

TREES OF TREVECCA COLLEGE CAMPUS

by
Jerry Costa
Master of Arts

Thesis
Submitted to the Faculty of the
Graduate School of
George Peabody College for Teachers
in partial fulfillment of the requirements
for the degree of
Specialist in Education
in Biology

August, 1970

Nashville, Tennessee

Approved:

Major Professor

Chairman of Department

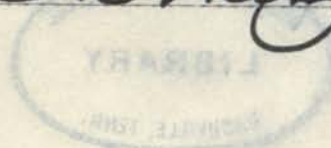
Dean of Graduate School

Date:

7-30-70

7-30-70

8-4-70



257206

ACKNOWLEDGEMENTS

My sincere appreciation to:

Dr. Gus Tomlinson and Mrs. Barbara Turner of Peabody College for the courtesy they have shown when consulted and for their helpful suggestions in order to make this project a more useful one.

Mr. John Moore of Hardi Gardens who helped me identify some of the leaves of my collection.

My daughter, Esther Costa Swink, for her patient typing and retyping of this paper.

10-20-70

For

My family
that I prize above all
other earthly ties.

CONTENTS	Page
Introduction.	1
Materials and Methods	2
Results and Summary	5
Leaf Examples and Tree Description	8
Aceraceae (Box Elder, Red Maple, Silver Maple, Sugar Maple)	9
Aquifoliaceae (American Holly, Buford Holly).	13
Betulaceae (Hazelnut)	15
Bignoniaceae (Catalpa).	16
Caprifoliaceae (Fragrant Honeysuckle)	17
Cornaceae (Flowering Dogwood)	18
Fabaceae (Bristly Locust, Mimosa, Red Bud).	19
Fagaceae (American Beech, Black Oak, Chestnut Oak, Pin Oak, Shingle Oak)	22
Hamamelidaceae (Sweet Gum)	27
Juglandaceae (Black Walnut, Pecan, Shellbark Hickory) . . .	28
Magnoliaceae (Southern Magnolia, Tulip Magnolia, Yellow Poplar).	31
Moraceae (Osage Orange, Paper Mulberry, Red Mulberry) . . .	34
Pinaceae (Arbor Vitae, Canadian Hemlock, Colorado Spruce, Irish Juniper, Red Cedar, Spiny Greek Juniper, Virginia Pine, White Pine).	37
Rosaceae (Black Cherry, Common Apple, Crab Apple, Weeping Cherry).	45
Salicaceae (Weeping Willow, Cottonwood)	49
Simaroubaceae (Tree-of-Heaven)	51
Ulmaceae (American Elm, Chinese Elm, Hackberry, Southern Hackberry)	52
Key to Genera and Species	56

References Used.	86
Map.	87

Introduction

Trevecca Nazarene College is an accredited senior arts college located on an elevated fifty acre tract of land in the south side of Nashville overlooking part of the city.

During a large portion of the year the above tract is resplendent with verdant grass, colorful flowers and a considerable variety of trees and shrubs which are interspersed along it walks and buildings.

The writer came to Trevecca College as a student in 1948. He has been associated with the institution in the field of instruction since 1957. In recent years the project of identifying the trees of this campus has been a recurring thought in his mind for it appeared as one of the many needs of the college. On other college campuses this work has been done and has proved to be an interesting asset to visitors, students, faculty, and college constituency. It was this interest and need that led to the selection of the topic for this thesis and to a study for the proper solution to the problem. It was felt that the results of this study could also be used as an elementary teaching tool in some of the courses in biology, botany, and nature study.

The purpose of this work, therefore, was to make a research about every different tree on Trevecca's campus and provide necessary information of the tree portion of the botanical life of Trevecca Nazarene College in order to recognize it and identify it by both common and scientific names.

Materials and Methods

A number of different techniques to solve the various phases of the problem were used. Collectively they were made in the hope that they would result in the production of information that would be useful to the college administration and to the student body. It is hoped that this goal has been reached to some extent.

The college campus map included in this study shows the boundaries of the college property and the part actually used as a campus. No pretension is made to it being to exact scale. On it the location of each tree is indicated by a dot of a certain size and the number which accompanies it denotes the common name of such tree which can be found by consulting the legend. The legend on the map also gives the approximate diameter of the trees. These measurements were taken at approximately 30 inches above the ground. In cases where the trunk forked below that height the measurement was taken at the point of forking. This feature enables anyone interested to easily discover any tree of this tract of land and promptly learn to distinguish it from others in the field.

The chief work of this study consisted in making a leaf collection which would serve as the main tool for identification of the tree. This collection of leaves was made and prepared in such a manner as to preserve as much as possible the original natural color, shape, and identity features of the leaves. To this end each leaf is sealed between two layers of contact paper which make easy its preservation. To aid in identification a portion of the twig is also included to reveal the leaf arrangement, whether it be opposite,

alternate, or whorled, and to show the kind of buds and bark. Sometimes the flower is also included. The leaf is hinged to the sheet which makes it possible to view the back side of the example and to observe its characteristics as well. Each leaf is then identified as to family, genus, and species.

As a further help to identification, a picture of the whole tree is attached, in some instances to show its characteristic shape, while in other cases a close-up picture to show the features of just part of the tree. These pictures make it possible to see over-all features that a leaf alone cannot reveal.

Below the picture a brief description of the main characteristics for recognition is given. By these some guidelines to identification are added.

On the trees of the chief part of the campus a final easy, and it is hoped permanent, means of identification has been added. Each tree bears a plastic tag which gives its identity both by common name and by botanical name. This has been done to make the study more complete and because some individuals want to learn just the common name while others want to know both. These tags are placed on the side of the trunk which faces the main walks throughout the campus. The tags are fastened in such a way as to allow for expansion in growth and at the same time to be able to weather any storm and still remain in place.

A final instrument for the identification of Trevecca's trees is a key which can be easily followed by the beginning student and which will lead him to identify any tree on the campus. This key is

intended to develop for the student, or anyone else interested, the preliminary skill to identification of plants by familiarizing them with the use of a key. It should also make it easier for them to use more helpful but also more complicated keys which they may need to consult in the future. The name of some species which are not yet on the campus have been included in the key. This was done for two reasons. In the first place plans are being made to plant other trees and secondly the answer to the search on the part of the student should not be too obvious. This feature should help to develop the technique of close observation, a necessity for scientific research.

Results and Summary

The undertaken project has made available for the college the following information.

1. The different kinds of trees on the campus.
2. The number of each kind found there.
3. The approximate size of each tree.
4. The collective number of all the trees.

It has revealed that on this 50 acres of land a number of trees common to the State of Tennessee are lacking. This revelation makes possible the selection of trees that should be planted as a part of the future expansion and beautification of Trevecca College campus.

The following figures along with the common names of the trees give part of the above information. The trees are listed according to their order of frequency of occurrence on the campus.

	No. present
Maples	
Sugar Maple	43
Silver Maple	30
Red Maple	<u>15</u>
	88
Hackberries	
Northern Hackberry	4
Southern Hackberry	<u>55</u>
	59

Junipers	
Spiny Greek Juniper	7
Irish Juniper	5
Virginia Juniper	<u>5</u>
	17
Arbor Vitae	14
Common Apple	12
Dogwood	11
Catalpa	8
Chinese Elm	8
American Holly	7
Magnolia	7
White Pine	7
Cottonwood	7
Canadian Hemlock	6
American Elm	6
Tree of Heaven	6
Pecan	5
Bristly Locust	5
Black Walnut	5
Paper Mulberry	4
Box Elder	4
Wild Cherry	4
Redbud	4
Red Mulberry	4
Shellbark Hickory	4

Virginia Pine	3
Mimosa	3
Osage Orange	3
Pin Oak	3
Crab Apple	3
Sweet Gum	2
Buford Holly	2
Hazelnut	2
Black Oak	2
Weeping Cherry	1
Fragrant Honeysuckle	1
Weeping Willow	1
Tulip Tree	1
Beech	1
Chestnut Oak	1
Spruce	1
Tulip Magnolia	1

LEAF EXAMPLES
and
TREE DESCRIPTION



FAMILY: Aceraceae

COMMON NAME: Box Elder

GENUS: Acer

SPECIES: negundo

DATE: July 12, 1970



BOX ELDER, (*Acer negundo*), Family Aceraceae

Box Elder is an exceptional maple, the only one with compound leaves. These leaves are 6 - 15 inches long, pinnately compound with 3 - 7 coarsely toothed or shallowly lobed leaflets. Greenish-yellow staminate and pistillate flowers are on separate trees. The V shaped paired and winged seeds are 1.5 - 2 inches long. On young trees the bark is gray brown and slightly ridged, on old trees heavily furrowed. It grows rapidly to a height of 50 - 75 feet and from 2 - 4 feet in diameter.



FAMILY: Aceraceae

COMMON NAME: Red Maple

GENUS: Acer

SPECIES: rubrum

DATE: July 12, 1970



RED MAPLE, (*Acer rubrum*), Family Aceraceae

This tree grows 75 - 80 feet in height and 1 - 2 feet in diameter. The smooth light gray bark of young trees develops narrow, scaly plates with age. Leaves are 2 - 6 inches across, with usually three roughly triangular coarsely toothed lobes and a reddish petiole. They turn scarlet in the fall. Flowers are of two kinds, male and female, borne on the same tree or on different trees and appear before the leaves. The paired seeds have slightly divergent wings 0.8 of an inch long.



FAMILY: Aceraceae

COMMON NAME: Silver Maple

GENUS: Acer

SPECIES: saccharinum

DATE: July 12, 1970



JUL

SILVER MAPLE, (*Acer saccharinum*), Family Aceraceae

Silver Maple reaches a height of 60 - 80 feet and a diameter of 2 - 4 feet with a widespread crown and brittle branches. The bark of young trees is smooth and silver gray. The bark of old trees has long narrow scales loose at their ends making the trunk shaggy in appearance. The leaves are deeply cut, 5 - lobed with large marginal teeth, green and smooth above and silvery below. The clusters of short stemmed greenish-yellow flowers appear before the leaves in early spring and produce typically paired seeds.



FAMILY: Aceraceae

COMMON NAME: Sugar Maple

GENUS: Acer

SPECIES: saccharum

DATE: July 12, 1970



MAY • 70

SUGAR MAPLE, (*Acer saccharum*), Family Aceraceae

Sugar Maple tree grow 75 - 100 feet tall and 2 - 4 feet in diameter. The bark is smooth and gray-brown in young trees and becomes scaly and furrowed with age. Leaves are opposite 3 - 5 inches in diameter and usually 5-lobed. The margins have large pointed teeth with those of the center lobe roughly parallel. The color is deep green above and whitish below. Clusters of yellow, long stemmed polygamous flowers develop with the leaves. Their fruit is typically paired, winged and U shaped.



FAMILY: Aquifoliaceae

COMMON NAME: American Holly

GENUS: Ilex

SPECIES: opaca

DATE: July 12, 1970



MAY • 70

AMERICAN HOLLY, (*Ilex opaca*), Family Aquifoliaceae

It is a fairly common tree as much as 50 feet tall with leathery evergreen leaves 2 - 4 inches long and 1 - 2 inches wide with a sharp-pointed tip and spiny toothed (occasionally smooth) margins. Bark is thin gray or pale green. Greenish-white staminate and pistillate flowers are borne on separate trees. The fruit is berry-like, bright red, and 0.3 of an inch in diameter.



FAMILY: Aquifoliaceae

COMMON NAME: Bufordi Holly

GENUS: Ilex

SPECIES: cornuta Bufordi

DATE: July 12, 1970



BUFORDI HOLLY, (*Ilex cornuta* Bufordi), Family Aquifoliaceae

This ornamental tree has a smooth dark gray bark. The leaves are lustrous yellow-green, 2.5 - 3 inches in length, and 1 - 1.5 inches in width. Their apex ends most of the time in three horn-like points with spines and from this feature it gets its name. They may have spines near the base also. The fruit is a red berry about the size of a pea.



FAMILY: Betulaceae

COMMON NAME: Hazelnut

GENUS: Corylus

SPECIES: americana

DATE: July 12, 1970



HAZELNUT, (*Corylus americana*), Family Betulaceae

The Hazelnut is a shrub with broad, somewhat heart-shaped, double-toothed leaves. The leaves are 2-5 inches long and 2-2.5 inches wide. The height of the shrub is about 10 feet. The fruit is an edible nut enclosed in a thin, flattened, hairy, ragged-edged husk. The twigs and leaf-stalks are bristly-hairy.



FAMILY: Bignoniaceae

COMMON NAME: Catalpa

GENUS: Catalpa

SPECIES: speciosa

DATE: July 12, 1970



CATALPA, (*Catalpa speciosa*), Family Bignoniaceae

Deciduous leaves, long stemmed, heart shaped, 10 - 12 inches long and 7 - 8 inches wide, whorled or opposite are on this tree. Tubular white flowers marked with purple and yellow bloom after leaves develop 2 - 2.5 inches long. The fruit is a long cigar like pod with many small seeds. The bark is often scaly and the tree may grow to 100 feet in height and four feet in diameter.



FAMILY: Caprifoliaceae

COMMON NAME: Fragrant
Honeysuckle

GENUS: Lonicera

SPECIES: fragrantissima

DATE: July 12, 1970



JUL

FRAGRANT HONEYSUCKLE, (*Lonicera fragrantissima*), Family Caprifoliaceae

This tree often sprouts from the ground in many branches with gray bark. The flowers are yellow like those of vine honeysuckle and have a fragrant odor. The leaves are 2 - 2.5 inches long and 1 - 1.5 inches wide with entire margin. The leaf tapers to the base and apex ending in a slender point. It reaches a height of 15 - 20 feet.



FAMILY: Cornaceae

COMMON NAME: Flowering Dogwood

GENUS: Cornus

SPECIES: florida

DATE: July 12, 1970



FLOWERING DOGWOOD, (*Cornus florida*), Family Cornaceae

This tree has simple, opposite, deciduous leaves 3 - 6 inches long and 1.5 to 2 inches wide. They are usually oval with pointed apex and smooth margins. The leaves turn scarlet in the fall. Flowers are greenish-white surrounded by four large white or pink petal-like bracts. Fruit is bright red in clusters. Bark is dark brown to black, rather smooth in young trees and breaking up into small scaly black as the tree ages. It grows 15 - 40 feet high and 6 - 18 inches in diameter.



FAMILY: Fabaceae

COMMON NAME: Bristly Locust

GENUS: Robinia

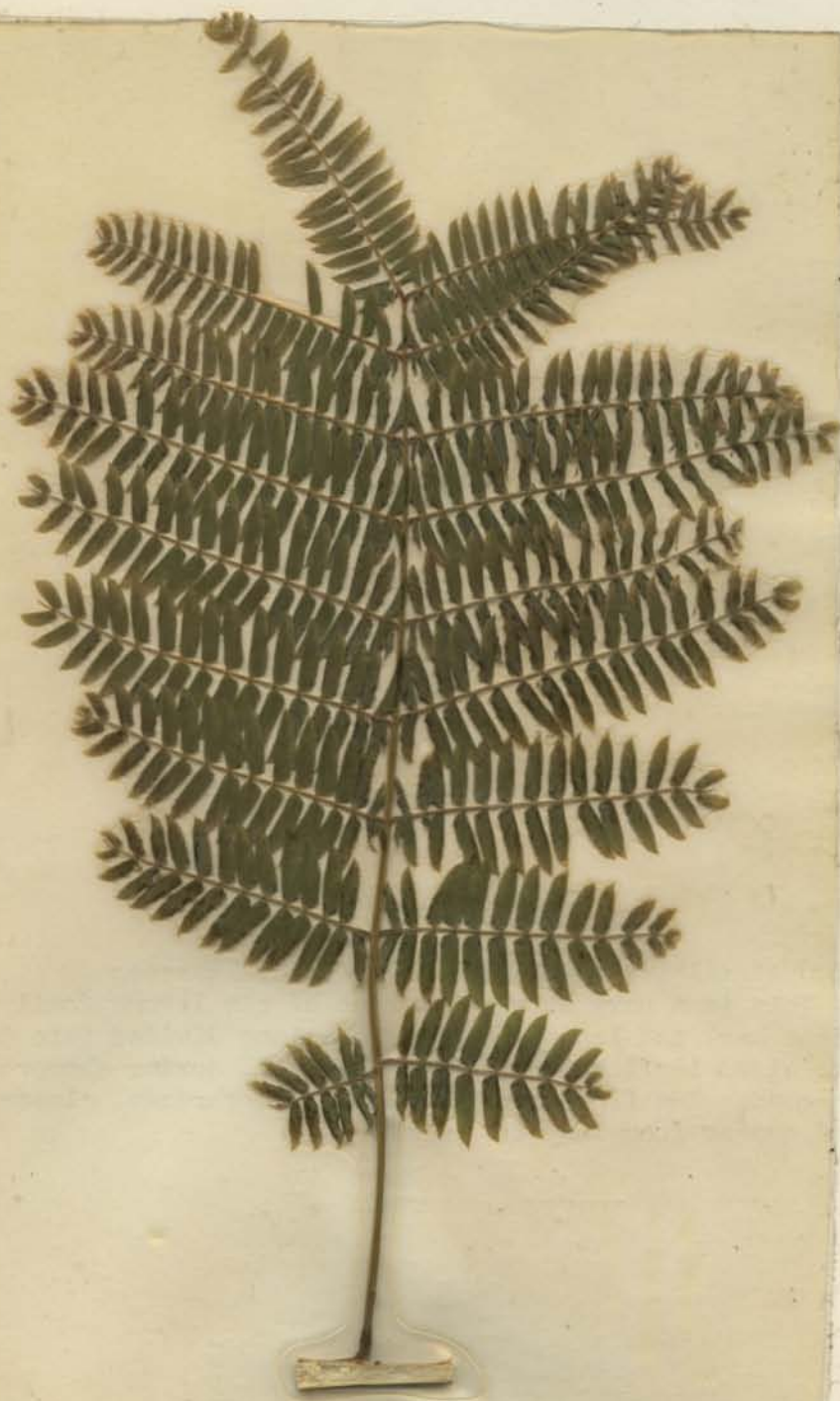
SPECIES: hispida L.

DATE: July 12, 1970



BRISTLY LOCUST, (*Robinia hispida* L.), Family Fabaceae

This is a shrubby tree with twigs covered with bristly hairs almost as long as the paired thorns at the base of the leaf. The leaf is compound with 7 - 11 leaflets and the leaflets are bristle tipped. The flowers are rose to purple in color. The Bristly Locust grows to a height of 2 - 10 feet and the bark of the tree is gray.



FAMILY: Fabaceae

COMMON NAME: "Mimosa"

GENUS: Albizzia

SPECIES: julibrissin

DATE: July 12, 1970



"MIMOSA" (*Albizia julibrissin*), Family Fabaceae

This is a very attractive tree of the legume family with smooth, light bark, and leaves 5 - 8 inches long divided into 40 - 50 small one-sided leaflets that close at night, during showers, or when touched. The flowers are small, pink, thready, clustered in heads, and appear from June to August.



FAMILY: Fabaceae

COMMON NAME: Red Bud

GENUS: Cercis

SPECIES: canadensis

DATE: July 12, 1970



JUL

RED BUD, (*Cercis canadensis*), Family Fabaceae

This is a small tree growing to a height of 25 - 50 feet and a diameter of 6 - 12 inches. The bark is red-brown. The leaves are alternate, heart shaped, entire, 3 - 5 inches long and wide, and glossy green. The flowers are bright, purplish red, pea shaped, in clusters among the twigs and appearing before the leaves. The fruit is an oblong many seeded pod.



FAMILY: Fagaceae

COMMON NAME: American Beech

GENUS: Fagus

SPECIES: grandifolia

DATE: July 12, 1970



AMERICAN BEECH, (*Fagus grandifolia*), Family Fagaceae

This tree grows from 60 - 100 feet tall and from 2 - 3 feet in diameter with a short trunk. The bark is very smooth and light gray and commonly blotched. The leaves are 2 - 6 inches long and 1 - 2.5 inches wide with small incurved marginal teeth and are smooth on both sides.



FAMILY: Fagaceae

COMMON NAME: Black Oak

GENUS: Quercus

SPECIES: velutina Lam.

DATE: July 12, 1970



BLACK OAK, (*Quercus velutina* Lam.), Family Fagaceae

The leaves of this tree are coppery with axillary tufts of hair below. They have 5 - 7 lobes separated by variable sinuses. The bark is black, ridged, and furrowed. This tree grows 50 - 70 feet tall and 1 - 3 feet in diameter with rounded crown.



FAMILY: Fagaceae

COMMON NAME: Chestnut Oak

GENUS: Quercus

SPECIES: prinus

DATE: July 12, 1970



CHESTNUT OAK, (*Quercus prinus*), Family Fagaceae

This tree is also called Rock Oak. Its leaves are 4 - 8 inches long and 1.5 - 3 inches wide and have margins with large rounded teeth. The undersurface is often hairy. The bark on this tree is dark brown or black, deeply ridged and furrowed. The Chestnut Oak grows 50 - 60 feet tall and 1 - 2 feet in diameter.



FAMILY: Fagaceae

COMMON NAME: Pin Oak

GENUS: Quercus

SPECIES: palustris

DATE: July 12, 1970



PIN OAK, (*Quercus palustris*), Family Fagaceae

The bark of this tree is gray, leaves are small, the blade about 2 - 5 inches long is often cut almost to the midrib. Lobes are often 3-toothed with long bristle like tips. It is smooth below with conspicuous tufts of hairs in the angles of the large veins. The petiole is slender up to 2 inches long. Acorns are sessile or on short stalks, the cups covering about 1/3 of the nut. The tree may grow 70 feet tall.



FAMILY: Fagaceae

COMMON NAME: Shingle Oak

GENUS: Quercus

SPECIES: imbricaria Michx.

DATE: July 12, 1970



SHINGLE OAK, (*Quercus imbricaria* Michx.), Family Fagaceae

The Shingle Oak tree has laurel like oblong lanceolate leaves with smooth wavy and slightly curled margins. The leaves are 4 - 6 inches long and 1 - 2 inches wide. The bark on the tree is broadly ridged and gray-brown in color. It is also known as Northern Laurel Oak and grows to a height of 40 - 60 feet and to a diameter of 1 - 3 feet.



FAMILY: Hamamelidaceae

COMMON NAME: Sweet Gum

GENUS: Liquidambar

SPECIES: styraciflua L.

DATE: July 12, 1970



MAY • 70 •

SWEET GUM, (*Liquidambar styraciflua* L.), Family Hamamelidaceae

This tree has distinctive alternate star shaped leaves in bright green and they become red and gold in the fall. The tree is monoecious but staminate and pistillate flowers are separate. The fruit is a bur-like head of capsules on a long stem 1.5 inches in diameter. Each capsule contains two seeds. Twigs often have corky wings. The stem may grow from 80 - 120 feet tall and 3 - 5 feet in diameter with a gray to brown furrowed bark.



FAMILY: Juglandaceae

COMMON NAME: Black Walnut

GENUS: Juglans

SPECIES: nigra

DATE: July 12, 1970



BLACK WALNUT, (*Juglans nigra*), Family Juglandaceae

The leaves of this tree are 12 - 24 inches long with 15 - 23 sessile leaflets that are smooth above and hairy below. The fruit of the tree is enclosed in a yellowish-green husk. The stout twigs have 3-lobed leaf scars. The bark of matured trees is furrowed and dark brown to black. It grows 70 - 100 feet tall and 2 - 3 feet in diameter.



FAMILY: Juglandaceae

COMMON NAME: Pecan

GENUS: Carya

SPECIES: illinoensis

DATE: July 12, 1970



JBL

PECAN, (*Carya illinoensis*), Family Juglandaceae

The leaves of this tree are 12 - 20 inches long with 9 - 17 narrow leaflets with narrow pointed ends that are somewhat curved. The nuts are 4 ribbed and 1 - 2.5 inches long and brown in color. The bark is light brown to gray with narrow, vertical scaly ridges. Being the largest of the hickories it attains a height of 100 - 140 feet. The trunk diameter may be 2 - 4 feet.



Juglandaceae

COMMON NAME: Shellbark Hickory

GENUS: Carya

SPECIES: laciniosa

DATE: July 12, 1970



JUL

SHELLBARK HICKORY, (*Carya laciniosa*), Family Juglandaceae

The leaves are 15 - 22 inches long with 5 - 9 lanceolate leaflets (usually 7) which are hairy below. The nuts are 4 - 6 ribbed. Shellbark grows 80 - 100 feet high and 3 - 4 feet in diameter. The bark in young trees is gray and has a net-like pattern.



FAMILY: Magnoliaceae

COMMON NAME: Southern Magnolia

GENUS: Magnolia

SPECIES: grandiflora

DATE: July 12, 1970



MAY • 70

SOUTHERN MAGNOLIA, (*Magnolia grandiflora*), Family Magnoliaceae

This tree grows 25 - 80 feet tall and 2 - 3 feet in diameter with a rounded top. The leaves are evergreen, leathery, oval to ovate, 5 - 10 inches long, 2 - 3 inches wide, glossy green above and lighter below with short pointed apex. Large fragrant flowers are 6 - 9 inches in diameter. Aggregate fruit grows 3 - 4 inches long, is red to rust-brown, and is hairy. The bark of the tree is brownish gray.



FAMILY: Magnoliaceae

COMMON NAME: Tulip Magnolia

GENUS: Magnolia

SPECIES: soulangeana

DATE: July 12, 1970



TULIP MAGNOLIA, (*Magnolia soulangeana*), Family Magnoliaceae

The leaf of this ornamental tree is the same size and shape of the common magnolia grandiflora, but it is not as leathery. It is famous for its purplish flower that looks like a tulip and which arises before the leaves. Because of its flower, it is called commonly "tulip magnolia". It branches from the ground like a bush and has a smooth gray bark. The branches end in a large hairy terminal bud.



FAMILY: Magnoliaceae

COMMON NAME: Yellow Poplar

GENUS: Liriodendron

SPECIES: tulipifera

DATE: July 12, 1970



JUL

YELLOW POPLAR, (*Liriodendron tulipifera*), Family Magnoliaceae

This tree has long-stemmed truncate leaves with four lobes. They are 4 - 6 inches long, bright green above and paler below. The tulip shaped flowers have 6 greenish-yellow petals with orange at the base and do not appear until after the leaves develop. The fruit is a conelike aggregate of single winged samaras. Stipule scars encircle the twigs. Mature trees have gray-brown, ridged and furrowed bark. The tree grows from 80 - 150 feet tall and 4 - 6 feet in diameter.



FAMILY: Moraceae

COMMON NAME: Osage Orange

GENUS: Maclura

SPECIES: pomifera

DATE: July 12, 1970



JUL

OSAGE ORANGE, (*Maclura pomifera*), Family Moraceae

It is a tree with thorns on practically every branch. The leaves are shiny ovate, from 3 - 5 inches long and 2 - 3 inches wide with smooth margins. The staminate flowers are in racemes and the pistillate in heads and are borne on separate trees after the leaves appear. The female trees bear a yellowish-green, round and milky fruit the size of a large orange. The bark is broken into broad rounded scaly ridges. The tree grows 20 - 30 feet tall and 1 - 2 feet in diameter.



FAMILY: Moraceae

COMMON NAME: Paper Mulberry

GENUS: Broussonetia

SPECIES: papyrifera

DATE: July 12, 1970



PAPER MULBERRY, (*Broussonetia papyrifera*), Family Moraceae

This is a small tree with short trunk and greenish bark, broad, round top, and milky juice. Twigs are stout, hairy and green becoming gray. Leaves, ovate, thin, blunt toothed with two or many lobes, are rough above and pale and hairy beneath. They are 4 - 8 inches long. The flowers are in small round clusters. They form a reddish hairy fruit about 1 inch broad.



FAMILY: Moraceae

COMMON NAME: Red Mulberry

GENUS: Morus

SPECIES: rubra L.

DATE: July 12, 1970



01 • 101

RED MULBERRY, (*Morus rubra* L.), Family Moraceae

A tree 20 - 40 feet with spreading branches that form a rounded top. Twigs are generally hairy and greenish gray. Leaves are ovate; base is usually heart shaped with toothed margins. The leaves have 2 - 3 lobes, are dark green above, and are usually hairy beneath. The fruit is dark purple. It is much cultivated.



FAMILY: Pinaceae

COMMON NAME: Arbor Vitae

GENUS: Thuja

SPECIES: occidentalis

DATE: July 12, 1970



ARBOR VITAE, (*Thuja occidentalis*), Family Pinaceae

Arbor Vitae is a medium sized ornamental tree with leaves that are $\frac{1}{16}$ - $\frac{1}{8}$ of an inch long and nearly always scale-like. They grow in 4 rows around twigs but are flattened from the sides. The center leaves show tiny glands. The cones are somewhat bell-shaped, about $\frac{1}{2}$ of an inch long. The bark is fibrous with numerous cross-thatched ridges. They grow in height 40 - 50 feet and 2 - 3 feet in diameter.



FAMILY: Pinaceae

COMMON NAME: Canadian Hemlock

GENUS: Tsuga

SPECIES: canadensis

DATE: July 12, 1970



CANADIAN HEMLOCK, (*Tsuga canadensis*), Family Pinaceae

The needles of this tree are flat and 0.3 - 0.7 of an inch long tapering from base to apex with two white bands of stomata below. The ovoid cones are 0.5 - 0.8 of an inch long and are attached by a short, slender stalk. The outer margin of scales is smooth. The bark on this tree is purplish brown, scaly and deeply furrowed. This Hemlock tree grows 60 - 75 feet tall and 1 - 3 feet in diameter. It has a dense, pyramidal "lacy" crown.



FAMILY: Pinaceae

COMMON NAME: Colorado Spruce

GENUS: Picea

SPECIES: Parryana Sarg.

DATE: July 12, 1970



COLORADO SPRUCE, (*Picea Parryana* Sarg.), Family Pinaceae

This tree is usually 80 - 100 feet in height to 3 feet in diameter with rigid horizontal branches in whorls. Winter buds are $\frac{1}{4}$ - $\frac{1}{2}$ inch long. The bark is broken into rounded plates and is gray. The leaves are pointed toward the apex of the branch and are about $\frac{1}{2}$ - $\frac{3}{4}$ of an inch long.



FAMILY: Pinaceae

COMMON NAME: Irish Juniper

GENUS: Juniperus

SPECIES: communis hibernica

DATE: July 12, 1970



IRISH JUNIPER, (*Juniperus communis hibernica*), Family Pinaceae

This tree is tall and slender reaching a height of 75 - 100 feet and a diameter of 1 - 1.5 feet. It has short somewhat drooping branches which give it a conical shape. The leaves are about $\frac{3}{8}$ of an inch long and sharply pointed. The bark is dark brown with long thin scales as the tree gets older.



FAMILY: Pinaceae

COMMON NAME: Red Cedar

GENUS: Juniperus

SPECIES: virginiana L.

DATE: July 12, 1970



RED CEDAR, (*Juniperus virginiana* L.), Family Pinaceae

This tree is medium sized and has both scale-like and longer 3-sided needle-like leaves. They are $\frac{1}{16}$ - $\frac{3}{4}$ of an inch long and entirely green. The fruit is a hard globular berry, whitish to blackish green in color and $\frac{1}{4}$ of an inch in diameter. The bark is dry and shreddy. The height is 40 - 50 feet and the diameter is 1 - 2 feet.



FAMILY: Pinaceae

COMMON NAME: Spiny Creek
Juniper

GENUS: Juniperus

SPECIES: excelsa stricta

DATE: July 12, 1970



SPINY GREEK JUNIPER, (*Juniperus excelsa stricta*), Family Pinaceae

This tree differs from Irish Juniper in that it is much smaller, begins growth closer to the ground, and tapers more from base to apex. The leaves are around .5 of an inch long and sharply pointed. The bark is dark brown and scaly.



FAMILY: Pinaceae

COMMON NAME: Virginia Pine

GENUS: Pinus

SPECIES: virginiana Mill

DATE: July 12, 1970



VIRGINIA PINE, (*Pinus virginiana* Mill), Family Pinaceae

This tree becomes as much as 36 meters tall with rough and sinuous branches. The twigs are glaucous and the leaves are in two's and deep green. The leaves are 4 - 7 cm. long. The sheath is 5 - 8 mm. long. The cone is 5 - 7 cm. long, narrowly conic when closed, ovoid when open, and each scale appendage is with a curved spine.



FAMILY: Pinaceae

COMMON NAME: White Pine

GENUS: Pinus

SPECIES: strobus

DATE: July 12, 1970



WHITE PINE, (*Pinus strobus*), Family Pinaceae

This is a tall tree with relatively few and horizontal large limbs. Needles are 2 - 4 inches long, slender and occur five to the bundle. Cones are slender, tapering, thornless, and 3 - 10 inches long. The bark is not scaly as in other pines but dark with deep furrows. This is the only five needled pine and it grows 75 - 100 feet tall and 2 - 4 feet in diameter.



FAMILY: Rosaceae

COMMON NAME: Black Cherry

GENUS: Prunus

SPECIES: serotina

DATE: July 12, 1970



01000 • 100 •

BLACK CHERRY or WILD CHERRY, (*Prunus serotina*), Family Rosaceae

The bark on branches of young trunks is smooth and bright reddish brown marked by white horizontal lenticels and has a bitter almond taste. On older trunks the bark is rough and broken into plates. Leaves are alternate, simple, 2 - 6 inches long and 1.- 1.5 inches wide and with margins broken by fine incurved teeth, thick and shiny above and paler beneath. The flowers are white and in racemes. The fruit is about the size of a pea and purplish black. Tree grows 50 - 60 feet tall, 1 - 3 feet in diameter.



FAMILY: Rosaceae

COMMON NAME: Common Apple

GENUS: Malus

SPECIES: bracteata

DATE: July 12, 1970



JUL

COMMON APPLE, (*Malus bracteata*), Family Rosaceae

This is a small tree with deciduous, alternate, and toothed and wooly leaves. The flowers are light pink, 1.5 inches in diameter, and clustered in racemes on short spurlike branches. The fruit, a pome, is smaller than the commercially grown varieties.



FAMILY: Rosaceae

COMMON NAME: Crab Apple

GENUS: Malus

SPECIES: almey

DATE: July 12, 1970



CRAB APPLE, (*Malus almei*), Family Rosaceae

This tree branches near the ground. The bark is gray with horizontal dark lines. With age the bark breaks into large thin scales. It reaches a height of 30 feet and a diameter of 1 - 1.5 feet. The leaves are dark green above and a paler green below. They range in size from 2 - 4 inches long and from 1 - 2 inches wide. The fruit is a small apple about the size of a cherry and purple red in color.



FAMILY: Rosaceae

COMMON NAME: Weeping Cherry

GENUS: Prunus

SPECIES: subhirtella pendula

DATE: July 12, 1970



WEeping CHERRY, (*Prunus subhirtella pendula*), Family Rosaceae

This is an ornamental tree of some significance. The bark is red-brown and smooth when young with gray horizontal lines characteristic of other cherries. The leaves are smooth above, dark green, 2 - 6 inches long and 1.5 - 2 inches wide, and have coarsely toothed margins. The branches droop which give it its characteristic name.



FAMILY: Salicaceae

COMMON NAME: Weeping Willow

GENUS: Salix

SPECIES: babylonica

DATE: July 12, 1970



WEeping WILLOW, (*Salix babylonica*), Family Salicaceae

This tree is around 50 feet tall with greenish long twigs hanging suspended. The leaf blades are narrowly lanceolate or linear lanceolate, 5 - 12 cm. long, .5 - 1 inch wide, and finely serrate. They are glossy above and pale gray beneath. This tree is native of China but is found planted in all parts of the world. The bark on large trees is heavily ridged, furrowed, and dark brown to black.



FAMILY: Salicaceae

COMMON NAME: Eastern Cottonwood

GENUS: Populus

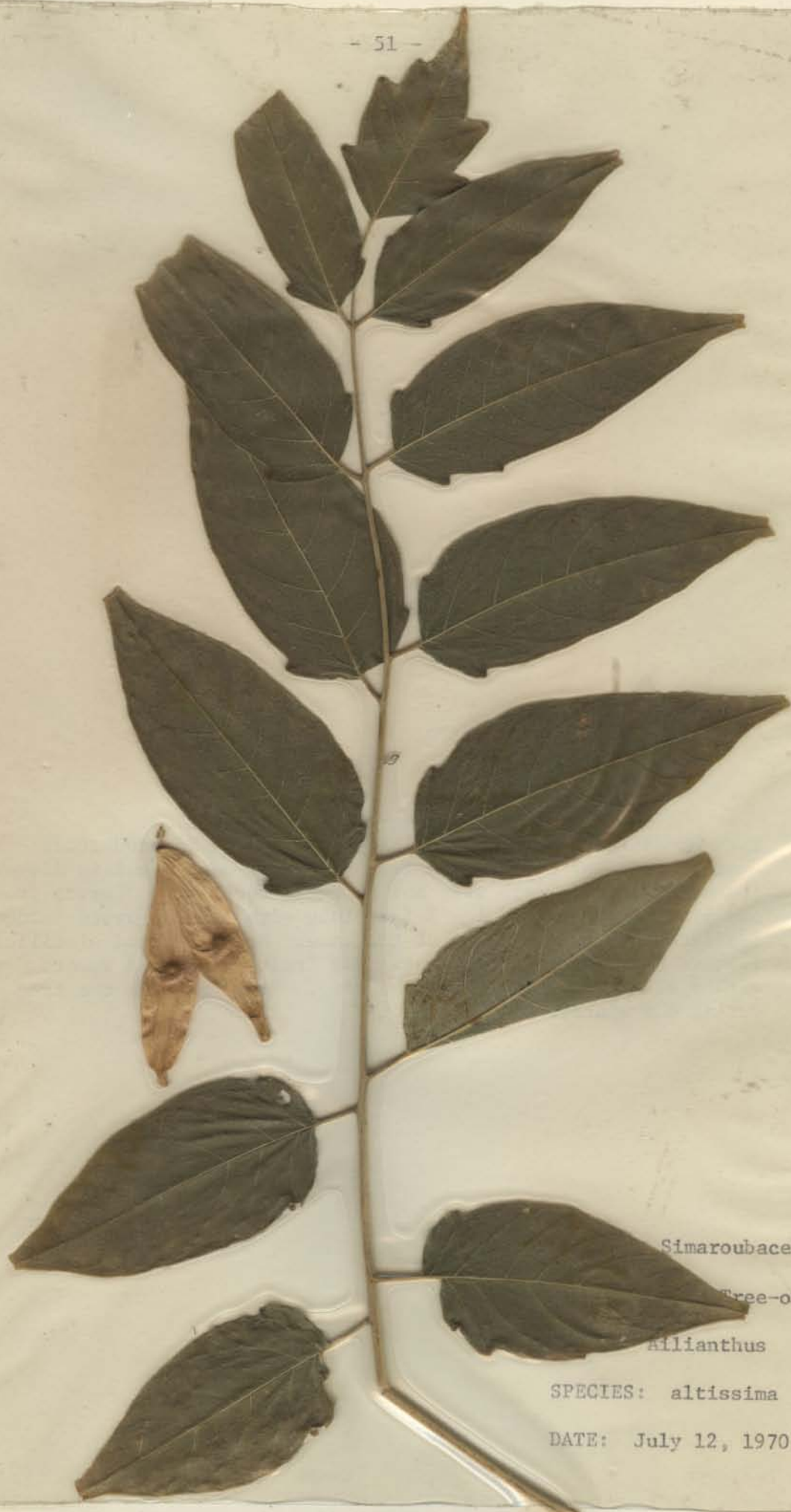
SPECIES: deltoides

DATE: July 12, 1970



EASTERN COTTONWOOD, (*Populus deltoides*), Family Salicaceae

The leaves of this tree are roughly triangular 3 - 6 inches long and 4 - 5 inches wide with coarsely rounded marginal teeth. They are smooth and lustrous green above and paler below with a flattened stem $1\frac{1}{2}$ - $3\frac{1}{2}$ inches long. The seed bearing capusles are 3 - 4 valved and 0.3 of an inch long. The bark of mature trees is dark gray and furrowed. The tree attains a height of 75 - 100 feet and 3 - 4 feet in diameter.



Simaroubaceae

Tree-of-Heaven

Ailanthus

SPECIES: altissima

DATE: July 12, 1970



TREE-OF-HEAVEN, (*Ailanthus altissima*), Family Simaroubaceae

This tree may grow to 100 feet in height and 3 feet in diameter. The bark is thin, dark gray and somewhat roughened. Leaves are odd pinnately compound 1 - 3 feet long with 11 - 41 ovate-lanceolate leaflets which are toothed at the base. Staminate and pistillate flowers are on different trees. The fruit is twisted samara with a seed in the center of the wing. These hang on the tree during the winter.



FAMILY: Ulmaceae

COMMON NAME: American Elm

GENUS: Ulmus

SPECIES: americana L.

DATE: July 12, 1970



AMERICAN ELM, (*Ulmus americana* L.), Family Ulmaceae

The American Elm is a large tree with the trunk often branching near the ground into large limbs, giving a unique vase-shaped form. The leaves are variable, smooth or sandpapery above, hairless or hairy beneath. They are 2 - 6 inches long. The height is 80 - 100 feet and the diameter is 2 - 5 feet. The bark is 1 - 1 1/2 inches thick, ashy gray with broad ridges which separate into thin appressed scales on the surface.



FAMILY: Ulmaceae

COMMON NAME: Chinese Elm

GENUS: Ulmus

SPECIES: pumica

DATE: July 12, 1970



CHINESE ELM, (*Ulmus pumica*), Family Ulmaceae

These trees grow from 1 - 3 feet in diameter and from 20 - 60 feet in height with round crown. The leaves are ovate and somewhat leathery, 1 - 3 inches in length and 1 - 1.5 inches wide, the base of which varies from even to oblique. The bark is usually scaly in old trees.



FAMILY: Ulmaceae

COMMON NAME: Hackberry

GENUS: Celtis

SPECIES: occidentalis

DATE: July 12, 1970



HACKBERRY, (*Celtis occidentalis*), Family Ulmaceae

The leaves of this tree are $2 \frac{1}{2}$ - 6 inches long and $\frac{3}{4}$ - $2 \frac{1}{2}$ inches wide. The margins are singly toothed and the tapering apex slightly curved. The base is obliquely rounded. The tree grows 30 - 40 feet tall and 1 - 2 feet in diameter. Sometimes this tree grows up to 100 feet tall and 4 feet in diameter. The warty gray to brown bark is an excellent identification feature.



FAMILY: Ulmaceae

COMMON NAME: Southern Hackberry

GENUS: Celtis

SPECIES: laevigata

DATE: July 12, 1970



SOUTHERN HACKBERRY, (*Celtis laevigata*), Family Ulmaceae

This tree is normally not more than 40 or 50 feet high and has a trunk not more than 2 feet in diameter. The bark on this hackberry is gray and cracked into scales, and very often it is seen with irregular warts on it. The leaves are ovate-lanceolate with long acuminate tips. Margins are entire or with a few teeth near the end. The leaves are about 2 - 3 1/4 inches long.

KEY TO TREVECCA COLLEGE CAMPUS TREES

KEY TO GENERA

Keys to the species within the genera will be found in the alphabetical list of genera which follows this key. When a genus includes only one arborescent species within the area, the full name is included in the key to genera.

1. Deciduous trees (leaves fall each year). 3
1. Evergreen trees (leaves persisting into the second year or longer; leaves broad, leathery, or needle-like or scale-like). 2
2. Trees with needle-like leaves or small scale-like leaves. Group A
2. Trees with broad, hard, leathery leaves. Group B
3. Trees with thorns; branches and sometimes trunks bearing various kinds of thorns. Group C
3. Trees without thorns. 4
4. Trees with two or more leaves at a node. Group D
4. Trees with alternate leaves (leaves, lateral branches, and buds characteristically one at a node). 5

- 5. Leaves compound. Group E
- 5. Leaves simple, sometimes deeply lobed but never with distinct leaflets. Group F

Group A

Key to the genera with needle or scale-like leaves

- 1. Leaves needle-like, 2, 3, or 5 in a bundle with a sheath at the base, 5 to several cm. long. Pinus
- 1. Leaves not in bundles, linear or scale-like, less than 5 cm. long. 2
 - 2. Leaves all small, scale-like, overlapping, the twig more or less flattened. 3
 - 2. Leaves not all small and scale-like, not on flattened twigs. 4
- 3. Leaves of 2 shapes, the lateral ones overlapping the edges of the decidedly flattened twigs.
. Thuja occidentalis L. (Northern white cedar)
- 3. Leaves nearly uniform, slightly flattened branchlets which often curve at the tips. CHAMAECYPARIS
- 4. Leaves produced more or less in one plane. 9
- 4. Leaves spreading in all directions, at least on young growth. 5
- 5. Leaves flattened. 7
- 5. Leaves 4-angled, square in cross section. 6

6. Leaves 2-5 cm. long, clustered on very short branches. CEDRUS
6. Leaves less than 2 cm. long, uniformly distributed along
the branches. Picea
7. Leaves awl-shaped, tapering to a sharp point, or scale-like. .
. Juniperus virginiana L. (Red cedar)
7. Leaves linear. 8
8. Leaves borne on stalks, which persist on the twigs after
the leaves have fallen; cones pendant.
. Tsuga caroliniana Engelm. (Carolina hemlock)
8. Leaf stalks not persisting on twigs; cones erect. . . . Abies
9. Leaves borne on stalks which persist on the twigs after the leaves
have fallen; cones pendant.
. Tsuga canadensis (L.) Carr. (Eastern hemlock)

Group B

Key to the genera of broad-leaf evergreens

1. Leaf margins undulate, all with a few stout spinose teeth. .
. Ilex opaca Ait. (American holly)
1. Leaf margins entire. 2
2. Leaf margins not ciliate. 3
3. Leaves obovate to oblong, usually less than 4 cm. in length;
fruit a berry.
. Vaccinium arboreum Marsh. (Farkleberry, winter huckle-
berry)
3. Leaves averaging more than 5 cm. 4

Group C

Key to the genera of trees with thorns on the stem

1. Leaves simple. 5
1. Leaves compound. 2
 2. Leaves at least in part decomposed (more than once pinnate) 4
 2. Leaves all pinnately compound (once pinnate). 3
3. Leaflets ovate, rounded at both ends, not punctate. . . . Robinia
4. Leaves very large (6-12 dm. long) bi- to tripinnate, borne in a cluster at the top of the stem; thorns simple. . . .
. Aralia spinosa L. (Devil's walking stick)
4. Leaves smaller (less than 3 dm. long), pinnate to bipinnate, scattered on the twigs; thorns stout, frequently branched. .
. Gleditsia
5. Leaves entire 6
 6. Petioles 2-5 cm. long; leaves acuminate, usually rounded at the base; the multiple fruit spherical, 10-15 cm. in diameter. . . MACLURA POMIFERA (Raf.) Schneid. (Osage orange)
 6. Petioles 1-2 cm. long; leaves acute to rounded at the apex, tapering at the base; fruit a cherry-like drupe.
. Bumelia lycioides (L.) Gaertn. (Buckthorn bumelia)

Group D

Key to the genera with 2 or more leaves at a node

1. Leaves simple. 4
1. Leaves compound. 2
 2. Leaves palmately compound (leaflets clustered at the apex of the petiole). Aesculus

2. Leaves pinnately compound or trifoliate. 3
3. Leaflets 3 to 5, coarsely toothed toward the apex; fruit
double-winged. *Acer negundo* L. (Boxelder)
3. Leaflets commonly 7 to 11, entire or finely toothed; fruit
single-winged. *Fraxinus*
4. Leaves characteristically whorled (3 at a node). . . . *Catalpa*
4. Leaves characteristically opposite, seldom whorled 5
5. Leaves heart-shaped, large (1.5-3 dm. long); exotic tree of
city plantings, frequently escaped.
. *PAULOWNIA TOMENTOSA* (Thunb.) Steud. (Empress tree)
5. Leaves not heart-shaped, smaller. 6
6. Leaves entire or toothed, but not lobed. 8
6. Leaves both toothed and lobed.7
7. Twigs velvety.
. *BROUSSONETIA PAPYRIFERA* (L.) Vent. (Paper Mulberry)
7. Twigs not velvety. *Acer*
8. Leaves obscurely to strongly serrate or crenulate. . . . 10
8. Leaves strictly entire. 9
9. Leaves less than 5 cm. long, ovate to elliptic; escaped shrub
occasionally attaining tree form. . *LIGUSTRUM VULGARE* L. (Privet)
10. Twigs velvety.
. *BROUSSONETIA PAPYRIFERA* (L.) Vent. (Paper mulberry)
10. Twigs not velvety. 11
11. Leaves distinctly serrate. *Viburnum*
11. Leaves obscurely serrate or crenulate toward the apex. . . . 12
12. Leaves broadly ovate, crenulate; primary veins arising from
the lower two-third of the midvein, strongly incurving;
trees of uplands. . . *Cornus florida* L. (Flowering dogwood)

12. Leaves oblong-ovate or ovate-lanceolate, obscurely serrate:
veins pinnate throughout; shrubby trees of river swamps. . .
. *Forestiera acuminata* (Michx.) Poir. (Swamp privet)

Group E

Key to the genera with alternate compound leaves

1. Leaves pinnately compound (once pinnate). 4
1. Leaves decomposed (more than once-pinnate). 2
 2. Upper pinnae undivided (merely toothed), lower pinnae
divided; all apices acuminate; fruit a drupe.
. *MELIA AZEDARACH* L. (Chinaberry)
 2. All pinnae divided into pinnules; fruit a legume (pod). 3
3. Leaflets oval, about 5 pairs to each pinna; pod large, heavy
(1-2.5 dm. long); pith orange or salmon-colored.
. *Gymnocladus dioica* (L.) K. Koch (Kentucky coffee-tree)
3. Leaflets one-sided, about 20 - 25 pairs to each pinna; pod flat,
thin (.5-1 dm. long); pith white.
. *ALBIZZIA JULIBRISSIN* Duraz. (Mimosa)
4. Leaves with glands on lower teeth, often with offensive
odor when crushed.
. *AILANTHUS ALTISSIMA* (Mill.) Swingle (Tree-of-heaven)
4. Leaves without such glands. 5
5. Leaves with odor of green walnuts when crushed, pith chambered
. *Juglans*
5. Leaves without walnut odor, pith not chambered. 6
 6. Leaves without pulvini; fruit not a legume. 8
 6. Leaves with pulvini; fruit a legume. 7

- 7. Leaflets all opposite. Robinia
- 7. Leaflets mostly alternate.
 - Cladrastis lutea (michx. f.) K. Koch (Yellowwood)
- 8. Stipules or stipule scars present; buds red; vein scars
 - 3 or 5. Sorbus americana Marsh. (Mountain ash)
- 8. Stipules absent; buds not red; vein scars more numerous. 9
- 9. Lateral buds partially or wholly concealed by petioles; fruit
 - a small dry drupe; pith large. Rhus
- 9. Lateral buds not concealed by petioles; fruit a nut, husk
 - splitting along 4 lines; pith small, angled. Carya

Group F

Key to the genera with alternate simple leaves

- 1. Leaves needle-like, 1-1.5 cm. long, 2-ranked on deciduous
 - branchlets. Taxodium distichum Rich. (Bald cypress)
- 1. Leaves not needle-like. 2
 - 2. Leaves fan-shaped, more or less incised or divided at the
 - broad summit; veins dichotomous; leaves alternate but
 - partly clustered on spur branches.
 - GINKGO BILOBA L. (Maiden-hair tree)
 - 2. Leaves not fan-shaped; net veined, or palmate veined . . 3
 - 3. Leaves variously toothed or lobed or both. 8
 - 3. Leaves strictly entire (never more than gently undulate). . . 4
 - 4. Leaves heart-shaped. Cercis canadensis L. (Redbud)
 - 4. Leaves not heart-shaped. 5
 - 5. Leaves mostly less than 1.5 dm. long. 7
 - 5. Leaves mostly more than 2 dm. long. 6

6. Twigs encircled by a stipular scar at each node. *Magnolia*
6. Without stipules. *Asimina triloba* (L.) Dunal (Pawpaw)
7. Leaves characteristically clustered at tips of twigs with very short internodes; pith 5-angled; fruit an acorn. *Quercus*
8. Leaf-blade usually averaging at least 1.5 times as long as broad. 18
8. Leaf-blade usually about as broad as long. 9
9. Leaves more or less regularly toothed, but not lobed. 14
9. Leaves usually with a few conspicuous lobes, toothed or entire. 10
10. Leaves bilaterally and symmetrically lobed. 12
10. Some leaves unlobed, other asymmetrically lobed. 11
11. Leaves coarsely serrate; fruit a multiple "berry". 16
11. Leaves not serrate; fruit a drupe.
. *Sassafras albidum* (Mitt.) Nees (*Sassafras*)
12. Leaf-tip truncate or broadly notched; leaves with one pair of broad, acute, lateral lobes.
. *Liriodendron tulipifera* L. (Tulip tree, yellow poplar)
12. Leaf-tip acuminate; leaves with main veins and lobes essentially palmate. 13
13. Leaves star-shaped with deep notches between lobes, margin with fine, regular serrations.
. *Liquidambar styraciflua* L. (Sweet gum)
13. Leaves not star-shaped, with shallow sinuses; margins entire except for a few sinuate teeth
. *Platanus occidentalis* L. (Sycamore)

14. Leaf margins merely undulate or crenate; axillary buds stalked. *Hamamelis virginiana* L. (Witch hazel)
14. Leaf margins distinctly toothed; buds not stalked. 15
15. Leaves all unlobed in our species, smooth above; sap not milky. 17
15. Trees usually with some irregularly lobed leaves but occasionally all unlobed; leaves usually somewhat harsh above; sap milky; fruit multiple. 16
16. Leaves velvety on lower surface, bases oblique, petioles 5-10 cm. long; twigs velvety.
. *BROUSSONETIA PAPHYRIFERA* (L.) Vent. (Paper mulberry)
16. Leaves not velvety, usually not oblique, petioles 2-4 cm. long; twigs not velvety. *Morus*
17. Leaves in 2 rows; pith cylindrical. *Tilia*
17. Leaves in more than 2 rows; pith 5-angled *Populus*
18. Leaves characteristically clustered at tips of twigs, with very short internodes, prominently lobed or coarsely and regularly toothed; pith 5-angled; fruit an acorn. *Quercus*
18. Leaves not characteristically clustered at tips except on spur branches; if somewhat clustered, with glandular petioles; if somewhat lobed, less than 8 cm. long; pith cylindrical; fruit not an acorn. 19
19. Sap milky; fruit multiple and fleshy; leaves ovate to cordate. occasional forms of *Morus*
19. Sap not milky; fruit not multiple and fleshy; leaves ovate to lanceolate. 20

- 20. Teeth of leaf-margins bristle-tipped.Castanea
- 20. Teeth of leaf-margins not bristle tipped. 21
- 21. Leaves in 2 rows, more or less in one plane. 22
- 21. Leaves in more than 2 rows. 30
- 22. Leaves with 2 prominent lateral veins from base of blade;
lateral buds appressed; pith typically chambered. . .Celtis
- 22. Leaves otherwise; pith continuous. 23
- 23. Leaves with main lateral veins dissipating into smaller
veins before reaching the margin; fruit a small pome (apple-
like); buds long and tapering.Amelanchier
- 23. Main lateral veins extending into teeth of leaf margin. fruit
not a pome. 24
- 24. Terminal bud long and tapering, at least 4 times as long
as broad; leaves coarsely serrate; fruit a bur with two
triangular nuts. Fagus
- 24. Terminal buds less than 4 times as long as broad; leaves
finely or doubly serrate. 25
- 25. Most leaves bilaterally symmetrical or nearly so. 27
- 25. Most leaves decidedly lop-sided, especially at base. 26
- 26. Leaf margins mostly double serrate, not glandular. . Ulmus
- 26. Leaf margins singly serrate, teeth glandular.
. . Planera aquatica (Walt.) Gmel. (Planer tree, water elm)
- 27. Trunk and large branches smooth with fluted or projecting
ridges, "muscular" in appearance; bud scales in 4 rows. . . .
.Carpinus caroliniana Walt. (Blue beech)
- 27. Trunk and larger branches without fluted or projecting
ridges. 28

28. Some lateral veins forked; bark longitudinally shredded;
lenticels inconspicuous; fruit completely enclosed in a
papery sac...**Ostrya virginiana* (Mill.) K. Koch (Hop hornbeam)
28. Lateral veins unforked and continuous to leaf margin. 29
29. Bark relatively smooth except in very old trees; lenticels
conspicuous, laterally elongated on larger branches and
trunk; fruit winged, in cone-like clusters. *Betula*
29. Bark ridged or scaly; lenticels inconspicuous; fruit a
samara. *Ulmus*
30. Leaf-blades less than 4 times as long as broad 32
30. Leaf-blades at least 4 times as long as broad. 31
31. Bud with one exposed scale. *Salix*
31. Bud with about 6 exposed scales. *Prunus*
32. Buds distinctly stalked; fruit a woody cone-like
structure. *Alnus serrulata* (Ait.) Willd. (Alder)
32. Buds not stalked; fruit otherwise. 33
33. Stipules or stipular scars present. 34
33. Neither stipules nor stipular scars present. 34
34. Petioles with one or more glands near the blade; fruit
a drupe. *Prunus*
34. Petioles without glands. 35
35. Wood of twigs yellowish and ill-smelling; leaves obscurely
toothed, with main lateral veins ending in margin.
.**Rhamnus caroliniana* Walt. (Carolina buckthorn)
35. Wood of twigs neither yellowish nor ill-smelling; leaves
distinctly toothed with main lateral veins not extending to
leaf-margin. 36

36. Vein-scar one. Ilex
36. Vein-scars two or more 37
37. Younger twigs averaging less than 3 mm. in diameter; leaves
finely and regularly serrate. Amelanchier
37. Younger twigs averaging more than 3 mm. in diameter; leaves
coarsely toothed or irregularly lobed. Pyrus

ALPHABETICAL LIST OF GENERA WITH KEYS TO SPECIES

*Abies fraseri (Pursh) Poir. (Southern balsam fir)

Acer, Maple Family

1. Leaves compound. *A. negundo L. (Boxelder)
1. Leaves simple 2
2. Buds with 4 - 8 scales apparent, essentially sessile;
flowers in lateral clusters; trees of various habitats.. 3
3. Leaves usually with 7 prominent veins from petiole; leaf-
scars meeting; sap milky when evident; exotic trees frequent
in city planting. A. PLATANOIDES L. (Norway maple)
3. Leaves with 3 or 5 prominent veins from petiole; leaf-scars
usually not meeting; sap not milky; native trees. 4
4. Buds ovoid, flower buds rounded and collaterally
multiple, usually 4 scales showing. 7
4. Buds conical, exposed scales 6 or more. 5
5. Leaves averaging less than 8 cm. wide; small tree with
chalky-white bark, reported in Tennessee only from south-
eastern corner A. leucoderme Small (Chalk maple)
5. Leaves averaging more than 8 cm. wide; larger trees with
grayish brown bark. 6

- 6. Leaves not yellow-green beneath, not drooping at margins;
buds smooth; twigs buff. *A. saccharum Marsh. (Sugar maple)
- 6. Leaves yellow-green beneath, drooping at margins; buds
hairy; frequently with foliaceous stipules.
. A. nigrum Michx. f. (Black maple)
- 7. Lobes of leaves narrowed at the base; twigs ill-smelling;
bark flaking A. saccharinum L. (Silver maple, water maple)
- 7. Lobes of leaves not narrowed at the base; twigs not ill-
smelling; bark tight, not flaking. 8
- 8. Leaves 3-lobed; twigs and lower leaf surface usually
pubescent; leaves conspicuously paler beneath.
. *A. rubrum var. trilobum K. Koch (Carolina red maple)

Aesculus, Soapberry Family

- 1. Buds gummy-resinous; leaves coarse, veiny; leaflets often 7.
. A. HIPPOCASTANUM L. (European horse-chestnut)
- 1. Buds not gummy; leaves thinner and less veiny; leaflets 5 .. 2
- 2. Fruit warty; leaflets reaching 15 cm. in length; stamens
exserted; small tree of lowlands.
. A. glabra Willd. (Ohio Buckeye)
- 2. Fruit smooth; leaflets reaching 20 cm. in length; stamens
included; large tree of the mountains.
. A. octandra Marsh. (Yellow Buckeye)

*AILANTHUS ALTISSIMA, Quassia Family, (Mill.) (Tree of heaven)

*ALBIZZIA JULIBRISSIN Duraz., Pulse Family, (Mimosa)

Amelanchier

1. Leaves glabrous below; young leaves brownish green.
. *A. laevis Wiegand (Service berry)

1. Leaves pubescent below; young leaves whitish-green.
. *A. arborea (Michx. f.) Fern. (Shadbush)

*Aralia spinosa L. (Devil's walking stick, Hercules' club)

*Asimina triloba (L.) Dunal (Pawpaw)

*BROUSSONETIA PAPYRIFERA (L.) Mulberry Family, Vent. (Paper mulberry)

Carya, Walnut Family

1. Buds with more than 6 overlapping scales; leaflets 3-9,
the uppermost largest. 3

1. Buds with 4-6 scales in pairs, meeting at edges; leaflets
7-17, usually lanceolate, often curved. 2

2. Leaflets 9-17; nut cylindric, longer than broad, shell
thin, smooth; bark with flat, scaly, interlacing
ridges C. illinoensis (Wang.) K. Koch (Pecan)

2. Leaflets 7 - 13; nut somewhat flattened, about as broad
as long, kernel bitter. 3

3. Larger terminal buds over 12 mm. in length. 4

4. Twigs buff or orange-colored, glabrous; nut at least 3 cm.
long, shell thick; bark splitting off in long strips;
leaflets 7-9; typically in bottomlands or along streams..
. . . C. laciniosa (Michx. f.) Loud. (Big shellbark hickory)

4. Twigs brown or gray, often somewhat pubescent; nut and
bark various; typically on uplands. 5

5. Twigs red-brown to gray with age; leaflets typically 5,
terminal leaflet stalked; bark splitting off in long
strips. *C. ovata (Mill.) K. Koch (Shagbark hickory)
5. Twigs bright-brown to gray; leaflets typically 7-9,
stellate-pubescent; terminal leaflet sessile or nearly
so; bark tight. *C. tomentosa Nutt. (Mockernut hickory)

Catalpa, Bignonia Family

1. Leaves rarely angled, with unpleasant odor when bruised;
bark thin, flaky; lower lobes of corolla entire; pods about
8 mm. broad; seeds pointed. . . C. BIGNONIOLIDES Walt. (Catalpa)
1. Leaves often angled, without unpleasant odor; bark thick
and rough; lower lobe of corolla notched at apex; pods fully
10 mm. broad; seeds obliquely truncate.
. C. speciosa Warder (Western catalpa)

CEDRUS DEODARA Loud. (Deodar cedar)

Celtis, Elm Family

1. Leaf-blades seldom more than 5 cm. in length; fruit dark
orange-red, on stalks about as long as the petioles; small
tree. *C. tenuifolia var.
georgiana (Small) Fern. & Schub. (Georgia hackberry)
1. Leaf-blades usually more than 5 cm. in length; fruit on
stalks longer than the petioles; becoming large trees. . . 2
2. Leaf-blades entire, or toothed toward the apex; bark
light gray, with corky warts.
. . . *C. laevigata Willd. (Sugarberry, southern hackberry)
2. Leaf-blades strongly toothed to well below the middle .. 3

3. Leaves tending to be lanceolate, blades tapering at both ends; buds about 3 mm. long; bark light gray with corky warts, even on older trees.
 . *C. laevigata var. smallii Sarg. (Small's sugarberry, hackberry)

3. Leaves tending to be ovate, rounded or subcordate at base; buds about 6 mm. long; bark warty on branches, ridged on trunks of older trees. *C. occidentalis L. (Hackberry)

*Cercis canadensis L., Pulse family (Redbud)

CHAMAECYPARIS sp. (White cedar)

Cornus, Dogwood Family

1. Leaves irregularly alternate; fruit blue.
 . *C. alternifolia L. F. (Blue dogwood, alternate-leaved dogwood)
1. Leaves always opposite. 2
2. Leaves broadly ovate, with 5-6 pairs of lateral veins; twigs with appressed hairs, usually glaucous; flower clusters with 4 large petal-like bracts; fruit red, in dense heads. *C. florida L. (Flowering dogwood)

Corylus americana Walt., Birch Family

*Diospyros virginiana L. (Persimmon)

Fagus, Beech Family

1. Leaves with 9-14 pairs of veins, serrate.
 *F. grandifolia Ehrh. (American beech)
1. Leaves with 5-9 pairs of veins, denticulate.
 F. SYLVATICA L. (European beech)

Ilex, Holly Family

1. Leaves evergreen. 2

1. Leaves deciduous. 2
2. Leaves with sharp pointed and spiny toothed margins . .
. *Ilex opaca*
2. Leaves with shield-like shape, 3 apical spines,
sometimes spines toward base margin. *Ilex Bufordi*

Juglans, Walnut Family

1. Pith chocolate-colored; leaf-scars with a downy cross-line
at top, not notched; fruit longer than broad, hull sticky-
glandular. **J. cinerea* L. (Butternut)
1. Pith tan; leaf-scars without a downy ridge at top, notched;
fruit essentially spheroidal, hull not glandular.
. **J. nigra* L. (Black walnut)

**Juniperus virginiana* L., Pine Family (Red cedar)

LIGUSTRUM VULGARE L., Olive Family (Privet)

**Liquidambar styraciflua* L., Witch Hazel Family, (Sweet gum)

**Liriodendron tulipifera* L., Magnolia Family, (Tulip tree, yellow poplar)

LONICERA FRAGRANTISSIMA

MACLURA POMIFERA (Raf.) Schneid. (Osage orange, hedge-apple,
bois d'arc)

Magnolia

1. Leaves deciduous. 3
1. Leaves evergreen. 2
2. Leaves averaging more than 7 cm. broad, leathery, per-
sistent, usually rusty tomentose beneath.
. *M. GRANDIFLORA* L. (Evergreen magnolia)

3. Leaves averaging less than 7 cm. broad, thinner and obovate
 *M. soulangeana*

Malus, Rose Family

1. Leaves ovate to lanceolate, with prominent teeth or lobes,
 or persistently woolly beneath. 2
2. Branches without thorns; buds pubescent; leaves hairy
 or woolly beneath. **P. MALUS* L. (Apple)
2. Branches usually armed with hard, sharp lateral spurs. 3
3. Leaves on vigorous shoots pubescent below at maturity.
 .*P. coronaria* var. *lancifolia* (Rehd.) Fern. (*M. bracteata* Rehd.)
 (Lance-leaved crab)
3. All leaves glabrous at maturity. 4
4. Leaves usually less than twice as long as broad, frequently
 lobed, leaves on flowering branches acute or acuminate.
 **P. coronaria* L. (Sweet crabapple)
4. Leaves usually more than twice as long as broad, unlobed,
 leaves on flowering branches obtuse. 5
5. Fruit yellow-green. **P. angustifolia* Ait. (Narrow-leaf crabapple)
5. Fruit purplish red. *M. Almey*

Morus, Mulberry Family

1. Leaves harsh above, more or less tomentose below, infre-
 quently lobed. **M. rubra* L. (Red mulberry)

**Picea Parryana*, Pine Family, (Red spruce)

Pinus, Pine Family

1. Leaves characteristically 5 in a bundle.
 **P. strobus* L. (Eastern white pine)

1. Leaves 2 or 3 in a bundle. 2
2. Leaves characteristically 2 in a bundle; or in both twos and threes. 3
3. Cones commonly asymmetrical, often more than 7 cm. in length, with very stout prickles.
 *P. pungens Lamb. (Table mountain pine)
3. Cones usually symmetrical, with slender prickles, less than 7 cm. in length. 4
4. Branches nearly smooth; leaves twisted, usually less than 5 cm. long, in twos.
 *P. virginiana Mill. (Virginia pine, scrub pine)
5. Branches scaly; leaves not twisted, usually 7-13 cm. long, usually in both twos and threes.
 *P. echinata Mill. (Shortleaf pine)

Populus

1. Fastigate (with upright branches).
 *P. NIGRA var. ITALICA Muench. (Lombardy poplar)
1. Not fastigate. 2
2. Petioles round; blade often 1.5 dm. or more long. . . .
 P. heterophylla L. (Swamp cottonwood)
2. Petioles flattened; blade smaller. 3
3. Teeth small, more than 14 on each side. 5
3. Teeth large, less than 14 on each side of the leaf-blade. . 4
4. Petioles averaging over 5 cm. in length; twigs and leaves essentially glabrous.
 *P. grandidentata Michx. (Large-toothed aspen)

4. Petioles averaging less than 5 cm.; twigs and leaves

white tomentose. *P. ALBA L. (Silver poplar)

5. Petioles smooth. *P. deltoides Bartr. (Carolina poplar, cottonwood)

Prunus, Rose Family

(A difficult group when without fruit and flower characteristics)

1. Terminal-bud typically present. 5

1. Terminal-bud typically absent, represented by a scar . . . 2

2. Buds elongate, longer than thick. 4

2. Buds scarcely longer than thick. 3

3. Leaves usually 6-10 cm. long; calyx lobes glandular. . . .
. P. munsoniana Wight & Hedrick (Munson plum)

3. Leaves mostly 2-6 cm. long; calyx lobes without glands. . .
. *P. angustifolia Marsh. (Chickasaw plum)

4. Trees forming thickets from root-sprouts; leaves acuminate
from the first. *P. americana Marsh. (Wild plum)

4. Trees without rootsprouts; leaves somewhat obtuse when
they unfold. P. mexicana Wats. (Big-tree plum)

5. Twigs green or red. *P. PERSICA (L.) Batsch. (Peach)

5. Twigs reddish-brown or gray. 6

6. Buds averaging 4 mm. long; flowers in elongate racemes.
. *P. serotina Ehrh. (Wild black cherry)

6. Buds less than 4 mm. long; branches pendulose.
. *P. subhirtella pendula

Quercus, Beech Family

1. Leaves characteristically lobed, toothed, or both. 6

1. Leaves characteristically entire (unlobed and untoothed). 2
2. Leaves rhomboidal, widest above the middle.
. Q. nigra L. (Water oak)
2. Leaves widest near the middle, tapering gradually toward
both ends. 3
3. Leaves evergreen, persisting throughout the winter, without
bristle tips; margins revolute. . . Q. VIRGINIANA Mill. (Live oak)
3. Leaves deciduous, with bristle tips. 4
4. Leaves over 2.5 cm. wide, 3 times as long as broad, often
hairy below. Q. imbricaria Michx. (Shingle oak)
4. Leaves typically less than 2.5 cm. wide. 5
5. Leaves typically narrowly lanceolate, deciduous in the fall .
. Q. phellos L. (Willow oak)
5. Leaves typically elliptical, margins slightly revolute, deci-
duous in late winter. Q. laurifolia Michx. (Laurel oak)
6. Leaves broadest near the tip (about 1/6 - 1/4 from the
apex); not conspicuously lobed or toothed. 7
6. Leaves broadest nearer the middle, with conspicuous teeth
or lobes. 8
7. Leaves 1-1.5 dm. long, lower surface brownish scurfy, round
or cordate at base. . . . Q. marilandica Muench. (Blackjack oak)
7. Leaves .5-1 dm. long, lower surface smooth and shining, taper-
ing to the base. Q. nigra L. (Water oak)
8. Leaves distinctly lobed. 12
8. Leaves with coarse teeth or scalloped but not distinctly
lobed. 9

9. Teeth acute. *Q. muehlenbergii* Engelm. (Chinquapin oak)
9. Teeth rounded or margins scalloped. 10
10. Leaves coarsely sinuate-toothed or with irregular
shallow lobes, usually with 6-8 pairs of lateral veins,
not all ending in teeth; acorns on stalks 5-10 cm. long.
. *Q. bicolor* Willd. (Swamp white oak)
10. Leaves mostly with more than 9 pairs of lateral veins,
all ending in regular teeth; acorns short-stalked. . . 11
11. Petioles yellowish; leaves yellow-green above, pubescent but
not tomentose beneath; trees of dry uplands (to 5,000 ft.).
. . . *Q. prinus* L. (*Q. montana* Willd.) (Chestnut oak, mountain oak)
11. Petioles green; leaves dark-green above, commonly tomentose
beneath; trees of lowlands and wet soils.
. *Q. michauxii* Nutt. (Swamp chestnut oak)
12. Lobes of leaves with bristle-tips. 16
12. Lobes of leaves without bristle-tips. 13
13. Leaves glaucous and glabrous beneath at maturity.
. *Q. alba* L. (White oak)
13. Leaves densely gray-pubescent beneath. 14
14. Twigs pubescent; leaves generally with 5 principal lobes;
acorns small, 1-1.5 cm. long, less than half covered by
the unfringed cup. *Q. stallata* Wang. (Post oak)
14. Twigs glabrous or nearly so; acorns more than half covered
by the cup. 15

15. Acorn cup conspicuously fringed along margin; acorns 2-5 cm.
long; leaves nearly cut in two by deep sinuses.
. *Q. macrocarpa* Michx. (Bur oak)
15. Acorn cup not fringed, nearly covering acorn, which is 1.5-
2.5 cm. long; leaves irregularly lobed.
. *Q. lyrata* Walt. (Overcup oak)
16. Mature leaves smooth beneath except for tufts of hairs
in the major vein-axils. 19
16. Mature leaves more or less pubescent on the whole under
surface. 17
17. Leaves brownish or rusty pubescent beneath, lobes not
curved, frequently wider toward the end.
. *Q. velutina* Lam. (Black oak)
17. Leaves grayish or yellowish pubescent beneath, lobes
generally curved and widest at the base. 18
18. Leaves variable in shape, mostly 3-5 lobed, some with
a long slender central lobe.
. *Q. falcata* Michx. (Southern red oak)
18. Leaves more uniform in shape, mostly 7-11 lobed, with
the upper edges of lobes almost perpendicular to the
midrib.
Q. falcata var. *pagodaefolia* Ell. (Swamp red oak, cherrybark
oak)
19. Lateral lobes of leaves not decidedly longer than the width
of the undivided portion of the blade; leaves dull, 7-11 lobed;
acorn cup saucerlike.
. *Q. rubra* L. (*Q. borealis* Michx. f.) (Northern red oak)

19. Lateral lobes of leaves decidedly longer than the width of the undivided portion of the blade; leaves lustrous, 5-9 lobed. 20
20. Acorn cup saucerlike, seldom enclosing more than one-fourth of the acorn. 22
20. Acorn cup bowl-shaped, enclosing almost half of the acorn. 21
21. Acorn with several concentric rings near apex, 1.5-2.5 cm. long and about as broad; upland sites, usually dry.
. *Q. coccinea* Muench. (Scarlet oak)
21. Acorn without concentric apical rings, 2-3 cm. long, longer than broad; bottomland sites. *Q. nuttallii* Palmer (Nuttall oak)
22. Acorn oblong-ovoid, 2-3 cm. long; limestone sites.
. *Q. shumardii* Buckl. (Shumard red oak)
22. Acorn hemispherical, 1-1.5 cm. long; branches like pins driven into trunk, frequently drooping; bottomlands or upland swamps. *Q. palustris* Muench. (Pin oak)

Robinia, Pulse Family

1. Compound leaf, leaflets 6-20 eggshaped. 2
1. Compound leaf, leaflets 5-7. 2
2. Branches with short, hairless twigs, stiff; paired, stipular thorns; flowers white.
. *R. pseudoacacia* L. (Black locust)
2. Branches with hairy twigs, purplish flower. *R. hispida*

Salix, Willow Family

1. Branchlets strongly drooping. S. BABYLONICA L. (Weeping willow)
1. Branchlets not strongly drooping. 2
 2. Leaves whitish beneath. S. ALBA L. (White willow)
 2. Leaves green beneath. 3
3. Leaves closely and finely toothed; petioles distinct.
 - S. nigra Marsh. (Black willow)
3. Leaves distantly toothed, nearly sessile.
 - S. interior Rowlee (S. longifolia Muhl.) (Sandbar willow)

Thuja occidentalis L. (Northern white cedar, arbor vitae), Pine Family

Tsuga, Pine Family

1. Leaves extending more or less in one plane, averaging less than 1 cm. long; cones 1-2 cm. long; common tree of mountain valleys... T. canadensis (L.) Carr. (Eastern hemlock)
1. Leaves radiate, averaging more than 1 cm. long; cones 2-4 cm. long; rare tree of mountain ridges.
 - T. caroliniana Engelm. (Carolina hemlock)

Ulmus, Elm Family

1. Leaves usually more than 7 cm. long. 4
1. Leaves mostly less than 7 cm. long. 2
 2. Trees usually small; twigs wingless, dark gray; leaves singly serrate or nearly so. U. PUMILA L. (Chinese elm)
 2. Trees often large; usually with twigs two-winged, reddish brown. 3
3. Leaves acuminate, coarsely doubly toothed, smooth above and hairy below; spring flowering. U. alata Michx. (Winged elm)

3. Leaves rounded or acute at apex, almost singly toothed, rough above and hairy below; fall flowering.
. *U. crassifolia* Nutt. (Cedar elm)
4. Branches with corky ridges. 6
4. Branches without corky ridges. 5
5. Bud-scales coated with rusty hairs; leaves very rough above; pedicels short; fruit not ciliate; inner bark mucilaginous.
. **U. rubra* Muhl. (*U. fulva* Michx.) (Slippery elm)
5. Bud-scales without rusty hairs; leaves relatively smooth above; pedicels slender, drooping; fruit ciliate; inner bark not mucilaginous. **U. americana* L. (American elm)

DESCRIPTIVE LEAF TERMS

A. LEAF ARRANGEMENTS

1. Alternate. Leaves borne one at a node in a spiral arrangement.
2. Opposite. Leaves borne two at a node on opposite sides of the stem.
3. Whorled (verticillate). Leaves borne three or more at a node.

B. LEAF PARTS

One or more of the parts listed below may be absent or modified. For example, a sessile leaf is one which lacks a petiole. Stipules are frequently absent or modified.

1. Blade. The major portion of the leaf, which is usually flat and expanded.
2. Petiole. The stalk-like connection between the blade and the stem.
3. Pulvinus. Thickened portion of petiole at base of leaf, blade or leaflet, characteristic of legume family.

4. Rachis. The continuation of the petiole as the axis of a pinnately compound leaf. Rachilla: a secondary rachis.
5. Stipule. One of a pair of small leaf-like appendages borne near the base of the petiole. Stipules may be modified into hairs, thorns, glands, etc.

C. LEAF SHAPES

Leaves are usually bilaterally symmetrical. However, asymmetrical modifications of the following types also occur.

1. Cordate. Heart-shaped.
2. Elliptical. Broadest in the middle; having the form of an ellipse.
3. Lanceolate. Broadest near the base; lance-shaped.
4. Linear. Narrow form with more or less parallel sides.
5. Needle-shaped (acicular). Slender, hard leaves characteristic of pines and their relatives.
6. Obovate. Egg-shaped in outline; broadest above the middle.
7. Orbicular. Round in outline.
8. Ovate. Egg-shaped in outline; broadest below the middle.
9. Scale-like. Minute, appressed, triangular or ovate form characteristic of certain evergreens.
10. Spatulate. Narrow obovate form; broadest near the tip.
11. Triangular (deltoid). Three-sided form, either narrow or broad.

D. LEAF SEGMENTATIONS

1. Simple. A form in which the blade is not divided into leaflets.
 - a. Undivided.
 - b. Pinnatifid. Form in which the blade is variously divided into lobes and sinuses (a sinus is the notch between lobes), but not into separate leaflets.

- c. Lobed. Blade divisions with rounded sinuses.
- d. Incised. With shallow, irregular, more or less sharp divisions.
- e. Cleft. Deeply cut with narrow sinuses.
- 2. Compound. Blade divided into leaflets.
 - a. Pinnate. Leaflets arranged in two rows along the rachis.
 - b. Palmate. Leaflets radiate from the end of the petiole.
- 3. Decompound. More than once pinnately divided.
 - a. Bipinnatifid. With the leaflets pinnatifid.
 - b. Bipinnate. With the leaflets divided to the rachilla.
 - c. Tripinnatifid. With the secondary leaflets pinnatifid.
 - d. Tripinnate. With the secondary leaflets divided to the rachilla.

E. LEAF MARGINS

- 1. Ciliate. Margins fringed with hairs.
- 2. Entire. With a continuous margin, not lobed or toothed.
- 3. Gland-tipped. Hairs or teeth gland-bearing.
- 4. Sinuate. Strongly wavy.
- 5. Spinose. Margins, lobes or teeth with hard, sharp projections.
- 6. Toothed. Small marginal lobes.
 - a. Crenate. Margins scalloped. Crenulate: small crenations.
 - b. Dentate. With the teeth directed outward, i.e., with equal sides. Denticulate: small dentations.
 - c. Serrate. With the teeth directed toward the apex, i.e., with unequal sides. Serrulate: small serrations.
- 7. Undulate. Wavy.

F. LEAF APICES (Apex, singular)

- 1. Acuminate. Margins curving gradually into a long slender tip.
- 2. Acute. Straight margins meeting in a sharp well-defined angle.

3. Cuspidate. Terminating abruptly in a short bristle or spine.
4. Emarginate. With a shallow notch.
5. Obtuse (rounded). Blunt tipped.
6. Truncate. As if cut off at the end.

G. LEAF BASES

1. Acuminate. Margins tapering to the base.
2. Acute. Margins forming a sharp angle at the base.
3. Auriculate. With conspicuous, rounded basal lobes.
4. Cordate. Heart-shaped at the base.
5. Cuneate. Wedge-shaped at the base; an exaggerated form of the acute base.
6. Hastate. With pointed, outwardly directed basal lobes.
7. Rounded. Base of blade blunt, margins forming a continuous curve.
8. Sagittate. With pointed, downwardly directed basal lobes.
9. Truncate. As if cut off at the base.

H. LEAF VENATION

1. Parallel. Conspicuous veins extending from the base to the apex of the leaf.
2. Reticulate. Veins anastomosing to form a net. (a) Pinnate. Principal lateral veins diverging in a regular manner from the midvein. (b) Palmate. Three to several main veins radiating from the base of the blade.
3. Dichotomous. Each vein forking at intervals into 2 smaller veins of equal size.

I. SPECIAL LEAF TEXTURES

1. Membranaceous. Thin, papery blade.

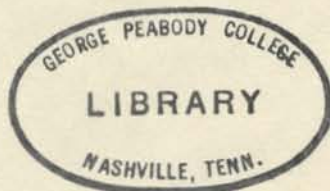
2. Coriaceous. Tough, leathery blade.

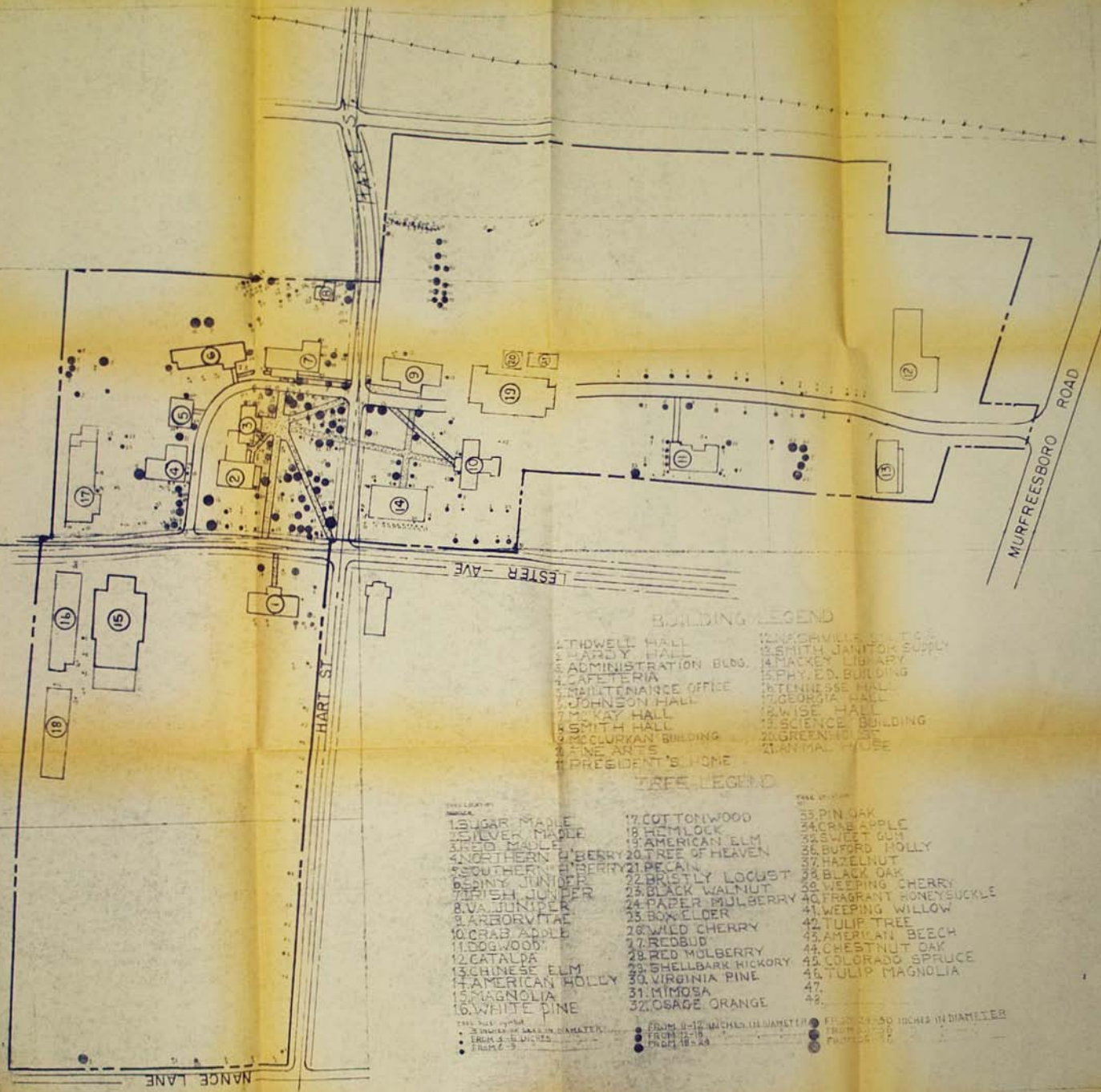
J. LEAF SURFACES

1. Dull. Not shiny.
2. Glabrous. Smooth, devoid of hairs or scales.
3. Glaucous. With a whitish, waxy bloom which will rub off.
4. Hairy. With various filamentous epidermal outgrowths.
 - a. Pubescent. With short hairs.
 - Puberulent. With minute hairs.
 - Downy. Abundantly pubescent with soft, short hairs.
 - Silky. With appressed, soft, straight pubescence.
 - b. Villous. With long, soft hairs.
 - c. Tomentose. With densely matted hairs.
 - d. Glandular. With gland-tipped hairs.
5. Rugose. Wrinkled.
6. Scabrous. Rough to the touch.
7. Scaly. With various non-filamentous, flattened, appressed, epidermal outgrowths.
8. Shiny (lustrous). Glossy, bright, polished.

REFERENCES USED

- Brockman, Frank. Trees of North America. New York: Golden Press, 1968.
- Coker, William Chambers and Totten, Henry Roland. Trees of the Southeastern States. Chapel Hill: University of North Carolina Press, 1945.
- Common Forest Trees of Tennessee. Nashville, Tennessee: Department of Conservation, 1964.
- Curtis, Carlton C. and Bausor, S. C. The Complete Guide to North American Trees. New York: Collier Books, 1943.
- Harrar, Elwood S. and Harrar, J. George. Guide to Southern Trees. 2nd ed. New York: Dover Publications, 1946.
- Harlow, William Morehouse. Fruit Key and Twig Key to Trees and Shrubs.
- Jaques, H. E. Plant Families: How to Know Them. Dubuque, Iowa: Wm. C. Brown Co., 1949.
- Peattie, Donald Culross. A Natural History of Trees of Eastern and Central North America. 2nd ed. Boston: Houghton Mifflin Co., 1966.
- Petrides, George A. A Field Guide to Trees and Shrubs. Boston: Houghton Mifflin Co., 1958.
- Radford, Albert E.; Ahles, Harry E. and Bell, C. Ritchie. Guide to the Vascular Flora of the Carolinas. Chapel Hill: Book Exchange, University of North Carolina, 1964.
- Sargent, Charles Sprague. Manual of the Trees of North America. Boston: Houghton Mifflin Co., 1933.
- Shanks, R. E. and Sharp, A. J. Summer Key to Tennessee Trees. Knoxville, Tennessee: The University of Tennessee Press.





BUILDING LEGEND

- | | |
|-------------------------|--------------------------|
| 1. THIDWELL HALL | 12. MANORVILLE COTTAGE |
| 2. HARDY HALL | 13. SMITH JANITOR SUPPLY |
| 3. ADMINISTRATION BLDG. | 14. HACKETT LIBRARY |
| 4. CAFETERIA | 15. PHY. ED. BUILDING |
| 5. MAINTENANCE OFFICE | 16. TENNESSEE HALL |
| 6. JOHNSON HALL | 17. GEORGIA HALL |
| 7. KAY HALL | 18. WISE HALL |
| 8. SMITH HALL | 19. SCIENCE BUILDING |
| 9. MCCLURKAN BUILDING | 20. GREENHOUSE |
| 10. FINE ARTS | 21. ANIMAL HOUSE |
| 11. PRESIDENT'S HOME | |

TREE LEGEND

- | | | |
|----------------------|-----------------------|--------------------------|
| 1. SUGAR MAPLE | 17. COTTONWOOD | 33. PIN OAK |
| 2. SILVER MAPLE | 18. HEMLOCK | 34. CRAB APPLE |
| 3. RED MAPLE | 19. AMERICAN ELM | 35. SWEET GUM |
| 4. NORTHERN H. BERRY | 20. TREE OF HEAVEN | 36. BUFORD HOLLY |
| 5. SOUTHERN H. BERRY | 21. PECAN | 37. HAZELNUT |
| 6. PINKY JUNIPER | 22. BRISTLY LOCUST | 38. BLACK OAK |
| 7. IRISH JUNIPER | 23. BLACK WALNUT | 39. WEeping CHERRY |
| 8. VA. JUNIPER | 24. PAPER MULBERRY | 40. FRAGRANT HONEYSUCKLE |
| 9. BARBORTAL | 25. BOX ELDER | 41. WEeping WILLOW |
| 10. CRAB APPLE | 26. WILD CHERRY | 42. TULIP TREE |
| 11. DOGWOOD | 27. REDBUD | 43. AMERICAN BEECH |
| 12. CATALPA | 28. RED MULBERRY | 44. CHESTNUT OAK |
| 13. CHINESE ELM | 29. SHELLBARK HICKORY | 45. COLORADO SPRUCE |
| 14. AMERICAN HOLLY | 30. VIRGINIA PINE | 46. TULIP MAGNOLIA |
| 15. MAGNOLIA | 31. MIMOSA | 47. |
| 16. WHITE PINE | 32. ORANGE | 48. |

TREE SIZE SYMBOL
 1. UNDER 12 INCHES IN DIAMETER
 2. FROM 12-18 INCHES
 3. FROM 18-24 INCHES
 4. FROM 24-30 INCHES IN DIAMETER
 5. FROM 30-36 INCHES IN DIAMETER
 6. FROM 36-42 INCHES IN DIAMETER
 7. FROM 42-48 INCHES IN DIAMETER
 8. FROM 48-54 INCHES IN DIAMETER
 9. FROM 54-60 INCHES IN DIAMETER
 10. FROM 60-66 INCHES IN DIAMETER
 11. FROM 66-72 INCHES IN DIAMETER
 12. FROM 72-78 INCHES IN DIAMETER
 13. FROM 78-84 INCHES IN DIAMETER
 14. FROM 84-90 INCHES IN DIAMETER
 15. FROM 90-96 INCHES IN DIAMETER
 16. FROM 96-102 INCHES IN DIAMETER
 17. FROM 102-108 INCHES IN DIAMETER
 18. FROM 108-114 INCHES IN DIAMETER
 19. FROM 114-120 INCHES IN DIAMETER
 20. FROM 120-126 INCHES IN DIAMETER
 21. FROM 126-132 INCHES IN DIAMETER
 22. FROM 132-138 INCHES IN DIAMETER
 23. FROM 138-144 INCHES IN DIAMETER
 24. FROM 144-150 INCHES IN DIAMETER
 25. FROM 150-156 INCHES IN DIAMETER
 26. FROM 156-162 INCHES IN DIAMETER
 27. FROM 162-168 INCHES IN DIAMETER
 28. FROM 168-174 INCHES IN DIAMETER
 29. FROM 174-180 INCHES IN DIAMETER
 30. FROM 180-186 INCHES IN DIAMETER
 31. FROM 186-192 INCHES IN DIAMETER
 32. FROM 192-198 INCHES IN DIAMETER
 33. FROM 198-204 INCHES IN DIAMETER
 34. FROM 204-210 INCHES IN DIAMETER
 35. FROM 210-216 INCHES IN DIAMETER
 36. FROM 216-222 INCHES IN DIAMETER
 37. FROM 222-228 INCHES IN DIAMETER
 38. FROM 228-234 INCHES IN DIAMETER
 39. FROM 234-240 INCHES IN DIAMETER
 40. FROM 240-246 INCHES IN DIAMETER
 41. FROM 246-252 INCHES IN DIAMETER
 42. FROM 252-258 INCHES IN DIAMETER
 43. FROM 258-264 INCHES IN DIAMETER
 44. FROM 264-270 INCHES IN DIAMETER
 45. FROM 270-276 INCHES IN DIAMETER
 46. FROM 276-282 INCHES IN DIAMETER
 47. FROM 282-288 INCHES IN DIAMETER
 48. FROM 288-294 INCHES IN DIAMETER
 49. FROM 294-300 INCHES IN DIAMETER