

Thesis
The ecology of The Manhattan woody plants.
by
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Ash Green

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Fraxinus Viridis

The distribution of the green ash is very general in this section of the country as it grows along all of the streams and in all of the bottom timbers and also in sheltered localities upon banks and in ravines. It is a thrifty growing tree requiring a fairly good soil and appearing at its best under mesophytic conditions. The wood is hard and very tough and flexible, being much used in the manufacture of buggies, ball bats and every thing requiring the qualities of strength and durability.

The Ash propagates by means of seed. These seed grow in pairs and are winged in such a shape that in falling from the tree they revolve and are borne some distance from the parent tree thus in a measure solving the problem of distribution. Distribution is further aided by the carrying of the seed by means of water. The little trees are often found growing thickly upon the flood plains along the rivers. The conditions are such in the places however that the little trees rarely live beyond the first season.

The winged seeds are a special adaptation for the distribution of seed and this covering probably acts as a protection to the seed until the germinating time, There seems to be no insect that feeds upon the seed and as the trees are prolific seed bearers the species would soon overrun all of the favorable localities were it not for the struggle for existence going on constantly in the plant societies.

Ash white

Fraxinus Americana

The distribution of the white ash is very limited in this section of Kansas and as far as my observations have carried me I have found only one group of these trees.

These are growing near the mouth of Cedar Creek, about six miles up the Blue river.

The white Ash differs from the green in the color of the bark, being of a light brown color when the growth is new instead of green as in the twigs of the green ash. The fact that the distribution of the species is so limited would seem to point toward some check in the propagation of this tree but as far as I have investigated I have found no

reason, either from unfavorable conditions of climate or soil or from lack or destruction of seed that would satisfactorily account for the rarity of specimens of this species.

Ash Pickly

Laurophyllum Americanum

The pickly ash is a shrub or bush rarely growing more than four or five feet high but it is widely distributed over this section of the state, it usually grows in clumps or thickets in some protected spot either in a depression of the ground or as under bush among the larger varieties of forest trees although it is sometimes found growing well up toward the top of the hills in a quite exposed position. The tree is thickly armed with thorns which are probably a means of protection against animals although as far as I can find out they would not be disturbed by animals if they grew unharmed, the buds of this species are a distinctive feature being of a reddish brown color and covered by a hairy brown coat protecting the buds against heat and cold and also against evaporation.

Apple, wild-crab

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Pyrus Coronaria

The apple is found growing in only a few places in this locality, there are a few trees growing back of Mount Prospect on the south side of the Kaw and there is one little thicket about three miles south-west of Keats altogether specimens being quite rare. The species ~~is~~ propagated by means of seeds that are enclosed in a fleshy receptacle much like the common tame crabapple although much smaller. These pomes are eaten by animals or birds or are carried by means of water to greater or less distances from the parent stock thus seeming to solve the problem of distribution but apparently the seeds are either destroyed by the process of digestion or else the climatic conditions are such that the trees do not thrive for if it were otherwise the species would be more common.

As a special adaptation the trees are armed with sharp spines much like the Scarlet Haw. The difference being that in the haw the spines are very numerous and longer and keener than in the apple while in the apple the spines are fewer and also shorter and more like hawthorn.

Box-elder

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Acer Negundo

This is one of the very common forest trees in Central Kansas being distributed along the streams and roadsides and also much used as a shade tree about residences and upon the streets of the towns. The conditions are best for the tree where there is plenty of moisture and in some place where it is not crowded or shaded by other trees the wood is soft and somewhat brittle being of very little use in manufacturing or building, so brittle that a heavy wind is apt to do a considerable damage to the trees standing in exposed positions.

The species is propagated by means of seeds said seeds being winged to aid in distribution it also propagates by means of second growth several branches often growing upon the stump where a tree has been cut down. The seeds of the box-elder seem to be specially adapted to the conditions of soil and climate in this locality as they spring up readily in the fence-rows, corners of fields, flood-plains and in fact everywhere where they are free from disturbance long enough for germination to take place.

The special adaptations consist of the winged seeds for the purpose of scattering the young plants beyond the range of competition with the parent tree, and of the compound or divided leaves for the purpose of securing a better light relation, the leaves were probably at one time all of one part but now they consist of from three to seven parts or leaflets and sometimes these separate leaflets are cleft so as to form two nearly separate parts thus giving a much better light relation to the undermost leaves of the tree. Sometimes the tree shows one other special adaptation this is the turning of the lower branches so as to secure the best relation to the light. I have noticed branches growing almost straight downward to escape a dense shade above them and secure the light of the sun as it beats in obliquely under the upper thatch of foliage.

Buck Bush

Symphoricarpos Vulgaris

The plant is a small bush and grows scattered about over pastures, timber lands, lowlands and highlands, in almost every conceivable place where anything can grow. These you

are more than apt to find a bush of this hardy little plant working out a satisfactory solution of the problem of existence. The plant is small seldom growing more than two feet in height it branches from an underground root stool giving it the appearance of throwing up many different shoots and forming a compact little clump of foliage.

The bush propagates by means of seeds contained in a small red berry, each berry contains two or more seeds and the bushes are sometimes literally covered with these berries so it is really no wonder that we see so many specimens of the species growing upon every hand. The problem of seed distribution is in all probability dependant upon the birds who eat the berries for the sake of the fleshy pericarp and thus distribute the seed very widely. I consider this berry formation one of the special adaptations for scattering the seed over a wide range of territory.

The leaves of this plant also have an unpleasant taste perhaps serving to make the foliage unpalatable to stock and thus being an adaptation for the sake of protection.

Button Bush

Cephalanthus Occidentalis

This shrub is confined almost entirely to the swamps near St. George forming here nearly the whole swamp. Some few specimens are found growing in low places along the creek but outside of the swamps, specimens are scarce.

The bushes are propagated by means of seeds borne in round dense heads of a Composite form. The balls fall off or are whipped off by the wind and float about in the water until they find a resting place in the mud and give rise to a new plant or by the decay and separation of the "Button" give rise to several instead of one bush. Growing in standing water as they do it is probable that the root system is much reduced as in the case of most all water-plants, the long fibrous roots that go out in search of moisture becoming useless. Yet this particular bush has need of a rather extensive root system as a means of anchorage as it presents a rather large top to the wind and would otherwise be blown from its moorings.

Buckeye

Aesculus Argentea

The buckeye grows in nearly all of the lowland timbers being one of the shade plants, i.e., growing only in the partial shade of the larger trees. It grows only in the woods or in the bottom of the timbered ravines. The plant is a shrub rarely growing more than four or five feet high but once in a great while one may find a specimen that has attained a height of ten feet and a diameter of five or six inches.

The plant is propagated by a fruit of the Akenae order. It has a very large kernel surrounded by a light shell of a brown color. These fruits grow in a heavy leathery husk containing from one to three or four of the buckeyes. One peculiar thing about these seeds is their great size composed almost entirely of food material for the nourishment of the young scion. The bark upon the tree is of a whitish caste and very thick and tough for so small a tree indicating some sort of a special adaptation of a protective nature. The leaves are compound in form consisting of several long pointed leaflets

upon a single long feather-rib shaped stem¹⁸
 This is an adaptation to the relation of light to
 the plant necessitated by its growing in the
 reduced rays of the sun after it has passed
 through the intervening foliage of the taller
 trees.

Basswood

Tilia Americana

Growing generally along the water-courses
 in the section of the State but never growing
 at any great distance from a good and
 constant supply of water. The wood of this
 tree is straight grained and very white and
 pretty but it is also very light and soft so
 that its value as a wood is not of a high
 order. The seeds are round hard little
 balls about as big as a hackberry and have
 a peculiar arrangement to aid in seed dis-
 persion. The seeds usually three in number
 are attached to a stem an inch long and this
 in turn is fastened to a long narrow leaf
 set on the stem at an angle so that when
 it is detached it and falls toward the ground
 it acts as an inclined plane bearing the
 seeds to some little distance from its
 source of origin and thus gaining a

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relation of less competition with regard to
the parent tree, The leaves are large and
round in shape showing a highly
developed vein system thus indicating
that the circulation of the tree is strong and
that it is a healthy and a rapid grower
under existing conditions.

Buckthorn

Rhamnus lanceolatus

This is one of the rare varieties as far as
this part of the state is concerned growing in
only one or two spots within six or eight miles
of the college, There is one clump of bushes in
the mouth of a hollow about five miles up
Wildcat and another standing at the base
of the sand-hills well down toward St. George
There may be other places as close but these
are the only ones I have been able to find
The twigs are of a shiny metallic luster having
a caste something like lead in color and the
bush is one of the first to put out its foliage
in the spring, its means of propagation is
obscure and so far I have been unable to
find any of its seed although it must
propagate by this means as it flowers just as
other seed plants do. The name buckthorn

was a rather deceptive one to me until I became acquainted with the plant suggesting to my mind a thorny bush whereas the twigs are in reality perfectly smooth and free from thorns and the bark is if anything smoother than usual among wild shrubs.

Bur Oak

Quercus Macrocarpa

This is the giant of the oak family and is the tree of which so many poetic and romantic things have been said and written. It is found growing in most of the lowland timbers and is gradually working its way toward the top of the slopes where there is any footing for trees following in the wake of others of the oak family in their slow but none the less sure ascent toward the hill-tops. The tree is a slow though sturdy growing the typical form being broad and round topped with a wide spread of branches.

They are propagated by means of acorns of which they bear great numbers but many of said acorns are destroyed by a worm pest and still others by squirrels and other animals so that after all the

number of This species growing in our timber lands is comparatively small when their long life and possibilities for propagation are taken into consideration.

As in all of the oaks the leaves of the bur oak are clift to some extent providing in this way for the foliage upon the lower part of the tree. The wood is very tough and strong and being one of the hardest is of much commercial value being used in the manufacture of wagons, farming implements furniture and the like to a great extent much of the timber being shipped to foreign countries to be made into a finished product.

Black Oak

Quercus Velutina

This oak is not so widely distributed as the foregoing but confines itself to banks and hill sides where the conditions are rather dry than otherwise, it is easy to distinguish from the bur oak because of the reddish cast of the wood and the relative smoothness of the bark. The trees do not attain as great a size and the acorns are fewer in number and smaller.

in size. One of The peculiar Things about¹⁴ These trees lies in The fact that They retain Their leaves Throughout The winter season seeming to point toward some special Adaptation on Their part either as a protective covering or to a lack of sufficient vitality on The part of The tree to enable it to drop Its leaves at This stage of The year. The leaves as in The other oaks are cleft perhaps because The leaves themselves are so thick and glossy that it is scarcely possible for light to penetrate Through Them to The leaves lower down The stem.

Black Jack

Quercus Marilandica

This oak grows almost entirely upon the sand hills around St. George covering the tops of These sand ridges with an almost impenetrable growth of low scrubby trees. They are The smallest of The oak family and distinguishable from The black oak by being rougher barked and also by a slight difference in The buds, propagation of The species takes place by means of acorns and in cases where The land has been cleared by scrubbing also by means of sprouts.

thrown up from the part of the tap-root left in the soil. The black jack grows under almost the worst conditions imaginable as to growth conditions and richness of soil as the land is almost pure sand and very hot and dry for the greater part of the year but the trees seem to be able to withstand almost any thing as to lack of moisture and as they retain their leaves as well as the black oak it may possibly be as a protection against the frequent sand storms that occur in the country, be this as it may they form a most admirable wind brake for the protection of stock and numerous other purposes.

Catalpa

Catalpa speciosa

I found growing only as a tame tree in this locality and consequently its distribution is limited to lawns and other places where shade or ornamentation is desirable to the mind of man. The trees are propagated by means of seeds growing in long pods each pod containing a large number of seed, the seeds are wrapped in a sort of haken chaf that tends to blow about

and distribute the seed after the pod once ¹⁶ breaks open which is a matter of time rather than a function of the plant.

The leaves of this tree are very broad and well adapted to the purpose of exposing a large surface to the sun's rays, the leaf petioles are also large and long admitting of a good arrangement of the leaves with regard to the source of light.

Choke Cherry

Prunus Virginiana

This little fruit bearing tree usually seeks a place near the water in which to grow, it is not very plentiful around Manhattan but there are several groves of them within a space of a few miles of town where they grow quite thickly for all of that. They grow very large never getting to be more than seven or eight feet high and very slender, the buds of the tree are one of the distinctive features being long, much longer than any ordinary bud, at least thus times as long as they are thick. In looks they resemble a tame cherry somewhat in general appearance differing in point of blossoms. These of the

Choke cherry being in much larger bunches
than those of the same tree.

The trees are propagated by means of the pits
contained within the cherries themselves, they
are solid little pellets and somewhat heavy
and perhaps this accounts for the fact
that the trees usually grow in thickets instead
of being scattered through the timber among
the other trees. It may also be due to the
fact that the trees must be cross fertilized
in order to bear fruit and if so they must
of necessity be near to each other.

Coffea Beans

Gymnocladus Dioica

Rather a peculiar tree never growing
in groups of more than three or four in
a place and usually you find them
growing long distances apart solitary and
alone as far as their own species are
concerned. The trees grow tall but
never to a very large size the average
diameters being from six inches to a
foot, the wood is of a reddish brown color
having a large pith this pith forming
nearly the whole bulk of the twigs until
they are very old the twigs are very

Thick and blunt breaking off abruptly when they are yet a half inch thick.

The coffee bean as its name indicates is propagated by means of a sort of bean, this bean grows in a long heavy pod containing about half a dozen beans, the general outline is round and they are covered by a very hard shell, the tree has a special adaptation in the shape of leaves they are long ribbed compound leaves having small round blades distributed evenly along the sides of the petiole these blades are so small and so far apart that they afford an ideal light relation to the branches below them on the trunk of the tree. There is probably some special adaptation in the matter of the pith being so large too but it is obscure and would require special research to disclose what it is. As to the matter of distribution it is rather difficult to imagine how it takes place as the beans are too heavy to be carried by wind or water and I never knew of an animal molesting them about the only remaining source of disturbance lies in the small boy and the bean-gum and a conservative person would regard this as an essential way of distributing the species.

Chinquapin Oak

Quercus Acuminata

These oaks form the class that are commonly known as scrub oaks. They are not large as a general thing and present a thin straggling appearance that warrants the name. The trees are usually found growing scattered along the beds and banks of ravines, through the mixed timbers and especially are they found slowly working their way up the barren hill-sides and taking life and vegetation in their wake. They are propagated by means of acorns as in the other oaks and are easily distinguishable from the others by the smallness of the acorns, the whiteness of the bark and by their general appearance. The leaves are cleft as in the other members of the species and to all appearances for the same purpose, other details about the tree are of an uninteresting nature and generally well known.

Cottonwood

Populus Peltoides

The distribution of the tree is general throughout the country but the location where it seems to flourish best is where it forms a fringe along the river banks. This tree is common

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nearly the whole of the fringing growth along both rivers. The cottonwoods are the giants of the plant societies in this locality growing to as great a diameter as seven or eight feet when the conditions are favorable and the age of the tree sufficient to allow of so great a growth.

Propagation takes place by means of a tiny seed just barely visible to the naked eye.

Distribution of the seed is accomplished by means of wind and water. The seeds being provided with a cottony growth that enables them to be blown for long distances by the wind or to be easily portable by water.

The trees bear a great number of seeds and I have seen them scattered so thickly upon the slack water of the river as to form an almost unbroken senn and sometimes when the river has been up at the right time of year and receded leaving a mud bar bare the little seedling trees come up almost as thickly as they can stand but dying in a short time from the fierce competition and intense heat of the reflected sun.

The tree is much used as a shade tree and is often found growing under even xerophytic conditions and upon the poorest of soil.

Summer Grape

Vitis Riparia

This is one of the climbing vines and grows scattered throughout the timber and along fences and wherever there is a chance for it to climb upon anything sometimes it is found running along the ground but as soon as anything springs up large enough to shade it the tendency to climb becomes apparent and the vine is seen running over the surrounding vegetation.

The vine is propagated by means of seeds contained in the grapes themselves and the distribution of the seed is aided by the birds and animals that eat the fruit. The leaves of the vine are broad exposing a large surface to the rays of the sun but the edges are also cleft so as to allow some of the light to pass on to the lower leaves of the plant, another adaptation is the tendrils by which the vine climbs and the mere act of climbing is an adaptation for the sake of obtaining a better light relation. Thus enabling the vine to flourish in a plant society where if it were not provided with means of climbing it would smother.

Hackberry

Celtis Occidentalis

This tree grows in nearly all of the bottom timbers and in the ravines extending up into the hills, once in a great while you find one growing under xerophytic conditions upon the top of some hill but so greatly modified in appearance that it is almost impossible to recognize it unless there are either berries or leaves upon it.

The tree is one of the roughest barked that grows in this locality even the bark upon the smaller branches being rough and harsh. The propagation of the species is carried on by means of seeds contained in a sort of berry, one single round seed covered by a thin pericarp constitutes a berry and birds and small animals that make the berries their food serve to distribute the seed over a wide reach of country and furnish in this way the necessary conditions of light moisture and relation to other plants to make the life of the young tree a success in the world of vegetable strife and competition.

Soft Maple

Acer Saccharinum

This tree grows along the rivers more than anywhere else being found near the water as a general thing but they do follow the creeks and ravines to some extent are much planted for shade trees and once in a great while they grow upon the hilltops where it is very dry and the soil of the poorest kind.

The species is propagated by means of seeds that grow two upon a single stem and are winged to assist in distribution when seeds are winged in this way they revolve when falling and in this way descend very slowly so that if there happens to be any wind the seeds are blown to a great distance before they reach the ground. The bark of the tree is smooth and of a dark brown color, the sap of the tree is plentiful and quite sweet in taste so much so that it is often used as syrup and for making sugar, the leaves are cleft along the edges having five points, making a very pretty leaf from an artistic standpoint.