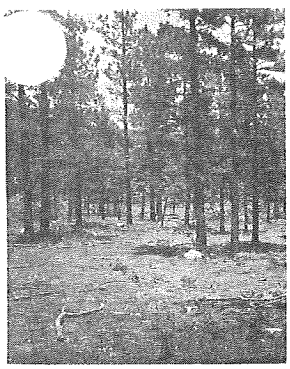
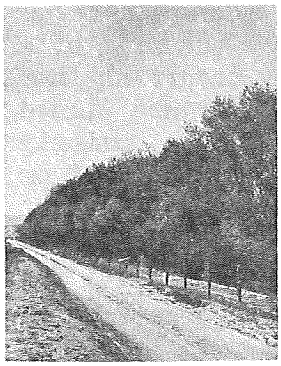
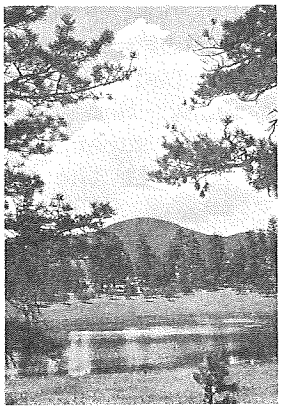
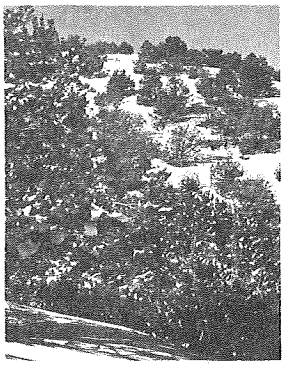
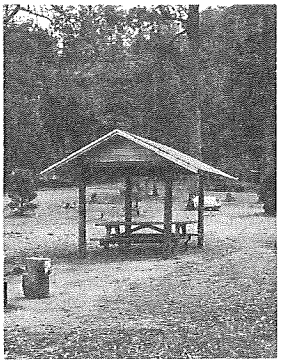
Technical Notes Woodland Conservation

FOREST MANAGEMENT WINDBREAKS WATERSHEDS FOREST RECREATION

U. S. DEPARTMENT OF AGRICULTURE NEW MEXICO SOIL CONSERVATION SERVICE

WOODLAND TECHNICAL NOTE NO. 27

January 15, 1973

SUBJECT: Tree Identification During Winter

The chief characteristics which may be effectively used to distinguish trees in the winter condition are the buds, leaf scars, lenticels, bark, and pith. These characteristics of trees are largely obscured during the summer by the presence of the leaves and are usually overlooked. Buds appear as conspicuous features on most of the perennial plants of temperate regions after the autumnal fall of leaves. The bud is a short, partially developed stem with very short internodes and with rudimentary leaves in various stages of development, the whole protected by bud scales which enclose it. These bud scales are considered by many to be modified leaves. They may be covered with hairs, have hairs on their margins, or covered with a resinous secretion. These coverings protect the internal portion of the bud, especially the growing tip, from drying out, as well as from mechanical injury.

Buds are classified according to their position on the stem as (1) terminal, (2) axillary (lateral), and (3) adventitious. When a stem ends in a bud, the bud is called a terminal bud. In some plants terminal buds are not developed. New growth in these plants proceeds from some of the lateral buds.

Axillary (lateral) buds are buds which arise in leaf axils, which are just above the place on the stem where a leaf is attached. These buds may have alternate, opposite, or whorled arrangement.

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These are cases where two or more buds spring from the axil of a leaf instead of the single axillary bud regularly occurring there. These buds are called accessory buds. Sometimes they are placed one over the other and are said to be superposed. More commonly the accessory buds stand side by side in the axil of the leaf or above the leaf scar.

Adventitious buds are buds which arise anywhere on the plant except at the end of the stem or in axils of leaves. They may form on stems, roots or leaves.

Other characteristics of twigs which may also be used as aids in identification of trees in the winter condition will be briefly discussed.

Leaf scars mark the place where leaves were attached to twigs. If these scars are examined closely one can observe smaller scars within them. These small scars are called bundle scars or traces. They represent the broken ends of the vascular bundles which formerly passed out of the stem into the leaf petiole. The shape of leaf scars are specific for a given species of tree and are arranged (Phyllotaxy) in one of three different ways: (a) opposite, (b) whorled, and (c) alternate. With alternate leaf scars the determination of the number of leaf scars in each complete turn of the spiral is important since it is often the same throughout a genus and may apply to all members of a family. In determining spiral arrangement (Phyllotaxy) the twig is held in a vertical position and two leaf scars are chosen, one of which is directly above the other; twisted, deformed, or very slow growth twigs should not be used, and the inspection should be confined to a single season's growth. Neglecting to count the lower leaf scar of the two chosen, ascend the spiral and count the number of leaf scars passed, up to and including the upper leaf scar, and also note the number of complete turns made around the twig. A fraction may then be formed using the number of turns as the numerator and the number of leaf scars as the demoninator. If this is done it will be found that one of the following fractions has resulted: 1/2, 1/3, 2/5, 3/8, 5/13, 8/21, (only the first three are common). The 1/2 phyllotaxy typical of elm is the simplest arrangement and results in a so-called "two-ranked" placement of leaf scars. If stipules were persistent with the leaf, a small stipular scar may be seen on each side of the leaf scar, or even surrounding the twig. Bud scale scars occur in compact groups on the stem and mark the point of former attachment of bud scales. They often form rings around the stem, especially those left by terminal buds. The age of a twig may be determined by counting the number of terminal bud scars. The small raised or ridged openings or pores on woody twigs are called lenticels. They differ in size and shape from species to species and aid in identification.

Bark and pith characteristics are also used in differentiating between many trees in the winter conditions.

TREES IN WINTER CONDITION - Key to the Genera

1a. Leaves needle-shaped, or scale-like, fruit a cone or - - - - blue berry - 2
1b. Leaves usually deciduous; if evergreen the leaves are broad and flat -10

2a. Leaves needle-like and in clusters (sometimes alternate in Cedrus) - 3
2b. Leaves solitary, not clustered - - - - - - - - - - - - - - - 4

3a. Leaves in clusters of 2 - 5 - - - - - - - - - Pinus (pines)
3b. Leaves in clusters of more than 5 (sometimes alternate and single) - - - - - - - - - - - - - - - - - -Cedrus (true cedar)

4a. Leaves scale-like or awl-shaped, usually opposite - - - - - 5
4b. Leaves needle-like (narrowly linear) alternate or spirally-whorled - 7

5a. Twigs flattened; leaves all of one kind (scale-like); mature fruit a small, brown dry cone - - - - - - - -Thuja (Arbor Vitae)
5b. Twigs not flattened; leaves scale-like and opposite or needle-like and in whorls of three - - - - - - - - - - - - - 6

6a. Leaves of two kinds, either scale-like or else awl-shaped, often both kinds on same branch. Fruit a blue berry - Juniperus
6b. Leaves all scale-like and usually covered with a white bloom which gives the foliate a bluish-green appearance; fruit a globose cone - - - - - - - - - - - - - - Cupressus (Cypress)

7a. Leaves usually falling in autumn with the small lateral branchlets; leaves cinnamon-brown if persistent; linear and two ranked - - - - - - - - - - - - - Taxodium (Bald Cypress)
7b. Leaves persistent and green in winter - - - - - - - - - - - 8

8a. Branchlets roughened by persistent, brown, leaf-bases, leaves needle-like, four-sided - - - - - - - - - Picea (Spruces)
8b. Branchlets not roughened; leaves flattened - - - - - - - - 9

9a. Leaves 1/2" - 1 1/2" long, green, grooved above - -Pseudotsuga (Douglas Fir)
9b. Leaves 1 1/2" - 2" long; bluish-green or whitish beneath, not grooved above - - - - - - - - - - - - - - - - Abies (Firs)

10a. Leaves persistent and green (in this region) in winter - - 11
10b. Leaves deciduous in winter - - - - - - - - - - - - - - - - 15

11a. Leaves compound and opposite - - - - - Sambucus (some Elders)
11b. Leaves simple - 12

12a. Leaves opposite - 13
12b. Leaves alternate - 14

Trees in Winter Condition - Key to the Genera

13a. Leaves with serrate-crenate margins - - - - - - Euonymus (Spindle tree)
13b. Leaves entire - - - - - - - - - - - - - - - Ligustrum (Privet)

14a. Leaves large with stipular rings about stem at base of petiole; cultivated - - - - - - - - - - - Magnolia (some magnolias)
14b. Leaves smaller, without stipular rings: native - Quercus (live oaks)

15a. Leaf-scars opposite (2 at node) or whorled (3 at node)- - - - 16
15b. Leaf-scars alternate (1 at node) - - - - - - - - - - - - - - - - 21

16a. Leaf-scars whorled (3 at node) - - - - - - - - - - - - - - - - - 17
16b. Leaf-scars opposite - 18

17a. Leaf-scars round and prominent; bundle traces in a circle - Catalpa (catalpa)
17b. Leaf-scars small and not round, six-ranked; bundle traces not in a circle - - - - - - - - - - - - - - - - - - Chilopsis (Desert Willow)

18a. Twigs with large, soft pith - - - - - - - - - Sambucus (Elders)
18b. Twigs with small pith - 19

19a. Bundle-scars 1 - - - - - - - - - - - - - - - Ligustrum (Privet)
19b. Bundle-scars more than 1 (sometimes many small ones in a - - circle) - 20

20a. Buds dark brown; bundle-scars small and many - - Fraxinus (Ashes)
20b. Buds not dark brown; bundle-scars usually three - Acer (Maples, Box Elder)

21a. Leaf-scars surrounding the bud (buds previously covered by base of petiole); buds reddish-brown and pointed; bark white in patches due to scaling off of outer bark - - Platanus (Sycamore)
21b. Leaf-scars not surrounding the bud; bark not white when outer layers are scaled off - 22

22a. Leaf-scars minute, without evidence of bundle-scars (leaves scale-like and late deciduous), young twigs often reddish - Tamarix (saltcedar)
22b. Leaf-scars evident; bundle-scars present - - - - - - - - - - - 23

23a. Twigs, branches or trunk armed with stiff, sharp prickles, spines, or thorns - 24
23b. Trees not armed with thorns or spines - - - - - - - - - - - - - 30

24a. Twigs armed with lateral thorns - - - - - - - - - - - - - - - - - 25
24b. Twigs with thorns at the ends of branches or with spur-like lateral branches ending in thorns (lateral thorns may be present - 29

Trees in Winter Condition - Key to the Genera

25a. Thorns or spines in pairs at each node, superficial, peeling off with bark (stipules) - 26
25b. Thorns not in pairs at each node, connected with the wood - 27

26a. Spines stout and curved, often unequal; bark smooth; fruit a drupe - Zizyphus (Jujube)
26b. Spines short and equal, not curved; bark rougher; fruit a short flat persistent pod - - - - - - - - Robinia (Locust)

27a. Young twigs often silvery-white; buds pubescent or silvery; bundle-scar one; bark shiny on young branches - Eleagnus (Russian Olive)
27b. Young twigs or buds not silvery; bundle scars more than one - 28

28a. Thorns beside the axillary buds; fruit large and orange-like - Maclura (Osage Orange)
28b. Thorns above the axillary buds (often in clusters on the trunk and branches); fruit a long pod - Gleditisia (Honey Locust)

29a. Terminal bud absent; twigs smooth - - - Prunus (Plums, cherries)
29b. Terminal bud present; twigs and terminal bud pubescent - Pyrus (Pears, apples)

30a. Stipule-scars encircling the twig at each node - - - - - - - 31
30b. Stipule-scars small or none - - - - - - - - - - - - - - - - - - 33

31a. Twigs with milky sap; buds globose - - - - Ficus (Figs)
31b. Twigs without milky sap; buds not globose - - - - - - - - - - 32

32a. Bud scales 2, united; buds compressed or flattened - Liriodendron (Tulip Tree)
32b. Bud with single keeled scale; buds not decidedly flattened - Magnolia (magnolia)

33a. Bundle-scars 1-3 (often many bundle scars appearing in three definite groups) - 34
33b. Bundle-scars not more than 3 - - - - - - - - - - - - - - - - - 54

34a. Bundle-scar 1 - 35
34b. Bundle-scars 3 or in 3 compound, but distinct groups - - - 36

35a. Bark on branches dark, smooth, and shiny; spines often present, young twigs silvery; fruit a small drupe - - Elaeagnus (Russian Olive)
35b. Bark not smooth on branches; small tree; leaf-scars six-ranked (whorled, opposite, or scattered); fruit a persistent pod - Chilopsis (Desert Willow)

Trees in Winter Condition - Key to the Genera

36a. Buds stalked or elongated - 37
36b. Buds short and sessile - 38

37a. Trees with persistant catkins - - - - - - - Alnus (Alder)
37b. Small trees or shrubs without catkins; pith pinkish; fruit a more or less persistent, short pod - Cercis (Judas tree or Redbud)

38a. Bud-scales only 1 visible, standing immediately over the leaf-scar - Salix (willows)
38b. Bud-scales 2 or more - 39

39a. Pith with partitions, air cavities between (diaphragmed pith) - 40
39b. Pith without partitions (not diaphragmed), continuous - - - 41

40a. Terminal bud present; axillary buds often superposed, pith brown - Juglans (Walnut)
40b. Terminal bud absent; axillary bud single; pith white - - - - Celtis (Hackberry)

41a. Buds more or less sunken; silvery-silky, often superposed leaf leaf scars horse-shoe shaped when torn by buds; pith relatively large - Ptelea (Hop Tree)
41b. Buds not sunken, usually arranged (if more than one) side by side and not superposed - 42

42a. Terminal bud present and distinct - - - - - - - - - - - - - - - 43
42b. Terminal bud absent (last bud not at extreme tip of twig) - 45

43a. First or outermost bud-scale of lateral buds directly in front (exactly above center of leaf-scar); twigs brittle at base - - Populus (cottonwood)
43b. First or outermost scale of lateral bud not directly in front (to one side of center of leaf scar); twigs not brittle at base - 44

44a. Bud-scales 4 visible; branches contorted (twisted), bearing many short, lateral, spur-like branches - Pyrus (Pears, apples)
44b. Bud-scales more than 4 visible; fruiting spurs not so prominant and smaller - - - - - - - - - - - - - - - - Prunus (Cherries, plums)

45a. Small stipule-scar present - - - - - - - - - - - - - - - - - - - 46
45b. No stipule-scars present - 48

46a. Leaf-scar quite regularly two-ranked (third scar situated on branch directly above the first) - - - - - - - - - - - - - - - - 47
46b. Leaf-scars not two-ranked; bud-scales 6 or more visible; buds dark - - - - - - - - - - - - - - - - - Prunus (Plums, apricots)

Trees in Winter Condition - Key to the Genera

47a. Bud-scales 4 or less visible, pith often closely chambered; native - - - - - - - - - - - - Celtis (Hackberry)
47b. Bud-scales 4 or more visible; pith continuous; cultivated in New Mexico - - - - - - - - - - - - - - - - - Ulmus (Elms)

48a. Leaf-scars large, prominent, and usually three-lobed; bundle-scars in 8 compound groups - - - - - - - - - - - - - - - 49
48b. Leaf-scars small, not so prominent or distinctly lobed; bundle-scars 3, usually not compound, but simple - - - - - - 51

49a. Buds with 3 exposed scales; leaf-scars elevated; fruit a persistent, light yellow berry - - - Melia (Chinaberry)
49b. Bud with two exposed scales; leaf-scars little or slightly raised - 55

50a. Buds pubescent, often superposed; fruit a persistent orange, translucent berry - - - - - - - - - Sapindus (Soapberry)
50b. Buds glabrous, solitary; fruit a bladdery cap dehiscent by 3 halves - - - - - - - - - - - - - - - - - - Koelreuteria

51a. Buds usually superposed, more or less sunken, rather small; twigs often zig-zag, fruit a pod - - - - - - - - - - - - - - - 52
51b. Buds distinct and quite prominent, seldom superposed (except in Cercis); twigs not distinctly zig-zag - - - - - - - - - - 53

52a. Buds rusty-hairy and partially sunken within the leaf-scar; fruit a short, flat pod - - - - - - - - - - Robinia (Locust)
52b. Buds glabrous, exposed through an irregular torn margin of the leaf-scar; fruit a long twisted pod - Gleditisia (Honey Locust)

53a. Part of buds elongated or stalked; numerous bud-scales; bud-scales many, dark colored; ciliate margins; pith pinkish; fruit a pod - - - - - - - - - - Cercis (Judas Tree or Redbud)
53b. Bud sessile; bud-scales 4 or more visible; pith not pinkish - - - - - - - - - - - - - - - - - - Pyrus (Pears and apples)

54a. Twigs with milky sap; bark orange to brown in color - - - - Morus (Mulberry)
54b. Twigs without milky sap - 55

55a. Terminal bud absent; leaf scars large - - - - - - - - - - - - - 56
55b. Terminal bud present; leaf scars small - - - - - - - - - - - - 57

56a. Smooth-barked; buds solitary, sessile; bundle-scars more than 5; pith white to colored - - - - - - Allanthus (Tree of Heaven)
56b. Rough-barked; buds superposed, sunken in raised silky craters; bundle-scars 5 (sometimes 3 compound); pith large; salmon-colored - - - - - - - - - - - - Cymnocladus (Coffee Tree)

Trees in Winter Condition - Key to the Genera

57a. Bud-scales in pairs (opposite); Terminal bud single and large - - Carya (Pecan)

57b. Bud-scales not in pairs. Many exposed scales; buds usually clustered at the end of twigs; buds small - - - Quercus (Oaks)