

# TREE IDENTIFICATION

- GENERAL IDENTIFYING FEATURES
- BY LEAVES
- BY BUDS
- BY TWIGS

STUDENTS SHOULD BE ABLE TO IDENTIFY THE FOLLOWING COMMON SPECIES BY LEARNING THE CHARACTERISTICS OF LEAVES, BARK, BUDS, AND TWIGS.

White Pine	Red Pine	Pitch Pine
Eastern Hemlock	Balsam Fir	White Spruce
Red Oak	White Oak	Black Oak
Scarlet Oak	Pignut Hickory	Shagbark Hickory
Red Maple	Sugar Maple	Norway Maple
White Ash	Black Cherry	White Birch
Gray Birch	Yellow Birch	Black Birch
Eastern Cottonwood	Quaking Aspen	Big Tooth Aspen
American Elm	American Sycamore	Sassafras
American Beech	Flowering Dogwood	Black Walnut
Butternut	Black Willow	Horse Chestnut
Tupelo/Black Gum	American Basswood	American Holly

It is suggested you obtain a good tree identification guide to supplement the following information.

#### SUGGESTED REFERENCES

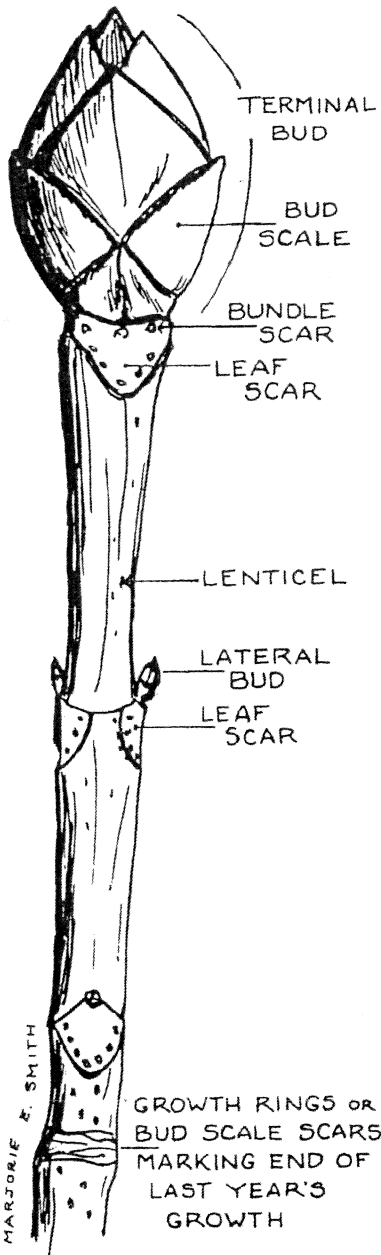
1. Peterson Field Guide: Tree's and Shrubs or Eastern Trees
2. Forest Trees of Massachusetts, a Pocket Manual
3. Winter Botany: An Identification Guide to Native Trees & Shrubs by William Trelease.
4. Fruit Key and Twig Key Guide by William M. Harlow

# Winter Tree Identification

Bud Arrangement			Basswood (alternate)	American Beech (zigzag)
Opposite	Alternate	Zigzag	terminal bud reddish and shiny bark light gray and smooth trunk grows in clumps	sharp, pointed buds
<b>Maples (opposite)</b>  <b>Sugar Maple</b> sharp, pointed terminal buds  <b>Red Maple</b> blunt, reddish, terminal buds	<b>Ashes (opposite)</b> Hershey kiss-shaped terminal bud  <b>White Ash</b> smiling leaf scar  <b>Green Ash</b> trapezoid leaf scar	<b>Quaking Aspen (alternate)</b> shiny terminal bud light, greenish bark buds hug twig	<b>Big Tooth Aspen (alternate)</b> dull terminal bud live, gray bark buds point away from twig slightly	
<b>Shagbark Hickory (alternate)</b>  layered, oval bud  peeling bark	<b>Small understory trees: (alternate)</b>  <b>Musclewood</b> single terminal bud, thin twigs, blue-gray muscle looking wood  <b>Ironwood</b> single terminal bud, thin twigs, shaggy wood	<b>Birches (alternate)</b> <b>Paper</b> white, papery bark <b>Yellow</b> yellow, papery bark	<b>Oaks (alternate)</b> Terminal buds are clustered.  <b>Red Oak</b> Reddish bud  <b>White Oak</b> Gray bud	

# HOW TO BE A TWIG DETECTIVE

## HORSE CHESTNUT TWIG



Have you explored the miracle of buds? Observing eyes quickly find them, large and small, on bushes and trees in a variety of sizes, shapes, and colors. To identify buds it is important to notice their arrangement on the twig. Are they in pairs or **opposite** each other? A few trees have their buds so arranged — maple, ash, horse chestnut, and dogwood are native eastern ones. Most buds are **alternate**, appearing first on one side of the twig, then the other: elm, oak, birch, etc. Below the bud look for a **leaf scar**, left when the leaf fell off in autumn. It differs for each kind of tree. In the leaf scar are tiny dots or **bundle scars** which are the ends of veins that transported food and water between leaf and twig. These tiny dots may form a pattern, and even resemble a face in walnut and butternut.

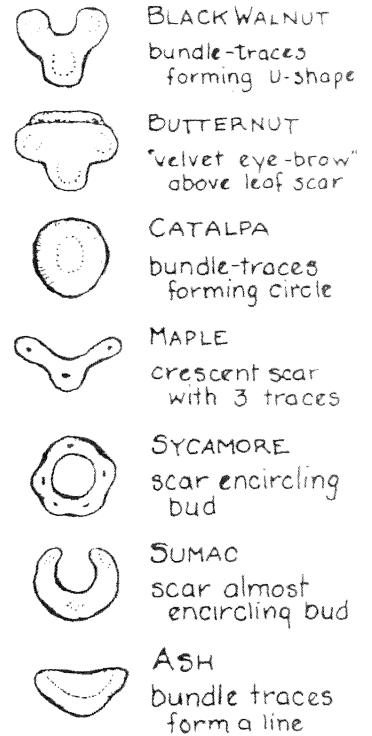
Buds are usually protected by several scales. Willow is an exception and has a single, cap-like scale that covers the bud. This is easily seen in the pussy willow. Can you find the **terminal bud** of a twig when it has one? It is the largest bud at the very end, as in the maple. Buds along the sides of the twig are called **lateral buds**. Usually the larger buds contain flowers, or leaves and flowers, while the small ones are leaf buds. Open a large bud and look for these things.

When the terminal bud is formed, that ends growth for the season. Some trees do not have terminal buds. In these cases the twig keeps growing until food supply falls off. The twig then dies back to the last lateral bud, which becomes a pseudo- (false) terminal bud with a small round scar (different from the leaf scars) at its base where the branch died back and fell off. These buds are usually set at an angle (examples: linden, elm and sycamore).

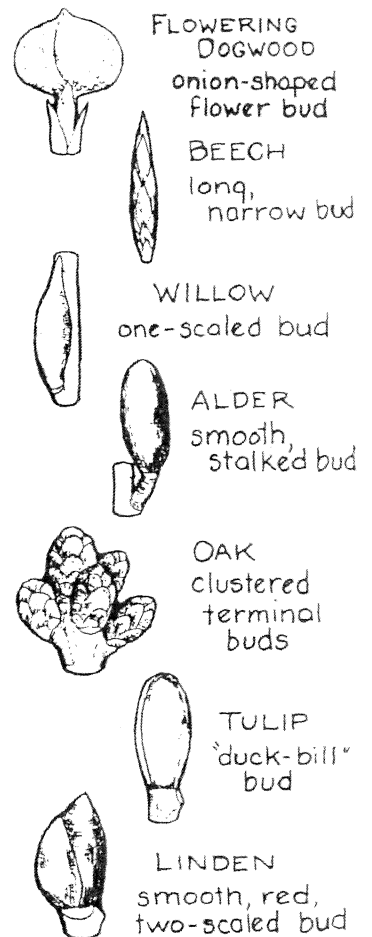
Do you have little raised dots here and there along your twig? They are **lenticels** that allow oxygen into the branch (see "Word of the Month"). The dark lines on white birch bark are the lenticels.

A few inches from the tip of your twig you may discover several lines or rings close together. These **growth rings** were left when the bud scales of last year's terminal bud fell off. They show last year's growth or how much the twig grew in one year. Now look for the next ring further down. That marked the end of the twig two years ago. Starting at the tip of the twig, count the growth rings to get the age of the twig. Be a twig detective. Marjorie E. Smith

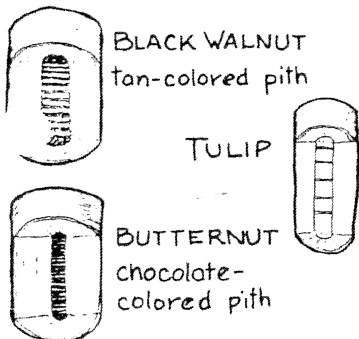
## SOME DISTINCTIVE LEAF SCARS



## SOME DISTINCTIVE BUDS



## SOME TWIGS WITH "CHAMBERED" PITH



Small drawings by May T. Watts. Accompanying text adapted from her "WINTER TWIGS," a MORTON ARBORETUM BULLETIN.

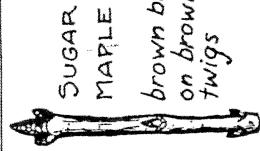
# SOME CLUES FOR TWIG DETECTIVES,

Massachusetts  
South Lincoln

Hubon Society  
Massachusetts

## TREES WITH OPPOSITE BRANCHING

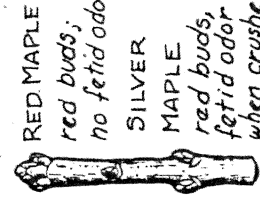
### BUDS 1. Smooth buds, crescent-shaped leaf scars with 3 bundle scars



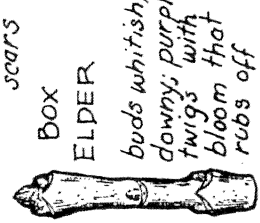
SUGAR MAPLE  
brown buds on brown twigs



NORWAY MAPLE  
green and red buds; keeled scales



RED MAPLE  
red buds; no fetid odor



SILVER MAPLE  
red buds; fetid odor when crushed



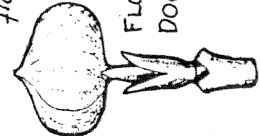
BOX ELDER  
buds whitish, downy; purple twigs with bloom that rubs off

### 3. Large terminal bud



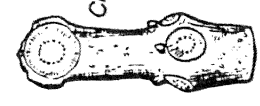
HORSE CHESTNUT  
buds sticky

### 4. Onion-shaped flower bud



FLOWERING DOGWOOD

### 5. Often 3 buds at a node



CATALPA

## TREES WITH ALTERNATE BRANCHING

### BUDS 1. Single scale

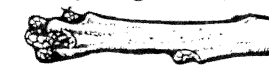


WILLOW  
hood-like scale

### 2. Clustered terminal buds



BLACK OAK GROUP  
sharp-pointed buds



WHITE OAK GROUP  
blunt buds

### 3. Large end bud with loose dark outer scales



SHAGBARK HICKORY  
brownish twigs with light-colored lenticles

### 4. Flattened, yellowish buds



BITTERNUT HICKORY  
granular, mustard-yellow buds

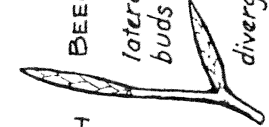


WITCH-HAZEL  
towny, stalked, naked buds

### 5. Long, narrow buds



SHADBUSH  
scales fringed with hairs



BEECH  
lateral buds divergent

## TWIGS 1. Thick twig, thick pith



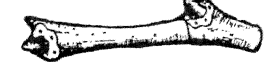
TREE OF HEAVEN



STAGHORN SUMAC  
leaf scar almost encircles bud



TULIP  
"duck-bill" terminal bud



SYCAMORE  
leaf scar encircles bud

## 3. Knob-like twigs



HAWTHORN



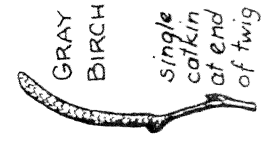
GINKGO  
twigs peeling in silky fibres

## 4. Green twigs



SASSAFRAS  
only one bundle scar

## CATKINS in winter



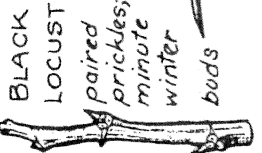
GRAY BIRCH  
single catkin at end of twig



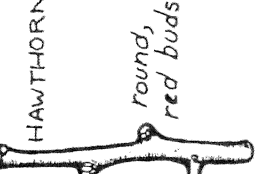
SPECKLED ALDER  
mahogany-colored catkins



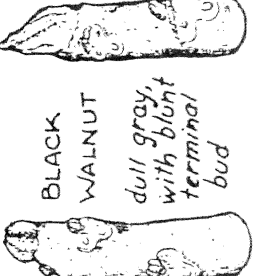
HONEY LOCUST  
minute winter buds; zig-zag twig



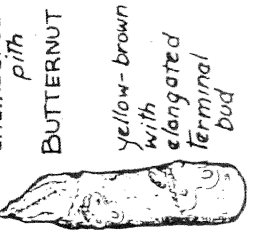
BLACK LOCUST  
paired, minute winter buds



HAWTHORN  
round, red buds



BLACK WALNUT  
dull gray, with blunt terminal bud



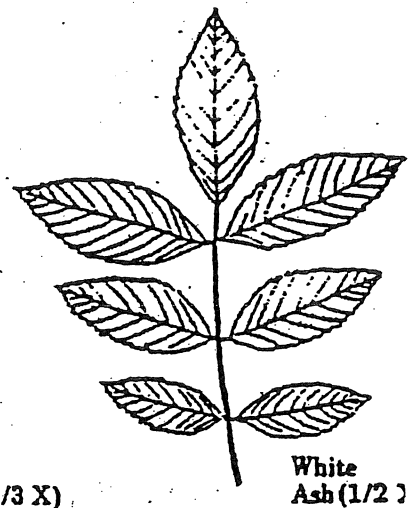
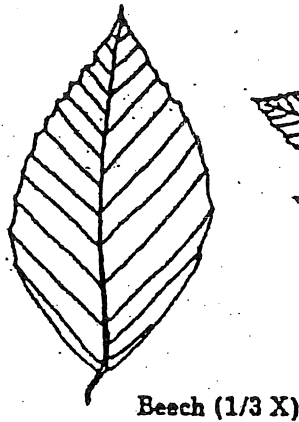
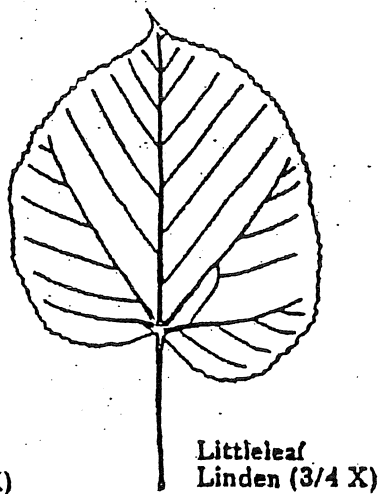
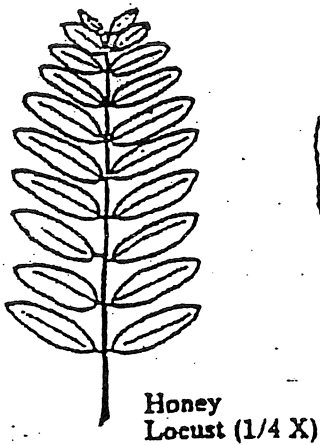
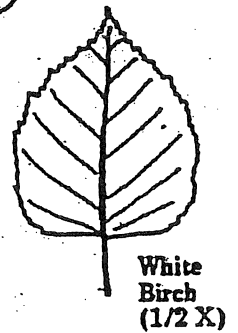
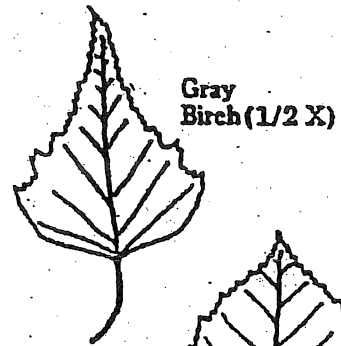
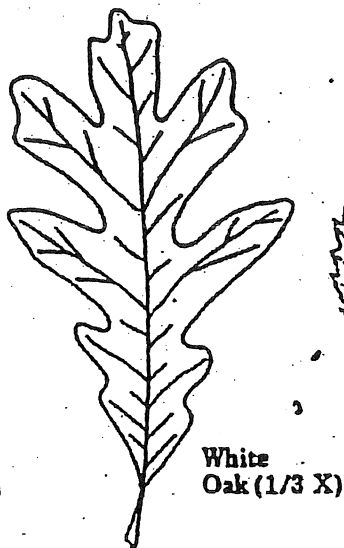
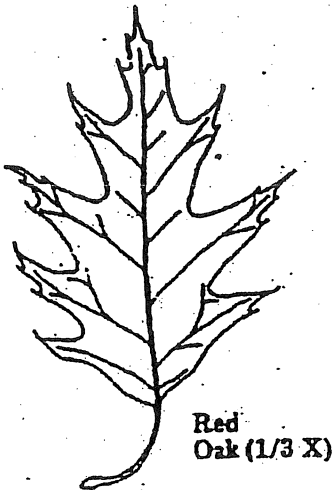
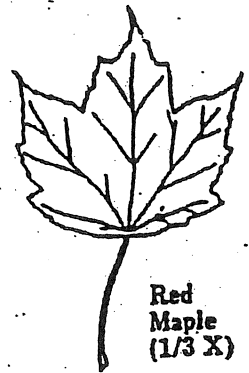
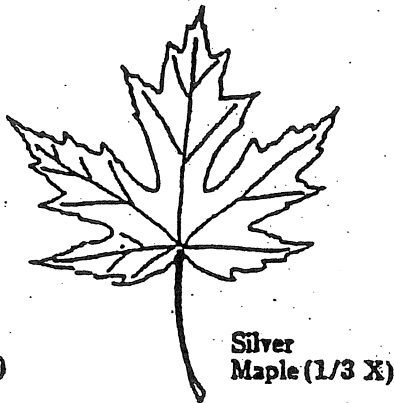
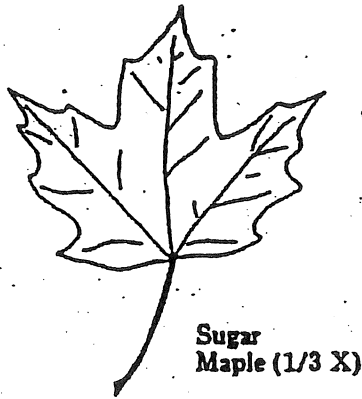
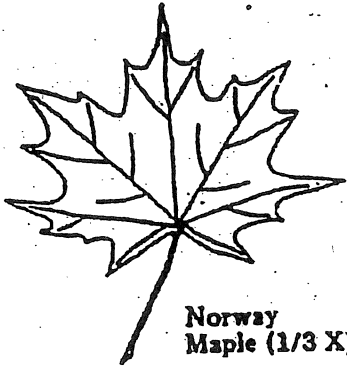
BUTTERNUT  
yellow-brown, with elongated terminal bud

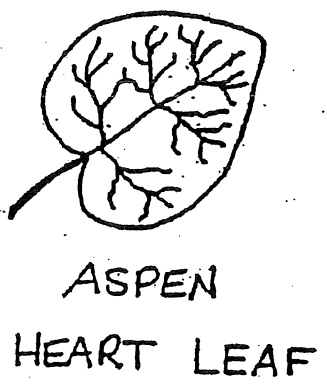
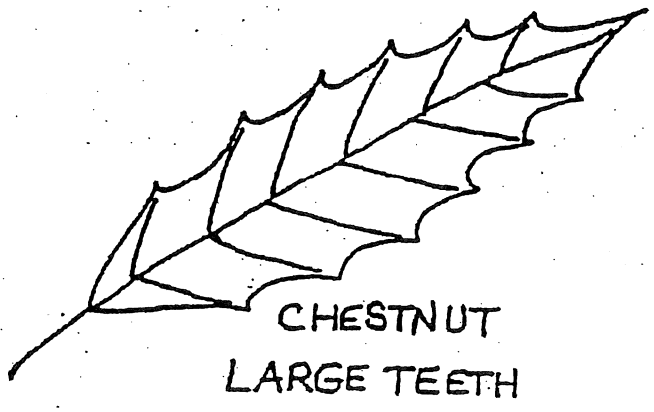
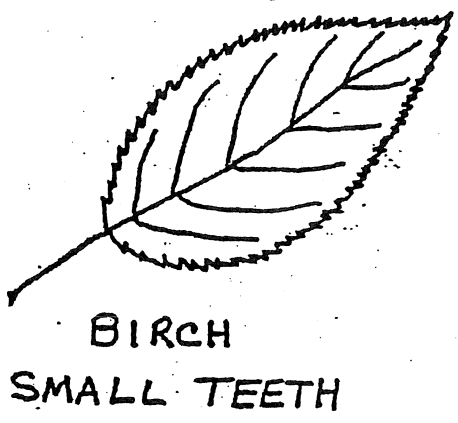
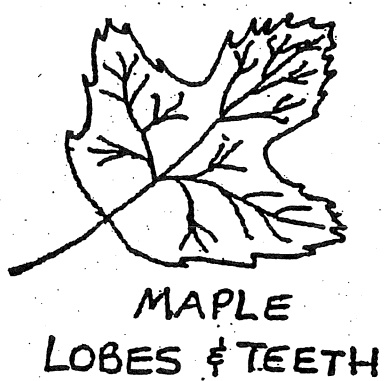
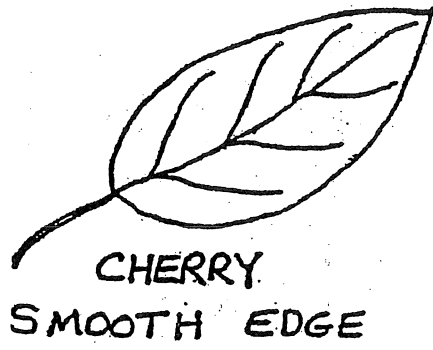
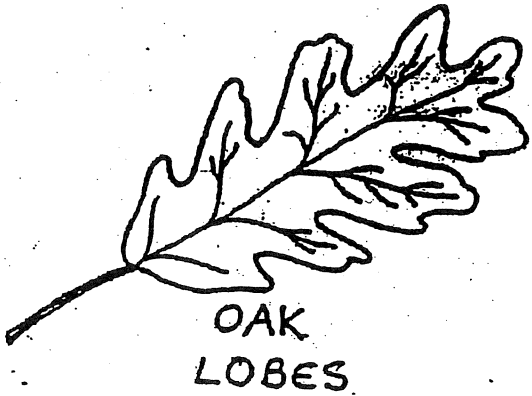
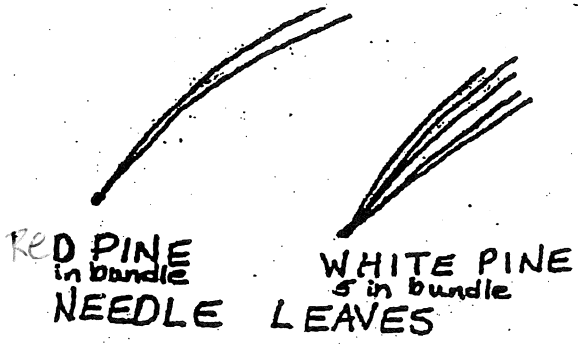
## BUNDLE-SCAR U-shaped, chambered pith

Illustrations and text, from Winter Twigs, by May Theilgaard Watts, Bulletin of Moron Arboretum, Lisle, Ill. Used by permission.

# LEAVES OF COMMON CITY TREES

(from  $\frac{1}{4}$  to  $\frac{3}{4}$  normal size, as marked)





### Patterns of Buds



Alternate



Opposite

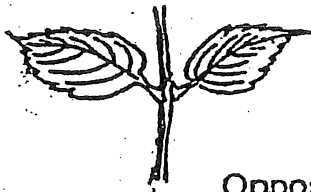


Whorled

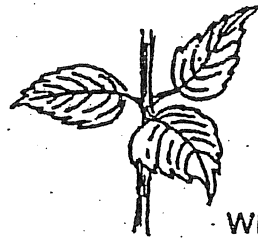
### Leaf Arrangements



Alternate



Opposite



Whorled

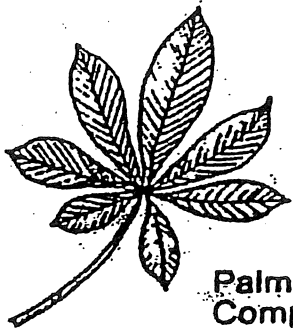
### Leaf Patterns



Simple



Bi-Pinnately Compound



Palmately Compound

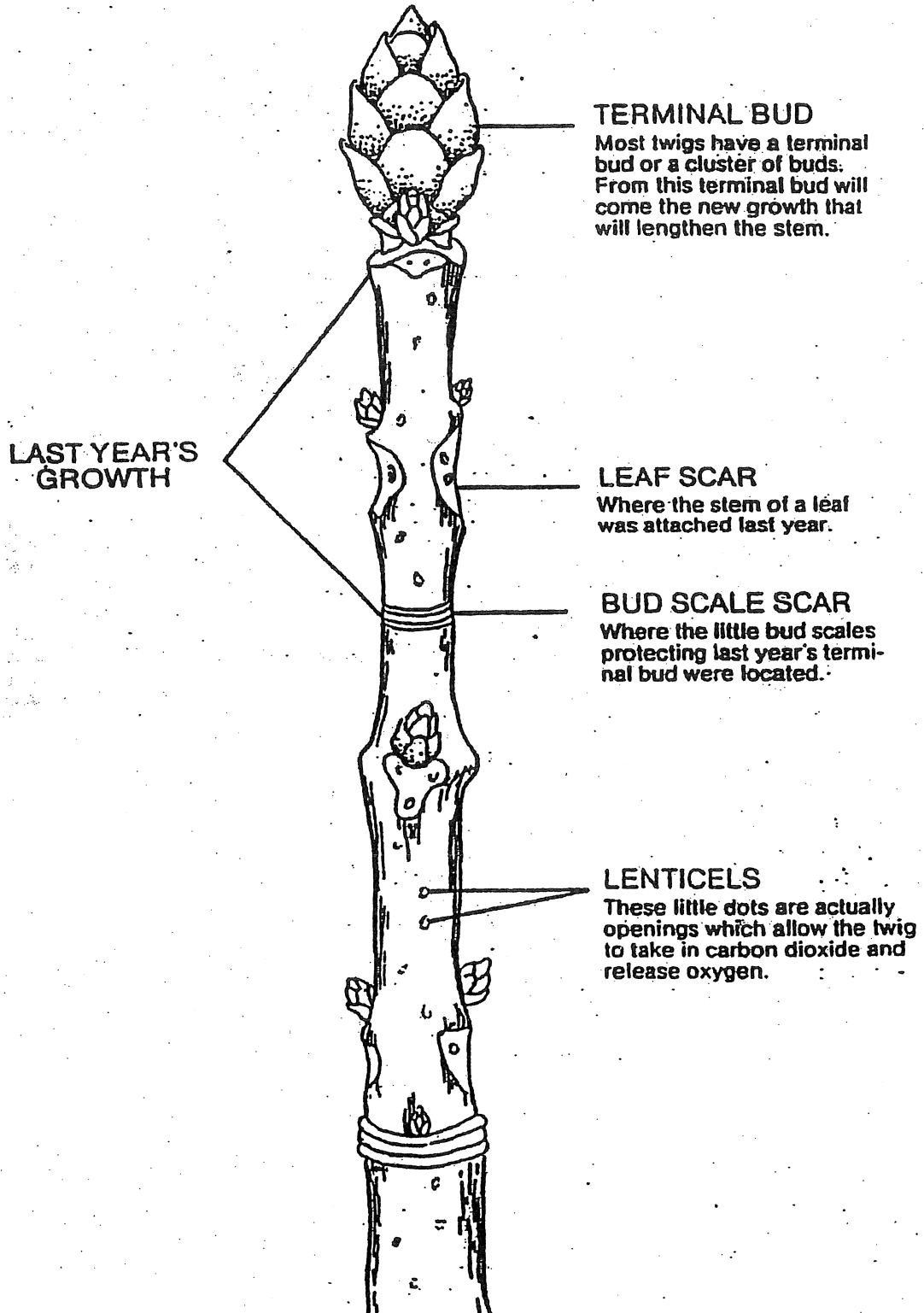


Pinnately Compound



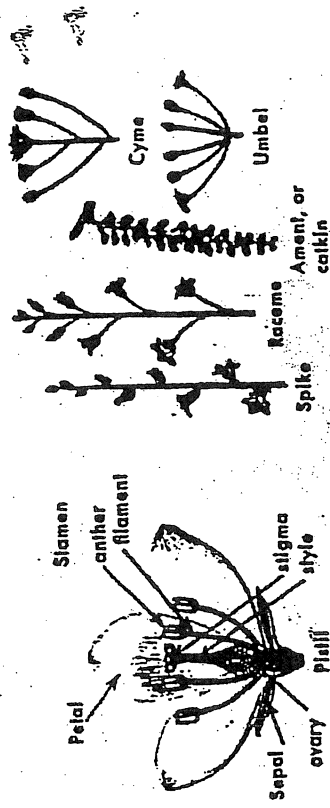
# TWIG ILLUSTRATION

## HORSE CHESTNUT IN SPRING

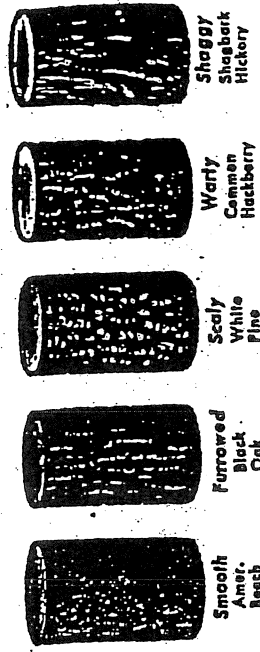


# IDENTIFICATION FEATURES

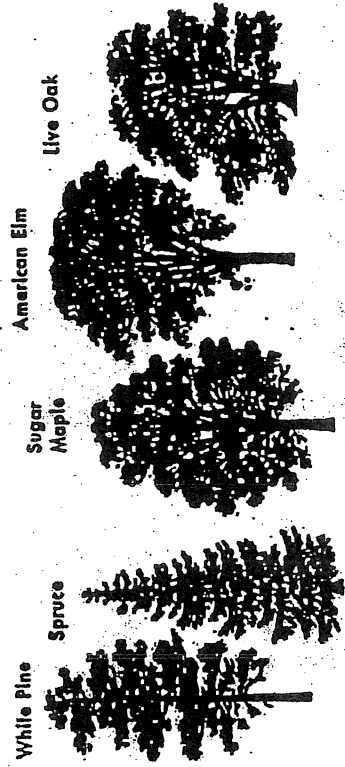
## FLOWERS



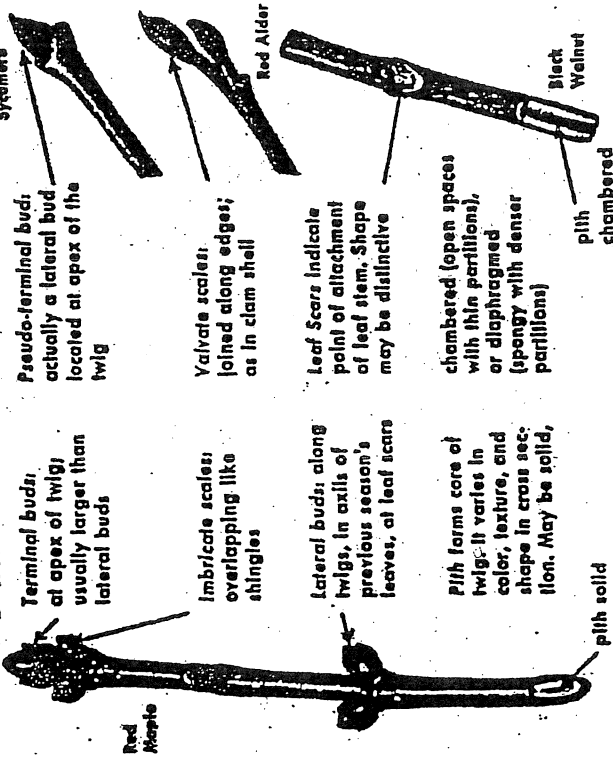
## BARK



## TREE SHAPES



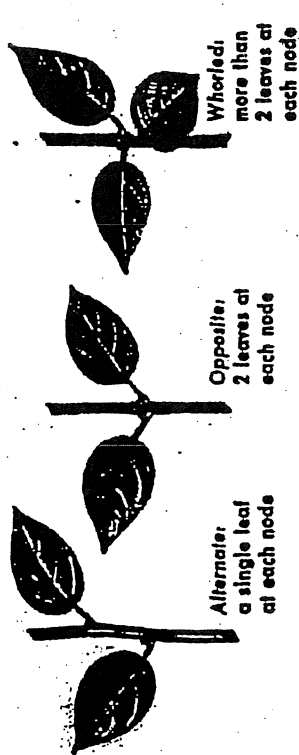
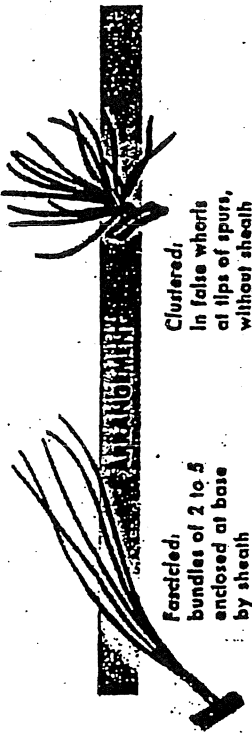
## TWIGS & BUDS



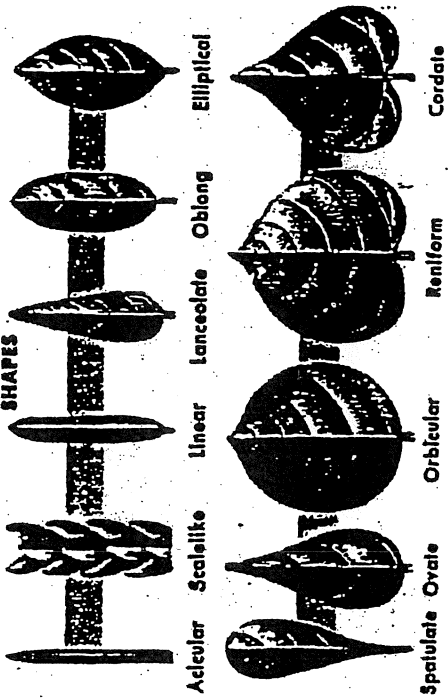
## FRUITS

ANGIOSPERMS		ANGIOSPERMS	
Examples of simple and compound fruits			
<b>Cone</b> (Pine)	<b>seed on scale</b> (Pine)	<b>Aggregate of Samaras</b> (Yellow-poplar)	<b>Multiples of Drupes</b> (Hickory)
<b>Fleshy</b> (Berry)	<b>Nut</b> (Hickory)	<b>Drupe</b> (Cherry)	<b>Berry</b> (Persimmon)
<b>Multiple of Achenes</b> (Sycamore)	<b>Capsule</b> (Pepper)	<b>Pome</b> (Apple)	<b>Aggregate of Follicles</b> (Mesquite)
<b>Samaras</b> (Elm)	<b>Legume</b> (Lentil)	<b>Aggregate of Follicles</b> (Mesquite)	

**LEAVES** may be deciduous (shed annually), or they may be evergreen or persistent (remaining on tree one to many years). Most cone-bearing trees and some broad-leaved trees are evergreen. Leaf arrangement may be obscure at growing tips, where leaves may not have reached full size. Leaves of some trees bear stipules (not shown), small leaflike appendages at base of petiole.



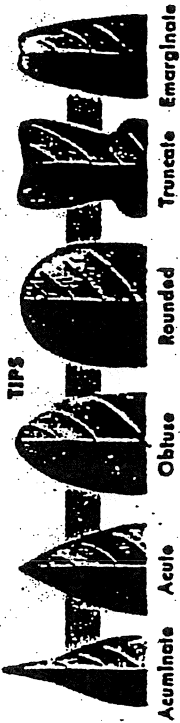
**SHAPES**



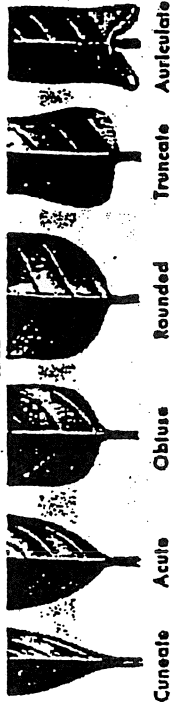
**MARGINS**



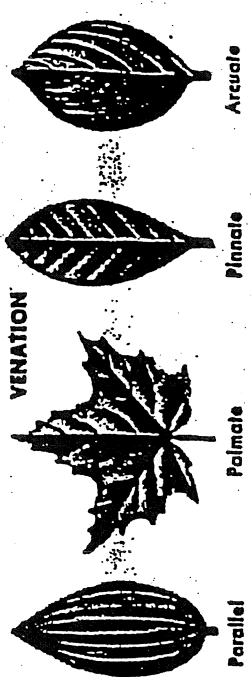
**TIPS**



**BASES**



**VENATION**

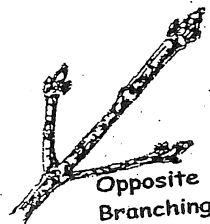


# Deciduous Trees (lose leaves in winter)

Correct identification of a tree should be based on the combination of twig features listed instead of just one feature. For example a twig from a Maple tree will have opposite branching and a v shaped leaf scar. However, a twig with alternate branching and a v shaped leaf scar is not from a Maple tree.

## Opposite Branching (buds and leaf scars)

Trees: Maples, Ash, Dogwood, Horsechestnut & Shrubs in the family Caprifoliaceae.



### Maples

Leaf scar v-shaped with 3 bundle scars.



3. Sugar Maple- Brown buds on brown twigs

4. Red Maple- Red buds on young red twigs. Twigs lack a disagreeable odor when bruised. Note that the silver maple twigs are similar to those of red maple except that silver maple twigs have a disagreeable odor when bruised.

### 5. White Ash

Leaf Scar large and conspicuous, slightly protruding in such a way that even at some distance they can be seen like paired steps along the twig (giving a jointed appearance)

Bundle scars forming a crescent.



Lateral buds brown rounded.

The first pair of lateral buds situated directly below the terminal bud so that the tip of the stem resembles a Vikings helmet. (Maples have this same arrangement of buds. However, the buds of maple are sharp-pointed and those of ash are rounded).



Twigs lack hairs.

### 6. Flowering Dogwood

Onion shaped flower bud



### 7. Horsechestnut

Large and sticky terminal bud

Leaf scar large and conspicuous



## Alternate Branching (buds and leaf scars)

Many trees and shrubs. All the trees on this page and the following pages have this type of branching.



## Oaks

Terminal buds clustered together

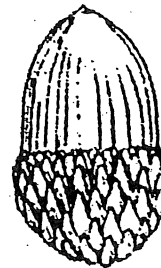
Buds sharp pointed- Red, Scarlet or Black Oak.

Buds rounded and blunt- White oak



OAK  
clustered  
terminal  
buds

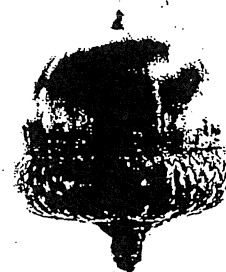
Fruit an acorn comprised of a nut and a cup that encloses the nut. The cup has scales that are flat and overlapping (Red, Scarlet and Black Oak) or warty (White Oak).



### 9. Red Oak

Buds reddish brown and sharp pointed

The nut of acorn enclosed only at base in the cup. Cup saucer shaped. Scales on cup flat and overlapping, closely fitting.



### 10. Scarlet Oak

Buds in lower 1/2 reddish-brown, upper 1/2 whitish in color and sharp pointed

The nut of acorn usually, but not always with one or more concentric circles around the tip. The nut enclosed 1/3 to 1/2 of its length in the cup. Cup bowl-shaped. Scales on cup flat and overlapping, closely fitting and shiny.



### 11. Black Oak

Terminal buds angled (with definite flat sides), grayish-brown, usually covered with grayish white wooly hairs. Buds sharp pointed.

The Nut of acorn enclosed 1/3 to 1/2 its length in the cup. Cup bowl shaped. Scales on cup overlapping, loosely fitting, and dull brownish in color. The scales creating a fringe at the top of the cup.



### 12. White Oak

Buds rounded and blunt.

The cup of acorn covered with warty scales



8. American Beech

Long narrow buds that stick out from the stem.  
The scales on the buds lack hairs.



13. Sassafras

Green twigs that smell like lemon cleaner when scratched.

Birches

Twigs have long, soft catkins in winter- a hanging flexible spike of very small flowers.

Buds on spur shoots.  
(not all twigs will exhibit this characteristic)



14. Black & Yellow Birch

Twigs with winter-green odor.

Black birch twigs have a stronger winter green odor than those of yellow birch.  
Black birch bark is dark and is not peeling. Yellow birch bark at first bronze in color, thin and readily peeling in papery curls.

15. White Birch and Grey birch-  
twigs with no special odor (smell like a tree)

White birch bark on mature trees chalky white and peels off in papery curls.

Grey birch bark on mature trees dull grayish white, smooth does not peel as readily as white birch.

16. Cherry

Twigs when scratched smell bad, like crushed tomato leaves (described as smelling like bitter almonds).

Branches typically have a disease that looks like burned marshmallows.

17. Shagbark Hickory

Large terminal bud with loose dark outer scales.



Bark peels away from the stem in long loose strips.



TRUNK LOOKS UNTIDY

18. Black Walnut

Buds large.

Leaf scars large and conspicuous. Bundle scars forming a u shape.



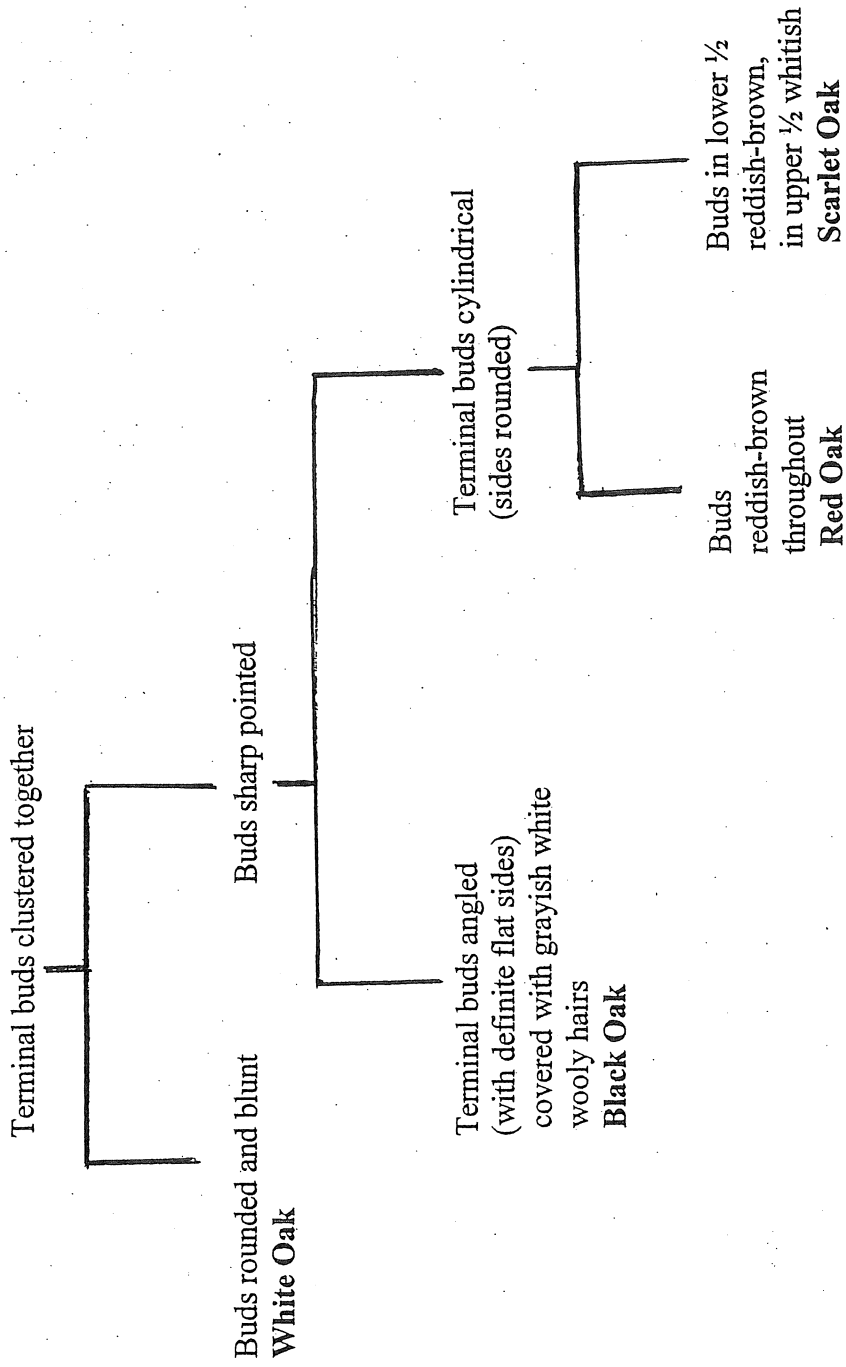
BLACK WALNUT  
bundle-traces  
forming U-shape

Pith when cut lengthwise shows cross petioles separating small cavities. This type of pith is referred to as a chambered pith). Pith tan-colored.



BLACK WALNUT  
tan-colored pith

## Key to Oaks using Buds





# Key to Oaks using Acorns

Fruit of trees an acorn  
comprised of a nut and a cup  
which encloses the nut.

