

FOREST TREES OF NEW JERSEY

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Experiment Stations

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NEW JERSEY
AGRICULTURAL EXPERIMENT STATIONS
BULLETIN 202

APRIL 25, 1907.

Forest Trees of New Jersey.

BY

BYRON D. HALSTED.

During the past few years the subject of forestry has become one of rapidly growing importance. Long before this, those best able to judge were aware of the fact that the wood industry in the United States was upon the decline, largely from the sheer lack of knowledge, combined with a spirit of commercialism upon the part of those engaged in the timber trade. As a result, the people in general are now feeling the effects of a dearth of lumber and the general unbalance which always must come to a country with its native woodlands cleared by ax and fires, to say nothing of the immeasurable loss in the beauty of the landscape of mountain, hills and streams.

Our own State, while not included in the leading forest areas of the country, has suffered its share in this destruction, and it is a pleasure to recall that its government has in many ways endeavored to awaken in its people a true sense of the importance of developing and preserving in forests large tracts that, almost annually, are subjected to the injurious or ruinous effects of fires. By means of public lectures, conventions, the press, &c., the value of the forest industry has been proclaimed. It is a pleasure to feel that the subject is at present taking more definite form and a Forest Commission* is organized and is working in full sympathy

* State Board of Forest Park Reservation Commissioners. (See Digest of Law, page 51.)

with the leading officials of the State. Already certain tracts of forest land have been acquired by the State to be developed and kept permanently in forests, and, as it is hoped, to become a center around which will gather the whole wooded industry of New Jersey.

It is still further a matter of congratulation that within the past year Dr. J. C. Smock, long time Director of the Geological Survey of the State, has given to Rutgers College (including the New Jersey State College of Agriculture) a tract of thirty-six and a half acres adjoining the College Farm, upon which is to be developed a proving grounds for various kinds of trees from other portions of the world, by means of which it is hoped to bring into the State timber trees that may far surpass in practical value those native to our commonwealth.

Such a tract may become the administrative head of all the centers of research along the various lines of forestry—a branch of the State College where the people may apply for information, and, by visiting, become further acquainted with this work of tree introduction and other forestry problems in their various interesting phases.

Feeling assured that our forests are to receive that attention commensurate with their economic and esthetic importance, the Experiment Station has prepared a list of trees native to, or growing in the wild state in, New Jersey, with the hope that it will give to the people somewhat of that elemental knowledge so much needed for the prosecution of the work of developing to a profitable issue the forest interests of the State.

A knowledge of what we already have naturally precedes that of our needs from outside. At best, this list can be only a preliminary step, but, it being taken, the way will be made for the publication at an early date of a revised list accompanied, possibly, with maps showing the forest areas and those that might be made profitable again by being covered with timber trees for the good of our lumber interests, the water-supply of our cities and that beauty of rural scenery that is a growing factor in the development of our State that the sooner reckoned with the better for one and all.

The present list is based upon the "Flora of New Jersey," prepared by Dr. N. L. Britton (now Director-General of the New York Botanical Gardens), and published by the Geological Survey in 1889. The localities for each species are chiefly such as are given in that report supplemented with information from the "Handbook of the Flora of Philadelphia and Vicinity" (1905),

by Ida A. Keller and Stewardson Brown, which gives the localities of many kinds of trees for the southern half of the State.

The order of presentation of, and the botanical names in, the list are those of Sargent's "Manual of the Trees of North America," the most recent standard work upon the general subject. Messrs. Houghton, Mifflin & Co., the publishers of this excellent work, have kindly permitted the use from it of the engravings that are herein presented.

It is the expectation that this list will stimulate the readers to study the kinds of trees in their localities and send in information as to any kinds in the list and add new ones wherever they are found. In short, this list is a guide in the further canvass of the State in the immediate interest of the trees now found in New Jersey, and will, it is hoped, ultimately aid in the very important work of developing a genuine systematic and sane silviculture in the State.

The writer lays no claim to originality and has felt free to draw from all the various sources of information upon forestry that may be found in the geological reports and those of the State Board of Agriculture and the Horticultural Society. It is a pleasure to note that the writers of these various papers are among the leading authorities upon forestry matters, and include Smock, Rothrock, Gifford, Hollick, Meier, Kümmel and Pinchot, the last-named being now in charge of the United States Forestry Service. A list of these papers is given near the end of this bulletin, followed by a brief digest of the various legislative enactments relating to forestry.

In the list that follows, the botanical name of the species is first given, followed by some of its common names in the order of their popularity so far as the writer is able to judge of this matter. The important item of distribution is next considered and special localities are given by counties, when the kind in question is not generally found throughout the State. Following this are extracts from various papers that are in the reports, above mentioned, and within the reach of all who are desirous of following the matter further.

Lack of space prevents a description of each species, but with the aid of the twenty-five engravings it is hoped that the reader may be able to add to his information concerning New Jersey trees. The more important kinds are marked with a star and exotic species are printed in capitals.

LIST OF NEW JERSEY TREES.

**Pinus strobus*, L. White Pine. Soft Pine. Five-leaved Pine.

“Camden: Berlin, rare. Gloucester: Woodbury, Swedesboro. Monmouth and Ocean: Pine Brook and northward along the Southern railroad, rare. Middlesex, Woodbridge, and frequent in the middle and northern counties, forming groves, but never forests.” (Britton’s catalogue.)

“The White Pine is usually associated with rather rocky uplands. The only place in South Jersey, in the knowledge of the writer, where it grows in the forest is in Manahawkin

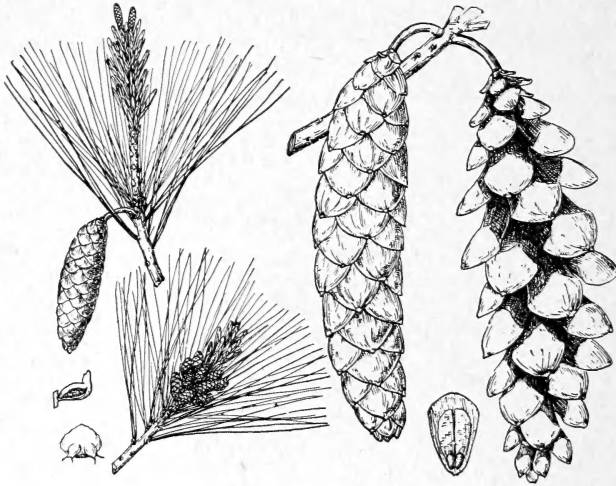


Fig. 1.

Pinus strobus, L. White Pine. Soft Pine. Five-leaved Pine. From Sargent’s “Trees of North America.”

swamp. It has been much cut, but a number of large trees remain. They overtop the cedars and other trees of the swamp and have grown with remarkable rapidity. Stumps twenty-five inches in diameter average about fifty annual rings.” (Geol. Rpt., ’94, Gifford, 252.)

“It is not necessary to state the uses of *Pinus strobus*, nor should it be necessary to state that it ought to be cultivated extensively. It is a rapid grower, thrives well on the poorer soil of South Jersey, yields early returns and is very valuable when mature—what more is wanted? The planting of the White Pine is done in the same manner as the Yellow Pine.” (Hort. Rpt., ’03, Meier, 215.)

**Pinus rigida*, Mill. Pitch Pine. Long-leaved Pine.

“Common throughout the State. In sandy or rocky soil. Very abundant in the southeastern counties, forming the forests of the Pine Barrens.” (Britton.)

“The timber of the uplands consists chiefly of the Short-leaved Pitch Pine, &c. The pine occupies the poorest tracts to the exclusion of other trees, but is by no means confined to such tracts.” (Geol. Rpt., '91, Coman, 113.)

“The Rough-bark or Pitch Pine not long ago was the dominating forest tree. The adaptability of the species is remarkable. It is common on the driest uplands, where other trees perish, but grows much longer in a shorter time in the

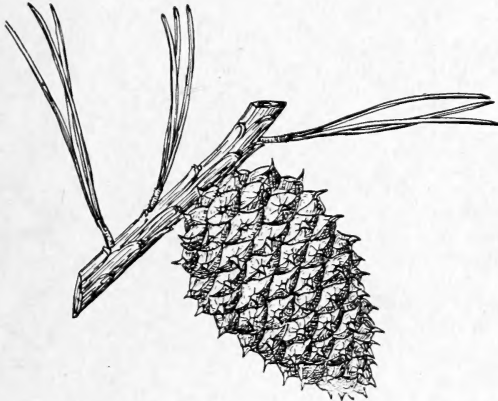


Fig. 2.

Pinus rigida, Mill. Pitch Pine. Long-leaved Pine. From Sargent's "Trees of North America."

deepest swamps. The growth of this pine illustrates a point which explains the distribution of trees in many places. A species grows where it meets with the least opposition. It is not preference, but endurance. Upland Pitch Pine is full of resin and is fit only for rough work and cord-wood. Swamp Pitch Pine is lighter, more durable and is in demand for planks and logs.” (Geol. Rpt., '94, Gifford, 251.)

“Pitch Pine (*Pinus rigida*) and Short-leaved Pine (*P. echinata*) are commonly found mixed together, but the latter predominates, as a rule, on the better soils, giving way on poorer soil to Pitch Pine. This is not because the Pitch Pine prefers poor soil, but because it is less fastidious. It flour-

ishes not only on loamy soil, but on dry, unproductive sand, and in low, wet areas, called 'pine swamps.' In dense stands the Pitch Pine has a long, clear trunk and a short, narrow crown. When growing in mixture, they reach about the same maximum dimensions, namely, a height of eighty-five and a diameter of two feet. The greater part of the Pitch Pine is, however, growing in open stands. The most interesting silvicultural characteristic of the Pitch Pine is its ability to send up shoots from dormant buds at the collar of the root and to sprout in the crown after the foliage has been completely burned. The ability of Pitch Pine to sprout is a very important characteristic, for in this way burned land is restocked at once with a growth of pine, which, though of little value for anything but cord-wood, shades the ground and will eventually restore the seedling growth if the fires are kept out." (Geol. Rpt., '98, Pinchot, 45.)

"*Pinus rigida* is exceedingly abundant in the coniferous zone, where it often forms the bulk of the arboreal vegetation over large areas. Less abundant in the tension zone.* Represented by scattered groves or individuals in the deciduous zone. It is the characteristic pine of the coniferous zone." (Geol. Rpt., '99, Hollick, 189.)

"*Pinus rigida* attains a size suitable for fire-wood in from fifteen to twenty years, and it is commonly estimated that it will produce as many cords per acre as it has been years in growing. * * * When the timber becomes larger its value per cord increases, as it then finds a market for lumber and lath, for piling and other purposes." (Agric. Rpt., 1887, Cook, 300.)

* According to Dr. Hollick, the "Deciduous Zone" is that portion of the State lying north of a line drawn from Trenton to Metuchen. In like manner, the "Coniferous Zone" lies south of a line from Long Branch to Salem. Between these two zones is a middle portion of the State called the "Tension Zone, because," as Dr. Hollick writes, "it is there that the two floras meet and overlap, producing a constant state of strain or tension in the struggle for advantage."

**Pinus echinata*, Mill. Yellow Pine. Short-leaved Pine.

“Middlesex: Sparingly near South Amboy. Monmouth and Ocean: Dry, sandy soil, common; New Egypt, abundant, but I have not seen much of it in the pine barrens. Burlington: Common in the western part of the county; Medford, Quaker Bridge, Brown Mills. Camden: Frequent;

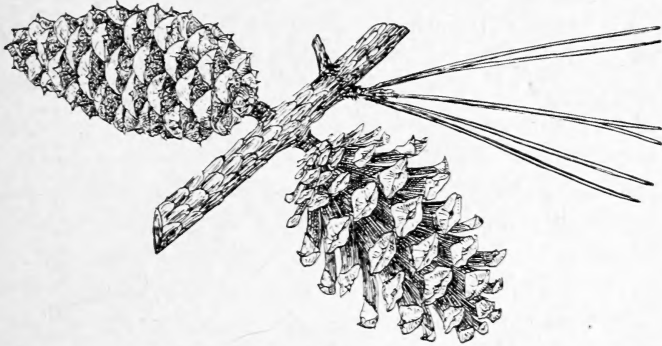


Fig. 3.

Pinus echinata, Mill. Yellow Pine. Short-leaved Pine. From Sargent's "Trees of North America."

Ancora, Winslow. Gloucester: Mickleton, Swedesboro. Cumberland: Fairton; frequent about Bridgeton. Atlantic: Mays Landing, Hammonton." (Britton.)

“The original forest cover has practically disappeared and a large percentage of what remains is in a poor condition. The choicest timber on the upland was Yellow Pine. Only several small patches of this virgin pine remain, the finest of which is at Inskipps, on the road to the Blue Hole from Winslow. Another beautiful grove may be seen at Jenkins Neck, and other clumps have been left in protected spots. It is known to woodmen as the ‘smooth bark pine.’ * * * In South Jersey *Pinus echinata* grows the best in light, loamy soil.” (Geol. Rpt., '94, Gifford, 251, 252.)

“In the finest virgin pine forest (*P. echinata*) in South Jersey, where no fires have burnt and no trees have been cut for years, there is a dense underwood, the chestnut oak predominating.” (Geol. Rpt., '94, Gifford, 267.)

“In dense stands both the Short-leaf and Pitch Pines have long, clear trunks and short, narrow crowns. When growing

in mixture they reach about the same maximum dimensions, namely, a height of eighty-five and a diameter of two feet. Under favorable conditions both species reproduce themselves prolifically from the seed, especially on abandoned fields and old roads, and in small openings in the forest. On the better classes of soil both trees are creeping back, among the second-growth hardwoods, to the ground they once occupied, and in the end they will probably predominate over all other species." (Geol. Rpt., '98, Pinchot, 45.)

"*Pinus echinata* is most abundant in the tension zone, particularly in the marl belt, often forming groves of considerable extent; less abundant in the coniferous zone and not recorded from any locality within the deciduous zone. This and *Pinus Virginiana* may be regarded as specially characteristic of the tension zone." (Geol. Rpt., '99, Hollick, 189.)

"It is a mistake to encourage the propagation of inferior species, such as the Pitch Pine, in regions where *P. echinata* and several other excellent trees grow equally as well. Pitch Pines are, of course, better than nothing, but when they are mixed with *P. echinata*, as is often the case in Southern New Jersey, the latter should be favored." (Geol. Rpt., '99, Gifford, 281-283.)

"*Pinus echinata* is the tree for South Jersey. The cheapest way to plant is, in case the land is not too stumpy, to run a one-horse harrow over it, and then, after the seed is sown, run the harrow over the same strip again in order to cover the seed. The strips should be four or five feet apart. Where a harrow and horse cannot be used, it is best to work in the seed with a rake. The best way, however, is to plant with one or two-year old plants at four feet distance." (Hort. Rpt., '03, Meier, 214.)

**Pinus Virginiana*, Mill. Jersey or Scrub Pine.

"Warren: Along the Delaware river above Riegelsville. Hunterdon: Abundant about Milford, and elsewhere along the river. Burlington: Sandy woods near Pemberton, and not uncommon in the western part of the county. Camden: Near the river, frequent. Gloucester: Occasional. Salem and Cumberland: Frequent or common. Monmouth and

Ocean: Sandy soil, very rare. Atlantic: Hammonton, Mays Landing. Middlesex: Along the Raritan below New Brunswick; sand hills near Woodbridge; near Monmouth Junction." (Britton.) "Common outside the Pine Barrens." (Keller & Brown.)

"On the Delaware bay slope the Jersey Pine is quite common." (Geol. Rpt., '91, Coman, 114.)

"The Spruce Pine (*Pinus Virginiana*) is abundant in West

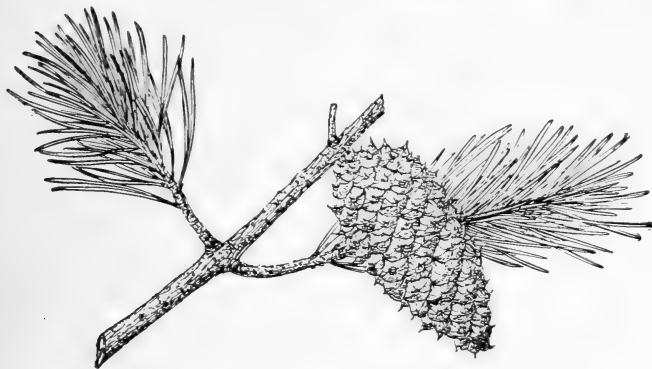


Fig. 4.

Pinus Virginiana, Mill. Jersey or Scrub Pine. From Sargent's "Trees of North America."

Jersey on gravelly ridges. Small clumps and single trees are scattered sparingly through the southern interior. * * * In South Jersey it grows best on gravelly ridges." (Geol. Rpt., '94, Gifford, 252.)

"*Pinus Virginiana* is abundant in the tension zone, especially in the clay belt. Less abundant in the coniferous zone, but frequently forming small forests or groves. Recorded from the deciduous zone only at widely separated localities—Riegelsville, Milford and New Brunswick." (Geol. Rpt., '99, Hollick, 189.)

Pinus taeda, L. Loblolly Pine. Old Field Pine.

"Cape May: Near Cape May." (Britton.)

"On the southern borders of the Carolinian zone there appears the Old Field Pine (*Pinus taeda*). One specimen was discovered by Mr. Pinchot and another by Mr. Arthur Hollick, in Southern New Jersey." (Geol. Rpt., '99, Gifford, 237.)

Pinus pungens, Michx. Table Mountain Pine. Hickory Pine.

“Hunterdon: Abundant one mile east of Sergeantsville.”
(Britton.)

Larix Americana, Michx. Tamarack. Larch.

“In swamps, northern counties. Hudson: New Durham. Bergen: Along Passaic river and at Closter. Passaic: Greenwood lake, Cedar pond, Bearfoot mountain. Morris: Budd’s lake; abundant between Succasunna and Ironia. Sussex: Near Hamburg; between Andover and Waterloo, and near Sparta. Warren: Oxford Furnace, on Great Meadows, and a large grove south of Green’s pond.”
(Britton.)

Picea Mariana, B., S. & B. Black Spruce.

“Swamps in the northern counties. Hudson: New Durham swamp; Secaucus. Bergen: Palisades, rare. Morris: Budd’s lake; swamps near Succasunna. Passaic: Greenwood lake; Cedar pond; Bearfoot mountain. Sussex: Swamp near High Point and Warren; Kittatinny mountains, near the Water Gap. Hunterdon county.” (Britton.)

**Tsuga Canadensis*, Carr. Hemlock. Hemlock Spruce.

“Monmouth and Ocean: Shady borders of swamps, very rare; along Crosswicks creek, above New Egypt. Burlington: Along the Delaware, above Burlington; Vincentown, and frequent in moist woods and along streams, middle and northern counties. Quite plentiful on the Kittatinny mountains.” (Britton.)

“*Tsuga Canadensis* is more or less abundant in the deciduous zone, especially in hilly regions alongside the borders of streams. Not recorded south of the tension zone, except indefinitely, as very rare, in Monmouth and Ocean counties. New Egypt, Vincentown and Burlington are the only exact localities known to me south of the Triassic border, and these three localities are all within the tension zone.” (Geol. Rpt., '99, Hollick, 188.)

Thuja occidentalis, L. Arbor-vitæ.

“Rocky banks of the Hudson, New Jersey.” (Torrey Cat.) “Bergen: Near Closter. Warren county. Commonly planted. Not seen by me growing wild within the State.” (Britton.)

**Chamæcyparis thyoides*, Britt. White Cedar.

“Passaic: Near the southern end of Greenwood lake. Essex: Swamp at Kingsland. Hudson: New Durham and

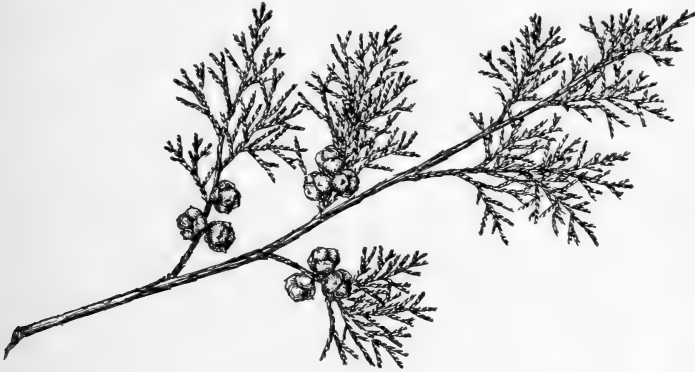


Fig. 5.

Chamæcyparis thyoides, Britt. White Cedar. From Sargent's "Trees of North America."

Secaucus swamps, abundant; a few trees on the meadows near Newark; Bergen Point. Middlesex: About the buried forest on Mr. Ernst's property, near South Amboy, and common southward in cedar swamps. Most abundant in the Pine Barrens." (Britton.)

"The most important tree in the lowlands is the White Cedar (*Chamæcyparis thyoides*). From the accumulation of cedar logs in the beds of many swamps it is safe to call it a native tree. There is nothing more characteristic of the region than swamps of cedar. It grows in dense masses along fresh-water streams. It is becoming scarce, owing to the value of the lumber, lack of attention to regeneration and demand for the bottom for cranberry bogs. When a cedar swamp is cut, the kind of trees which follows depends upon several conditions. If the ground is seeded with gum, maple and the like, the cedar loses its hold. If the bottom is not well

seeded with other trees and the surrounding cedar is in fruit, it may come up in cedar. * * * The cedar is usually a prolific seed-bearer. Its small, winged seeds are disseminated by the wind. It fruits when very young. It is not uncommon to find a White Cedar, three feet high, in fruit. When a swamp bottom is burnt, it often comes up in White Cedar as even and dense as a field of wheat, while a swamp, which has been cut and not burnt over, produces a great variety of swamp trees. Although a common observation, this is more or less of accidental occurrence. A swamp bottom is usually well seeded with a variety of trees and shrubs, the seeds of which have been carried there in a variety of ways. A fire destroys these seeds and forms a soil on the surface of the muck. If this occurs when the cedar is in fruit, its light seeds are sown by the wind and cedar soon appears. There are thousands of acres of land in South Jersey where the cedar will grow with little care, but owing to brush and other less valuable trees it is unable to establish itself. There is a small but thrifty swamp in Atlantic county which originated in this way. Three cedars were planted in a meadow. Other trees were not allowed to grow. Soon the ground was seeded and a mass of young cedar appeared. The trees are now fit for timber, and the three originals may plainly be seen above the rest of the swamp. After the stopping of fires the regeneration of white cedars deserves attention." (Geol. Rpt., '94, Gifford, 259.)

"White Cedar, one of the most valuable timber trees of Eastern North America, grows rapidly, abundantly and with magnificent reproduction in the frequent swamps of this region. At present, so great is the haste to harvest what may so easily be burnt, the White Cedar is usually cut in very early youth. At the only saw-mill I visited none of the 'logs' on the skids were over twelve inches in diameter; the majority were not over eight inches and very many were less than four inches in diameter at the large end; a few were not over three. Yet these 'logs' had been cut at the surface of the ground, and the measures given include the root-swelling in every case." (Geol. Rpt., '95, Pinchot, 187.)

"White Cedar grows in very dense stands and has in consequence a short, narrow crown and a long, clear, straight

bole. * * * The oldest timber studied was about eighty years old, at which age it attains a maximum diameter of fifteen inches and a height of seventy feet. * * * In view of the value of cedar, it is important to have some definite figures concerning its rate of growth and its reproductive capacity. On account of the regular growth of the trees and the comparatively even stands, a few measurements will suffice to afford a basis for broad generalization. The cedar appears to require on an average sixty years to reach a height of fifty feet and eighty years to reach sixty. It is interesting to note that when the forest is thinned the trees grow more rapidly in diameter than when they remain in crowded stands. At Marigold Swamp seven stumps were measured of trees which had stood for some years on the edge of a clearing. These trees were growing at the rate of 2.2 inches in diameter in ten years, whereas four trees measured within the same stand showed an average rate of growth of about 1.05 inches in ten years, or a little less than half. There are few trees, if any, which grow in as dense masses as White Cedar. In order to show the number of trees per acre and the amount of wood at different ages, eight sample plots were measured and the trees counted. These valuation surveys are summarized below. At twenty years of age there were over 10,000 trees per acre, at forty years about 3,500 and at eighty years in one case still over 1,000. From these figures it follows: First, that it requires about sixty years to produce lumber in paying quantities; second, that it would pay to thin the forest when it is about forty to sixty years old." (Geol. Rpt., '98, Pinchot, 57.)

"*Chamaecyparis thyoides* forms the bulk of the vegetation in the cedar swamps of the coniferous zone. Rare in the tension zone. Locally in limited numbers in certain isolated swamps in the deciduous zone, Secaucus, New Durham, High Point," &c. (Geol. Rpt., '99, Hollick, 189.)

"Perhaps the easiest and quickest way to secure a stand of White Cedar is to plant it. Young cedars are constantly invading cranberry bogs where they are very unwelcome. These can be easily secured in large quantities, and are better for planting than the spindling specimens from the woods. Another way is to sow the seed. After removing all the trees

and brush from the place where a cedar stand is desired, when not too dry, it is best to burn over the surface and then sow the seed mixed with dirt." (Geol. Rpt., '99, Gifford, 286.)

"*Chamaecyparis thyoides* is the choicest of the soft woods. For boat and tank construction it has no equal. The wood is soft and light, clean and easily seasoned, and most remarkable for its durability. The White Cedar should only be grown on wet mucky or wet sandy soil. It should be planted when two years old at a distance of three feet." (Hort. Rpt., '03, Meier, 215.)

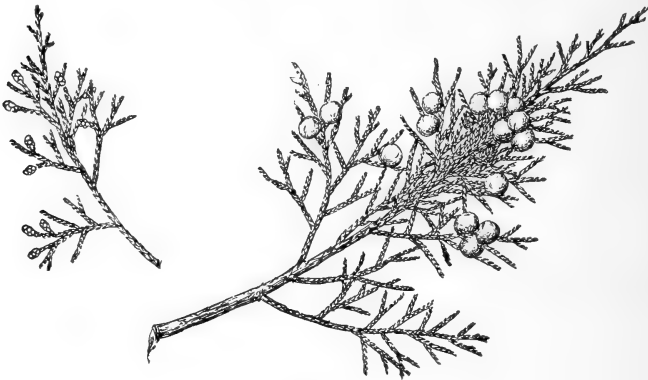


Fig. 6.

Juniperus Virginiana, L. Red Cedar. Savin. From Sargent's "Trees of North America."

**Juniperus Virginiana*, L. Red Cedar. Savin.

"Common in dry soil throughout the State, except in the Pine Barrens, where it is only occasionally met with." (Britton.)

"The Red Cedar grows in South Jersey in dry fields, while in the Southern States it is common in swamps. The quality of timber also depends upon the location of the tree. It is claimed that the Red Cedar which grows on the beaches of South Jersey is much more durable than that which grows on the mainland." (Geol. Rpt., '94, Gifford, 251.)

"The rate of growth of Red Cedar is far less rapid than that of *Pinus rigida* and *Pinus echinata*. It appears from an examination of Red Cedar stumps, posts and post timber grown on white sand on the shore of Great Egg Harbor below Mays Landing, that in similar situations this tree, in rather

open forest, may be expected to produce posts worth thirty-five cents in about thirty years, and posts worth seventy-five cents in forty to fifty years, on the basis of present prices. These prices, I understand, correspond approximately to diameters on the stump of six and ten inches, respectively." (Geol. Rpt., '95, Pinchot, 188.)

Taxus brevifolia, Nutt. Yew.

"Damp woods in the northern counties. Bergen: Common on the Palisades. Passaic: Greenwood lake. Sussex: Swartwood lake, near Ogdensburg." (Britton.)

Juglans cinerea, L. Butternut.

"Ocean and Monmouth: Banks of streams, rare. Mercer: On hills near Princeton, and frequent in woods in the northern counties. A tree with leaves having from three to five leaflets only was found by Rev. E. E. Butler, near Morristown, 1886." (Britton.)

Juglans nigra, L. Black Walnut. Walnut.

In low woods. Frequent, except in the Pine Barrens.

"The walnut is a valuable tree for its wood and nuts. Although associated with rich woods, it grows rapidly in the

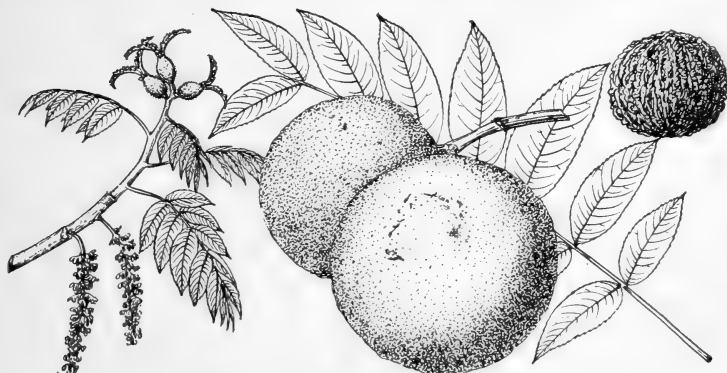


Fig. 7.

Juglans nigra, L. Black Walnut. Walnut. From Sargent's "Trees of North America."

light, loamy soils of South Jersey. Several very handsome specimens may be seen in Atlantic and Cape May counties." (Geol. Rpt., '94, Gifford, 283.)

"*Juglans nigra* grows best in deep, loose, fresh to moist, warm and sandy loam. It will grow in a dry and compact soil, but not in a wet one. Black Walnut is very scarce at the present time, and therefore it would be a profitable investment to plant wherever the soil is suitable for this tree, yet unprofitable for agriculture. The walnut is a fairly rapid grower and it produces useful timber in forty years. For planting, stratify the walnuts in the fall and leave them until they begin to germinate in the spring, then the germinating seed may be taken up and planted in its permanent position, at a distance of six by six feet apart." (Hort. Rpt., '03, Meier, 214.)

Hicoria minima, Britt. Bitternut. Swamp Hickory.

"In low woods. Rather common throughout the State." (Britton.)

Hicoria ovata, Britt. Shellbark Hickory. Shagbark Hickory.

"In low woods and meadows. Common except in the Pine Barrens." (Britton.)

**Hicoria alba*, Britt. Mockernut. Big Bud Hickory. White-heart Hickory.

"In woods. Common throughout the State." (Britton.)

Hicoria glabra, Britt. Pignut.

"In low woods. Cumberland: Bridgeton. Camden: Frequent about Camden, and common in the middle and northern counties." (Britton.)

Myrica cerifera, L. Wax Myrtle.

"In low grounds. Sussex: Swartswood lake; in streams two miles east of Sparta. Warren: Lake on Blockade mountain, White pond and common in the eastern and southern parts of the State." (Britton.)

Populus tremuloides, Michx. Aspen. Quaking Asp.

"In woods. Common throughout the State; most abundant in the northern counties." (Britton.)

Populus grandidentata, Michx. Poplar.

“Camden: Ateo, occasional. Burlington: Near Moorestown. Monmouth: Holmdel, and frequent in the middle and northern counties.” (Britton.)

Populus heterophylla, L. Swamp Cottonwood. Black Cottonwood.

“In wet woods. Bergen: Carlstadt; one mile northeast of Woodbridge. Hudson: Weehawken. Cumberland: Fortescue Beach.” (Britton.)

Populus balsamifera, L. Balsam. Tacamahac. Balm of Gilead.

“Sussex: Along the Delaware river below Port Jervis. Hunterdon: Holland Station, and frequently escaped from cultivation.” (Britton.)

Populus deltoidea, Marsh. Cottonwood.

“Warren: Along the Delaware river at several points.” (Britton.)

“Among those species which grow with surprising rapidity, even on poor soils, and which may be easily propagated, the Cottonwood deserves first place. In speaking of this tree, in



Fig. 8.

Populus deltoidea, Marsh. Cottonwood. From Sargent's "Trees of North America."

his bulletin on the cultivated poplars, Professor Bailey says: "Taking all things into consideration, the Cottonwood is probably the best of the poplars for general ornamental planting.

It grows rapidly and in almost every soil, and yet it possesses an air of strength and durability which most of the poplars lack. Its foliage is always bright and glossy, and the constant movement of the broad, rich green leaves gives it an air of cheeriness which few trees possess. The tree has been much used upon the western prairies and in western towns, much too abundantly for good landscape effects. The rapid growth of the tree gives a feeling of luxuriance to plantations, even when most trees appear to be weak or starved. The Cottonwood grows best upon rather low lands, and yet it is generally an admirable tree upon high and dry areas.' Like the Locust, the Cottonwood has an extensive root system, and reproduces itself profusely by means of root suckers. It is, therefore, excellent for holding the soil in place. The wood of this tree is extensively used in the manufacture of paper, and I can see no reason why its cultivation should not be encouraged. Throughout southern Europe the poplars are extensively planted by the owners of small holdings. These tall straight trees form a characteristic feature of the French and Italian landscape. They prefer poplar, because the trees are easily produced from cuttings, because they soon grow to a size fit for boards, because they yield the peasant loppings for fuel, and because they throw so little shade that grass and other crops will grow between the rows." (Geol. Rpt., '99, Gifford, 287).

"The wood of this tree (*Populus deltoides*) is growing more and more valuable and the demand steadily increasing. It is extensively used for paper pulp. It is a rapid grower and adapts itself easily to almost any soil. On the moist, pine-barren land of Southern New Jersey it grows perfectly. Thirty cords of pulp wood to the acre, under average circumstances, might be expected after fifteen years. It is planted from cuttings or seedlings, eight feet apart." (Hort. Rpt., '03, Meier, 213.)

POPULUS ALBA, L. White Poplar. Abele.

"Frequently spontaneous by suckers and troublesome in fields. Adventive from Europe." (Britton.)

POPULUS NIGRA, L. Lombardy Poplar.

"Hudson: Hoboken, on the road to Weehawk." (Torrey Herb.) "Warren: Island in the Delaware, above Phillipsburg. Salem: Banks of the Delaware. Adventive from Europe." (Britton.)

"The Lombardy Poplar, a native of Asia, once so common around old dwellings, is rapidly losing its hold, owing, it is claimed, to the fact that only trees of one sex were introduced into this country, the male and female flowers being on separate trees. This is an interesting example of the effects of long-continued asexual reproduction." (Geol. Rpt., '94, Gifford, 255.)

**Salix nigra*, Marsh. Black Willow.

"Along streams and ponds. Passaic: Greenwood lake, and common in the middle and southern counties." (Britton.)

"Willows are not plentiful in South Jersey, although there is much land adapted to their cultivation. They are mainly disseminated by the wind. The branches which are snapped off by winds and rushing water easily take root in swampy places." (Geol. Rpt., '94, Gifford, 260.)

"The wood of the willow is more valuable than is usually supposed. It holds a nail tenaciously, and although soft, is



Fig. 9.

Salix nigra, Marsh. Black Willow. From Sargent's "Trees of North America."

firm. * * * The wood of the Black Willow has been used to considerable extent by shipbuilders in South Jersey." (Geol. Rpt., '94, Gifford, 283.)

“Willow culture is destined to become an important industry in this region. The first to begin it on damp pine-barren land was the Baron de Hirsch Colony of Russian refugees. The willow has been rightly called the ‘Cinderella of Trees.’ It will grow on land which for other purposes is almost hopeless. Its pliant twigs are excellent for trunks, boxes, crates, &c., besides baskets. It furnishes work at a season of the year when there is little else to do. It is a good plan, as is common in Europe, for one member of the family to learn the trade of basket-making. In this way a local industry is produced.” (Geol. Rpt., '99, Gifford, 290.)

“The largest portion of willows for baskets is imported. Experiments have fully established that the same kinds and the same quality as those imported can be grown and marketed in New Jersey at a great profit. * * * In Germany and France, where this cultivation has reached its greatest perfection, willow growers do not hesitate to plant the best of their wheat land in willows. * * * To make willow culture most profitable, such soils should be selected as cannot be otherwise used to advantage. The best soil is a fresh, black sand, but even a heavy, compact loam, or rich but sour meadow land, which produces the poorest quality of grass, is acceptable. Peaty soil, if it can be covered with a layer of sand or loam, will produce a good growth. Moors and gravels are unsuitable, however. Water is desirable, yet they will not thrive in stagnant water. The preparation of the soil should be a thorough one. In no case should a plantation be attempted but in prepared ground. * * * There are more than 250 species of willows, but only a very limited number are of commercial value. The requirements of a good basket willow are, that it produces many slender rods without branching, that these rods be soft and pliable and of white color when peeled, and that the stocks produce vigorously for a long period of years. I recommend three kinds, the Almond-leaved Willow, the Bitter Purple Willow, the Common Osier, these being greatly desired by basket makers, as they possess all the qualities a good willow should have, being pliable, durable, tough, and white when peeled. The best time for planting is the late fall, generally the end of October.” (Hort. Rpt., '03, Meier, 209.)

Salix lucida, Muehl. Shining Willow.

“Low grounds. Sussex: Andover; Swartswood lake; frequent about Sparta. Morris: Budd’s lake. Essex: Verona.” (Britton.)

Salix fluviatilis, Nutt. Sand Bar Willow.

“Gravelly shores of the Delaware river. Sussex, Warren, Hunterdon, Camden and Gloucester counties.” (Britton.)

Salix cordata, var. *Mackenzieana*, Hook. Willow.

“Low grounds. Frequent throughout the State.” (Britton.)

**Salix discolor*, Muehl. Glaucous Willow.

“Low grounds. Common throughout the State.” (Britton.)

Salix Bebbiana, Sarg. Willow.

“In dry soil. Warren: Near Carpentersville. Sussex: Waterloo. Morris: Near Budd’s lake. Bergen: Palisades. Essex: Verona.” (Britton.)

Carpinus Caroliniana, Walt. Hornbeam. Blue Beech. Ironwood.

“River banks and in copses. Common throughout the State, except in the Pine Barrens.” (Britton.)

Ostrya Virginiana, K. Koch. Hop Hornbeam. Ironwood. Leverwood.

“Along river banks, &c. Bergen: Closter, Palisades. Sussex: Swartswood lake. Warren: River hills from Phillipsburg southward. Hunterdon: Along the Delaware. Somerset: Along the Raritan at Roxiticus.” (Britton.)

Betula lenta, L. Cherry Birch. Black Birch. Sweet Birch.

“Gloucester: Plentiful in a ravine east of Mullica Hill, and common in woods, middle and northern counties.” (Britton.)

Betula lutea, Michx. Yellow Birch. Gray Birch.

“In woods, northern counties. Bergen: Closter and Palisades. Passaic: West side of Bearfoot mountain. Morris: Lake Hopatcong, Brook Valley and near Hurdstown. Essex county. Sussex: Near Morris pond.” (Britton.)

**Betula nigra*, L. Red Birch. River Birch.

“Along rivers and lakes. Common throughout the State. Especially abundant along the Delaware and all its tributary streams.” (Britton.)

“Species more or less abundant in both deciduous and coniferous zones.” (Geol. Rpt., '99, Hollick, 185.)

**Betula populifolia*, Marsh. Gray Birch. White Birch.

“In swampy soil. Common throughout most of the State, but locally rare in the southern counties and along the Delaware.” (Britton.)

“Species more or less abundant in both deciduous and coniferous zones.” (Geol. Rpt., '99, Hollick, 185.)

Alnus tenuifolia, Nutt. Alder.

“Low grounds in the northern counties. Morris: Budd's lake. Sussex: Near Andover and at Culver's Gap.” (Britton.)

Alnus oblongifolia, Torr. Alder.

“In low grounds. Common throughout the State.” (Britton.)

**Fagus Americana*, Sweet. Beech.

“In rich woods. Burlington: Pemberton. Monmouth: Banks of 'Squan and Shark rivers, rare. Camden: Abundant about Camden. Gloucester: Quite frequent; and common in the middle and northern counties.” (Britton.)

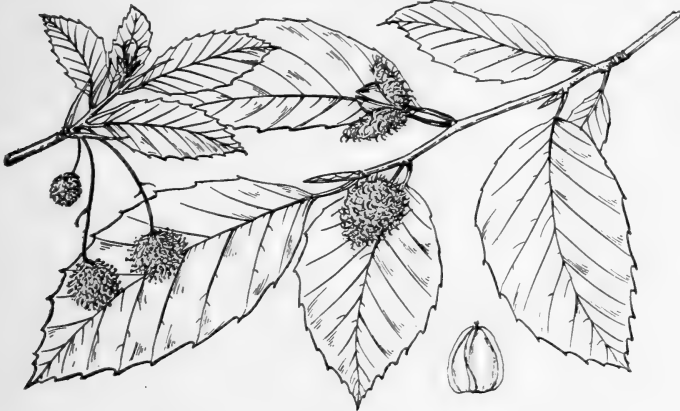


Fig. 10.

Fagus Americana, Sweet. Beech. From Sargent's "Trees of North America."

**Castanea dentata*, Borkh. Chestnut.

“In woods. Cumberland: Bridgeton, rare. Salem: Frequent. Atlantic: Mays Landing, not frequent; and common in the middle and northern counties; rare in the Pine Barrens.” (Britton.)

“The Chestnut grows well in the southern interior, but is scarce, owing to fires. It still grows wild, as at ‘Chestnut’ neck, where it was once abundant.” (Geol. Rpt., '94, Gifford, 254.)

“The Chestnut has been strongly recommended for planting in South Jersey in places which are free from fires. Several letters have been received, testifying to the fact that it grows well on light soils. Although easily affected by fires, it yields large returns in a few years, producing a useful wood and a salable fruit. The second growth is vigorous and the tree lives and fruits for many years. The celebrated chestnut trees on the slopes of Mount Ætna must be counted among the oldest trees on earth, being as old, according to some au-

thorities, as the Christian era. Many varieties of the chestnut are under cultivation, differing considerably in the size of the tree and in the size and quality of the nut. Before planting for its fruit, those who are not familiar with its cultivation should consult a horticulturist. The chestnut is



Fig. 11.

Castanea dentata, Borkh. Chestnut. From Sargent's "Trees of North America."

certainly one of the most useful and beautiful of trees, and since it thrives in South Jersey, deserves to be planted there, especially along streets, although it is much clubbed and disfigured by boys while in fruit." (Geol. Rpt., '94, Gifford, 282.)

"Deciduous zone, coniferous zone, scattering from the deciduous zone." (Geol. Rpt., '99, Hollick, 185.)

"The value of the chestnut timber in the Highlands and Kittatinny Valley depends much on the quality of the soil and the location. The stump land sells at from \$1 to \$5 per acre; a growth of thirty years at from \$10 to \$30; of fifty years, from \$25 to \$50; but in many instances good growths, accessible to markets, have sold at figures three or fourfold greater than the above. The time required to grow railroad ties and telegraph poles is from twenty-five to forty years, and will probably average thirty years. Chestnut grows naturally and brings the quickest returns, although oak is more valuable." (Agric. Rpt., '87, Cook, 299.)

Castanea pumila, Mill. Chinquapin.

“Mercer: Near Trenton, in woods between White Horse and Mercerville. Gloucester: Abundant at Clarksboro. Salem: Near Jericho.” (Britton.)

**Quercus rubra*, L. Red Oak.

“Woods. Atlantic: Landisville, scarce. Camden: Occasional near Camden; Ateo, rare. Gloucester: Occasional, and common in the middle and northern counties.” (Britton.)

“There is little oak of value left on the uplands. In or near villages in protected localities large specimens may still be seen.” (Geol. Rpt., '94, Gifford, 254.)

“A very large part of the Pine-Barren district is oak copice. The area in pine, however, is constantly decreasing, the area in oak increasing. Oaks of some kind almost invariably follow pine. Throughout every pine woods are scattered here and there suppressed oaks, the seeds of which may have been dropped by jays or chickarees. Just as soon as the pines are cut, these oaks, owing to increase of light and room, grow

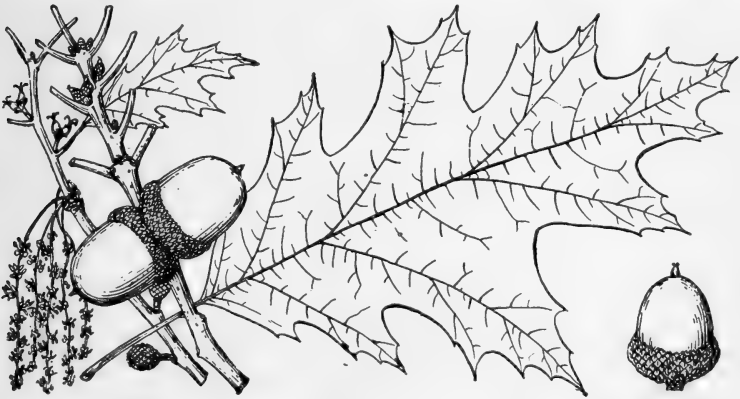


Fig. 12.

Quercus rubra, L. Red Oak. From Sargent's "Trees of North America."

quickly. In spite of the poverty of the soil and the inroads of insects, and although burnt and cut again and again, they show remarkable vigor. Many dry leaves cling to the small oak trees until the following spring; the limbs reach close to the ground, and fire, therefore, in the late winter or early

spring, before there is much sap in the wood, kills them, although the stumps live on, and with great persistency produce a fresh growth. In the struggle for existence the Scrub Oak and the Black Jack usually survive. Although these two oaks are of slight economic importance, it is due to their pertinacity that in many places the soil has been prevented from shifting. The species which form this coppice are Red Oak (*Q. rubra*), Post Oak (*Q. minor*), Black Oak (*Q. velutina*), White Oak (*Q. alba*), Chestnut Oak (*Q. prinus*), Spanish Oak (*Q. digitata*), Black Jack (*Q. marilandica*), and Scarlet Oak (*Q. coccinea*)." (Geol. Rpt., '99, Gifford, 242.)

Quercus palustris, Muench. Pin Oak. Swamp Spanish Oak.

"In low woods. Occasional or frequent in the southern counties. Abundant northward." (Britton.)

**Quercus coccinea*, Muench. Scarlet Oak.

"Woods. Common throughout the State." (Britton.)

"Deciduous zone, coniferous zone. It may be noted that *Quercus coccinea* is listed as a characteristic tree in both zones. This means that it is so abundant in both that any description

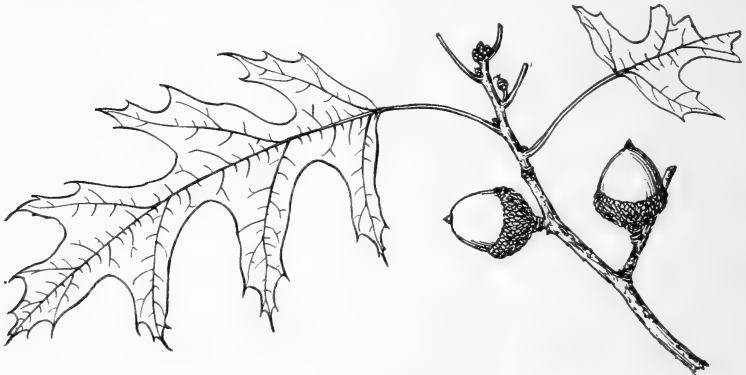


Fig. 13.

Quercus coccinea, Muench. Scarlet Oak. From Sargent's "Trees of North America."

of the prevailing vegetation in either would be incomplete unless it was mentioned." (Geol. Rpt., '99, Hollick, 185.)

**Quercus velutina*, Lam. Black Oak. Yellow Oak.
 "Woods. Frequent throughout the State."

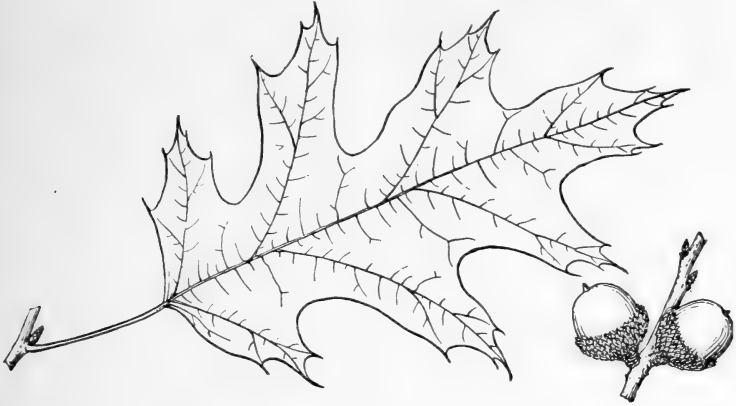


Fig. 14.

Quercus velutina, Lam. Black Oak. Yellow Oak. From Sargent's "Trees of North America."

**Quercus nana*, Sarg. Bear Oak. Scrub Oak.

"Common throughout the State. Extremely abundant on the Kittatinny and Green Pond Mountain ranges, and in the sandy soils of the middle and southern counties." (Britton.)

"The Scrub Oak is common, but is of little use." (Geol. Rpt., '94, Gifford, 254.)

**Quercus digitata*, Sudw. Spanish Oak.

"In woods. Monmouth: Keyport. Ocean: Point Pleasant, rather rare. Burlington: Moorestown, Pemberton and frequent in the southern counties." (Britton.)

**Quercus nigra*, L. Water Oak. Black Jack.

"In sandy woods. Middlesex: South Amboy; between New Brunswick and Little Washington. Mercer: And common southward on the Yellow Drift." (Britton.)

"*Quercus nigra* has practically the same range as *Quercus phellos*, which is as follows: More or less abundant in the southern part of the State in both the coniferous and tension zones. Further north, especially abundant in the clay belt of the latter zone, where it occurs close to the edge of the Triassic border, but has not been recorded beyond." (Geol. Rpt., '99, Hollick, 190.)

**Quercus phellos*, L. Willow Oak. Peach Oak.

"Mercer, Monmouth: Near Keyport; near Long Branch. Middlesex: South River, New Brunswick and common southward." (Britton.)

"Willow Oak is plentiful in Cape May and Atlantic counties." (Geol. Rpt., '94, Gifford, 260.)

"*Quercus phellos* is more or less abundant in the southern part of the State in both the coniferous and tension zones. Further north, especially abundant in the clay belt of the latter zone, where it occurs close to the edge of the Triassic border, but has not been recorded beyond." (Geol. Rpt., '99, Hollick, 189.)

Quercus Rudkini, Britt. (Q. Phellos, L., X. Q. nigra, L.)? Rudkins Oak.

"Monmouth: Near Middleton; in low woods, and near Keyport. Salem: Low woods near the Delaware, a single tree. Burlington: Birmingham." (Britton.)

Quercus heterophylla, Michx. Bartram Oak.

"Cumberland: In low woods near Fairton. Salem: Four miles from Pennsgrove, a form with deeply-lobed leaves. Gloucester: Near Woodbury; near Mickleton. Camden: Haddonfield. Burlington: Mount Holly. Ocean: New Egypt." (Britton.)

"This is perhaps a hybrid between *Quercus Phellos* and *Quercus velutina*. It was first known in the eighteenth century from an individual growing in a field belonging to John Bartram on the Schuylkill river, Philadelphia. What appears to be the same form has since been discovered in a number of stations from New Jersey to Texas, and it is possible that *Quercus heterophylla* may, as many botanists have believed, best be considered a species." (Sargent's "Manual of the Trees of North America," 249.)

Quercus brevifolia, Sarg. Blue Jack.

"Sussex: Waterloo, Sussex Mills, Andover, Walpack Center and Swartswood. Morris: Near Budd's lake. Essex: Orange. Hunterdon: Rare, and common in the middle and southern counties on the sandy soils of the Yellow Drift." (Britton.)

Quercus alba, L. White Oak.

"Woods: Common throughout the State. Not abundant in the Pine Barrens. A form with peculiarly lengthened leaves, at Bridgeton." (Britton.)

"The White Oak, which is usually associated with rich,

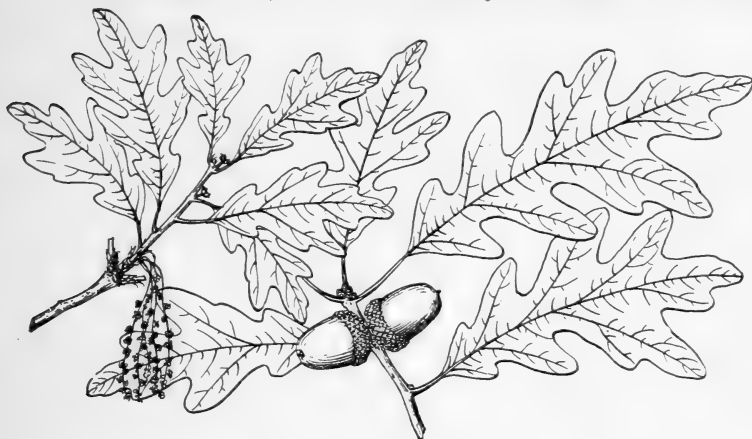


Fig. 15.

Quercus alba, L. White Oak. From Sargent's "Trees of North America."

heavy soils, grows well in Jersey sand." (Geol. Rpt., '94, Gifford, 247.)

"It may be noted that *Quercus alba* is listed as a characteristic tree in both zones. This means that it is so abundant in both that any description of the prevailing vegetation in either would be incomplete unless it was mentioned." (Geol. Rpt., '99, Hollick, 185.)

"The wood of the White Oak, when split into thin slivers, is an excellent basket material." (Geol. Rpt., '99, Gifford, 260.)

**Quercus minor*, Sarg. Post Oak.

"In sandy or rocky woods. Bergen county. Hudson: On Little Snake Hill. Warren: A clump on the Musconetcong, near Bloomsbury, and common in the middle and southern counties." (Britton.)

**Quercus platanooides*, Sudw. Swamp White Oak.

"In low grounds. Burlington: Marleton, and common in the middle and northern counties." (Britton.)

“In Griscom’s Swamp, between the Tuckahoe and Great Egg Harbor rivers, *Quercus platanoides* is growing. This swamp is the only place in South Jersey known to the writer where the Swamp White Oak is abundant. It is a magnificent tree and deserves to be planted in low regions.” (Geol. Rpt., '94, Gifford, 260.)

Quercus prinus, L. Chestnut Oak. Rock Chestnut Oak.

“In woods. Common throughout the State, except in the Pine Barrens. A form with leaves lobed more than half way to the midrib, at Elwood.” (Britton.)

Quercus acuminata, Sarg. Yellow Oak. Chestnut Oak.

“Warren: On limestone bluffs, below Phillipsburg. Sussex: On limestone, at Sussex Mills and Sterling Hill, also at Lake Grinnell. Cumberland: On sandy soil, near Bridgeton. Gloucester: Mullica Hill.” (Britton.)



Fig. 16.

Ulmus Americana, L. White Elm. From Sargent's "Trees of North America."

Ulmus Americana, L. White Elm.

“In low grounds, particularly along rivers. Salem: Near Salem. Gloucester: Quite common along streams near Mickleton. Camden: Occasional near Atco; along the Delaware. Monmouth and Ocean: Rather rare, and common in the middle and northern counties.” (Britton.)

“There are few elm trees in South Jersey.” (Geol. Rpt., '94, Gifford, 254.)

Ulmus Thomasi, Sarg. Cork Elm.

“Sussex: Along L. & H. R. R., above Woodruff’s Gap, a single tree observed.” (Britton.)

Ulmus fulva, Michx. Slippery Elm. Red Elm.

“In low woods. Camden: Clementon. Monmouth and Mercer: Not common. Union: Plainfield. Hunterdon: Frequent. Hudson: Hoboken, and frequent in the northern counties.” (Britton.)

Celtis occidentalis, L. Hackberry. Sugarberry.

“Bergen: Closter, scarce; Weehawken, Palisades. Passaic: Midvale and Ringwood. Sussex: Newton, Franklin Furnace. Hunterdon: Milford, and frequent in low grounds, middle and southern counties, though not very abundant in the Pine Barrens.” (Britton.)

“The forest at Avalon is so dense that many birds seek shelter there. The principal trees of these beaches are the Hackberry (*Celtis occidentalis*), Holly (*Ilex opaca*), Red Cedar (*Juniperus virginiana*), Sour or Black-Gum (*Nyssa sylvatica*), Magnolia (*M. glauca*), Wild Cherry (*Prunus serotina*), Sassafras (*S. sassafras*), Swamp Maple (*Acer rubrum*), and a few oaks and pitch pines, and even Red Mulberry.” (Geol. Rpt., '99, Gifford, 251.)

Morus rubra, L. Red Mulberry.

Camden: Winslow. Burlington: Pemberton, rare. Monmouth: Keyport, and frequent in woods, middle and northern counties.” (Britton.)

**Magnolia glauca*, L. Sweet Bay. Swamp Bay.

“Bergen: Woodbridge. Hudson: New Durham. Essex: Short Hills. Middlesex: Near New Brooklyn; Woodbridge. Metuchen, and common in swamps in the southern parts of that county, as in Monmouth and in all the southern counties.” (Britton.)

“The hardwood swamps usually contain *Magnolia glauca*.” (Geol. Rpt., '94, Gifford, 260.) “The flowers of magnolia (*M. glauca*), which scent the woods in June, are also a source of revenue.” (Geol. Rpt., '94, Gifford, 285.)



Fig. 17.

Liriodendron tulipifera, L. Yellow Poplar. Tulip-tree. From Sargent's "Trees of North America."

**Liriodendron tulipifera*, L. Yellow Poplar. Tulip-tree.

"Common in woods throughout the State. Our largest forest tree." (Britton.)

"Deciduous zone, coniferous zone. Scattering from the deciduous zone. (Geol. Rpt., '99, Hollick, 185.)

"In some swamps there is a specimen of *Liriodendron tulipifera*." (Geol. Rpt., '99, Gifford, 247.)

"This is one of our most valuable forest trees, its wood being useful for many purposes. Though it once grew abundantly, it has become so scarce and difficult of access that the prices are distinctly on the advance. It prefers deep, light, loamy, sandy or clayey soils, in cool, moist situations. Since it is rather difficult for inexperienced men to grow this tree from seed, young trees for planting are best taken from the woods or bought from the nurserymen. Trees may also be raised from cuttings. Young trees should be planted four or six feet apart." (Hort. Rpt., '03, Meier, 214.)

**Sassafras sassafras*, Karst. Sassafras.

"Woods and copses. Common throughout the State." (Britton.)

"Species more or less abundant in both the deciduous and coniferous zones." (Geol. Rpt., '99, Hollick, 185.)

**Liquidambar styraciflua*, L. Sweet Gum. Bilsted. Liquidambar.

“Morris: Lake Hopateong. Hunterdon: Common in forests at Pittstown; Rosemont, rare. Bergen: Frequent on the Palisades. Mercer: Frequent about Trenton, and common in woods, middle and southern counties.” (Britton.)

“The hardwood swamps usually contain *Liquidambar styraciflua*.” (Geol. Rpt., '94, Gifford, 260.)

“Market baskets are made from the woods of the Sweet Gum. The log is sawed into pieces of the proper length and



Fig. 18.

Liquidambar styraciflua, L. Sweet Gum. Bilsted. Liquidambar. From Sargent's "Trees of North America."

each is cut into thin circular sheets. When the sticks get too small in circumference to be conveniently cut, they are sold for rollers. The bottoms of the baskets are usually of pine.” (Geol. Rpt., '94, Gifford, 284.)

“Species more or less abundant in both the deciduous and coniferous zones.” (Geol. Rpt., '99, Hollick, 185.)

Hamamelis Virginiana, L. Witch-Hazel.

“Camden: Sparingly about Camden. Gloucester: Bank of Raccoon Creek. Monmouth and Ocean; Swamps and damp woods, rare; Freehold. Mercer: Trenton. Union: Plainfield, and frequent in damp woods in the northern counties.” (Britton.)

“There are many plants of more or less value medicinally. Perhaps the most important, which is common throughout the woods of the E. Carolinian zone, but rare in New Jersey, is

the Witch-Hazel, a fluid extract of the twigs, &c., of this plant is a famous lotion for allaying inflammations. It is used by everybody for the ills of both man and beast. It is a peculiar shrub, with several branching crooked trunks, about ten feet in height. Its pale yellow flowers bloom late in autumn when the leaves are falling, and the woody capsule, which explodes and scatters its two black shining seeds, matures the following summer. It grows well on the poorest kind of gravelly soil." (Geol. Rpt., '99, Gifford, 261.)

Platanus occidentalis, L. Sycamore. Buttonwood. Button-ball.

"Low grounds and along streams. Common throughout the State, though not abundant in the Pine Barrens." (Britton.)

"Although frequent along streets and around dwellings, one seldom finds the Buttonwood in the woods. This is probably the largest tree that grows in the Eastern United States. It

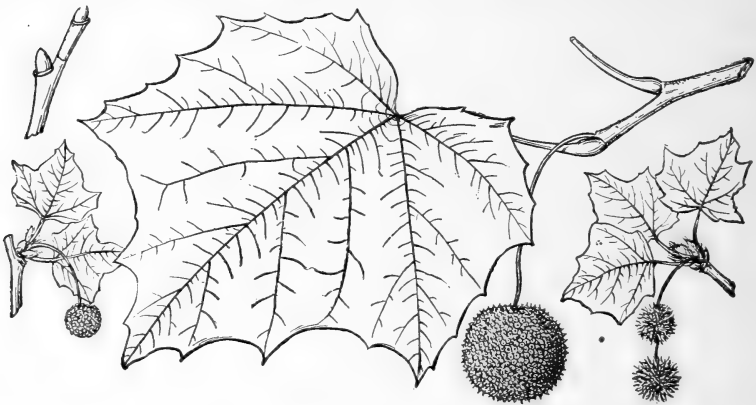


Fig. 19.

Platanus occidentalis, L. Sycamore. Buttonwood. Button-ball. From Sargent's "Trees of North America."

is claimed by many that they sometimes rival in size the giants of California and Australia. There are several beautiful specimens in the cultivated regions of New Jersey." (Geol. Rpt., '94, Gifford, 254.)

Amelanchier Canadensis, T. & G. Shad Bush. Service Berry.

"Swamps and wet woods throughout the State. Most abundant in the northern counties. Rare in the Pine Barrens." (Britton.)

Amelanchier obovalis, Ashe. Shad Bush. Service Berry.

"In similar situations as *A. Canadensis*. Burlington: Pemberton, and frequent in the northern and middle counties." (Britton.)

Prunus Americana, Marsh. Wild Plum.

"Cumberland: Near Bridgeton. Gloucester: Abundant near Mullica Hill. Mercer: Near Titusville. Camden: Along the Delaware, below the city. Monmouth: Banks of streams, not common; and frequent along water-courses in middle and northern counties." (Britton.)

Prunus Pennsylvanica, L. Wild Red Cherry. Bird Cherry.

"Rocky woods. Union: Plainfield. Essex: Franklin. Hudson: Weehawken, and frequent in the northern counties." (Britton.)

Prunus serotina, Ehrh. Wild Black Cherry. Rum Cherry.

"In open woods and along fence rows. Common throughout the State." (Britton.)

"The Wild Cherry is common in fields, the seeds of which have been carried by birds. This tree is in ill-repute with farmers because, it is claimed, it exhausts an undue amount



Fig. 20.

Prunus serotina, Ehrh. Wild Black Cherry. Rum Cherry. From Sargent's "Trees of North America."

of the soil. Crops in the region of a Wild Cherry tree are very noticeably affected." (Geol. Rpt., '94, Gifford, 254.)

“The Wild Cherry is worthy of more encouragement than it has heretofore received. It grows on poor soil, is easily propagated, yields an excellent wood and attracts birds which are fond of its fruits. Mr. J. H. Schober, the pioneer of health planting in Holland, who is experimenting with many species of foreign trees on his plantation at Schovenhorst, was loud in his praises of this tree and pronounced it one of the most promising of his vast collection.” (Geol. Rpt., '99, Gifford, 285.)

Cercis Canadensis, L. Redbud. Judas-tree.

“Woods, New Jersey.” (Torrey Cat., 1819.) “Camden: In damp woods on bank of the Delaware, between Camden and Gloucester. Burlington: Bordentown. Mercer: Banks of the Delaware, north of Trenton. Hunterdon: Common at Rosemont. Somerset: Rocky Hill. Also, escaped from cultivation at other places.” (Britton.)

GLEDITSIA TRIACANTHOS, L. Honey Locust.

“Commonly planted, and sparingly escaped from cultivation. Adventive from the southwest.” (Britton.)

ROBINIA PSEUDACACIA, L. Locust. Acacia. Yellow Locust.

“Extensively planted and escaped from cultivation. Naturalized from the west.” (Britton.)

“The cultivation of this tree for timber or for ornamental purposes has extended its range from Massachusetts quite to Louisiana in our country, into many parts of Canada, and quite generally throughout England and other countries of Europe. It has a straight stem bearing quite irregular and rather naked branches, clothed with pinnate leaves, which consist of nine to seventeen oblong-ovate leaflets, and, in their season, with hanging bunches or racemes of pinkish white to white flowers. When grown in groves or plantations, or in our native forests with other trees, its stem is very straight, and attains a height of sixty to eighty feet, and is almost entirely naked. But in more open situations it spreads out wider, and forms an irregularly shaped top. * * * It is remarkable for the length and number of its roots, and for

the great tendency which these have of throwing up suckers or sprouts, and at great distances from the tree. * * * The cultivation of the Locust is more profitable upon rich and loamy soils, or at least upon soils underlaid by a good subsoil. And on such bottom it grows more rapidly, and does not appear to be so much injured by the attacks of the borer. Its rapid growth is especially noticeable in the green sand marl district of our State, whenever its roots and innumerable rootlets can penetrate the marl. The red sand bed of the same geological formation also appears to be favorable to its growth. And any soil, underlaid by a tolerably stiff subsoil, is adapted to it, provided it is not too wet. * * * In view of the rapid diminution of the area of forests in this State and the



Fig. 21.

Robinia pseudacacia, L. Locust. Acacia. Yellow Locust. From Sargent's "Trees of North America."

consequent injurious changes in our climatic phenomena, and also in consequence of the increasing demand for more durable and valuable woods, the cultivation of the Locust should be rapidly extended. The small expense and the slight attention needed make the experiment easy of trial, and the profits of successful or thrifty growth are so large as to attract the attention of all landowners. It is not necessary in the interests of climate to surrender areas, now tilled, to forest or to devote them to the cultivation of this wood, although, as a matter of profit, the locust areas of Monmouth county can show larger returns per acre than the average net receipts from the farmed lands of the State; but it is sufficient for

this and for our supply of wood to give to it the thousands of acres not capable of profitable tillage, and the sides of our roads and other grounds now either bare or exclusively devoted to other ornamental trees." (Agric. Rpt., '93, J. C. Smock, 55.)

"Owing to the depredations of the locust-borer, it is always best to mix another species with the Locust. For this purpose *Prunus serotina* and the American Chestnut are excellent. As with other leguminous plants, bacteroids, which reside in a symbiotic state in tubercles on its roots, are able in some mysterious way to accumulate nitrogen. The litter, which is rich but thin, soon decays. Once established, the locust hurst will never need renewal; hundreds of stool-shoots and root-suckers are present to take the place of felled trees on the admission of light. Besides a tap-root the Locust has an extensive horizontal root system by which the soil is held in place. It is for this reason used on railroad embankments and dry soils subject to shifting." (Geol. Rpt., '99, Gifford, 285.)

"The seed ripens in September and should be gathered during fall and winter. The pods containing the seed are kept in a dry place over winter and the seed planted in the spring. Spring planting is preferable to fall planting on account of danger from field mice during the winter. The seed is thrashed out. Just before planting the seed should be placed in scalding water, which will cause it to swell. If the seed is not put in scalding water it will 'lie over' in the ground and germinate the second year only. Sow the seed in beds where the young plants should remain one or two years, when they may be set out permanently at four to six feet distance. Do not plant them further apart than six feet. They may also be grown from root cuttings or from sprouts. Trees grown from seed are best as they are more healthy and possess a greater reproductive power." (Hort. Rpt., '03, Meier, 213.)

ROBINIA VISCOSA, Vent. Clammy Locust.

"Escaped from cultivation. Hunterdon: Sparingly. Morris: Chatham; near Dover; Mount Freedom and Madison. Essex: Franklin; Belleville. Somerset: Black swamp.

Mercer: Princeton. Ocean: Toms River. Salem: About Salem: Adventive or naturalized from the southwest." (Britton.)

Rhus hirta, Sudw. (*R. typhina*.) Staghorn Sumach.

"Gloucester: Near Mickleton. Burlington: Bordentown. Mercer: Near Trenton. Essex: Along Orange Mountains. Hudson: Little Snake Hill, and frequent in rocky places in the northern counties." (Britton.)

"The Staghorn Sumach is sometimes called the Vinegar Tree, from the use of its acid fruit in vinegar. *Rhus hirta*, which grows to be a small tree, has been planted to a considerable extent in yards in South Jersey, but is very rare in the woods." (Geol. Rpt., '94, Gifford, 286.)

Rhus copallina, L. Sumach.

"In poor soil. Frequent throughout the State; most abundant in the southern counties." (Britton.)

**Ilex opaca*, Ait. Holly.

"Warren: Mountain Ridge, below Carpentersville. Mercer: Trenton. Monmouth: Abundant and very large in the old forest on Sandy Hook. Middlesex: Sparingly on the sand hills of the Raritan, near Woodbridge, and common in woods in the southern counties." (Britton.)

"*Ilex opaca* is common in wet woods, especially near tide-water, in the coniferous zone. Less abundant in the tension zone. Reported from but one locality in the deciduous zone at Carpentersville." (Geol. Rpt., '99, Hollick, 189.)

"The commonest, and by far the most characteristic, trees of the beaches are the Holly and Red Cedar. The Holly thrives here, reaching a much larger size than on the mainland, apparently enjoying the moist, salt atmosphere and loose sand. It is a dune tree, *par excellence*. Its limbs are close and jagged, in striking contrast to the pyramidal, symmetrical holly trees of the inland open fields. Its prickly foliage is dense and dark green, and its crown is flat. It produces rich red berries in profusion, and its bole is bright gray in color, rugged and sturdy. It is not uncommon to find

two hollies grown together, or the limb of one tree growing into another tree, or a limb bending down and uniting with the trunk, forming what the natives call 'jug handles.' Those who are familiar with the region will never forget these groups of hollies, nor the masses of aromatic red cedars with limbs festooned with gray lichens." (Geol. Rpt., '99, Gifford, 252.)

Acer spicatum, Lam. Mountain Maple.

"In rocky woods. Union: Three miles north of Plainfield, rare. Somerset: Peapack. Essex: On First mountain. Hunterdon: Stockton. Warren: Along the Delaware, below Carpentersville, and at Low's Hollow. Sussex: Near Newton, and on High Point." (Britton.)

Acer Pennsylvanicum, L. Striped Maple. Moose Wood.

"Passaic: West side of Bearfoot mountain. Sussex: Bank of stream in woods near High Point. Warren: Delaware Water Gap." (Britton.)

Acer Saccharum, Marsh. Sugar Maple. Rock Maple.

"Hudson: Weehawken. Mercer: Abundant about Princeton; bank of Assanpink creek, two miles east of Trenton, now



Fig. 22.

Acer Saccharum, Marsh. Sugar Maple. Rock Maple. From Sargent's "Trees of North America."

destroyed, and frequent in rocky woods in the northern counties." (Britton.)

Acer nigrum, Michx. Black Maple.

“Hunterdon: Locktown.” (Britton.)



Fig. 23.

Acer saccharinum, L. Silver Maple. Soft Maple. From Sargent's "Trees of North America."

Acer saccharinum, L. Silver Maple. Soft Maple.

“Sussex: Waterloo and along the Delaware river. Warren: Very abundant from above the Water Gap to Riegelsville. Hunterdon: Common along the Delaware.” (Britton.)

**Acer rubrum*, L. Red Maple. Scarlet Maple.

“Swamps and low grounds. Common throughout the State.” (Britton.)

“Species more or less abundant in both the deciduous zone and the coniferous.” (Geol. Rpt., '99, Hollick, 185.)

Rhamnus Caroliniana, Walt. Indian Cherry.

“Hudson: Secaucus and New Durham.” (Britton.)

Rhamnus Purshiana, DC. (*R. alnifolia*, L'Her.) Bearberry. Coffee-tree.

Hudson: Along the railroad, near New Durham.

Tilia Americana, L. Linden. Basswood. Linn. Whitewood.
 "Salem: Banks of the Delaware. Monmouth: Banks of

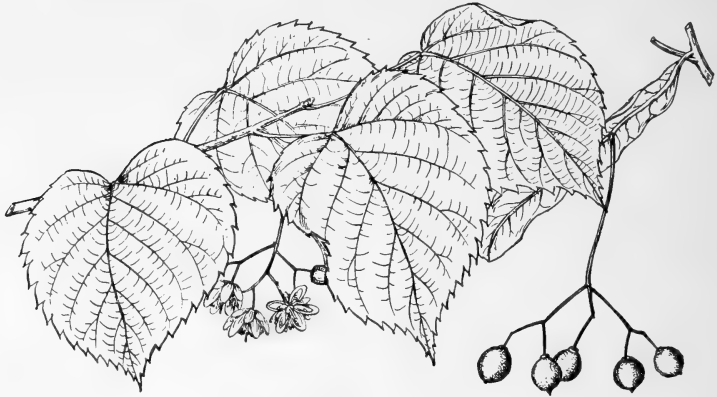


Fig. 24.

Tilia Americana, L. Linden. Basswood. Linn. Whitewood. From Sargent's "Trees of North America."

'Squan river; Cliffwood. Camden county, and frequent in woods, middle and northern counties." (Britton.)

Tilia pubescens, Ait. Linden. Basswood.

"Hudson: On the high hills, near Weehawken. Bergen: Lyndhurst, possibly not native. Hunterdon: Rosemont, rare." (Britton.)

ARALIA SPINOSA, L. Hercules' Club.

"Sparingly escaped from cultivation. Passaic: Rutherford. Union: Plainfield. Monmouth: Keyport. Camden: Ancora. Hunterdon. Gloucester: Escaped from cultivation, near Mantua. Adventive from the southwest." (Britton.)

Nyssa sylvatica, Marsh. Tupelo. Gum-tree. Pepperedge.

"In swamps and low grounds. Occasionally in dry soils. Common throughout the State, except in the mountainous portions of Sussex and Warren counties. Most abundant and luxuriant in the southern counties." (Britton.)

Cornus florida, L. Flowering Dogwood.

"In open woods. Common throughout the State. Not very abundant in the Pine Barrens." (Britton.)

Diospyros Virginiana, L. Persimmon.

“Morris: Summit. Hunterdon: White House; Stockton, frequent; Pittstown, Baptisttown and Frenchtown. Somerset: Near Peapack. Essex: Franklin. Union: Plainfield, Evona and Washington Rock. Hudson: Bergen Point. Mercer: Princeton, and common southward on the Yellow Drift soils.” (Britton.)

Fraxinus nigra, Marsh. Black Ash.

“In wet woods. Bergen: Closter, Lyndhurst. Essex county. Morris: Boonton. Hunterdon: Rosemont, Pittstown. Sussex: Waterloo. Monmouth: Freehold.” (Britton.)



Fig. 25.

Fraxinus Americana, L. White Ash. From Sargent's "Trees of North America."

Fraxinus Americana, L. White Ash.

“Moist woods. Camden: Atco. Gloucester: Quite common about Mickleton, and common in the middle and northern counties.” (Britton.)

Fraxinus Pennsylvanica, Marsh. Red Ash.

“Gloucester: Banks of the Delaware. Pennsgrove, also the glabrate form; not common about Mickleton, and common in the middle and northern counties.” (Britton.)

Fraxinus Pennsylvanica var. *lancolata*, Sarg. Green Ash.

“Monmouth and Ocean: ‘Near streams, not rare.’ (Knieskern.) But surely rare in the eastern parts of those counties. Gloucester: Mullica Hill. Hunterdon: Stockton. Mercer: Along the Delaware, below Trenton.” (Britton.)

Catalpa Catalpa, Karst. *Catalpa*. Indian Bean.

“Mercer: Banks of Crosswicks creek, ‘where it must be native, as it figures in a deed for land bearing date of 1684, as Indian Bean Tree, which is certainly before these trees were brought from the South for shade and ornamental purposes.’ (C. C. Abbott.) Burlington: Along Rancocas creek, Pemberton and Birmingham, certainly spontaneous; also along roadsides, New Lisbon and Juliustown. Hunterdon: Along the Delaware. Warren: Along the Delaware. Elsewhere commonly escaped from cultivation.” (Britton.)

Sambucus Mexicana, DC. Common Elder.

“Rich soil in open places. Common throughout the State, but not very abundant in the Pine Barrens.” (Britton.)

Sambucus glauca, Nutt. (*S. racemosa*, L.) Elder.

“In rocky places. Hudson: Snake Hill; Weehawken. Union: Plainfield. Essex: On First Mountain. Hunterdon: Bull’s Island, and frequent in the northern counties.” (Britton.)

FORESTRY PAPERS IN STATE REPORTS.

A list of the papers upon forestry (including plants generally) published in the (1) annual reports of the State Geologist, (2) annual reports of the State Board of Agriculture and (3) annual reports of the State Horticultural Society, arranged in chronological order.

1873.—Appendix. "On Cultivating the Locust Tree for Timber," by J. C. Smock, pp. 55-62. (Agricultural Report.)

"Forest Fires and the Means for Diminishing and Preventing Them," by C. E. Elmer, pp. 62-64. (Agricultural Report.)

1875.—"Forest and Forest Culture," by J. C. Smock, pp. 59-63. (Agricultural Report.)

1887.—"Our Forests: (1) The Protection of Our Forests from Fires," by G. H. Cook, pp. 289-314; (2) "Natural Supply and Perpetuity of Our Forests," by J. B. Lyman, pp. 315-322; (3) "Study in Our Public Schools of the Care and Culture of Trees," by E. O. Chapman, pp. 323-332. (Agricultural Report.)

1889.—"A Few Thoughts about Trees," by Mrs. Helen V. Austin, pp. 124-135. (Horticultural Report.)

1891.—"Oak Land and Pine Land Belts and Their Relation to Agriculture," by C. W. Coman, pp. 111-141. Map 1. Area by Counties. (Geological Report.)

1892.—"Forests of New Jersey," by J. C. Smock, pp. 91-100. (Agricultural Report.)

1893.—"Forest Growth and Protection," by Franklin Dye, pp. 53, 54.

1894.—"Report on Forestry," by C. C. Vermeule, pp. 225-244. Map 1. (Geological Report.)

"Preliminary Report on the Forest Conditions of South Jersey," by John Gifford, pp. 245-286. (Geological Report.)

1895.—"Report on Forestry in Northern New Jersey," by C. C. Vermeule, pp. 99-156. (Geological Report.)

"Report on Forest Fires for Season of 1895," by J. Gifford, pp. 157-182. One illustration. (Geological Report.)

"Notes on the Forests of New Jersey," by G. Pinchot, pp. 183-188. (Geological Report.)

"The Forestry Question," by John Gifford, pp. 169-178. Three illustrations. (Agricultural Report.)

"Relations of Forests to the Surface of the Country," by J. T. Rothrock, pp. 179-181. (Agricultural Report.)

"The Value of Forests to Agriculture," by A. W. Pearson, pp. 182-186. (Horticultural Report.)

1896.—"Notes Collected During a Visit to the Forests of Holland, Germany, Switzerland and France," by J. Gifford, pp. 339-365. (Geological Report.)

1898.—"Southern New Jersey Pine Belt," by C. C. Vermeule, pp. 185-189. (Geological Report.)

Appendix A. "Study of Forest Fires and Wood Production," by G. Pinchot, pp. 1-102. Plates XXII. (Geological Report.)

1899.—"Report on Forests," by C. C. Vermeule, pp. 1-125. Maps 7. Plates XXXI. Figures 9. (Geological Report.)

"The Plains," by G. Pinchot, pp. 125-130. (Geological Report.)

"Silvicultural Notes on the White Cedar," by G. Pinchot, pp. 131-136. (Geological Report.)

"Relation between Forestry and Geology in New Jersey," by Arthur Hollick, pp. 177-201. (Geological Report.)

"The Role of Insects in the Forest," by J. B. Smith, pp. 203-232. (Geological Report.)

"The Forestal Conditions and Silvicultural Prospects of the Coastal Plain of New Jersey," by J. Gifford, pp. 233-317. (Geological Report.)

1901.—"Silviculture in Relation to Horticulture," by J. Gifford, pp. 103-121. Five illustrations. (Horticultural Report.)

1902.—"Forest Fires in New Jersey During 1902," by F. R. Meier, pp. 97-108. Plate 1. (Geological Report.)

"Forestry for New Jersey Farmers," by F. R. Meier, pp. 309-322. Three illustrations. (Agricultural Report.)

1903.—"Forest Fires in New Jersey During 1903," by F. R. Meier, pp. 45-71. Plate 1. (Geological Report.)

"Most Profitable Trees to be Planted on Waste Lands of New Jersey," by F. R. Meier, pp. 208-215. (Horticultural Report.)

1904.—"Forest Fires in New Jersey During 1904," by F. R. Meier, pp. 273-290. Plate 1. (Geological Report.)

1905.—"Purpose and Work of the New Jersey State Forestry Commission," by Henry A. Kummel, pp. 114-127. (Agricultural Report.)

1906.—"Forestry in New Jersey," by F. R. Meier, pp. 208-210. (Horticultural Report.)

LAWS UPON FORESTRY.

1865.—“An act to prevent injuries by fire from locomotive engines on railroads, and to provide for compensation therefor.” (Page 901.)

Digest.—Duty of railroad companies. Person or corporation responsible for any injury.

1875.—“A supplement to an act passed November twenty-fourth, one thousand seven hundred and ninety-four, entitled ‘An act to prevent the burning of woods, marshes and meadows.’” (Page 20.)

Digest.—Justices of the peace, constables, overseers of highways, &c., tenants and agents may order inhabitants to assist in extinguishing or stopping progress of fires. Penalty for refusing to obey orders.

“A second supplement to the above act.” (Page 39.)

Digest.—Penalty for firing woods, forest, &c.

1876.—A supplement to the act entitled ‘An act for the punishment of crimes,’ approved March twenty-eighth, one thousand eight hundred and seventy-four.” (Page 83.)

Digest.—Penalty for endangering property by burning brush or other material.

1892.—An act to provide for the extinguishment of forest fires in the third and fourth-class counties of this State, and to provide for the payment of the expense thereof.” (Page 205.)

Digest.—Township committees may employ a person or persons to fight and extinguish forest fires. Sum to be raised by taxation.

1893.—“An act to provide for the planting and care of shade trees on the highways of the municipalities of this State. (Page 496.)

Digest.—Commission appointed shall have control and power to plant, &c., shade trees. Governing body of municipality by resolution direct commissioners to be appointed. Term of office. Vacancy filled for unexpired term only. By whom appointments made. Notice of contemplated improvement to be published. By whom cost of planting trees borne. Cost of such improvement collected same as other taxes. Cost and expense of caring for such trees, &c., paid by a general tax.

1894.—“A further supplement to an act entitled ‘An act to complete the geological survey of the State,’ approved March thirtieth, one thousand eight hundred and sixty-four.” (Page 178.)

Digest.—Managers may appoint expert assistance. Geologist shall report results and statement to Legislature. What statement shall include. Also state argument relative to climate, rainfall, &c.

“That the State Geologist, under the direction of the Board of Managers of the Geological Survey, and with the assistance of a competent botanist to be selected by said board for his expert knowledge of forestry and of the forest trees of this State, and such other expert assistance as may be required for the purpose, shall make an investigation to ascertain the extent, character and location of the wild lands in this State which are suited for permanent occupation by forests rather than by agriculture.”

“A supplement to the act entitled ‘An act to provide for the extinguishment of forest fires in the third and fourth-class counties of this State, and to provide for the payment of the expense thereof.’” (Page 298.)

Digest.—Preamble. Township committee shall appoint fire marshal. Marshal shall appoint deputy. Duties of marshal. Township committee shall cause map made and copy thereof to be filed. Marshal may be removed for cause.

1896.—“An act to protect shade, ornamental and fruit trees from injury by horses, mules and other animals.” (Page 239.)

Digest.—Unlawful to hitch or tie animals to trees.

1902.—“An act concerning forest fires and the prevention thereof.” (Page 451.)

Digest.—Fire marshal. Powers of constable. Power and authority during fire. May assist in adjoining district. Further duties. Annual report. Care in burning charcoal, &c. Penalty for violation. Investigation of fires. Report of investigation. May issue process to bring offenders before grand jury. Testimony returned. Cost of investigation. Appropriation by State.

1904.—“An act to provide for the planting and care of shade and ornamental trees in the public highways of any city of this State by the authorities having the management of the public parks in any such city.” (Page 274.)

Digest.—Shade trees in cities. Care of; planting additional trees. Annual expenditure. Construction of this act.

1905.—“An act for the establishment of forest park reservations by and in the State of New Jersey, and for the appointment of a State board of forest park reservation commissioners, and defining its powers and duties.” (Page 77.)

Digest.—Forest park reservation commissioners. Power and duties. *Ex-officio* members. Terms. Vacancy. Acquisition of lands. Preservation and management. Reports. As to cutting or selling timber. Employes. Misdemeanor to cause fires or to cut timber. Fire wardens. Title to rest in State. Maintain roads. Right of eminent domain. Action to establish forest reservation. Map. As to improvements. Prior resolution by board necessary. Secretary of board. Duties. Officers of board. Expenses. Seal.

“Among duties are: ‘The board shall observe, keep in view, and, so far as it can, put in operation the best method to reforest cut-over and denuded lands, to forest waste and other lands, to prevent injury of forest by fire, the administering and care of forests on forestry principles, the encouragement of private owners in preserving and growing timber for commercial and manufacturing purposes and the general conservation of forest tracts around the headwaters and on the water-sheds of all the water courses of the State; said board shall make reports of its work, conclusions and recommendations to each session of the Legislature, and from time to time publish, in a popular manner, and print for popular distribution, a bulletin or other form such of its conclusions and recommendations as may be of immediate public interest.’ ”

1906.—“A supplement to the above act.” (Page 38.)

Digest.—Contract for forestry purposes.

“An amendment to the last act.” (Page 70.)

Digest.—Section eight amended. Action to establish forest reservation. Contract. Searches. Conveyance.

“An act for the appointment of fire wardens, the prevention of forest fires and the repeal of sundry acts relating thereto.” (Page 221.)

Digest.—Fire warden and salary. Township fire warden. Term. Vacancy. Township districts. Deputy fire wardens. Supervision by State fire wardens. Fire patrol. Extinguishing forest fires. Summon assistance. Act in adjoining district. Control by State warden. Rules and regulations for wardens. Compensation. Wardens. Helpers. Presentation of bills. One-half paid by State. If destroyed area more than

acre report to State warden. Notices posted. Closed season for burning brush. Fires must be watched. Back-firing allowed. Penalties. Right to arrest without warrant. Magistrates may issue process. In nature of summons. Endorsement. Statement made in process. Judgment. Form of judgment. Signed by magistrate. Appeal may be taken to Court of Common Pleas. Bond filed. Transcript sent to court. Appeal acts as stay. Execution granted by magistrate. Officers to serve process or execution. Procedure. Costs. Disposition of penalty. Adjournments. Sureties. Use of money appropriated by township. State charges. Acts and parts of acts repealed.

“An act to authorize any municipality of this State to use lands for forestry purposes, to cut and sell timber therefrom and to determine the character of such use.” (Page 261.)

Digest.—Municipal forestry. Public land.

“A supplement to an act entitled ‘An act to provide for the planting and care of shade trees on the highways of the municipalities of this State,’ approved March twenty-eighth, one thousand eight hundred and ninety-three.” (Page 333.)

Digest.—Jurisdiction and enforcement of ordinances. Officers to serve process. Proof of ordinance.

“An act in relation to the control of public parks belonging to or under the control of any municipality of this State or any department in the government thereof.” (Page 522.)

Digest.—Control of parks. Power of commission. Relating to ordinances.