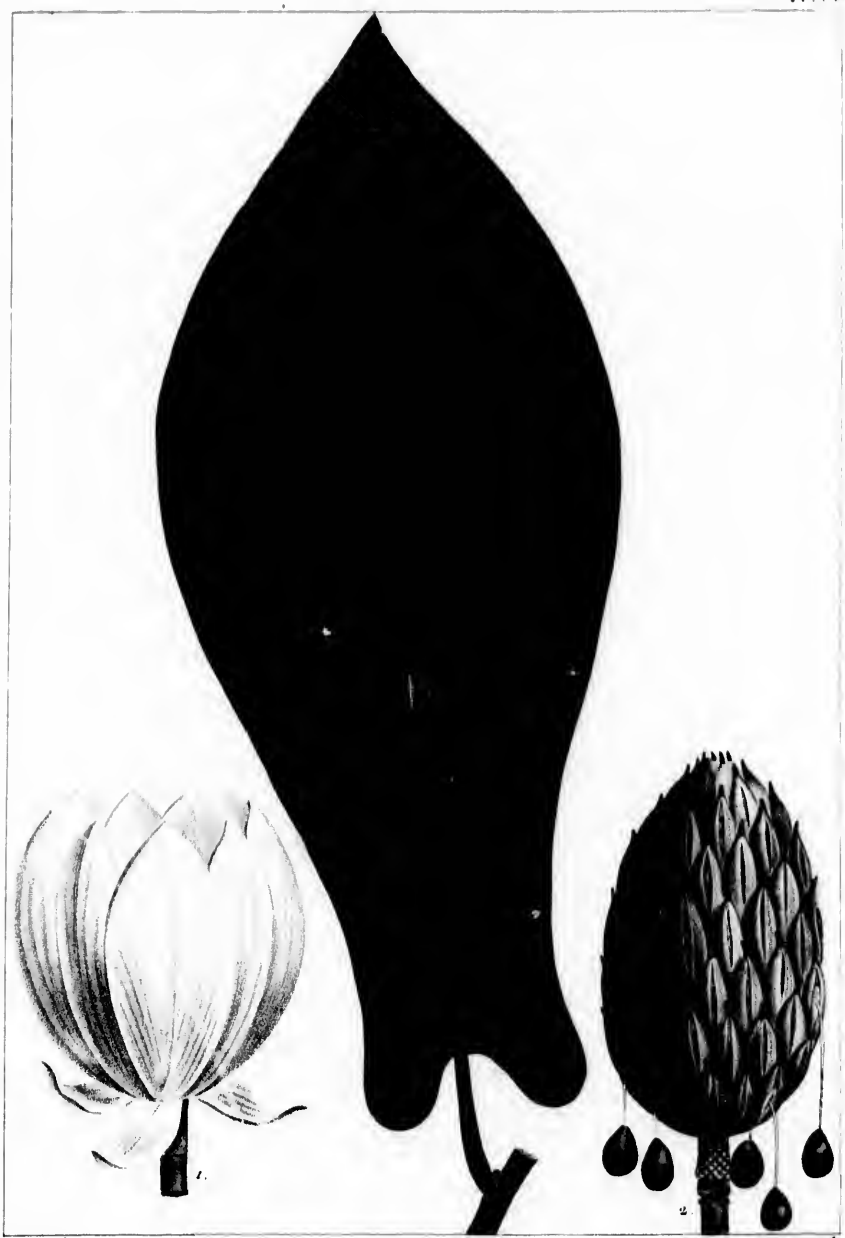

Bessa del. Gabriel sculp.

Long leaved cucumber Tree

Magnolia auriculata

Gabriel sculp.

of the world, so that it is no longer necessary to go in quest of it to its native climate.

PLATE LV.

A leaf of a fourth part of the natural size. Fig. 1, *A petal of the natural size. Fig.* 2, *A cone with seeds of the natural size.*

[It is mostly propagated by seeds. A sheltered glade, in a shrubbery or wood, not near enough to other trees to be injured by the roots, is the most desirable site. The odor of the flowers is decidedly disagreeable.]

LONG LEAVED CUCUMBER TREE.

MAGNOLIA AURICULATA. *M. foliis subrhombi-oideo-obovatis, infirne angustatis, basi profundo sinu quasi auriculatis, membranaceis, utrinque-viridibus.*

THIS species of Magnolia, equally remarkable with the preceding for the beauty of its foliage and for the size of its flowers, which are of an agreeable odor, is found only in a small tract far retired in the country, and has but lately become known to Botanists. As the result of my own researches, it appears to be particularly confined to that tract of the Alleghany mountains which traverses the Southern States, at the distance of nearly 300 miles from the sea. It should be remarked that in this part the chain is much broader than further north, in Virginia. The Long-leaved Cucumber Tree is, however, sometimes found on the steep banks of the rivers which rise in these lofty mountains, and which on one side roll their waters to the sea, and on the other flow to meet the Ohio, after traversing the States of Kentucky and Tennessee. The point nearest the sea at which I have met with it is *Two Sisters' Ferry*, about 35 miles from Savannah in Georgia: but it seems to be found here only by accident, for from this spot to the mountains, a distance of 150 miles, it is no more seen. I have no where found it as abundant as on on the steepest part of the lofty mountains of North Carolina, particularly those which are called by the inhabitants Great Father Mountains, Black and Iron Mountains. It is designated

by the names of Long-leaved Cucumber Tree, and of Indian Physic. The soil of these mountains, which is brown, deep, and of an excellent quality, is peculiarly favorable to its growth, and it multiplies spontaneously with such facility, that I could have collected a thousand young plants in a single day. The Black Oak, the Scarlet Oak, the Red Oak, the Chesnut, the Red Ash, the Buck Eye, the Cucumber Tree and the Sorrel Tree compose the remainder of the forests which shade these solitary retreats, where, in the finest days of summer, the atmosphere is charged with moisture by evaporation from the numberless torrents which tumble from the summits.

The Long-leaved Cucumber Tree is much inferior in size to most of the trees with which it grows, attaining only the height of 40 or 45 feet, and the diameter of 12 or 15 inches. Its trunk is straight and well shaped, and often undivided for half its length ; its limbs, widely spread and sparingly ramified, give to the tree, when stript of its leaves, so peculiar an air, that it is readily distinguished.

The leaves are of a light green color, of a fine texture, 8 or 9 inches long, and from 4 to 6 inches broad ; on young and vigorous trees they are often one-third or even one-half larger. They are smooth on both surfaces, acuminate at the summit, widest near the top and narrowest towards the bottom. The base is divided into rounded lobes, whence is derived the specific name of *Auriculata*.

The flowers are 3 or 4 inches in diameter, of a fine white color, of an agreeable odor, and situated at the extremity of the young shoots, which are of a purplish red dotted with white.

The cones are oval, 3 or 4 inches long, and like those of the Umbrella Tree, of a beautiful rose color when ripe. They differ from those of the other species by a little inferiority of size, and by a small appendage which terminates the cells. Each cell contains one or two red seeds.

The wood is soft, spongy, very light, and unfit for use. The bark is gray, and always smooth, even on the oldest trees. When the epidermis is removed, the cellular tissue, by contact with the air, instantly changes from white to yellow. The bark has an agreeable, aromatic odor, and an infusion of it in some spirituous liquor is employed as an excellent sudorific in rheumatic affections.

The Long-leaved Cucumber Tree flourishes in the open fields in the neighborhood of Paris and of London. It is becoming common in Europe in the gardens of amateurs of foreign vegetables, who justly prefer it to the Umbrella Tree on account of its flowers, which, though smaller, have the advantage of an agreeable perfume. This tree bears equally well the diversity of the winters of Philadelphia, for several stocks sent by my father from the Mountains of North Carolina to Messrs. W. Hamilton and Bartram, who reside near that city, succeed perfectly in the open garden, and have for several years bloomed and yielded seed. The useful and agree-

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Large leaved Umbrella Tree.
Magnolia macrophylla.

able productions which seem to have been confined by the hand of nature to a single district, are thus propagated from one extremity of the globe to the other, and serve, by the innocent pleasure attending their cultivation, to solace the afflictions of humanity.

PLATE LVI.

A leaf of a fourth part of the natural size. Fig. 1, *A flower of two-thirds of the natural size. Fig.* 2, *A cone with seeds of the natural size.*

LARGE-LEAVED UMBRELLA TREE.

MAGNOLIA MACROPHYLLA. *M. ramis medullosis, fragilibus; foliis omnium amplissimis, oblongè subcuneato-obovalibus, basi sinuatâ, subauriculatis subtùs glaucis; junioribus argenteis, densissimè holosericeis.*

OF the twelve species of Magnolia hitherto discovered on the Old and New Continents, the Large-leaved Umbrella Tree is the most remarkable for the size of its leaves and of the flowers. It is also the least multiplied of the American species, and is rarely met with in the forests. On account of the resemblance of its leaves to those of the Umbrella Tree, the two species have hitherto been confounded by the inhabitants of the districts in which they grow: I have, therefore, given it the specific name of Large-leaved Umbrella Tree, which is sufficiently characteristic. My father, in his *Flora Boreali-Americana*, as well as many succeeding botanists, designates it by the name of *Magnolia macrophylla*, Large-leaved Umbrella Tree, while in the catalogues of gardeners, and sometimes in those of botanists, it is denominated *Magnolia Michauxii*. I have thought proper to drop this specific name, however honorable to my father, and to retain the one which he himself had established.

In the month of June, 1789, in the first journey made by my father from Charleston to the Mountains of North Carolina, I accompanied him, and discovered this tree, which he immediately judged to be a new species of Magnolia. The spot on which we found this magnificent vegetable is in

North Carolina, 10 miles south of Lincolnton, and 250 miles from Charleston. Our extensive researches in quest of it in the upper part of the Southern States, and those subsequently made by several English botanists east of the Alleghanies, which were alike unsuccessful, sufficiently prove that it is extremely rare between the mountains and the sea. West of the range, in Tennessee, it is more common, but even here only a few trees are found together, at intervals of 40 or 50 miles; as I had an opportunity of observing during my journey in the Western States in 1803.

The Large-Leaved Umbrella Tree, like the Umbrella Tree, on which it is a constant attendant, delights in cool situations sheltered from the wind, where the soil is deep and fertile. In its general appearance, and in the terminal arrangement of its leaves, it most nearly resembles the species just mentioned; in the conformation of the inferior surface of the leaf, it is more like the Long-leaved Cucumber Tree. It forms also a mean between these two species by its size, which does not exceed 35 feet in height, and 4 or 5 inches in diameter. The body of the tree is covered with a smooth and very white bark, by which in the winter, when stript of its leaves, it is readily distinguished from the Umbrella Tree. At this season it differs also from the Umbrella Tree in its buds, which are compressed instead of being rounded at the end, and which are covered with a soft and silvery down.

Of all this genus, the Large-leaved Umbrella Tree is the species which bears the largest leaves: some of them are 35 inches long and 9 or 10 inches broad. They are borne on petioles, short in comparison with the size of the leaves, and are of an oblong-oval shape, pointed at the extremity, and cordiform at the base: their color is light green above, and glaucous beneath: they fall in the autumn and re-appear early in the spring. The flowers are white and larger than those of any other species of Magnolia, for when fully blown they are sometimes 8 or 9 inches in diameter: they are composed of 6 petals, longer and broader than those of the Umbrella Tree. Within the flower, near the bottom of the petals, is a purple spot 7 or 8 lines in diameter. The flowers diffuse a fragrant odor, and their beauty is heightened by the luxuriant foliage which surrounds them.

The cones are about 4 inches long, nearly cylindrical, and of a vivid rose color when arrived at maturity. In the arrangement of the cells and of the seeds, they resemble those of the Umbrella Tree and of the Long-leaved Cucumber Tree; it should be remarked, however, that they are destitute of the appendages visible on the fruit of the last mentioned species, especially when it is dry.

The seeds of the Large-leaved Umbrella Tree require, in order to preserve their power of germination, the same attention with those of the preceding species.

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Loblolly Bay

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brella Tree, and is of no value in the arts: like many other plants, its only use is to adorn the garden, and to add another charm to the rural retreat. For this purpose only it is eagerly sought for in France and England by the lovers of exotic trees, and with the more reason as it passes the winter uninjured in the climates of Paris and of London. A tree of this species which I brought from America seven years ago, bloomed in 1811 in the gardens of the Empress Josephine at Malmaison.

The Large-leaved Umbrella Tree might be grafted by approach or by inoculation on stocks of the Umbrella Tree, which is far more common: an experiment of this sort, made by my father in his garden near Charleston, S. C., was crowned with complete success.

PLATE LVII.

A leaf of a fifth part of the natural size. Fig. 1. *A petal of half the natural size.*

[The flowers of this superb tree are attacked, immediately on their opening, by thousands of rose bugs, which desert the rose for its superior attractions.]

[See Nuttall's Supplement, Vol. 1, p. 83.]

LOBLOLLY BAY.

Polyandria monogynia. Linn. Malvaceæ. Juss.

Gordonia lasyanthus. *G. foliis glaberrimis, subserratis, nitidis, coriaceis; floribus longè pedunculatis; capsulâ conoideâ, acuminatâ.*

The Loblolly Bay is comprehended within the same limits with the Long-leaved Pine, being confined to the maritime parts of the Southern States, to the two Floridas, and to Lower Louisiana. It is very abundant in the *branch swamps*, and exists in greater proportion than the Red Bay, Swamp Bay and Black Gum, with which it is usually associated. In the

pine barrens, tracts of 50 or 100 acres are met with at intervals, which, being lower than the adjacent ground, are kept constantly moist by the waters collected in them after the great rains. These spots are entirely covered with the Loblolly Bay, and are called *Bay Swamps*. Although the layer of vegetable mould is only 3 or 4 inches thick, and reposes upon a bed of barren sand, the vegetation of these trees is surprisingly luxuriant.

The Loblolly Bay grows to the height of 50 or 60 feet, with a diameter of 18 or 20 inches. From 25 to 30 feet its trunk is perfectly straight. The small divergency of its branches near the trunk gives it a regularly pyramidal form; but as they ascend they spread more loosely, like those of other trees of the forest.

The leaves are ever-green, from 3 to 6 inches long, alternate, oval-acuminate, slightly toothed, and smooth and shining on the upper surface. The flowers are more than an inch broad, white and sweet-scented; they begin to appear about the middle of July, and bloom in succession during two or three months. This tree possesses the agreeable singularity of bearing flowers when it is only 3 or 4 feet high.

The fruit is an oval capsule, divided into five compartments, each of which contains small, black, winged seeds. These seeds appear to germinate successfully only in places covered with *Sphagnum*, a species of moss which copiously imbibes water, and in which are found thousands of the young plants, which are plucked up with ease.

The bark of the Loblolly Bay is very smooth while the tree is less than 6 inches in diameter; on old trees it is thick and deeply furrowed. In trunks which exceed 15 inches in diameter, four-fifths of the wood is heart. The wood is of a rosy hue, and of a fine, silky texture; it appears to be very proper for the inside of furniture, though the Cypress is generally preferred. It is extremely light; when seasoned it is very brittle, and it rapidly decays unless it is kept perfectly dry; hence it is entirely neglected in use, and is not employed even for fuel.

The value of the Loblolly bark in tanning compensates in some measure for the uselessness of its wood: it is employed for this purpose throughout the maritime parts of the Southern States and of the Floridas. For although this branch of industry is by no means as extensively practised in this part of the country as in the Northern States, and though these regions afford many species of Oak, yet the species whose bark is proper for tanning are not sufficiently multiplied to supply the consumption. As much of the bark of the Spanish Oak as can be obtained, of which the price is one half greater, is mixed with that of the Loblolly Bay. This tree has the advantage of maintaining very long the circulation of its sap, so that the bark may be taken off during three or four months.

I can add little to this description of the Loblolly Bay: the luxuriance of its vegetation, the beauty of its flowers, and the richness of its ever-green

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Pl. 59

Gabriel sculp.

foliage place it among the Magnolias, and, with the other species, it contributes to the ornament of the forest in the southern part of the United States. It is less sensible to cold than the Large-flowered Magnolia, and with some attention it may be brought through the winter in the climates of Paris and London. This opinion is corroborated by the fact that I have seen several of these trees growing in the botanical garden, founded by Dr. D. Hosack, near New York, where no other precaution was used than slightly covering them in the winter.

PLATE LVIII.

A branch with leaves and a flower of the natural size. Fig. 1, *A seed vessel. Fig.* 2, *A seed.*

FRANKLINIA.

GORDONIA PUBESCENS. *G. foliis lanceolatis, subserratis, subpubescentibus, floribus subsessilibus, capsulâ sphericâ.*

THIS species of Gordonia appears to be restricted by nature within very narrow bounds, having hitherto been found only on the banks of the Altamaha, in the State of Georgia. It was discovered there in 1770 by John Bartram, who gave it the name of Franklinia, in honor of one of the most illustrious founders of American independence; a philosopher equally distinguished by his scientific acquirements and by his patriotic virtues.

The Franklinia is much smaller than the preceding species, and rarely exceeds 30 feet in height and 6 or 8 inches in diameter. The bark of the trunk presents a smooth and angular surface, like that of the Hornbeam. The leaves are alternate, oblong, narrowed at the base and toothed; they are annually shed in the fall.

The Franklinia blooms in Carolina about the beginning of July, and a month later near Philadelphia. The flowers are more than an inch in diameter, white and of an agreeable odor. Like those of the Loblolly

Bay, they open in succession during two or three months, and begin to appear when the tree is only 3 or 4 feet high.

The fruit is in the form of round, ligneous capsules, which, when ripe, open at the summit in four seams, to release the small, angular seeds.

Although the Franklinia is only found two or three degrees further south than the Loblolly Bay, it appears to be far less sensible to cold; for I have seen several trees of this species in the garden of J. and W. Bartram, about 4 miles from Philadelphia, whose growth was luxuriant, and which, during 25 years, had remained uninjured by the severe winters which occur in this part of Pennsylvania.

The Franklinia has long been cultivated in France and England; but though the cold is less intense, it grows less kindly at Paris than at Philadelphia. This tree seems to be less highly esteemed than it deserves: it might easily be naturalized, and its magnificent flowers, especially when rendered double, would richly contribute to the decoration of our pleasure grounds.

PLATE LIX.

A branch with leaves and a flower of the natural size. Fig. 1, *The capsule which contains the seeds. Fig.* 2, *A seed.*

[This superb tree and the preceding belong to the order Ternströmiaceæ, and are allied to the Camellia. Near Philadelphia, in high and dry situations, it is hardy; in inferior situations a hard winter kills it to the root, from which stools spring up in abundance; these may be layered. A tree of this kind, more than thirty feet high, flourishes admirably at South Laurel Hill Cemetery, and has long been admired for its beautiful and abundant bloom; the fragrant flowers drop in an almost perfect state every day for two months, and it persists in this habit till a heavy frost. In ornamental planting by no means neglect this rare and valuable tree. The Loblolly Bay it is difficult to preserve through a Philadelphia winter.]

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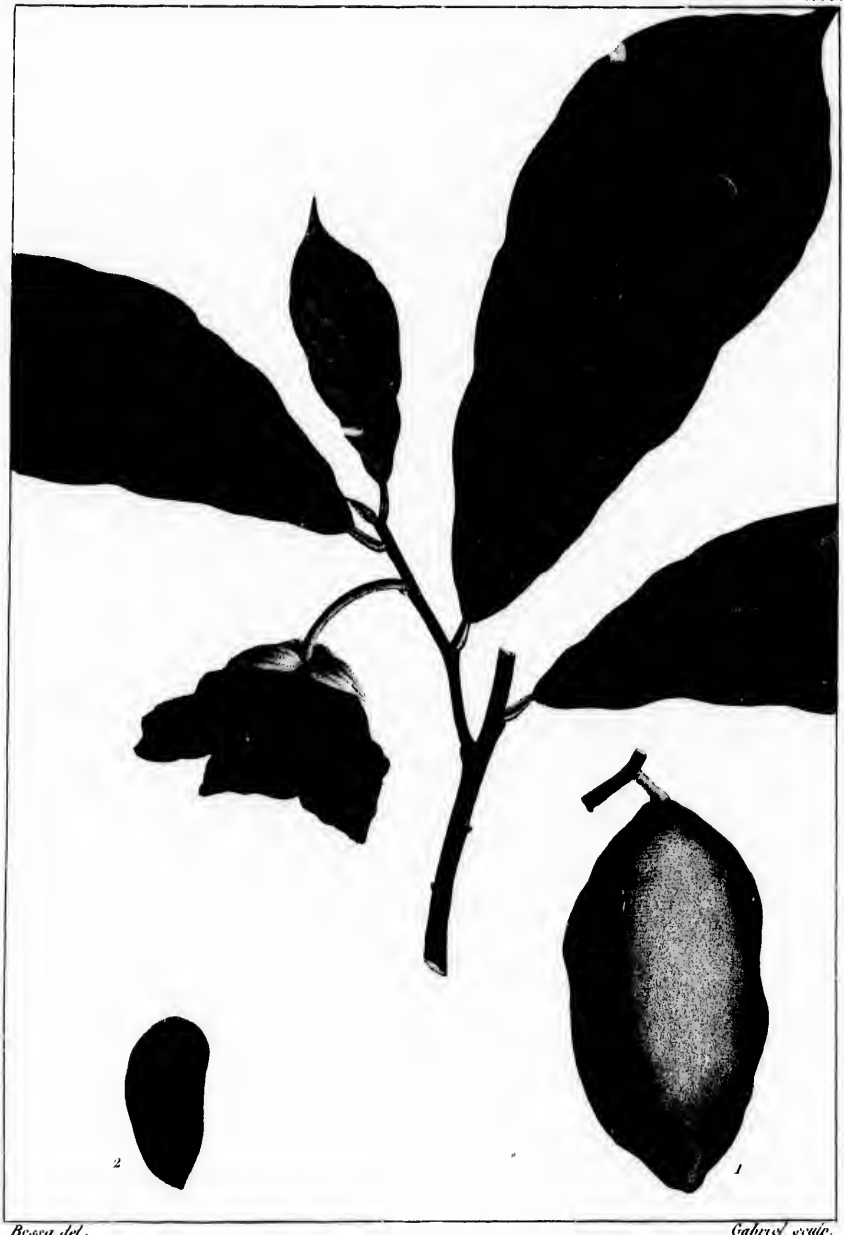

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Papaw.

Annona triloba.

Pl. 60.

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Gabriel sculp.

PAPAW.

Polyandria Polygynia. Linn. Anonæ. Juss.

Anona triloba. *A foliis glabriusculis, oblongè cuneato-obovalibus; petalis exterioribus orbiculatis; fructibus maximis, crassius carnosis.*

Although the Papaw most frequently presents itself in the form of a shrub, it sometimes exhibits such dimensions that it may be ranked among trees of the third order; as it is sufficiently interesting in other respects to merit attention, I have therefore thought proper to describe it.

By the French of Upper Louisiana, and of the two Canadas, the *Anona triloba* is called *Assiminier*, and by the Americans, Papaw. I have not observed it north of the Schuylkill river, and it appears to be unknown, or extremely rare, in the low and maritime parts of the Southern States. It is not uncommon in the bottoms which stretch along the rivers of the Middle States; but it is most abundant in the rich valleys intersected by the western waters, where at intervals, it forms thickets exclusively occupying several acres. In Kentucky and in the western part of Tennessee, it is sometimes seen also in forests where the soil is luxuriantly fertile; of which its presence is an infallible proof. In these forests it attains the height of 30 feet and the diameter of 6 or 8 inches, though it generally stops short of half this elevation.

The leaves are borne on short petioles, and are alternate, 5 or 6 inches in length, and of an elongated form, widening from the base to the summit. They are of a fine texture, and the superior surface is smooth and brilliant. The flowers, which are attached by short peduncles are pendent and of a purple hue.

When the fruit is ripe, which takes place toward the beginning of August, it is about 3 inches long and an inch and a half thick, of a yellowish color, and of an oval form, irregular and swelling into inequalities. Its pulp is soft and of an insipid taste, and it contains several large, triangular stones. It is never brought into the markets, and is sought in the woods only by children. At Pittsburg, some persons have succeeded in making from it a spirituous liquor; but notwithstanding this experiment, very feeble hopes can be entertained of cultivating the tree with profit for this purpose.

The trunk of the Papaw is covered with a silver-grey bark, which is smooth and even polished. The wood is spongy, extremely soft, destitute of strength, and applicable to no use in the mechanical arts. I have noticed

that the cellular tissue of the bark, and particularly that of the roots, exhales in summer a nauseous odor, so strong as to occasion sickness if it is long respired in confined air.

This tree has bloomed in Europe for many years; but it rarely fructifies, and is principally esteemed for the beauty of its flowers and of its foliage.

PLATE LX.

A branch with leaves and flowers of the natural size. Fig. 1, *Fruit of the natural size and color. Fig.* 2, *A stone separated from the pulp.*

POPLAR OR TULIP TREE.

LYRIODENDRUM TULIPIFERA. *L. foliis trilobis; lobo medio truncato; calice triphyllo.*

Magnoliaceæ. Jus.

This tree, which surpasses most others of North America in height and in the beauty of its foliage and of its flowers, is also one of the most interesting from the numerous and useful applications of its wood. Wherever it abounds, and throughout the greater part of the United States, it is called Poplar. In Connecticut, New York, and New Jersey, it is known by the name of White Wood, and of Canoe Wood, and more rarely, by that of Tulip Tree. This last denomination, which, since the introduction of the tree, has been adopted in Europe, is certainly the most proper, because the flower nearly resembles the tulip, and because the tree bears in none of its characters any analogy to the Poplars, which are in every respect inferior to it. But the name of Poplar has become so generally sanctioned by use in the United States, that I have not felt at liberty to change it, and have only annexed the other as a synonym, with a feeble hope of its ultimately prevailing.

The southern extremity of Lake Champlain, in latitude 45°, may be be considered as the northern limit, and the Connecticut river, in the longitude of 72°, as the eastern limit of the Tulip Tree. It is only beyond the Hudson, which flows two degrees further west, and below the 43° of latitude, that it is frequently met with and fully developed. Its expansion is not here repressed, as in Vermont and the upper part of Connecticut, by

Bessa del. Gabriel sc.

Poplar *or* Tulip Tree.
Lyriodendrum tulipifera.

the excessive cold, and by a mountainous surface unfavourable to its growth. It is multiplied in the Middle States, in the upper parts of the Carolinas and of Georgia, and still more abundantly in the western country, particularly in Kentucky. Its comparative rareness in the maritime parts of the Carolinas and of Georgia, in the Floridas and in Lower Louisiana, is owing less to the heat of the summer than to the nature of the soil, which in some parts is too dry, as in the *pine-barrens*, and in others too wet, as in the swamps which border the rivers. Even in the Middle and Western States, the Tulip Tree is less abundant than the Oaks, the Walnuts, the Ashes and the Beeches, because it delights only in deep, loamy, and extremely fertile soils, such as are found in the rich bottoms that lie along the rivers, and on the borders of the great swamps that are enclosed in the forests.

In the Atlantic States, especially at a considerable distance from the sea, Tulip Trees are often seen 70, 80, and 100 feet in height, with a diameter from 18 inches to 3 feet. But the Western States appear to be the natural soil of this magnificent tree, and here it displays its most powerful vegetation. It is commonly found mingled with other trees, such as the Hickories, the Black Walnut and Butternut, the Coffee Tree and the Wild Cherry Tree; but it sometimes constitutes alone pretty large tracts of the forest, as my father observed in Kentucky, on the road from Beard Stone to Louisville. In no other part of the United States did he find the Tulip Trees so lofty, and so great a diameter. He observed many of them in passing which appeared to be 15 or 16 feet in circumference; and 3½ miles from Louisville, he measured one, which, at 5 feet from the ground was 22 feet and 6 inches in circumference, and whose elevation he judged to be from 120 to 140 feet; the correctness of this estimate I have since had an opportunity of proving. Of all the trees of North America with deciduous leaves, the Tulip Tree, next to the Buttonwood, attains the amplest dimensions: while the perfect straightness and uniform diameter of its trunk for upwards of forty feet, the more regular disposition of its branches, and the greater richness of its foliage, give it a decided superiority over the Buttonwood, and entitle it to be considered as one of the most magnificent vegetables of the temperate zone.

In the development of its leaves, the Poplar differs from most other trees. Leaf-buds, in general, are composed of scales closely applied one upon another, which, in the spring, are distended by the growth of the minute bundle of leaves which they enclose, till they finally fall. On some trees, those buds are without scales, as for instance, on the Butternut. On the Tulip Tree, the terminal bud of each shoot swells considerably before it gives birth to the leaf: it forms an oval sac which contains the young leaf, and which produces it to the light only when it appears to have acquired sufficient force to endure the influences of the atmosphere.

Within this sac is found another, which, after the first leaf is put forth, swells, bursts, and gives birth to a second. On young and vigorous trees, 5 or 6 leaves issue successively in this manner from one sac. Till the leaf has acquired half its growth, it retains the two lobes which composed its sac, and which are now called *stipulæ*.

In the spring, when the weather is warm and humid, the growth of the leaves is very rapid: they are 6 or 8 inches broad, borne on long petioles, alternate, somewhat fleshy, smooth, and of a pleasing green color. They are divided into three lobes, of which the middle one is horizontally notched at its summit, and the two lower ones are rounded at the base. This conformation is peculiar to the Tulip Tree, and renders it easily distinguishable in the summer. The flowers, which are large, brilliant, and on detached trees very numerous, are variegated with different colors, among which yellow predominates: they have an agreeable odor, and, surrounded by luxuriant foliage, they produce a fine effect. In the spring, they are gathered by women and children in the neighbourhood of New York, and sold in the market of that city.

The fruit is composed of a great number of thin, narrow scales, attached to a common axis, and forming a cone 2 or 3 inches in length. Each cone consists of 60 or 70 seeds, of which never more than a third, and some seasons not more than 7 or 8 in the whole number, are productive. It is also observed that during ten years after it begins to yield fruit, almost all the seeds of the Tulip Tree are unproductive, and that, on large trees, the seeds from the highest branches are the best.

The bark, till the trunk exceeds 7 or 8 inches in diameter, is smooth and even; it afterwards begins to crack, and the depth of the furrow and the thickness of the bark are proportioned to the size and to the age of the tree.

The heart or perfect wood of the Tulip Tree is yellow, approaching to a lemon color, and its sap or alburnum is white. Though this tree is classed as a light wood, it is much heavier than the Poplars; its grain is equally fine and more compact, and the wood is easily wrought and polishes well. It is found strong and stiff enough for uses that require great solidity. The heart, when separated from the sap and perfectly seasoned, long resists the influence of the air, and is said to be rarely attacked by worms. Its greatest defect, when employed in wide boards and exposed to the weather, is that it is liable to shrink and warp by the alternations of dryness and moisture: but this defect is in a great measure compensated by its other properties. The nature of the soil has so striking an influence upon the color and upon the quality of the Tulip wood, that the mechanics who employ it have made the remark, and have distinguished it by the names of White Poplar and Yellow Poplar. The external appearances which mark these varieties are so equivocal, that it can be ascertained to

which a tree belongs only by cutting it. It is known in general that the White Poplar grows in dry, gravelly, and elevated places; it is recognised too by its branchy summit, and by the small proportion which the light yellow heart bears to the sap. The grain also is coarser and harder, and the wood decays more speedily: hence it is always neglected when the other variety can be obtained. The Yellow Poplar possesses every quality requisite to fit it for so great a variety of uses, that I shall content myself with mentioning the most common. At New York and Philadelphia, and in the adjacent country, the Poplar is often employed, in the construction of houses, for rafters and for the joists of the upper stories, for which purposes it is esteemed on account of its lightness and strength. In the other Middle States, in the upper parts of the Carolinas, and above all in the Western States, it is more generally used in building, and is considered as the best substitute for the Pine, the Red Cedar and the Cypress. Wherever it abounds it serves for the interior work of houses, and sometimes for the exterior covering, as I observed in several small towns situated between Laurel Hill and the Monongahela river. It is not easy in this region to procure pine boards, which otherwise would be preferred, as they do not, like those of Poplar, warp when exposed to the weather. The panels of doors, and of wainscots, and the mouldings of chimney-pieces are made of Poplar. In the States of Ohio and Kentucky, on the banks of the Miami river, and in the upper part of North Carolina, Poplar shingles about 15 inches long are preferred for covering roofs, because they are the most durable, and because they are not liable to split by the effect either of intense frost or of ardent sunshine.

In all the large towns in the United States, Tulip Tree or Poplar boards, which are often 2 or 3 feet wide, are exclusively used for the panels of coaches and chaises. When perfectly dry, they receive paint well, and admit of a brilliant polish. The vicinity of Boston does not produce this tree, and the coach-makers procure it from New York and Philadelphia: it is also sent for the same use to Charleston, S. C., where the Tulip Trees are few in number and inferior in size. The seat of Windsor chairs, which are fabricated at New York, Philadelphia and Baltimore, and in many other towns, is always of Poplar; a larger quantity of the wood than would be supposed is consumed in this way, and also in the manufacture of trunks which are covered with skins, and of bedsteads, which are stained in imitation of mahogany. I have remarked that the circular board and the wings of fanning-mills are of this wood; as it is easily wrought in the lathe, and is very light, it is much used for wooden bowls: it is also preferred for the head of hair brooms or sweeping brushes. The farmers choose it for the eating and drinking troughs of cattle; these troughs are formed of a single piece, and exposed to the weather they last as long as those made of Chesnut and of Butternut. In Kentucky, I have seen the

Tulip Tree employed for the rails of rural fence; but I must confess my inattention in not learning their duration. It is found useful also in the construction of wooden bridges, as it unites lightness with strength and durability. I have been assured that the heart of the Poplar might be profitably employed for the fellies of large mill-wheels. The Indians who inhabited the Middle States, and those who still remain in the western country, preferred this tree for their canoes, which, consisting of a single trunk, are very light and strong, and sometimes carry twenty persons. In fine, the Poplar affords excellent charcoal, which is employed by smiths in districts that furnish no fossil coal. In the lumber-yards of New York, Philadelphia and Baltimore, a great quantity of this wood is found in forms convenient for the uses which I have enumerated. It is very cheap, being sold at half the price of Black Walnut, Wild Cherry and Curled Maple.

In all the country watered by the Monongahela river, between the 30° and 40° of latitude, the Tulip Tree is so abundant, that large rafts, composed wholly of these logs, are made to float down its stream. At Brownsville, they are sawn into boards, which are used in the environs, and even at Pittsburg, in the construction of houses, and which are sold at $10 for 1000 feet. I observed that the mean diameter of the logs was from 12 to 15 inches; that of the largest from 20 to 24 inches, and that of the smallest 9 or 10 inches: their two extremities were of a dark blue color. I have also remarked that when a Poplar is felled, the chips of the heart which are left upon the ground, particularly those which are half buried in the leaves, suffer at the end of three or four weeks a remarkable change; the lower part becomes of a deep blue, and they exhale a fetid, ammoniacal odor.

The live part or cellular tissue of the bark which covers the trunk of the Tulip Tree, the bark of the branches, and still more that of the roots, has an agreeable smell and a very bitter taste. In Virginia, some inhabitants of the country steep the bark of these roots, with an equal portion of Dogwood bark, in brandy during eight days: two glasses of this tincture, taken every day, sometimes cure intermittent fevers. Poplar bark, reduced to powder and given in substance to horses, appears to be a pretty certain remedy for worms.

The American Museum for December, 1792, contains circumstantial details concerning the valuable properties ascribed to this bark by Dr. Young of Philadelphia. I shall recall what he has written on this subject, though these properties have since been denied by other physicians in the United States, and though the use of this bark is not general in the country, and is unknown in the capitals, where the faculty are most enlightened. In Dr. Young's opinion, the most proper time to gather the Poplar bark for medical use is the month of January. He asserts that it is more bitter than the Peruvian bark, though less astringent, and that it possesses some

properties in common with the acrid aromatics; whence he concludes that it is a powerful tonic and antiseptic: the aromatic principle appears to reside in a resinous part of its substance, which stimulates the intestinal canal, and which operates as a gentle cathartic. In many instances the stomach cannot support it, unless each dose is accompanied by a few drops of laudanum. In intermittent fevers, when taken after the biliary ducts have been evacuated by an emetic, it is often found equal to the Peruvian bark. In remittent it is used with as great success as in intermittent fevers, and in one instance it was found to operate more successfully than the Peruvian bark. In inflammatory disorders, where the phlogistic diathesis is not very strongly marked, and where a weakness of arterial action has taken place, it gives tone and vigor to the stomach. United with laudanum, it has frequently dissipated the alarming symptoms of pulmonary consumption when attended with nightly sweats and diarrhœa. A person afflicted with catarrh complicated with dyspepsia, which had resisted the best chosen remedies, was perfectly cured by this bark. Dr. Young also assures us that there is not in the whole materia medica a more certain and efficacious remedy in hysterical affections than the bark of Poplar roots combined with a small quantity of laudanum; that taken after the first passages have been evacuated, it is a specific in cholera infantum; in fine, that it is an excellent remedy for worms. It is given in aqueous extract, either in the form of infusion or of decoction, but it is most efficacious when taken in substance: the dose for an adult is from one scruple to two drachms.

In Paris, a spirituous liquor is made from the fresh bark of Poplar roots, with the addition of a sufficient quantity of sugar to render it agreeable to the taste.

The Tulip Tree was introduced into Europe 60 years ago, and many stocks of this species, more than 50 feet high, exist in France, Germany and England, which are annually covered with myriads of flowers, and which yield productive seeds. It has been so widely spread within 15 years, that there are few country seats where it is not found; and, by the fine form of its trunk, by the richness and singularity of its foliage, and by the beauty of its flowers, it is eminently fitted to adorn them. It is to be desired, on account of the excellent qualities and diversified uses of its wood, that it should be multiplied also in our forests.

PLATE LXI.

A branch with leaves and a flower of the natural size. Fig. 1, *A cone of the natural size. Fig.* 2, *A seed of the natural size.*

[This is a difficult tree to transplant, as like the Magnolias, its roots have

few fibres. It is therefore best grown on the spot where it is to remain, or the plants may be kept in pots; if in the nursery, they should be transplanted every year. It is not very patient of the knife.]

SWEET GUM.

Monœcia Polyandria. Linn. Amentaceæ. Juss.

Liquidambar styraciflua. *L. foliis palmatis, lobis acuminatis, dentatis; axillis nervorum villosis.*

No tree has hitherto been found in North America so extensively diffused as the Sweet Gum. On the sea-shore it is seen, towards the north-east, between Portsmouth and Boston, in the latitude of 43° 30′, and it is found as far as Old Mexico, towards the south-west: from the coast of Virginia it extends westward to the Illinois river, thus spreading over more than two-thirds of the ancient territory of the United States, together with the two Floridas, Upper and Lower Louisiana, and a great part of New Spain.

In the United States this tree is universally called Sweet Gum, and by the French of Louisiana, *Copalm*. In the Middle, Western and Southern States, the Sweet Gum is sufficiently multiplied to be numbered among the most common trees: it is met with wherever the soil is fertile, cool and exposed to temporary inundations, and is usually seen in company with the Maple, the Tupelo, the Swamp White Oak, the Shagbark Hickory and the Butternut. In the South, it grows also in the great Swamps which border the rivers, and here, owing doubtless to the mildness of the winter and to the intense heat of the summer, it displays its amplest dimensions. The largest Sweet Gum that I have observed was in a swamp, 4 or 5 miles from Augusta in Georgia; at five feet from the ground it was 15 feet 7 inches in circumference; it ramifies at the height of 15 or 18 feet, and its summit was spacious in proportion to the thickness of its trunk. The soil in which it grew was rich and constantly moist, and abounded particularly in the Chesnut White Oak, Willow Oak, Wahoo, Black Gum, Red Maple, Red Ash, and Black Ash.

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Sweet Gum

Liquidambar styraciflua

From the form of a single tree, it is not to be concluded that the Sweet Gum generally branches at so small an elevation. When confined amidst other trees, its trunk, like that of the Oak, the Elm and the Poplar, is perfectly straight and of an uniform size to the height of 30 or 40 feet, at which it begins to divide itself into branches: in these situations it is usually from 1 to 2 feet in diameter. As the sweet Gum is profusely multiplied, it is often found on soils unpropitious to its growth. On dry and gravelly land, its height does not exceed 15, 20 and 30 feet, and its secondary branches are covered with a dry and flaky bark, of which the plates are attached by the edge, instead of the face as on other trees.

The Sweet Gum is garnished with fine foliage, which changes to a dull red with the first autumnal frosts, and falls soon after. The shoots upon which the young leaves appear in the spring are smooth and of a yellowish green color. The leaves vary in size from 3 to 6 inches, according to the vigor of the tree and to the situation of the leaf, being larger and less deeply palmated on the lower branches: they are alternate, petiolated, and divided into 5 principal lobes: in this last particular, they bear some resemblance to the leaves of the Sugar Maple and the Norway Maple, from which they differ in having the lobes deeper and more regularly shaped, and in being finely denticulated at the edge. It should be remarked also that, at the birth of the leaves, the back of the principal rib is surrounded by a small tuft of red down. In warm weather, a viscous substance exudes from the leaves of such of these trees as grow upon dry grounds; when bruised, they exhale a sensible, aromatic odor.

The barren and fertile flowers are borne by different branches of the same tree. The fertile flowers are not conspicuous, and the barren ones are in oval aments an inch and a half in length. The fruit is globular and bristling with points; when arrived at maturity, it is about an inch and a half in diameter, and is suspended by a flexible pedicle, 1 or 2 inches long: the globes, which are green at first and afterwards yellow, are composed of a great number of closely connected capsules. At the beginning of autumn these capsules open and give liberty to the seeds, which are small, blackish, oblong, compressed and surmounted by a wing. Each capsule contains one or two seeds united with a great number of minute bodies incapable of germination, resembling oaken saw dust.

The trunk of the full grown tree is covered with a deeply furrowed bark, not unlike that of several species of Oak. Sweet Gums are found of the the same size and on the same soil, some of which have a large proportion of sap and only 5 or 6 inches of heart, while others consist principally of perfect wood, with only a thin layer of sap. The heart is reddish, and when sawn into boards it is observed to be transversely marked at considerable distances with blackish belts. This wood is compact and fine grained, and is susceptible of a bright polish. Though inferior in strength to

the Oak, it suffices for many purposes which require great toughness and solidity. At Philadelphia, when perfectly seasoned and stript of the sap, it is used in building the interior of houses, and especially for the joists of the upper stories: when employed with these precautions, it lasts longer than any species of Red Oak. As it furnishes boards of 2 or 3 feet in width, it is sometimes sawn very thin, and employed by cabinet-makers to line the inside of certain articles of mahogany furniture: its lightness, the fineness of its grain, and its reddish complexion, render it peculiarly proper for this purpose.

In the country, furniture was formerly made of the Sweet Gum, which, when preserved with care, was not destitute of beauty, though inferior to the Black Walnut and the Wild Cherry wood, which are harder and less easily defaced. At Philadelphia, the Sweet Gum is preferredfor small, oval or round picture frames, which are dyed black; it serves also, though less frequently than the Wild Cherry Tree and the Curled Maple, for bedsteads and for the balusters of staircases. At New York, it is commonly taken for coffins. In a word, the Sweet Gum, however inferior in quality to the Black Walnut, may be usefully employed in all work that is sheltered from the air, without which precaution it speedily decays. It is little esteemed for fuel, and, mixed with other species of no greater value, it forms the lowest quality of wood in the market.

In summer, upon cutting the live bark and at the same time slightly wounding the sap of the Sweet Gum, a resinous substance of an agreeable odor distils in small quantities: in repeated experiments made in Carolina, I was never able to collect from a tree of a foot in diameter more than half an ounce in a fortnight.

All that has been said of the properties and uses of the Sweet Gum proves its inferiority to that of many other trees. Probably when the attention of the American proprietors becomes engaged in the composition of artificial forests, they will give the preference to other more useful species, reserving of the Sweet Gum only a small number of the most vigorous stocks.

In Europe, this tree has for many years grown in the open field; but, though it exceeds the height at which it fructifies in the United States, it has not yet yielded seed, and for this reason it is not extensively multiplied. It deserves to be more generally diffused in parks and gardens, on account of the agreeable tint and singular form of its leaves.

PLATE LXII.

A branch with a leaf of the natural size. *Fig.* 1, *Fruit of the natural size.*

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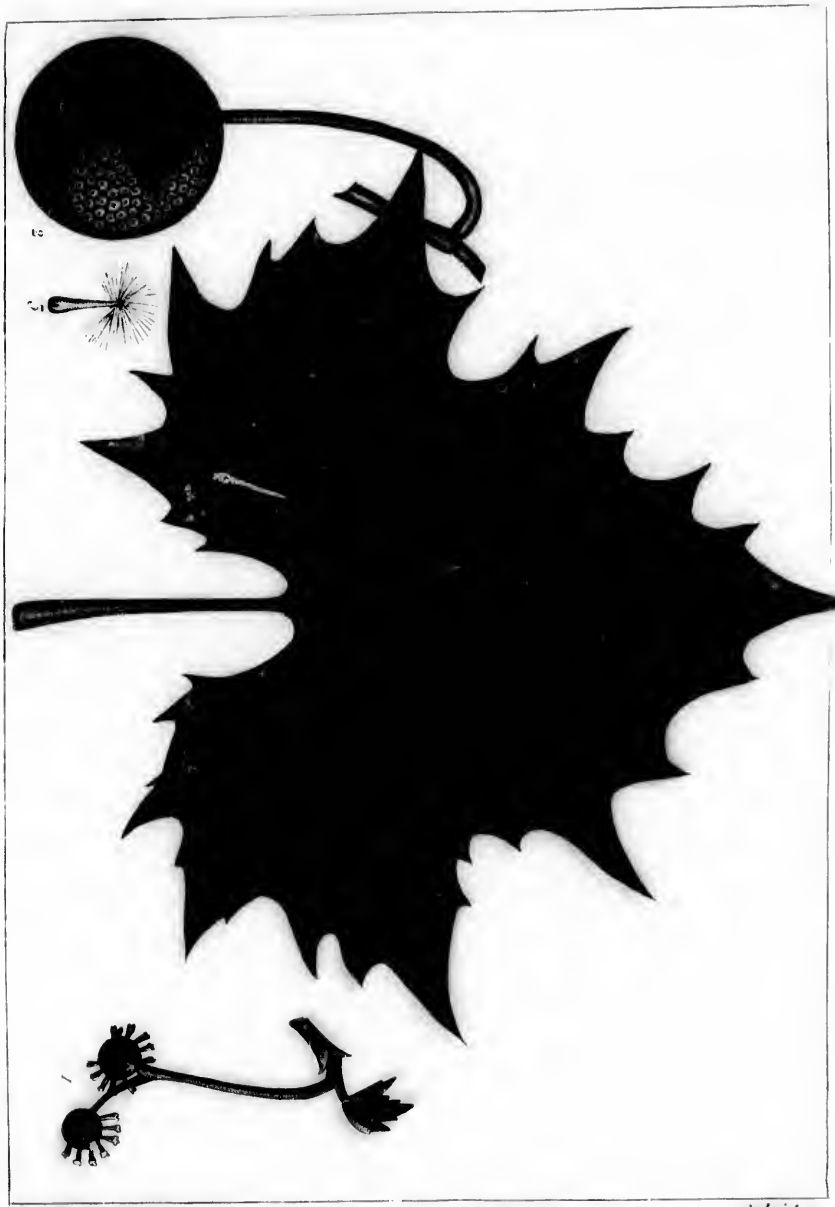

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Button Wood.

Platanus occidentalis.

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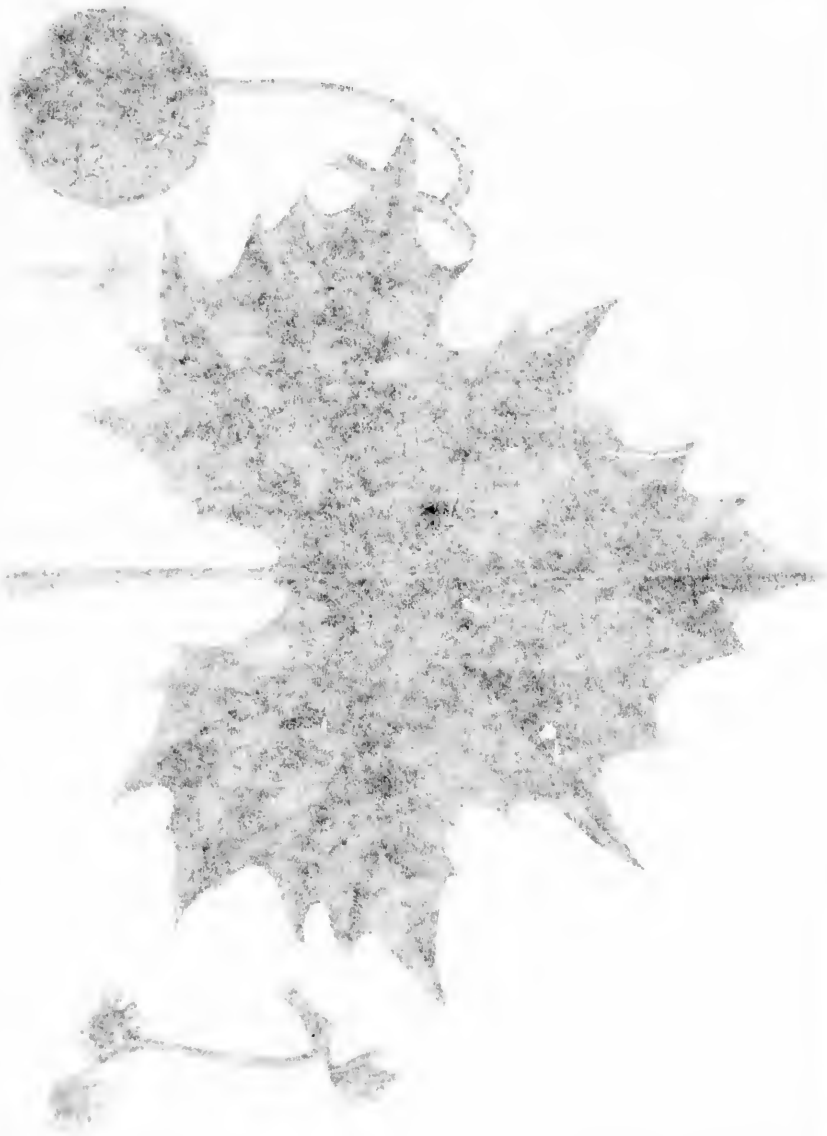

Fig. 2, *A seed of the natural size.* *Fig.* 3, *Barren dust which accompanies the seed.*

[The round prickly catkins which contain the seeds are hard, and not readily broken by the hand; but by exposure to the sun, or to fire heat, they crack and open, and the seeds may then be easily shaken out. They may be sown and treated like seeds of the pine and fir tribe; but unlike them, they lie a year in the ground before coming up.]

BUTTONWOOD, OR SYCAMORE.

Monœcia Monandria, Linn. Amentaceæ, Juss.

Platanus occidentalis. *P. foliis lobato-angulosis, ramulis albentibus.*

Among trees with deciduous leaves, none in the temperate zones, either on the Old or the New Continent, equals the dimensions of the Planes. The species which grows in the Western world is not less remarkable for its amplitude and for its magnificent appearance than the Plane of Asia, whose majestic form and extraordinary size were so much celebrated by the ancients.

In the Atlantic States, this tree is commonly known by the name of Buttonwood, and sometimes, in Virginia, by that of Water Beech. On the banks of the Ohio, and in the States of Kentucky and Tennessee, it is most frequently called Sycamore, and by some persons Plane Tree. The French of Canada and of Upper Louisiana give it the name of Cotton Tree. The first of these denominations appears to be the most widely diffused, and not to be entirely unknown in those districts where the others are habitually employed; for this reason I have adopted it, though a less appropriate appellation than that of Plane Tree.

According to my own observations, the Buttonwood does not venture, towards the north-east, beyond Portland, in the latitude of 40° 30′; but further west, in the 73° of longitude, it is found two degrees further north, at the extremity of Lake Champlain and at Montreal. I have not observed it myself, in this direction, beyond Onion river in Vermont, and I have never seen it in the district of Maine, nor in Nova Scotia. The trees of

this species which exist at Halifax, have been planted for ornament, and, though they are 40 feet in height, they do not display the same vigor as in a more southern latitude, where the winter is less rigorous. Proceeding from Boston and the shores of Lake Champlain towards the west and the south-west, the Buttonwood is continually met with over a vast tract, comprising the Atlantic and Western States, and extending beyond the Mississippi.

The nature of the Buttonwood confines it to moist and cool grounds, where the soil is loose, deep and fertile: the luxuriance of its vegetation depends upon the union of these circumstances. It is never found upon dry lands of an irregular surface among the White and Red Oaks and the Walnuts: it is also more rare in all the mountainous tract of the Alleghanies than in the flat country. It is remarked, in that part of Virginia which lies upon the road from Baltimore to Petersburg, that, though the Buttonwood is multiplied in the swamps, its growth is stinted, and that it does not in general exceed 8 or 10 inches in diameter. Further south, in the lower parts of the Carolinas and of Georgia, it is not abundant even on the sides of the rivers, and is not seen in the *branch-swamps* already mentioned, which intersect the *pine-barrens*, and which are principally covered with the Small Magnolia, the Red Bay, the Loblolly Bay, the Red Maple, etc. The cause of the Buttonwood not being found in these small marshes is, perhaps, that the layer of vegetable mould, which is black and always miry, is not sufficiently thick and substantial to support its growth, and that the heat, in this part of the Southern States, is long continued and excessive. The Buttonwood is in no part of North America more abundant and more vigorous than along the great rivers of Pennsylvania and of Virginia; though, in the more fertile valleys of the West, its vegetation is perhaps still more luxuriant, especially on the banks of the Ohio and of the rivers which empty into it, viz. the Great Muskingum, the Great Kenhawa, the Great Sciota, the Kentucky, the Wabash, etc. The bottoms which are watered by these rivers are covered with dark forests, composed of trees of an extraordinary size. The soil is very deep, loose, of a brown color, and unctuous to the touch: it appears to have been formed by the slime deposited in the course of ages, at the annual overflowing of the rivers. The leaves, which every autumn form a thick layer upon the surface, and the old trees that fall by the weight of years and crumble into vegetable mould, give to this soil, already so fertile, a degree of fecundity which is without example in Europe, and which is manifested by prodigies of vegetation.

The margin of the great rivers of the West is occupied by the Willow, after which comes the White Maple, and next the Buttonwood: but this arrangement is not uniformly observed, and the Maple alone, or, as it more frequently happens, mingled with the Buttonwood, sometimes grows upon the brink. Among the trees which compose these forests, these three spe-

cies are least liable to injury from the continued presence of water, and by their position they are exposed to have their basis every year inundated by the swelling of the rivers. In these situations, the Buttonwood is constantly found to be the loftiest and largest tree of the United States. Often, with a trunk of several feet in diameter, it begins to ramify at the height of 60 or 70 feet, near the summit of the other trees; and often the base divides itself into several trunks equally vigorous and superior in diameter to all the surrounding trees.

On a little island in the Ohio, 15 miles above the mouth of the Muskingum, my father measured a Buttonwood which, at 5 feet from the ground, was 40 feet and 4 inches in circumference, and consequently more than 13 feet in diameter. Twenty years before, General Washington had measured the same tree, and found it to be of nearly the same size.

In 1802, in a journey through the Western States, I found on the right bank of the Ohio, 36 miles from Marietta, a Buttonwood whose base was swollen in an extraordinary manner: my travelling companion and myself measured it, and at 4 feet from the ground we found it to be 47 feet in circumference. This tree, which still exhibited the appearance of vigorous vegetation, ramified at 20 feet from the ground. A Buttonwood of equal size is mentioned as existing in Genesee. The astonishing dimensions of these trees recall the famous Plane Tree of Lycia spoken of by Pliny, whose trunk, hollowed by time, afforded a retreat for the night to the Roman Consul Licinius Mutianus, with eighteen persons of his retinue. The interior of this grotto was 75 feet in circumference, and the summit of the tree resembled a small forest.

The most striking resemblance, in the majesty of their form and in the enormous size of their trunk, thus appears to exist between the only two species of Plane that have hitherto been discovered. The American species is generally thought, in Europe, to possess a richer foliage, and to afford a deeper shade than the Asiatic plane: its leaves are of a beautiful green, alternate, from 5 to 10 inches broad, less deeply lobed, and formed with more open angles than those of the Plane of the Eastern Continent. In the spring, the lower surface of these leaves is covered with a thick down, which disappears towards summer. In certain districts where this tree is very abundant, its vicinity is a source of alarm to the inhabitants: they believe that the fine down from its leaves, floating in the air, produces an irritation of the lungs and a disposition to consumption. This apprehension I consider as a popular error; for the slightest zephyr suffices to waft to a distance, and to disperse in the airy waste this light and impalpable substance.

The sexes are separate on the Buttonwood, but the male and female flowers are attached to the same peduncle, instead of being placed on different branches. The flowers are in the form of small balls: the fertile

ones grow to the diameter of an inch, and are supported by pedunceles 2 or 3 inches long. These balls fall in the course of the autumn and winter, and, parting asunder, the seeds which compose them are scattered in the wind, by means of the plumy tuft by which they are surmounted.

The trunk and branches of the Buttonwood are covered with a smooth, pale green bark, of which the epidermis detaches itself every year in portions: a sufficiently obvious character is thus afforded, by which to distinguish the tree when bared of its leaves. The roots when taken from the earth are of a beautiful red color; but they lose this tint upon being split and exposed to the light in a dry place. The concentric layers and the medullary rays are also observed to be much more distinct in the roots than in the body of the tree. In clearing new lands it is sometimes difficult to eradicate the Buttonwood: the stumps, during a long time, give birth to fresh shoots, but when once dead they speedily decay.

The Buttonwood, in seasoning, becomes of a dull red: its grain is fine and close, and it is susceptible of a brighter polish than the wood of the Beech, to which it bears some resemblance. Its concentric circles are divided into numerous sections, by fine medullary rays extending from the centre to the circumference. When the trunk is sawn in a direction parallel to these rays, they appear larger than when it is cut parallel to the concentric circles. It would seem, then, that the division should be made in an intermediate direction, so that the spots may be of a proper size and at equal distances, which gives an elegant surface to the wood.

Cabinet-makers, at Philadelphia, rarely make use of the Buttonwood: they attribute to it the defect of easily warping, which does not belong to the Wild Cherry and to the Black Walnut. As these species of wood are also harder and of a more durable polish, the Buttonwood is little used except for bedsteads, which retain the color of the wood and are coated with varnish.

The Buttonwood speedily decays when exposed to the atmosphere, hence it is proper only for work that is sheltered from the weather; when thoroughly seasoned, it may be usefully employed in the interior of houses for joists, and for sheathing the frame. It never enters into the construction of vessels. The French of Illinois and of Post Vincennes, on the river Wabish, sometimes fashion it into canoes, one of which, made a few years since on this river, of a single Buttonwood, was 65 feet long, and carried 9,000 pounds.

It is difficult to mark the difference between the two species of Plane in the color and organization of their wood. If the excellencies which were ascribed by the ancients to the wood of the Plane are not recognised in that of the Buttonwood, it is perhaps owing to the great variety of timber proper for building, which is furnished by the soil of the United States,

and to the superiority, in cabinet-making, of mahogany, which is obtained with facility from the West Indies.

The Asiatic and American Planes have been many years cultivated in Europe: the rapid growth and majestic appearance of these trees render them proper for adorning extensive parks and gardens, and for forming the avenues leading to large towns. In the United States, where the atmosphere is more humid than in Europe, they would perfectly fulfil this destination in all situations where the soil is not too dry. Their rich and shady folige is free from the inconvenience of being devoured by caterpillars, which in North America, still more than in Europe, infest the Elm and the Cherry Tree.

PLATE LXIII.

A leaf of a third of the natural size. Fig. 1, *Flowers. Fig.* 2, *Fruit at maturity. Fig.* 3, *A seed.*

[Emerson thinks, with justice, that there is no propriety in calling this tree Sycamore, as that name indicates a totally different tree. It flourishes best in a deep, loose, rich soil, in a cool, moist situation, and is remarkable for the rapidity of its growth and for the ease with which it may be propagated, the seeds taking root in any stirred ground where they alight. It has been supposed that the speedy returns of fuel made by buttonwood plantations, would render its cultivation for that purpose more profitable than any other trees, except the locust on dry soils.

Sow the seeds broadcast in the spring, very thick, in a rich seed bed of light, fine mould, and rake them in; the young plants are tender and should be screened for several months from the heat of the sun by mats or brushwood; transplant when a year old. See Emerson's Trees and Shrubs of Massachusetts.

See Nuttall's Supplement, vol. 1, p. 47, for an account of the Californian Buttonwood, *Platanus racemosa.*]

CATALPA.

Didynamia Angiosperma. Linn. Bignoniæ. Juss.

Bignonia catalpa. *B. foliis simplicibus, ternis, cordatis; paniculâ laxissimâ; floribus diandris, intus maculis purpureis et luteis asperses; capsulâ gracili, longâ, teretî.*

Catalpa Syringæfolia. Sims.

In the Atlantic States, the Catalpa begins to be found in the forests on the banks of the river Savannah, near Augusta in Georgia, and west of the Alleghanies, on those of the Cumberland, between the 35th and 36th degrees of latitude. Further south it is more common, and abounds near the borders of all the rivers which empty into the Mississippi, or which water the province of West Florida. I have been assured that it is particularly abundant on the Escambia or Conecuh, which empties at Pensacola. It is remarkable that the Catalpa should not exist in the lower part of the Carolinas and of Georgia, and in East Florida, which lie so near the country of its natural growth, and where stocks that have been planted for ornament about the houses shoot with extraordinary vigor.

In these southern regions it frequently exceeds 50 feet in height, with a diameter from 18 to 24 inches. It is easily recognised by its bark, which is of a silver-gray and but slightly furrowed, by its ample leaves, and by its wide spreading summit, disproportioned in size to the diameter of its trunk. It differs from other trees also by the fewness of its branches.

The leaves are heart-shaped, petiolated, often 6 or 7 inches in width, glabrous above and downy beneath, particularly on the principal ribs; they are late in venturing out in the spring, and are among the first to shrink at the approach of autumn. The flowers, which are collected in large bunches at the extremity of the branches, are white, with violet and yellow spots, and are beautiful and showy. The capsules are cylindrical and pendent, of a brown color when ripe, three or four lines in diameter, and 12 or 15 inches in length.

The seeds are thin, flat, and enveloped in a long, narrow membranous wing, terminated by a hairy tuft. Each seed with its wing, is about an inch long, and a line and a half broad.

That the Catalpa is a tree of rapid growth, is proved by the distance of the annual concentric circles. Its wood is of a grayish white color, of a fine texture, very light, and very brilliant when polished. It resembles the

Bignoniæ. Juss.

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; capsula gracili,

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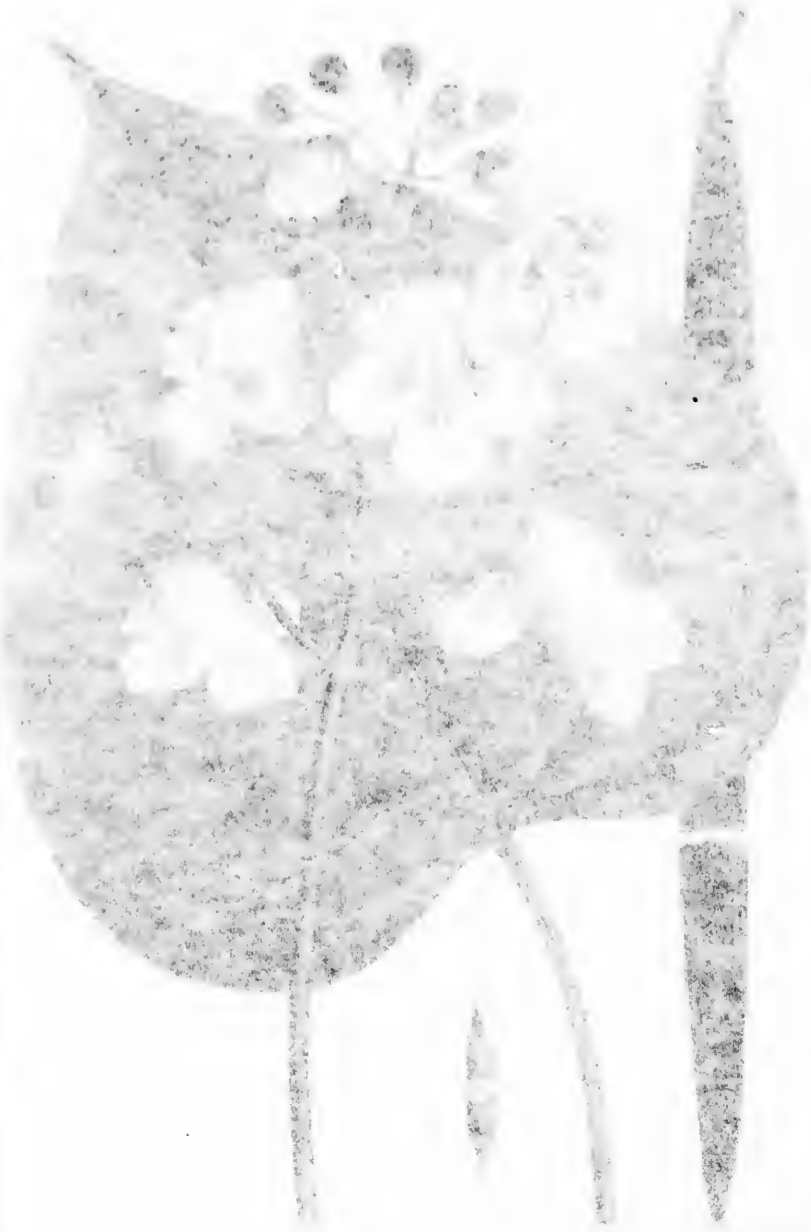

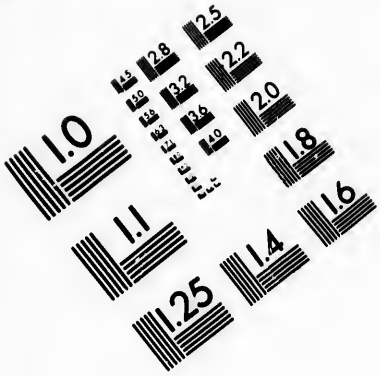

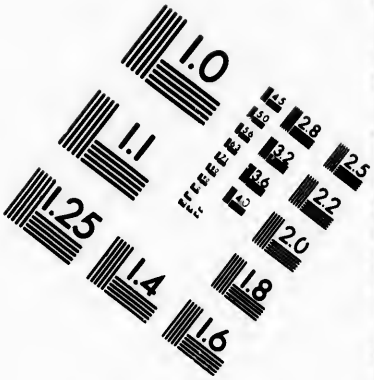

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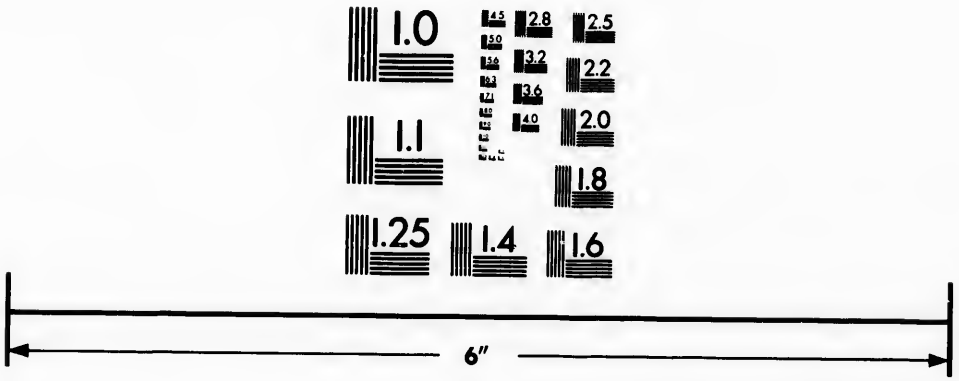

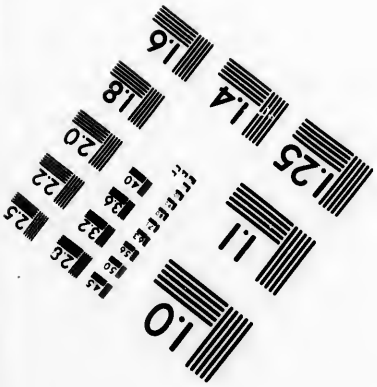

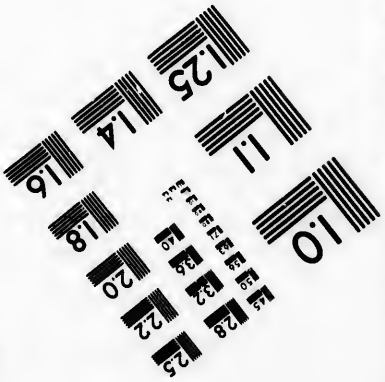

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CATALPA.

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[illegible]

[illegible] the lower part of the [illegible] which [illegible] near the [illegible] have been planted for orna- [illegible]

[illegible] in height, with a [illegible] bark, which [illegible] and [illegible] branches.

[illegible] 7 inches in width, glabrous [illegible] on the principal ribs; they [illegible] spring, and are among the first to shrink at the approach of autumn. The flowers, which are collected in large bunches at the extremity of the branches, are white, with violet and yellow spots, and are [illegible] and showy. The capsules are cylindrical and pendent, of a brown color [illegible], three or four lines in diameter, and 12 or 15 inches in length.

The seeds are thin, [illegible] terminated by [illegible] is about an inch long, and a line and a half broad.

The [illegible] Catalpa is [illegible] by the distance of [illegible] concentric circles. [illegible] color, of a [illegible] texture, very light, and [illegible]. [illegible]

Bessa del. Gabriel Sc.

Catalpa

Bignonia catalpa

Butternut wood, with this exception, that the Butternut wood is of a reddish hue, and is less durable when exposed to the weather. Posts of the Catalpa, perfectly seasoned, have recently proved to be very lasting, by experiments made in the United States. Such is the information which I have been able to collect concerning the wood of this tree: I have never visited the thinly inhabited regions in which it abounds.

In the spring, if a bit of the cellular integument of the Catalpa bark is removed, a poisonous and offensive odor is exhaled. In a thesis supported at the Medical College of Philadelphia, this bark is maintained to be tonic, stimulant and more powerfully antiseptic than the Peruvian Bark; but this thesis appears to be undeserving of the same confidence with the treatise already mentioned, concerning the Dogwood, in which the author affords proofs of sound and various information. I have been assured that the Honey collected from the flowers of this tree is poisonous, and that its effects, though less alarming, are analogous to those of the honey of the Yellow Jasmine, *Geselmium nitidum*.

In the Carolinas and in Georgia the Catalpa is called Catawbaw Tree, after the name of an Indian tribe that formerly inhabited a large part of these States, and from whose territory the tree was probably first procured; the name of Catalpa, adopted in the Middle Section of the United States, and in Europe, is perhaps a corruption of this original. The French of Upper Louisiana call it *Bois Shavanon*, from the Shavanon or Shawnee nation which once existed in West Tennessee, on the borders of the river of this name, called by the English the Cumberland. The Catalpa has long been cultivated with success in Europe, though in the climate of Paris its young shoots sometimes suffer by the late frosts. Its rapid growth, the remarkable size of its leaves, and the beauty of its numerous bunches of flowers, entitle the Catalpa to a distinguished place among ornamental trees: but it has ceased to be rare, and is less highly esteemed than while it was less common.

PLATE LXIV.

A leaf and a bunch of flowers of the natural size. Fig. 1, *A pod. Fig.* 2, *A seed.*

CRAB APPLE.

Icosandria pentagynia. Linn. Rosaceæ. Juss.

Malus coronaria. *M. foliis lato-ovalibus, basi rotundatis, sub-angulatis, serratis, nitidè glabris; pedunculis corymbosis; fructu parvo, odorato.*

Pyrus Coronaria. Linn. The Garland-flowering Apple Tree.

A species of Wild Apple Tree is found in North America, whose nature has not yet been modified by cultivation. The Wild Apple Tree of Europe in a long series of years, has yielded a great number of species and varieties of fruit, which, in France alone, amount to nearly three hundred. Except the District of Maine, the State of Vermont, and the upper part of New Hampshire, the Crab Apple is found, on both sides of the mountains, throughout the United States; but it appears to be most multiplied in the Middle States, and especially in the back parts of Pennsylvania and of Virginia. It abounds, above all, in the Glades, which is the name given to a tract 15 or 18 miles wide, on the summit of the Alleghanies, along the road from Philadelphia to Pittsburg.

The ordinary height of the Crab Apple Tree is 15 or 18 feet, with a diameter of 5 or 6 inches; but it is sometimes found 25 or 30 feet high, and 12 or 15 inches in diameter. The two stocks which I found by measurement to be of this size, stood in a field which had long been under cultivation, and this circumstance may have contributed to their extraordinary growth. They were insulated trees that in appearance exactly resembled the common Apple Tree. I have universally remarked, that the Crab Apple grows most favourably in cool and moist places, and on fertile soils.

The leaves of this tree are oval, smooth on the upper surface, and when fully developed, very distinctly toothed; some of them are imperfectly three-lobed. While young they have a bitter and slightly aromatic taste, which leads me to believe that, with the addition of sugar, they would make an agreeable tea. Like the common Apple Tree, this species blooms very early in the spring. Its flowers are white, mingled with rose color, and are collected in corymbs; they produce a beautiful effect, and diffuse a delicious odor, by which, in the Glades where the tree is abundant, the air is perfumed to a great distance. The apples, which are suspended by

ON. Rosaceæ. Juss.

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Bessa del. Gabriel sculp

Crab Apple.

Malus coronaria.

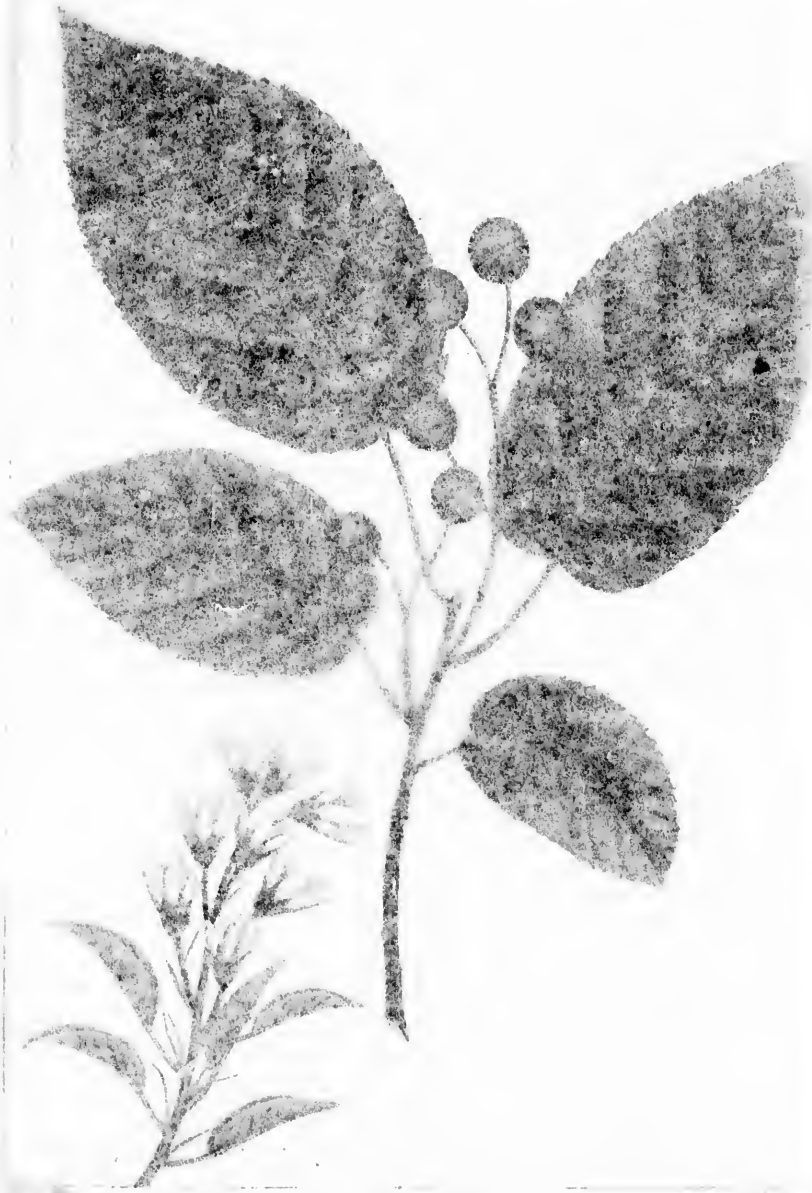
Bessa del. Gabriel sculp

June Berry.

Mespilus arborea.

Pl. 6

Gabriel sculp



short peduncles, are small, green, intensely acid, and very odoriferous. Some farmers make cider of them, which is said to be excellent; they make very fine sweet-meats also, by the addition of a large quantity of sugar.

No attempts have been made in the United States to improve the fruit of the Crab Apple Tree, nor any experiments of uniting it, by grafting, with the species imported from Europe. These species succeed so perfectly, and furnish such excellent new varieties, that much time would be spent upon the Crab Apple, without bringing it to as high a state of improvement. Perhaps it might be cultivated with advantage for cider; but, aside from its utility in this way, it must be regarded only as a tree highly agreeable for the beauty of its flowers and for the sweetness of its perfume.

PLATE LXV.

A branch with leaves and fruit of the natural size. Fig. 1, *A bunch of flowers.*

[In North America, as in Europe, a species of Wild Apple Tree is found, the nature of which has not yet been modified by cultivation.]

JUNE BERRY.

Icosandria pentagynia. Linn. Rosaceæ. Juss.

Mespilus arborea. *M. foliis sub-ovalibus, acutissime serratis, sub-acuminatis; adultis glabris; racemo simplici, elongato; florifero lanuloso; fructifero glabro; petalis oblongis; fructibus atro-purpureis, edulibus.*

Mespilus canadensis. A. Mich. Flor. Bor. Am.

With the exception of the maritime parts of the Carolinas and of Georgia, this tree is spread over the whole extent of the United States

and of Canada; but it is most multiplied upon the Alleghany Mountains, and upon the elevated banks of the rivers which flow from them. In the Northern Section of the Union, it is called Wild Pear Tree, and in the Middle States, June Berry; which latter name I have adopted, because it is universally employed in the regions where the tree is most abundant, because it indicates that in maturing its fruit it is among the earliest trees, and because the *Mespilus arborea* is remote from all resemblance to the Wild Pear Tree.

In the vicinity of New York and Philadelphia, the June Berry appears to grow of preference in moist and shady situations, and along the margin of brooks and rivulets. In the Western Country, it is found in the midst of the forest among the Oaks, the Walnuts, the Maples, etc. Here, also, it reaches its greatest height, which does not exceed 35 or 40 feet, with a diameter of 10 or 12 inches.

The leaves of the June Berry are 2 or 3 inches long, and alternately arranged. When beginning to open, they are covered with a thick, silvery down, which disappears with their growth, and leaves them perfectly smooth on both sides. They are of an elongated oval shape, of a delicate texture, and finely denticulated. The flowers which are white and pretty large, are disposed in long panicles at the summit of the branches, they blow in the beginning of April, and are succeeded by small fruit of a purplish color and of an agreeable, sweet taste. This fruit, of which the largest tree rarely yields more than half a pound, is ripe in the beginning of June, before that of any other tree or shrub. It is sometimes brought to the market of Philadelphia, where it is bought only by children: I have also seen small quantities of it exposed in the market of Pittsburg.

The trunk of the June Berry is covered with a bark resembling that of the Cherry Tree. Its wood is of a pure white, and exhits no difference between the heart and the sap; it is longitudinally traversed by small, bright, red vessels, which intersect each other and run together. This peculiarity, which deserves the attention of vegetable physiologists, is also observable in the Red Birch.

The fruit of this tree is, in my opinion, too small and too scanty to reward the pains of improving its taste and of increasing its volume by long continued cultivation; but its early and beautiful flowers entitle it to notice as an ornamental vegetable.

PLATE LXVI.

A branch with leaves and fruit of the natural size. Fig. 1, *Flowers of the natural size.*

[Dr. Darlington says that the fruit is considerably improved in size and quality by long culture.]

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Bessa del. Gabriel sc.

Dwarf Rose Bay.

Rhododendrum maximum.

Dwarf Rose Bay
Rhododendron maximum.

Bessa del. Gabriel sculp.

Mountain Laurel.

Kalmia latifolia.

Pl 68

Gabriel sculp

Mountain Laurel
Kalmia

MOUNTAIN LAUREL,

OR

DWARF ROSE BAY.

Decandria monogynia. Linn. Rosaceæ. Juss.

Rhododendrum maximum. *R. arborescens; foliis subcoriaceo-oblongis, abruptè acuminatis, crassis, coriaceis, glabris; calicibus laciniis, ovalibus, obtusis; corolla subcampanulatâ.*

The Mountain Laurel generally presents itself in the form of a shrub, of less than 10 feet in height; but as it sometimes rises to the height of 20 or 25 feet, with a diameter of 4 or 5 inches, its diffusion throughout a large part of the United States, and the remarkable beauty of its flowers, have induced me to describe it.

The west end of Long Island, and the river Hudson below the Highlands, may be considered as the limit, far beyond which the Mountain Laurel ceases to be found in the forests. It is abundant, on the contrary, in the Middle States, and in the upper parts, particularly in the mountainous tracts of the Southern Section. It is almost exclusively seen on the borders of creeks and rivers, and is observed to be more multiplied in approaching the Alleghanies, till, in the midst of these ranges, especially in Virginia, it becomes so abundant on the sides of the torrents, as to form impenetrable thickets, in which the bear finds a secure retreat from the pursuit of the dogs and of the hunters.

Deeply shaded situations, in the vicinity of cool and crystal waters flowing among rocks, where the atmosphere is laden with vapor, are the most congenial to the Mountain Laurel and Kalmia. Shade and humidity seem to be indispensable, for it flourishes among the White Cedars in the gloomy swamps of Lower Jersey, where the surface of the miry soil is carpeted with moss constantly surcharged with moisture.

When fully expanded the leaves are smooth, 5 or 6 inches long, of an elongated oval form, and of a thick, coriaceous texture. They are evergreen, and are partially renewed once in three or four years.

The flowers are commonly rose-coloured, with yellow dots on the inside, and sometimes they are perfectly white. They are always collected at the

extremity of the branches in beautiful groups, which derive additional lustre from the foliage which surrounds them.

The seeds are extremely minute, and are contained in capsules that open in the fall, for their escape.

The wood of the Mountain Laurel is hard, compact and fine grained: but it is inferior in these respects to that of the Kalmia Latifolia. I do not know that it is appropriated to any use.

This shrub has long existed in Europe; but as it requires a cooler and more shady exposure, and more assiduous culture than the *Rhododendrum ponticum*, which is a native of the Alps and of the Pyrennees, it is less extensively multiplied.

PLATE LXVII.

A branch with leaves and flowers of the natural size. Fig. 1, *A seed vessel. Fig.* 2, *Seeds.*

THE BROAD-LEAVED KALMIA.

Decandria monogynia. Linn. Rosaceæ. Juss.

Kalmia latifolia. *Latifolia L. K. arborescens; foliis petiolatis ovalibus, coriaceis, glabris; corymbis terminalibus, viscido-puberulis.*

The Broad Leaved Kalmia is a large shrub, which, if its height alone is considered, appears, like the preceding species, to be excluded from the class of vegetables which I have assumed the province of describing more particularly than has been done by preeeding authors; but the uses which are beginning to be made of its wood entitle it to our notice. It bears indifferently the names of Kalmia, Laurel and Calico Tree.

The West end of Long Island and the vicinity of Poughkeepsie, which lies on the river Hudson, between the 42° and 43° of latitude, may be considered as nearly the northern limit of the Kalmia. I have never seen it on the shores of Lake Champlain, nor on the banks of the river Mohawk, where, in situations otherwise congenial, its growth is probably forbidden

by the severity of the winter. It abounds in New Jersey, and covers Weehock Hill, nearly opposite to the city of New York. It grows also near the Schuylkill, in the immediate neighborhood of Philadelphia. Proceeding thence toward the south-west, it is found along the steep banks of all the rivers which rise in the Alleghany Mountains; but it is observed to become less common in following these streams from their source, toward the Ohio and Mississippi on one side, and toward the Ocean on the other. It is rare in Kentucky and in West Tennessee, and in the Southern States it disappears entirely when the rivers enter the low country, where the pine barrens commence.

Although this Kalmia abounds along the rivers of the Middle and Southern States, it is proportionally less common than upon the Alleghany Mountains, from Pennsylvania to the termination of the chain in Georgia. I have nowhere seen it more profusely multiplied, nor of a greater height and more luxuriant vegetation, than in North Carolina, on the loftiest part of the Alleghanies. It occupies tracts of more than 100 acres, and forms upon the summit, and for a third of the distance down the sides, thickets 18 or 20 feet in height, which are rendered nearly impenetrable by the crooked and unyielding trunks, crossed and locked with each other. As the shrubs which compose these copses are of a uniform height, and richly laden with ever-green foliage, they present, at a distance, the appearance of verdant meadows, surrounded by tall trees.

The leaves are of a coriaceous texture, oval-acuminate, entire, and about 3 inches long. The flowers, which are destitute of odor, are disposed in corymbs at the extremity of the branches: in general they are of a beautiful rose color, and sometimes of a pure white. They are always numerous, and their brilliant effect is heightened by the richness of the surrounding foliage; hence this shrub is in great request for the embellishment of gardens. The minute seeds are contained in small, globular capsules.

On the declivities of the Alleghanies, in North Carolina, where I have observed the largest Kalmias, the trunk is generally 3 inches in diameter. The wood, particularly that of the roots, is compact, fine grained, and marked with red lines. When dry it is very hard, and it turns and polishes well. At Philadelphia it is selected for the handles of light tools, for small screws, boxes, etc.: it is said also to make good clarionets. Probably the Kalmia will hereafter be more extensively employed, as, of all American shrubs, its wood most nearly resembles the Box wood, and is most fitted to supply its place. I have been assured that its leaves are narcotic, and that they are poisonous to cattle.

This Laurel was long since introduced into Europe, where it is multiplied for the beauty of its flowers and of its foliage; but many years are necessary to obtain it from the seed, in a condition to bloom. A soft, loose and

cool soil, and a shady northern exposure, appear to be the most congenial to its growth.

PLATE LXVIII.

A branch with leaves and flowers of the natural size. ***Fig.*** **1**, *A seed vessel.* ***Fig.*** **2**, *Seeds.*

most congenial

1, *A seed vessel.*

BIRCHES.

The northern extremity of the Old and New Continents is the native climate of the Birch, if we may judge from the number of species which is found there, and which diminishes in descending toward the south. To the inhabitants of regions destitute of most of the larger vegetables, which flourish in more temperate climates, the trees of this genus are highly interesting, and are applied by them, with wonderful ingenuity, to the necessities of life: they employ the wood in the construction of houses and of vessels, and in the works of the wheel-wright and cabinet-maker; of the bark, which is nearly incorruptible, they make canoes, boxes, and a more secure covering for their habitations; with the leaves they dye their nets; and from the sap they procure a mild and sugary beverage.

From the researches of botanists it results, that as many species of Birch are found in the northern part of the United States as in Europe; and, from my own observations on the comparative properties of their wood, the advantage appears to lie wholly on the side of the American species. Thus the Canoe Birch equals the White Birch, which grows in Sweden and in Russia; and the Cherry Birch and Yellow Birch far exceed it, in the strength and beauty of their wood, as is proved by the uses to which they are applied in Canada and in the Northern and Middle Sections of the United States.

Of the seven species of Birch which have been discovered in North America, five may be ranked among tall trees; the two remaining species, of which, for that reason, no mention will be made, are classed with the shrubs.

I have observed, in the form and disposition of the aments of the different species of American Birch, a distinction, in my opinion sufficiently marked to authorize the division of them into two sections: the first section consists of the species which have long, flexible, and pendulous aments, and comprises the Canoe Birch and the White Birch, to which is added the Common European Birch; the second section is composed of the species whose aments are short and straight, namely, the Red Birch, the Black Birch, and the Yellow Birch.

I have been led to this division by the external appearance, rather than by a minute physiological examination of the sexual parts of the different species, leaving more accomplished botanists to decide upon its adoption.

[*Soil, Propagation, &c.* The Birch has been called an amphibious plant, by the Earl of Haddington, as it grows on rich or poor, wet or dry, sandy or rocky situations, nor refuses any soil or climate whatever; it, however, luxuriates most in deep loams lying on a porous subsoil, or in alluvial soil, by the sides of rivers, or smaller streams. Plants are not readily produced otherwise than by seed, which ripens in September and October, and may be either gathered and sown immediately, or preserved in a dry loft, and sown in spring; if immediately, the catkins may be gathered wet, but if to be kept, they ought to be gathered quite dry. Cover the seeds very lightly, and your plants will appear in March or April from the Autumn sowing, but not till May or June if sown in the spring. See the account of the Common European Birch for the method of making plantations.

Emerson remarks, that no trees are more distinguished for their light and feathery foliage, and the graceful sweep of their limbs, than the Birches; no family affords such a variety of aspect.

See Nuttall's Supplement, Vol. I, p. 22, &c., and Vol. II. p. 117.]

METHODICAL DISPOSITION

OF THE

BIRCHES.

BETULACEÆ. Richard.

Monœcia Polyandria. LINN. Amentaceæ. Juss.

FIRST SECTION.

Fertile aments, pedunculated and pendulous.

1.	Canoe Birch,	*Betula papyracea.*
2.	Common European Birch,	*Betula alba.*
3.	White Birch,	*Betula populifolia.*

SECOND SECTION.

Fertile aments, sessile and erect.

4.	Red Birch,	*Betula rubra.*
5.	Yellow Birch,	*Betula lutea.*
6.	Black Birch,	*Betula lenta.*

CANOE BIRCH.

BETULA PAPYRACEA. *B. foliis ovalibus, acuminatis, subæqualiter serratis; petiolo glabro; venis subtus hirsutis.*

Betula papyrifera. A. MICH. Flor. Bor. Am.

By the French Canadians this tree is called *Bouleau Blanc*, White Birch, and *Bouleau à Canot*, Canoe Birch: it is known to the Americans also by these denominations, and sometimes by that of Paper Birch. The name of Canoe Birch appears to be the most proper, as it indicates an important use which is made of its bark.

The Canoe Birch is most multiplied in the forests in the country lying north of the 43° of latitude, and between the 75° of west longitude and the Atlantic Ocean; comprising Lower Canada, New Brunswick, the District of Maine, and the States of New Hampshire and Vermont. It ceases below the 43° of latitude, and is not found in the southern part of Connecticut, nor below Albany, in the State of New York.

The surface of these regions, in general very irregular and diversified in every direction with hills and valleys, is occupied by thick and gloomy forests, of which the soil is fertile and principally covered with large stones, overgrown with moss. This part of North America, though situated 10 degrees further south, very nearly resembles Sweden and the eastern part of Prussia, not only in the face of the soil, but in the severity of the climate.

The Canoe Birch attains its largest size, which is about 70 feet in height and 3 feet in diameter, on the declivity of hills and in the bottom of fertile valleys. Its branches are slender, flexible, and covered with a shining, brown bark, dotted with white. The leaves are borne by petioles 4 or 5 lines long, and are of a middling size, oval, unequally denticulated, smooth, and of a dark green color. The aments are pendulous, and about an inch in length: the seeds are ripe towards the middle of July.

The heart or perfect wood of this tree when first laid open, is of a reddish blue, and the sap is perfectly white. It has a fine, glossy grain, with a considerable share of strength: that it is but little employed is attributable partly to its speedy decay when exposed to the succession of dryness and moisture, and partly to the existence, in the countries which produce it, of several species of wood, such as the Maples, the Beech, and even the

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Howard del. Gabriel Sculp.

Canoe Birch.

Betula papyracea.

Yellow Birch, which are far preferable for the uses of the joiner and the wheel-wright. It is fully equal, however, to the White Birch which grows in Sweden and Norway, and which, for many purposes, is advantageously substituted for the Oak; but these countries are destitue of trees analogous to those which have just been mentioned as enriching the native soil of the Canoe Birch. In the District of Maine, tables are frequently made of it, and stained in imitation of Mahogany.

A section of the trunk of this tree, 1 or 2 feet in length, immediately below the first ramification, exhibits very elegant undulations of the fibre, representing bunches of feathers or sheaves of corn: these pieces are divided into thin plates for inlaying Mahogany, and in Boston and the towns situated further north, they are generally employed by cabinet-makers to embellish their work.

The Canoe Birch affords excellent fuel, and is exported in great quantities from the District of Maine to Boston.

On trees not exceeding 8 inches in diameter, the bark is of a brilliant white, like that of the White Birch of Sweden, and, like that too, it is almost indestructible. Trees long since prostrated by time are often met with in the forests, whose trunk appears sound, while the bark contains only a friable substance, like vegetable mould. This bark, like that of the European species, is devoted to many uses: in Canada and in the District of Maine, the country people place large pieces of it immediately below the shingles of the roof, to form a more impenetrable covering for their houses: baskets, boxes and portfolios are made of it, which are sometimes embroidered with silk of different colors; divided into very thin sheets, it forms a substitute for paper; and placed between the soles of the shoes and in the crown of the hat, it is a defence against humidity. But the most important purpose to which it is applied, and one in which it is replaced by the bark of no other tree, is the construction of canoes. To procure proper pieces, the largest and smoothest trunks are selected: in the spring two circular incisions are made several feet apart, and two longitudinal ones on opposite sides of the tree; after which, by introducing a wooden wedge, the bark is easily detached. These plates are usually 10 or 12 feet long, and 2 feet 9 inches broad. To form the canoe, they are stitched together with fibrous roots of the White Spruce, about the size of a quill, which are deprived of the bark, split, and suppled in water. The seams are coated with resin of the Balm of Gilead. Great use is made of these canoes by the savages and by the French Canadians in their long journeys into the interior of the country: they are very light, and are easily transported on the shoulders from one lake or river to another, which is called the portage. A canoe calculated for four persons with their baggage, weighs from 40 to 50 pounds; some of them are made to carry fif-

teen passengers. Such are the ordinary uses of the bark and of the wood of this tree.

The Canoe Birch flourishes in the vicinity of Paris, where it is known in the nurseries by the name of *Betula nigra*, Black Birch. If it is found to grow with success upon poor lands, it will prove a valuable acquisition to the European forests, as it surpasses our native Birch in stature and in the quality of its wood.

PLATE LXIX.

A branch with leaves and fertile aments of the natural size. Fig. 1, *A seed. Fig.* 2, *The scale which covers the seeds.*

[See Nuttall's Supplement, Vol. 1, p. 25.]

COMMON EUROPEAN BIRCH.

BETULA ALBA. *B. foliis deltoidibus, acutis, duplicato-serratis, glabris; strobilorum squamis lobis lateralibus rotundatis; petiolis glabris, pedunculis longioribus.*

OF all the leafy trees of the Old Continent, the Birch is found in the highest latitude; it grows as far north as the 70th degree, though its vegetation is so much repressed by the excessive cold of the winter, that it is reduced to the size of a shrub. A few degrees further south, it attains its fullest development, and it is the most common, the tallest, and most robust of the leafy trees which compose the forests between the 65th and 55th degrees of latitude; in which interval are comprised Lapland, Norway, Sweden, and a great part of Russia. Proceeding still further south, the Birch is observed to become less common in the forests in proportion as the Maples, the Beeches, the Elms and the Oaks become more abundant. In France, between the 48th and 45th degrees, it appears to suffer from the influence of too dry and too warm an atmosphere; for it is inferior, in size and in the quality of its wood, to the same species in the North of

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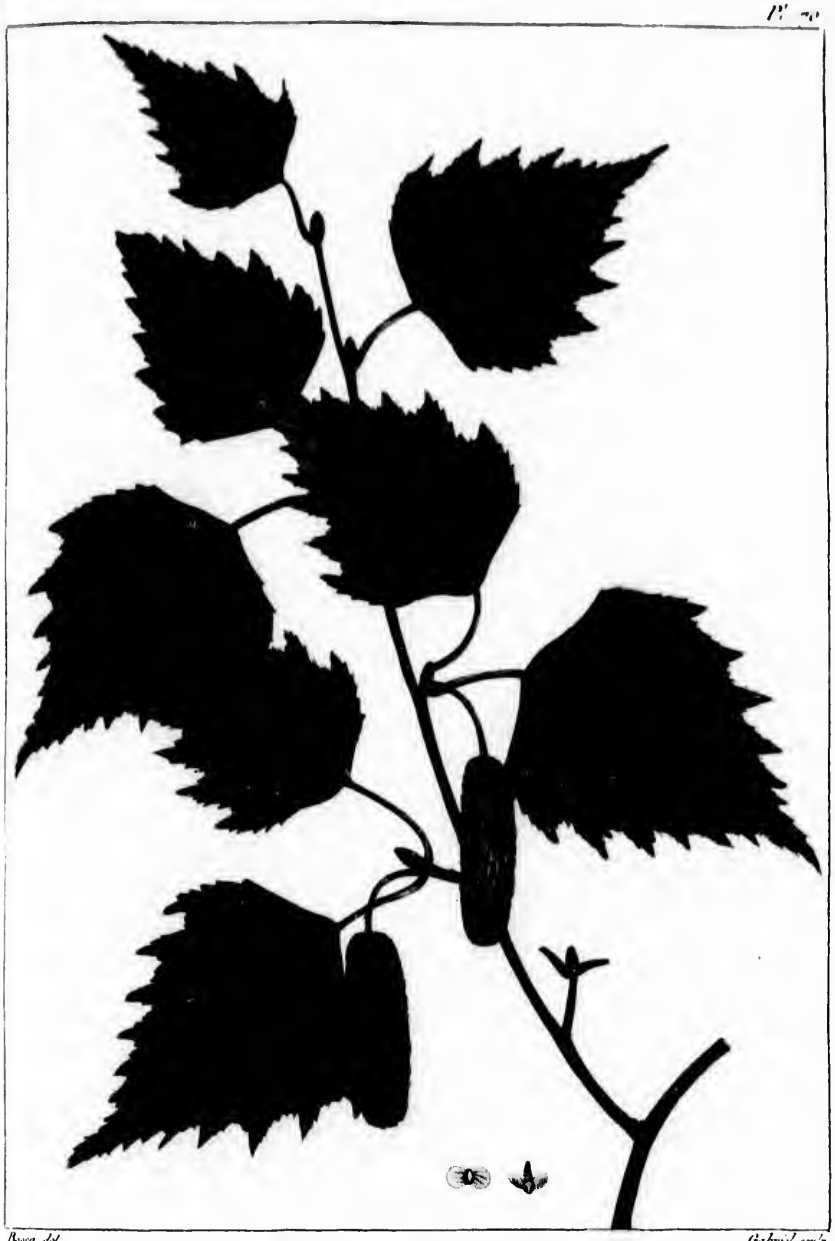


Bessa del. Gabriel sculp.

Common European White Birch.

Betula alba.

Europe. The 45th parallel may be assumed as the limit below which the Birch is only accidentally found in the forests, if we except lofty mountains, whose elevation tempers the atmosphere with perennial coolness.

In Germany, Sweden and Russia, the Birch is 70 or 80 feet high, and about 2 feet in diameter; but in France it rarely exceeds two thirds of this height. The trunk and limb of the large trees are covered with a thick bark, whose epidermis is white and perfectly similar to that of the White Birch and the Canoe Birch. The small branches, likewise resemble those of the species just mentioned, being slender, flexible, and of a brown color spotted with white.

The Birch blooms early in the spring; the fertile and barren flowers are borne by different branches of the same tree. The barren flowers are disposed in pendulous aments about an inch long; the fertile flowers are greenish, small, and not conspicuous. The seeds also are very small, and are collected round a common stem, in the form of aments: each of them is covered with a scale, and furnished with two membranous wings. The leaves are alternate, nearly triangular, acuminate, and irregularly toothed; they vary in size according to the age of the tree and to the nature of the soil on which it grows; in very dry lands they are not more than an inch in length.

In the north of Europe, the Birch affords a singular variety of resources to the inhabitants, who make use, with admirable ingenuity, of its wood, bark and leaves. But the expedients to which they are obliged to have recourse, for defence against the extreme intensity of the cold, prove how little these regions have been favoured by the Creator. In Sweden, Norway and Finland, this wood is most commonly employed by the wheel-wright, and serves for the manufacture of almost all the implements of husbandry. It is used by turners for bowls, plates, spoons, chairs, etc. The trunk, like that of the Canoe Birch, affords pieces immediately below the first ramification, which, when polished, present beautiful wavings of the grain, and form elegant articles of furniture.

The bark is also subservient to a great variety of economical uses: boxes, baskets and sandals are made of it; it is placed between the soles of the shoes, or in the Crown of the hat, as a defence against humidity: and sometimes it is wrapped around the lower part of posts to preserve them from decay. It endures many years uninjured, even when exposed to the vicissitudes of the atmosphere. To prepare the skin of the reindeer, the Laplanders cut this bark into small pieces, which they macerate, and afterwards boil in water, with the addition of a little salt. The skins are plunged repeatedly into this decoction warmed, and are allowed to remain in it several days; when taken out they are vigorously curried to render them pliable and soft; thus prepared they are hardly permeable by water. In Russia, by slowly burning the bark of large Birches in kilns or furnaces,

an empyreumatic oil is obtained, with which a leather is prepared highly esteemed for durability.

The leaves of the Birch, both green and dry, are given to cattle. When young, they are used by the inhabitants as a substitute for tea; they are also employed to dye wool of a yellowish color.

The sap of the Birch is very abundant in the spring, and, by evaporation, it affords a sirup, rich and sugary, but incapable of crystalization. By the addition of fermenting matter, this sap is converted into beer, into a species of wine, or into vinegar. Such are the principal uses of the European Birch, all the valuable properties of which are completely united in the Canoe Birch of North America.

England and the south of Germany being favoured with a milder climate, and, consequently, with a greater variety of trees than the more northern countries, are not dependent upon the Birch for so great a variety of uses; but even here it is a valuable possession, as it is proved by the experience of upwards of two centuries, to grow more rapidly than any other tree in barren soils. Hence, in Europe, all dry, meager, gravelly lands, analogous to those which, in the centre and in the north of the United States, produce the Black Jack Oak, the Bear Oak, and the Scrub Oak, are found to be more profitably devoted to plantations of Birch than to any other species of culture. In this manner, also, they are gradually prepared for the growth of more valuable trees, such as the Oaks, the Chesnuts, etc.

Plantations of Birch are formed by sowing the seed, or by setting out young plants collected in the woods, or, which is far preferable, procured from a nursery. When the first method is employed, the ground should be turned with an iron-toothed harrow, in damp weather in the month of November. Fifteen pounds of seed, including the scales, should be sown upon an acre, and afterwards covered by drawing over it a harrow made of brush-wood.

Nothing contributes more to the success of the seeds than previously burning the noxious herbs and bushes growing upon the ground. It is observed in the north of Europe and of the United States, that the Birch reappears, as if by enchantment, in forests that have been destroyed by fire. The Birch seed is sometimes mixed with rye, which, springing with the young plants, protects them during the first summer from the sun, and which, by the profit of the crop indemnifies the husbandman for a part of the expense of forming his plantation. If the ground is burthened with the young plants, a part of them may be taken up the third year to fill the vacant spaces in woods composed of Oaks, of Pines, etc. They may be sold also to persons who prefer forming their coppices by transplantation, which is the mode generally employed in Europe. In the month of November, holes are formed 5 feet distant, in a straight line, to which the young plants are committed, in moist weather which promises rain. In

the course of the summer, a day is chosen for bestowing a light tillage upon the land, to clear it of the noxious herbs, as is practised for Indian Corn. This is all the labor required to ensure the success of the plantation.

These coppices may be cut every five years, if they are destined for making brooms, or every eight or nine years for hoops, which are substituted for those of Oak and of Chesnut; at twelve years of age, they afford excellent fuel for baking, brick-making, and for all manufactures which require a brisk and clear fire.

I have entered into these details concerning the propagation of the Birch, because, among the trees of the Old Continent, it is one of the most profitable for cultivation upon poor lands. Proprietors in the United States, who read the works which have been published in Germany, France and England, on the management of forests, will be able to appreciate, in this respect, the importance of the Birch.

The European Birch is so nearly related in its bark, its foliage, the quality of its wood, and in other properties, to the White Birch and to the Canoe Birch, that it appears to occupy a middle place between these two species. Its principal resemblance to the White Birch is seen in its leaves, and in its favorable growth upon the most sterile soils, upon those even which are at the same time meager and humid. The most remarkable difference consists in the larger size of the European species, and in the superior quality of its wood. The inferiority of the White Birch is not attributable to the climate, for it exhibits the same dimensions in the District of Maine, and in Pennsylvania and Maryland. The White Birch of Europe and the Canoe Birch resemble each other in their wood, their bark, and their ample proportions, which are perhaps superior in the American species. They differ in the form of their leaves, and they grow on very different soils: the Canoe Birch is exclusively attached to rich lands constantly cool, and capable of yielding an abundant harvest of corn or of clover, and it propagates itself naturally only in that part of North America which corresponds in climate to the 54th and 55th degrees of latitude in Europe. Between the White Birch of Europe and the Red Birch, I have observed no resemblance, except in the suppleness of their twigs; which is more remarkable in the Red Birch.

The length of this description will not be deemed superfluous by persons who justly appreciate the importance of precise ideas on subjects like the present.

PLATE LXX.

A branch with leaves and aments of the natural size. Fig. 1, *A seed. Fig.* 2, *A scale which covers the seed.*

WHITE BIRCH.

BETULA POPULIFOLIA. *B. foliis longè acuminatis, inæqualiter serratis, glaberrimis.*

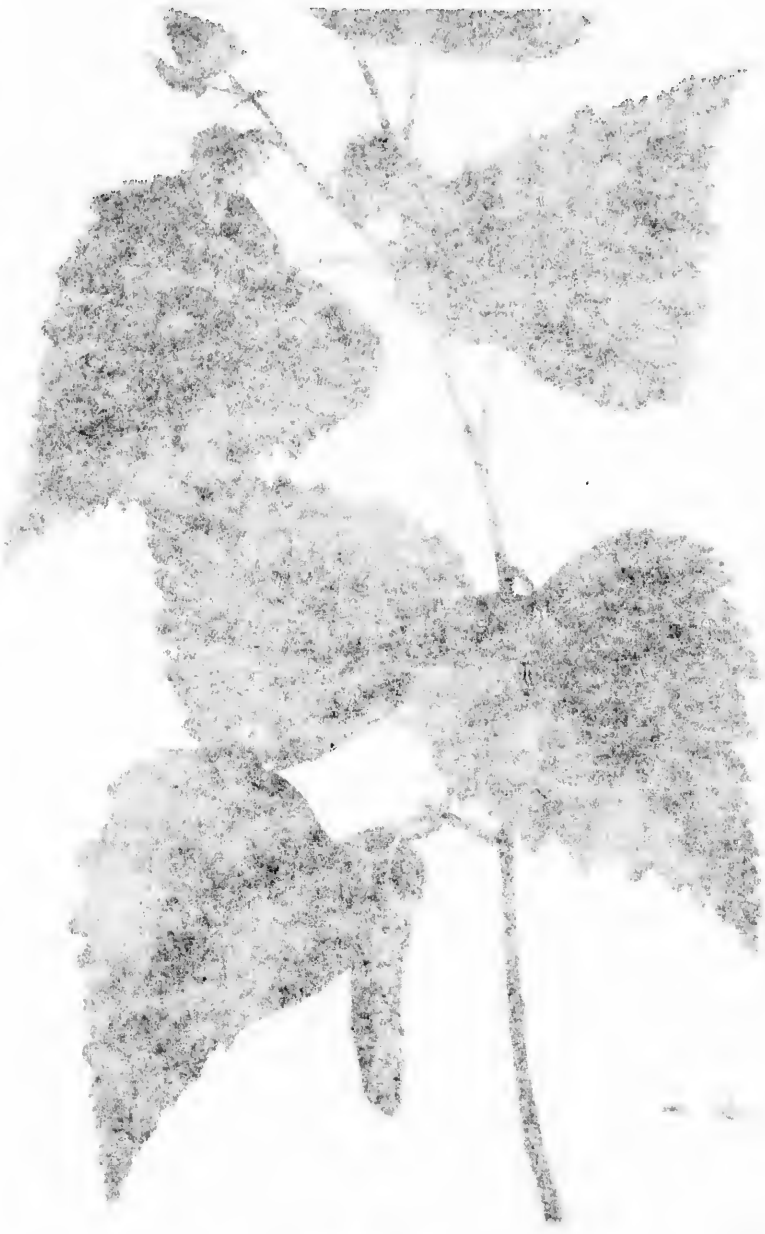
THIS species, like the Canoe Birch, grows in Canada and in the northern extremity of the United States: it is found also in the lower parts of New York, New Jersey and Pennsylvania. In Virginia it is more rare, and I venture to assert that it does not exist in the remaining Southern States. In the environs of New York and of Philadelphia it is called White Birch, and this name is habitually used in the district of Maine, where that of Old Field Birch is also frequently employed, to distinguish the White Birch from the Canoe Birch.

The White Birch is most frequently found in places scantily furnished with woods, where the soil is dry and meager; in these situations it commonly rises to the height of 20 or 25 feet. Single trees, which grow accidentally in moist places, expand to an ampler size, and are sometimes 30 or 35 feet high, and 8 or 9 inches in diameter.

The White Birch appears to be less multiplied than the other trees of this genus: it is rarely found in groups, and single trees are met with only at considerable intervals. It is more common in the District of Maine; but, even here, it is seen only by the side of the highways, and in sandy soils that have been exhausted by cultivation.

On trees that are fully grown, the branches are numerous, slender, and generally drooping. The leaves are smooth on both surfaces, heart-shaped at the base, very acuminate, and doubly and irregularly toothed. The petioles are slightly twisted, and the leaves are thus rendered more tremulous than those of trees on which this dispositon is not observed. I have also remarked that the buds, a few days after their development, are slightly coated with a yellowish, odoriferous substance. The trunk of this species is clad in a bark of as pure white as that of the Canoe Birch and of the European Birch: but its epidermis, when separated from the cellular tissue, is incapable of being divided, like that of the two proceeding species, into thin sheets; which constitutes an essential difference.

The wood of the White Birch is very soft, brilliant when polished, and perfectly white. From its speedy decay, and from the inferor size of the tree, it is employed for no use, not even for fuel. The twigs are too brittle for common brooms.



Bessa del.^t Gabriel Sculp

White Birch.
Betula populifolia.

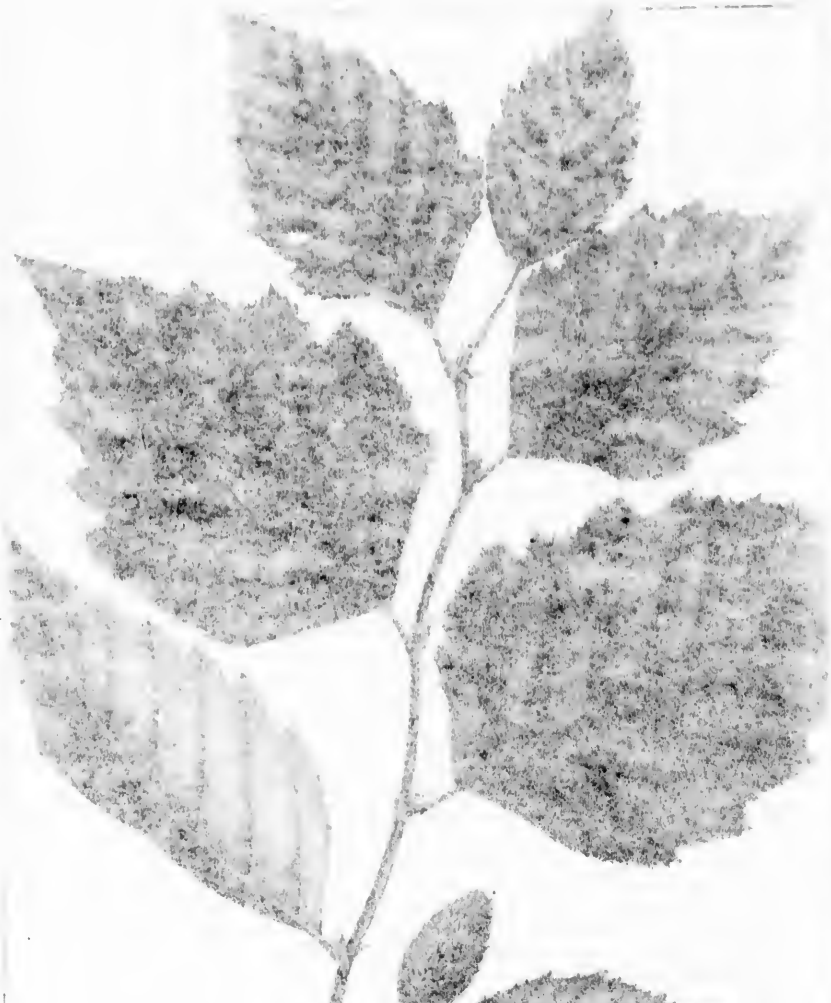
H. J. Redouté del. Bessin Sculp.

Red Birch.

Betula rubra.

Pl. 72.

Bowen Sculp.



Red Birch

This tree can boast of no utility which should entitle it to be introduced into the forests of Europe, or to be preserved in those of America.

PLATE LXXI.

A branch with leaves and aments of the natural size. Fig. 1, *A seed. Fig.* 2, *A scale.*

[See Nuttall's Supplement, vol. 1, p. 25.]

RED BIRCH.

BETULA RUBRA. *B. foliis rhombeo-ovatis, acuminatis, duplicato-serratis; petiolo brevi.*

Betula nigra, WILLD. Betula lanulosa, A. MICH. Flor. Bor. Am.

THE banks of a small river near Kouacknack, in New Jersey, about 10 miles from New York, may be assumed as the most northern point at which this species of Birch is found. I have never seen it in the Eastern, but it is abundant in the Middle and Southern States, particularly in Maryland, Virginia, and the upper part of the Carolinas and of Georgia.

In Pennsylvania and New Jersey, the name of Red Birch is given to the *Betula rubra*, to distinguish it from the White Birch; but further south, where the White Birch does not exist, or is comparatively rare, this species is simply called *Birch*.

The Red Birch is not, like the other species of this genus, seen growing in the midst of the forest, but is found only on the banks of rivers, accompanied by the Buttonwood, the White Maple and the Willow. It expands with the greatest luxuriance on the sides of limpid streams which have a gravelly bed, and whose banks are not marshy like those of the rivers in the maritime parts of the Carolinas and of Georgia. On the Delaware, 30 miles from Philadelphia, along the road that leads to New York by New Hope and Somerset, I have seen several Red Birches which were 70 feet in height, and 2 or 3 feet in diameter. They rarely exceed these dimensions in Virginia and North Carolina, where, from the milder temperature of the climate, they are more abundant.

On the trunk and on the largest limbs of a lofty Red Birch, the bark is thick, deeply furrowed, and of a greenish color. On trees not exceeding

8 or 10 inches in diameter, the epidermis is reddish or cinnamon-colored; whence probably is derived the appropriate denomination of Red Birch. The epidermis of this species, like that of the Canoe Birch, divides itself transversely into thin, transparent sheets, which apppear to be composed of a mixed substance, instead of presenting a pure, homogeneous texture; hence they have not a uniform transparency, nor a perfectly even surface: compared with the bark of the Canoe Birch, they are like coarse paper compared with fine. When this tree is fully expanded, its summit is ample, but the uncommon thickness of its branches prevents it from appearing tufted. The twigs, which form the extremity of the tree, are long, flexible and pendulous, and the limbs are of a brown complexion spotted with white: their bark is slightly uneven, while, on the other branches it is smooth and glossy.

The petioles of the Red Birch are short and downy; the leaves are about 3 inches long and 2 inches broad, of a light green on the upper surface, and whitish beneath: they are doubly denticulated at the edge, very acuminate at the summit, and terminated at the base in an acute angle, more regular than is seen in the leaf of any other tree. The fertile aments are 5 or 6 inches long, straight, and nearly cylindrical. The seeds are ripe in the beginning of June.

The wood of the Red Birch is sufficiently compact and nearly white: very little difference in color is observed between the sap and the heart. This wood offers the same singularity with that of the June Berry, being longitudinally marked by red vessels, which intersect each other in different directions. In some parts of Virginia and North Carolina, the negroes make bowls and trays of Red Birch when they cannot procure Poplar. When saplings of Hickory or White Oak are not to be found, hoops, particularly those of rice casks, are made of the young stocks and of branches not exceeding an inch in diameter. In Philadelphia its twigs are exclusively chosen for the brooms with which the streets and court-yards are swept, which are similar to those employed for the same purpose in Paris. The twigs of the other species of Birch being less supple and more brittle, are not proper for this use.

Though the Red Birch is constantly found on the borders of rivers, it is not naturally confined to them: a flourishing stock, more than 30 feet in height, exists in the garden of the State-house at Philadelphia. Among all the Birches, the vegetation of this species only is invigorated by intense heat: this consideration suffices to recommend its propagation in Italy, and in the southern parts of France and of the United States; for it has been judiciously observed by authors who have written on this genus of trees, that if the good properties of the Birch are not brilliant, they are at least numerous and useful.

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Brown del. Gabriel sculp.

Yellow Birch.

Betula lutea.

Yellow Birch

Betula lutea

PLATE LXXII.

A branch with leaves and a barren ament of the natural size. Fig. 1, *A seed. Fig.* 2, *A scale.*

YELLOW BIRCH.

BETULA LUTEA. *B. foliis ovatis, acutis, serratis; petiolis pubescentibus.*

Betula excelsa. AITON.

THIS species, like the Canoe Birch, belongs only to the northern regions of the New World. It abounds especially in the forests of Nova Scotia, of New Brunswick, and of the District of Maine, where it is designated by no other name than Yellow Birch. On the Western bank of the Hudson it is rare; and in New Jersey and Pennsylvania only a few individuals of the species are met with, in moist and shady situations. It is confounded by the inhabitants of these States with the Black Birch, which is very abundant, and to which it bears a striking resemblance.

In the District of Maine the Yellow Birch is always found on cool and rich soils, among the Ashes, the Hemlock Spruce, and the Black Spruce. In these situations it exhibits its amplest dimensions, which are 60 or 70 feet in height, and more than 2 feet in diameter. The specific name of *excelsa*, which has been given to it, is injudicious, as it leads to an erroneous opinion that it surpasses every other species in height. It is a beautiful tree, and its trunk is of nearly a uniform diameter, straight, and destitute of branches for 30 or 40 feet. It is particularly remarkable for the color and arrangement of its epidermis, which is of a brilliant golden yellow, and which frequently divides itself into very fine strips, rolled backwards at the ends, and attached in the middle.

The young shoots, and the leaves at their unfolding are downy; towards the middle of summer, when fully expanded, the leaves are perfectly smooth, except the petiole, which remains covered with a fine, short hair: they are about 3½ inches long, and 2½ inches broad, oval acuminate, and bordered with sharp and irregular teeth. The leaves, the bark, and the young

shoots have an agreeable taste and smell, similar to those of the Black Birch, though less sensible, which they lose in drying.

In its fructification, this species nearly resembles the Black Birch. The fertile aments are borne on short peduncles, and are 12 or 15 lines long, 5 or 6 lines in diameter, straight, of an oval shape, and nearly cylindrical. The scales which compose them are trifid, pointed, and about 3 lines in length: viewed through the lens, they are seen to be downy. Beneath these scales are the small winged seeds, which are ripe about the first of October.

The wood of the Yellow Birch is inferior in quality and in appearance to that of the Black Birch, and never assumes as deep a shade; but it is strong, and, when well polished, makes handsome furniture. In Nova Scotia, and in the District of Maine, it is found by experience to be every way proper for that part of the frame of vessels which remains always in water. In the District of Maine it is preferred for the yokes of cattle and for the frames of sledges; and in Nova Scotia the young saplings are almost exclusively employed for the hoops of casks.

The Yellow Birch is an excellent combustible, and it is anuually transported in great quantities from the District of Maine to Boston. Its bark is highly esteemed in tanning; but in Maine it is employed in a very small proportion, and only for what is called by the curriers fair leather.

Oddy, in his Treatise on European Commerce, affirms that great quantities of Yellow Birch boards are imported into Scotland and Ireland, and that they are highly esteemed in joinery. The Birch mentioned by Oddy is doubtless the species which I am describing.

Such are the observations concerning this tree which I collected in my travels through the United States; they lead me to believe that the soil and climate of Germany would be more favourable to its multiplication than those of France, where the preference should be given to the Black Birch, which requires less humidity.

PLATE LXXIII.

A branch with leaves and fertile aments of the natural size. ***Fig.*** **1,** *A seed.* ***Fig.*** **2,** *The scale which covers the seed.*

[The Yellow Birch is a highly ornamental tree, and deserves attention from the planter of taste.]

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Fig. 1, *A seed.*

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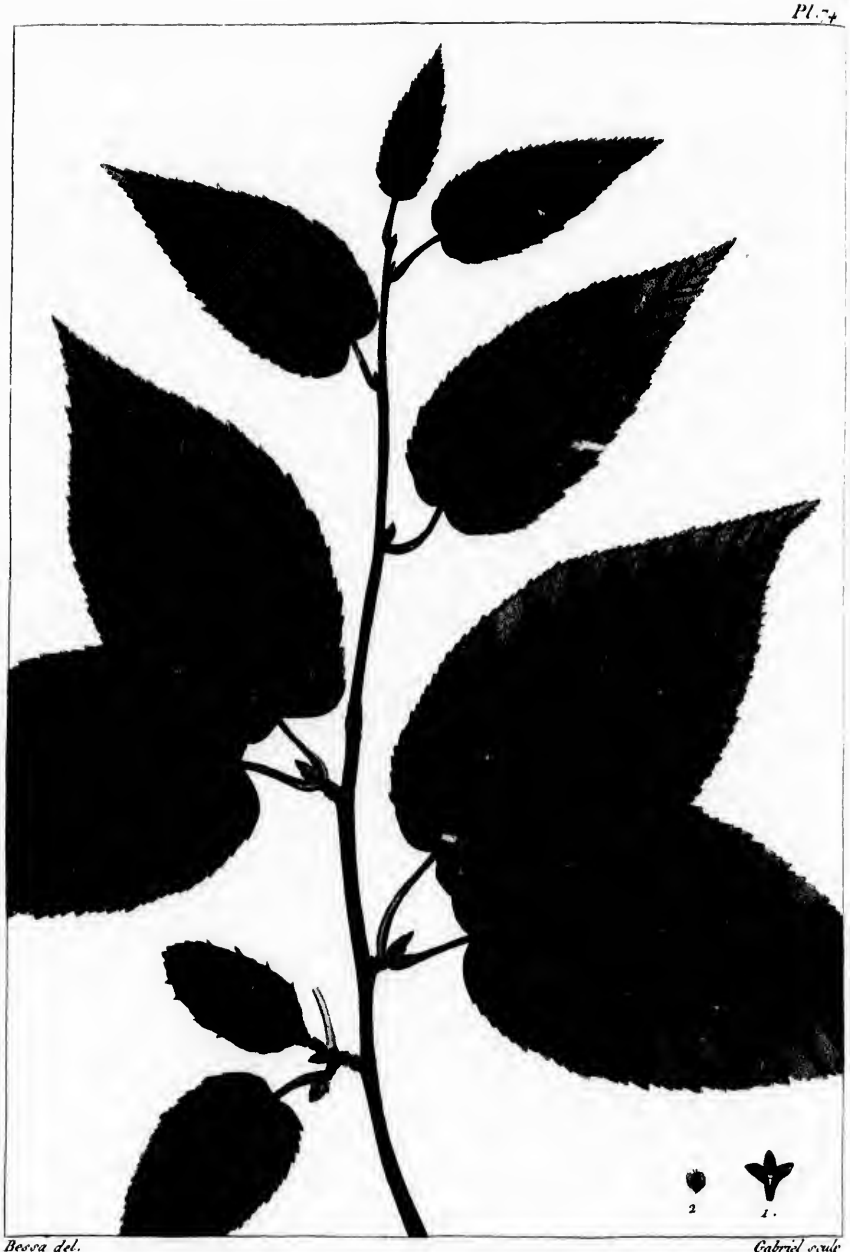

Bessa del. Gabriel sculp.

Black Birch.
Betula lenta.

Pl. 74

Gabriel sculp

BLACK BIRCH.
Betula lenta.

BLACK BIRCH.

Betula lenta. *B. foliis cordatis-ovatis, argutè serratis, acuminatis, glabris.*

Betula carpinifolia. A. Mich. Flor. Bor. Am.

The agreeable foliage of this species, and the valuable properties of its wood, render it the most interesting of the American Birches. Wherever it grows in the United States, it is known by the name of Black Birch: its secondary denominations are Mountain Mahogany in Virginia, and Sweet Birch and Cherry Birch in Connecticut, Massachusetts, and further north. In Canada it is universally called Cherry Birch.

I have observed the Cherry Birch in Nova Scotia, in the District of Maine, and in the State of Vermont, though more rarely than the Yellow Birch. It abounds in the Middle States, particularly in New York, Pennsylvania and Maryland; further south it is confined to the summit of the Alleghanies, on which it is found to their termination in Georgia, and to the steep and shady banks of the rivers which issue from these mountains. According to my own researches, it is a stranger to the lower part of Virginia, and to the southern and maritime parts of the Carolinas and of Georgia; nor do I remember to have seen it in Kentucky, nor in the western part of Tennessee.

In New Jersey, and upon the banks of the North river, where I have most attentively observed the Black Birch, I have uniformly remarked that it grew of preference in deep, loose and cool soils, and that in these situations it attained its greatest expansion, which sometimes exceeds 70 feet in height, and 2 or 3 feet in diameter.

In the neighborhood of New York, the Black Birch is one of the earliest trees to renew its foliage. At the close of winter the leaves, during a fortnight after their birth, are covered with a thick, silvery down, which disappears soon after. They are about 2 inches long, serrate, cordiform at the base, acuminate at the summit, of a pleasing tint and fine texture, and not unlike the leaves of the Cherry Tree. The young shoots are brown, smooth, and dotted with white, as are also the leaves. When bruised the leaves diffuse a very sweet odor, and, as they retain this property when dried and carefully preserved, they afford an agreeable infusion, with the addition of sugar and milk.

The barren flowers of the Black Birch are disposed in flexible aments about 4 inches long. The fertile aments which are commonly situated at the extremity of the young branches, are 10 or 12 lines long, and 5 or 6 lines in diameter, straight, cylindrical, and nearly sessile at the season of the maturity of the seed, which is about the first of November.

The bark, upon the trunk of trees less than eight inches in diameter, is smooth, grayish, and perfectly similar in its color and organisation to that of the Cherry Tree. On old trees, the epidermis detaches itself transversely, at intervals, in hard, ligneous plates, 6 or 8 inches broad.

The wood of the Black Birch, when freshly cut, is of a rosy hue, which deepens by exposure to the light. Its grain is fine and close, whence it is susceptible of a brilliant polish; it possesses also a considerable share of strength. The union of these properties renders it superior to the other species of American Birch, and in Massachusetts, Connecticut and New York, it is next in esteem to the Wild Cherry Tree, among cabinet-makers in the country. Tables and bedsteads of this wood, when carefully preserved, acquire with time the appearance of Mahogany, hence it is employed in Boston for the frames of arm-chairs and of sofas; coach-makers also use it for the frames of their panels. Shoe lasts are made of Black Birch, but they are less esteemed than those of Beech. Such are the principal uses of this wood, from which it may easily be gathered to what subsidiary purposes it is applicable.

The vegetation of the Black Birch is beautiful, and, in a congenial soil, its growth is rapid. A proof of this last assertion is found in the Annals of the Arts, where a stock of this species is reported to have attained the height of 45 feet and 8 inches in nineteen years.

These considerations should induce the Americans to bestow great care on the preservation of the Black Birch, and the inhabitants of the old World to introduce it into their forests. The attempts upon a great scale would be more successful in the North of France, in England and in Germany, on account of the greater humidity of the climate, than in more southern countries.

I shall terminate this description of one of my favourite trees, by recommending it to the lovers of foreign vegetables, as eminently adapted, by the beauty of its foliage and by the agreeable odor of its flowers, to figure in their parks and gardens.

PLATE LXXIV.

A branch with leaves and fertile aments of the natural size. Fig. 1, *A seed. Fig.* 2, *A scale which covers the seed.*

[A tree of this species in Massachusetts measured in 1839, 9 feet 5 inches in girth, at three feet from the ground.]

ALDERS.

Amentaceæ.

COMMON ALDER.

ALNUS SERRULATA. *A. stipulis ovalibus, obtusis; foliis duplicato-serratis, ovalibus, acutis.*

This species of Alder is found in the Northern, Middle, and Western States, and is every where designated by the name of Common Alder. It frequently grows along the sides of brooks, and abounds still more in places covered with stagnant water. Its ordinary size is 8 or 10 feet in height, and about 2 inches in diameter, though often it is less. Its leaves are of a beautiful green, about 2 inches long, oval, distinctly sulcated on the surface, and doubly denticulated at the edge.

This shrub blooms in January: the sexes are separate upon the same stock. The barren flowers are disposed, like those of the Birch, around a common axis, in flexible pendulous aments about 2 inches long. The fertile flowers are in the form of small, oval bodies, garnished with a dull red, fringe: they are converted into small, scaly cones, which open, when arrived at maturity, to release the minute, flat seeds.

The wood of the Common Alder, when first laid open, is wide, and it becomes reddish by contact with the air: its resemblance in this respect to the analogous European species, *Alnus glutinosa*, leads me to believe that they are alike also in the properties of their bark.

The Common Alder is too small to be applicable to any use in the arts: from its inferiority of size, it will probably one day give place to the European Alder.

PLATE LXXV.

Common Alder, with a leaf of the natural size. Fig. 1, *A fertile and a barren ament. Fig.* 2, *A cone at maturity. Fig.* 3. *Seeds.*

BLACK ALDER.

ALNUS GLAUCA. *A. foliis subrotundo-ellipticis, duplicato-serratis, subtus glaucis.*

Alnus incana. WILLD.

This species of Alder, which is unknown in the Southern, and rare in the Middle States, is not uncommon in Massachusetts, New Hampshire and Vermont; but even here it is less multiplied than the Common Alder, which abounds throughout the United States. The Black Alder is a third taller than the preceding species, being sometimes 18 or 20 feet in height, and about 3 inches in diameter. Its leaves are similar in shape, but are easily distinguishable by their different tint and superior size: they are of a pale bluish green, and a third larger than those of the Common Alder. Both species grow in cool, moist places, and upon the margin of rivulets.

The bark of the trunk and of the secondary branches is smooth, glossy, and of a deep brown color sprinkled with white. It is employed by hatters, if I have been correctly informed, for dying black. The diminutive size of this tree excludes it entirely from use; but to recommend it to the notice of amateurs it is only necessary to observe that it is one of the most beautiful species of the genus.

The dwarfish stature of all the species of Alder that have hitherto been discovered in North America, excludes them from that class of vegetables to the description of which I have restricted my labors; but I could not forbear mentioning the two most remarkable species, of which one merits attention on account of its abundant diffusion, and the other on account of a striking peculiarity in the color of its leaves.

PLATE LXXVI.

Black Alder, with a leaf of the natural size.

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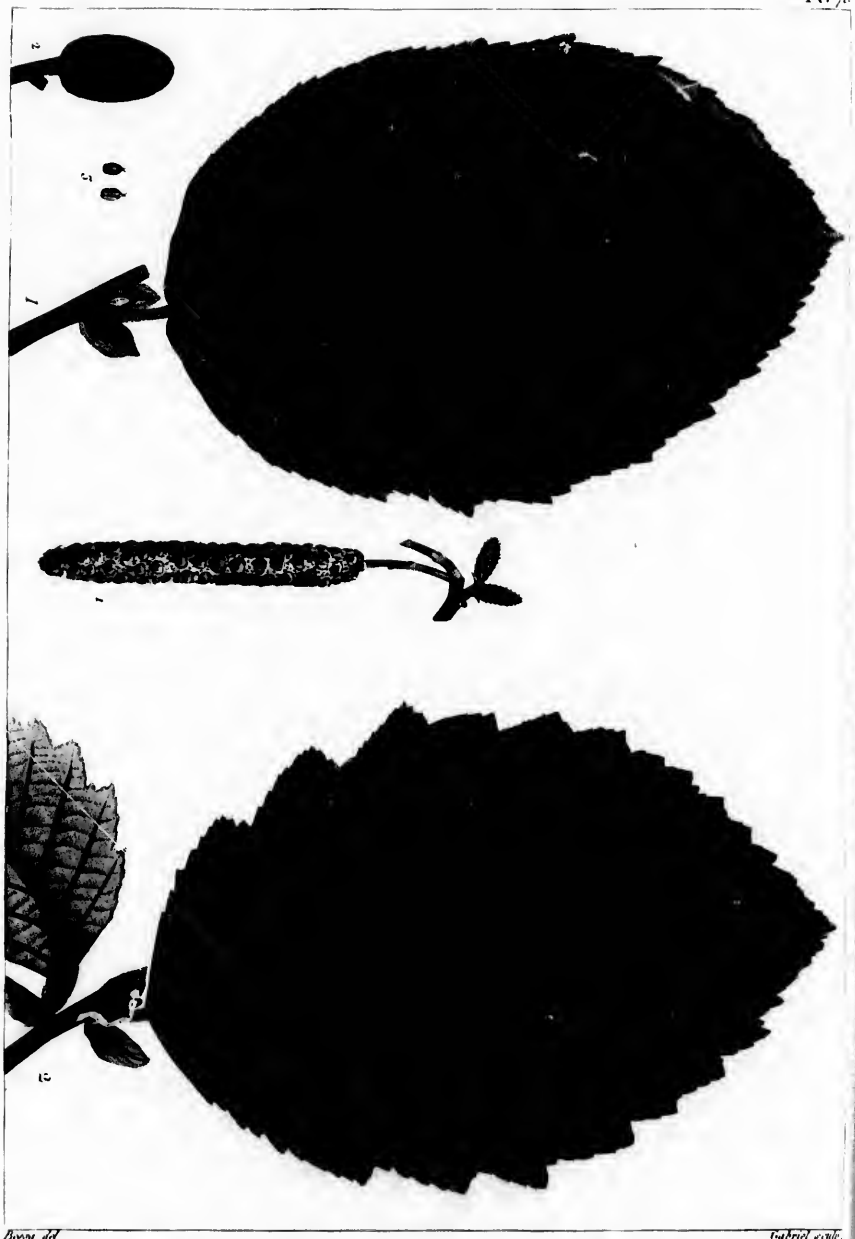

Bessa del. Gabriel sculp.

1. Common Alder.
Alnus serrulata.

2. Black Alder.
Alnus glauca.


Pl. 73
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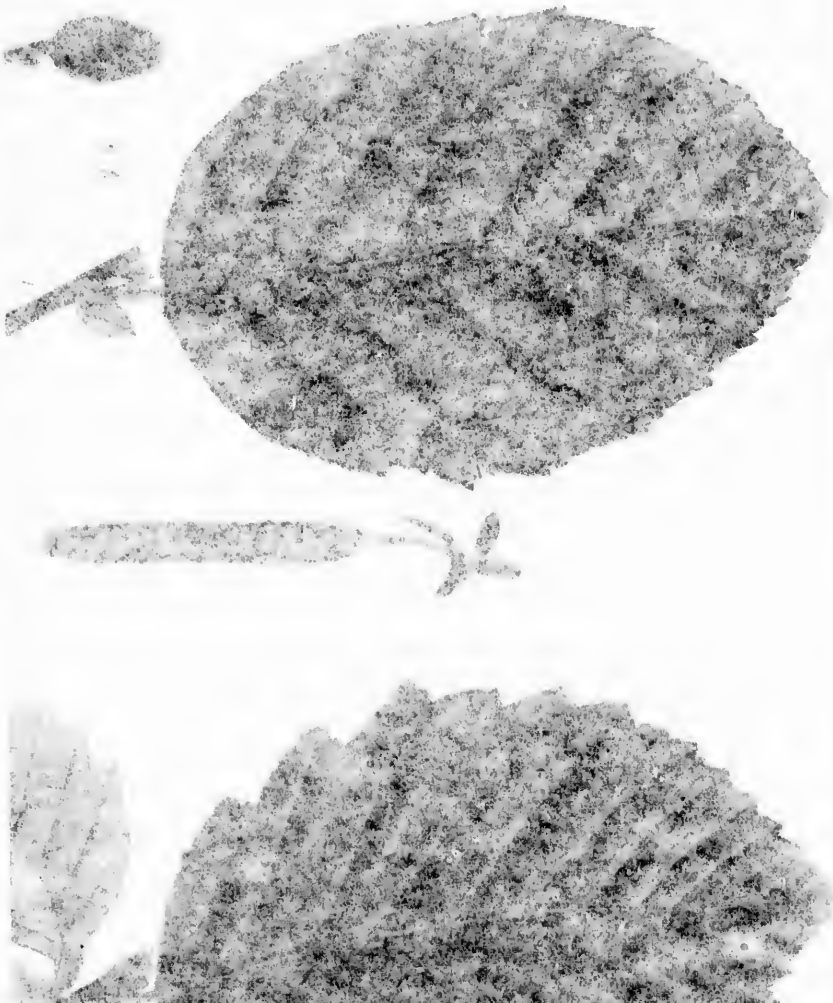

Common Alder
Alnus vulgaris

Black Alder
Alnus glutinosa

COMMON EUROPEAN ALDER.

ALNUS GLUTINOSA. *A. foliis subrotundo-cuneatis, obtusis, subretusis, glutinosis; axillis venarum subtus villosis.*

THE Common European Alder bears so great a resemblance to the Common American Alder, in its flowers, its seeds, its leaves, its wood and its bark, as to render a separate figure unnecessary: the only difference observable between them is that the European species is larger and has smaller leaves.

The Common European Alder is a fine tree of more than 50 feet in height: its trunk is generally straight, tapering gradually from the base to the summit, and garnished with numerous branches, tending rather to close round the stock, than to diffuse themselves widely; hence the Alder, like the Lombardy Poplar, grows in great numbers in a small space, without impediment from the proximity of the stocks.

The wood of this tree is fine-grained, compact, susceptible of a fine polish, and not destitute of strength. When perfectly dry, it is light and easily wrought; hence it is in request with manufacturers of wooden ware. In France immense quantities of wooden shoes are made of it, which are seasoned by fire before they are sold. The Alder takes a better black than any other wood, and when polished and varnished it affords a good imitation of Ebony. With sulphate of iron, the bark forms a black dye for coloring wool, and, as it is procured at a very low price, it is extensively substituted for gall nuts by hatters and dyers. The wood of the Alder, when deeply buried in earth that is constantly humid, is found to endure a great length of time; it is therefore used for the pipes of conduits. In Flanders and Holland, it serves for the piles upon which buildings are erected in marshy places.

In France, England and Germany, the Alder is considered as a valuable tree, on account of its rapid growth in wet grounds. It is frequently observed on the sides of streams flowing through meadows, and, as its roots penetrate to a great distance, it contributes more effectually than most other trees to support the banks at the season of the overflowing of the waters.

The European Alder shoots with such vigor, that copses formed of it may be cut every seven years, and at the end of eighteen years they furnish trees exceeding 35 feet in height, whose wood is far superior to that of the Lombardy Poplar. It is obtained from the seed, or from cuttings of a proper length, buried in very moist ground, except a few inches that appear

above the surface. The young plants should be cut the second year, to invigorate their roots. The seeds of the Alder are very small, and are in danger of perishing if they are not very lightly covered with earth.

This tree, to which so much importance is attached in Europe, will probably at a future period be considered as a valuable acquisition in America, especially in the States east of the river Hudson.

LOCUST.

Diadelphia decandria. Linn. Leguminosæ. Juss.

Robinia pseudo-acacia. *R. stipulis spinosis; foliis impari-pinnatis; racemis cernuis seu pendulis; calicis dentibus muticis.*

Obs. Flores albi.

One of the first trees introduced into Europe from the forests of North America, east of the Mississippi, was the Locust. For the acquisition of this tree, still more interesting for the excellent properties of its wood than for the beauty of its foliage and of its flowers, we are indebted to J. Robin, a French botanist, who received it from Canada, and cultivated it on a large scale, in the reign of Henry IV., about the year 1601. Since that period it has been so extensively propagated, that it has become universally known in France, England and Germany. To commemorate the introduction of so valuable a tree, and to express the acknowledgments due to the person who had conferred this benefit upon the Old Continent, Linnæus gave the genus to which it belongs the name of *Robinia*.

In the Atlantic States, the Locust begins to grow naturally in Pennsylvania, between Lancaster and Harrisburg, in the latitude of 40° 20′. West of the Mountains, it is found 2 or 3 degrees further north; which is explained by an observation already repeated, that, in proceeding toward the West, the climate becomes milder and the soil more fertile. But the Locust is most multiplied in the South-West, and abounds in all the valleys between the chains of the Alleghany Mountains, particularly in Limestone Valley. It is also common in all the Western States, and in the territory

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Brown del. Gabriel sculp.

Locust.

Robinia pseudo acacia.

comprised between the Ohio, the Illinois, the Lakes, and the Mississippi. It is not found in the States east of the river Delaware, nor does it grow spontaneously in the maritime parts of the Middle and Southern States, to the distance of from 50 to 100 miles from the sea, all the stocks that are seen in these parts having been planted at different periods.

The dimensions of the Locust vary with the soil and climate: thus in Pennsylvania, between Harrisburg and Carlisle, where it begins to appear, it is much smaller than in Virginia, and particularly in Kentucky and West Tennessee, which are situated 3 or 4 degrees further south, and where the soil is more fertile. In these States it sometimes exceeds 4 feet in diameter, and 70 or 80 feet in height; which is twice the size it attains east of the Mountains.

The foliage of the Locust is light and agreeable to the eye. Each leaf is composed of opposite leaflets, 8, 10, 12, and sometimes more, in number, surmounted by an odd one. The leaflets are nearly sessile, oval, thin, of a fine texture, and of so smooth a surface that the dust is blown off from them as it alights. These leaves are rarely injured by insects.

The flowers are disposed in numerous pendulous bunches: they are perfectly white, and diffuse the most delicious odor. Their fine effect, heightened by the fresh tint of the light green foliage, renders the Locust one of the most admired in Europe among ornamental trees. In passing through Harrisburg, on the 4th of June, 1808, I saw the Locust in full bloom: it was in flower at the same season of the year 1812, at Paris, in the latitude of 48° 50′. To the flower succeeds a narrow, flat pod, about 3 inches long, containing 5 or 6 small seeds, which are commonly brown, and sometimes black.

On the trunk and large limbs of the old Locust, the bark is very thick and deeply furrowed. The young tree, till it attains the diameter of 2 or 3 inches, is armed with formidable thorns, which disappear in its maturer age. The wood, which is commonly of a greenish yellow color, marked with brown veins, is hard, compact, and susceptible of a bright polish; it has a good deal of strength, with but little elasticity. Its principal value in the United States, where the greater part of the houses and of the fences of cultivated grounds are of wood, is its power of resisting decay longer than almost any other species of wood.

Though the Locust is multiplied east of the Mountains, in the upper part of Virginia and of the two Carolinas, it forms a much smaller proportion of the forests than the Oaks and Walnuts, and is nowhere found occupying exclusively tracts even of a few acres. For this reason it is the only tree, besides the Black Walnut, that is left standing in the clearing of new lands: hence these two species, which are not sufficiently multiplied to supply the demand for their wood, are frequently seen growing in the midst of cultivated fields.

The greatest consumption of Locust wood is for posts, which are preferred for enclosing court-yards, gardens and farms, in the districts where the tree abounds, and in the circumjacent country. They are transported for the same use to Lancaster, Baltimore, Washington, Alexandria, and the vicinity. When the trees are felled in the winter, while the circulation of the sap is suspended, and the posts allowed to become perfectly dry before they are set, they are estimated to last 40 years. Experience has shown that their duration varies according to certain differences in the trees from which they are formed: thus about Lancaster and at Harrisburg, a town on the Susquehanna, where a considerable trade is carried on in wood that is brought down the river, those trees are reputed the best whose heart is red; the next in esteem are those with a greenish yellow heart; and the least valuable are those with a white heart. From this variety in the color of the wood, which probably arises from a difference of soil, are derived the names of Red, Green and White Locust. In the Western States, there is a variety which is sometimes called Black Locust.

Great quantities of Locust posts are sold at Harrisburg; they are 7 or 8 feet long and the price is 18 cents each in the rough state, or 25 cents when hewn and mortised. They are made from stocks less than a foot in diameter, split into two pieces. I have remarked that when the trunk of the Locust exceeds 15 inches in diameter it is frequently decayed at the heart; but I presume this defect is not found in trees that grow further south. Posts of Locust and of Red Cedar of the same dimensions are sold in the lumber-yards of Baltimore; those of Locust at 40 cents, and those of Red Cedar at 30. This difference is probably attributable to the great strength of the Locust. In the Western States also, where this tree is larger and more abundant than in the country east of the Mountains, it is the most esteemed and the most generally employed for posts.

In naval architecture, the ship-wrights use as much Locust wood as they can procure. It is as durable as the Live Oak and the Red Cedar, with the advantage of being stronger than the one and lighter than the other. It enters, with the Live Oak, the White Oak and the Red Cedar, into the upper and lower parts of the frame, though in a very small proportion; for in the interior of Pennsylvania, Maryland and Virginia, where, as I have observed, it grows naturally and whence it is procured, nine-tenths of the Locusts do not exceed a foot in diameter, and from 36 to 40 feet in height: it thus becomes difficult to procure timber of the requisite size. Another very important use of the Locust in ship-building is for the treenails, or the pins destined to attach the *side planks* to the frame. Instead of decaying, they acquire with time an extreme hardness, and they are used, to the exclusion of all others, in the ports of the Middle States. The mean price at Philadelphia, whither they are brought from the river Susquehanna, is

$10 a thousand. From fifty to a hundred thousand of these pins are annually exported to England.

In the construction of houses, even of such as are wholly of wood the Locust is not extensively employed in the countries where it is most multiplied: the use to which it is more particularly applied is to support the *sills* or the beams on which the frame reposes. These sills are of Oak, and if they were placed immediately on the ground, they would decay more rapidly than the Locust. This invaluable property of durability, which is possessed by the Locust in a degree far superior to that of any other tree except the Red Mulberry, sufficiently indicates the purposes to which it may be advantageously applied: but in the United States its use is limited to the objects which I have enumerated, and it is through mistake that it has been said to be employed for staves and hoops, and for forming hedges.

From the hardness of the Locust wood when seasoned, and the fineness of its grain and its lustre when polished, it has been, for several years, extensively substituted by turners for the Box in many species of light work, such as salt-cellars, sugar-bowls, candlesticks, spoons and forks for salad, boxes, and many other trifling objects which are carefully wrought into pleasing shapes, and are sold at low prices.

The rapid growth of the Locust was early remarked by the inhabitants of the United States; for this is an inestimable quality in a tree whose wood unites so many excellencies. This consideration has induced many persons to plant it in those parts of the country where it does not naturally grow, particularly in the lower part of the States lying east of the river Delaware. Thus between New York and Boston, a distance of nearly 300 miles, it is seen at intervals growing before the farm-houses, and sometimes by the side of fences: but perhaps not one proprietor in a hundred has adopted this useful measure. On Long Island, near the west end of which lies the city of New York, the forests were in a great measure destroyed in the war of Independence, and many persons have successfully adopted the culivation of the Locust on an extensive scale; but these plantations are still very much circumscribed, and, except the larger trees which are cut into tree-nails, and which serve to supply in part the demand of the shipwrights of New York, the whole growth is consumed by the cultivators. Regular plantations of Locust, of 20 or 30 acres, have not been formed in any part of the United States, though several agricultural societies have offered premiums for their encouragement.

Within eighteen or twenty years an obstacle has unhappily appeared, which will contribute greatly to prevent the multiplication of the Locust in all the anciently settled parts of the United States: this is a winged insect which attacks the living tree, penetrates through the bark into the centre of the trunk, and, for the space of a foot, mines it in every direc-

tion, so that it is easily broken by the wind. This inconvenience is already so serious as to induce many people to forego all attempts to form plantations of Locust. In Virginia, I have not learned that trees of the natural growth have been visited by this destroyer, but those that have been reared about the plantations have already felt its ravages. This evil, which it appears difficult to remedy, will be more sensibly felt when the destruction of the forests now on foot, an inevitable consequence of the increase of population and of the neglect of all measures of preservation, shall force the inhabitants to have recourse to plantations, which they will wish to form in a certain proportion of the Locust. Hence it may result that, disappearing successively from the American forests by constant consumption, and not being reproduced on account of this insect, the Locusts will become extremely rare in their native country, and abundant in Europe, where no similar catastrophe forbids their propagation.*

Though I have asserted that I have seen Locusts in America 70 or 80 feet high, it must be observed that this luxuriant growth is confined to the most fertile districts of Kentucky and West Tennessee, where the newly cleared lands yield for several years in succession, without manure, from 30 to 60 bushels of Maize or Indian corn, to the acre. In general, this tree does not exceed 40 or 45 feet in height on lands of middling quality, that produce the Oaks and the Hickories, compared with which the Locust is a tree only of secondary size, affording timber of inconsiderable dimensions. For this reason it should not be substituted for the Oak, the Beech, the Chesnut and the Elm, in soils where these species already flourish.

In Europe, the greatest share of attention has been bestowed upon the Locust, and the most extended observations have been published on its culture in countries lying north of the 48° of latitude: but notwithstanding the success which is said to have been obtained in cultivating it, I cannot think that this is its proper climate. I have observed, as well as many other persons, that its vegetation is accelerated by the warmth of a more southern sun: the effect is visible even at Orleans, where, though the difference of latitude is only one degree, the Locusts are larger than in the

* [The following important information is taken from Emerson's "Trees and Shrubs of Massachusetts, p. 463:

"The practice of planting this tree by road-sides, and along the enclosures of pasture lands, has much increased of late years, but has been checked by the fact that, in such situations, it is exposed to the inroads of an insect, whose worm penetrates to the heart of the tree, and destroys its life. An unexpected remedy has, however, been suggested by the success of Joseph Cogswell, Esq., in the cultivation, some years ago, of a large plantation of the Locust. He found that when it forms a wood, those trees only are attacked by the worm, which form the outskirts, exposed to the sun and free air. Whether it is that the insect parent of the worm delights, as many do, in the sunlight, and avoids the shade of the woods, or from whatever cause, it was found that all the interior of the plantation was free from its attacks."

The great destruction by thoughtless sportsmen of the Woodpeckers, is probably the reason why the Locusts are now infested with worms more than formerly.]

vicinity of Paris. Italy and the southern departments of France are the countries of Europe where the greatest advantages may be expected from the rapid growth of the Locust. Individuals, who are more in haste than governments to realise their gains, may obtain from it, at the end of 20 or 25 years, a mass of wood twice as great as from any other species of tree: and it might be formed in this country, as in America, into tree-nails, for the purposes of ship-building, and sold at a high price in the sea-ports. Raised upon uncultivated and open grounds, the quality of the wood would be superior to that of trees growing in the primitive forests of the New World, where it is injured by the humidity of the atmosphere.

It appears from the authors who at different periods have written on the Locusts, that about a hundred years since it was in great request in Europe on account of the beauty of its foliage and of its fragrant flowers. It was afterwards found to have defects, and declined so far in public favor, that during half a century it fell into entire neglect. Within 10 or 15 years, several agriculturists have given it fresh celebrity, by representing it as a useful rather than an ornamental tree; though its merit in this last respect is undeniable.

In France, and still more in Germany, much has been published in favor of the Locust, and very little has been written against it; but the greater part of those who are engaged in forming plantations oppose its propagation. It appears to have been too much praised on the one hand, and too much decried on the other, and not to have been justly appreciated in those respects in which it has an incontestable superiority over most other trees of the temperate zones.

If I may be allowed to give an opinion, I should say that its principal advantages consist in the rapidity of its growth, and in the excellent qualities by which its wood is fitted for the most important uses. To these must be added another property by which it is distinguished from other trees of rapid growth, and which has not been placed in a sufficiently striking light by the authors who have treated of the Locust: it is that of beginning from the third year to convert its sap into perfect wood; which is not done by the Oak, the Chesnut, the Beech and the Elm, till after the 10th or the 15th year. Hence, if all these species were planted at the same time upon good land, in 25 or 30 years the Locusts, already one third larger in general than the others, and often twice as large, would be found almost wholly composed of heart, and would be of sufficient dimensions for the various uses to which their wood is adapted; while the others, besides being too small at this age to be employed with advantage, would have only half the diameter of the trunk converted into perfect wood. This is a most important consideration, for it is well known that every species of wood must be deprived of the sap before it is used, as this part is subject to become worm-eaten if it is sheltered, and to decay if it is exposed to the air.

But these prominent excellencies are balanced by defects which seem difficult to remedy. When standing alone, the branches of the Locust are easily broken by the wind: if left to itself, its trunk, after attaining a certain height, rarely preserves its shape; and the limbs, ill arranged, of unequal size and very divergent, give to its summit an uncouth and disagreeable form. Its thin and restless foliage yield also a scanty shade: hence this tree is not proper for the avenues and alleys of extensive gardens, nor for bordering public roads: for these purposes the Elm is infinitely superior; for besides the facility with which it is fashioned by the pruning-hook, its tufted foliage casts a denser shade, and its wood is of great value to the wheel-wright.

It is observed also that in plantations of Locusts whose verdure announces the most vigorous vegetation, there are some trees which languish and turn yellow; the cause of this malady it is difficult to assign.

For several years past, the proprietors of the department of the Gironde and of the neighbouring country, have taken advantage of the rapid growth of the Locust by cultivating it in copses, which are cut at the age of four years. The young stocks are then large enough to be split into props for vines, which are found to last more than 20 years. Old trees are also lopped, and the suckers cut every third year for the same purposes. This vigorous vegetation is doubtless attributable to the warmth of the climate.

The greatest inconvenience attending these copses is the thorns with which the young plants are armed, and by which their preparation for use is rendered more difficult and expensive than that of any other species. This disadvantage, however, is compensated by a double product obtained in half the time.

I must not omit to mention a new variety of Locusts, called *Robinia pseudo-acacia spectabilis* which in its early age is entirely destitute of thorns. This valuable variety is distinguished by the superior size of its leaves, and by the greater rapidity of its growth. Though its seeds produce stocks with thorns, it is still probable that they will disappear from the future generations of the tree: in the meanwhile, it may be multiplied by layers, or by forming small trenches in which the roots will send up shoots that may be afterwards separated from the parent tree.

I need not say how much this variety is preferable for copses; the twigs, with their leaves, may also be safely given to cattle, who eat them with avidity. For the production of this variety, which gives a new value to the Locust, particularly in the south of France, we are indebted to Mr. Descemet, a gentleman distinguished by his theoretical and practical knowledge of agriculture.

It has been asserted that the most profitable manner of disposing of poor lands, too much exhausted to produce the Oak and other species of hard

wood, is to cover them with copses of Locust; but about Paris, and further north, the experiment has not uniformly succeeded. During three or four years, the Locusts surpass the Birches planted at the same time, and give the most flattering promise; but by the seventh or eighth year their voracious roots appear to exhaust the soil, the branches about the middle of the young tree perish, and its short and languishing shoots announce its decay; while, on the other hand, the young Birches continue healthful and vigorous, and some of them already equal the Locust in height. Perhaps the Locusts require lopping the third or fourth year.

Such is the fruit of my enquiries concerning this tree in America, and my observation of its culture in Europe. Its propagation is attended with advantages and disadvantages: on weighing them together, I am of opinion that, as an ornamental and as a useful tree, it merits a place, particularly the variety without thorns, both in gardens and plantations.

PLATE LXXVI.

A branch with a bunch of flowers. Fig. 1, *A pod. Fig.* 2, *A seed.*

[Few trees are less injurious to pastures, and its droppings and flowers are thought to have a favourable effect on the growth of grass. Its bright and velvety foliage, it has been remarked, is too smooth to retain the dust, and is often seen bright and clean, on the side of a dusty road. Where resistance to a strain is required, the Locust is considered superior to any other wood. As an ornamental tree, it is not now much employed in this region, on account of its frailness and injuries from insects, but its pendant racemes of fragrant flowers must be admitted to be extremely beautiful.

Soil, propagation, &c. The Locust may be propagated by cuttings of the branches, but with greater facility by cuttings of the roots, and also by large truncheons, and by suckers, but the simplest and best mode is by seed; if not sown immediately on gathering, it should be kept in pods till the following spring: when sown in the autumn or spring it comes up the following summer, and the plants, at the end of the season will be fit for transplanting where they are finally to remain, or into nursery lines. Pouring hot water on the seeds, (and even boiling), as recommended by Cobbett, should be cautiously done.

The seeds should be sown in good free soil, rich rather than otherwise, and covered with light earth from a quarter to half an inch deep. In fine seasons the plants will be from 2 to 4 feet high by the ensuing autumn. The Locust will transplant at almost any age, and with fewer roots than almost any other tree. Though it grows on poor land better than almost any other species of hard wood, on such land sound timber of

Locust cannot be produced, and it will always be good economy to fell it within thirty or forty years, or at least, not allow it to grow for timber, to a great age. The various kinds of Pine are better adapted to the poorest soils.]

ROSE-FLOWERING LOCUST.

Robinia viscosa. *R. foliis impari pinnatis; ramis viscoso glandulosis.*

Obs. Flores rosco-albi.

This species of Locust is found only on that part of the Alleghanies which traverses Georgia and the Carolinas, and in the territory of the Cherokee Indians, situated west of the mountains. My father discovered it in the summer of 1790, and his subsequent researches, as well as my own, confirm the opinion that it does not exist north of the 35th degree of latitude, nor in all the lower part of the Southern States: thus it appears to be confined to a very small tract.

The Rose-flowering Locust is not as large as the preceding species: its ordinary stature does not exceed 40 feet, with a diameter of 10 or 12 inches. Its branches, like those of the Locust, are garnished with thorns, which, however, are smaller and less numerous. The annual shoots are of a dull red color, and are covered with a viscid, adhesive humor: M Vauquelin, of the French Institute, has analysed this substance, and found it to be a new vegetable matter.

The foliage of the Rose-flowering Locust is thick and of a dusky green. The leaves are 5 or 6 inches long, and are composed of opposite leaflets, 10, 12, or 14 in number, with a terminal odd one. The leaflets are about an inch in length, oval, nearly sessile, smooth, and of a fine texture.

The flowers are in oval bunches 4 or 5 inches long. They are numerous and of a beautiful rose color, but destitute of fragrance. This tree not unfrequently blooms twice in the year, and it forms one of the most brilliant ornaments of the park and the garden. The seeds are small and contained in hairy pods 2 or 3 inches long, and 3 or 4 lines broad.

Well-informed and unprejudiced cultivators, employed in the raising of exotic trees and plants, assure us that seeds of the Rose-flowering Locust,

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Rose flowering Locust.
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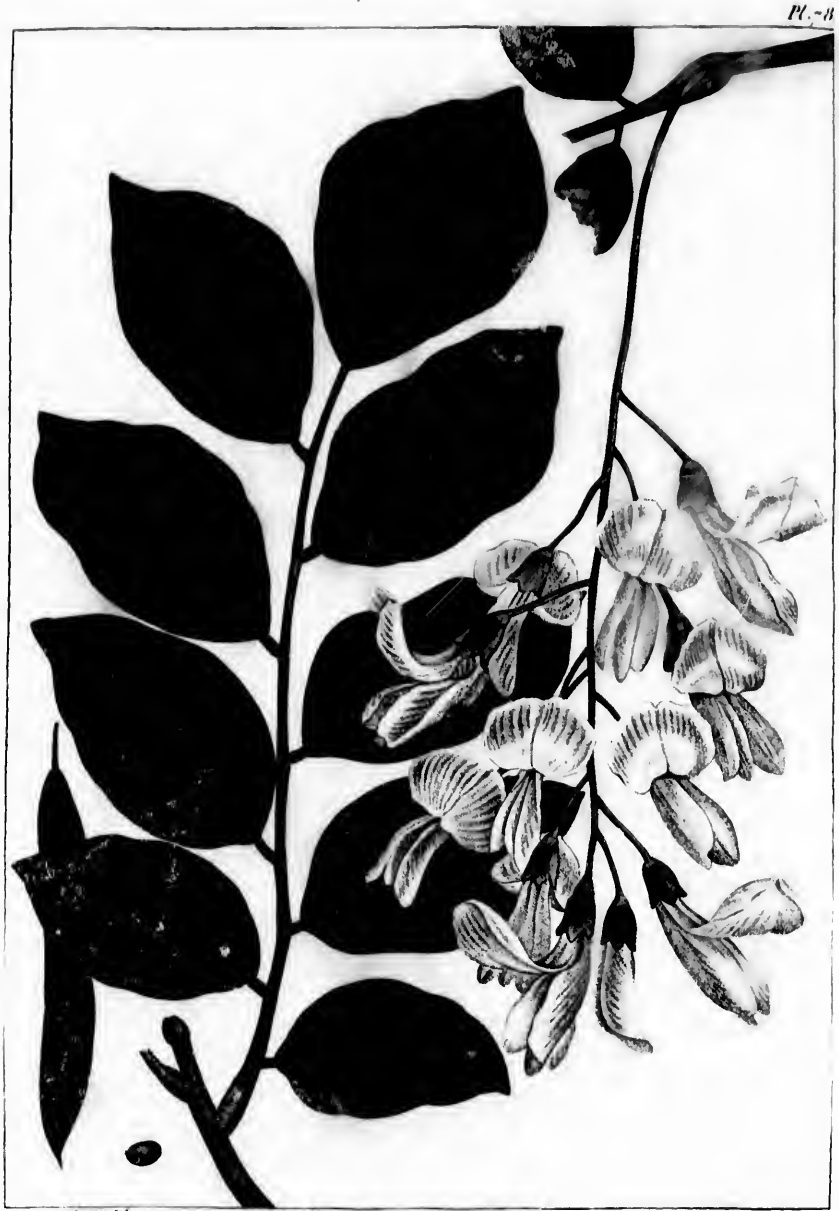

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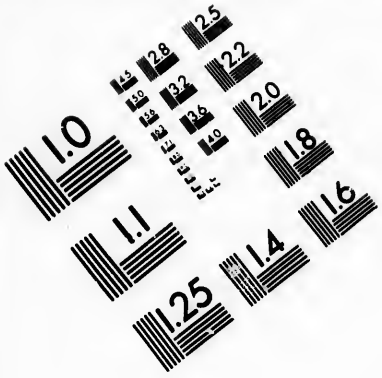
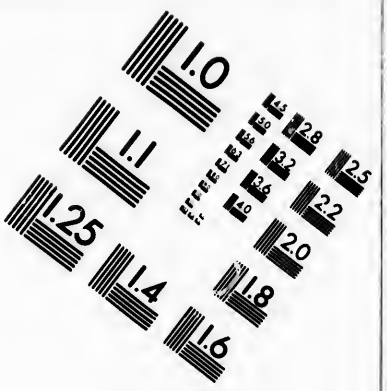
Yellow Wood.
Virgilia lutea.

Pl. 18

Gabriel sc.





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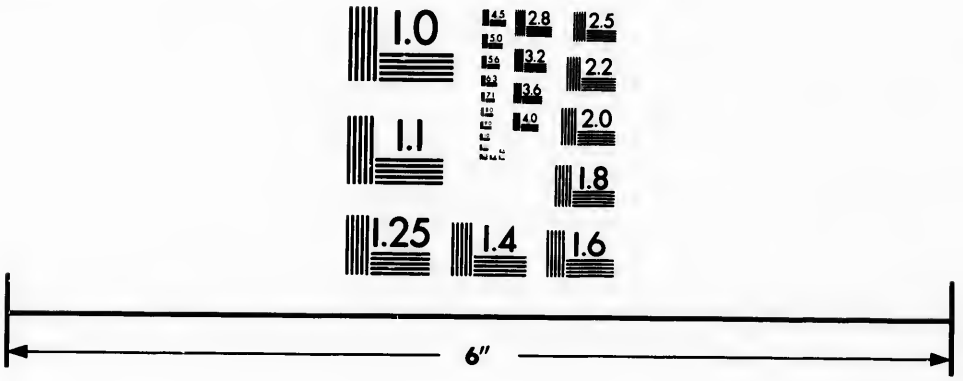

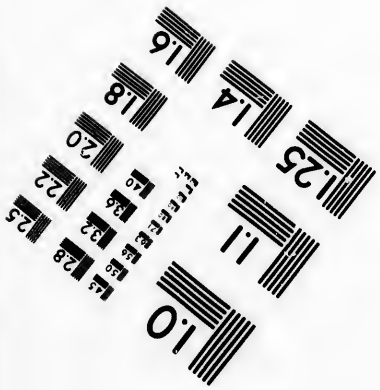

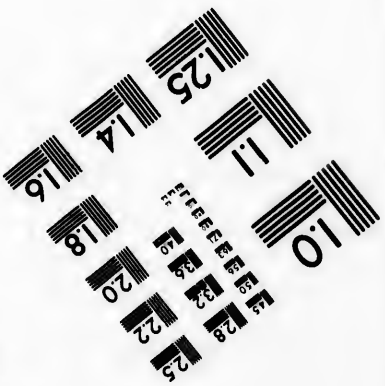

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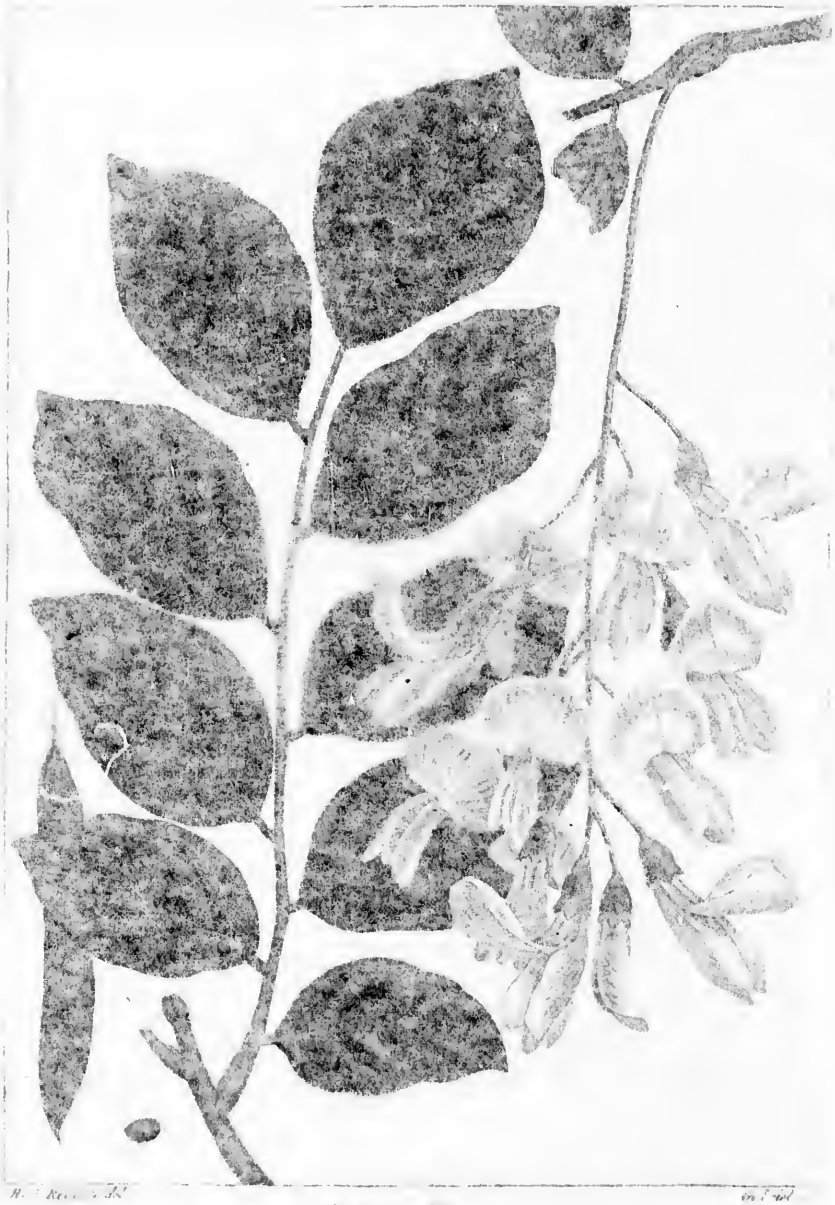

Yellow Wood.
Fagara flava.

which they have themselves collected and sown, have produced the Locust. The difference between the two species is however so distinctly characterized, that this metamorphosis is hardly credible.

The wood of the Rose-flowering Locust is of a greenish color, like that of the common species, which it resembles also in its other properties: but the inferior size of the tree, notwithstanding its surprisingly rapid growth, renders it less interesting to the arts.

This species easily supports the rigorous winters of New York and Pennsylvania, where it succeeds perfectly well; several stocks sent by my father to his friends residing in those capitals, bloom luxuriantly every year: but it is liable to the ravages of the same insect which destroys the Locust.

This beautiful tree was introduced into Europe in 1791: my father, who had transported it from the mountains to his garden near Charlestown, S. C., sent me a stock, which arrived in July of that year. I presented it to M. Lemonnier, chief physician of Lewis XVI., who planted it in his garden at *Petit Montreuil*, near Versailles, where it is still standing. From this stock are derived, by sprouts or by grafting, all the trees of the species which at present adorn the pleasure grounds throughout Europe.

PLATE LXXVII.

A branch with flowers of the natural size. Fig. 1, *A pod. Fig.* 2, *A seed.*

YELLOW WOOD.

VIRGILIA LUTEA. *V. foliis impari-pinnatis, foliolis ovato-acuminatis; racemis pendulis; gemmis inclusis.*

Obs. Flores albi.

THE Yellow Wood is confined to that part of West Tennessee which lies between the 35th and the 37th degrees of latitude, where it is commonly designated by the name which I have adopted.

This tree grows of preference on gentle declivities, in a loose, deep and fertile soil, and is usually accompanied by the Red Mulberry, Coffee Tree, Sweet Locust, Black Walnut, and other species whose presence evinces the richness of the land. It rarely exceeds 40 feet in height, and 1 foot in diameter, and in general it does not attain even these dimensions. Its trunk is covered with a greenish bark, which is smooth instead of being furrowed like that of most other trees.

The leaves of the Yellow Wood are 6 or 8 inches long on old trees, and of twice this size on young and thriving stocks. They are composed of two rows of leaflets, smooth, entire, nearly round and about an inch and a half in diameter. The leaflets are 3, 4 or 5 on each side, borne by short petioles, and surmounted by an odd one, which is supported by the common footstalk. As in the Buttonwood, the lower part of the footstalk contains the bud, which becomes visible on plucking the leaf.

The flowers form elegant, white, pendulous bunches, a little larger than those of the Locust, but less odoriferous.

The seeds of the Yellow Wood also nearly resemble those of the Locust, and are contained in pods that differ only in being a little narrower.* The seeds are ripe in the vicinity of Nashville about the 15th of August, at which season, in the year 1812, I collected a quantity and afterwards distributed them in France to nurserymen and amateurs of foreign plants. From these seeds have sprung the trees which we see growing with so much vigor in Europe, and mocking the rigor of our winters: several of them bloomed in the year 1813.

From the form and foliage of this tree, my father was of opinion that it belonged to the genus *Sophora:* the affinity is proved by the fact that it is grafted with success into that genus only. It was hastily ranged as a new genus, by the name of *Virgilia*, before its flowers had been examined; though without the inspection of this part of a vegetable no certain opinion can be formed of its affinities.

To procure the seeds from which have sprung the beautiful trees that are seen in the gardens of Paris, I felled several stocks, and thus had an opportunity of examining the quality of the wood. Its grain is fine and soft; it is principally remarkable for the yellow color of the heart, which speedily imparts this hue to cold water; but the color is fugitive even where the wood is boiled with alum. The inhabitants of the country were very desirous of finding some method of rendering it permanent.

Aside from the fine vegetation of the Yellow Wood, the brilliant color of its heart appears to me to be a sufficient motive for multiplying it till we become able to appreciate its importance in dyeing.

* [Gardeners and others should endeavor to procure seeds from this tree, which is destined to be one of the most popular, as it is one of the most ornamental of our native productions.]

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Gleditsia triacanthos.

Pl. 79.

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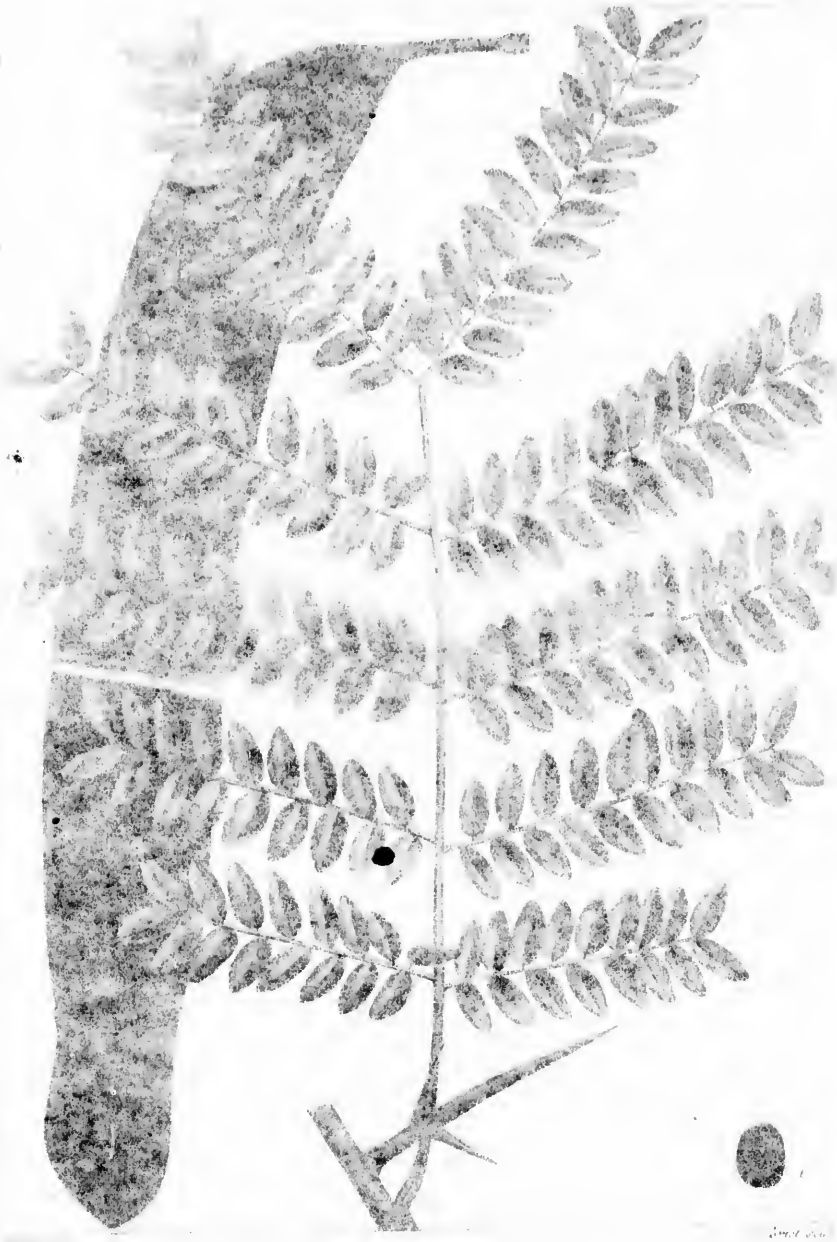

Sweet Locust

Gleditsia triacanthos

PLATE LXXVIII.

A leaf of half the natural size. A bunch of flowers of the natural size. Fig. 1, *A pod. Fig.* 2, *A seed.*

[The blossoms, foliage, and the smooth, greenish gray bark of this rare tree are all beautiful, and it deserves to be more extensively introduced. The wood is so brittle, that in removing specimens the limbs, unless carefully handled are liable to break. In the autumn, the beautiful yellow of the leaves of the Virgilia is unrivalled by any other tree. There is a very noble specimen in the grounds of Mrs. Price, near Germantown, Pa.; its height is 46 feet 8 inches, with a stem measuring 6 feet 7 inches in girth at the ground, and over four feet at six inches from the ground.

Torrey and Gray, to whose work I should more frequently refer if it were completed, have named this tree *Cladastrus tinctoria.*]

SWEET LOCUST.

Polygamia diœcia. Linn. Leguminosæ. Juss.

Gleditschia triacanthos. *G. ramis spinosis; spinis crassis; foliis lineari-oblongis; leguminibus longis, compressis, polyspermis.*

The Sweet Locust belongs peculiarly to the country west of the Alleghany Mountains, and it is scarcely found in any part of the Atlantic States, except in Limestone Valley and its branches, which lie between the first and second ranges of the Alleghanies, beginning near Harrisburg in Pennsylvania, in the latitude of 40° 42′, and extending from north-east to south-west into the State of Virginia. The soil in this valley is generally very substantial. In the fertile bottoms which are watered by the rivers emptying into the Mississippi, in the Illinois country, and, still more, in the southern part of Kentucky and Tennessee, the Sweet Locust is abundant. It commonly grows with the Black Walnut, Shell-bark Hickory, Red Elm, Blue Ash, Locust, Box Elder and Coffee Tree, and forms a part of the forests that cover the most fertile soils. In different parts of the United

States, this species is called indifferently Sweet Locust and Honey Locust; the French of Illinois call it *Févier*.

In situations most favorable to its growth, such as I have observed on the banks of the Ohio, between Gallipolis and Limestone, the Sweet Locust attains a very ample size. I have measured several stocks which were 3 or 4 feet in diameter, and which appeared to equal in height the loftiest trees of these time-honored forests. Some of them had the trunk undivided for 40 feet.

The Sweet Locust is easily known by its bark, which, at intervals of a few inches, detaches itself laterally in plates 3 or 4 inches wide and 2 or 3 lines thick, and by the form of its trunk, which appears to be twisted, and presents three or four crevices of inconsiderable depth, opening irregularly from the bottom toward the top. The large thorns which cover the branches, and frequently the trunk of young trees, afford another very distinct character. These thorns are sometimes several inches long, ligneous, of a reddish color, and armed, at some distance from the base, with two secondary thorns about half the size of the first.

The leaves of the Sweet Locust are pinnated and composed of small, oval, serrate, sessile leaflets. This foliage is elegant and of an agreeable tint; but it is thin, and scarcely obstructs the passage of the sun-beams. It is shed annually at the approach of winter.

The flowers are small, not very conspicuous, and disposed in bunches. The fruit is in the form of flat, crooked, pendulous pods, from 12 to 18 inches long, and of a reddish brown color. The pods contain brown, smooth, hard seeds, enveloped in a pulpy substance, which, for a month after their maturity, is very sweet, and which then becomes extremely sour. Beer is sometimes made by fermenting this pulp while fresh; but the practice is not general, as the Apple and Peach Tree, particularly the last, have become common in the Western Country, and afford a much superior beverage.

The perfect wood or heart of the Sweet Locust nearly resembles that of the Locust, but its grain is coarser, and its pores more open: in these respects it is more strikingly characterized even than the wood of the Red Oak. When perfectly seasoned it is extremely hard. It is little esteemed in Kentucky, where it is more employed, and consequently can be better appreciated than elsewhere. It is used neither by the carpenter nor the wheel-wright: it is sometimes taken by the farmers for rails to fence their fields, but only when they are unable to procure better wood. It is found by experience to be far inferior to the Wild Cherry and Black Walnut for cabinet-making. The only destination for which it appears to be peculiarly adapted is the forming of hedges, which its long thorns would render impenetrable.

The Sweet Locust has been cultivated for many years in Europe. It

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Bessa del. Gabriel sculp

Water locust.

Gleditsia monosperma.

Gabriel sculp

Water locust

flourishes, blooms, and yields seed in the climates of London and Paris; but its vegetation is less active than in the south of France.

PLATE LXXIX.

A branch with leaves and a thorn of the natural size. Fig. 1, *A pod of the natural size. Fig.* 2, *A seed.*

WATER LOCUST.

GLEDITSCHIA MONOSPERMA. *G. ramis subspinosis; foliolis ovato-oblongis; leguminibus ovalibus, mucronatis, monospermis.*

THIS species is plainly distinct from the preceding, especially in the form of its fruit, and belongs to a more southern climate; in the Atlantic States it is first seen in the lower part of South Carolina. The point at which it is found nearest to Charleston is about two miles beyond Slanbridge, at the distance of 32 miles. In South Carolina, as well as in Georgia and East Florida, where I have myself observed it, this tree, though not very rare, is not common, and the traveller sometimes loses sight of it for whole days, in tracts that seem peculiarly favourable to its growth. In the Western Country it is found three or four degrees further north, near Kaskaskias in the Illinois Country.

In the southern and maritime part of the United States, this tree is designated by no other name than that of Water Locust, and grows only in the large swamps that border the rivers, where the soil is constantly wet and often inundated at the season of the rising of the waters. It is commonly associated with the Cypress, Large Tupelo, Red-flowering Maple, Overcup Oak, Plane Tree, and Nutmeg Hickory. It is probably found, also, united with the same trees, in the impenetrable forests which cover the swamps on the banks of the Mississippi.

The Water Locust is 50 or 60 feet high, and from 1 to 2 feet in diameter. The bark upon the trunk of the young trees is smooth; on old stocks it is cracked, but less deeply than that of the Oaks and the Walnuts. The branches, like those of the Sweet Locust, are armed with thorns, which

are less numerous, smaller, and more pointed; they are often simple, or accompanied near the base with a single secondary thorn.

The leaves nearly resemble those of the Sweet Locust, from which they differ in being a little smaller in all their proportions.

The flowers, which are not conspicuous, are of a greenish color and destitute of odor. The pods are ripe at the beginning of November. They are reddish, about an inch in diameter, and united in bunches of 3 or 4, each of which contains a single naked seed.

The wood of the Water Locust resembles that of the Sweet Locust in its loose texture and yellow color; but as it grows in wet grounds, it is consequently inferior in quality. In Carolina and Georgia it is wholly neglected in use.

I believe there exists in the Western States another species of Prickly Locust, whose pods are narrow and only 4 inches in length; but my information is not sufficiently accurate to allow me to describe it.

PLATE LXXX.

A branch with leaves and a thorn of the natural size. Fig. 1, *A pod of the natural size. Fig.* 2, *A seed.*

[We are accustomed to consider some of the forest trees of this country —the Sycamores of the Ohio, or the giant Pines of Oregon, as at least respectable specimens of size and longevity, but they seem saplings of yesterday, when compared with some of the enormous leguminous trees of the forests of Brazil. Dr. Martius, a careful and accurate scientific traveller, speaking of Locust trees in South America, represents a scene in Brazil, where some trees of this kind occur of such enormous dimensions, that fifteen Indians with outstretched arms, could only just embrace one of them. At the bottom they were 84 feet in circumference, and 60 feet where the trunks became cylindrical. By counting the concentric rings of such parts as were accessible, he arrived at the conclusion that they were of the age of Homer, and 332 years old in the age of Pythagoras; he argues that the trees cannot but date far beyond the time of our Saviour.]

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Gabriel sculp.

Sassafras

SASSAFRAS.

Enneandria monogynia. Linn. Laurineæ. Juss.

Laurus sassafras. *L. foliis deciduis, integris trilobisque; floribus dioïcis.*

The Sassafras, on account of its medicinal virtues, was among the first trees of America which became known to the Europeans.

Monardes, in 1549, and after him, Clusius, who have written on the foreign vegetables employed in medicine, treat at length of the uses of its wood in certain diseases. Hernandes, in his History of the Plants of New Mexico, published in 1638, mentions the Sassafras among the trees of the province of Mechoacan; but I doubt whether it is as common in that part of North America as in the regions which lie east of the Mississippi.

In the United States, the neighborhood of Portsmouth in New Hampshire, in the latitude of 43°, may be assumed as one of the extreme points at which it is found toward the north-east: in the Western Country, it is met with one degree further north. But in these latitudes it is only a tall shrub, rarely exceeding 15 or 20 feet in height. A few degrees further south, in the neighborhood of New York and Philadelphia, it grows to the height of 40 or 50 feet, and attains a still loftier stature in some parts of Virginia, the Carolinas, and the Floridas, as well as in the Western States and in Upper and Lower Louisiana. It is abundant throughout these countries, except in the mountainous districts of the Alleghanies, by which they are divided, where it appears to be comparatively rare. In fine, from Boston to the banks of the Mississippi, and from the shores of the Ocean in Virginia to the remotest wilds of Upper Louisiana beyond the Missouri, comprising an extent in each direction of more than 1800 miles, the Sassafras is sufficiently multiplied to be ranked among the most common trees. It is seen growing on lands of every description, from the dry and gravelly to the moist and fertile, with the exception of such as are arid and sandy to excess, like the pine-barrens of the Southern States: neither is it found in the swamps that border the rivers by which these States are watered.

In the low, maritime parts of Virginia, of the two Carolinas and of Georgia, the Sassafras is observed to prefer plantations and soils which have been exhausted by cultivation and abandoned. The old trees give birth to hundreds of shoots, which spring from the earth at little distances, but which rarely rise higher than 6 or 8 feet. Though this tree is common on poor lands, and blooms and matures its seed at the height of 15 or 20 feet, yet it is never of very ample dimensions, except in fertile soils, such

as form the declivities which skirt the swamps, and sustain the luxuriant forests of Kentucky and West Tennessee.

The leaves are 4 or 5 inches in length, alternate, and petiolated. At their unfolding in the spring, they are downy and of a tender texture. They are of different shapes upon the same tree, being sometimes oval and entire, and sometimes divided into lobes which are generally 3 in number, and rounded at the summit. The lobed leaves are the most numerous and are situated on the upper part of the tree.

About New York and Philadelphia, the Sassafras is in full bloom in the beginning of May, and six weeks earlier in South Carolina. The flowers unfold themselves before the leaves, and appear in small clusters at the end of the last year's shoots. They are of a greenish yellow hue, and are but slightly odoriferous. In this species of Laurel the sexes are confined to different stocks. The fruit or seed is of an oval form and of a deep blue color, and is contained in small, bright red cups, supported by peduncles from 1 to 2 inches in length. These seeds, when ripe are eagerly devoured by the birds, and soon disappear from the tree.

The bark which covers the trunk of an old Sassafras is of a grayish color, and is chapped into deep cracks. On cutting into it, it exhibits a dark dull red, a good deal resembling the color of the Peruvian bark. The bark of the young branches and suckers is smooth and of a beautiful green color. The wood of this tree is not strong, and branches of considerable size may be broken with a slight effort. In the young tree the wood is white; in those which exceed 15 or 18 inches in diameter it is reddish and of a closer grain. It is not, however, in these respects to be compared with the Oak and the Hickory. Experience shows that this wood, stripped of its bark, resists for a considerable period the progress of decay; and it is on this account employed for the posts and rails of rural fence. It is also sometimes used in the country for joists and rafters in houses built of wood. I have been informed that it is secure from the attacks of worms; this advantage is attributed to its odor, which it preserves as long as it is sheltered from the sun and the rain. Bedsteads made of it are never infested by insects. But for these purposes the Sassafras wood is not in habitual use, and is only occasionally employed in this country: it is never seen exposed to sale in the lumber-yards of the large towns, and it appears incapable of ever becoming an article of great interest in the mechanical arts. For fuel, also, it is held in little esteem, and it is only in the cities of the Southern States, which are not, like those of the north, abundantly furnished with fuel, that it is brought into the market as wood of the third quality. Its bark contains a great deal of air, and snaps while burning like that of the Chesnut.

The medicinal properties of the Sassafras are so well proved, that during more than 200 years, since its first introduction into the materia medica, it

has maintained the reputation of an excellent sudorific, which may be advantageously employed in cutaneous affections, in chronic rheumatisms, and in syphilitic diseases of long standing. In the last case it is always joined with lignum vitæ and sarsaparilla. The wood is slightly aromatic, but the smell and taste which are peculiar to the vegetable are more sensible in the young branches, and incomparably more so in the bark of the roots; this part of the tree, therefore, should always be preferred, for the wood appears to me to contain but a small degree of the qualities assigned to it, and even this it loses after being long kept. From the thick and as it were sanguinolent bark of the roots, a large quantity of essential oil is extracted, which, like the other essential oils, after a long repose, deposits very beautiful crystals.

The flowers of the Sassafras when fresh have likewise a weak aromatic odor. A great number of people in the United States, in the country and even in the cities, consider them as stomachic and efficacious in purifying the blood; and, for this purpose, during a fortnight in the spring, they drink an infusion of them with a little sugar. They are carried to market in the cities, and sold at 7 or 8 cents a pint. To gather the flowers, the branches are lopped and often the whole tree is cut down: great havoc is in this way made of the species.

The dried leaves and the young branches of the Sassafras contain a mucilaginous principle nearly resembling that of the Ocra. In Louisiana the leaves are used by the inhabitants to thicken their pottage.

In Virginia, and in the more southern states, the country people make a beer by boiling the young shoots of the Sassafras in water, to which a certain quantity of melasses is added, and the whole is left to ferment: this beer is considered as a very salutary drink during the summer.

Such is the result of my observations on the Sassafras, a tree highly interesting from its uses in medicine. It is in my opinion, sufficiently valuable in this respect to merit propagation in Europe: in the south of France and in Italy it would undoubtedly thrive, since it succeeds in the climate of Paris and London.

PLATE LXXXI.

A branch with fruit and leaves of the natural size. Fig. 1, *Male flowers. Fig.* 2, *Female flowers.*

[As an ornamental tree the Sassafras has not taken the rank it deserves in America. The spray is long and irregular, forming a short angle with the branches, and curving upwards; when a group of three or four is formed,

their umbrella shaped united tops are very beautiful, and the spray divested of its summer garb will always be admired by those who have studied the subject.

Soil, propagation, &c. Any free soil, rather moist than dry, will suit this species. The seeds should be placed in a rot-heap, as they remain a year and sometimes two or three, before they come up. It is also propagated by cuttings of the root, or by suckers.

See Nuttall's Supplement, Vol. 1, p. 88.]

RED BAY.

LAURUS CAROLINIENSIS. *L. foliis perennantibus, ovato-acuminatis, subtùs subglaucis, baccis carruleis.*

THIS species of Laurel is first observed in the lower part of Virginia, and it continues to be seen uninterruptedly throughout the maritime districts of the Carolinas and of Georgia, in the two Floridas, and in Lower Louisiana. It is confined, as well as several other trees which I have described, precisely within the limits which I have assigned to the pine-barrens.

This tree is known only by the name of Red Bay. It is profusely multiplied, and, with the Sweet Bay, Tupelo, Red-flowering Maple, Water Oak, etc., it fills the branch-swamps which intersect the pine-barrens. It is seen on the skirts of the great swamps which border the rivers, and around the ponds covered with the Laurus æstivalis, Pond-bush, that are met with in the barrens. A cool and humid soil appears to be essential to its growth for it is never found in dry or sandy lands. It is also remarked that the further south it grows the more vigorous and beautiful is its vegetation: thus in the southern part of Georgia and in the Floridas, it is often 60 or 70 feet high and from 15 to 20 inches in diameter: dimensions which it more rarely attains in the Carolinas. Perhaps, also, as the Carolinas have been longer inhabited and are more fully peopled, the largest stocks have been felled for certain uses to which they are found perfectly adapted.

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H. J. Redouté del. Gabriel sculp.

Red bay.

Laurus carolinensis ?.

form: its trunk is generally crooked and divided into several thick limbs, at 8, 10 or 12 feet from the ground. It differs in this respect from the Loblolly Bay, the Sweet Gum, the Tupelo, and the Oaks, whose trunks are straight and of nearly an uniform size for 20 or 30 feet.

Upon old trunks the bark is thick and deeply furrowed; that of the young branches on the contrary, is smooth and of a beautiful green color. The leaves are about 6 inches long, alternate, oval-acuminate, whitish or glaucous on the lower surface, and ever-green. When bruised they diffuse a strong odor resembling that of the Sweet Bay, Laurus nobilis, and may be employed in cookery. The flowers are disposed in small, axillary bunches, springing between the leaf and the twig, and are supported by slightly downy peduncles. The fruit or seed is oval and very similar to that of the Sassafras. The seeds germinate with ease, and the old trees are surrounded by hundreds of young plants.

The wood of the Red Bay is of a beautiful rose color: it is strong, has a fine, compact grain, and is susceptible of a brilliant polish. Before Mahogany became the reigning fashion in cabinet-making, this wood was commonly employed in the Southern States, and afforded articles of furniture of the highest beauty. That it is no longer used, is attributable to the difficulty of finding trees of sufficient diameter, and to the facility of obtaining Mahogany, which is imported in large blocks from St. Domingo, at a moderate price.

It has lately been discovered that the Red Bay, like the Red Cedar, may be usefully employed in ship-building, as it unites the properties of strength and durability. In the southern part of Georgia and in East Florida, when stocks are met with of considerable dimensions, they are sent, in the form of square timber, to New York and Philadelphia with the Live Oak and the Red Cedar.

In fine, the Red Bay is a handsome tree, whose wood is elegant and of a superior quality, but which rarely attains such dimensions as to afford important resources to the arts; such, at least, appears to be the result of experience as far as it has gone.

PLATE LXXXII.

A branch with leaves and seeds of the natural size.

CAMPHOR TREE.

LAURUS CAMPHORA. *L. foliis ovatis, utrinque acuminatis, trinerviis, nitidis; petiolis laxis; fructibus atropurpureis.*

AMONG the vegetables of the Old Continent which possess a high degree of interest for the United States, the Camphor Tree holds an eminent place. It especially deserves attention from the inhabitants of the Floridas, of the lower part of the Carolinas, and of Lower Louisiana. Its multiplication in these climates would be so easy, that after a few years it might be abandoned to nature.

The Camphor Tree in its general character is nearly related to the Red Bay, so common throughout the regions which I have just mentioned: they are of the same height, are both ever-green, and so similar in appearance that at a little distance they are easily confounded.

The Camphor Tree grows in China, Japan and some other parts of the East Indies. It often exceeds 40 or 50 feet in height, with a proportional diameter. The leaves are supported by long petioles, and are alternate, shining on both sides, 2 or 3 inches long, an inch broad, and acuminate at both extremities, with distinct longitudinal ribs. The young branches are green.

The flowers, like those of the Red Bay, are diminutive, whitish, and united in small axillary bunches. The seeds resemble those of the Red Bay in size and form, but are of a dark purple color. The leaves, the bark, the wood and the roots are strongly impregnated with the odor of Camphor: from the roots especially, this substance, so useful in medicine, is extracted.

In China and Japan the unrefined Camphor is obtained in the following manner: the roots are cut into small pieces and boiled with water in large iron retorts, of which the cover is made of earth and provided with cords of rice-straw. When the ebullition commences, the Camphor rises with the vapor and attaches itself to these cords in the form of grayish dust, in which state it is brought to Europe. The greater part of the Camphor of commerce comes from the province of Sotsoanna, and from the Isles of Gotha.

Till within a few years, the Dutch have exclusively possessed the secret of refining the Camphor, and of bringing it into a state proper for medical use. But chemistry has made such rapid progress in France since the revolution, that this process, among others, has become known, and it is

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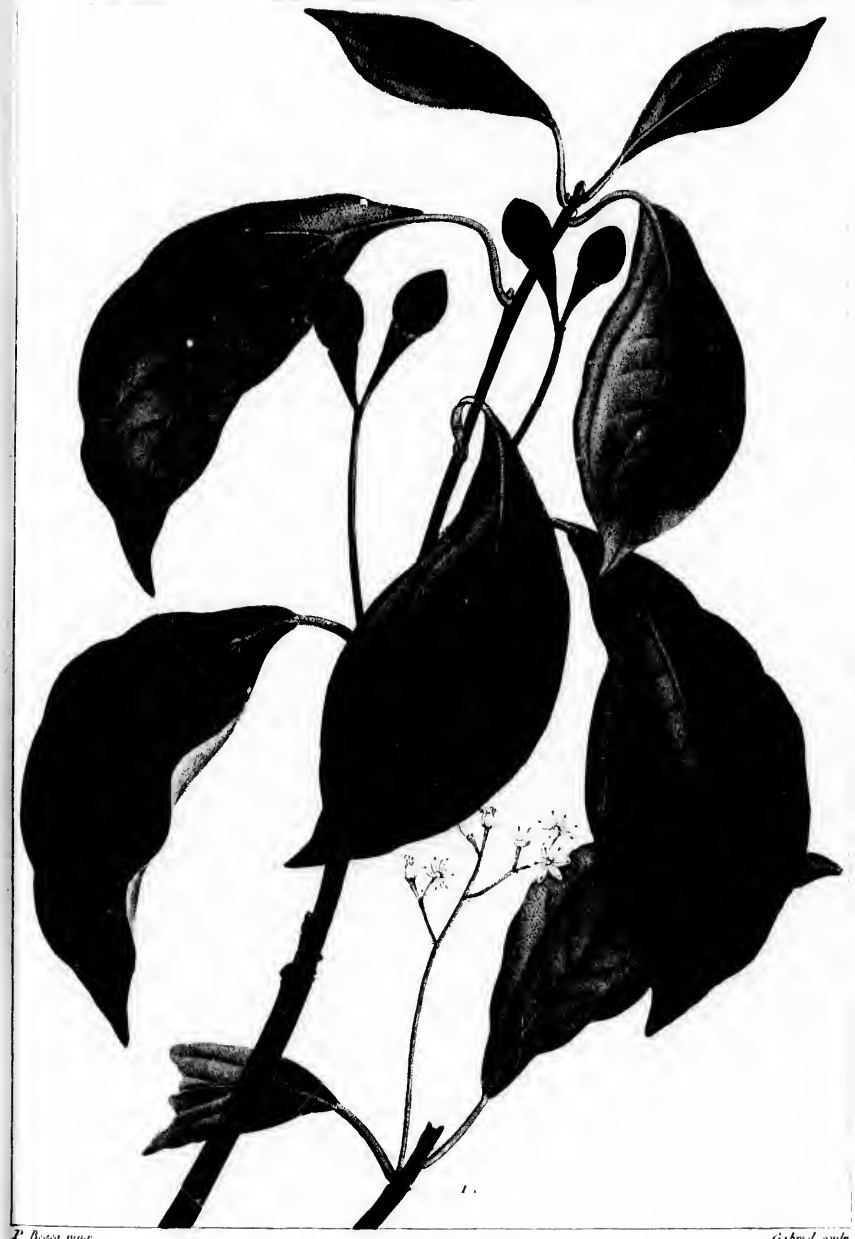

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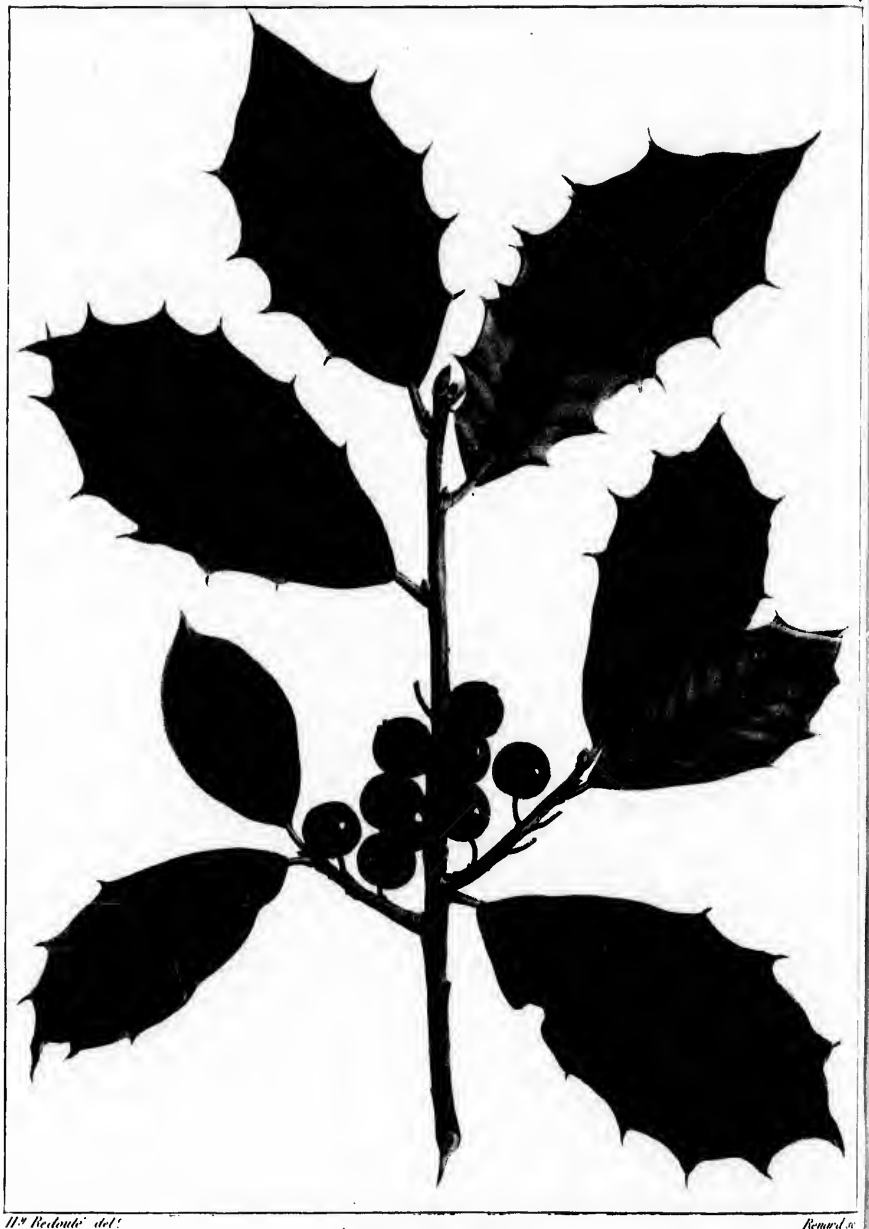
Camphire Tree.

Laurus camphora.



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American Holly.

Ilex opaca.

Pl. 8.

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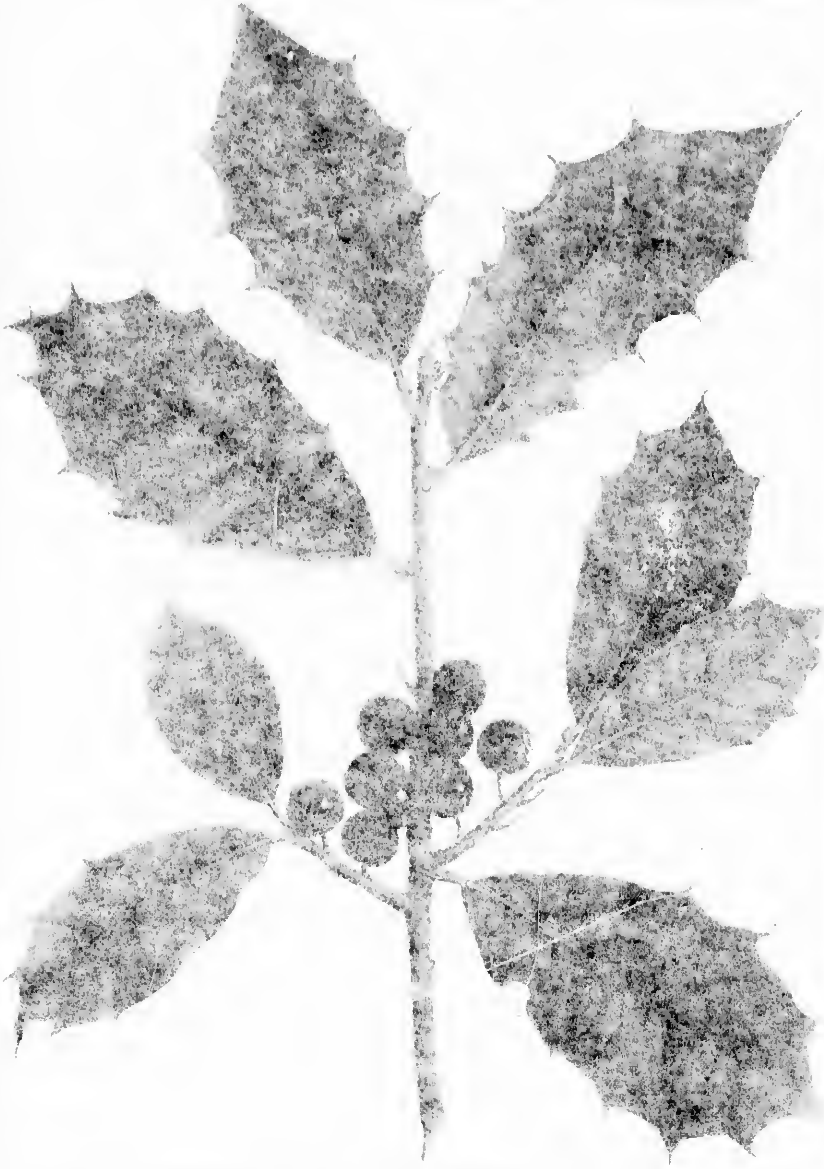

American Holly

Ilex opaca

now extensively practised in the laboratories of Paris.* We are informed, in general, that the distillation is effected without water in glass retorts, with the addition of one-sixteenth part of quick lime.

The Camphor thus refined is a whitish, transparent resin, highly volatile and inflammable, and of a very penetrating odor. It is so light that it floats upon water, and so inflammable that it may be entirely consumed upon the surface of that fluid.

Camphor is regarded as one of the most powerful remedies in the art of medicine: it is sedative, antiseptic, and diaphoretic; but it is considered as injurious in inflammatory complaints: the ablest physicians unite sulphate of potash or nitre with it as a corrective.

From its powerful antiseptic properties, it is frequently employed in the preservation of animal substances, and always forms a part of the composition destined to secure the skins of birds and quadrupeds from decay, in collections of natural history.

Another tree, which is also natural to the East Indies, and which, according to M. Corea de Serra, has a great affinity to the *Shorea robusta* of Dr. Roxburg, furnishes Camphor of an excellent quality. This substance is obtained likewise from certain plants of the class of *Labiæ*, such as Lavender and Mint, but not in sufficient quantities to form an article of commerce.

PLATE LXXXIII.

A branch with leaves and fruit of the natural size. Fig. 1, Flowers.

AMERICAN HOLLY.

Dicœcia tetrandria. Linn. Rhamnoidæ. Juss.

Ilex opaca. *I. foliis ovalibus, rigidè patulèque dentato-spinosis; fructibus ovoïdeis, rubris.*

Among the Hollies of North America, I shall confine myself to the

* [And of the United States.]

description of this single species, which sometimes grows to a great height, and of which the wood is employed in the arts. It is designated in all parts of the United States where it grows by the name of American Holly.

I am unable to mark the northern limit of this tree with as much precision as that of many others; but I believe it does not extend far beyond Long Island, though it is already common in Lower Jersey. It is found in all the more Southern States, in the Floridas, in Lower Louisiana, and in West Tennessee, but it is observed to become more rare in approaching the mountains. On the eastern shore of Maryland, and in certain parts of Virginia, for instance near Richmond, where it particularly abounds, it grows almost exclusively on open grounds and in dry and gravelly soils: while in South Carolina, Georgia and Lower Louisiana it is seen only in shady places, on the edges of swamps, where the soil is cool and fertile. Its vegetation in these situations is so vigorous that it equals 40 feet in height and 12 or 15 inches in diameter.

The American Holly, in its pyramidical shape and in its brilliant evergreen foliage, bears a striking resemblance to the European species, *Ilex aquifolium*. Its leaves present a slight difference, being less twisted, less acuminate, and of a lighter green. Its flowers are white and not conspicuous. They are succeeded by numerous red berries which remain long attached to the branches. Upon the trunk of old trees the bark is smooth and of a whitish gray color; on the young branches it is green and shining.

The wood of the American Holly is very similar to that of the European species; they are both very heavy and compact, with a white alburnum and brown heart. Its grain is fine and compact; hence it is very brilliant when polished. Its principal use is for inlaying Mahogany furniture: the black lines with which cabinet-makers sometimes adorn their work are of Holly dyed in the coppers of the hatter. As it turns well, it is chosen for light screws and for the small boxes in which apothecaries put their opiates. When perfectly dry, this wood is very hard and unyielding, hence it is excellently adapted for the pullies which are used in ships; but the Lignum Vitæ, which is cheap and easily procured from the West Indies, is preferred.

The best bird-lime employed in Europe is made of the Holly. The inner bark is pounded into a paste which is put into pots and left to ferment in the cellar. When the process has proceeded far enough, the paste is washed, to separate the ligneous fibres, and preserved in close vases with the addition of a little oil. This substance is green, soft, and very viscid. It is condensed by cold and softened by heat.

The attempt has been successfully made ofemploying the Holly for hedges, which are very dense and which have the recommendation of preserving their foliage through the year: but it is found in Europe that the Thorn and the Locust possess superior advantages; especially where it is

necessary, as in the United States, to enclose large tracts of arable land. The seeds of the Holly, of the Thorn, and of the Dogwood, do not spring before the second or third year; but I have been told that they may be caused to shoot the first year by the following very simple method. After gathering the seeds, which are ripe towards the close of autumn, they must be cleared of the pulpy envelope by rubbing them in water; they are afterwards slightly covered with earth in a box, and deposited during the winter in the cellar. Care must be taken to keep the earth moist by watering it from time to time, for the purpose of swelling the seeds. When the warm season commences, they are committed to the earth, in the spot where they are to remain. The berries of the Holly are purgative, and, taken to the number of 15 or 20, they excite vomiting; but there are so many remedies whose operation is better understood and more certain, that the best treatises on materia medica attach little importance to this vegetable.

My enquiries concerning the American Holly have not led me to an acquaintance with any property which should entitle it to a preference in Europe over our native species, *Ilex aquifolium*.

PLATE LXXXIV.

A branch with leaves and fruit of the natural size.

[*Soil, propagation, &c.* The Holly attains the largest size in a rich, sandy loam, but it will grow, and even thrive, on almost any soil, provided it is not overcharged with moisture; it succeeds better beneath the shade and drip of other trees than any other evergreen shrub or tree, except the Box. If young plants suffer from moving, cut them down close to the ground, and they will frequently recover.

In addition to the advice respecting the seeds given by Michaux, I would observe that a covering of half rotten leaves, or a litter of straw, placed over the seed beds, will protect the ground from extreme heat and drought, and will greatly facilitate the progress of germination, which is often attended, however, with disappointment. After remaining a year they may be placed in pots for a twelvemonth, previous to removal to their final place of growth.

Cleft-grafting does not succeed so well with the Holly as whip-grafting or budding. Cuttings made in autumn, of the ripened summer shoots, and planted in a sandy soil in a shady border, and covered with hand-glasses, will put forth roots in the following spring. When planted for a hedge, for which I strongly recommend it, the soil ought to be trenched to the depth of 3 or 4 feet, and filled up with good soil from the adjoining surface.

The permanence and beauty of a Holly hedge should stimulate the

gardener and amateur to overcome the difficulties which undoubtedly attend its propagation and transplantation.]

SOREL TREE.

Decandria monogynia. Linn. Ericeæ. Juss.

Andromeda arborea. *A. foliis oblongo-ovalibus, acuminatis, denticulatis; paniculis terminalibus; corollis subpubescentibus.*

Obs. Arbor altitudinem 50-60 pedum assequens.

This is the only species of *Andromeda* which rises to a sufficient height to be ranked among forest trees. It begins to appear on the Alleghanies in Virginia, and is found to their termination in Georgia. It grows also in the Southern States on the steep banks of the rivers that flow from the mountains; but it becomes more rare in following them from their source, whether eastward or westward, and ceases entirely in the maritime parts of the Carolinas and of Georgia.

I have nowhere seen the Sorel Tree of ampler dimensions than in the fertile valleys at the foot of the lofty mountains of North Carolina, particularly in those whose waters unite in the northern branch of the river Catawba, about 30 miles from Morgantown and 300 miles from Charleston. In these valleys I have measured Sorel Trees which were 50 feet high and 12 or 15 inches in diameter. This is an extraordinary size for a tree of this genus, which is very numerous in the Atlantic States, and three fourths of whose species, to the number of eight or ten, rarely exceed 6 feet in height and an inch in diameter. The growth of the Sorel Tree is observed to be stinted in dry and gravelly lands, so that it presents itself in the form of a bush: as I have particularly remarked about Knoxville, where it is most abundant.

The leaves of the Sorel Tree are downy in the spring, but they become smooth in acquiring their growth. They are alternate, oval-acuminate, finely denticulated, and from 4 to 5 inches long.

The flowers are small, white, and formed into spikes 5 or 6 inches long.

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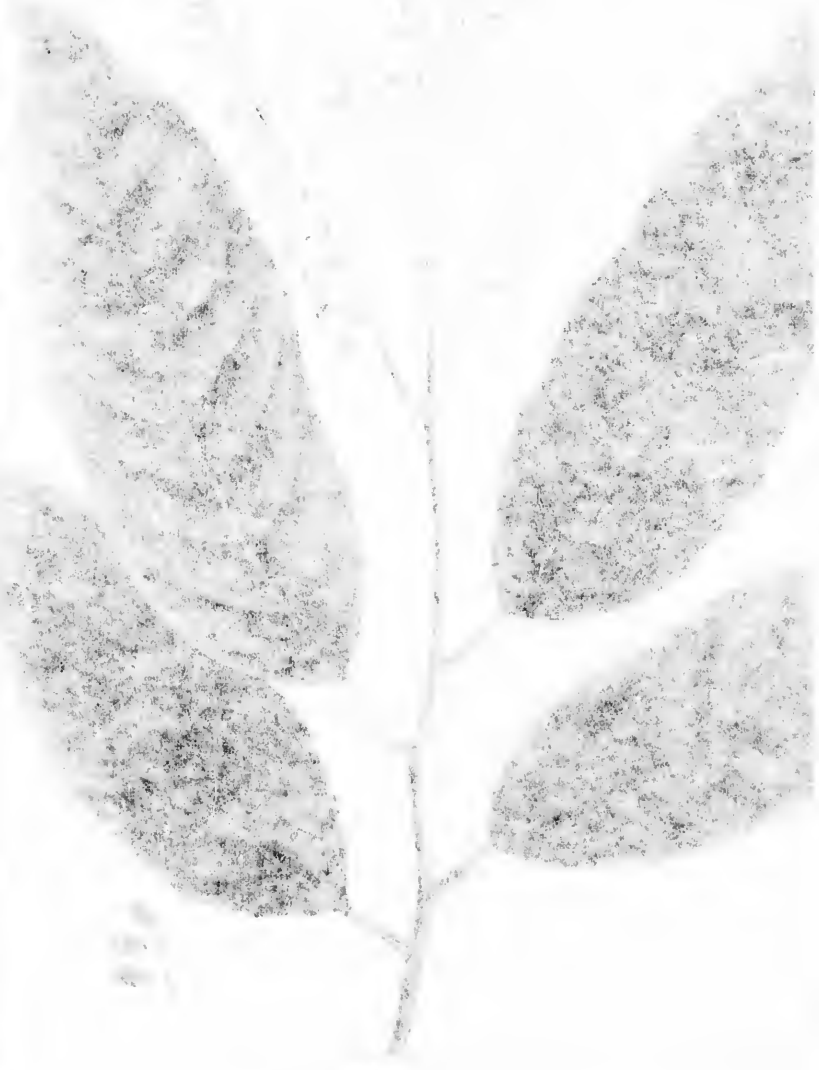

Bessa del. Gabriel sculp.

Sorel Tree.

Andromeda arborea.

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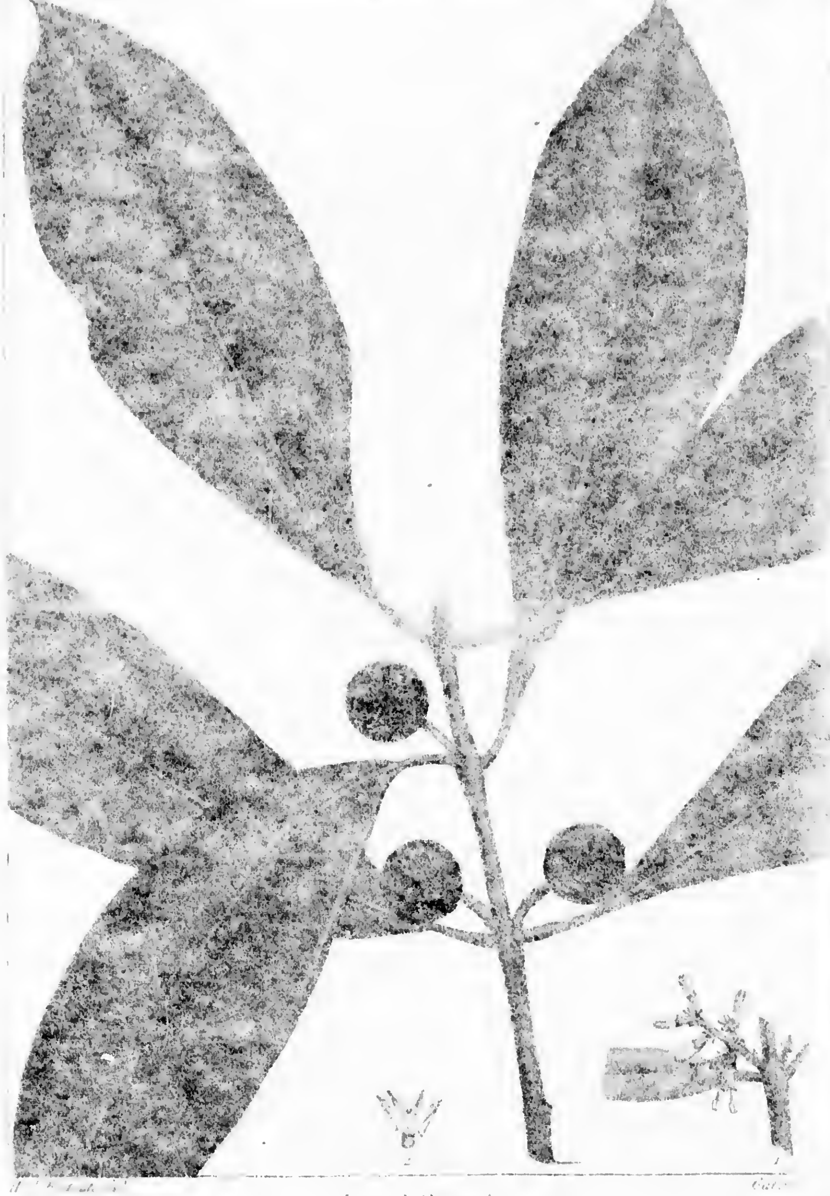
Devil Wood.

Olea americana.

Pl 86

Gabriel sculp



Devil Wood.

Olea americana

United in groups they have a fine effect, and render this tree very proper for the embellishment of gardens. The seeds are exceedingly minute, and are contained in small capsules.

On the trunk of the Sorel Tree the bark is thick and deeply furrowed. The wood is of a pale rose color and very soft. It burns with difficulty, and is wholly rejected in the arts.

From the acidity of the leaves is derived the appropriate name of Sorel Tree. In drying they become black, and when Sumac is not to be obtained, they are used to impart this color to wool.

The Sorel Tree endures an intenser degree of cold than that of its native climate. I have seen a stock 18 feet high flourishing at New York, where the winter is more severe than in any part of France or England. This fact should induce amateurs to multiply it on account of its beautiful flowers, which it begins to display at the height of 5 or 6 feet.

PLATE LXXXV.

A branch with leaves and flowers of the natural size. Fig. 1, *Capsules which contain the seed. Fig.* 2, *Seeds.*

DEVIL WOOD.

Diœcia diandria. LINN. Jasmineæ. JUSS.

OLEA AMERICANA. *O. foliis latè oblanceolatis, coriaceis, lucidis, integerrimis; drupa globosâ.*

THIS tree belongs exclusively to the Southern States, the Floridas and Lower Louisiana; toward the north it is not found beyond Norfolk in Virginia, and, like the Live Oak and the Cabbage Tree, is confined to the sea-shore, being rarely found even at a small distance within the country. It is so little multiplied, that it has hitherto received no name from the inhabitants of the country, except on the banks of the river Savannah, where it is called Devil Wood.

This tree grows in soils and exposures extremely different; on the sea-

shore, it springs with the Live Oak in the most barren and sultry spots, and in other places it is seen with the Big Laurel, the Umbrella Tree, the Sweet Leaves, etc., in cool, fertile and shaded situations.

This tree, or, to speak more accurately, this large shrub, is sometimes 30 or 40 feet high, and 10 or 12 inches in diameter: but this size is extraordinary; it commonly fructifies at the height of 8, 10, or 12 feet. The leaves are 4 or 5 inches long, opposite and lanceolate, entire at the edge, smooth and brilliant on the upper surface, and of an agreeable light green. They are ever-green, or at least are partially renewed only once in 4 or 5 years. The fertile and barren flowers are on separate trees: they are very small, strongly scented, of a pale yellow, and axillary, or situated between the petiole of the leaves and the branches. The season of flowering, in the neighbourhood of Charleston, is about the end of April. The fruit is round, and about twice as large as a common pea. When ripe, it is of a purple color, approaching to blue, and consists of a hard stone thinly coated with pulp. As it remains attached to the branches during a part of the winter, its color forms, at this season, an agreeable contrast with the foliage.

The bark which covers the trunk of the Devil Wood is smooth and grayish. The wood has a fine and compact grain, and when perfectly dry it is excessively hard and very difficult to cut or split; hence is derived the name of Devil Wood. It is, notwithstanding, neglected in use. On laying bare the cellular tissue of the bark, its natural yellow hue changes instantaneously to a deep red, and the wood, by contact with the air, assumes a rosy complexion. Experiments should be made to detect the nature of this active principle in the bark, which causes it to change color so suddenly by exposure to the air.

From the temperature of the native skies of this tree, we may conclude that it is capable of resisting a greater degree of cold than the Common Olive; it becomes then, on account of its beautiful foliage, its odoriferous flowers and its showy fruit, a valuable acquisition to Italy and the south of France.

PLATE LXXXVI.

A branch with leaves and fruit of the natural size. Fig. 1, *Flowers.*

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Fig. 1, *Flowers.*

Bessa del

Gabriel scul

Olive Tree

Olea Europæa.


Pl. 87
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Gabriel sculp

Olive Tree
Olea Europæa

OLIVE TREE.

OLEA EUROPÆA. *O. foliis lanceolatis, integerrimis ; racemis paniculatis.*

SINCE the introduction of the Vine, the Olive seems principally wanting to complete the vegetable riches of the United States; and, probably, it might be cultivated with success on some portion of their soil.

The genus of the Olives, of which one species only is found in North America, is more diversified in the eastern hemisphere; nine species are mentioned by botanical writers, which are natives of remote extremities of the Old World. The Olea fragrans grows in China and Japan; its flowers are impregnated with the sweetest odor, and are employed by the Chinese to perfume their tea.

But none of these species form an object of great importance in the rural economy of the regions to which they are indigenous, nor does their introduction promise very beneficial fruits to the agriculture of other countries. It is far otherwise with the European Olive. This ornament of the vegetable kingdom, which is called by Columella the first among trees, has constituted, from the remotest antiquity, the pride of some of the most celebrated regions of the globe; and besides, from the commercial value of its products, it is invested, both by sacred and profane history, with a thousand interesting associations.

The beauty of the Olive is far from corresponding to its intrinsic value. It varies in size according to the soil and climate in which it grows; and in France the temperature is not warm enough for its perfect development. Pliny says that in Spain it was one of the largest trees: *Non alia major in Bætica arbor.* On Mount Atlas, Desfontaines saw Wild Olives from 45 to 60 feet in height; and Beaujour compares the Olives of the plains of Marathon to the finest Walnuts for stature and expansion. Lofty Olives are still seen in the Island of Corfu, shading the spot where they once enriched the gardens of Alcinous.

In the Olive-yards of France these trees are generally from 18 to 20 feet in height, and from 6 inches to 2 feet in diameter. About Aix, Montpellier, etc., they are kept low partly by the disasters to which they are exposed from the cold, and partly by the care of the cultivator, to facilitate the gathering of the fruit. They ramify at a small height, and form a compact and rounded summit. The open, coriaceous foliage is of a pale, impoverished verdure, and the general appearance of the tree is not unlike that of a common Willow which has been lopped, and which has acquired a new summit of three or four years' growth.

Indeed the Olive possesses neither the majesty of forest-trees, nor the gracefulness of shrubbery. It clothes the hills without adorning them, and, considered as an accident of the landscape it does not charge the picture sufficiently to contribute greatly to its beauty. The rich culture for which the southern provinces of France are celebrated is less conducive to rural beauty than some of the humbler species of husbandry. The richest country is not always the most lovely; a country of mines, for example, is usually ungracious to the eye, and the Olive is called by an Italian writer, a mine upon the surface of the earth.

This tree is remarkable for its longevity: the ancients limited its existence to two hundred years, but modern authors assert that, in climates suited to its constitution, it survives its fifth century. Relations are made of the bulk of some of these patriarchal trees, too surprising to be repeated unless they were perfectly authenticated; but in France there are Olive trees which two men can hardly compass in their arms.

The main limbs of the Olive are numerously divided: the branches are opposite, and the pairs are alternately placed upon conjugate axes of the limb. The foliage is ever-green, but a part of it turns yellow and falls in the summer, and in three years it is completely renewed. In the spring or early autumn, the seasons when vegetation is in its greatest activity, the young leaves come out immediately above the cicatrix of the former petioles, and are distinguished by their suppleness and by the freshness of their tint.

The color of the leaves varies in the different varieties of the Olive, but they are generally smooth and of a light green above, whitish and somewhat downy with a prominent rib beneath. On most of the cultivated varieties they are from 15 lines to 2 inches long, and from 6 to 12 lines broad, lanceolate, entire, nearly sessile, opposite and alternate in the manner of the branches.

The Olive is slow in blooming as well as in every function of vegetable life. The buds begin to appear about the middle of April, and the bloom is not full before the end of May or the beginning of June. The flowers are small, white, slightly odoriferous, and disposed in axillary racemes or clusters. A peduncle about as long as the leaf issues from its base, upon which the flowers are supported by secondary pedicles like those of the Common Currant. Sometimes the clusters are almost as numerous as the leaves, and garnish the tree with wanton luxuriance; at others, they are thinly scattered over the branches, or seen only at their extremity. It is essential to remark that they are borne by the shoots of the preceding year. Each flower is complete in itself, consisting of a calyx, a monopetalous corolla divided into four lobes, and of the organs of reproduction, namely, two stamina and one pistil.

A week after the expanding of the flower the corolla fades and falls. If the calyx remains behind, a favorable presage is formed of the fruitfulness of the season: but the hopes of the husbandman are liable to be blasted at this period by the slightest intemperateness of the elements, which causes the germ to fall with the flower. Warm weather, accompanied by gentle breezes that agitate the tree and facilitate the fecundation, is the most favourable to his hopes.

The fruit of the Olive is called by botanists a *drupe*: it is composed of pulpy matter enveloping a stone, or ligneous shell containing a kernel. The olive, is ovate, pointed at the extremity, from 6 to 10 lines in diameter in one direction, and from 10 to 15 lines in the other: on the wild it hardly exceeds the size of the red currant. The skin is smooth, and, when ripe, of a violet color; but in certain varieties it is yellowish or red. The pulp is greenish, and the stone is oblong, pointed and divided into two cells, one of which is usually void. The oil of the olive is furnished by the pulp, which is a characteristic almost peculiar to this fruit; in other oleaginous vegetables it is extracted from the seed. The young olive sets in June, increases in size and remains green through the summer, begins to change color early in October, and is ripe at the end of November or in the beginning of December. On the Wild Olive 5 or 6 drupes are ripened upon each peduncle; but on the cultivated tree a great part of the flowers are abortive, and the green fruit is cast at every stage of its growth, so that rarely more than one or two germs upon a cluster arrive at maturity.

It has been observed from early antiquity that the produce of the Olive is alternate; and in France it is proverbially said to labor one year for itself and one year for its owner. The cause of this phenomenon will be mentioned hereafter. It is asserted that the Wild Olives are sometimes barren; but these must be trees that have sprung from stones dropped upon arid rocks, in whose crevices the roots barely find nourishment enough to sustain the abject existence of the plant.

On the branches of the Olive, and on the trunk of the young tree, the bark is smooth and of an ashy hue. When the epidermis is removed, the cellular tissue appears of a light green. On old trees the bark upon the trunk and upon the base of the principal limbs is brown, rough and deeply furrowed. In the spring and autumn, when the sap is in motion, the bark is easily detached from the body of the tree.

The wood is heavy, compact, fine-grained and brilliant. The alburnum is white and soft, and the perfect wood is hard, brittle and of a reddish tint, with the pith nearly effaced as in the Box. It is employed by cabinet makers to inlay the finer species of wood which are contrasted with it in color, and to form light, ornamental articles, such as dressing cases, tobac-

co-boxes, etc. The wood of the roots, which is more agreeably marbled, is preferred.

The Olive accommodates itself to almost every variety of soil ; but it shuns a redundancy of moisture, and prefers loose, calcareous, fertile lands mingled with stone, such as the territory of Attica and of the south of France. The quality of its fruit is essentially affected by that of the soil, it succeeds in good loams which are capable of bearing corn, but on fat lands it yields oil of an inferior flavor, and becomes laden with a barren exuberance of leaves and branches. The temperature of the climate is a consideration of more importance than the nature of the soil, as all the varieties of the Olive dread the extremes both of heat and cold. Neither do they delight in very low or in very elevated situations, but rather in gentle declivities with an exposure adapted to the climate, where the fresh breezes, playing among the branches, may contribute to the health of the tree and to the fineness of the fruit.

Notwithstanding the delicacy of its complexion, the Olive is extremely tenacious of life. When the trunk has perished by frost or by fire, it sprouts anew, and we are assured that if a bit of the bark, with a thin layer of wood, is buried in the earth, it becomes a perfect plant.

In this respect the Olive is the polypus of vegetables. It is multiplied by all the modes that are in use for the propagation of trees : by sowing the seed, by layers, by slips, by cuttings of the root, and by sprouts separated from the trunk or from the roots of the parent stock. The most obvious method, that of forming nurseries from the seed, is generally censured in books, and rejected in practice : the difficulty of obtaining the young plants, and the length of time which must elapse before they begin to reward the labor of the husbandman, have discouraged its adoption. But, if these objections could be obviated, this is doubtless the most eligible practice. As the plants thus reared begin a new life, they are more vigorous and of longer duration than off-sets from an old tree ; they form also a perpendicular root, which penetrates deeply and secures them from the danger of suffering by drought.

In most of the experiments that have been made of this method, the fruit has been sown entire ; and this is even enjoined, as a necessary precaution. But, however it may seem to be indicated by nature, such is not her own process. The stones which produce the Wild Olives are deposited by animals that digest the pulp, or by birds that carry away the fruit in their beaks, devour the pulp and leave the stones to take their chance with the elements. The principles of vegetable physiology, also, support the conclusions derived from these observations. The pulp not only invites the depredations of animals, such as field-mice, pies, etc., but this oily envelope, by preserving the shell from moisture, prevents its decaying in season for

the germination of the kernel, which, in the meantime, becomes rancid and loses its fecundity.

Ripe fruit of the finest varieties is selected; that of the *Gros Ribiés* is the best; and the stones, after being separated from the pulp, are cleansed in an alkaline solution. A sheltered situation is chosen, where the earth is thoroughly loosened to the depth of 3 feet, and enriched with the warmest manures. In the month of March the stones are sown, at a small distance apart, in trenches 2 or 3 inches deep, and covered with earth. The soil should be kept free from herbage, and occasionally watered during the summer. The young plants appear in October and continue to vegetate through the winter; by the following spring, the most thriving among them will hav attained the height of 30 inches. The feebler stocks should now be eradicated. With proper attention, and in a favorable soil, the remainder will be 4 or 5 feet high and 6 or 7 lines in diameter, in the course of the third spring, with a perpendicular root of 30 inches. This is the season for transplanting them. Great care should be bestowed upon the preparation of the ground, and the young plants should be placed 3 feet apart. After two years they will be sufficiently advanced to be grafted, and at the end of five years they may be transplanted to the olive-yard.

To accelerate the germination, the stones may be kept in fine mould during the summer and autumn, and sown in the beginning of January. They soon begin to vegetate, and before the following winter the young stocks acquire strength enough to support its rigors, while the tender plant that comes up in October is in danger of suffering by the slightest hoarfrost. Perhaps some advantage would be found in reducing the thickness of the shell before it is committed to the ground, in order to expose the germ more speedily to the influence of those agents which are necessary to its expansion.

Every mode of grafting is successfully practised on the Olive: the most common and the most proper for young stocks is that of inoculation. The operation should be performed in May, while the juices are in active circulation. Different opinions prevail respecting the insertion of the graft above or below the surface of the ground: grafting below the surface is attended with this advantage, that, when the trunk is destroyed, a generous progeny springs from its base.

A few stocks should be left to form new varieties. Fruit trees and flowers lose, in reproduction, the properties which they had acquired by culture, and tend anew to the state of nature. But in a great number of plants reared from the seed, a few are found that equal or excel the parent: florists consider themselves as fortunate, if, among a thousand Hyacinths or Tulips, they obtain three or four deserving of notice.

The young Olives begin to yield fruit the 10th or 12th year, and are fully productive about the 25th or 30th: thus Hesiod's observation, that no

man gathers fruit from an Olive of his own planting, must be admitted with the abatements of poetry.

A second method of forming a nursery, which has been successfully adopted near Toulon, is by transplanting the young Wild Olives.

The ancients relied principally upon propagation by slips, and this easy and expeditious mode is still generally followed in Spain. A smooth, thriving sprout or branch, 1 or 2 inches in diameter, is cut into pieces 12 or 15 inches long, which are carefully set, without wounding the bark, in ground prepared as for the seed. They are placed at the distance of 3 feet and at such a depth that 3 inches only appear above the surface. To encourage the formation of roots, the larger end, which is committed to the earth, should be smeared with a composition of mould and animal manure, and the end which is exposed to the air should be protected by a covering of clay. Cuttings of the roots, also, buried in an inclined position in trenches 4 inches deep, will sprout in the course of the year. A few months later the feebler stocks are plucked up, and the more vigorous ones are left at the distance of 3 feet. Another easy resource is found in the shoots that spring up round the base of an old Olive, or from roots laid bare and wounded for this purpose.

It is necessary, in every case, to ascertain the point at which the original stock was grafted. The offspring is invariably identical in its nature with that part of the parent tree from which it was separated; it requires grafting, therefore, if it was detached from a point below the insertion of the graft, or from a tree which had not submitted to this process.

All these operations are performed at the close of winter or the opening of spring. The length of time which the young plants should remain in the nursery varies with their size and strength, but it rarely exceeds four or five years. During this period the ground should be kept mellow and clean, and occasionally watered in the summer, if the season is dry. But this indulgence should not be prodigally bestowed. Vegetable, as well as animal and moral life is susceptible of habitude. For this reason it is also, an important precept in the formation of nurseries, to select a soil analagous to that in which the trees are to reside. If the young plant is lavishly supplied with nutricious juices, its pores become distended, its fibre gross, and its vegetation luxuriant. Superfluous enjoyments easily become necessaries of life: hence, when it is removed to a different scene, and condemned to struggle for existence in an ungrateful soil, it loses heart and perishes where it might have been long-lived and fruitful, if its temperament had been hardened by early privation.

When the nurslings have arrived at a proper age, the next step is to transplant them to the Olive-yard. The task of preparing the ground for their reception should be begun immediately after the harvest. Holes or trenches, at least 3 feet in width, are dug and left mouldering till the close

of winter, which is the season for transplanting the Olive. The stock and principal branches are lopped and the wounds are covered with clay. As much of the roots as possible should be preserved, with the earth adhering to them. When the trees are carried to a distance, which may be done with the precautions that are used for other fruit trees, they should be set during several hours in water before they are replaced in the ground. Mellow, fertile mould should be spread upon the bottom of the holes and thrown first upon the roots; among which the earth should be lightly forced, though it is not useful to render it compact nor to heap it about the trunk. A copious watering follows, which is repeated in the course of the season, as the weather and the health of the plant may require.

The Olive arrived at an advanced age may be transplanted in the same manner as the young tree. In general, whatever vegetable is to support this trial, the most important precept is, that the earth be widely broken up and minutely subdivided, so that the roots may be placed in their natural position, and that their first efforts to extend themselves may not be embarrassed by compact masses, which they penetrate with difficulty, and from which they derive scanty subsistence.

The Olives should be planted at such a distance that they may not interfere with each other, and that every portion of the soil may contribute to their nourishment. In meager lands from which no other produce is exacted, 18 or 20 feet are enough; but in vineyards or corn-lands they may be 35 or 40 feet apart. Cato assigns 25 or 30 feet, which, as mean term, is sufficiently exact. In warmer climates, certain varieties attain such dimensions as to require a space of 60 or 70 feet.

The Olive does not become barren when totally abandoned; but, like other vegetables, it repays the neglect of the husbandman with a diminished produce, and his care with larger and more abundant fruit.

In Provence it is customary to turn the soil in the spring and in the fall. Besides the tillage of the plough, the ground should be carefully dressed with the spade about the foot of each tree. More labor is required by some soils than by others: a compact, argillaceous loam must be more frequently turned than a light, calcareous mould.

The olive-yard should be manured at least once in three or four years; but it would be more beneficial to sustain its strength by moderate, annual supplies. Most species of manure, while they increase the produce of the Olive, impair the quality of its fruit: the finest oil is made from wild trees growing in calcareous lands of moderate fertility. Vegetable substances are preferable to animal manures for fruit trees in general, and especially for the Olive and the Vine. When animal matter is employed, it should be tempered with marl, sea-weeds, leaves, etc., and applied only when the whole is reduced to mould. To soils deficient in this ingredient, calcareous matter is of the utmost utility. Great benefit is said to be found in Spain

from sea-water poured upon the roots of the Olive. But the finest manure is the offals of the fruit that has been pressed, and the washings of the utensils and of the oil-vessels.

The manure is spread in the fall, in the winter, or before the tillage in the spring. Its effects are most sensible when it is applied at the beginning of winter, as, during this season, its virtues are imbibed by the soil and communicated to every fibre of the roots; through the spring and summer, on the contrary, it sometimes remains nearly inert beneath the surface. But in climates where the Olive is liable to injury from cold, the most serious accidents are to be feared from keeping its roots too warm in the winter. Its vegetation being in this manner quickened, so that the sap is set in motion by every genial sun, it is exposed to the most imminent danger from the returning frost. The fatal effects of cold are frequently less attributable to its intensity than to its suddenness: a plant which has become relaxed by the tepid breath of a deceitful zephyr is surprised and killed by the frozen blast of the north wind. To maintain an even temperature at the roots during the winter, earth should be heaped about the base of the trees, and the manure should be spread early enough in the fall to assist them in ripening their fruit and preparing the bloom of the succeeding year, or late enough in the spring to avoid the accidents of frost. The Greeks do not make use of manure, except when chance conducts a flock of sheep to the foot of an Olive, which immediately becomes conspicuous by a richer vegetation. When substances proper for manure cannot be obtained in the requisite abundance, the deficiency may be supplied by sowing grasses or cereal plants, and ploughing in the green herb.

The pruning of the Olive is subject to the general principles of the art, modified by the peculiar nature of the tree. A part of its branches should be curtailed every year, and the number of bearing shoots determined so that it may not be exhausted by its fruit. After 12 or 15 years, one or two of the principal limbs may be lopped, and at intervals, which must depend upon the condition of each tree, the whole summit may be retrenched. The most favorable season for pruning the Olive is in March.

More than 30 varieties of the Olive are known in France,* which are

* The most exact and extensive catalogue of the Olives is found in the New Duhamel. The following are some of the most esteemed varieties:

1. The *Olivier pleureur*, *Olea craniomorpha*, 14th variety in the New Duhamel, is one of the largest and finest trees. Its branches are redundantly numerous, and pendent like those of the Weeping Willow. Its fruit is good for the table, and yields a pure and abundant oil. It should be placed in valleys rather than on elevated grounds, as it has more to apprehend from drought than from cold; there are individuals of this variety in Languedoc that have three times survived the general destruction of the Olives by frost.

2. The *Olivier a fruit arrondi*, *Olea sphærica*, 26th variety, N. D., is also among the least sensible to cold. It requires moisture, a good soil, and abundant manure. Its oil is of a superior quality.

distinguished by their size, by their temperament as to soil and climate, and by the qualities of their fruit. Some of these varieties, like those of the Vine, owe their characteristic properties to the spot in which they are reared.

The principal product of the Olive is oil, but the pickled fruit is also a valuable article of commerce. The simplest manner of preserving the green olives is by covering them with a solution of common salt impregnated with fennel, cumin, coriander-seed and rose-wood: the most perfect method is that employed for the *picholines* of Provence, which are so called from *Picciolini*, by whom the process was invented. They are gathered in the beginning of October, and the finest of them are selected and thrown into a weak solution of soda or potash rendered caustic with lime. In this solution they remain 8 or 10 hours, till the pulp ceases to adhere to the stone; they are then steeped, during a week, in pure, cold water, daily renewed, and are afterwards transferred to an aromatic brine. Such of them as are destined for the tables of the luxurious are taken out after a certain time, deprived of the stone, in place of which is substituted a caper or a bit of truffle, and closed up in bottles of the finest oil. In this manner they are kept palatable for two or three years. The sweet olive of the ancients, which was eaten without preparation, is said to exist in the kingdom of Naples.

The proper season for gathering the olives for the press is the eve of their maturity, which varies in different climates and in different varieties of the Olive, but which is easily distinguished by the color of their fruit. Two powerful considerations should engage the cultivator not to delay the olive-harvest. We have already observed that the produce of this tree is alternate. The phenomenon, it is true, is more uniformly witnessed in some varieties than in others; but it might be assumed as a constant character, if it was not proved by experience to depend upon accidental causes. It has been attributed to the injury sustained by the trees in beating off their fruit; but it is not observed in some places where this practice prevails, and is constant in others where it is discarded. It has also been ascribed to injudicious pruning; but it is witnessed alike in olive-yards pruned in the most opposite modes, and in those that are unconscious of

3. The *Olivier de Lucque*, *Olea minor Lucensis*, 9th variety, N. D., is hardy and yields a fruit proper for preserving.

4 and 5. The *Aglandaou*, *Olivier à petit fruit rond*, *Olea fructu minore et rotundiore*, 3rd variety N. D., and the *Olivier de Salon*, *Olea media fructu subrotundo*, 19th variety, N. D., are good for oil, and prefer dry and elevated grounds.

6. The *Olivier amygdalin*, *Olea amygdalina* 25th variety, N. D., is much esteemed about Montpellier for its fine and abundantoil.

7. The *Picholine*, *Olea oblonga*, 11th variety, N. D., yields the most celebrated pickled olives. This variety is not delicate in the choice of soil and climate.

the knife. The little fruit that is borne in the year of repose is, also, of an inferior quality. Some other explanation must therefore be sought for, and a satisfactory one is indicated by Pliny in the continuance of the fruit upon the branches after its maturity: *Hærendo, enim, ultra suum tempus, absumunt venientibus alimentum.* This cause, which is generally admitted by vegetable physiologists in France, has been developed by Olivier in a Memoir presented to the Economical Society of Paris. Evergreen trees, and among them the Olive, put forth the young shoots that are to bloom the succeeding year, not in the spring, like trees with deciduous leaves, but at the close of summer; and the buds are prepared during the autumn and the beginning of winter. If, then, the tree is overladen with fruit, this second growth is prevented, and the hopes of the following season are precluded; or, if the fruit is left too long upon the branches, it diverts the juices which should be employed in the preparation of the flower-buds. At Aix, where the olive-harvest takes place early in November, it is annual and uniform; in Languedoc, Spain, Italy, etc., where it is delayed till December or January, it is alternate. The quality of the oil, also, depends upon gathering the fruit in the first stage of its maturity. It should be carefully plucked by hand, and the whole harvest completed, if possible, in a single day. To concoct the mucilage and to allow a part of the water to evaporate, it is spread out, during two or three days, in beds 3 inches deep.

The oil-mill retains nearly its primitive form: it consists of a basin raised 2 feet from the ground, with an upright beam in the middle, around which a massive mill-stone is turned by water or by a beast of burthen. The press is solidly constructed of wood or of cast iron, and is moved by a compound lever. The fruit, after being crushed to a paste, is put into sacks of coarse linen or of feather-grass, and submitted to the press. The virgin oil, which is first discharged, is the purest, and retains most sensibly the taste of the fruit. It is received in vessels half filled with water, from which it is taken off and set apart in earthen jars: to separate the vegetable fibres and other impurities, it is repeatedly decanted. When the oil ceases to flow, the paste is taken out and broken up. As the sacks are returned to the press, boiling water is poured over them, and the pressure is renewed with redoubled force, till every particle of the oil and water is extracted.

The mixture is left in a vat, from which the oil is taken off as it rises to the surface. This oil, though less highly perfumed than the first, is nearly as fine, and is usually mingled with it. The offals of the fruit are sometimes submitted to a third process: in a basin into which a rill of pure water is admitted, they are ground anew, the skins and mucilaginous particles floating on the surface are drawn off into reservoirs, and the shells are preserved for fuel. The utmost cleanliness is necessary in making the oil, which is finished in a day: with the nicest economy in the process, it

amounts in weight to nearly one-third of the fruit. The mean produce of a tree may be assumed, in France, at ten pounds, and in Italy at fifteen: but single trees have been known in the productive season to yield three hundred pounds.

The kernel of the olive affords an oil, the mixture of which with that of the pulp is said to injure its flavor and to hasten its rancidity. A machine has, in consequence, been invented for bruising the pulp without crushing the stone: that the arguments for its adoption have not prevailed over the established usage is no proof of their unsoundness; more convincing evidence is found in the exquisite quality of the oil of Aix.

But there are abuses which experience has demonstrated without being able to correct them: the fruit, after hanging too long upon the trees, is kept fermenting in heaps, to increase the quantity of oil, while the only effect is to vitiate its quality.

Besides the finest oil which is used upon the table, immense quantities are employed in the making of soap and for mechanical purposes. A part of the oil consumed in this way at Marseilles is imported from Greece and the Mediterranean Isles.

The Olive requires a climate whose mean temperature is equal to 57° 17′, and that of the coldest month to 41° 5′. In the United States, where the mean temperature of the year is 57° 17′, that of the coldest month is only 0° 5′, with some days far more intense. The capriciousness of our climate is still more dangerous to delicate vegetables than its inclemency; the difference of temperature in a single day is sometimes almost equal to that of the whole year in the south of Italy. The Olives near Charleston were rendered barren by the vernal frosts which congealed the young shoots. In a more southern latitude they would be secure in the winter, but they would languish through a sultry summer, unrefreshed by the healthful breezes which they respire on the shores of the Mediterranean Sea; they would, besides, find a silicious instead of a calcareous soil.

While the Floridas were held by the English, an adventurer of that nation led a colony of Greeks into the eastern province, and founded the settlement of New Smyrna: the principal treasure which they brought from their native clime was the Olive. Bartram, who visited this settlement in 1775, describes it as a flourishing town. Its prosperity, however, was of momentary duration: driven to despair by hardship and oppression, and precluded from escape by land, where they were intercepted by the wandering savages, a part of these unhappy exiles conceived the hardy enterprise of flying to the Havanna in an open boat; the rest removed to St. Augustine when the Spaniards resumed possession of the country. In 1783, a few decaying huts, and several large Olives, were the only remaining traces of their industry.

Louisiana, the Floridas, the islands of Georgia, and chosen exposures in

the interior of the State, will be the scene of this culture. Perhaps it will be extended to some parts of the Western States; it has been hastily concluded that the Olive can exist only in the vicinity of the sea; it is found in the centre of Spain, and in Mesopotamia at the distance of a hundred leagues from the shore. The trial should be made in every place where its failure is not certain, and for this purpose young grafted trees should be obtained from Europe, and the formation of nurseries from the seed immediately begun.

The Olive is perhaps the most valuable, but it is not the only accession that might be made to our vegetable kingdom, if a more enterprising spirit prevailed in our husbandry, and if establishments were formed for the reception of exotic plants. This important subject claims the attention of government; amid its labors for the promotion of commerce and manufactures, why should not its fostering care be extended to agriculture?

PLATE LXXXVII.

A branch with leaves and fruit of the natural size. Fig. 1. *Flowers of the natural size. Fig.* 2, *A flower magnified. Fig.* 3, *A drupe with the stone exposed.*

Note.—The preceding article was written at the request of Mr. Michaux, for whom I seize with pleasure an opportunity of expressing my esteem; justice obliges me to avow that it has not had the benefit of his revision.

I have consulted the most judicious ancient and modern works, Columella, Pliny, the New Duhamel, the Memoirs of the Academy of Marseilles, etc., and have myself observed the Olive in Provence.

Augustus L. Hillhouse,
Citizen of the United States.

[See Nuttall's Supplement, Vol. 3, page 68, where it is said that the "cultivation of the Olive has been attended with the greatest success in Upper California, and the Olives produced are of an excellent quality. It might also, no doubt, be cultivated in the southern part of the Oregon Territory. Around Santa Barbara, the Olive Trees were in full flower in the latter end of March and beginning of April, and put on the appearance of a Willow Grove. Forty barrels of these pickled Olives were shipped from St. Diego to Boston in the Alert, the vessel in which I returned to the United States in 1836."]

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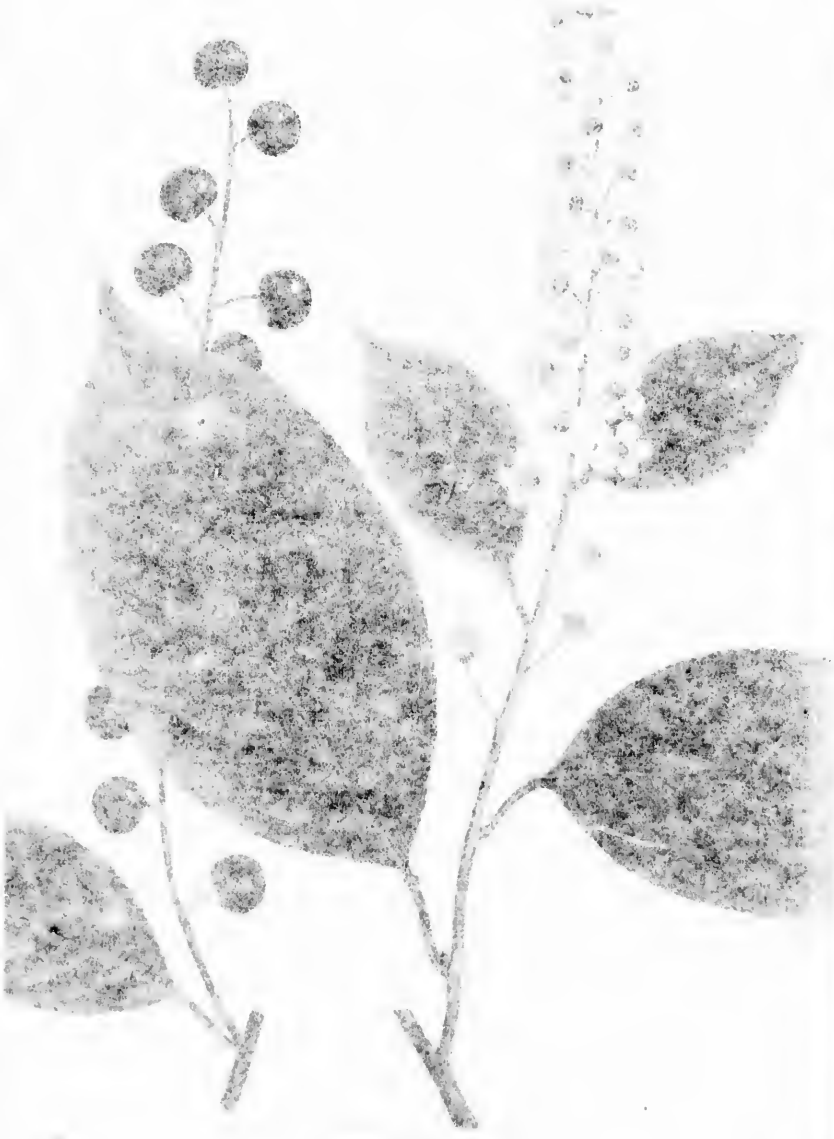
Bessa del. Gabriel sculp.

Wild Cherry.
Cerasus virginiana.

Pl.38

Gabriel sculp



Wild Cherry

WILD CHERRY TREE.

Icosandria monogynia. LINN. Rosaceæ. JUSS.

CERASUS VIRGINIANA. *C. foliis deciduis, ovati-oblongis, acuminatis, serratis, nitidis; racemis terminalibus, elongatis; fructibus globosis, nigris.*

THE Wild Cherry Tree is one of the largest productions of the American forests. Its wood is of an excellent quality and elegant appearance, and is usefully employed in the arts. In the Atlantic as well as in the Western States, this tree is known only by the name which I have adopted. It is more or less abundant as the soil and climate are more or less favorable to its growth, to which the extremes of heat and cold in the seasons, and of dryness and humidity in the soil, are alike unpropitious. Thus in the District of Maine, where the winter is long and intense, it hardly exceeds 30 or 40 feet in height, and from 8 to 12 inches in diameter; in the southern and maritime parts of the Carolinas and of Georgia, where the summer is intemperately hot, and where the soil is generally arid and sandy, it is rarely seen, and on the banks of rivers where the ground is too wet, its dimensions are stinted; but in the upper part of these States, where the climate is milder, and the soil more fertile, it is sufficiently common, though less multiplied than in Virginia and Pennsylvania. It abounds, also, in the Illinois country, in Genessee and in Upper Canada, and unites with the Overcup White Oak, the Black Walnut, the Honey Locust, the Red Elm, and the Coffee Tree, in the forests which cover these fertile regions. But it is no where more profusely multiplied, nor more fully developed than beyond the mountains in the States of Ohio, Kentucky, and Tennessee. On the banks of the Ohio, I have measured stocks which were from 12 to 16 feet in circumference, and from 80 to 100 feet in stature, with the trunk of an uniform size, and undivided to the height of 25 or 30 feet.

The leaves of the Wild Cherry Tree are 5 or 6 inches long, oval-acuminate, denticulated, of a beautiful brilliant green, and furnished at the base with two reddish glands. It is remarked in the neighborhood of inhabited places, that they are peculiarly liable to be attacked by caterpillars.

The flowers are white, and collected in spikes, which have a beautiful effect. The fruit is about the size of a pea, disposed in the same manner as the flowers, and nearly black at its maturity; soon after which, notwithstanding its bitterness, it is devoured by the birds. It is sold in the markets of New York and Philadelphia, and is employed to make a cordial, by infusion in rum or brandy, with the addition of a certain quantity of sugar.

The bark of this tree is so peculiar as to render it distinguishable at first sight, when from its height the form of its leaves cannot be discerned. The trunk is regularly shaped, but the bark is blackish and rough, and detaches itself semi-circularly in thick, narrow plates, which are renewed after a considerable lapse of time.

The perfect wood is of a dull, light red tint, which deepens with age. It is compact, fine-grained and brilliant, and not liable to warp when perfectly seasoned. It is extensively employed in the small towns of the Middle and Western States for every species of furniture: and when chosen near the ramification of the trunk it rivals Mahogany in beauty. The Wild Cherry Tree is generally preferred to the Black Walnut, whose dun complexion with time becomes nearly black. Among the trees that grow east of the Mississippi, it is the most eligible substitute for Mahogany. On the banks of the Ohio, at Pittsburg, Marietta and Louisville, it is employed in ship-building, and the French of Illinois are said to use it for the fellies of wheels.

In the lumber-yards of New York and Philadelphia, Wild Cherry wood is sold in planks of different thicknesses, which are employed for bed-steads and other articles of furniture. Planks are sent from Kentucky to New Orleans, where they are also employed in cabinet-making.

The Wild Cherry Tree deserves a place in the forests of Europe, and it is especially adapted to the northern departments of France, and to the country along the Rhine, which are the most analogous to its native regions. To recommend its propagation to the foresters of Europe, is at the same time to invite those of America to preserve it with care, and to favor its reproduction; they should leave on foot the old stocks of the natural growth for the purpose of furnishing seed, and favor the increase of the young trees by destroying those of other species by which it might be impeded.

PLATE LXXXVIII.

A branch with leaves and fruit of the natural size.

[The bark is bitter and aromatic, its taste being strong, penetrating, and not disagreeable. It is undoubtedly, a useful tonic, and appears to possess in some degree, narcotic and antispasmodic properties. The latter quality is strongest in the recent state of the bark, and in the distilled water. In Europe, *C. Virginiana* is planted solely as an ornamental tree; and as such, deserves a place in every collection; and it should be planted in every shrubbery where it is desirable to attract frugivorous singing birds.

Soil, propagation, &c. It prefers a dry soil, but will grow in almost any situation. The species is propagated by seeds.]

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Wild Orange.

Cerasus caroliniana.


Pl 80
Gabriel sculp

Wild Orange

WILD ORANGE TREE.

CERASUS CAROLINIANA. *C. foliis perennantibus, breviter petiolatis, lanceolato-oblongis, mucronatis, lævigatis, subcoriaceis, integris; racemis axillaribus, brevibus; fructu subglobloso, acuto, sub-exsuco.*

OBS. Arbor formosa, fastigiata; ramis strictis; fructibus hieme persistentibus.

THIS beautiful species of Cherry Tree was observed in the Bahama Isles by Catesby, and subsequently by my father. On the continent of North America it appears to be nearly confined to the islands on the coast of the Carolinas, of Georgia and of the Floridas. Except the margin of the sea, it is rarely found on the mainland, even at the distance of 8 or 10 miles from the shore, where the temperature is 5 or 6 degrees colder in the winter, and proportionally milder in the summer.

This tree is known only by the name of Wild Orange Tree. Its leaves are oval-acuminate, evergreen, smooth and shining on the upper surface, and about 3 inches in length. The flowers are numerous, white, and arranged in little bunches an inch or an inch and a half long, which spring at the base of the leaf. The fruit is small, oval, and nearly black: it consists of a soft stone surrounded with a small quantity of green pulpy substance, which is not eatable. This fruit persists through a great part of the following year, so that in the spring the tree is laden at once with fruit and with flowers. The Wild Orange Tree may be considered as one of the most beautiful vegetable productions of this part of the United States, and it is selected with the more reason by the inhabitants to plant about their houses, as it grows with rapidity and affords an impenetrable shade.

I have remarked that of all the trees which grow naturally in the Carolinas and in Georgia, the flowers of the Wild Orange are preferred by bees.

It ramifies at a small height, and forms a spacious and tufted summit, which is owing, perhaps, to its growing upon open ground instead of being compressed in the forest, and forced to shoot upwards in order to enjoy the light. The bark of the trunk is of dun complexion, and is commonly without cracks.

The perfect wood is rose-colored and very fine-grained; but as this species is not extensively multiplied, I do not know that it is appropriated to any use: there is the less occasion for it, as other wood, in no respect inferior, is procured with facility.

I have remarked in the bark of the roots a strong odor resembling that

of the Wild Cherry stone: hence I presume that it would afford a fragrant spirituous liquor.

The only merit of this tree is its brilliant vegetation, which renders it, when in bloom, one of the most beautiful productions of the southern part of the United States. Too delicate to support the winter of Paris, it would flourish in the open field only in the southern departments of France and in Italy.

PLATE LXXXIX.

A branch with leaves and flowers of the natural size, and fruit of the preceding year.

[The name of "Wild Orange Tree" would appear to be a misnomer. It is called in Loudon's Arboretum, the Carolina Bird Cherry.]

RED CHERRY TREE.

CERASUS BOREALIS. *C. foliis ovali-oblongis, acuminatis, glabris; floribus subcorymbosis; fructibus rubris.*

THE Red Cherry is common only in the Northern States and in Canada, New Brunswick and Nova Scotia. It is rarely met with in New Jersey and Pennsylvania, and is wholly unknown in the Southern States. In the District of Maine and in Vermont it is called Small Cherry and Red Cherry; the last of which denominations I have preferred.

The size of the Red Cherry places it among trees of the third order: it rarely exceeds, and often does not equal, 25 or 30 feet in height and 6 or 8 inches in diameter. Its leaves are 5 or 6 inches long, oval, denticulated and very acuminate. The flowers are collected in small, white bunches, and give birth to a red fruit of inconsiderable size, which is ripe in the month of July. This fruit is intensely acid, and is not abundant even on the largest trees.

The trunk is covered with a smooth, brown bark, which detaches itself

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Red Cherry.

Cerasus borealis.

Buck eye
Pavia lutea

laterally. The wood is fine-grained and of a reddish hue; but the inferior size of the tree forbids its use in the mechanical arts.

This species of Cherry Tree offers the same remarkable peculiarity with the Canoe Birch, of reproducing itself spontaneously in cleared grounds, and in such parts of the forests as have been burnt, which is observable in spots where fire has been kindled by travellers.

Of all the native species of North America, the Red Cherry Tree bears the greatest analogy to the cultivated Cherry Tree of Europe, hence it is the most proper for receiving grafts: it has been found difficult to graft the European Cherry Tree upon the Wild Cherry Tree.

PLATE XC.

A branch with fruit of the natural size. Fig. 1, *A bunch of flowers.*

LARGE BUCKEYE.

Heptandria monogynia. Linn. Aceræ Juss.

Pavia lutea. *P. foliis quinatis, æqualiter serratis; corollis luteis, tetrapetalis, viscosis, clausis.*

The Yellow *Pavia*, or Large Buckeye, is first observed on the Alleghany Mountains in Virginia, near the 39th degree of latitude; it becomes more frequent in following the chain toward the south-west, and is most profusely multiplied in the mountainous districts of the Carolinas, and of Georgia. It abounds, also, upon the rivers that rise beyond the Mountains and flow through the western part of Virginia, and the States of Kentucky and Tennessee, to meet the Ohio. It is much less common along the streams which have their source east of the Alleghanies, and which, after watering the Carolinas and Georgia, empty into the Ocean. This species may be considered then as a stranger to the Atlantic States, with the exception of a tract of thirty or forty miles wide in the Southern States, as it were beneath the shadow of the mountains. It is here called Big Buckeye, to distinguish it from the *Pavia rubra*, which does not exceed 8 or 10 feet in height, and which is called Small Buckeye.

I have seen no situation that appeared more favourable to the Big Buckeye than the declivities of the lofty mountains of North Carolina, and particularly of the Greatfather Mountain, the Iron Mountain, and the Black Mountain, where the soil is generally loose, deep and fertile. The coolness and humidity which reign in these elevated regions, appear likewise to be necessary to its utmost expansion; it here towers to the height of 60 or 70 feet, with a diameter of 3 or 4 feet, and is considered as a certain proof of the richness of the land.

The leaves of this tree are united to the number of five at the end of a common petiole of considerable length. They are lanceolate, pointed at the summit, serrate and slightly furrowed. The flowers, of a light, agreeable yellow, are upright and disposed in bunches at the end of the shoots of the same season. The numerous bunches of flowers, contrasted with the fine foliage, lend a highly ornamental appearance to the tree. The fruit is contained in a fleshy, oval capsule, which is often gibbous, and whose surface, unlike that of the Horse Chesnut of Asia, and of the American Horse Chesnut, is smooth. Each capsule contains two seeds, or chesnuts, of unequal size, flat upon one side, and convex on the other. They are larger and lighter colored than those of the common Horse Chesnut, and, like them, are not eatable.

In 1808, I passed a great part of the summer with Messrs. John and William Bartram, at their charming residence at Kingsessing, on the banks of the Schuylkill, five miles from Philadelphia, where they have collected a great variety of trees from different parts of the United States and Europe; I remarked that the Large Buckeye was one of the earliest among them to cast its leaves; they begin to fall about the 15th of August, while the other Horse Chesnuts are still clothed with their finest verdure. Its foliation and flowering are also tardy, which is an essential defect in a tree whose only merit is its beauty. The wood, from its softness and want of durability, can subserve no useful purpose. Even in beauty, this species is inferior to the common Horse Chesnut, and can never supplant that magnificent tree.

PLATE XCI.

A branch with leaves and flowers of the natural size. Fig. 1, *Fruit beginning to open. Fig.* 2, *a chesnut of the natural size.*

[*Soil, propagation*, &c.—Like all the Æsculaceæ, to thrive, it requires a deep, rich soil. It is commonly propagated by buds, because the colour of the flower is found to vary much in plants raised from seed.]

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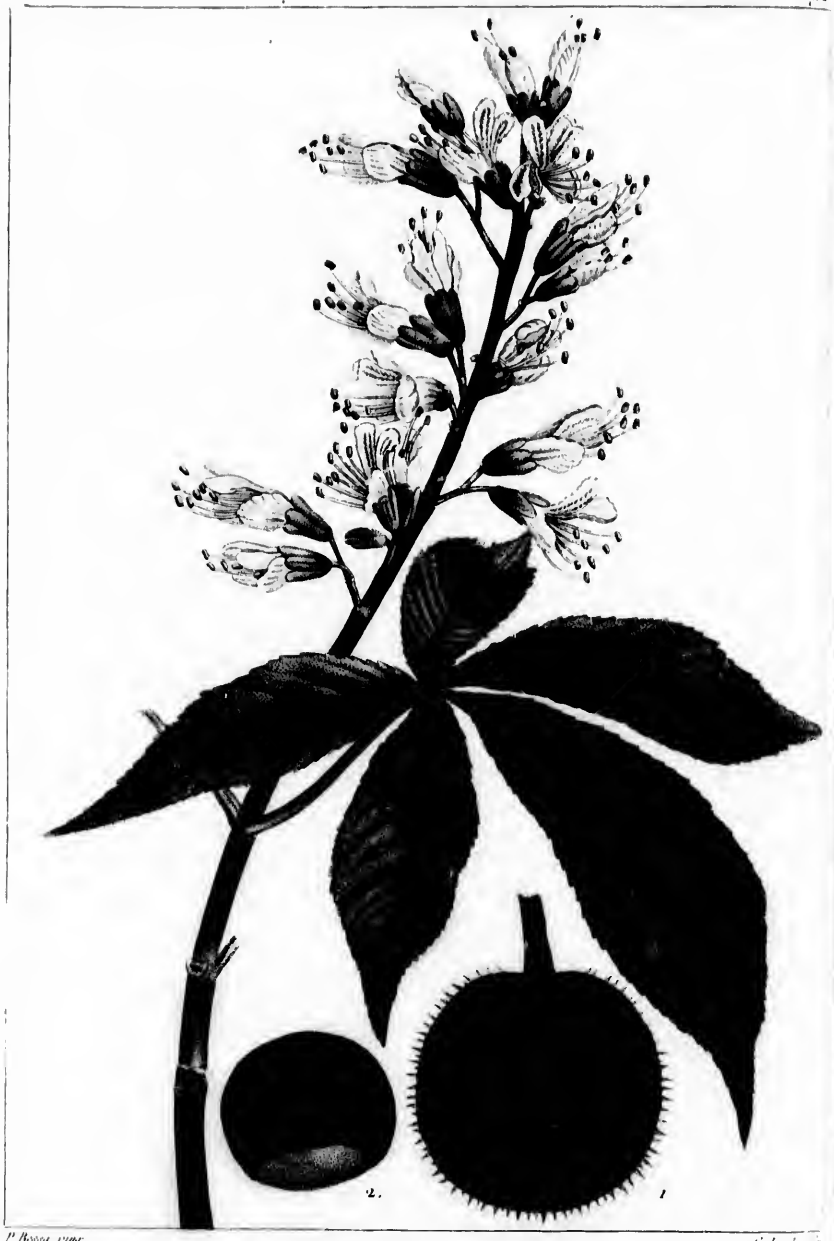

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Ohio Buck eye.

Pavia ohioensis.

Ohio Buckeye
Aesculus glabra

OHIO BUCKEYE,

OR

AMERICAN HORSE CHESNUT.

PAVIA OHIOENSIS. *P. foliis quinatis, inæqualiter dentatis; floribus sub-flavis; fructibus muricatis.*

THIS species of Horse Chesnut, which is mentioned by no author that has hitherto treated of the trees and plants of North America, is unknown in the Atlantic parts of the United States.* I have found it only beyond the Mountains, and particularly on the banks of the Ohio for an interval of about 100 miles, between Pittsburg and Marietta, where it is extremely common. It is called Buckeye by the inhabitants, but as this name has been given to the *Pavia lutea* I have denominated it Ohio Buckeye, because it is most abundant on the banks of this river, and have prefixed the synonyme of American Horse Chesnut, because it proved to be a proper Horse Chesnut by its fruit, which is prickly like that of the Asiatic species, instead of being smooth like that of the *Pavia*.

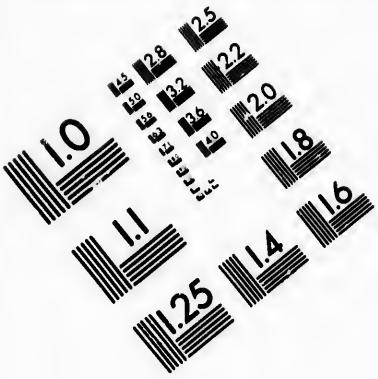
The ordinary stature of the American Horse Chesnut is 10 or 12 feet, but it sometimes equals 30 or 35 feet in height, and 12 or 15 inches in diameter. The leaves are palmated, and consist of 5 leaflets parting from a common centre, unequal in size, oval-acuminate, and irregularly toothed. The entire length of the leaf is 9 or 10 inches, and its breadth 6 or 8 inches.

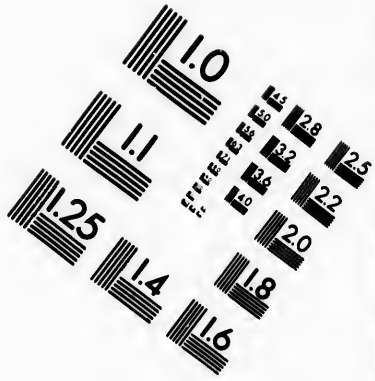
The bloom of this tree is brilliant: its flowers appear early in the spring, and are collected in numerous white bunches. The fruit is of the same color with that of the Common Horse Chesnut and of the Large Buckeye, and of about half the size: it is contained in fleshy, prickly capsules, and is ripe in the beginning of autumn.

On the trunk of the largest trees the bark is blackish, and the cellular tissue is impregnated with a venomous and disagreeable odor. The wood is white, soft, and wholly useless.

The value of the Ohio Buckeye or American Horse Chesnut consists chiefly in the beauty of its flowers, which, with its rapid vegetation and hardy endurance of cold, will bring it into request both in Europe and America as an ornamental tree.

[* Since the above was written this tree has been generally distributed in the United States.]





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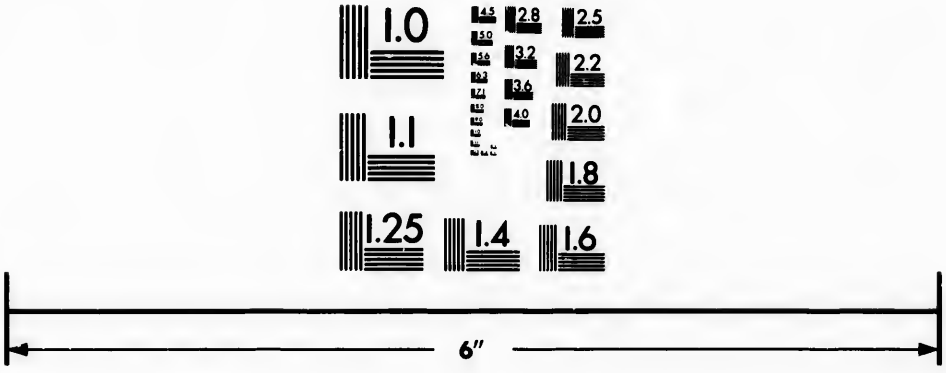

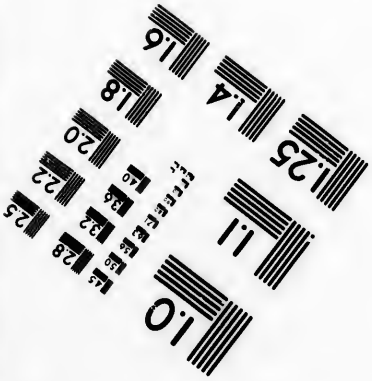

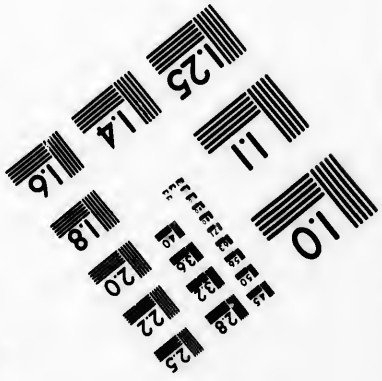

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PLATE XCII.

A branch with leaves and flowers. ***Fig.*** **1.** *Fruit.*

PERSIMON.

Polygamia diœcia. Linn. Guaiacanæ. Juss.

Diospyros viginiana. *D. foliis longè petiolatis, oblongo-ovalibus, acuminatis, subtùs pubescentibus.*

The banks of the river Connecticut, below the 42d degree of latitude, may be considered as the northern limit of this tree; but it is rendered rare in these parts by the severity of the winter, while in the State of New Jersey, near the city of New York, it is common, and still more so in Pennsylvania, Maryland, and the Southern States: it abounds, also, in the western forests. It is every where known to the Americans by the name of Persimon; the French call it *Plaqueminier*, and its fruit *plaquemines*.

The Persimon varies surprisingly in size in different soils and climates. In the vicinity of New York it is not more than half as large as in the more Southern States, where, in favorable situations, it is sometimes 60 feet in height, and 18 or 20 inches in diameter.

The leaves are from 4 to 6 inches in length, oblong, entire, of a fine green above and glaucous beneath: in the fall they are often variegated with black spots. The terminal shoots are observed to be usually accompanied, at the base, by small rounded leaves.

This tree belongs to the class of vegetables whose sexes are confined to different stocks. Both the barren and fertile flowers are greenish, and not strikingly apparent. The ripe fruit is about as large as the thumb, of a reddish complexion, round, fleshy, and furnished with 6 or 8 semi-oval stones, slightly swollen at the sides, and of a dark purple color. It is not eatable till it has felt the first frost, by which the skin is shrivelled, and the pulp, which before was hard and extremely harsh to the taste, is softened and rendered palatable. The fruit is so abundant that in the Southern States a tree often yields several bushels, and even in New Jersey I have

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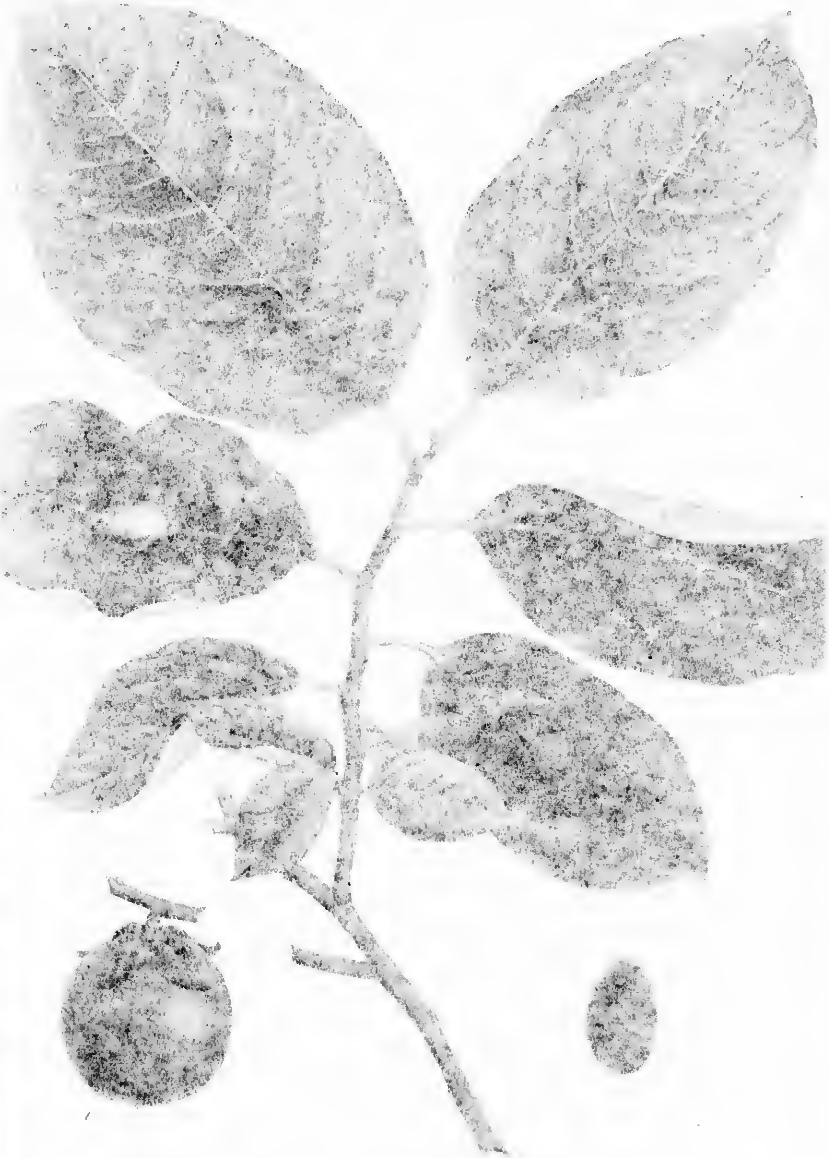

Persimmon
Diospyros virginiana

Redouté del.t Gabriel sculp.t

Persimon.

Diospiros Virginiana.

seen the branches of stocks not more than 7 or 8 feet in height bent to the ground by their burthen. In the south it adheres to the branches long after the shedding of the leaf, and when it falls it is eagerly devoured by wild and domestic animals. In Virginia, the Carolinas, and the Western States, it is sometimes gathered up, pounded with bran, and formed into cakes which are dried in the oven, and kept to make beer, for which purpose they are dissolved in warm water, with the addition of hops and leaven. It was long since found that brandy might be made from this fruit, by distilling the water, previously fermented, in which they had been bruised. This liquor is said to become good as it acquires age: but it will be impossible to derive profit from the Persimon in these modes, and in the country where it is most abundant, a few farmers only employ its fruit occasionally for their households. The Apple Tree and the Peach Tree are far more advantageous, as their growth is more rapid, and their produce more considerable.

The trunk of the full-grown Persimon is covered with a deeply furrowed, blackish bark. The fresh sap is of a greenish color, which it preserves after it is seasoned, and the heart is brown, hard, compact, strong, and elastic; I have been told, however, that it is liable to split. At Baltimore it is used by turners for large screws, and by tinmen for mallets. At Philadelphia shoe-lasts are made of it equal to those of Beech, which is usually preferred. In Carolina the negroes employ it for large wedges with which, aided by those of iron, they split the trunks of trees. I have been assured by coach makers in Charleston that they had employed it for the shafts for chaises, and found it preferable to the Ash and to every other species of wood except the Lance Wood of the West Indies, and that the difficulty of procuring stocks of the proper size alone prevented it being more frequently applied to this use: in truth, though it is common in the woods, it is usually of inconsiderable dimensions.

Such are the particulars with which I have become acquainted concerning the wood of the Persimon. Its properties appear not to be distinctly ascertained nor generally recognised; they are such, however, as to deserve the attention of persons whose object is a practical knowledge of the trees of the United States.

I have heard it asserted by farmers in Virginia, that the grass is more vigorous beneath the Persimon than under any other tree, and this fact is attributed to the speedy decay of its leaves, which form an excellent manure. In an ancient periodical work printed at Philadelphia, I find that the English government, in the years 1762 and 1763, offered a premium of 20 pounds sterling for every 50 pounds of gum collected from the Persimon in their American Colonies. They were doubtless misinformed on this subject: a greenish gum, without taste or smell, exudes from the tree, but, in

several hundred experiments, I have not been able, by wounding the bark, to collect more than two scruples from a single stock.

Breckel, in his History of North Carolina, says that the inner bark has been used with success in intermittent fevers. The fact remains to be verified; I have not had an opportunity of proving it by my own observations nor by authentic report, but it is rendered in some degree probable by the extreme bitterness of the bark.

The inhabitants of the Southern States have very properly preserved the Persimon in clearing the forests. Its fruit might, without doubt, be doubled in size by attentive cultivation. As the tree is diœcious, care must be taken to procure stocks of both sexes. The roots run to a great distance, and produce a numerous family of sprouts.

The Persimon grows perfectly well and even yields fruit in the climate of Paris; but further south it would succeed still better. Its propagation may be recommended for the sake both of its fruit and of its wood.

Observation.—Dr. B. S. Barton, Professor of Botany and Materia Medica in the University of Pennsylvania, believes the Persimon of the Southern States to be a distinct species from that of New Jersey. He grounds this opinion upon the fact that the leaves of the Virginia Persimon are one-half larger and slightly downy beneath, and the fruit one half smaller, with flat instead of convex stones. I am disposed to admit the distinction, but am not prepared to adopt it with confidence. I have always ascribed the difference to climate, which, as we have had occasion to remark, has so extraordinary an influence on the development of other trees, that are common to different parts of the United States. I leave the difficulty, however, to be resolved by more accomplished botanists, simply observing that the two varieties are similar in their general appearance and in the properties of their wood and fruit.

PLATE XCIII.

A branch with leaves of the natural size. Fig. 1, *Fruit of the natural size. Fig.* 2, *A seed.*

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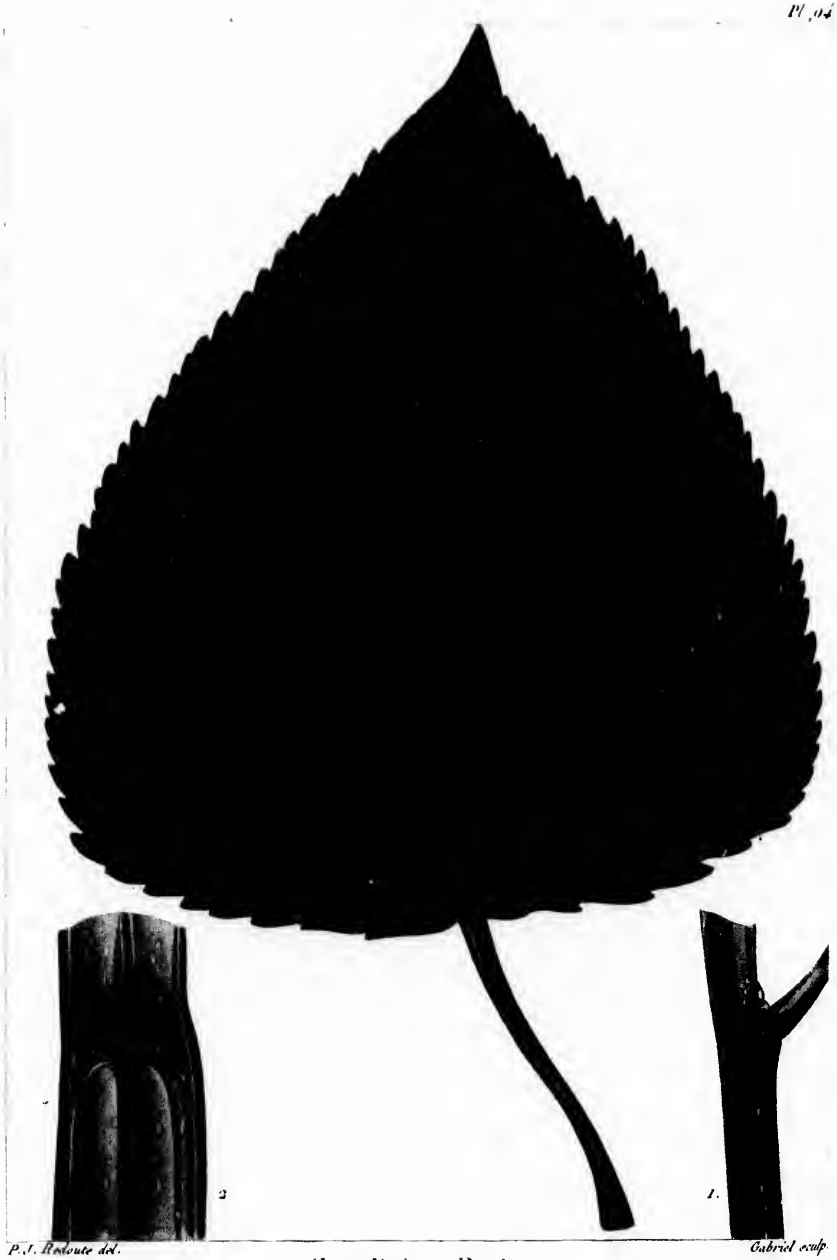
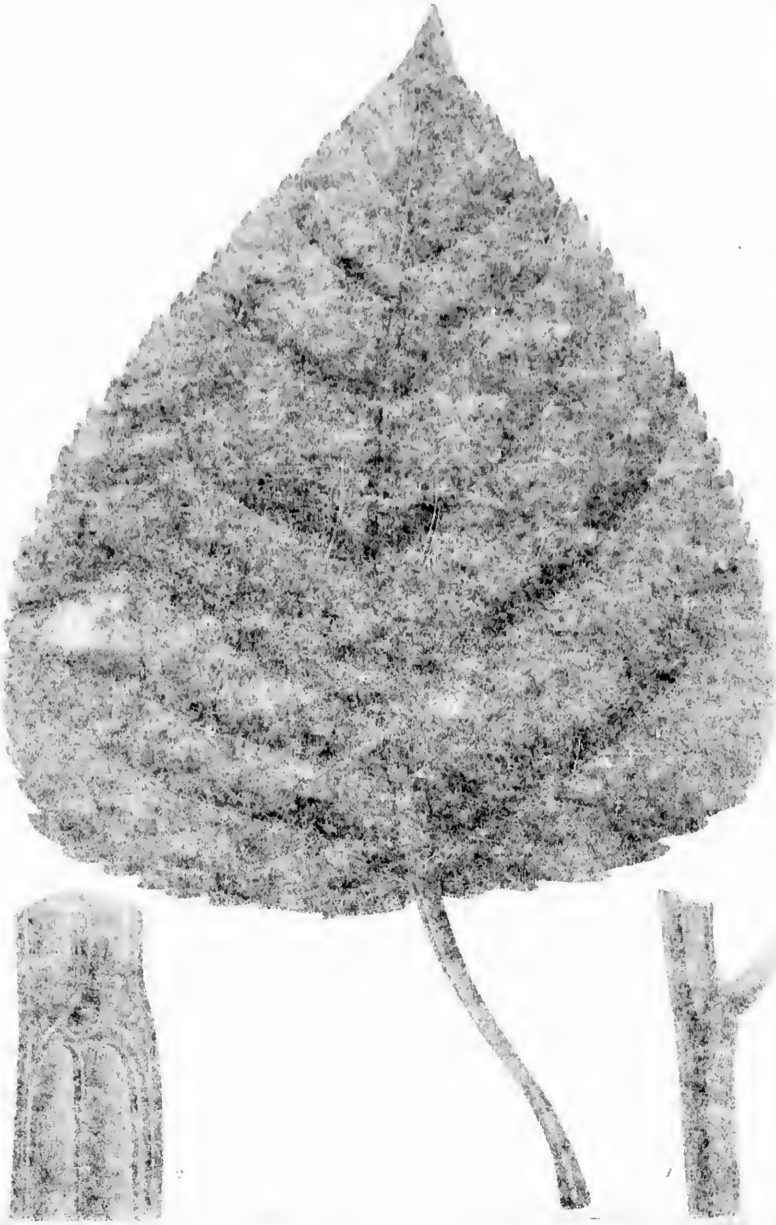


P.J. Redoute del. Gabriel sculp.

Carolinian Poplar.
Populus Angulata.

Pl. 94

Gabriel sculp.



Carolinian Poplar

Populus angulata

CAROLINIAN POPLAR.

Dioecia polyandria. Linn. Amentaceæ. Juss.

Populus angulata. *P. arbor maxima; ramis acutangulis; foliis deltoïdeis, serratis; junioribus amplissimis, cordatis; gemmis viridibus, non resinosis.*

The lower part of Virginia is the most northern point at which I have found this species of Poplar, and here it is less common than in the two Carolinas, in Georgia and Lower Louisiana. It grows of preference on the marshy banks of the great rivers which traverse these States, and is peculiarly abundant on the Mississippi, from the ocean to the mouth of the Missouri, and along the Missouri for 100 miles from the junction of these streams, which, in following their windings, is a distance of 1500 miles. In the swamps, the Carolinian Poplar is accompanied by the Cypress, Large Tupelo, Red-flowering Maple, Water Hickory, Over-cup Oak, Cotton Wood and Cotton Tree. Among the numerous species of Poplar found in the United States this is one of the most remarkable for its size, being sometimes 80 feet high, with a proportional diameter and an expansive summit, garnished with beautiful foliage.

The leaves, from the moment of their unfolding, are smooth and brilliant, but they differ widely in conformation, at different ages of the plant; on sprouts and young stocks they are 7 or 8 inches long, as much in breadth in the widest part, heart-shaped and rounded at the base, with the principal ribs of a reddish color; on trees exceeding 5 or 6 inches in diameter and 30 or 40 feet in height, they are only one fourth as large, particularly on the higher branches, and their base is nearly straight, and at right angles with the petiole. These leaves are thin, smooth, of a fine green tint, marked with yellowish nerves and edged with obtuse teeth, which are finer towards the summit and coarser near the base. The long petiole compressed in the upper part renders them easily agitated by the wind.

On sprouts and young stocks the annual shoots are very thick, distinctly striated and of a green complexion spotted with white; on branches of the second, third, and even of the seventh or eighth year, the traces of the furrows are still observable: they are indicated by prominent red lines in the bark terminating at the insertion of the young shoots, which ultimately disappear with the growth of the branches. This character belongs also to the Cotton Tree; but, besides the difference of their general appearance, the two species are distinguished by their buds; those of the Carolinian

Poplar are short, of a deep green, and destitute of the resinous, aromatic substance which covers those of the Cotton Wood, and of which the vestiges remain till late in the season.

The wood of the Carolinian Poplar is white, soft, and considered as unfit for use in its native country. This stately tree was introduced many years ago into Europe, where it is justly esteemed as an ornamental vegetable by the amateurs of foreign plants. In the climate of Paris its terminal branches are liable, in rigorous seasons, to be destroyed by the frost.

In the North American Flora, my father has confounded the Carolinian Poplar and the Cotton Wood. The two species agree in the angular form of their trunk, but they differ in other respects, which I have particularly mentioned.

PLATE XCIV.

A leaf of the natural size from the middle of a large tree. Fig. 1, *A portion of an annual shoot. Fig.* 2, *A piece of the bark from a branch of the third year.*

[All the species of Poplar are deciduous trees, mostly growing rapidly and to a large size; the Poplar is diœcious, and the catkins of the males of most of the species are very ornamental from the red tinge of their anthers, and from their being produced very early in the spring, when the trees are leafless. The females of all the species have their seeds enveloped in abundance of cottony down; this, when ripe, and the seeds are shed, adheres to every object near it, and is so like cotton wool in appearance and quality, that it has been manufactured into cloth and paper. The tremulous motion of the leaves, which is common in a greater or less degree, to all the poplars, proceeds from the great length of the petioles in proportion to the size and weight of the leaves to which they are attached. The Poplars are all readily propagated by cuttings or layers, and some of them by suckers; they all like a moist soil, particularly when it is near a running stream, but none of them thrive in marshy or undried soil. On very dry ground the leaves of the Poplars grow yellow, and fall off much sooner than when they are planted in a more congenial soil; from their rapid growth and great bulk they are liable to have their branches broken off by the wind, when the rain enters, and the trunk soon rots and becomes the prey of insects.

See Nuttall's Supplement, vol. 1, p. 51, et seq.]

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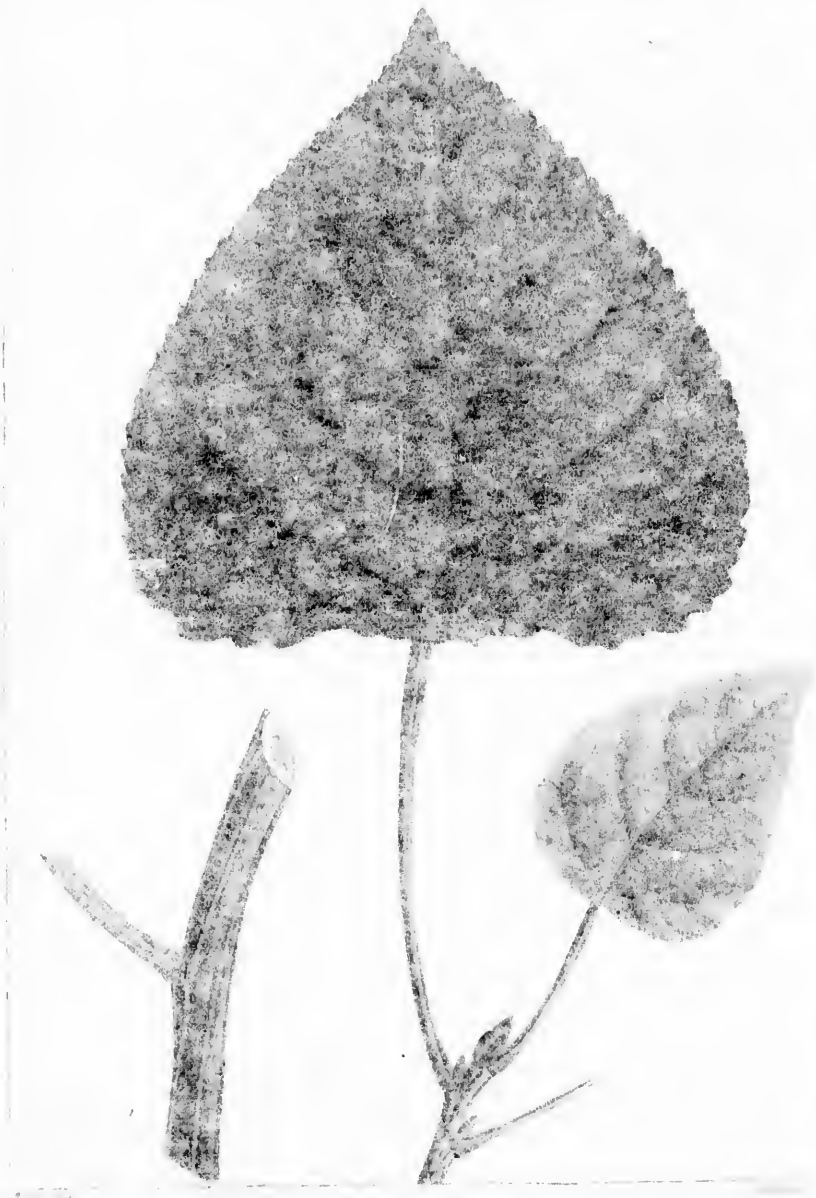
Bessa del. Gabriel sculp.

Cotton Wood.

Populus Canadensis.

Pl. 9.

Gabriel sculp.



Cotton Wood.
Populus Canadensis

COTTON WOOD.

POPULUS CANADENSIS. *P. foliis magnis latè-cordatis, crenatis, glabris; basi glandulosis; ramis angulatis in adultis.*

THIS species, like the Virginian Poplar, has long been known in Europe. It was probably introduced into France from Canada; such at least is the origin indicated by the name *Canadian Poplar*. I have found this tree in the upper part of the State of New York, on the banks of the river Genesee which empties into Lake Ontario in the 43d degree of latitude, in some parts of Virginia, and on several islands of the Ohio. I have every where seen it on the margin of rivers, in a fat, unctuous soil, exposed to inundation at their overflowing in the spring. It is never met with on the skirts of swamps and in other wet grounds in the forests. On the banks of the Genesee, where the winter is as rigorous as in the north of Germany, the Cotton Wood is 70 or 80 feet high and 3 or 4 feet in diameter.

The remarks communicated to me by M. De Foucault, who has long cultivated this tree and studied it with more minute attention than myself, agree perfectly with the result of my own observations in the country of its natural growth. "The leaves," says M. De Foucault, "are deltoid, or trowel-shaped, approaching to cordiform, always longer than they are broad, glabrous and unequally toothed: the petioles are compressed and of a yellowish green, with two glands of the same color as the base: the branches are angular, and the angles form whitish lines, which persist even in the adult age of the tree. Every soil does not suit the Cotton Wood; in compact argillaceous lands it grows less kindly than the Virginian Poplar.

"The Virginian Poplar is justly preferred as a useful tree, not only because it is less difficult in the choice of soil, but because it is superior in height: the elevation of the Cotton Wood is repressed by the frequent ramification of its limbs near the trunk, and if the lower limbs are lopped away the same form is assumed by those above.

"The Cotton Wood is a more picturesque tree than the Virginian Poplar, particularly when growing on the sides of rivers. Its trunk is very plainly sulcated, even in its old age. It is less so, indeed, than the Carolinian Poplar, but far more so than the Virginian Poplar, whose trunk is rounder and summit more spherical; hence the two species are easily distinguished. The Cotton Wood, also, acquires a superior bulk."

The female aments are 6 or 8 inches long, flexible and pendulous. The seeds are surrounded with a beautiful plume which has the whiteness of

cotton, and the young buds are coated with a resinous, aromatic substance of an agreeable odor.

In the atlantic States this Poplar is rare and has received no specific name. It appears, on the contrary, to be common on the banks of the Mississippi above the river of the Arkansas, and on the Missouri and its tributary streams. It is doubtless the Poplar designated by the name of Cotton Wood, and mentioned so frequently by Gass, who accompanied Lewis and Clark to the Western Ocean, and by Pike in his interesting account of the northern part of New Spain. Often, say these travellers, it is the only tree seen growing on the sides of the rivers. The Mandans, who live 1500 miles from the mouth of the Missouri, feed their horses during the winter with its young shoots. The excessive cold experienced in these regions sufficiently proves that the Cotton Wood is not the same tree with the Carolinian Poplar, whose annual shoots freeze every year with a degree of cold much less intense. The Americans of Upper Louisiana, it is true, confound the two species because they are found growing in company on the banks of the Mississippi; but the Carolinian Poplar, which is more abundant than the other in Lower Louisiana, where the temperature of the winter is too mild for snow, disappears on the Missouri at the distance of 100 miles from its junction with the Mississippi.

PLATE XCV.

Leaves of the natural size taken from a large tree. Fig. 1, *Part of a branch of two years' growth.*

[The Canadian Poplar is propagated by cuttings of the young wood, about 18 inches long, put in during autumn; the shoots produced from these cuttings are always curved at the lower extremity, though in a few years this curvature entirely disappears. The fine Poplar avenues in the lower parts of the gardens at Versailles are formed of this species.

See Nuttall's Supplement, vol. 1, p. 54.]

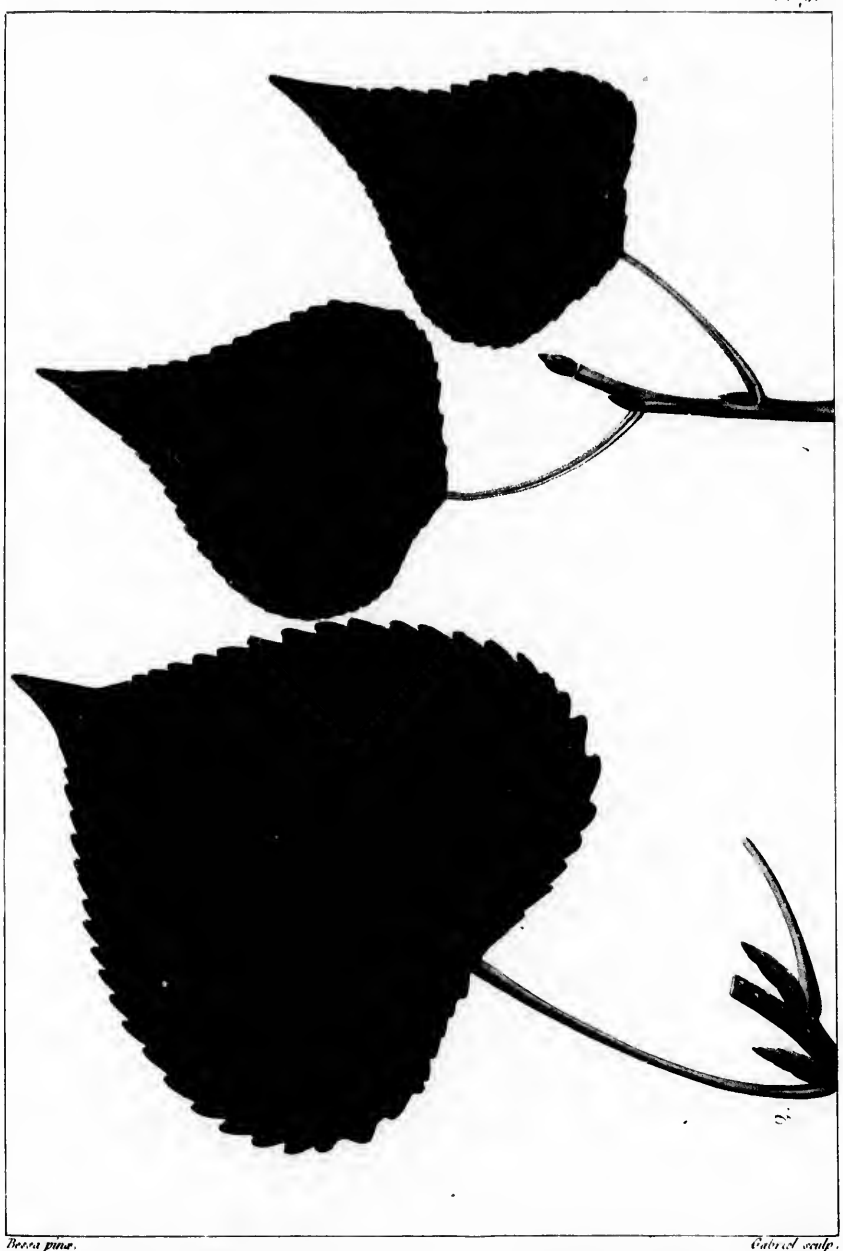
AMERICAN BLACK POPLAR.

POPULUS HUDSONICA. *P. ramulis junioribus pilosis; foliis dentatis, conspicuè acuminatis.*

I HAVE found the American Black Poplar only on the banks of the river

American Black Poplar
Populus Hudsonica

Virginian Poplar.
Populus moliifera



Bessa pinx. Gabriel sculp.

1. American Black Poplar.
Populus Hudsonici.

2. Virginian Poplar.
Populus molinifera.

Hudson, above Albany, but I presume that it grows also in the provinces of Canada, which I have never visited. The stocks which I have observed were insulated, and consequently spread into a diffuse summit, hence I was unable to determine the stature of this tree when confined in the forest, but their size, which was 30 or 40 feet in height and 12 or 15 inches in diameter, sufficiently proves that it surpasses the American Aspen and the Large Aspen.

The bark of the young branches is of a grayish white, and the buds, which spring from the bosom of the leaves, are of a dark brown. One of the distinctive characters of this species is the hairiness of the young shoots and of the petioles in the spring, which is perceptible, also, on the back of the young leaves. The leaves are smooth, of a beautiful green color, denticulated, rounded in the middle, and acutely tapering toward the summit. When fully developed they are a little more than 3 inches long, about 2 inches broad, and, unlike the leaves of trees in general, they exhibit nearly the same shape from the moment of their unfolding. The aments of this Poplar are 4 or 5 inches long, and destitute of the hairs which surround those of several other species.

As this tree is rare in the United States, and as I have observed it only on the banks of the Hudson, where it is never used, I can afford no information concerning the quality of its wood; but, if we may judge from its appearance, it is inferior to the Virginian and Lombardy Poplars.

Several large trees of this species are seen growing in New York, near the Park, which are called American Black Poplars.

PLATE XCVI.

Fig. 1, *Leaves of the American Black Poplar.*

VIRGINIAN POPLAR.

POPULUS MONILIFERA. *P foliis deltöideis, glabris, crenatis, petiolis aspice compressis, in adultis ramis teretibus.*

THOUGH this tree has been found neither by my father and myself, nor by several learned English botanists, who like us have traversed the Atlantic and a great part of the Western States in every direction, I have thought

proper to describe it because it may possibly be indigenous to some part of the United States which we have not visited, and because, on account of its rapid growth, it deserves the attention of the Americans. It has been cultivated in Europe for many years, and is universally considered as a native of North America. It is called Virginian Poplar and Swiss Poplar; the last of which denominations is owing only to its being abundantly multiplied in Switzerland.

The Virginian or Swiss Poplar is 60 or 70 feet high with a proportional diameter. Its trunk is cylindrical, and not sulcated like that of the aged Lombardy Poplar, and the bark upon old stocks is blackish. The leaves are nearly as long as they are broad, slightly heart-shaped, compressed towards the summit, obtusely denticulated and borne by long petioles. On large trees their mean length is from 2½ to 3 inches, but they vary in size, being twice as large on the lower limbs, and on young stocks growing in moist places. On trees equally vigorous and nourished by the same soil, the leaves of this species are observed to be only half as large as those of the Cotton Wood and Carolinian Poplar.

In France we have only the male of this Poplar, which is propagated by slips. On the young Virginian Poplar, as on the Cotton Wood and Carolinian Poplars, the annual shoots are angular, and this form subsists during the second and third years on vigorous stocks in a humid soil: on trees which are already 20 or 30 feet high and which grow on dry and elevated lands, the young branches are perfectly round, but in the other species they always retain the angular shape during several years.

As the Swiss Poplar has been and is still confounded with the Cotton Wood, I shall succinctly state the characters which distinguish them, according to the observations of M. De Foucault, a Director of the Imperial Administration of the Waters and Forests, eminently distinguished by his knowledge of botany applied to this branch of economy. He remarks that the leaves of the Virginian Poplar are much smaller and less distinctly heart-shaped; the young shoots are smaller and less angular, and on high grounds those of the third year are even cylindrical: the limbs also diverge less widely from the trunk. M. De Foucault adds that the wood of the Swiss Poplar is softer than that of the Cotton Wood, but that its growth is more rapid and that it prospers in a less humid soil. This last consideration explains the profusion with which it is multiplied throughout France, where it is found to yield a more speedy and more abundant product than the Lombardy Poplar.

PLATE XCVI.

Fig. 2, *Virginian or Swiss Poplar.*

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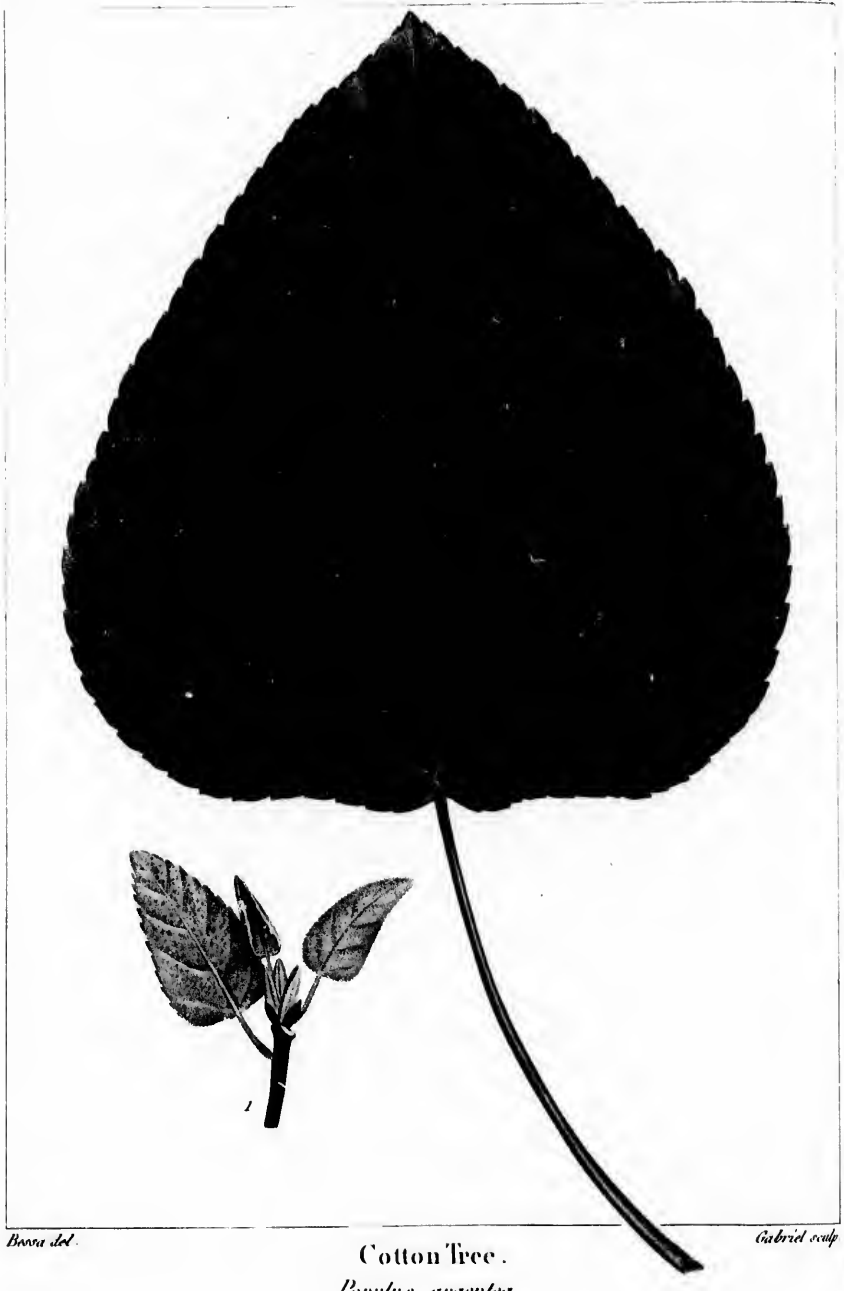


Bessa del. Gabriel sculp.

Cotton Tree.

Populus argentea.

Pl. 97

Gabriel sculp.

[This tree [illegible]

[illegible]

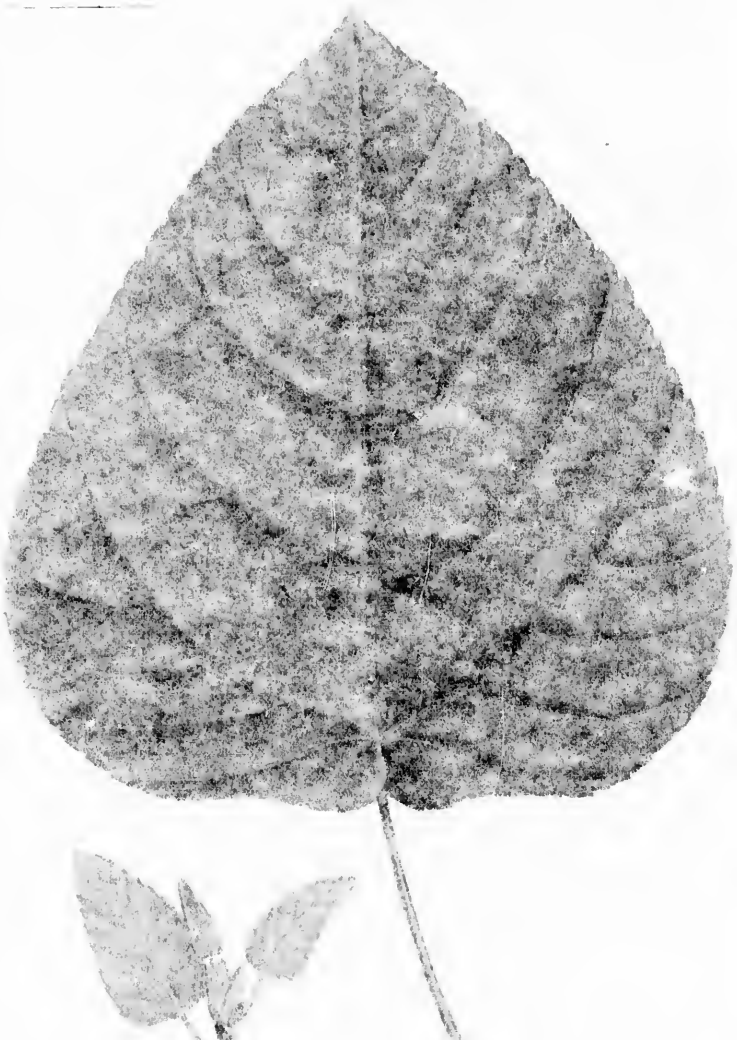
COTTON TREE.

POPULUS ARGENTEA [illegible]

This species [illegible] Middle, Western [illegible] Southern State[illegible] notice of the greater part of the inhabitants, and [illegible] name [illegible] on the banks of the river Savannah [illegible] called Cotton Wood. The [illegible] Carolinian Poplar which grows in the same [illegible]

A swamp in New Jersey near [illegible] Weehawken-ferry, [illegible] point at which I [illegible] gnia, but less [illegible] traverse the [illegible] to have found it [illegible] other places. [illegible] on the Ohio near its junction [illegible] Mississippi [illegible] than six miles in diameter [illegible] is about thirty miles from [illegible] the Illinois.

This is a towering tree which sometimes [illegible] and 2 or 3 feet in diameter. On trunks of [illegible] very thick and deeply furrowed. The [illegible] shoots are round, instead of being [illegible] Poplar and of the Cotton Wood. The [illegible] ered with a thick, white down, which [illegible] perfectly smooth [illegible] and [illegible] long petioles, are often 6 inches in length [illegible] texture, denticulated and heart shaped, with [illegible]



Cotton Tree

Populus argentea

[This tree is called the Necklace-bearing or Black Italian Poplar. In Great Britain it attains the height of 100 and even 120 feet.]

COTTON TREE.

POPULUS ARGENTEA. *P. ramulis teretibus; foliis amplis, sinu parvo cordatis, obtusis, leviter dentatis, junioribus tomentosis.*

THIS species is scattered over a great extent of country, comprising the Middle, Western, and Southern States. But it is so rare as to escape the notice of the greater part of the inhabitants, and it has received a specific name only on the banks of the river Savannah in Georgia, where it is called Cotton Wood. The same denomination is applied also to the Carolinian Poplar which grows in the same place.

A swamp in New Jersey near the North river, about two miles above Weehawken-ferry, and not far from the city of New York, is the most northern point at which I have observed this tree. I have met with it too, in Virginia, but less commonly than on the banks of some of the rivers which traverse the maritime parts of the more southern States. My father appears to have found it still more abundant in the Western Country. Among other places, he particularly mentions the environs of Fort Massac, situated on the Ohio near its junction with the Mississippi, and a swamp of more than six miles in diameter, which are entirely covered with it: this swamp is about thirty miles from the river Wabash, on the road from Kaskaskia to the Illinois.

This is a towering tree, which sometimes equals 70 or 80 feet in height and 2 or 3 feet in diameter. On trunks of these dimensions the bark is very thick and deeply furrowed. The young branches and the annual shoots are round, instead of being angular, like those of the Carolinian Poplar and of the Cotton Wood. The leaves, while very young, are covered with a thick, white down, which gradually disappears, leaving them perfectly smooth above and slightly downy beneath. They are borne by long petioles, are often 6 inches in length and as much in breadth, of a thick texture, denticulated and heart shaped, with the lobes of the base lapped

so as to conceal the junction of the petiole. The aments are drooping and about 3 inches long, or only half as long as those of the Carolinian Poplar.

The wood of the Cotton Tree is soft, light, unfit for use, and inferior, in my opinion, to that of the White Poplar and of the Virginia and Lombardy Poplars. The heart is yellowish inclining to red, and the young branches are filled with a pith of the same color.

This tree flourishes in France, but it is to be regretted that the quality of its wood does not correspond to the interest inspired by its elevated stature and beautiful foliage.

PLATE XCVII.

A leaf of half the natural size. Fig. 1, *A small branch with leaves a few days after their unfolding.*

TACAMAHACA, OR BALSAM POPLAR.

Populus balsamifera. *P. foliis ovato-lanceolatis serratis, subtus albidis, stipulis resinosis.*

This species of Poplar belongs to the northern regions of America to which I have not extended my researches. My father, who traversed Lower Canada and particularly the country lying between Quebec and Hudson's Bay, found the Balsam Poplar very abundant on the shores of Lake St. John, and in all the districts watered by the river Saguenai, between the 47th and 49th degrees of latitude. Notwithstanding the severity of the winter, it rises to the height of 80 feet with a diameter of 3 feet. It is multipled at Tadousack and Malebay near the river St. Lawrence, but, in approaching Montreal, it becomes less common, and is rare on the shores of Lake Champlain. Such are nearly its northern and southern limits.

In the spring, when the buds begin to be developed, they are abundantly coated with a yellowish, glutinous substance, of a very agreeable smell, and, though this exudation diminishes at the approach of summer, the buds retain a strong balsamic odor. The leaves are borne on long, round peti-

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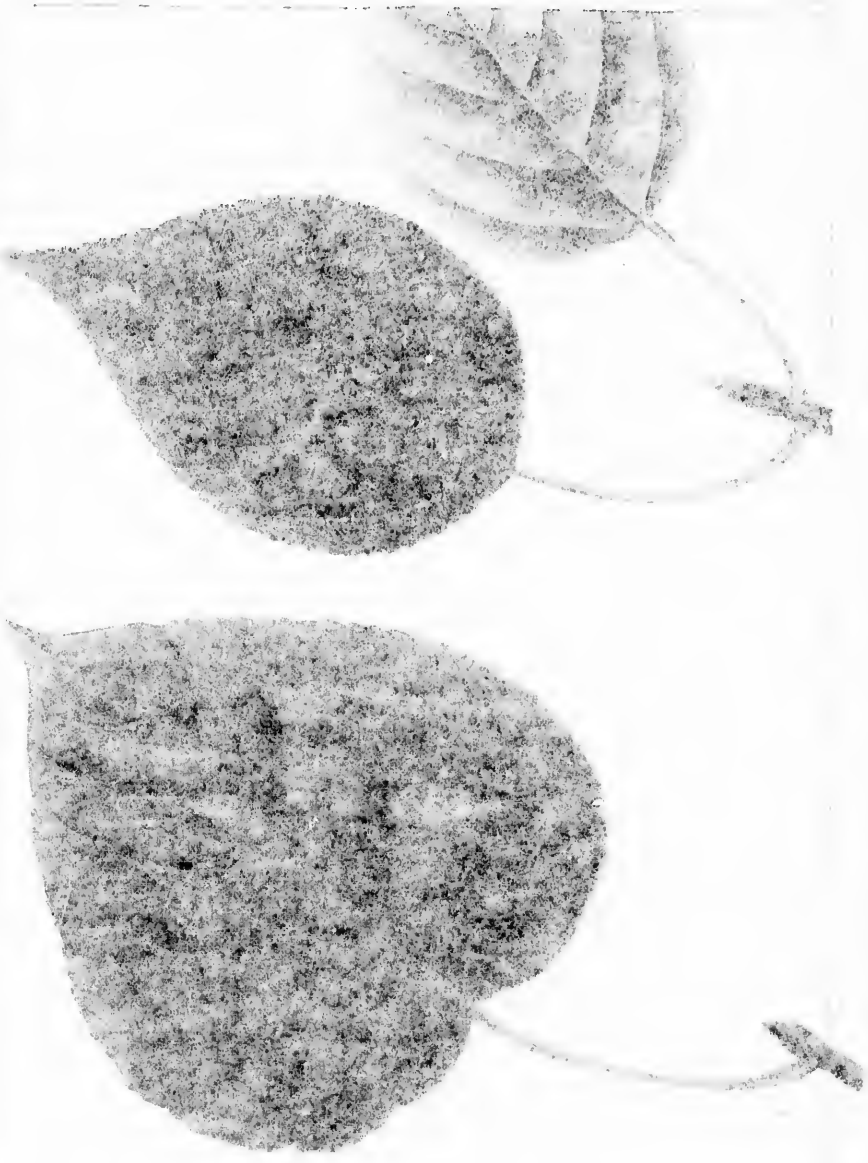
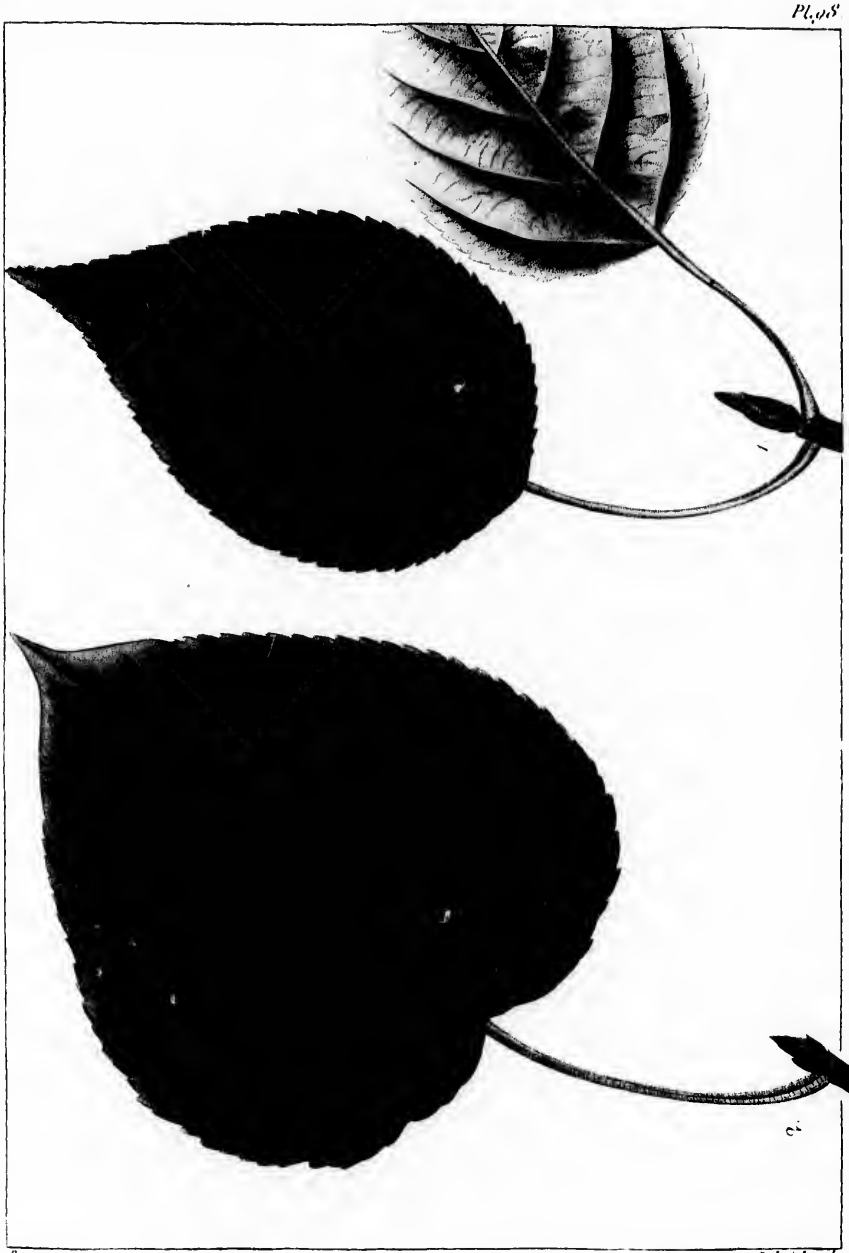


1. Balsam Poplar
Populus Balsamifera

2. Cotton-wood Balsam Poplar
Populus tacamahaca



Bessa pinx. Gabriel sculp.

1. Balsam Poplar.
Populus Balsamifera.

2. Heart Leaved Balsam Poplar.
Populus candicans.

oles, and are of a lanceolate oval form, of a deep green color above, and of a rusty silvery white beneath.

The wood of this tree is white and soft, and is not used by the Canadians.

PLATE XCVIII.

Fig. 1, *A branch of the natural size from a large tree.*

[This is one of the hardiest of the Poplars, though not of very rapid growth, except during the first three or four years in the nursery. In Franklin's First Journey, it is stated that it is found as far north as the Great Slave Lake, and that Mackenzie River has been named Rivière aux Liards, from the abundance of the tree in that quarter. "It also constituted," says Captain Franklin, "the greatest part of the drift timber that we observed on the shores of the Arctic Sea." Franklin says it yields a large quantity of potash. Pallas states that the grouse, and other birds of that family, that feed on the buds of this Poplar during winter have their flesh imbued with a grateful balsamic flavour. It is readily propagated by suckers, which it sends up in abundance ; or by cuttings, which however do not strike as those of other Poplars. It will grow in any soil, but it prefers one moist and rich, and a sheltered situation.

See Nuttall's Supplement, vol. 1., p. 55.]

HEART-LEAVED BALSAM POPLAR.

Populus candicans. *P. foliis cordatis ; petiolis hirsutis ; stipulis resinosis ; ramis teretibus.*

In the States of Rhode Island, Massachusetts and New Hampshire, this tree, which is a genuine Balsam Poplar, is commonly seen growing before the houses, both in the towns and in the country, less as an ornament than as a shelter from the sun. I have never found it in the forests of these States, where, if it exists, it must be extremely rare ; nor have I discovered whence it was first introduced. This species differs very evidently from

the preceding; its leaves are three times as large, perfectly heart-shaped, and, often, they have hairy petioles: but in both species the leaves are of the same color, and preserve, at all stages of their growth, the same shape, which is invariable upon young sprouts and upon old trees.

The buds of this species, like those of the Balsam Poplar, are covered in the spring, with a resinous balsamic substance, of an agreeable odor.

The Heart-leaved Balsam Poplar attains the height of 40 or 50 feet, with a diameter of 18 or 20 inches. The trunk is clad in a smooth, greenish bark and the wood is soft and unfit for use. The foliage is tufted and of a dark green tint, but the irregular disposition of the branches gives an inelegant appearance to the tree. In the spring the ripe seeds, garnished with down, are borne by the wind into the houses, and alight upon the furniture and upon the food; for this reason some persons have substituted for this species the Lombardy Poplar, a picturesque tree in every respect superior to it, whose limbs are compressed about the trunk so as not to interfere with the walls nor to obstruct the windows.

PLATE XCVIII.

Fig. 2, *A branch of the natural size from a large tree.*

AMERICAN ASPEN.

Populus tremuloïdes. *P. foliis subcordatis, abruptè acuminatis, serrulatis; margine pubescentibus.*

This species of Poplar is common in the Northern and Middle Sections of the United States, and, from my father's manuscript notes, appears to be still more abundant in Lower Canada. In the vicinity of New York and Philadelphia, where I have particularly observed it, I have remarked that it prefers open lands of a middling quality. Its ordinary height is about 30 feet, and its diameter 5 or 6 inches. The bark of the trunk is greenish and smooth, except on the base of the oldest trees, where it becomes furrowed.

The American Aspen blooms about the 20th of April, ten days or a fortnight before the birth of the leaves. The aments, which spring from the extremity of the branches, are composed of silky plumes, and are of an

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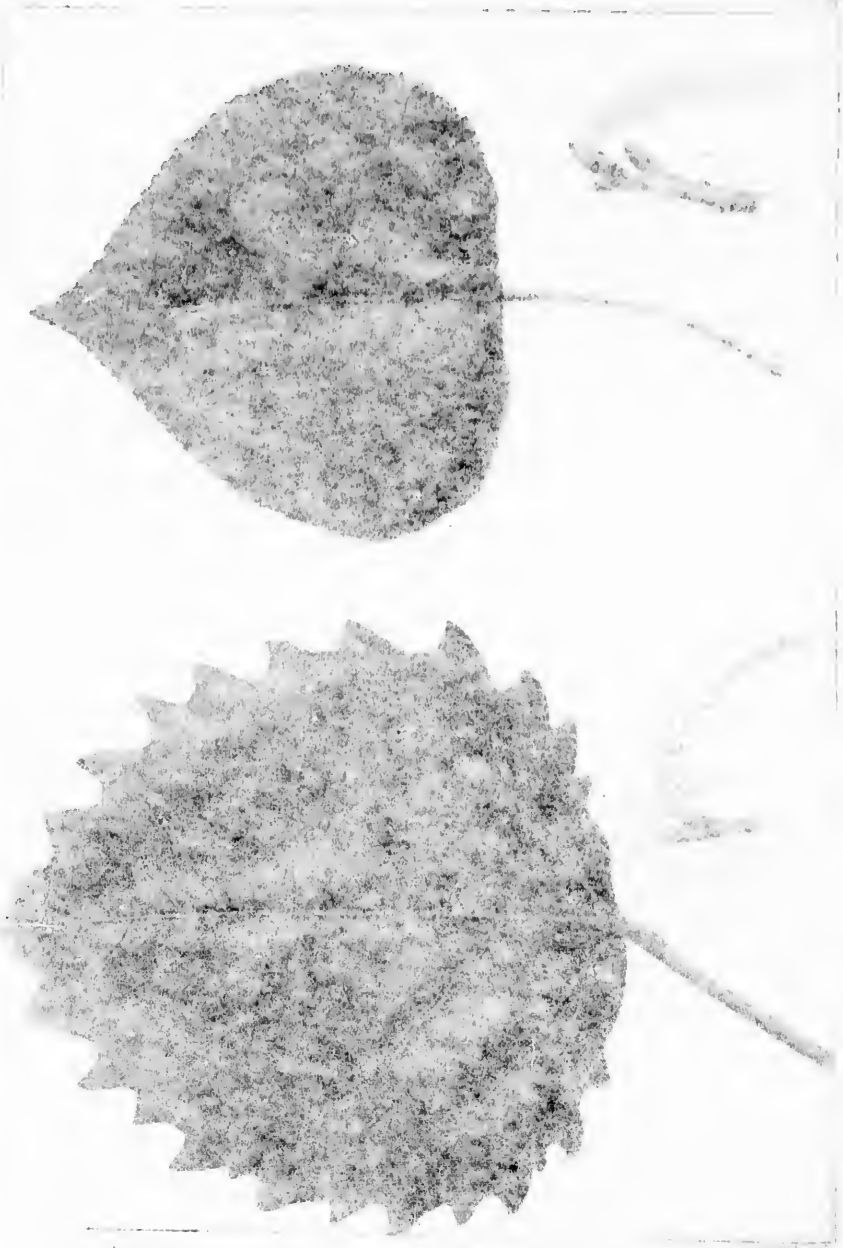
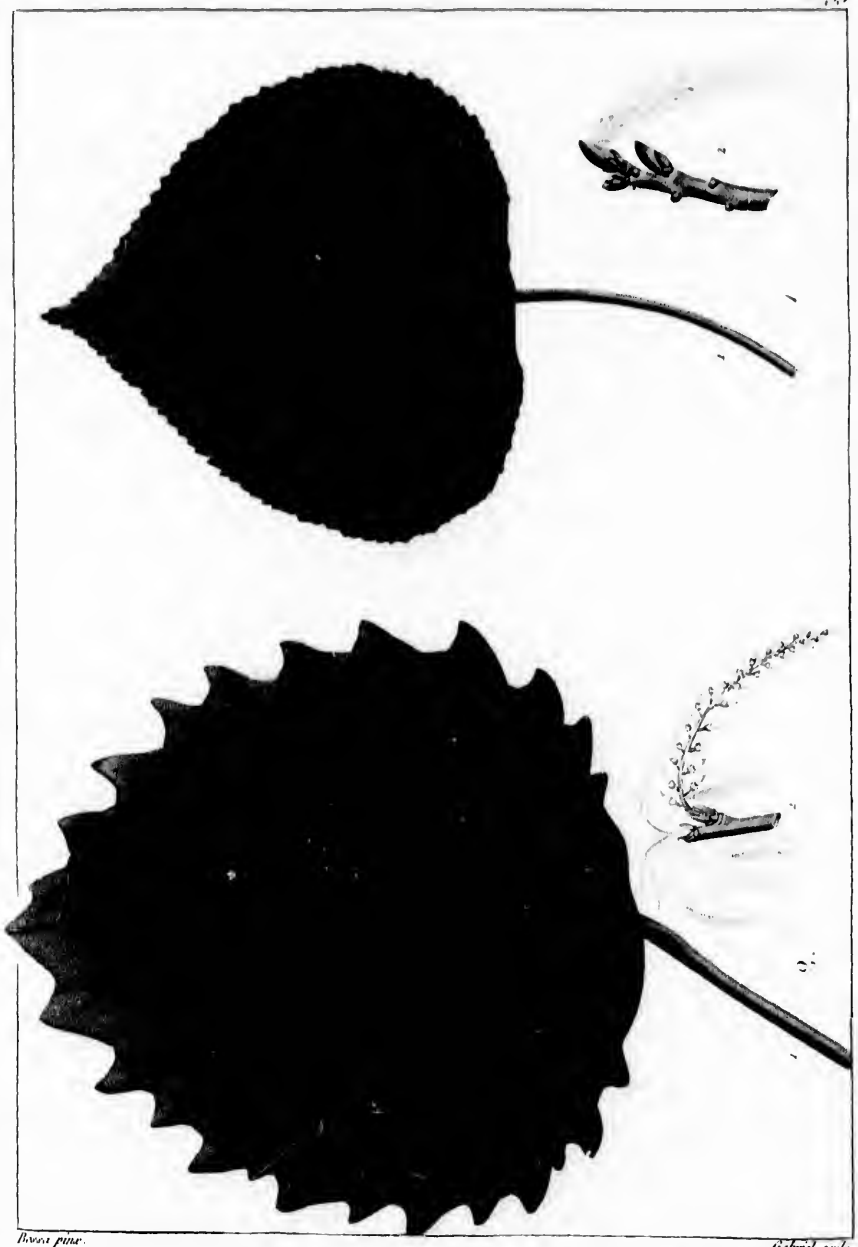


American Aspen.
Populus tremuloides

American Large Aspen.



Prevost pinx.

Gabriel sculp.

1. American Aspen.
Populus tremuloides.

2. American Large Aspen.
Populus grandidenta.

oval form, and about an inch in length. The leaves are about two inches broad, narrowed at the summit, and supported by long petioles; they are of a dark green colour, and, in the spring, their nerves are reddish: on stocks of 7 or 8 feet in height, they are nearly round, and are bordered with obtuse, irregular teeth; on young shoots, they are twice this size, heart-shaped, and acuminate at the summit. Of all the American Poplars, this species has the most tremulous leaves, the gentlest air suffices to throw them into agitation.

The wood of the American Aspen is light, soft, destitute of strength and of no utility. These defects are not even compensated by an ample size and rapid growth, and the tree is so much neglected that it is felled only to disencumber lands that are clearing for cultivation. It is greatly inferior to several species of the same genus, such, for example, as the Virginian Poplar, which is three times as large, more rapid in its growth, and of a more pleasing appearance.

Observation.—Since the publication of the French edition of this work, I have been informed that the wood of the American Aspen has been successfully divided into very thin *laminæ*, for the fabrication of women's hats. These hats were for a short time fashionable in several towns of the United States.

PLATE XCIX.

Fig. I. 1, *A leaf of the natural size.* 2, *An ament.*

AMERICAN LARGE ASPEN.

POPULUS GRANDIDENTATA. *P. petiolis supernè compressis; foliis subrotundò-ovalibus, acuminatis; utrinquè glabris, inæqualiter sinuatò-grandidentatis; junioribus villosis.*

THE American Large Aspen belongs rather to the Northern and Middle, than to the Southern States, in the upper parts only of which it is found. In the north of the United States, this Poplar, though not one of the most rare, is not one of the most common trees, and is so thinly scattered over the face of the country, that sometimes not a single stock is met with by the traveller for several days. For this reason, probably, it has hitherto

been confounded by the inhabitants with the preceding species, which is more multiplied: as it surpasses the Aspen in height, I have given it the name of Large Aspen.

It grows as favorably on uplands as on the border of swamps. It is about 40 feet high, 10 or 12 inches in diameter, and its straight trunk is covered with a smooth, greenish bark, which is rarely cracked. Its branches are few and scattered: they ramify and become charged with leaves only near the extremity, so that the interior of the summit is void, and of an ungraceful appearance.

At their unfolding in the spring, the leaves are covered with a thick, white down, which disappears with their growth, so that at the beginning of summer they are perfectly smooth. The full formed leaf is nearly round, 2 or 3 inches in width, smooth on both sides, and bordered with large teeth, from which is derived the Latin specific name of *grandidentata*, given to this species by my father in his *Flora Boreali-Americana*. The flowers compose aments about 2 inches long, which appear in the infancy of the leaves, and which, at this period, are thickly coated with down.

The wood is light, soft, and unequal to that of the Virginian and Lombardy Poplars; the tree, also, is inferior to these species in size, and in the rapidity of its growth. It thus appears to promise no advantage to the arts, and to be valuable only for its agreeable foliage. While it is less than 15 feet in height, it has a pleasing appearance, and it is entitled to a place in ornamental gardens.

PLATE XCIX.

Fig. 11. A leaf of the natural size. 2, A fertile ament with young leaves.

COMMON WHITE OR GRAY POPLAR.

Populus canescens. *P. foliis subrotundis, angulato-dentatis, subtomentoso-cinerescentibus; amentis cylindraceis, laxis.*

The Poplars of the Old Continent are less numerous than those of America. The largest among them are the Great White Poplar and the Com-

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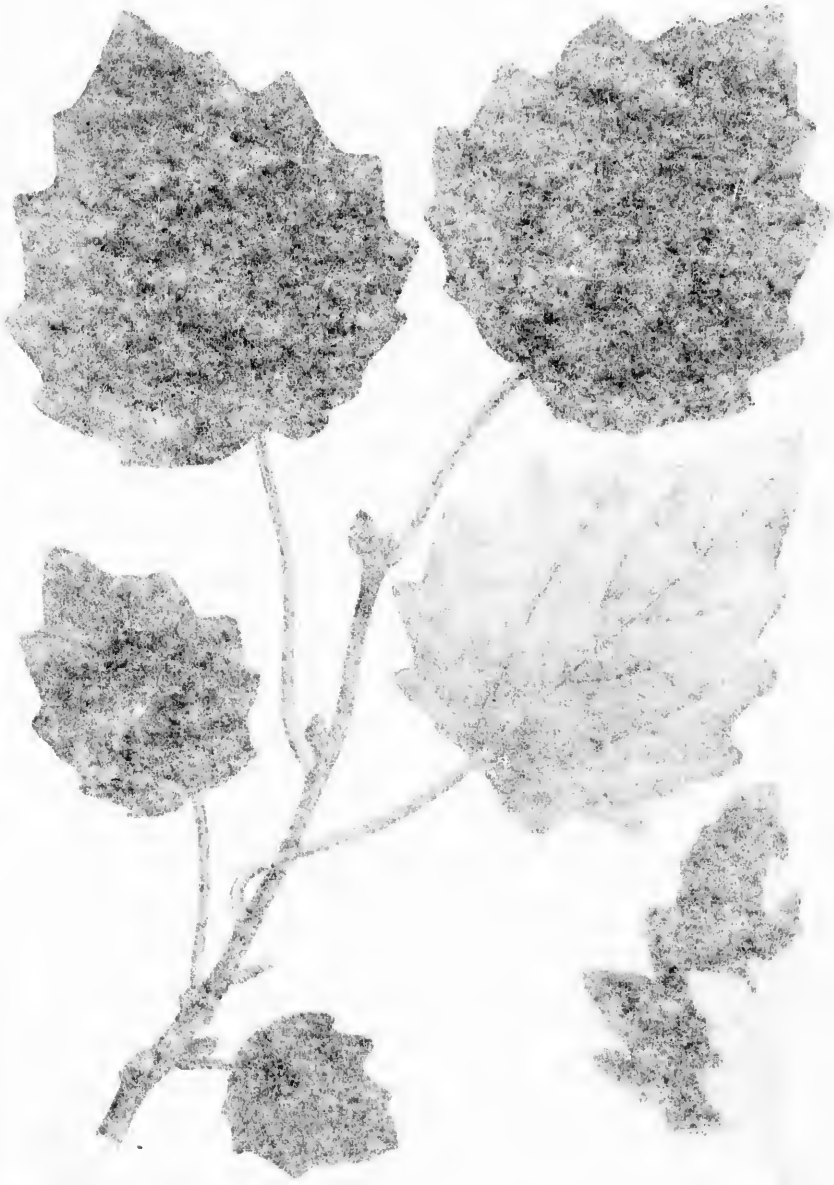

Common White
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Common White *or* Grey Poplar.

Populus canescens.

mon White Poplar, which were for a long time confounded, and which have been distinguished only within forty years by the characters of their leaves.

In the *Species Plantarum*, Willdenow thus designates the first of these trees: *Populus alba; foliis cordato-subrotundis, lobatis, dentatis, subtus tomentoso-nivies; amentis ovatis.* In this description, a shorter and more oval ament forms the peculiar character of the fructification; but the principal difference is in the leaves; those of the Great White Poplar are larger, and have the lower surface constantly whitened with thick down.

To this tree must be referred the allusions of the poets to the Poplar of Hercules: *Populus Alcidæ gratissima.* It is less common in France and in England than the White or Gray Poplar, and is inferior in size and in the quality of its wood.

The Gray Poplar, *Peuplier grisaille*, is one of the largest trees of the Old World: it rises to the height of 90 or 100 feet, with a diameter of 5 or 6 feet. On aged trees the bark is thick and deeply furrowed, and on younger stocks it is smooth and greenish. The leaves vary in size, shape and color, according to the age of the tree and the nature of the soil: in moist grounds they are larger and more downy, and on the summit of old trees they are smooth, round and toothed.

Like other Poplars, this species grows more rapidly in moist grounds, but it is proved to accommodate itself the most easily to a variety of soils. I remember near the house in which I was born, in the vicinity of Versailles, an avenue of these trees which were planted in the reign of Louis XIV., and which, in 1792, when they were felled, were from 90 to 100 feet in height, and from 4 to 6 feet in diameter.

The wood is superior to that of the other species in whiteness, in fineness and in strength; it gives a firmer hold to nails, and is not liable to warp and split. In England and Belgium, it is commonly used by turners for bowls, trays, etc. In the south of France it is employed for the floors and wainscots of houses, and in Paris for the cases in which goods are packed for exportation.

The Gray Poplar, therefore, should be preferred in our forests, though its growth is not the most rapid. It may be multiplied by slips or by suckers, which are transplanted the fourth or fifth year, or by branches 6 or 7 feet long and 3 inches in diameter, which do not require to be removed. The larger end of the branch should be cut obliquely, so as to expose the bark for the length of 5 or 6 inches, and set in a moist, cool soil, in a hole 18 inches deep. When the branch is severed from the tree it should be placed in water till it is set in the ground. The most favourable season for forming the plantation is the autumn or the beginning of spring. When slips are sent to a distance they should be enveloped in wet moss.

The superior size and majestic form of the Common White Poplar, its

rapid growth, and the varied and useful applications of its wood, cause it to be highly esteemed in Europe, and enable me to recommend it with confidence to the inhabitants of North America. East of the river Connecticut there is no tree with light and tender wood that unites these advantages. Among the Poplars of Europe and America, this species is the best substitute for the Tulip Tree, which is rare in the northern part of the United States, and whose reproduction will probably be attended with difficulties that do not accompany the propagation of the Common White Poplar.

PLATE C.

A *branch with leaves of the natural size.* *Fig.* 1, *A leaf from a sprout at the foot of an old tree.*

[See Nuttall's Supplement, vol. 1., p. 55.]

END OF VOL. II.