



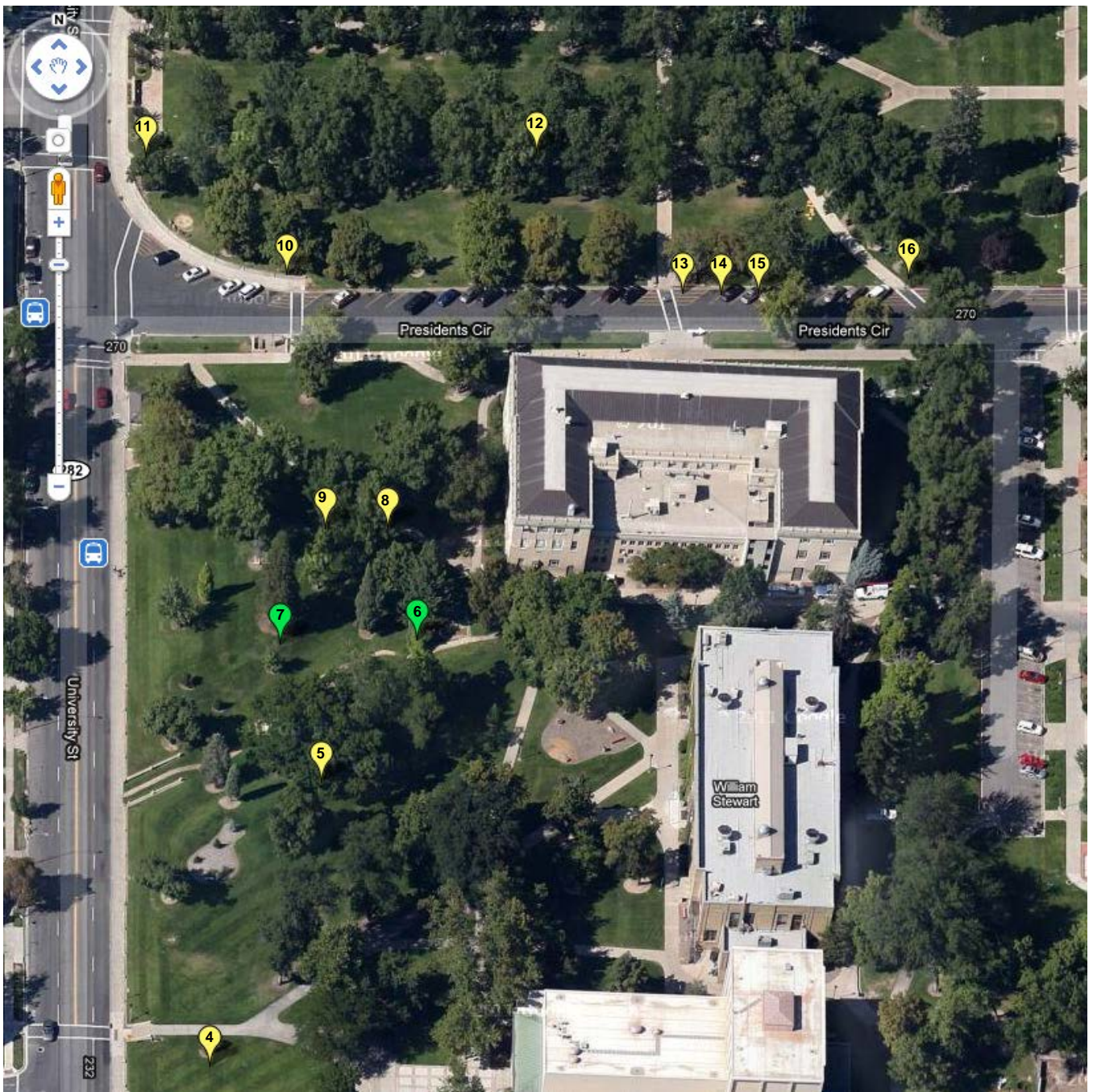
1-Black Walnut, *Juglans nigra*. Chambered pith. Pinnately compound leaves; terminal leaflet usually missing. Round nut with indehiscent husk. Chocolate color when older bark broken. Stout twigs (common with compound leaves).

2-Eastern Redcedar, *Juniperus virginiana*. Cones mature in 2 years, so 2 ages on female trees. Species dioecious; this one appears to be a male. Juvenile vs. adult foliage. Corner of building.

3-Red Horsechestnut, *Aesculus x carnea*. Palmately compound leaves; 5 leaflets, dark green and smaller than *A. hippocastanum*, buds smaller and less sticky. Red flowers. Small tree. Somewhat prickly husk on fruit. Group of 3 trees; girdling root on eastern one.

61-Ponderosa Pine, *Pinus ponderosa*. Needles in 2s & 3s. Cones with prickle. Buds cinnamon brown. Bark scaly, furrowed, becomes platy & red. Hard pine.

62-Austrian Pine, *Pinus nigra*. Medium long needles in fascicles of 2. Fairly large woody cones w/out prickle. Buds white. Bark gray-brown and not scaly. It is a hard or red pine - cones take 2 years to mature, fascicles w/sheath; white or soft pines take 1 year, no sheath. Hard pine.



4-Weeping European Beech , *Fagus sylvatica* var. 'Purpurea pendula'. Looks like a pile of branches. Entire leaves or very small teeth. Zig-zag twigs. Smooth gray bark. Small nut in 4-part capsule.

5-Japanese Zelkova, *Zelkova serrata*. Very large. Notice change in bark appearance for very old tree; horizontal lenticels on younger bark. Fruit a small drupe. Red fall color. Ulmaceae.

6-Port Orford Cedar, *Chamaecyparis lawsoniana*. Small (1/4"), round female cones with wrinkled scales (*Thuja* cones elongated). Scaly foliage in flattened, drooping sprays; white X underneath. Uncommon in Utah. Also called Lawson falsecypress. (May be a *Juniperus scopulorum* to the west).

7-Giant Sequoia, *Sequoiadendron giganteum*. Large. Dense pyramid. Leaves 1/8-1/2" long, usually awl-shaped or triangular, point forward, last 3-4 years. Cone woody, oval, 1-1/2 to 3" long. Spongy bark.

8-Lacebark or Chinese Elm, *Ulmus parvifolia*. Large. Samaras ripen in fall. Beautiful interlacing bark. Leaves small and leathery, dark green and glabrous above, hairy beneath when young.

9-Hackberry, *Celtis occidentalis*. Large. Look for nipple gall. Leaves narrower lanceolate than netleaf hackberry. Leaves serrate (netleaf entire or nearly so). Fruit dark purple (netleaf yellow to orange-red). Warty, ridged bark. Ulmaceae family.

10-Norway Maple, *Acer platanoides*. Milky sap (not so much in late summer). Samaras with widely spreading wings. Tight, ridged bark. Opposite leaves (MADCap Horse).

11-Japanese Flowering Cherry, *Prunus serrulata*. May be 'Kwanzan'. Group of 4 trees. 2-4 glands on petiole near base. Flowers usually pink. Often grafted on a standard at 4-6'.

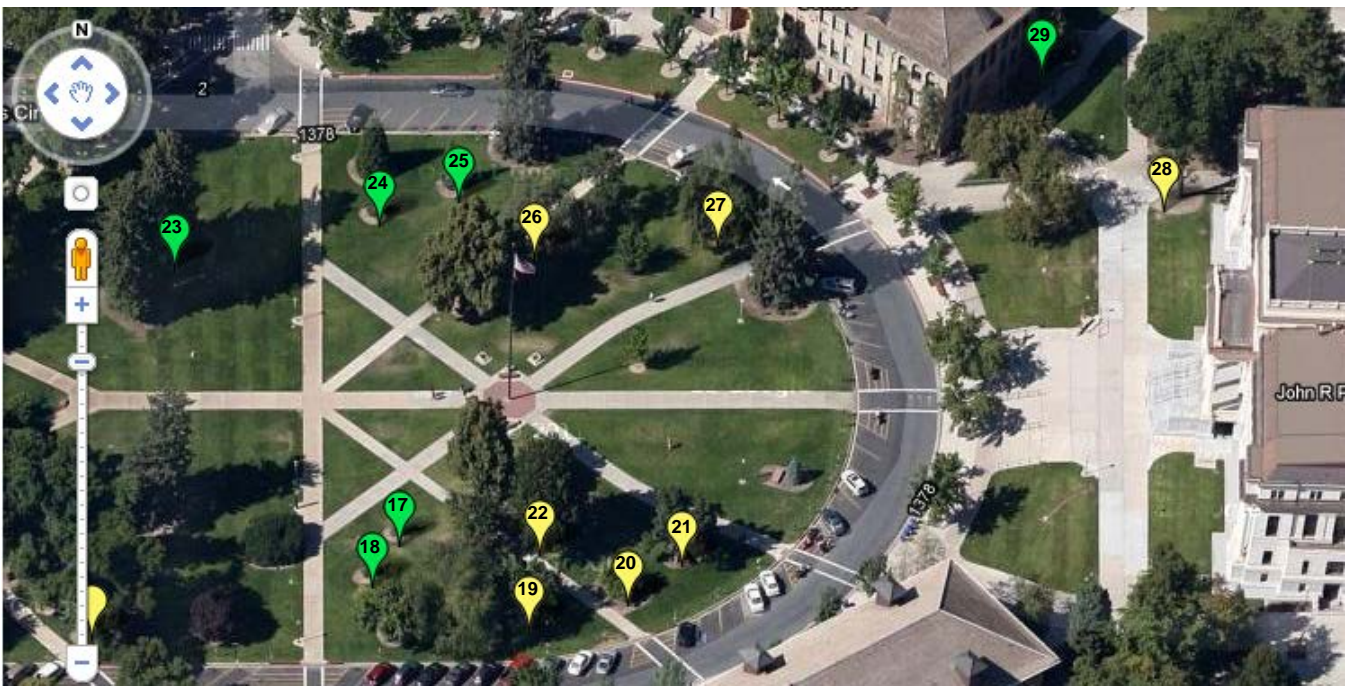
12-Kentucky Coffeetree, *Gymnocladus dioica*. Female (dioecious or polygamo-dioecious). Fruit a fairly large legume with large seeds (1/2"). 2x pinnately compound leaves; dark blue-green. Somewhat narrow crown. Coarse texture in winter. Many in this area.

13-Ohio Buckeye, *Aesculus glabra*. 5 leaflets per leaf; not as dark as *A. x carnea*. Flowers yellow-green. Fruit not as spiny as *A. hippocastanum* (has young fruit). Leaves without rusty hairs underneath.

14-Red Horsechestnut, *Aesculus x carnea*. Palmately compound leaves; 5 leaflets, dark green and smaller than *A. hippocastanum*, buds smaller and less sticky. Red flowers. Small tree. Somewhat prickly husk on fruit. Group of 3 trees; girdling root on eastern one.

15-Yellow Horsechestnut, *Aesculus octandra*. 5 leaflets. Flowers yellow. Fruit a smooth capsule with 2 seeds. Larger than *A. glabra*.

16-Green Ash, *Fraxinus pennsylvanica*. Bright green summer and yellow fall color. Leaf scar half circular and straight or shallow notched across top. Cross-hatching of bark less distinct than for *F. americana*. Opposite leaves.



17-Nootka Falsecypress, *Chamaecyperis nootkatensis*. Larger cones than Port-Orford (up to 1/2"); take two years to mature. No white marking underneath. Pendulous branches. Small trees look like they belong in a Dr. Seuss book.

18-Spanish Fir, *Abies pinsapo*. Leaves dark green above and whitish beneath; short and stiff; not flattened in cross-section; sharp. Cones upright, 4-8" long. Heat and drought tolerant.

19-English Hawthorn, *Crataegus laevigata*. Leaves fairly deeply lobed. Trunk a bundle of stems. Flowers red to pale pink in small clusters. Thorns 1" long but may not be present.

20-Saucer Magnolia, *Magnolia x soulangiana*. Large, deciduous, entire leaves. Large (5" to 10") white, pink, or purple flowers. Hybrid of *M. quinquepetala* (5) and *M. heptapeta* (7). Hairy buds, stipular scars, and smooth gray bark like all magnolias. Gets to be fairly large.

21-Lavalle Hawthorn, *Crataegus x lavalleyi*. Old tree. Leaves shiny dark green on top, finely pubescent beneath. Twigs very hairy at first but becoming glabrous. Fruit fairly large (5/8" to 3/4") pome; bright orange-red when mature. Hybrid of *C. crusgalli* and *C. pubescens*.

22-European Beech, *Fagus sylvatica*. Semi-fastigiata, contorted. Entire leaves or very small teeth. Zig-zag twigs. Smooth gray bark. Small nut in 4-part capsule (present).

23-Blue Spruce, *Picea pungens*. Often bluish needles; needles diamond shaped in cross section. Cones larger than Engelmann but smaller than white; scales with erose (toothed) margins; hang down. Rosette bud scales. Talk about female cones above, male below. Sharp spruces.

24-Norway Spruce, *Picea abies* var. 'Pendulum'. Norway spruce (weeping cv.). Cones 4-7" long. Branchlets often pendulous. Cultivars vs. species.

25-White Fir, *Abies concolor*. Fir cones upright (near tree top), disintegrate. Needles flat and white fir has longer needles than subalpine fir. Broader crown, blue instead of green color, and larger cones compared to subalpine. Flat, friendly firs.

26-Gambel or Scrub Oak, *Quercus gambellii*. Probably a hybrid (Cottam). In white oak group (rounded lobes, sinuses or no lobes; acorns mature in 1 season, glabrous inner shells rather than downy, warty caps; tyloses). Leaves smaller than white oak; tree often shrubby; root sprouts. Acorn short or no stalk.

27-Littleleaf European Linden, *Tilia cordata*. Smaller leaves, flowers, and fruit than American linden. Irregularly heart-shaped leaves. Check - *Tilia x euchlora* here or to the west (longer petioles, leaves non-glaucous underneath).

28-American Elm, *Ulmus americana*. Leaves glabrous or slightly rough on top, 4-6" long, unequal base (Siberians are equal). Samaras notched at tip, ripen in spring. Broken bark w/ alternating light and dark layers, black on bark from mildew from scale.

29-Scots or Scotch Pine, *Pinus sylvestris*. Butterscotch upper bark; twisted, blue-green needles, medium length; fairly small woody cones w/ no prickle.



30-Tree-of-heaven or Ailanthus, *Ailanthus altissima*. Leaves 1' to 2-1/2' long with 11 to 41 leaflets; musty smell when crushed. Coarse twigs. Flowers dioecious (some perfect). Smooth gray bark. Fruit a samara in bunches, orange-red when mature, wing with one seed.

31-Ginkgo or Maidenhair Tree, *Ginkgo biloba*. Fan-shaped leaves; dichotomous venation; on short spur shoots on older stems. Golden fall color. Dioecious. Gymnosperm.

32-European Hornbeam, *Carpinus betulus*. Somewhat broad crowned. Fruit a nutlet with distinctive 3-lobed bract in loose clusters. Leaves doubly serrate. Bark smooth and stem is sinewy.

33-Goldenchain Tree, *Laburnum x watereri*. Leaves trifoliolate (3 leaflets). Bright yellow flowers in clusters that hang down. Fruit a 1" to 2" long legume. Hybrid of *L. alpinum* and *L. anagyroides*.

34-Goldenraintree, *Koelreuteria paniculata*. Once pinnately compound leaves; leaflets toothed and can be deeply lobed. Flowers bright yellow in large bunches. Fruit a papery capsule with 3 hard black seeds.

35-Cork Oak, *Quercus suber*. Very thick, corky bark; ridged. Leaves with small, sharp serrations; no lobes. Acorns 1" to 1-1/2" long; scaly cap.

36-Mongolian Oak, *Quercus mongolica*. Leaves with large, rounded teeth to shallowly lobed. Bark thick and furrowed. Warty acorn cap.

37-European White Birch, *Betula pendula*. Bright white bark; not papery; with horizontal lenticels. Doubly serrate leaves; sometimes lobed (cut-leaved varieties). Fruit a nutlet in catkins.

38-European Hornbeam (2), *Carpinus betulus* var. 'Fastigiata'? Leaves doubly serrate. Bark smooth and stem is sinewy. Leaves doubly serrate. Compact, upright crown.

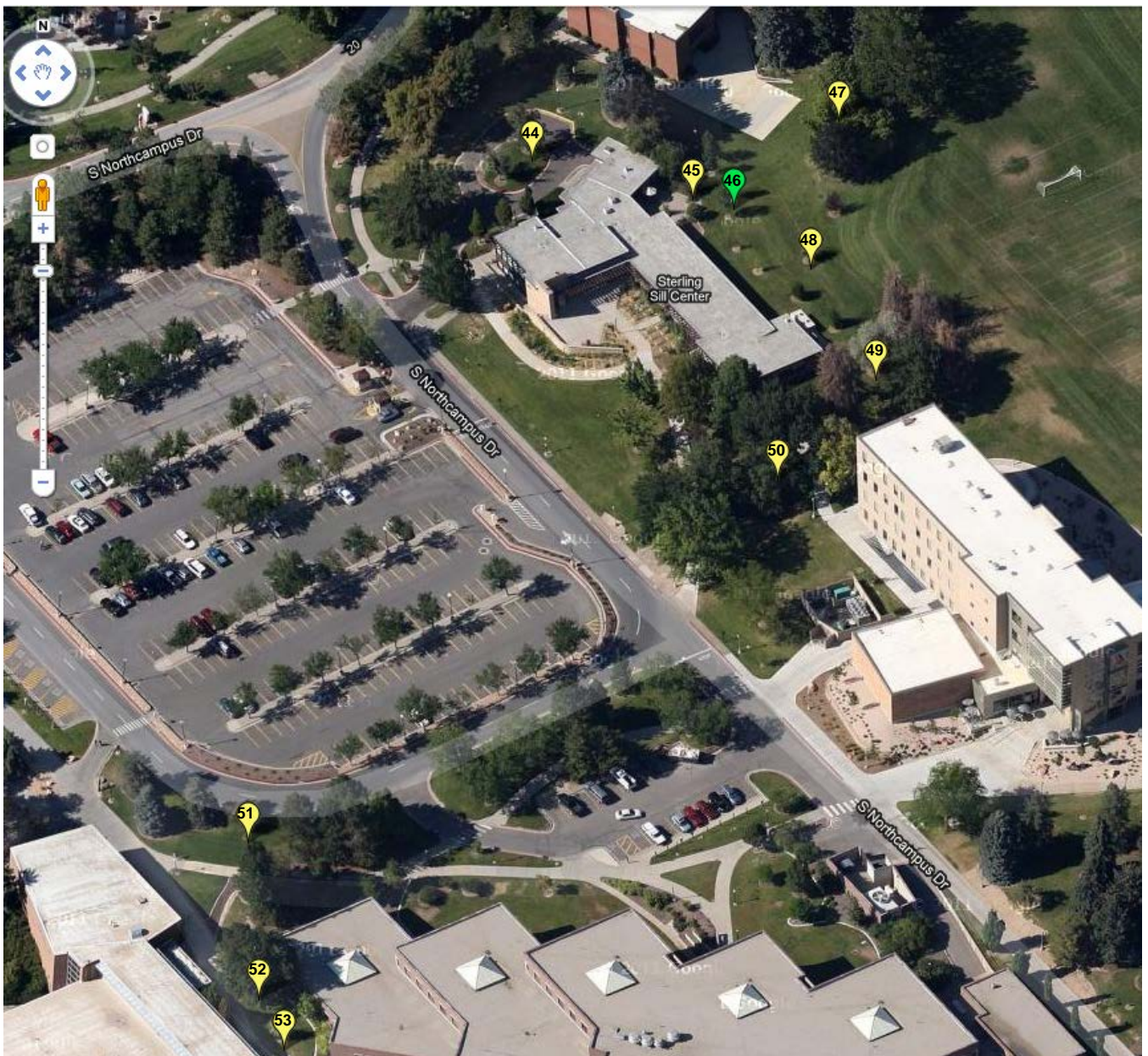
39-English Oak, *Quercus robur* var. 'Fastigiata'. Acorn with long peduncle (pedunculate oak). Earlobes on leaves. Fastigiate form.

40-White Mulberry, *Morus alba*. Leave smooth & shiny above, nearly glabrous below; white fruit. Red mulberry leaves scabrous above, hairy beneath, unlobed on old shoots; red to black fruit. Both are dioecious, so fruitless (male) varieties often planted.

41-Siberian Elm, *Ulmus pumila*. Very large. Leaves small (1-3" long), glabrous above, nearly equal base. Samara wing margin deeply notched at tip; ripens in spring. Bark gray, often stained by slime flux.

42-Black Locust, *Robinia pseudoacacia*. Has spines (modified stipules) vs. thorns (modified branches). Legume (fruit and nitrogen fixing). Fruit on ground. Interlacing bark. Borers.

43-White Ash, *Fraxinus americana*. Darker green leaves above and whitish below. Purplish fall color. Bark more distinctively cross-hatched. Leaf scar U-shaped with deep to shallow notch across top.



44-Sycamore Maple, *Acer pseudoplatanus*. Green buds in winter. Bark scaly and gray, flaking off to expose orange inner bark. Leaves sharply toothed, dark green. Samaras in 6-12" long, drooping panicles.

45-Common Smoketree, *Cotinus coggyria* var. 'Royal Purple'. Flowers tiny; fruit a small drupe. Flowers and fruit showy; held in clusters 6-8" across with hairy pink or purple stalks. Family story (Anacardiaceae - *Rhus*, *Pistacia*, *Toxicodendron*, etc.). Dioecious.

46-Dawn Redwood, *Metasequoia glyptostroboides*. Leaves opposite (baldcypress are alternate), deciduous. Fruit a 1" diameter, slightly elongated cone with 20-30 triangular scales

47-Horsechestnut, *Aesculus hippocastanum*. Leaves with 7 large leaflets. Flowers white to light yellow with red spots. Fruit capsule prickly with 1-3 kernels.

48-Yellow-Poplar or Tuliptree, *Liriodendron tulipifera*. Leaves 4-lobed with base and tip flat. Large yellow-green flowers becoming a tulip-shaped fruit (aggregate of samaras). Diaphragmed pith. Magnoliaceae.

49-Russian-olive, *Elaeagnus angustifolia*. Leaves silvery, scaly, margins entire. Fruit a 1/4-1/2" silver-yellow to reddish drupe. Twigs sometimes with spines. Twigs, leaves, and fruit covered with scales.

50-Bur Oak, *Quercus macrocarpa*. White oak group. Leaves lobed below middle and toothed above. Acorn cap fringed, surrounds half or more of acorn. Group of 7 trees.

51-European Mountainash or Rowan, *Sorbus aucuparia*. Compound leaves with serrate margins. Buds hairy; not sticky. Fruit a berry-like pome, 1/4-1/2" diameter, orange-red. Orange-red fall color.

52-Bur Oak, *Quercus macrocarpa*. White oak group. Leaves lobed below middle and toothed above. Acorn cap fringed, surrounds half or more of acorn.

53-Bigtooth or Canyon Maple, *Acer grandidentatum*. Like sugar maple but shrubbier or smaller. Leaf margins lobed, but lobe margins entire or divided into additional lobes. Fruit U-shaped samaras. Hard maple.



54-Sycamore Maple, *Acer pseudoplatanus*. Green buds in winter. Bark scaly and gray, flaking off to expose orange inner bark. Leaves sharply toothed, dark green. Samaras in 6-12" long, drooping panicles.

55-Spanish Fir, *Abies pinsapo*. Leaves dark green above and whitish beneath; short and stiff; not flattened in cross-section. Cones only 3/4" long.

56-Fastigiata European Beech, *Fagus sylvatica* var. 'Fastigiata'. Tightly fastigiata, with purple leaves. Entire leaves or very small teeth. Zig-zag twigs. Smooth gray bark. Small nut in 4-part capsule.

57-Incensecedar, *Calocedrus decurrens*. Scaly foliage clasping and flattened along stem in 4s; 1/4" long on youngest twigs, 1/2" long on older twigs; lateral pairs hide facial pairs. Cones 3/4" to 1-1/2" long with 6 (5 apparent) scales; 2 scales elongated and look like duck's bill. Somewhat narrow crowned.

58-Eastern Redbud, *Cercis canadensis*. Small tree with heart-shaped leaves with entire margins. Pink, pea-like flowers. Fruit a flattened legume 2-4" long. Gray to cinnamon-colored bark.

59-Mimosa or Silk tree, *Albizia julibrissin*. Flowers with many 1"+ long pink stamens. Fruit a thin, flattened, 4-6" long legume. Leaves doubly compound with 40-60 small leaflets.

60-Curleaf Mountain-mahogany, *Cercocarpus ledifolius*. Broadleaved evergreen; leaves last 2 years. Leaves with entire, revolute margins; leathery. Fruit a small achene with 2-3" long, hairy, persistent, corkscrewed style. Shrubby tree.

Botanical and Tree Glossary

Achene: small, dry and hard one-seeded fruit.

Acorn: nut-like fruit of an oak with a scaly or warty cap.

Alternate leaves: leaves arranged on alternating sides of the twig.

Angiosperm: class of plants that has the seeds enclosed in an ovary; includes flowering plants.

Annual rings: a layer of wood – including spring-wood and summer-wood – grown in a single season; best seen in the cross-section of the trunk.

Awl-like leaves: short leaves that taper evenly to a point; found on junipers and redcedars.

Berry: fleshy fruit with several seeds.

Bisexual flower: a perfect flower; a flower with organs of both sexes present.

Broadleaf: trees having broad, flat-bladed leaves rather than needles; also a common name for hardwoods.

Cambium: layer of tissue one to several cells thick found between the bark and the wood; divides to form new wood and bark.

Capsule: dry fruit that splits open, usually along several lines, to reveal many seeds inside.

Chambered pith: pith divided into many empty horizontal chambers by cross partitions.

Common name: familiar name for a tree; can be very misleading because common names vary according to local custom, and there may be many common names for one species.

Compound leaves: leaves with more than one leaflet attached to a stalk called a rachis.

Conifer: trees and shrubs that usually bear their seeds in cones and are mostly evergreen; includes pines, firs spruces, yews and Douglas Fir.

Cross-section: surface or section of tree shown when wood is cross-cut; shows the circular growth rings.

Deciduous leaves: leaves that die and fall off trees after one growing season.

Dichotomous key: a key to tree identification based on a series of decisions, each involving a choice between two alternate identification characteristics.

Diffuse-porous: a type of hardwood in which vessels in the spring-wood are the same size as vessels in summer-wood (maples, birches, poplars, etc.).

Dioecious: having unisexual flowers with staminate (male) and pistillate (female) flowers borne on different trees.

Drupe: fleshy fruit with a single stone or pit.

Elliptic: resembling an ellipse and about one-half as wide as long.

Entire margin: leaf margins that are smooth (not toothed).

Evergreen: trees and shrubs that retain their live, green leaves during the winter and for two or more growing seasons.

Family: group of closely related species and genera; scientific name ends in "aceae".

Forest ecology: study of the occurrence of forest plants and animals in respect to their environment.

Genus: a group of species that are similar; the plural of genus is genera.

Glabrous: Smooth, with no hair or scales.

Gymnosperm: large class of plants having seeds without an ovary, usually on scales of a cone; includes conifers and the ginkgo.

Hardwoods: usually refers to trees that have broad-leaves and wood made up of vessels; similar to angiosperms.

Heartwood: nonliving wood (often dark) found in the middle of a tree's stem.

Imperfect flower: a unisexual flower with either functional stamens or pistils but not both.

Inflorescence: the flowering portion of a plant.

Lanceolate: lance-shaped; about 4 times as long as wide and widest below the middle.

Lateral buds: buds found along the length of the twig (not at the tip); they occur where the previous year's leaves were attached.

Leaflets: small blades of a compound leaf attached to a stalk (rachis); without buds where they attach.

Legume: fruit that is a dry, elongated pod that splits in two, with seeds attached along one edge inside.

Lobed margin: leaf margin with gaps that extend more or less to the center of the leaf.

Lustrous: glossy, shiny.

Monoecious: having unisexual flowers with staminate (male) and pistillate (female) flowers borne on the same tree, though often on different branches.

Multiple fruit: fruit made up of a cluster of ripened ovaries that came from many separate flowers attached to a common receptacle.

Naturalized: nonnative trees that have escaped cultivation and are growing in the wild.

Needle-like leaves: very thin, sharp, pointed, pin-like leaves; found on pines, firs and some other softwoods.

Node: the point on a stem at which leaves and buds are attached.

Nut: hard, dry fruit with an outer husk that sometimes does not split open readily and an inner shell that is papery to woody.

Obovate: inversely ovate.

Opposite leaves: leaves arranged directly across from each other on the twig.

Orbicular: circular in outline.

Oval: broadly elliptic, with the width greater than one-half the length.

Ovate: having the lengthwise outline of an egg, widest below the middle.

Botanical and Tree Glossary (continued)

Palmately compound: compound leaves in which several leaflets radiate from the end of a stalk (rachis); like the fingers around the palm of a hand.

Perfect flower: a bisexual flower with functional stamens and pistils.

Persistent leaves: leaves that remain on the tree during winter.

Petiole: a slender stalk that supports a simple leaf.

Phloem: inner bark of a tree that carries food and sugars from the leaves to other parts of the tree.

Photosynthesis: process through which the leaves, with energy from sunlight, make food from water and carbon dioxide.

Pinnately compound: compound leaves in which leaflets are attached laterally along the rachis or stalk; leaves may be once, twice, or three-times pinnately compound.

Pistil: the ovary-bearing (female) organ of a flower.

Pistillate flower: a unisexual (female) flower bearing only pistils.

Pith: soft and spongy, or chambered tissue found in the middle of the stem.

Polygamo-dioecious: having unisexual flowers with staminate (male) and pistillate (female) flowers borne on different trees, but also having some perfect flowers on each tree.

Polygamo-monoecious: having unisexual flowers with staminate (male) and pistillate (female) flowers borne on the same tree, along with some perfect flowers on each tree.

Polygamous: Having some unisexual flowers and some bisexual flowers on each plant (can be polygamo-monoecious or polygamo-dioecious).

Pome: fruit with a fleshy outer coat and a stony layer (similar to plastic) within, with seeds inside the stony layer (apples, pears, etc.).

Pubescent: covered with hairs.

Rachis: the central stalk to which leaflets of a compound leaf are attached.

Radial-section: surface or section of a tree shown when wood is cut down its length straight through the middle.

Rays: ribbon-like groups of vessels, tracheids and fibers that move water and other substances in the xylem between inner and outer rings and the phloem; best seen in radial sections of the trunk.

Rhombic: with an outline resembling a rhombus (diamond-shaped).

Ring-porous: type of hardwood in which the vessels in spring-wood are much larger than vessels in summer-wood (oaks, ashes, elms etc.).

Samara: dry fruit with one or two flat wings attached to a seed (as on elms and maples).

Sapwood: living wood, often light colored, found between the bark or cambium and the heartwood, usually darker colored.

Scale-like leaves: small, short, fish-scale-like leaves which cover the entire twig; found on juniper and redcedar.

Scientific names: Latin-based names used world-wide to standardize names of trees and other plants and animals.

Semi-ring-porous: type of hardwood in which the vessels in the spring-wood are somewhat larger than vessels in summer-wood; between diffuse-porous and ring-porous (black cherry, black walnut, etc.).

Serrate: with teeth.

Shade intolerant: trees that need a lot of sunlight for growth and survival.

Shade tolerant: trees that can tolerate less sunlight for growth and survival.

Shrub: low-growing woody plant with many stems rather than one trunk.

Simple leaves: leaves with one blade attached to a petiole, or stalk.

Sinus: a recess between two lobes.

Softwoods: usually refers to trees that are conifers or cone-bearing; conifers generally have softer wood than angiosperms or hardwoods, but there are many exceptions.

Solid pith: pith that is not divided into chambers.

Species: trees with similar characteristics and that are closely related to each other; species is used in both the singular and plural sense (specie is not proper).

Spring-wood: wood on the inside of an annual ring, formed during the spring; cells are often thinner-walled.

Stamen: the pollen-bearing (male) organ of a flower.

Staminate flower: a unisexual (male) flower bearing only stamens.

Strobile: a cone or inflorescence with overlapping bracts or scales.

Summer-wood: wood on the outside of an annual ring, formed during the summer; this wood is sometimes dark and cells are often thicker-walled.

Tangential-section: surface or section of a tree shown by cutting a tree lengthwise, but not through the middle.

Terminal buds: bud appearing at the apex, or end, of a twig; usually larger than other lateral buds.

Toothed/serrated margin: leaf margin with coarse, fine, sharp or blunt teeth.

Tracheids: small-diameter tubes in the wood of trees that carry water from the roots to the leaves; water carrying tubes in conifer xylem are all tracheids.

Tree: a woody plant with one to a few main stems and many branches; usually over 10 feet tall.

Unisexual flower: an imperfect flower; a flower with organs of only one sex present.

Vessels: large-diameter tubes in the wood of hardwood, or angiosperm, trees that carry water from the roots to the trees.

Xylem: the wood of a tree, made up of strong fibers, tracheids and vessels.

Plant Taxonomic Levels*, Maple Example

Kingdom Plantae (Plants)

Division Magnoliophyta (Angiosperms; flowering plants)

Class Magnoliopsida (Dicotyledons)

Subclass Rosidae (many orders; showy flowers)

Order Sapindales (many families – citrus, cashew, etc.)

Family Aceraceae (2 genera – *Acer*, *Dipteronia*)

Genus *Acer* (120 species of maples)

Species *Acer grandidentatum* (canyon maple)

Variety 'Rocky Mountain Glow'

*These vary a lot by what source you look at.

Family

-Always end in "aceae" (pronounced ay-cee-ee)

-Usually also a common name

-Not italicized

-Named for most typical genus – Aceraceae (*Acer* – maples), Pinaceae (*Pinus* – pines; also *Abies*, *Picea*, *Larix*, etc.), Fagaceae (*Fagus* – beeches; also *Quercus*, *Castanea*), Cupressaceae (*Cupressus* – cypresses; also *Juniperus*, *Chamaecyparis*, *Thuja*, *Calocedrus*)

Latin or Scientific Names, Binomials

-2 part name – Genus + species; together called Latin name or binomial, or species

-Example *Pseudotsuga menziesii*

-Latin for consistency; one agreed-on name for each species

-Latin from features, geography, discoverers, etc. – pseudo = false, tsuga = hemlock genus, Archibald Menzies first described the species

Common Names

-If hyphenated or run together often indicates misleading common names – Douglas-fir, boxelder, mountain-ash, etc.