

Studies in Botany No. 12
OREGON STATE MONOGRAPHS

A wintertime key to deciduous trees and shrubs of
northwestern Oregon and western Washington

Plates I-XIV, inclusive by
Patricia L. Packard

Other drawings by
Helen M. Gilkey

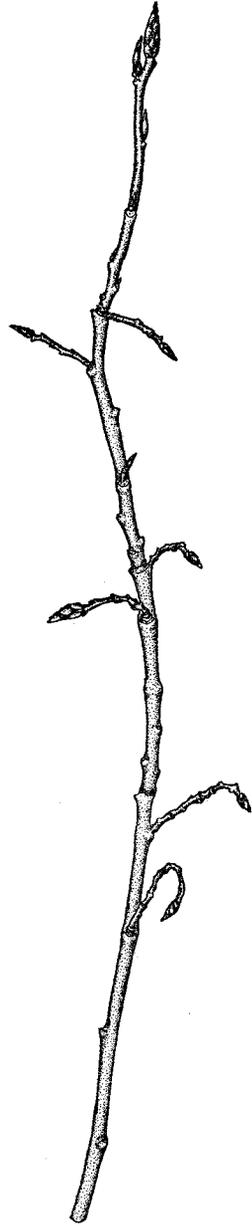
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Winter Twigs

by

HELEN M. GILKEY

PATRICIA L. PACKARD



OREGON STATE MONOGRAPHS

Studies in Botany

FRANK H. SMITH, *consulting editor*

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Winter Twigs

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A Warning

A student of the woody plants of an area inhabited by Poison Oak should, before making indiscriminate collections of twigs, have this species pointed out to him, and should become thoroughly familiar with it in all its aspects, in order that he may avoid contact with it. For, although in this manual it is keyed with other species, it is not safely handled and studied at close range, the poisonous principle being active in winter as well as in summer.

At all times of the year, Poison Oak is conspicuous. In the open, it grows as a bushy shrub often reaching 8 feet in height; while in margins of woods it may climb the trunks of trees for 30 feet or more, the stems attaching themselves, by small aerial roots, to the bark. The leaves in summer are characterized by 3 (very rarely 5) shining green, usually irregularly-margined, leaflets. In autumn the foliage becomes brilliantly colored, with scarlet or carmine hues predominating. When the leaves have fallen, many of the shrubs or vines bear conspicuous and often dense clusters of flattened and grooved gray or ivory seed cases. Many of these remain for much of the winter, though rodents harvest and store quantities of them.

Since some flowers are functionally sterile, the crop of fruits may vary from plant to plant, some plants bearing none. Therefore it is important to recognize the vegetative characters in winter, as described and illustrated in this manual.

The twigs are grayish or ashy-brown, and minutely ridged and pebbled. The shrubby form of Poison Oak is much branched but with the branches tending to be parallel to the main stems, the entire shrub thus appearing broom like. The buds are small and



naked, appearing as tiny fuzzy tufts. Even in these shrubby forms, clusters of aerial roots, like those used by the climbers for support, are sometimes found at the nodes of stems, though functionless here. The plants are capable of standing erect on their own, but are ready for the emergency of close proximity to a tree which could serve as a convenient means of support.

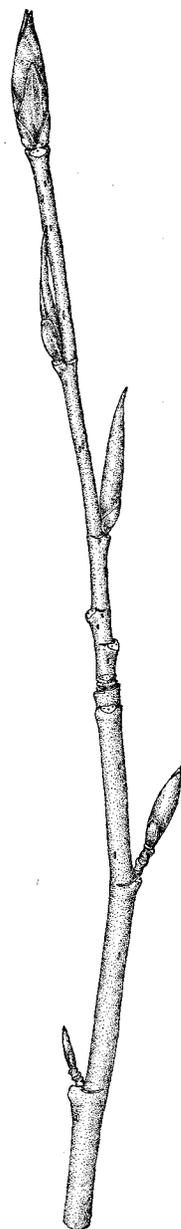
The poisonous principle which may cause severe skin eruptions can be acquired not only by direct contact with the plant but also from clothing or other objects which have been in contact with it. Smoke from burning Poison Oak may produce a violent reaction.

Some persons appear to be immune; but such apparent immunity is not necessarily completely or continually dependable. Extreme caution, therefore, should be exercised by all persons engaged in field work within Poison Oak territory.

In passing, it may be emphasized that, in spite of its misleading common name, Poison Oak is not an oak and has no relationship to this family. The Sumac family, to which it belongs, contains other poisonous species, notably Poison Sumac and the species from which certain oriental lacquers are derived. To its credit, however, it contains, also, the useful Cashew, Pistachio Nut, and Mango.

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Preface

The following key with its illustrated descriptions is designed for identification, in their winter condition, of the native and naturalized deciduous trees and shrubs of north-western Oregon and western Washington. In addition, since plants are no respecters of artificial geographical boundary lines, it is hoped that the material contained in these pages may be found useful, in part, in British Columbia and Alaska as well.

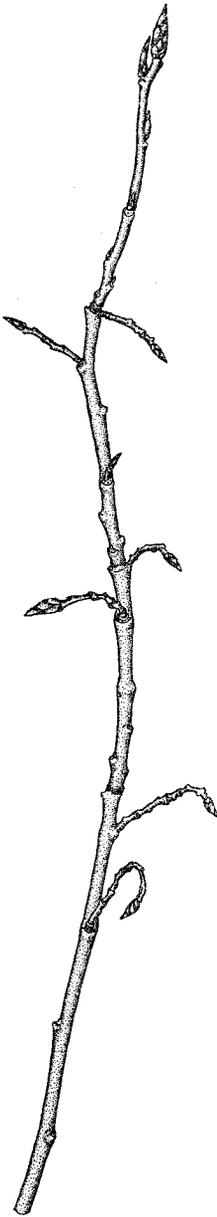
Wherever possible, without an undue burdening of the key, certain characters applicable throughout the year have been added in order that it can be utilized, also, in identifying plants in leaf. Technical terms have been kept to a minimum, with a glossary supplied to cover those employed. No special equipment for use of the key is required except a pocket knife, a razor blade, and a small hand lens of 8X or 10X magnification for determining plant characters.

The aim has been to include all native deciduous woody plants likely to be encountered in the designated area, also the more common escapes from cultivation. Added to these are certain species which are normally evergreen but, during an unusually severe winter, are tardily deciduous. In all, 82 species representing 35 genera of 17 families are covered, with keys to all species which can readily be separated by definite winter characters. In several genera, notably *Salix* (willows) and *Rosa* (roses), forms are sometimes interpreted with difficulty even by the help of flowers and leaves, since hybridization is common and intermediate combinations are frequent. Because of the intergrading characters and the often doubtful species limits, no vegetative separation is here attempted in *Salix*.

Limits of the Area, and Vegetative Distribution

The area covered in this manual lies between the crest of the Cascade Mountains and the Pacific Ocean, and from the Canadian border southward to the Umpqua Divide in southern Lane County, Oregon. Naturally, however, though these constitute somewhat logical boundaries, many of the species here treated spread widely into surrounding territory.





The general climate of the area is of direct or modified maritime influence. The boundaries selected, plus the north-south intrusion of the Coast Range, roughly divide the region topographically and climatically into four sub-areas which represent extreme delimitation of certain species; of others, merely denoting their relative abundance.

The narrow coastal strip along the western margin of the region is subjected to direct maritime influence of soil salinity and wind, and receives the heaviest rainfall. The woody Angiosperms contain many evergreens. Inland lies the Coast Range which throughout its extent does not attain great altitude, its highest point, Marys Peak in Benton County, Oregon, rising only 4,097 feet. This range is chiefly a coniferous area; its larger deciduous trees, mainly Red Alder (*Alnus oregona*), Big-leaf Maple (*Acer macrophyllum*), and Oregon Ash (*Fraxinus latifolia*) being confined largely to river or creek valleys. The upper slopes of the higher peaks offer habitats for species approaching subalpine forms which, in a few instances, are narrowly endemic. For example, Copper Rhododendron (*Cladodammus pyrolaeiflorus*), is, so far as known in Oregon, restricted to Saddle Mountain in Clatsop County. Sporadically it occurs in the Cascade Range in Washington.

Between the Coast Range and the Cascade Mountains is a wide somewhat less humid area, in Oregon occupied largely by the broad Willamette River Valley with its tributaries; and, in Washington, penetrated nearly half its length by the southward-reaching fingers of Puget Sound. In neither state is the area homogeneous. Modifications in soil, exposure, and other factors, result in localized concentration of vegetation adapted to the particular circumstances. Throughout much of the area, deciduous woody plants abound where conditions are favorable to their perpetuation. Where the native vegetation has been disturbed by settlement and agriculture, a number of introduced species have become naturalized.

The eastern edge of this area merges into the western slope of the Cascade Range. Though this section is more humid than the valleys below, the rainfall is less heavy than in the Coast Range. Consequently the forests are more open and shrub development is considerable. Elevation reaches to more than 14,000 feet, creating a variety of conditions. The number of deciduous species is large, but includes no narrowly-limited endemics.

Introduction

The logical time of year to become acquainted with deciduous trees and shrubs—that is, those which normally drop their leaves in autumn—would seem to be spring or summer when they are readily recognizable by their flowers and fruits. But winter is far from the sterile season which it superficially appears. In fact,

When winter woods are leafless and bare,
And Nature is stripped of her splendor;
When twigs and branchlets stand out 'gainst the sky
Graceful and dark and slender . . .

we may find the most stimulating conditions for such study since our ingenuity is pitted against more subtle characters, but just as definite indicators, of a plant's identity as are blossoms and seed pods.

Winter characters of deciduous woody plants test and develop one's powers of observation in the field. The *habit of growth* of a tree or shrub includes its typical height, spread, and contour, as determined by its type of branching; and these characteristics constitute an important first observation. The bark records its signature, as it were, and by the expert woodsman can clearly be read. In winter, too, remains of former flower clusters and seed cases may still, here and there, be found in position; while the ground beneath should yield valuable hints in the fallen leaves—weathered and perhaps skeletonized but still identifiable—and whatever portions of fruits may have survived the elements

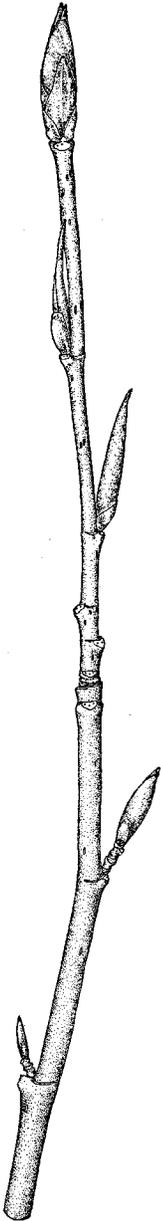
But the twigs, themselves, though denuded, generally offer sufficient information for accurate identification; and upon them the accompanying key is based. In it, technical terms are reduced to a minimum, but are employed in cases where they best serve a need. A glossary in which all such words here used are defined is provided in the back of this manual; and it is recommended that it be freely used. In passing, it should be noted that, in order to avoid constant repetition, the term "woody plants" may frequently be substituted in these pages for "trees and shrubs."

Following is a discussion of the characters most commonly used in the key.



Characters Used in Identification

Twigs and Buds



A twig is a terminal portion of a main stem or a branch, and constitutes the growth of from one year to several years. Typically, at the tip, a twig bears a *terminal bud* (exceptions will be noted later); while on the sides of the twig are borne the *lateral buds*. The place on the stem where a typical lateral bud is located is called a *node*, the portion of stem between any two nodes being an *internode*.

Functionally, the buds of woody plants are of two main kinds commonly called *leaf buds* and *flower buds*. The term "leaf bud" is somewhat of a misnomer since it produces not a leaf alone, but a leafy twig (shoot) similar to the one which bore it. Thus the leaf bud contains rudiments of both leaves and stem.

Positionally, a leaf bud may be *terminal* or *lateral* on the stem. A twig's annual increase in length normally originates with a terminal leaf bud formed at the close of the preceding growing season; while its branches develop from last year's lateral leaf buds. Thus a branch is usually a year younger than its parent shoot. In exceptional cases, however, of which Chittim (*Rhamnus purshiana*) is one, an occasional branch may grow from the axil of a rudimentary leaf *within* the terminal bud, the shoot and its branch therefore developing concurrently.

A *flower bud* contains an embryonic flower or inflorescence and, consequently, fruit; and here, too, a portion of stem is involved. Flower buds, also, may be either terminal or lateral or both.

A third kind of bud, which in reality is a composite of the other two, is sometimes found. This is the *mixed bud*, which bears rudiments of both leaves and flowers, as well as stem. An example is the large terminal bud of Big-leaf Maple (*Acer macrophyllum*) from which emerges a raceme of flowers and a short leafy continuation of the stem.

During the course of typical growth in woody plants when, by the end of a season, a terminal bud has been formed, increase in length of that twig for the current year automatically stops,—sealed off, as it were, by the presence

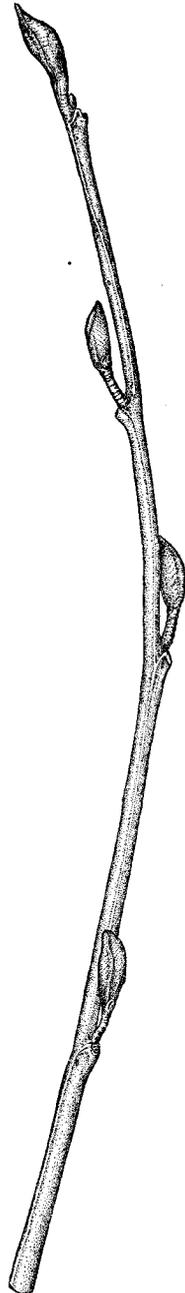
of the bud. This is called *determinate growth*. In certain trees and shrubs, however, notably Willow (*Salix*) and Western Huckleberry (*Vaccinium*), growth in length continues as long as conditions remain favorable. When these cease, no terminal bud is formed but the twig dies back at the tip, leaving no heir, so to speak, to carry on the following season's extension. Because of its indefiniteness, such growth is labeled *indeterminate*. Often the stem dies back to the nearest lateral bud, breaking off at that point and leaving either a recognizable stem scar or merely a withered remnant. The involved lateral bud typically assumes the function of the nonexistent terminal bud, carrying on, during the subsequent growing season, a pseudo-continuation of the twig. But the stem scar or remnant reveals what actually occurred, as does a generally obvious misalignment of the twig at this point.

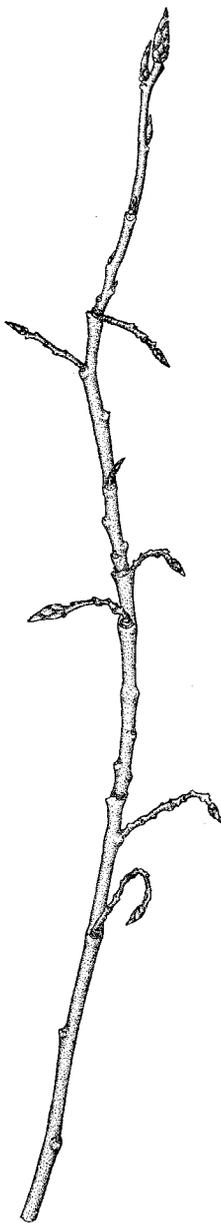
Leaf Scars and Bundle Scars

Leaf and bundle scars provide valuable data for winter identification of deciduous trees and shrubs; and it is logical, therefore, before discussing these, to consider briefly the organ which forms them.

A typical leaf consists of three component parts, namely: (1) a generally expanded portion called the *blade*; (2) a stalk known as the *petiole*; and (3) subtending the base of the petiole, a pair of usually small structures, the *stipules*. Of these, the stipules are generally the least conspicuous, though in cases—for example, certain willows and many members of the rose family—they are in evidence. Very rarely, but never in the native woody plants of our area, they predominate and take over the function of the blade. More frequently the stipules are absent or minute.

The petiole may be present or absent. If no petiole is present, the leaf is described as *sessile*. The blade in different species varies greatly in form; but whatever its shape, it is generally to some extent expanded and thus adapted to carry on its function of manufacturing food, in the most favorable exposure to sunlight. In exceptional cases the blade may be suppressed, the petiole substituting for it. Examples are the co-called simple-leaved acacias which are grown, particularly southward, as ornamentals. Again, however, this





condition is not found in native trees or shrubs of our area.

Leaf blades may be simple (undivided) or compound (divided into leaflets); but since this condition will have little to do with winter identification of twigs, it needs no further discussion here.

In winter, beneath a lateral bud at each node is found a *leaf scar*. Perhaps as good a definition as any for this structure was once written in an examination paper by a freshman: "A leaf scar is a scar that a leaf leaves when the leaf falls off in the fall." Whether this was composed innocently or by design, the instructor will never know, but at least it expresses the situation. A lateral bud is developed in the axil of a leaf. When the growing season approaches its end in late summer, a thin layer of more or less brittle cells, the *absciss layer*, is formed across the base of the leaf in the area of its attachment to the stem. Here the leaf naturally becomes detached, leaving on the stem below the bud a generally clean-cut scar shaped like the base of the petiole (or of the blade, in case of a sessile leaf). Sometimes a lesser scar can be seen at each side of the leaf scar. This pair of scars remains after falling of the stipules. In some cases, however, the stipules are merged with the petiole base, and thus leave no separate scars. Examples are found in many members of the rose family.

Within the leaf scar are usually to be seen scars of the leaf veins where they became detached from the food-and-water distributing system of the stem. These scars, called *bundle scars*, occur generally in the form of slightly raised dots or bars, and their number is often specific for a given species. The leaf scars of many species contain respectively 3, 5, or 7 bundle scars arranged in a more or less curved line. In most cases the bundle scar is simple; but in others, at least the central scar is compound; while in still others, the bundle scars may be indefinite in number and variously arranged.

Sometimes the bundle scars are obscured by the shriveling of the leaf scar, or by the presence of a ragged margin, the latter due to an incomplete formation of the absciss layer, or to complications involved in the presence of a secondary absciss layer. In such case, the scar may not be clean-cut. Examples are found in the genus *Rubus* which includes blackberry, thimbleberry, salmonberry, and related species. In these cases, a thin slice of tissue should be removed by a razor, to expose the bundle scars.

Arrangement of Buds

In respect to arrangement, lateral buds may be *opposite* or *alternate*. *Opposite buds* occur in pairs at a node, half the circumference of the stem apart, each succeeding pair occurring at right angles to the one below (1).

Alternate buds are arranged spirally around the stem (2), with a single primary axillary bud at the node. (The alternate arrangement is sometimes also called *spiral*.)

Since each primary lateral bud is borne above a leaf scar, it is obvious that the leaves carried the same arrangement—that is, opposite or alternate. A third arrangement, which occasionally occurs in woody plants, shows several buds forming a circle at each node. This is called the *whorled* arrangement, but since it does not occur in native trees or shrubs of our area, it will not be discussed further here.

Alternately arranged lateral buds generally occur singly at a node. But in certain species with either alternate or opposite arrangement, extra buds (*accessory* or *super-numerary*) are sometimes found at a node. These may be *superposed* (above the primary bud) (3) or *laterally multiple* (in horizontal line with it) (4). Both arrangements sometimes occur in Elder.

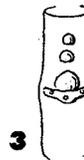


Bud Scales and Bud Scars

The leaf and flower rudiments in a bud may be protected by scales, in which case we find a *scaly bud*; or, if scales are absent and the young leaves or flowers are apparent from the first, the bud is termed *naked*. Naked buds are less common in temperate regions, but are present in Chittim (*Rhamnus purshiana*) and Poison Oak (*Rhus diversiloba*) in our area.

In the currants and gooseberries (*Ribes*), in most of our native woody Rosaceous plants, and in our maples (*Acer*), the bud scales are modified petioles, frequently bearing leaf-blade rudiments at their tips. Stipular scales are found in native species of *Ceanothus*; while the scales of Alder (*Alnus*) are entire leaf blades, retaining their identity in spite of extreme modification in structure. There is often successive transition from outer modified to inner unmodified leaves, as in *Acer macrophyllum*.

Obviously, due to their origin, bud scales follow the





same arrangement, in any given plant, as the foliage leaves. That is, bud scales of opposite-leaved plants, such as the maples, are paired and opposite; while those of alternate-leaved Hazel, for example, are single and alternate. Extreme suppression of internodes in most buds often obscures the true arrangement, and it can be ascertained only by close examination.

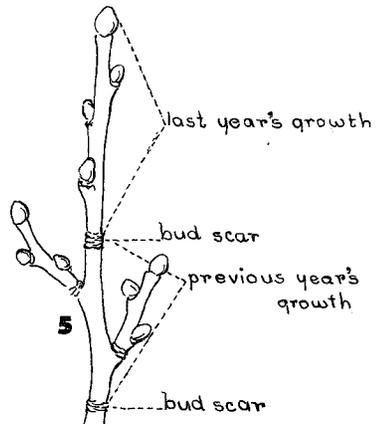
Since, as we have seen, bud scales are modified leaves or parts of leaves, primitively they may bear buds in their axils. This function has been retained in some native species of *Rubus*, *Acer*, *Sambucus*, and other genera; but such buds generally remain rudimentary.

A few trees—for example, willows—appear to have a single scale covering each bud. In most trees, however, several to many scales are present, the outer often thick and stiff, sometimes gummy; the inner scales becoming progressively softer, and often hairy or woolly. The scales protect the delicate rudimentary structures primarily from loss of water by evaporation; also, perhaps, but to a lesser degree, from mechanical injury or from sudden sharp changes in temperature.

In most cases, as in our maples, the inner scales develop for a time with the shoot, often reaching an inch or more in length before finally falling. Such scales are said to be *accrescent*.

After bud scales have served their purpose, they generally become detached and drop off, leaving usually cleanly-marked scars; though, in some cases, remnants of scales may remain for several years. Since the buds of most species are protected by several scales which occur in close proximity to each other, with practically no internodal elongation between them, the scars appear grouped; and since each group represents a single bud, it is called a *bud scar*. The term is of course somewhat erroneous because merely the scales, not the bud proper, became detached. But through long usage the term has become accepted, for want of a better.

Since the location of each so-called bud scar indicates

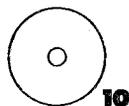
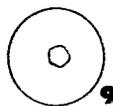
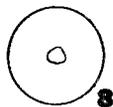
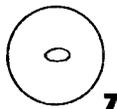
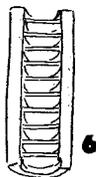


the beginning of the following season's growth, it is obvious that the age in years of most twigs can be determined by the number of growth intervals separated by bud scars (5). In those woody plants which produce no terminal bud, there is of course no terminal bud scar, and age determination by this means is impossible. An example is Willow; but here the annual *stem scar*, usually accompanied by a misalignment of the twig at the beginning of each new season's growth, is a usable substitute.

The Pith

Characters of the pith are useful in identification. In Alder, for instance, the pith of the twig is very large in comparison with the wood. In Indian Peach (*Osmaronia cerasiformis*), a longitudinal section of the stem reveals a somewhat rare arrangement of the pith in parallel plates. Such a pith is designated *lamellate* or *chambered* (6). The pith of the currants and gooseberries, while not regularly lamellate, often contains noticeable spongy areas.

The shape of the pith in cross-section likewise is useful. It may be oval (7); 3-angled (8); 5-angled (9) or more; round (10); or obscure. In determining pith shape, a stem must be cut cleanly across, and examined by aid of a hand lens. A useful method is to make a thin cross-sectional slice of the stem, and to place it on a dark background for examination by the lens.



Phyllotaxy

The arrangement of leaves, and consequently of leaf scars, on the twig is known as *phyllotaxy*. It is constant for each species and usually, also, for all species of a genus. The phyllotaxy of opposite-leaved plants is uniformly *decussate*, the plane of each pair being at right angles to the plane of the pair immediately above or below, bringing the leaf scars into four vertical ranks.

Alternate leaves are arranged spirally on the twig. A line drawn from one leaf scar to those successively above or below, will spiral around the stem, any two leaf scars being separated from each other by an equal portion of the circum-



ference of the stem. This is not always obvious, since most stems twist to some degree while growing.

The two-ranked arrangement most widely distributes the leaves, the second scar being on the opposite side of the stem from the first, the third directly in line with the first. In this case, the phyllotaxy is written as $\frac{1}{2}$, expressing the arc or portion of the circumference between two successive leaf scars. Also, the numerator equals the number of turns made around the stem by one cycle of leaf scars (one turn in this case); while the denominator expresses the number of leaf scars in each cycle, which is synonymous with the number of ranks on the stem. No woody plants in our area have this natural two-ranked arrangement; but the horizontal branches of Hazel (*Corylus*), by twisting of the stem to obtain full benefit of the sun on its foliage, often assume a two-ranked position.

Alder (*Alnus*) is three-ranked, one cycle of leaf scars containing three members and making one turn around the stem, the phyllotaxy thus expressed as $\frac{1}{3}$. The most common arrangement is five-ranked, each cycle containing five members and making two complete turns around the stem, the phyllotaxy thus expressed as $\frac{2}{5}$. In this case, the arc between any two successive leaf scars is two-fifths the circumference of the stem, and the sixth leaf scar is in line with the first.

Description of the Key

The Diagnostic Key which follows is a device used to determine the scientific name of each tree and shrub included in this manual, and is based on comparisons of characters which can be seen in winter. The scientific name of a plant is a *binomial*, i.e. it consists of two words as *Rhus diversiloba* (p. 13). The first word of each binomial is the *genus* (plural, *genera*) and always begins with a capital letter. The second word (*diversiloba*, in this case) is the *species* (this word is both singular and plural) and, as used by most authors, is never capitalized. (Note: Certain exceptions are permitted, but not required, by current international botanical rules.)

Since, unlike scientific names, common names are subject to no rules and hence may vary from one locality to

another, they are disregarded in the Key; but at least one common name for each species is included in the text.

It will be noted that when more than one species in a given genus is included, a twig is keyed first to the genus which is capitalized throughout. Example, CEANOTHUS, (p. 13). Immediately following this, the Key is extended to species, with the generic name merely initialed, thus: *C. integerrimus* and *C. sanguineus*.

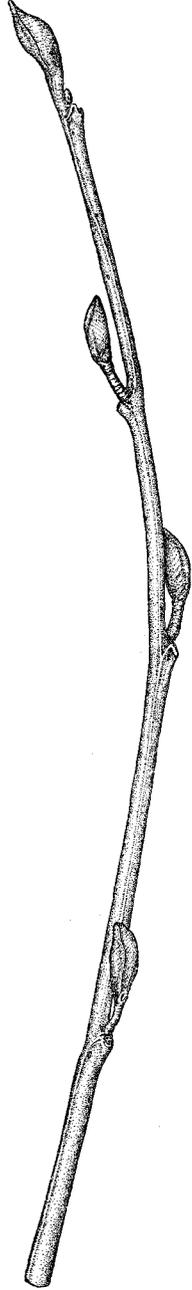
The occasional parenthetical numbers found within the body of the Key and in preceding pages of the introduction, refer to correspondingly numbered marginal illustrations.

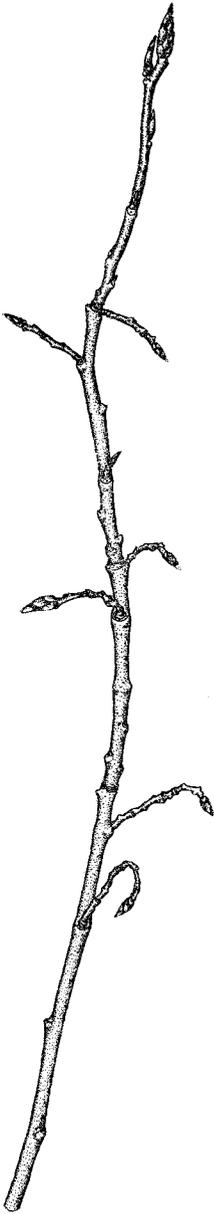
Following the Diagnostic Key, the species are catalogued under families and genera, and described in detail in winter aspect. Below the accepted name of each is cited the publication in which it first appeared, together with other names (*synonyms*) which it may have received. These synonyms, now rejected, arose through differences in interpretation of species boundaries, or as a result of different conclusions reached by various taxonomists working independently of each other.

How to Use the Key

The Diagnostic Key, for determination of the genera and species of trees and shrubs included in this manual, is based on comparisons of plant characters. As will be noted, each character used is paired with its opposing character, as *a* and *b* under, in each case, the same number, thus: 1a Leaf scars alternate, 1b Leaf scars opposite; 2a Buds naked, 2b Buds scaly; etc.

Now, with a twig before you, first note the arrangement of leaf scars. If they are alternate (check this term with its definition in the glossary), then pass to number 2. If the bud is enclosed within scales, it belongs under 2b. The first number under 2b is 4, and you must here decide whether the buds are (4a) *stalked* and with *continuous dense* pith, or (4b) *sessile* (or, if stalked, with *spongy* pith). If stalked and with dense pith, pass to 5. Granted that no errors have been made up to this point, the pith in cross-section will be either *round* (5a) or *3-armed* or *3-angled* (5b). (The determination of this character may require careful sectioning and examination.) If the pith is unmistakably round in cross-section, your tree or shrub should, according to the





Key, belong to the genus *Ceanothus*; and, by comparing 6a and 6b, you may identify it as to species.

In order to verify your conclusion, now turn to the description of *Ceanothus* and its species, and read each carefully. If an error appears to have been made and your plant does not agree with the description, go back to the beginning and retrace each step. In most choices, as between *leaves alternate* and *leaves opposite*, there is no possibility of error. But certain characters may appear somewhat obscure as, for example, in 4a and 4b. A bud may be so very short-stalked that with almost equal accuracy it may be termed sessile; or, if there is no question on this point, the texture of the pith may offer difficulties of interpretation. In a case of uncertainty such as this, it is of value to continue further in the Key, under both 4a and 4b, before drawing a conclusion.

Briefly, then, the procedure in using the Key is this: Begin at the beginning. Reconcile your plant with either 1a or 1b. Under the appropriate choice, pass to the next figure and again choose between *a* and *b*. Continue this process until the plant is satisfactorily placed. The process may very quickly lead to the correct name, as in *Rhus diversiloba*; or arrival at the name may involve the entire key, as in *Cornus occidentalis*.

It must be borne in mind that the accompanying Key includes only *native* or commonly naturalized trees and shrubs of the prescribed region. Attempted identification, by this Key, of ornamental or economic species which have not "run wild" could lead to strange and disappointing results. Also, species which have become naturalized in strictly localized areas may not be included.

It is hoped that with care in examination of the specimens to be identified, and with free use of the glossary and illustrations, even the beginner may be able to name most of the common deciduous trees and shrubs of northwestern Oregon and western Washington.

The Diagnostic Key

(Numbers in parentheses refer to marginal illustrations.)

Page



11

- 1a. Leaf scars alternate (11) (See page 17 for 1b)
 2a. Buds naked (12)
 3a. Leaf scars broadly V- to U-shaped; bundle scars 5
Rhus diversiloba 66
 3b. Leaf scars rounded; bundle scars 3
Rhamnus purshiana 72



12

- 2b. Buds scaly (13)
 4a. At least the flower buds short-stalked; or if buds not stalked, the pith continuous, very minute, and 3-angled in cross-section; pith dense
 5a. Pith round in cross-section.....CEANOTHUS 73
 6a. Bud scales narrow, largely exposing the densely pubescent leaf rudiments*C. integerrimus* 73
 6b. Bud scales broad, completely covering the leaf rudiments..... *C. sanguineus* 73



13

- 5b. Pith 3-armed or 3-angled in cross section
 7a. Fruiting structures woody, cone-like, persisting through the winter; buds conspicuously stalked
 ALNUS 21
 8a. Buds mostly dull red; next season's catkins present during the winter on the preceding year's growth; peduncles shorter than the "cones"; bark smooth, gray
 9a. Old leaves with revolute margins
A. oregona 21



14

- 9b. Old leaves with plane margins
A. rhombifolia 22
 8b. Buds dull purple; next season's catkins appearing with the leaves on the spring growth; peduncles longer than the "cones"; bark scaly, brown.....*A. sinuata* 22



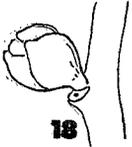
15

- 7b. Fruiting structures not woody or cone-like, and not persisting through the winter; buds not conspicuously stalked.....BETULA 23
 10a. Large tree; the bark peeling in papery sheets.....*B. papyrifera* var. *commutata* 23
 10b. Shrub, 3 to 12 ft. tall; bark not peeling in papery sheets....*B. pumila* var. *glandulifera* 26

- 4b. The buds not stalked; or, if short-stalked, pith coarsely spongy on drying, and neither very minute nor 3-angled in cross section
 11a. Lowermost (or the single) bud scale directly over the leaf scar (14)
 12a. Bud scale single, sac-like.....SALIX 19
 12b. Bud scales several, not sac-like.....POPULUS 19
 13a. Buds over 1/2 in., resinous and fragrant
P. trichocarpa 20
 13b. Buds under 1/2 in., averaging 1/4 in., scarcely resinous*P. tremuloides* 20
 11b. Lowermost bud scale lateral over leaf scar (15)

	Page
14a. Buds globose, sessile, often appearing 2-ranked on horizontal branches; scales papery, brown.....	<i>Corylus cornuta</i> 27
14b. Buds not as above, and never appearing 2-ranked	
15a. Bundle scars more than 7	
16a. Shrub, densely spiny; bundle scars in a single series	
<i>Oplopanax horridum</i>	76
16b. Tree, or rarely shrubby; bundle scars obscure, grouped.....	QUERCUS 27
17a. Bud scales glabrate.....	<i>Q. kelloggii</i> 28
17b. Bud scales downy.....	<i>Q. garryana</i> 27
15b. Bundle scars 7 or fewer, sometimes indistinguishable on shriveled leaf scars	
18a. Bundle scar 1 (See page 15 for 18b)	
19a. Bark of older twigs exfoliating in long thread-like shreds	
20a. Leaf scar often torn, the bundle scar projecting; twigs glabrous	
<i>Cladothamnus pyrolaeiflorus</i>	78
20b. Leaf scar clean, bundle scar flush with surface; twigs minutely tomentose, and with scattered stalked glands.....	<i>Menziesia ferruginea</i> 79
19b. Bark of older twigs not long-shreddy but, in <i>Spiraea</i> , sometimes exfoliating by thin plates	
21a. Leaf scars not sharply triangular, slightly raised.....	VACCINIUM 79
22a. Twigs sharply winged or angled	
23a. Stems winged	
24a. Buds pointed, their tips diverging (16); shrub 4 to 12 ft.; coastal, or at low altitudes in the Coast Range and Cascade Mountains	
<i>V. parvifolium</i>	83
24b. Buds appressed (17); shrub $\frac{1}{2}$ to 1 $\frac{1}{2}$ ft., diffusely branched; medium to high altitudes in the Cascade Mountains.....	<i>V. scoparium</i> 83
23b. Stems sharply angled, at least when young, but scarcely winged	
25a. Slender shrub, 3 to 10 ft. tall; at low altitudes in the Coast Range and Cascade Mountains; dead tip of stem above the uppermost bud continuing in direction of axis, thus distinctly terminal.....	<i>V. ovalifolium</i> 86
25b. Spreading shrub, 1 $\frac{1}{2}$ to 6 ft.; at medium altitudes in the Cascade Mountains; dead tip of stem above the uppermost bud diverging from the axis, thus appearing lateral	
<i>V. membranaceum</i>	83
22b. Twigs angled or not, never sharply so	
26a. Stems not angled; bark shreddy; shrubs of coastal and mountain bogs	
<i>V. uliginosum</i>	82





- 26b. Stems more or less angled; shrubs low, rigid
 - 27a. Buds plump, divergent (18), with several exposed scales..... *V. occidentale* 82
 - 27b. Buds flattened, appressed (19), with only 2 exposed scales
 - 28a. Twigs smooth; stems conspicuously, but not sharply, angled below the buds.....*V. deliciosum*
 - 28b. Twigs sometimes minutely pubescent; stems obscurely angled below the buds

V. caespitosum 86

21b. Leaf scars sharply triangular, not raised.....SPIRAEA 40

29a. Buds, and usually twigs, puberulous.....*S. douglasii* 41

29b. Buds, and usually twigs, glabrous

30a. Stems unbranched above the ground.....*S. lucida* 40

30b. Stems freely branching.....*S. densiflora* 41

18b. Bundle scars more than 1

31a. Pith solid or lamellate, not coarsely spongy (See page 16 for 31b)

32a. Bundle scars 5

33a. Leaf scars ragged; bark shreddy
Physocarpus capitatus 40

33b. Leaf scars not ragged; bark not shreddy

SORBUS 46

34a. Shrub reaching 15 ft.; growing at medium altitudes in the Cascade Mountains.....*S. sitchensis* 46

34b. Shrub typically under 7 ft.; growing at high altitudes in the Cascade Mountains

S. Occidentalis 46

32b. Bundle scars 3, though sometimes obscure

35a. Leaf scars shriveled, on greatly raised persistent petiole bases..... RUBUS 51

36a. Stems armed with spines or prickles

37a. Shrubs with weak thickened prickles
R. spectabilis 52

37b. Brambles and vines with well-developed, though sometimes small, prickles

38a. Stems cylindrical or nearly so

39a. Prostrate and creeping or climbing; scarcely glaucous

40a. Stems 1 to 4 ft. long; rare except in deep woods.....*R. nivalis* 60

40b. Stems reaching 12 to 18 ft.; common in open woods and thickets and along streams

R. macropetalus 57

39b. Erect or trailing; conspicuously blue-glaucous.....*R. leucodermis* 53

38b. Stems angled or fluted

41a. Twigs fluted, maroon.....*R. procerus* 56

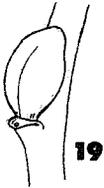
41b. Twigs merely angled, green or dull red.....*R. laciniatus* 57

36b. Stems unarmed with spines or prickles

42a. Stalks stout and upright.....*R. parviflorus* 52

42b. Stalks cordlike and trailing

43a. Bud scales pubescent.....*R. lasiococcus* 53

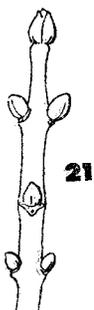


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43b. Bud scales glabrous except for ciliate margins <i>R. pedatus</i>	53
35b. Leaf scars clean and visible; petiole bases deciduous, but sometimes leaving a slight ridge	
44a. Scars (from leaf) linear; bundle scars sometimes obscure..... ROSA	58
45a. Calyx lobes deciduous or partly so	
46a. Fruit small, pear-shaped to globose, without a neck; prickles straight, needle-like, or absent; calyx lobes completely deciduous <i>R. gymnocarpa</i>	61
46b. Fruit long urn-shaped, contracted into a neck; prickles stout, recurved; calyx lobes often only partially deciduous..... <i>R. eglanteria</i>	60
45b. Calyx lobes persistent	
47a. Fruit usually borne singly; not contracted into a neck..... <i>R. nutkana</i>	61
47b. Fruit usually borne in corymbs	
48a. Heavy prickles absent; needle-like prickles absent or present, sometimes densely so at base..... <i>R. pisocarpa</i>	64
48b. Heavy and needle-like prickles present <i>R. durandii</i>	64
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50a. Bark shreddy..... <i>Holodiscus discolor</i>	44
50b. Bark not shreddy..... <i>Pyrus malus</i>	45
49b. Bud scales essentially glabrous	
51a. Lowermost bud scales distinctly swollen, fleshy at the base (20)	
52a. Bud scales not keeled; buds globose or nearly so..... <i>Crataegus douglasii</i>	51
52b. Bud scales, at least the lower, keeled; buds not globose	
53a. Stipule scars present, linear, sometimes inconspicuous PRUNUS	65
54a. Buds ovoid, $\frac{1}{4}$ to $\frac{3}{8}$ in. long; twigs of moderate thickness..... <i>P. demissa</i>	65
54b. Buds narrow, conical, averaging $\frac{1}{8}$ in. long; twigs slender... <i>P. emarginata</i>	65
53b. Stipule scars absent..... <i>Pyrus fusca</i>	45
51b. Lowermost bud scales not swollen at the base	
55a. Pith lamellate..... <i>Osmaronia cerasiformis</i>	47
55b. Pith continuous..... <i>Amelanchier florida</i>	50
31b. Pith with sponge-like cavities, at least when dry.....RIBES	32
56a. Stems armed with stout or slender prickles	
57a. Nodal prickles weak and many..... <i>R. lacustre</i>	32
57b. Nodal prickles 1 to 3	
58a. Tip of twig glandular-pubescent; nodal prickles mostly 3-forked	
59a. Prickles at nodes slender; internodal prickles typically absent on older stems..... <i>R. lobbiai</i>	32
59b. Prickles at nodes stout; internodal prickles usually present..... <i>R. menziesii</i>	33



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	Page
58b. Tip of twig not glandular-pubescent; nodal prickles single, or with rudimentary laterals.... <i>R. divaricatum</i>	33
56b. Stems unarmed with prickles	
60a. Leaf scars large and broad, covered by a membrane <i>R. bracteosum</i>	36
60b. Leaf scars narrow	
61a. Margins of inner bud scales ciliate, not glandular <i>R. laxiflorum</i>	37
61b. Margins of inner bud scales glandular and sometimes ciliate	
62a. Buds reaching $\frac{1}{4}$ in. to $\frac{1}{2}$ in.; shrubs erect, reaching 5 to 8 ft.	
63a. Growing west of the Cascade Mts. <i>R. sanguineum</i>	37
63b. Growing at medium altitudes in the Cascade Mts..... <i>R. aceriflorum</i>	38
62b. Buds less than $\frac{1}{4}$ in.; low shrub, widely branching, 3 $\frac{1}{2}$ ft. or less tall..... <i>R. cereum</i>	38
1b. Leaf scars opposite (21)*	
64a. Vines, climbing by twining petioles and petiolules; pith somewhat obscurely 12-angled..... <i>Clematis ligusticifolia</i>	29
64b. Trees or shrubs; or, if vines, pith rounded, hollow	
65a. Leaf scars covered by a membrane	
66a. Bundle scars 3..... <i>Philadelphus gordonianus</i>	39
66b. Bundle scars many, in a U line..... <i>Fraxinus latifolia</i>	87
65b. Leaf scars not covered by a membrane	
67a. Scars raised on persistent petiole bases and obscured by corky growths	
68a. Exposed bud scales 6 to 8; buds not conspicuously flattened..... SYMPHORICARPOS	92
69a. Erect shrub; twigs glabrous..... <i>S. albus</i>	92
69b. Low spreading shrub; young twigs pubescent..... <i>S. mollis</i>	93
68b. Exposed bud scales about 4.....LONICERA	88
70a. Pith solid; erect or spreading shrubs	
71a. Erect shrub; common at the coast and on low mountains..... <i>L. involucrata</i>	88
71b. Spreading shrub; in our area, found only at high altitudes..... <i>L. utahensis</i>	88
70b. Pith hollow; vines or shrubs; buds 4-angled, divergent	
72a. Twigs glabrous..... <i>L. ciliosa</i>	89
72b. Twigs pubescent, at least at nodes <i>L. hispidula</i>	89
67b. Scars not greatly raised; petiole bases not persistent, though a ridge sometimes remaining	
73a. Bundle scar 1..... <i>Euonymus occidentalis</i>	67
73b. Bundle scars more than 1	
74a. Pair of leaf scars meeting around stem in an ascending curve or point (22).....ACER	70
75a. Exposed bud scales 2..... <i>A. douglasii</i>	71
75b. Exposed bud scales more than 2	



21



22

* In *Fraxinus*, one bud of a pair sometimes slightly higher than the other.

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76a. Terminal bud usually absent; buds subtended by long white hairs..... <i>A. circinatum</i>	71
76b. Terminal bud usually present; buds not subtended by hairs..... <i>A. macrophyllum</i>	70
74b. Pair of leaf scars meeting around stem in a straight line, or a descending curve or point, or rarely not meeting (23)	
77a. Bundle scars generally 5 or 7 (rarely 3); twigs stout, with large leaf scars.....SAMBUCUS	96
78a. Buds diverging; upper margin of leaf scar notched <i>S. caerulea</i>	97
78b. Buds appressed; upper margin of leaf scar entire <i>S. callicarpa</i>	97
77b. Bundle scars 3; twigs slender; leaf scars narrow	
79a. Scales of terminal bud more or less persistent; pubescence, when present, consisting of appressed or reflexed hairs, attached by one end.....VIBURNUM	93
80a. Exposed bud scales 4 to 6..... <i>V. ellipticum</i>	96
80b. Exposed bud scales 2..... <i>V. edule</i>	96
79b. Scales of terminal bud deciduous; pubescence of twigs consisting, at least in part, of slender appressed hairs attached by their centers.....CORNUS	77
81a. Twigs dull reddish, with predominately gray overcoating; flower buds large, button-like, naked during most of the winter..... <i>C. nuttallii</i>	77
81b. Twigs deep lustrous red; flower buds not as described above..... <i>C. occidentalis</i>	77



Description of Plant Families, Genera, and Species

SALICACEAE

The Willows and Poplars

PLATE I-1

Salix L.

Willow

Ranging from prostrate shrubs to trees, often with several trunks from the base; bark smooth at first, becoming fissured with age; twigs flexible, or fragmenting easily, slender or moderately so; bark astringent to taste, often brightly colored (red, yellow, purple, or brown, especially in late winter), often slipping off easily in an entire cylinder; cross-section round, pith 5-angled or round in older portions, white, continuous; buds appressed, sessile, solitary, with a single outer scale standing directly over the leaf scar, enclosing either floral or leaf rudiments; terminal bud absent; leaf scars alternate, narrowly C- to U-shaped, not greatly raised; bundle scars 3; stipule scars generally minute or absent; phyllotaxy 2/5.

The species of Willow are many; and the identification of individuals is rendered difficult by the wide variability within a given species, and by the apparent frequent occurrence of hybridization, with resultant intergradation. No attempt is made here, therefore, to separate species on the basis of winter characters alone. A careful observer will learn, however, to recognize a few species in the area, by noting such attributes as twig color, pubescence, degree of flexibility or ease of fragmentation, and even flower structure as revealed by dissection of the buds. These may be checked against the traditional diagnostic keys for *Salix*, in floras covering the area.

Populus L.

Poplar

Trees; bark smooth when young, becoming fissured with age in some species; taste and odor astringent; pith 5-angled, continuous; mature buds with several pairs of exposed scales, the lowermost standing directly over the leaf scar; floral buds larger than the vegetative; terminal bud present, larger than the laterals; leaf scars alternate, raised, reniform or 3-lobed; bundle scars 3, often compound; stipule scars present.

PLATE I-2 *Populus trichocarpa* Torr. and Gray Cottonwood

Populus trichocarpa Torr. and Gray in Hook. Icon. Pl. 9: pl. 878. 1852.

- Tree reaching 140 feet; branches erect or tending to be so; bark yellow-gray, deeply fissured on older trunks.
- Twigs slender to moderately stout, usually curved and pebbly, lustrous, brown with shades of red or orange, green on shaded sides; lenticels conspicuous, orange, becoming pale, not raised, vertically elongated; older branches gray; leaf spurs present.
- X-section obscurely 5-angled in new growth, becoming round; pith 5-angled to star shaped, white, continuous; bark astringent, very bitter; odor strong.
- Buds very resinous, fragrant with a honey-comb-like odor; lateral buds narrowly fusiform, acuminate, $\frac{3}{4}$ inch or shorter, with 4 or more visible scales, these deep brown on exposed portions, the lowermost scales 2, keeled, usually well-developed, sometimes rudimentary and early-deciduous; leaf rudiments small, involute, immersed in fragrant orange-brown resin filling the bud cavity; terminal bud similar, 1 inch long, ovoid, acute, typically with 8 to 10 visible scales, the lowermost usually rudimentary and early deciduous.
- Leaf scars alternate, raised, giving the twig a warty appearance, lighter colored than the twig; bundle scars 3, the central compound; phyllotaxy 2/5; stipule scars prominent.
- Along streams and on low ground.

PLATE I-3 *Populus tremuloides* Michx. Quaking Aspen

Populus tremuloides Michx. Fl. Bor. Am. 2:243. 1803. *Populus vancouveriana* Trel., Tidestr. in Piper and Beattie, Fl. N.W. Coast 118. 1915.

- Small tree reaching 60 feet, straight and slender when open-grown at moderate altitudes, prostrate and shrubby at high altitudes; branches short, irregularly bent, forming a narrow, rounded crown; bark on trunk smooth, nearly unbroken, chalky white with black protuberances and markings.
- Twigs very slender, curving, branching at sometimes nearly right angles to the stem on the illuminated side, branches from the shaded side growing toward the light; first-year twigs lustrous orange-brown, glabrous, with occasional minute, elliptical lenticels, older growth be-

coming light and chalky, neutral or tawny beneath the bloom; spur branches usually present.

X-section round; pith 5-angled, small, continuous; no pronounced odor.

Buds slightly resinous, laterals nearly $\frac{1}{4}$ inch long, terminal slightly larger, flower buds larger than the vegetative, fusiform, acute; visible scales several, the lowermost directly over the leaf scar, dark brown with lighter margins, entire to emarginate, sometimes bifid, glabrous, occasionally with sparse white pubescence.

Leaf scars alternate, raised, reniform; bundle scars 3, along upper margin of leaf scar; phyllotaxy 2/5.

Principally in the Cascades; a few groves at low altitudes in the Willamette Valley.

BETULACEAE

The Alders and Birches

Alnus Hill

Alder

Shrubs or trees with gray bark; twigs more or less 3-angled; pith 3-angled or 3-armed, continuous; buds large, solitary, mostly stalked, 3-angled, 3-scaled; bud scales in our species morphologically leaf blades; leaf scars alternate, raised; bundle scars 3; stipule scars narrow; fruit a small woody cone-like structure, persistent in the winter; staminate inflorescence a catkin usually opening during late winter; young pistillate catkins visible in winter, but generally much smaller at maturity than the staminate, each pistil eventually producing a one-seeded, more or less winged, nutlet.

PLATE I-4

Alnus oregona Nutt.

Red Alder; Oregon Alder

Alnus rubra Bong., Mém. Acad. St. Petersb. VI. 2:162. 1837, non *Betula-Alnus rubra* Marsh. *Alnus oregona* Nutt., Sylva 1:28. 1842.

Tree or shrub reaching 105 feet, typically about 30 feet; branches slender, drooping, crown narrow, dome-shaped; bark thin, smooth, light gray; lenticels elongating horizontally on young trunks; inner bark red-brown.

Twigs slender, lustrous red to dull gray, hairy toward the ends; frequently strongly ribbed below the leaf scars, sometimes strongly angled; lenticels numerous, pale, elongated, often raised.

- X-section 3-angled, wood turning red or dark when cut; pith 3-armed, continuous.
- Buds conspicuously stalked, dark red, resinous, 3-angled, asymmetrical, smooth or sparsely pubescent, obtuse or acute, about $\frac{1}{2}$ inch or the terminal slightly longer, stalk equalling the bud in length, usually orange-tinted; scales 3, unequal.
- Leaf-scars alternate, reniform to three lobed, raised; bundle scars 3, the central scar compound; phyllotaxy $\frac{1}{3}$.
- Fruit a persistent cone-like structure, 1 inch or less in length, scales thickened toward the apex, peduncle shorter than the "cone," nutlet broader than the wing; "cone" maturing during the late winter on the past season's growth; margins of old leaves revolute.
- Common along streams and moist slopes.

Alnus rhombifolia Nutt.**White Alder**

Alnus rhombifolia Nutt., Sylva 1:33. 1842. *Alnus oblongifolia* Wats., Bot. Cal. 2:80. 1880, in part.

- Similar to *A. oregona*, no known characteristics infallibly distinguishing twigs of the two species in winter. Bark smooth, pale, twigs generally more slender, buds averaging smaller, cones $\frac{3}{8}$ to $\frac{5}{8}$ inch long, nutlet with narrow wing. Margins of old leaves not revolute.
- Along streams and on moist slopes.

PLATE I-5

Alnus sinuata (Regel) Rydb.**Sitka Alder**

Alnus viridis sinuata Regel in DC. Prod. 26:183. 1868. *Alnus sinuata* Rydb., Bull. Torr. Club 24:190. 1897. *Alnus sitchensis* Sarg., Silv. N. Am. 14:61. 1902.

- Shrub or small tree reaching 20 feet. Branches short, horizontal, forming an open crown. Bark blue-gray, inner bark red.
- Twigs moderate in size, 3-angled, orange-brown turning gray, glabrous to sparsely pubescent, glandular, gummy, with numerous pale elongated lenticels; spurs on older portions.
- X-section 3-angled; pith 3-armed, turning brown on exposure to air.
- Buds stalked, asymmetrical, appressed, dark, often purple, resinous, glabrous to sparingly pubescent, blunt to acute, $\frac{1}{2}$ inch long, lower scale short.
- Leaf scars alternate, prominently raised, half-round to reniform; bundle scars 3; phyllotaxy $\frac{1}{3}$.

Fruit a small cone-like structure, $\frac{3}{4}$ inch or less long, on a peduncle longer than the "cone"; scales thin, light-colored; nutlet as broad as the wing; flowers appearing with the leaves on new growth in the spring.

In the Cascade Mountains in our area; farther south, also coastal.

Betula L.

Birch

Trees or shrubs with usually brownish or whitish, generally shining, bark; twigs cylindrical; pith very minute, more or less clearly 3-angled, continuous, green; buds sessile, with usually 2 or 3 exposed scales; leaf scars alternate; bundle scars 3; stipule scars narrow.

PLATE XV-74

(Page 99)

Betula papyrifera Marsh

Western Paper Birch

var. *commutata* (Regel) Fern.

Betula occidentalis Hook. of some authors, not Hooker. *Betula alba* ssp. *occidentalis* (Hook.) Regel β *commutata* Regel, Bull. Soc. Nat. Mosc. 38:401. 1865. *Betula papyracea* var. *occidentalis* Dippel, Handb. Laubholz. 177. 1892. *Betula alba* forma *occidentalis* Fern., Am. Journ. Sci. ser. 4, 14: 173, 190. 1902. *Betula papyracea Lyalliana* Koehne ex Schelle in Beisner, Schelle & Zabel, Handb. Laubh.-Ben. 55. 1903. *Betula papyrifera* var. *Lyalliana* (Koehne) Schneid. Ill. Handb. Laubhk. 1:115. 1904. *Betula papyrifera* var. *occidentalis* Sargent in Journ. Arn. Arb. 1:63. 1919.

Tree, sometimes reaching 100 feet in height, and with a trunk diameter of 3 to 4 feet; bark of trunks pale reddish- or orange-brown or white, shining, marked by conspicuous horizontally-elongated lenticels; older bark peeling in thin papery sheets.

Twigs generally reddish-brown at first, with conspicuous light-colored, vertically oval lenticels and small, roundish dark glands, also sometimes minutely pubescent; older twigs becoming smooth, the lenticels elongating horizontally with age.

Buds sessile; scales brown, fimbriate, with many parallel veins, the lowermost scales thicker, more or less short-pubescent, somewhat varnished, the veining less conspicuous than in the upper; subterminal buds producing staminate catkins, the pistillate catkins arising from lateral mixed buds; terminal bud often wanting.

Leaf scars alternate, broad, nearly ellipsoid, the upper margin slightly flattened; bundle scars 3, slightly raised, nearer the upper than the lower margin.

PLATE I

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3. <i>Populus tremuloides</i> Michx. Quaking Aspen.....	20
4. <i>Alnus oregona</i> Nutt. Red Alder; Oregon Alder	21
5. <i>Alnus sinuata</i> (Regel) Rydb. Sitka Alder.....	22



PLATE I

British Columbia to northwestern Washington, and eastward.

Another variety, *Betula papyrifera* Marsh var. *subcordata* (Rydb.) Sarg. is recognized by some authors. This is a smaller tree, reaching a height of 30 to 45 feet, and a trunk diameter of less than 2 feet. Except for size at maturity, it is doubtful whether the two varieties can readily be distinguished in the field in the winter, since basic differences seem to be associated mainly with leaves and fruits.

The habitat of this variety is similar in general to that of var. *commutata*.

PLATE XV-75
(Page 99)

Betula pumila L.
var. *glandulifera* Regel

Western Low Birch

Betula pumila L. var. *glandulifera* Regel, Bull. Soc. Nat. Mosc. 38²: 410. 1866. *Betula hallii* Howell, Fl. N. W. Am. 1:614. 1902.
Betula glandulifera Butler, Bull. Torr. Club 36:425. 1909.

Shrub 3 to 12 feet tall, with slender branches, the older bark not peeling in papery sheets.

Twigs, when young, puberulent (later becoming glabrous), dotted by small scattered sessile glands, purplish-brown after sloughing of puberulence and epidermis.

X-section roundish.

Buds sessile, glandular-sticky, dark, obtuse, long-ovoid; scales several, at least the outermost ciliate.

Leaf scars alternate, somewhat broad, the upper margin nearly straight, the lower curved; bundle scars 3, near the upper margin.

Sphagnum bogs of the lower Willamette Valley in Oregon, and of the northern Cascades from northern Oregon to Alaska.

CORYLACEAE

The Hazels

Corylus L.

Shrubs; twigs slender, sometimes zigzag, round in cross-section; pith obscurely 3-angled; terminal bud wanting; leaf scars alternate, raised, appearing 2-ranked on horizontal branches; bundle scars 3, or multiple and obscure; staminate catkins long, pendulous, maturing in winter or very early spring; pistillate flowers in a scaly bud, exhibiting, at maturity, minute purple styles.

PLATE II-6

Corylus cornuta Marsh Western Hazel
var. *californica* (A. DC.) Sharp

Corylus rostrata Ait. var. *californica* A. DC., Prod. 162:133. 1864. *Corylus californica* Rose, Gard. and For. 8:263. 1895. *Corylus cornuta* Marsh var. *californica* (A. DC.) Sharp, Contrib. Dudley Herb. 4:59. 1951.

Tall shrub sometimes reaching 20 feet; bark smooth, gray. Twigs very slender, sometimes zigzag, gray-brown, with whitish pubescence on new growth; lenticels scattered, low, pale orange.

X-section round; pith small, obscurely 3-angled, brown, becoming imperfectly chambered.

Buds ovoid to globose, $\frac{1}{4}$ inch long, with usually 4 gray-brown pubescent scales visible; terminal bud wanting. Leaf scars alternate, raised, half round to reniform; bundle scars 3; phyllotaxy $\frac{1}{2}$.

Flowering in late winter. Staminate flowers in long pendulous catkins; pistillate flowers several, in a scaly bud, the deep red stigmas protruding at anthesis.

Common in open woods, on moist hillsides, and along streams.

FAGACEAE

The Oaks

Quercus L.

Trees or shrubs; deciduous, but the dry leaves often persisting during the winter; twigs slender to moderately stout; pith star-shaped, continuous; buds sessile, sometimes angled; internodes progressively shortened toward the tips causing the latest buds to appear clustered at the end; scales numerous, 5-ranked; leaf scars alternate, raised; bundle scars about 12, scattered; stipule scars small.

PLATE II-7

Quercus garryana Dougl. White Oak; Garry Oak

Quercus garryana Dougl. ex Hook. Fl. Bor. Am. 2:159. 1839. *Quercus douglasii* Benth., Pl. Hartw. 337. 1857, non Hook. and Arn. *Quercus oerstediana* R. Br., Campst. Ann. and Mag. Nat. Hist. IV 7:250. 1871. *Quercus jacobi* R. Br., l.c. 255. *Quercus breweri* Engl., Bot. Cal. 2:95. 1880. *Quercus gilbertii* Greene, W. Am. Oaks 77, pl. 37. 1889.

Trees reaching 50 feet, or shrubby; trunk short, clear; branches appearing to radiate from the trunk, the

lower branches drooping, the upper erect; bark thin, pale gray-brown, marked by wide ridges and narrow furrows.

Twigs moderately stout, sometimes nearly fluted, red-brown with rusty fascicled pubescence; lenticels prominent, raised, scattered, white; internodes short, a season's growth often no more than 5 inches.

X-section 5-angled; pith star-shaped, white, continuous.

Buds nearly $\frac{1}{2}$ inch long, ovoid to conical, obscurely 5-angled, appearing clustered near the tips; lateral buds ovoid, shorter than the terminal; scales in 5 vertical rows, typically with pale or rusty pubescence, paler in color than the twig; buds of *Q. garryana* tending to be longer and more acute than those of *Q. kelloggii*.

Leaf scars conspicuously raised, alternate, half-round to reniform; bundle scars many, in 3 groups; leaf scar covered by a corky development partially obscuring bundle scars.

Fruit an acorn developing the first year, the cup shallow, scales swollen, pubescent; nut smooth and shining. Woodland, dry hillsides, valley floors; common in much of the Willamette Valley, Oregon, and southward; more localized in western Washington.

PLATE II-8

Quercus kelloggii Newb.

Black Oak

Quercus tinctoria var. *californica* Torr., Pac. R. Rep. 4:138. 1856. *Quercus kelloggii* Newb., Pac. R. Rep. 6:28. 1857. *Quercus sonomensis* Benth., DC. Prod. 16²:62. 1864.

Tree reaching 75 feet; or shrubby, especially in high altitudes; trunk short; crowns irregular, open, rounded; bark dark, checked on older trunks, smooth on the branches.

Twigs moderately stout, dull red-brown, ribbed below the leaf scars, pubescence of white fascicled hairs mostly confined to the creases of the nearly fluted twigs; generally not as heavily pubescent as *Q. garryana*; lenticels small, inconspicuous.

X-section 5-angled; pith star-shaped, white, continuous.

Buds ovoid to conical, tending to be more ovoid than in *Q. garryana*, not apparently angled, generally not clustered at the tips of vigorously growing shoots; terminal bud best developed, laterals successively smaller; scales

typically glabrous except for the pubescent margins, lustrous, thin, papery, the same color as or lighter than the twig, tending to be short, rounded at the apex.

Leaf scars conspicuously raised, alternate, half round to reniform; bundle scars many, obscured by a corky development.

Fruit an acorn developing in 2 years, the cup deep, scales thin, pubescent; nut over 1 inch long, pubescent. Leaves sharply lobed, spine tipped.

From vicinity of Eugene, Lane County, Oregon, and southward.

RANUNCULACEAE

The Buttercups and Their Allies

Clematis L.

Soft-wooded vines climbing by petioles and petiolules, these persistent after the leaf blades have fallen; shoots 6- to 12-angled; pith angled or armed, often hollow, white, continuous; buds small, ovoid, solitary in most species; petioles opposite, persistent; stipule scars wanting.

PLATE II-9

Clematis ligusticifolia Nutt.

Wild Clematis

Clematis ligusticifolia Nutt. Torr. and Gray, Fl. N. Am. 1:19. 1838. *Clematis brevifolia* How., Fl. N. W. Am. 3. 1897.

Climbing vine, woody; stems sometimes reaching 40 feet, with a diameter of 3 inches at the bases; bark on the older portions gray, shredding, the younger portions dull brown to straw-colored.

Twigs slender, brown to straw-colored, sparsely short-pubescent toward the ends, no lenticels apparent; petioles opposite, persistent, joined around the stem by a raised flange.

X-section 6-angled or fluted; pith large, white, more or less distinctly 12-armed; wood thin.

Buds in axils of the petioles, about $\frac{1}{8}$ inch long, enclosed by 2 or 3 pairs of opposite, brown, white-puberulent scales.

Definite leaf scars never formed, petioles removed only by tearing or weathering.

Woods and thickets.

PLATE II

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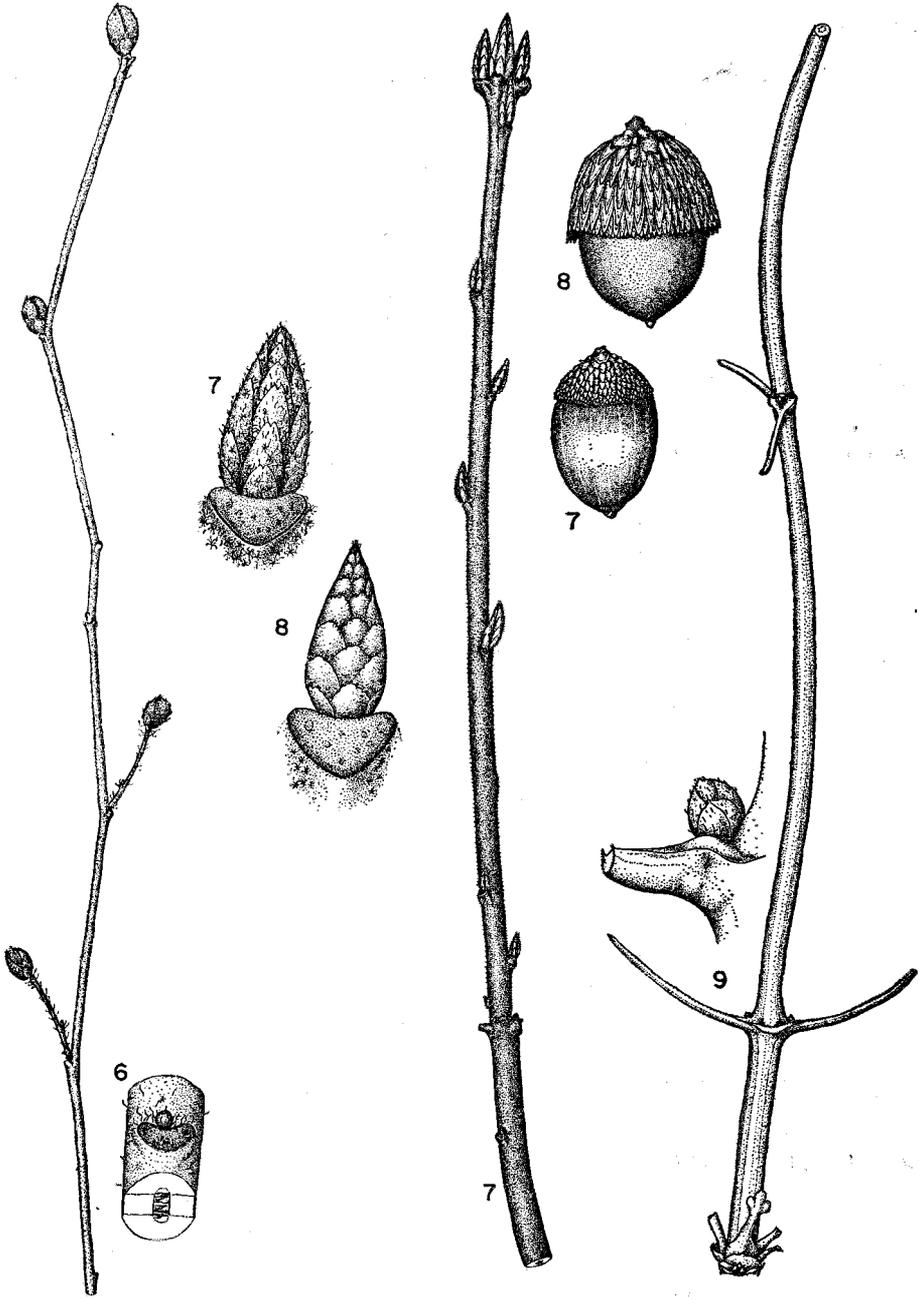


PLATE II

SAXIFRAGACEAE

The Saxifrages, Currants, and Gooseberries

Ribes L.

Shrubs, loosely branched; bark exfoliating; twigs cylindrical, ribbed from the leaf scars, often armed with nodal spines and internodal prickles; pith becoming spongy; buds sessile or stalked, the scales loose, in ours usually glandular-margined and 3-veined; odor pungent; bud scales consisting morphologically of petioles; leaf scars alternate, slightly raised, narrow and angularly crescent-shaped or broader; bundle scars 3; stipule scars wanting.

PLATE III-10

Ribes lacustre (Pres.) Poir.Swamp Currant;
Prickly Currant

Ribes oxycanthoides var. *lacustre* Pres., Syn. Pl. 1:262. 1805.
Ribes lacustre Poir. in Lam. Encycl. Suppl. 2:56. 1812. *Ribes echinatum* Dougl., Trans. Hort. Soc. Lond. 7:517. 1830. *Ribes parvulum* Rydb., Mém. N. Y. Bot. Gard. 2:203. 1900.

Shrubs, erect or prostrate, reaching 5 feet; branches crooked, bark gray.

Twigs pale or orange-brown, becoming darkened, short-spreading, sometimes glandular pubescent, usually densely spiny with internodal prickles; nodal spines many, spreading; bud scales persisting.

Pith angled, gray-white when cut, spongy, cavities sometimes very large.

Buds $\frac{1}{4}$ inch long, the laterals smaller than the terminal, diverging; scales thin, glabrous or minutely pubescent, orange-brown or rosy, 3-veined, often with leaf blade rudiments at the tips; margins glandular ciliate.

Leaf scars slightly raised, narrow, angularly crescent-shaped; bundle scars 3.

Woods and thickets.

PLATE III-11

Ribes lobbii Gray

Gummy Gooseberry

Ribes subvestitum Hook., Bot. Mag. t. 4931. 1856, not Hook. and Arn. *Ribes lobbii* Gray, Proc. Am. Acad. 10:274. 1876. *Grossularia lobbii* Cov. and Britt., N. Am. Fl. 22:217. 1908.

Shrubs reaching 6 feet, spreading, erect; bark dark gray, cracking circumferentially, giving trunks an odd ringed appearance.

Twigs dull straw-colored, turning dull dark gray when older, glandular, glabrate or typically nearly woolly with short white pubescence; internodal prickles wanting, found rarely on water sprouts, but 3 slender, lustrous, orange tinted spines at each node; twig not conspicuously ribbed beneath the leaf scars; bark shredding, leaving the stems lustrous dark red-brown; lenticels conspicuous after exfoliation of the epidermis; bud scales persistent.

X-section round; pith crenately round, green, turning brown when cut, spongy.

Buds $\frac{1}{8}$ inch long, tawny to yellowish, pubescent, the scales 3-nerved, often with leaf blade rudiments at the tips; margins glandular, ciliate.

Leaf scars alternate, slightly raised, narrow, angularly crescent-shaped; bundle scars 3.

Open slopes. Cascades and Coast Range.

PLATE III-12

Ribes menziesii Pursh **Coast Prickly-fruited Gooseberry**

Ribes menziesii Pursh, Fl. Am. Sept. 732. 1815. *Ribes ferox* Smith, in Rees' Cycl. 30: no. 26. 1815. *Ribes subvestitum* Hook. and Arn., Bot. Beechy Voy. 346. 1838. *Grossularia menziesii* Cov. and Britt. N. Am. Fl. 22:213. 1908.

Shrub reaching 6 feet, erect, loosely branched.

Twigs zigzag, slender, orange-brown, pubescent with hooked white hairs, often glandular, tips of the branches frequently dying back in winter; not conspicuously ribbed below the leaf scars; densely prickly with internodal prickles; nodal spines 3, rarely more.

Pith spongy, turning gray when cut.

Buds not obviously stalked, $\frac{1}{4}$ inch or less long, scales tawny or straw-colored, pubescent, 3-veined, tipped with leaf blade rudiments, margins ciliate.

Leaf scars alternate, slightly raised, narrowly crescent-shaped; bundle scars 3.

Along the coast, mostly in Lane County, Oregon; usually growing in thickets.

PLATE III-13

Ribes divaricatum Dougl. **Coast Black Gooseberry;
Straggly Gooseberry**

Ribes divaricatum Dougl., Trans. Hort. Soc. Lond. 7:515. 1830. *Ribes villosum* Nutt. in Torr. and Gray. Fl. N. Am. 1:547. 1840. *Ribes tomentosum* K. Koch, Wochenschr. Gärt. and Pfl. 2:138. 1859. *Ribes parishii* Hel., Muhlenbergia. 1:134. 1904. *Ribes suksdorfii* Hel., Muhlenbergia. 3:11. 1907. *Grossularia parishii* Cov. and Britt., N. Am. Fl. 22:224. 1908.

PLATE III

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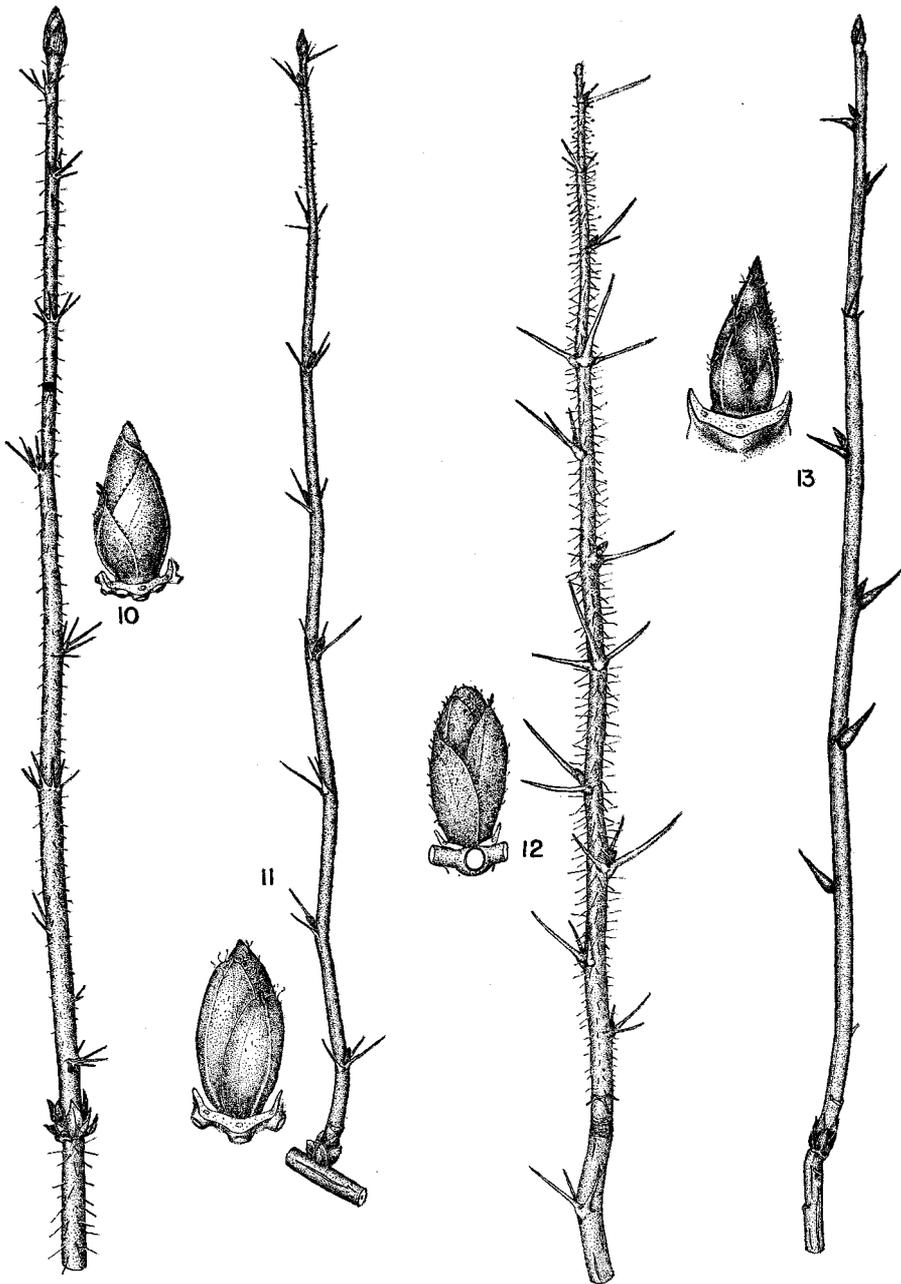


PLATE III

Shrub, straggling drooping branches abundant, and often as long as 10 feet; bark gray.

Twigs bleached or straw-colored, glabrous, ribbed from leaf scars; epidermis exfoliating, the bark becoming shreddy; internodal prickles none; nodal spines single, rarely 3, dark-colored, the laterals usually rudimentary and blunt; bud scales persistent.

X-section round; pith turning brown when cut, spongy.

Buds $\frac{1}{4}$ inch long, light brown or straw-colored; scales acute, keeled, indistinctly 3-veined, white pubescent, margins of inner scales woolly.

Leaf scars alternate, slightly raised, angularly crescent-shaped, narrow, bundle scars 3.

Streams in Cascades and Coast Range foothills, usually growing in thickets.

PLATE IV-14

Ribes bracteosum Dougl.

Stinking Black Currant

Ribes bracteosum Dougl., Fl. Bor. Am. 1:233. 1832.

Shrub reaching 10 feet, or taller when growing in shade, erect or straggling, scantily branched.

Twigs stout, malodorous, straw-colored or green-tinted, glabrous, glandular near the tips, with dull luster; lenticels swollen; bark exfoliating, unarmed; bud scales deciduous.

X-section round; pith large, crenately round, minutely spongy, white, continuous.

Buds prominently stalked, the laterals appressed, reaching $\frac{1}{4}$ inch in length, the terminal nearly $\frac{1}{2}$ inch; scales numerous, loose, keeled, tan or brown at the tips, shading into green, the margins minutely white-ciliate, glandular, the faces of the outer scales glabrous, the apices obcordate, the lateral veins indistinct; inner scales more or less covered by golden glands.

Leaf scars alternate, low, broad, covered by a membrane projecting beyond the scar over the stem below; bundle scars 3, arranged along the upper margin of the leaf scar; phyllotaxy 2/5.

In moist shaded places at low altitudes in the Cascade Mountains and Coast Range.

PLATE IV-15

Ribes laxiflorum Pursh

Coast Trailing Currant

Ribes americanum Pall., Fl. Ross. 1:34. 1788 non Mill. 1768.

Ribes laxiflorum Pursh, Fl. Am. Sept. 731. 1814. *Ribes affine* Dougl. ex. Bong. Mém. Acad. St. Petersb. VI. 2:138. 1832.

Shrubs reaching 5 feet, erect or trailing, sometimes prostrate with ascending branches.

Twigs soft, unarmed, moderate in size, light orange-brown to straw colored, pubescent with short curved white hairs, only faintly ribbed below the leaf scars, the bark becoming shreddy, leaving a dark stem; bud scales persisting. Resembling *R. bracteosum*; readily distinguished by the narrow leaf scars.

Pith spongy, pale or white.

Buds stalked, $\frac{1}{4}$ to $\frac{1}{2}$ inch, tan or brown with red tints; scales loose, 3-veined, often tipped with leaf-blade rudiments, glabrous or pubescent, margins ciliate.

Leaf scars alternate, slightly raised, narrow, angularly crescent-shaped; bundle scars 3.

Moist timber and burns, mainly in the Coast Range.

PLATE IV-16

Ribes sanguineum Pursh

Red-flowering Currant

Ribes sanguineum Pursh, Fl. Am. Sept. 164. 1814. *Calobotrya sanguinea* Spach, Ann. Sci. Nat. II. 4:21. 1835. *Ribes glutinosum* Benth., Trans. Hort. Soc. ser. 2, 1:476. 1838. *Coreosma sanguinea* Spach, Hist. Vég. 6:155. 1838. *Ribes scuphamii* Eastw., Proc. Calif. Acad. III. 2:242. 1902.

Shrubs reaching 8 feet, erect or bushy; bark gray-brown, exfoliating.

Twigs moderately slender, orange or red-tinted, sometimes dull with short gray pubescence, bark often beginning to exfoliate near base; older portion dull gray-brown, with none of the orange color of the younger growth; spurs many, short; twigs with a faint, rather pleasant odor when broken; bud scales not persisting.

Pith obscurely 5-angled, pale to dark brown, spongy but not always noticeably so, continuous.

Buds conspicuous, rosy red, reaching $\frac{1}{2}$ inch in length, laterals short-stalked; scales 3-veined, the margins glandular without ciliate hairs, the inner scales sticky, difficult to separate, bearing long-stalked glands when expanded; leaf rudiments plaited.

Leaf scars alternate, slightly raised, angularly crescent-shaped; bundle scars 3; phyllotaxy 2/5.

Open woods and thickets.

PLATE IV-17

Ribes acerifolium How.

Maple-leaved Currant

Ribes acerifolium How., Erythea 3:32. 1895. *Ribes howellii* Greene, Erythea 4:57. 1896.

Shrubs reaching 5 feet, nearly erect; bark shredding, leaving smooth dark gray stems.

Twigs moderately slender, straw-colored or orange-brown, pubescent with short, curved white hairs, occasionally glandular; faintly ribbed below the leaf scars; bark turning gray; spurs frequently formed; bud scales not persisting.

X-section round; pith round or obscurely 5-angled, brown, spongy.

Buds stalked, the terminal $\frac{1}{4}$ inch or longer, the laterals shorter; scales 3-veined, glabrous to minutely pubescent, margins sometimes ciliate and glandular, the red color tending more to a purple cast than in *R. sanguineum*, and generally not as intensely colored; inner scales gummy; leaf blade rudiments frequently found at the tips.

Leaf scars alternate, slightly raised, narrow, angularly crescent-shaped; bundle scars 3.

Thickets at or below timberline in the Cascades.

PLATE XV-76
(Page 99)

Ribes cereum Dougl.

Squaw Currant

Ribes cereum Dougl., Trans. Hort. Soc. Lond. 7:512. 1830. *Cerophyllum douglasii* Spach, Hist. Vég. 6:153. 1838. *Ribes balsamiferum* Kell., Proc. Calif. Acad. 2:94. 1861. *Ribes cereum farinosum* Jancz. Mém. Soc. Genève 35:358. 1907.

Shrubs $1\frac{1}{2}$ to $3\frac{1}{2}$ feet tall, widely and intricately branching, bushy; bark light gray with narrow, horizontally-lengthened lenticels.

Twigs very slender, the youngest growth reddish- or yellowish-brown, silvered by a minute white puberulence; lenticels inconspicuous on young twigs; epidermis exfoliating early in papery strips or flakes; branches numerous, widely spreading; the bark tight, gray, lenticels dark; odor of broken twigs none, or scarcely noticeable.

Pith minute, roundish in cross-section, becoming spongy or open.

Buds $\frac{1}{4}$ inch or less long, short-stalked, the stalks covered by somewhat obscure sessile glands; scales 3-veined, emarginate and mucronate; the margins of at least the upper scales fringed by minute sessile glands; scales varnished, the varnish drying into a white brittle wax-like substance; innermost scales enclosing the leaf rudiments in a clear sticky glue; leaf rudiments plaited.

Leaf scars alternate, very narrow, forming a deep crescent; bundle scars 3, nearly circular; phyllotaxy 2/5.

Dry open woods or thickets. Rare west of the Cascades, but reported from Mt. Jefferson, Oregon, on the west slope.

HYDRANGEACEAE

The Hydrangeas and Their Allies

Philadelphus L.

Widely branching shrubs; pith white, solid, continuous; buds small, sessile, solitary, the terminal bud typically wanting; leaf scars commonly opposite, covered by a membrane sometimes likewise covering the bud; bundle scars 3; stipule scars wanting.

PLATE IV-18

Philadelphus gordonianus Lindl.

Mock Orange;
Syringa

Philadelphus gordonianus Lindl., Bot. Reg. 24: Misc. 21. 1838.
Philadelphus columbianus Koehne, Gartenfl. 1896: 542. 1896.
Philadelphus angustifolius Rydb., N. Am. Fl. 22:166. 1905.
Philadelphus platyphyllus Rydb., l.c. 167. *Philadelphus lewisii* var. *gordonianus* Jeps., Man. 466. 1930.

Shrub reaching 12 feet, erect with spreading branches; bark gray, slightly rough.

Twigs slender, widely dichotomously branching, flattened at the nodes, keeled below the leaf scar, dark red-brown to pale, nearly lustrous, with scattered pubescence near the tip; lenticels inconspicuous; twigs characterized by the covered buds.

X-section round; pith large, white, continuous, oval or obscurely 6-angled.

Buds minute, naked, green and pubescent, hidden beneath the membrane covering the leaf scar; terminal bud wanting.

Leaf scars small, raised, opposite, angular, covered by a membrane, the pair of scars connected by a line around the twig; bundle scars 3.

Common in thickets and open woods.

ROSACEAE

The Roses and Their Allies

Physocarpus Maxim.

Loosely branching shrubs with brown exfoliating bark; twigs cylindrical, 4-ribbed; pith brown, solid, continuous; buds sessile, scales loose, brown; leaf scars alternate; bundle scars 5, the upper pair small; stipule scars small.

PLATE IV-19

Physocarpus capitatus (Pursh) Ktze.

Nine-bark

Spiraea capitata Pursh, Fl. Am. Sept. 342. 1814. *Spiraea opulifolia* var. *tomentella* Ser. in DC. Prod. 2:542. 1825. *Physocarpa opulifolia* Raf., New Fl. 3:73. 1836. *Physocarpa tomentosa* Raf., l.c. 74. *Spiraea opulifolia* var. *mollis* Torr. and Gray, Fl. N. Am. 1:414. 1840. *Neillia opulifolia* var. *mollis* Brew. and Wats., Bot. Cal. 1:171. 1876. *Neillia capitata* Greene, Pittonia 2:28. 1889. *Physocarpus capitatus* Ktze., Rev. Gen. Pl. 2:219. 1891. *Opulaster capitatus* Ktze., l.c. 949. *Opulaster opulifolius* var. *capitatus* Jeps., Fl. W. Mid. Cal. 276. 1901. *Opulaster cordatus* Rydb., N. Am. Fl. 22: 242. 1908.

Shrubs reaching 8 feet, straggly, irregularly branched; bark dark brown, exfoliating in sheets and shreds, giving the shrub a ragged aspect.

Twigs orange-brown, often twisted, sharply angled and ridged below the leaf scars; bud scales persistent; spurs present.

X-section flattened or angled in new growth, becoming round; pith tan, oval or round, continuous.

Buds twisted, about $\frac{3}{8}$ inch long, scales open, minutely pubescent, dry, the edges ragged, the lower scales keeled.

Leaf scars alternate, raised, small, as broad as long, angularly crescent-shaped, often shriveled; bundle scars 5, the upper pair small.

Common along streams.

Spiraea L.

Shrubs, usually low with simple branches; twigs mostly slender, cylindrical or angled; pith white, continuous; buds small, usually solitary, sessile, with several exposed scales; leaf scars alternate, small, often highly raised; bundle scar single; stipule scars wanting.

Spiraea lucida Dougl.

Shiny Spiraea

Spiraea betulifolia Hook., Fl. Bor. Am. 1:172. 1892, non Pall. 1784. *Spiraea lucida* Dougl. in l.c., as a synonym. 1832; ex Greene, Pittonia 2:221. 1892. *Spiraea corymbosa* var. *lucida*. Zabel, Handb. Laubh. Deuts. Dendr. Ges. 157. 1903.

Prostrate shrub sending up erect shoots as long as 2 feet; bark light red-brown.
 Twigs straight, slender, dully lustrous, glabrous, brown with shades of pink or red, rarely orange-brown; epidermis exfoliating on older portions; bud scales persisting; twigs usually terminating in an inflorescence.
 X-section 5-angled; pith large, white, continuous.
 Buds under $\frac{1}{8}$ inch long, broadly ovoid to conical, diverging, same color as the twig; exposed scales about 6, keeled at the tips, glabrous, acute, the margins not ciliate.
 Leaf scars alternate, small, triangular, surrounded by a pale area, raised; bundle scar single; phyllotaxy 2/5.
 Inflorescence a dense corymb, persisting.
 Mountains.

PLATE V-20

Spiraea densiflora Nutt.

Mountain Spiraea

Spiraea densiflora Nutt., Fl. N. Am. 1:414. 1840. *Spiraea betulaefolia* var. *rosea* Gray, Proc. Am. Acad. 8:381. 1862. *Spiraea splendens* Baum., Monats. Ber. Bef. Gart. Preuss. 18:294. 1875. *Spiraea lucida* var. *rosea* Greene, Pittonia 2:221. 1892. *Spiraea arbuscula* Greene, Erythea 3:63. 1895. *Spiraea helleri* Rydb., Fl. N. Am. 22:248. 1908.

Low shrub reaching 3 feet; stems stiff, erect, branching above, branches mostly simple; bark brown, orange or red-tinted, exfoliating.
 Twigs slender but rigid, glabrous, lustrous, orange-brown on the new growth, the dark red-brown inner bark exposed after shedding of the outer; bud scales persistent.
 X-section 5-angled; pith white, 5-angled, continuous.
 Buds under $\frac{1}{8}$ in length, ovoid to conical, diverging; exposed scales about 6, glabrous, margins ciliate, keeled.
 Leaf scars alternate, raised, small, light, triangular, surrounded by a light area; bundle scar single; phyllotaxy 2/5.
 Fruiting inflorescence of small, dense corymbs, persistent.
 Mountains at timberline.

PLATE V-21

Spiraea douglasii Hook.

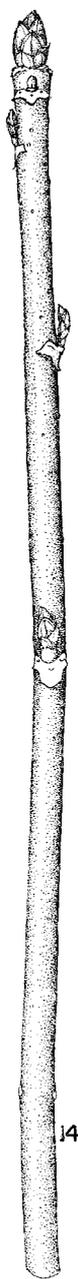
Hardhack

Spiraea douglasii Hook., Fl. Bor. Am. 1:172. 1834. *Spiraea nobleana* Hook., Bot. Mag. t. 5169. 1860.

Shrub 3 to 6 feet high, with straight, ascending branches; bark deep red-brown.
 Twigs very slender, dark red-brown covered with matted pubescence, becoming glabrous the second year, ribbed

PLATE IV

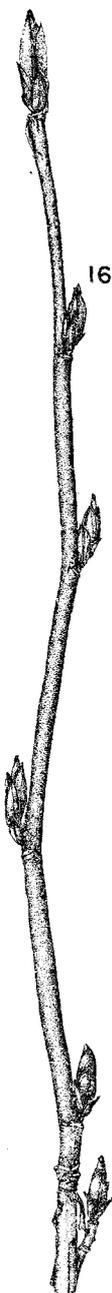
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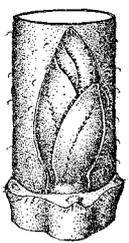
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19



PLATE IV

below the leaf scars; branchlets at nearly right angles to the main stem; bud scales persisting.

X-section 5-angled; pith continuous, white, turning gray or brown.

Buds less than $\frac{1}{8}$ inch in length, densely woolly, pale gray; scales several, pale red-brown or straw-colored, acute, keeled but obscured by the pubescence; leaf rudiments imbricate.

Leaf scars alternate, not raised, triangular, surrounded by a pale area; bundle scar single; phyllotaxy 2/5.

In moist situations, mostly swales and bordering water; occasionally in drier locations.

Holodiscus Maxim.

Shrubs with alternate leaf scars and no visible stipule scars; fruiting panicles generally persistent; fruit consisting of minute late-dehiscing, single-seeded, beaked pods.

PLATE V-22

Holodiscus discolor (Pursh) Maxim.

Ocean Spray

Spiraea discolor Pursh, Fl. Am. Sept. 342. 1814. *Spiraea ariaefolia* Smith in Rees Cycl. 33:6. 1816. *Schizonotus discolor* Raf., New Fl. 3:75. 1838. *Holodiscus discolor* Maxim., Act. Hort. Petrop. 6:254. 1890. *Schizonotus ariaefolius* Greene, Fl. F. 58. 1891, in part. *Schizonotus argenteus* var. *ariaefolius* Ktze., Rev. Gen. Pl. 1:225. 1891. *Holodiscus ariaefolius* Greene, Man. Reg. S. F. Bay 113. 1894. *Sericotheca discolor* Rydb., N. Am. Fl. 22:262. 1908.

Shrub reaching 15 feet, irregularly branched; bark dull brown or gray-brown.

Twigs moderately slender to stout, dull tawny-brown, 3-ribbed from the leaf scars; minutely pubescent on new growth; bark becoming shreddy.

X-section round; pith rather obscurely 5-angled, white, continuous.

Buds $\frac{1}{4}$ inch in length, often small, the terminal bud larger than the laterals; the 2 outer scales short, open, early deciduous, keeled, brown, lustrous, sparsely pubescent; inner scales tan or rosy with dense gray-white pubescence.

Leaf scars alternate, greatly raised, crescent-shaped to 3-lobed; bundle scars 3; phyllotaxy 2/5.

Thickets and along streams; widely distributed.

Pyrus L.

Trees or shrubs; twigs moderate in size, round in cross section; pith angled; buds moderate in size, sessile, solitary; exposed scales about 4, usually keeled, in our species morphologically petioles; leaf scars alternate, raised; bundle scars 3; stipule scars wanting.

PLATE V-23

Pyrus fusca Raf.

Wild Crab-apple

Pyrus fusca Raf., Med. Fl. 2:254. 1830. *Pyrus diversifolia* Bong., Mem. Acad. St. Petersburg. VI. 2:133. 1832. *Pyrus rivularis* Dougl. ex Hook. Fl. Bor. Am. 1:203. pl. 68. 1833. *Malus rivularis* M. Roem., Fam. Nat. Syn. 3:215. 1847. *Malus diversifolia* M. Roem., l.c. *Malus fusca* Schneider, Handb. Laubh. 1:723. 1906.

Small tree or shrub reaching 30 feet, often growing in thickets; bark thin, in loose red-brown plates.

Twigs moderate in size, pubescent, becoming glabrous, red-brown, turning brown, faintly lined below the leaf scars; lenticels small, pale, not raised; spurs usually present.

X-section round; pith white, continuous, crenately round; taste of twig faintly bitter.

Buds about $\frac{1}{8}$ inch long, the terminal larger than the laterals, bluntly acute; scales several, the apices bifid or acutetipped, the margins pubescent, the faces glabrous and lustrous to pubescent, bright red; lower scales swollen, fleshy at the base; leaf rudiments imbricated.

Leaf scars alternate, raised, half elliptical to narrowly shield-shaped; bundle scars 3, large; phyllotaxy 2/5.

Along streams and roadsides, and in open woods.

PLATE XV-77
(Page 99)*Pyrus malus* L.

Apple

Pyrus malus L. Sp. Pl. 1753. *Malus communis* Lam., Enc. Meth. 5:560. 1804.

Spreading tree or large shrub.

Twigs moderately stout, pubescent with matted hairs; dark reddish-brown beneath the overcoating of gray pubescence, somewhat angled below the leaf scars; lenticels inconspicuous, scattered; short thick spurs present on older twigs.

X-section round, or somewhat angled immediately below the leaf scars; pith white, greenish, or brownish, round or slightly angled, continuous.

Buds $\frac{3}{16}$ to $\frac{1}{4}$ inch long, appressed to the stem; scales several, densely gray-pubescent, reddish-brown beneath the pubescence, obtuse, often mucronate.

Leaf scars alternate, raised, lunate, scalloped beneath the bundle scars; bundle scars 3, large; phyllotaxy 2/5.

An escape from cultivation; common in fence rows and thickets; fruit usually remaining on the tree during the winter, and widely variable in shape, color, and size.

Sorbus (Tourn.) L.

Rather erect branched shrubs or small trees; twigs moderate in size, cylindrical, lenticels large; pith continuous, brown; buds nearly conical to oblong, the terminal large, the laterals solitary, sessile, many remaining undeveloped; scales several, sometimes gummy, morphologically petiole bases; leaf scars alternate, crescent-shaped to linear; bundle scars 3 to 7; stipule scars wanting.

PLATE V-24

Sorbus occidentalis Greene **Small Mountain-ash**

Pyrus occidentalis Wats., Proc. Am. Acad. 23:263. 1888. *Sorbus occidentalis* Greene, Fl. Fran. 54:1891.

Shrub 3 to 5 feet tall, branches erect, clustered, coarse.

Twigs very similar to those of *S. sitchensis*; moderate to stout, dark red-brown, becoming grayed, nearly glabrous to finely pubescent with white or rusty hairs, lenticels scarcely raised.

X-section round; pith pale brown, continuous, sharply 5-angled.

Buds similar to those of *S. sitchensis*, not as red or as gummy, smaller, about $\frac{1}{4}$ inch long; exposed scales several, keeled, often with leaf-blade rudiments at tips.

Leaf scars alternate, low, crescent-shaped, more than half encircling the twig, a petiole cap sometimes persisting; bundle scars 5.

Mountains at high altitudes.

PLATE V-25

Sorbus sitchensis Roem. **Western Mountain-ash**

Sorbus sitchensis Roem., Fam. Nat. Syn. 3:139. 1847. *Pyrus sitchensis* Piper, Mazama 2:107. 1901. *Sorbus americana* var. *sitchensis* Sudw., U. S. Dept. Agr. Misc. Circ. 92:133. 1927. *Sorbus cascadiensis* G. N. Jones, Univ. Wash. Pub. Biol. 7:174. 1938.

Shrubs from 4 to 15 feet tall, the branches spreading, slender, forming a round-topped crown; bark thin, light gray, smooth or slightly rough.

Twigs moderately stout, red-brown, pubescent, turning brown and glabrous, fragrant when broken; lenticels pale, slightly raised, becoming greatly elongated.

Pith 5-angled.

Buds reaching $\frac{3}{4}$ inch in length, the terminal larger than the laterals, acute, turning dark red, rusty- or white-pubescent to nearly glabrous, gummy; visible scales about 4, leaf blade rudiments often occurring at tips.

Leaf scars alternate, narrow, crescent-shaped, scarcely raised, long, half encircling the twig; bundle scars 5; phyllotaxy 2/5.

Mountains at moderate altitudes.

Osmaronia Greene

Shrubs with chambered pith and terete twigs; buds often supra-axillary and mucronulate; leaf scars crowded at the tips and alternate, little raised; bundle scars 3, stipule scars wanting.

PLATE VI-26

Osmaronia cerasiformis (T. and G.) Green **Indian Peach;** **Oso Berry**

Nuttallia cerasiformis Torr. and Gray *ex* Hook. and Arn. Bot. Beechey 336. 1838. *Exochordia davidiana* Baill., Addisonia 9:149. 1869. *Osmaronia cerasiformis* Greene, Pittonia 2: 191. 1891. *Osmaronia obtusa* Greene, Pittonia 5:310. 1905. *Osmaronia demissa* Greene, l.c. *Osmaronia bracteosa* Greene, l.c. 311. *Osmaronia padiformis* Greene, l.c. *Osmaronia laurina* Greene, l.c.

Shrub up to 10 feet, erect, usually with one main trunk, not widely branched; bark smooth and light gray.

Twigs moderate in size; new growth glabrous, greenish-brown with pale lenticels slightly elongated vertically; odor sharply pungent; taste bitter and slightly astringent, but surprisingly mild in comparison with the odor; spurs present.

X-section round, wood greenish; pith moderately large, white and lamellate.

Buds conspicuously bright rose-red, the lateral supra-axillary, ovoid, acute, sometimes reaching $\frac{1}{2}$ inch in length, but usually smaller, often asymmetrical; scales tending to be bifid and acute-tipped, some keeled, edges minutely white ciliate; scales loose.

Leaf scars alternate, narrow, slightly expanded at the bundle scars, crescent-shaped, little raised; bundle scars 3; phyllotaxy 2/5.

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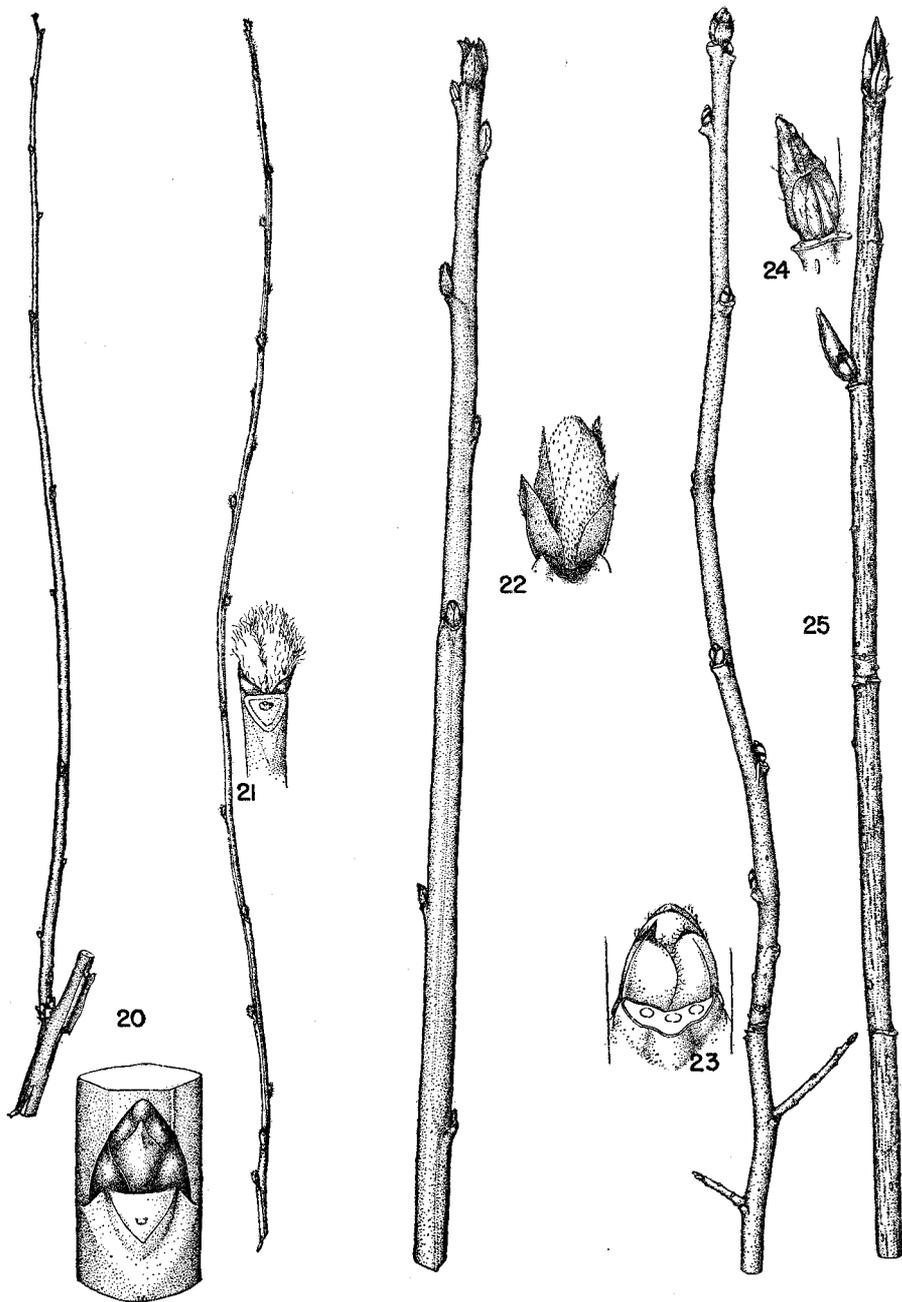


PLATE V

The first shrub, other than the willows, to flower in spring, often blossoming in January; in thickets and on roadsides.

Differing from *Amelanchier* with which it may be confused, in the chambered pith, stronger odor, bright red instead of dull purple buds.

Amelanchier Medic.

Shrubs or small trees with open crown; twigs slender, zigzag, nearly cylindrical; pith obscurely 5-angled, pale or white, continuous, solid; buds alternate, sessile, axillary or supra-axillary, solitary, of two kinds—larger and more dilated flower buds and narrow and elongated leaf buds; scales morphologically petioles; leaf rudiments plicate; leaf scars alternate, raised, with 3 bundle scars; stipule scars wanting.

PLATE VI-27

Amelanchier florida Lindl.

Service Berry

Amelanchier florida Lindl., Bot. Reg. 19 pl. 1589. 1833. *Amelanchier ovalis* var. *semintegrifolia* Hook., Fl. Bor. Am. 1:202. 1834.

Shrubs reaching 12 feet; branches slender, abundant, forming an open crown; bark gray or gray-brown, smooth or slightly furrowed on older specimens.

Twigs slender, brown with red or yellow tints, becoming gray; glabrate with a few short hairs at the tips and around the buds, to loosely woolly at the apex; lenticels minute; odor of twigs unpleasant, taste bitter; spurs present on older portions.

X-section round; pith white, small, obscurely 5-angled, continuous.

Buds slender, asymmetrical or curved, as long as $\frac{1}{4}$ inch before expansion, the terminal bud reaching $\frac{1}{2}$ inch with expansion of inner scales. Several loose outer scales exposed, shading from dull purple to red, often yellow on the margins, the edges pubescent, the apex emarginate with tip of the keel extending between the teeth; scales often tipped with leaf-blade rudiments, densely pubescent; the inner scales usually protruding.

Leaf scars alternate, raised, narrowly crescent-shaped, constricted between the bundle scars; bundle scars 3; phyllotaxy 2/5.

Common, in open woods and thickets.

Crataegus L.

Shrubs or trees, usually with spines, stiff widely forking branches, rounded crowns; twigs moderate in size, to slender; pith small; buds small, usually globose and shining, scales fleshy, morphologically petioles; leaf scars alternate, raised; bundle scars 3.

PLATE VI-28

Crataegus douglasii Lindl.

Western Hawthorn;
Western Black Haw.

Crataegus punctata var. *brevispina* Dougl. ex Hook. Fl. Bor. Am. 1:201. 1834. *Crataegus douglasii* Lindl., Bot. Reg. 21, pl. 1810. 1835. *Crataegus rivularis* Nutt. in Torr. and Gray, Fl. N. Am. 1:464. 1840. *Crataegus consanguinea* var. *douglasii* Torr and Gray, l.c. *Anthomeles douglasii* Roem., Syn. Rosifl. 3:140. 1847. *Mespilus rivularis* C. Koch, Wochenschr. 5:372. 1862. *Crataegus brevispina* Heller, Cat. N. A. Pl., ed. 2, 98. 1900. *Crataegus gaylussacia* Heller, Bull. S. Cal. Acad. 2:69. 1903. *Mespilus douglasii* Aschers and Graebn., Syn. Metteleur. Fl. 62²:24. 1906.

Shrubs or small trees reaching 30 feet; branches spreading or ascending; bark gray, smooth, appearing powdered. Twigs slender, often with short internodes, dull red or brown, lustrous to dull, with dense gray pubescence and mealy scurf; armed with stout thorns at right angles to stems; these, morphologically, modified branches with leaf scars near their bases; lenticels few, small and inconspicuous, slightly raised.

X-section round, inner bark thick, fleshy, red on rapidly growing twigs; pith 5-angled, pale brown, continuous. Buds mostly under $\frac{1}{8}$ inch long, blunt, rounded at the apex on mature plants, acute on young rapidly growing specimens; scales many, small, dry, sparingly scurfy, the lower scales sparsely pubescent, the lowest pair swollen, fleshy at the base, leaf blade rudiments imbricate.

Leaf scars raised, alternate, round to half round; on young rapidly growing twigs a petiole cushion remaining, this usually absent in mature slowly growing trees; bundle scars 3, obscured by a mealy scurf; phyllotaxy 2/5.

Common in pastures, roadsides, and stream bottoms.

Rubus L.

Shrubs or trailing vines, usually soft-wooded; stems, in x-section, round or 5-angled; pith moderately large, crenately round or 5-angled, continuous; buds sessile, axillary or supra-axillary, often superposed; bud scales in ours morphologically petioles, 3-parted at the tips, bearing minute

buds in axils of lower scales; leaf scars alternate, shriveled, mostly indistinguishable, on persistent petiole bases; bundle scars 3; stipules often persistent.

PLATE VI-29

Rubus spectabilis Pursh

Salmonberry

Rubus spectabilis Pursh, Fl. Am. Sept. 348. 1814. *Rubus stenopetalus* Cham. ex Choris, Voy. Pitt. Kamtch. 10. 1822. *Parmena spectabilis* Greene, Lfts. Bot. Obs. 1:244. 1906.

Shrub reaching 10 feet; stems erect, sparingly branched; epidermis yellow, exfoliating.

Twigs moderate in size, orange-brown, somewhat lustrous, minutely pubescent near the tip, faintly ribbed below the leaf scars, armed with short sharp prickles; lenticels not raised, inconspicuous; bud scales persistent.

X-section round; pith moderately large, white, continuous, obscurely 5-angled.

Buds $\frac{1}{8}$ inch or longer, sometimes laterally multiple, ovoid; scales light-colored, open, the short appressed pubescence of the outer scales becoming heavier on the inner; lowest scales acute, keeled, bearing leaf buds in their axils.

Leaf scars alternate, raised on permanent petiole bases, shriveled; bundle scars 3; linear stipules sometimes remaining.

Along streams and in open moist woods.

PLATE VI-30

Rubus parviflorus Nutt.

Thimbleberry

Rubus parviflorus Nutt., Gen. 1:308. 1818. *Rubus nutkanus* Moc. ex Ser. in DC. Prod. 2:566. 1825. *Rubus lacer* Ktze., Meth. Sp. 103. 1879. *Rubacer parviflorum* Rydb., Bull. Torr. Club 30:274. 1903. *Bossekia parviflora* Greene, Lfts. Bot. Obs. 1:211. 1906.

Shrub reaching 7 feet, sparsely branched.

Twigs moderate in size, tawny to orange-brown, dull, minutely pubescent to rarely nearly prickly with coarse hairs; faintly ribbed below the leaf scars, bluntly keeled below; lenticels not conspicuous; twigs unarmed; bud scales persisting; epidermis exfoliating, exposing the rust-brown inner bark.

X-section round; pith moderately large, white, round, continuous.

Buds reaching $\frac{3}{8}$ inch long, narrowly ovoid, with 4 to 5 exposed scales, these papery, dull brown, the 2 lower scales darker, sparingly pubescent near the tips, to densely gray-pubescent; buds borne in the axils of some scales.

Leaf scars alternate, raised on persistent petiole bases, shriveled; stipules lanceolate, often persisting; bundle scars 3.

Open woods, logged-off areas, and stream sides.

PLATE VI-31

Rubus pedatus Smith

Trailing Raspberry

Rubus pedatus Smith, Pl. Ic. pl. 63. 1791. *Dalibarda pedata* Stephan, Mem. Soc. Nat. Mosc. 1:129. 1806. *Comaropsis pedata* DC., Prod. 2:555. 1825. *Ametron pedatum* Raf., Sylva Tell. 161. 1838. *Psychrobatia pedata* Greene, Leaflets Bot. Obs. 1:245. 1906.

Low trailing plants with cord-like stems rooting at the nodes, spreading, with curved or appressed white pubescence, mostly with brown long-stalked glands; bud scales and broad stipules persisting.

X-section round.

Buds $\frac{1}{8}$ inch or less, superposed, hidden beneath persistent stipules, ovoid, blunt; scales glabrous, thin, almost lustrous, purple-tinted, margins white-ciliate, sometimes glandular; apex 3-parted.

Open woods in mountains.

R. pedatus and *R. lasiococcus* are by some authors considered to be possibly a single species. There is some intergrading in all winter characteristics, but the separation used in this key is reliable in most cases.

PLATE VI-32

Rubus lasiococcus Gray

Trailing Raspberry

Rubus lasiococcus Gray, Proc. Am. Acad. 17:201. 1882. *Comarobatia lasiococca* Greene, Leaflets Bot. Obs. 1:245. 1906.

Low trailing plants with cord-like stems rooting at the nodes as in *R. pedatus*; stems with spreading or appressed white pubescence; bud scales and stipules persisting.

X-section round.

Buds mostly superposed, $\frac{1}{8}$ inch or smaller, hidden by persistent stipules, broad, ovoid, blunt; scales thin, pink- or purple-tinted, margins long white-ciliate, faces pubescent, apex 3-parted.

Open woods in mountains.

PLATE VII-33

Rubus leucodermis Dougl.

Black-cap

Rubus leucodermis Dougl. ex Torr. and Gray, Fl. N. Am. 1:454. 1840. *Rubus occidentalis leucodermis* Focke, Abh. Nat. Ver. Bremen. 4:147. 1874. *Melanobatus leucodermis* Greene, Lfts. Bot. Obs. 1:243. 1906. *Melanobatus bernardinus* Greene, op. cit. 1:244. *Rubus bernardinus* Rydb., N. Am. F. 22:444. 1913.

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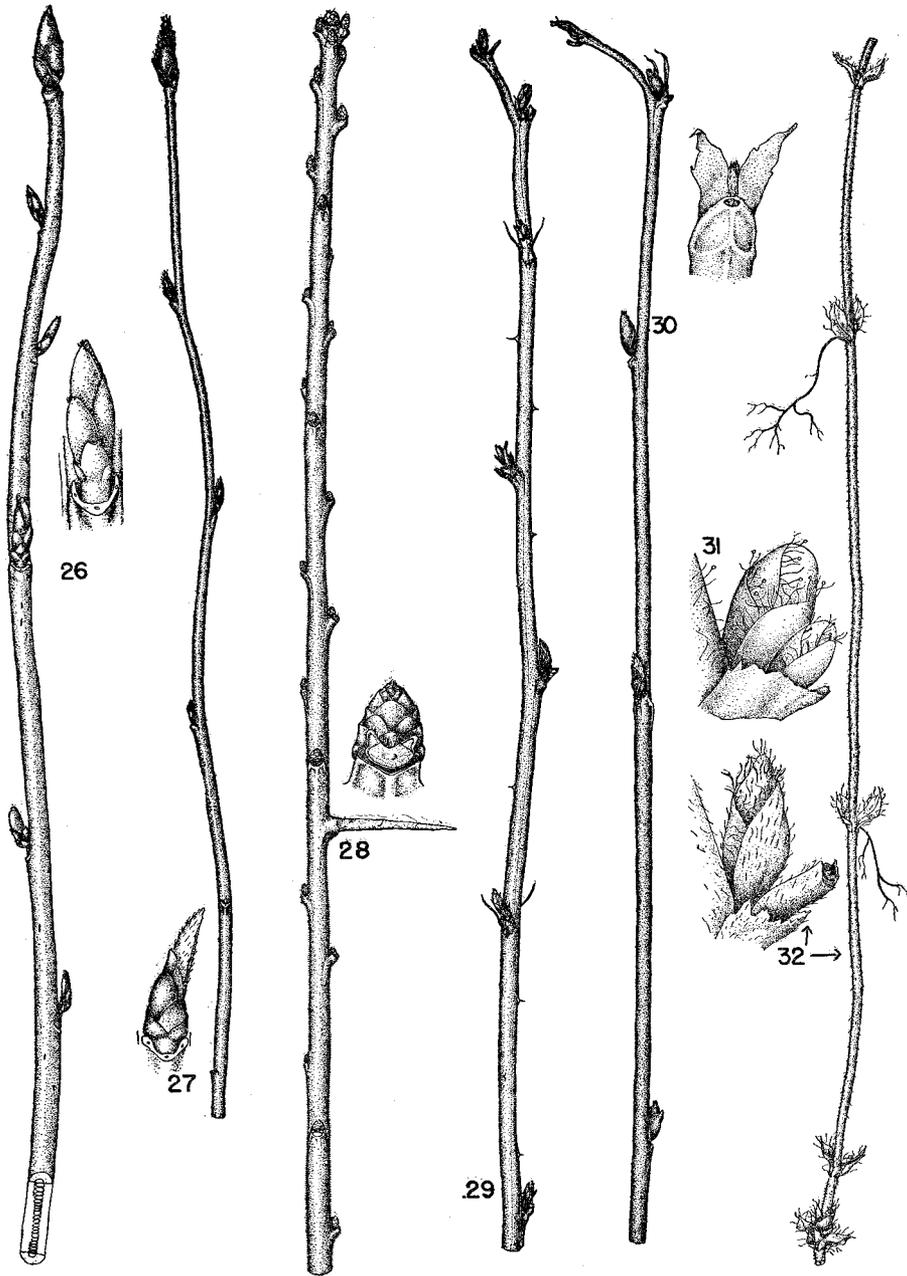


PLATE VI

Straggling biennial shrub; new growth green, old canes light blue or lavender with heavy bloom making them conspicuous among other shrubbery; tardily deciduous, a few leaves usually remaining on the new growth, these pinnately compound with 3 leaflets.

Twigs trailing at the tips, slender with long internodes, well armed with straight or recurving, broad-based prickles; glabrous.

X-section round; pith pale brown, continuous, crenately round.

Buds superposed, reaching $\frac{1}{4}$ inch; scales loose, opening early, red or green, the lower keeled, glabrous to pubescent with long ciliate margins; tips, especially of the lower scales, 3 parted; leaf buds borne in the scale axils; rudimentary leaves conduplicate with stipules folded over.

Leaf scars alternate, shriveled, largely indistinguishable, on a permanent petiole base; bundle scars 3; linear stipules occasionally persisting.

Common in open woods and thickets.

PLATE VII-34

Rubus procerus Muell.

Himalaya Blackberry

Rubus procerus P. J. Muell. ex Genev. in Mem. Soc. Acad. Mains-et-Loire. 24:209. 1868.

Stout trailing stems 10 feet or more in length; leaves palmately compound, 5-foliolate, sometimes remaining all winter; stems conspicuously maroon red, especially when wet, forming large dense clumps building up over other vegetation.

Twigs conspicuously 5-angled or fluted, deep lustrous maroon red, with a slight bloom, sparingly pubescent at the tips; well armed with flattened straight or curved prickles; odor pleasant, flower-like; growth of twigs often indeterminate.

X-section 5-angled; pith large, white, continuous, solid.

Buds superposed, expanding early; outer scales firm, brown or with red tints, sharply keeled, inner scales pale or green, all scales pubescent, 3- to 5-parted at the tips, with buds in some of the axils; leaf rudiments conduplicate, enclosed in the stipules.

Leaf scars alternate, shriveled, on ragged petiole bases; bundle scars 3; phyllotaxy 2/5.

A widespread and often abundantly established escape from cultivation.

PLATE VII-35

Rubus laciniatus Willd.**Evergreen Blackberry**

Rubus laciniatus Willd., Hort. Berol. pl. 82. 1807. *Rubus vulgaris* var. *laciniatus* Dippel, Handb. Laubh. Deuts, Dendr. Ges. 3:529. 1893.

Shrubs with long trailing prickly stems growing in dense clumps; evergreen or tardily deciduous; leaflets 3 to 15, deeply incised, palmately compound.

Twigs moderately stout, green or of a dark nondescript shade tending toward red, glabrate to pubescent with soft spreading hairs, heavily armed with stout, recurved prickles, these red at base, shading to light tips, appearing whorled, growing from ridges of the stem.

X-section 5-angled to fluted; pith 5-angled white, continuous.

Buds small, narrowly ovoid, superposed, unequal, divergent, the several exposed scales dark-colored, dry, short-appressed or woolly pubescent, sharply keeled; apex 3-parted.

Leaf scars alternate, shriveled, on raised petiole bases; stipules, when present, linear; bundle scars 3; phyllotaxy 2/5.

Widespread and common, an escape from cultivation.

PLATE VII-36

Rubus macropetalus Dougl.**Wild Blackberry**

Rubus macropetalus Dougl. Fl. Bor. Am. 1:178. 1832.

Stems trailing, as long as 18 feet, with long internodes; herbaceous at the tip, red with a bloom causing them to appear purple; green on the shaded side; glabrous or with appressed curved or spreading hairs or stalked glands; keeled and ribbed below leaf scars; armed with straight, curved or reflexed prickles; leaves tardily deciduous, 3-lobed, or compound, coarsely toothed.

X-section round; pith large, 5-angled, white or brown in the center.

Buds $\frac{1}{8}$ inch long, superposed, of unequal sizes; scales red, glabrate to white pubescent, the margins white-ciliate, the tips 3-parted, buds present in axils of the outer scales; buds expanding early, exposing pubescent, green- or brown-tinged inner scales.

Leaf scars alternate, raised on persistent petiole bases, shriveled; bundle scars 3; stipules persisting, long, linear; phyllotaxy 2/5.

Common, conspicuous in burns and logged areas.

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PLATE VII

Rubus nivalis Dougl., commonly called Snow Bramble, grows in deep woods at medium altitudes in the Cascade Mountains, and occasionally occurs, also, in woods of the Lower Columbia area. Essentially evergreen or tardily dehiscent, it differs vegetatively from *R. macropetalus* in its much shorter stems ($\frac{1}{2}$ to 3 ft.), more minute and less slender prickles, and in principally entire leaves with broad stipules which often persist after the blades have fallen. Summer differences are conspicuous. The flowers are few, usually solitary and axillary, and deep red. Fruits, also, red.

Rosa L.

Shrubs, erect or trailing, usually armed with slender or stout prickles; stems cylindrical; buds axillary or supra-axillary, ours mostly with glandular-margined scales, these morphologically petioles; leaf scars alternate, long, low, narrow, usually nearly linear; bundle scars 3; stipule scars wanting.

PLATE VIII-37

Rosa eglanteria L.

Sweetbrier

Rosa eglanteria L. Sp. Pl. 491. 1753. *Rosa rubiginosa* L. Mant. 2:564. 1771. *Rosa micrantha* Borrer ex Smith, Engl. Bot. pl. 2490. 1813. *Rosa suaveolens* Pursh, Fl. Am. Sept. 346. 1814. *Rosa walpoleana* Greene, Lfts. Bot. Obs. 2:264. 1912.

Shrub reaching 9 feet or more; stems stout, little-branched, curving outward, giving the shrub a fountain-like appearance.

Twigs green, moderately stout, zigzag, glabrous, armed with stout recurved tawny-gray prickles; lenticels minute, white, low, numerous, inconspicuous.

X-section round; pith white, obscurely 5-angled, continuous.

Buds small, supra-axillary, divergent, globose to ovoid, apex bluntly acute; exposed scales several, green with tints of pink, glabrous; margins usually brown, glandular-ciliate.

Leaf scars linear, extending half around the stem, alternate, low, slightly expanded at the 3 bundle scars.

Fruit long, urn-shaped, contracted into a neck, sparingly to densely prickly, borne singly or several in a corymb, the pedicels often glandular-hairy; calyx lobes tardily falling away.

Introduced from Europe.

PLATE VIII-38

Rosa nutkana Presl.

Common Wild Rose

Rosa nutkana Presl, Epimel. Bot. 203. 1851. *Rosa fraxinifolia* Hook., Fl. Bor. Am. 1:199. 1834, non *Borkh.* 1790. *Rosa lyalliana* Crepin, Bull. Soc. Bot. Belg. 15:39. 1876, as synonym. *Rosa caryocarpa* Dougl., Crepin, l.c., as synonym. *Rosa woodsii* Regel, Acta Hor. Petrop. 5:299. 1877, non Lindl. 1820. *Rosa anacantha* Greene, Leaflets Bot. Obs. 2:265. 1912. *Rosa muriculata* Greene, Leaflets Bot. Obs. 2:263. 1912. *Rosa columbiana* Rydb., N. Am. Fl. 22:514. 1918.

Shrub reaching 5 feet, branches erect.

Twigs slender, nearly straight, red, sometimes tinged with purple, glabrate; prickles heavy, laterally flattened, the base expanded, elliptic or tear-drop shaped, usually straight, sometimes ascending or recurved, frequently in pairs below the nodes.

X-section round; pith white, continuous.

Buds often supra-axillary, long-ovoid, rosy red, glabrate; scales obcordate or sparsely white-ciliate; leaf rudiments imbricate, leaflets conduplicate.

Leaf scars alternate, low, linear, slightly expanded at the bundle scars, reaching more than half way around the stem; bundle scars 3; phyllotaxy 2/5.

Fruit globose to vertically flattened, without a neck, orange-red, reaching $\frac{3}{4}$ inch in diameter, calyx lobes remaining attached.

Common, widely distributed.

PLATE VIII-39

Rosa gymnocarpa Nutt.

Wood Rose

Rosa gymnocarpa Nutt. ex. Torr. and Gray, Fl. N. Am. 1:461. 1840. *Rosa spithamea* var. *subinermis* Englm., Bot. Gaz. 6:326. 1881. *Rosa glaucodermis* Greene, Lfts. Bot. Obs. 2:255. 1912. *Rosa prionota* Greene, l.c. *Rosa piscatoria* Greene, l.c. *Rosa crenulata* Greene, l.c.

Shrubs sometimes reaching 4 feet, usually smaller; branches slender; bark brown.

Twigs slender, green in shaded locations, brown or purple when exposed, armed with straight, slender prickles $\frac{1}{8}$ inch long, or often unarmed; prickles, when present, needle-like, not dilated at the base.

X-section round or oval; pith crenately round, continuous, white.

Buds sometimes supra-axillary, divergent, occasionally laterally multiple, green or pale rose, ovoid, the 4 to 6 exposed scales glabrous, 3-nerved, emarginate, often with a minute tooth between the lobes, the inner scales sometimes with minute white or rose-colored marginal glands; leaf rudiments imbricate.

PLATE VIII

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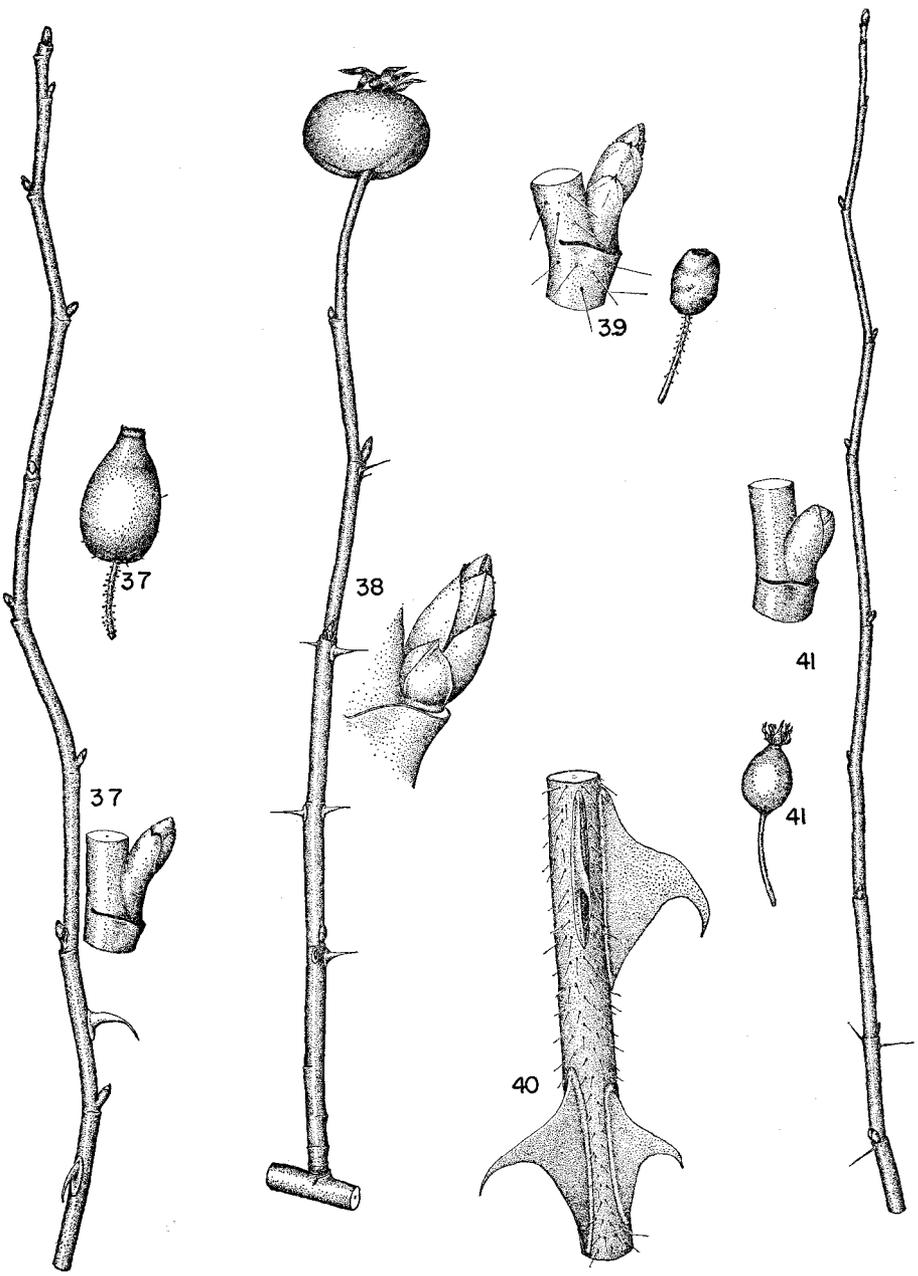


PLATE VIII

Leaf scars alternate, raised, linear, extending more than half around the stem.

Fruit ovoid, $\frac{3}{8}$ inch long, borne singly on an unarmed peduncle bearing stalked glands; calyx lobes deciduous. Open woods and thickets.

PLATE VIII-40

Rosa durandii Crep.

Saber-thorned Rose

Rosa durandii Crep., Bull. Soc. Bot. Fr. 22:19. 1875.

Shrub reaching 9 feet, heavily armed throughout with huge broad-based prickles, these sometimes reaching $1\frac{1}{2}$ inches in length and width; stems densely clothed with long needle-like prickles on the basal portion.

Twigs moderate in size, red-brown, well-armed with gray highly compressed prickles located roughly in pairs; tips of the twigs pubescent and glandular.

Buds small, diverging, supra-axillary, colored like the twig; exposed scales several.

Fruit globose, one to several in a corymb, reaching $\frac{3}{4}$ inch in diameter.

Roadsides and thickets, with other roses. Not common.

PLATE VIII-41

Rosa pisocarpa Gray

Clustered Wild Rose

Rosa pisocarpa Gray, Proc. Am. Acad. 8:382. 1872. *Rosa nutkana* var. *microcarpa* Crepin, Bull. Soc. Bot. Belg. 15:45. 1876. *Rosa rivalis* Eastw., Bull. Torr. Club. 32:198. 1905. *Rosa cope-landii* Greene, Leaflets Bot. Obs. 2:264. 1912. *Rosa pringlii* Rydb., Bull. Torr. Club 44:79. 1917. *Rosa chrysocarpa* Rydb., l.c. 74. *Rosa eastwoodiae* Rydb., N. Am. Fl. 22:527. 1917.

Shrub reaching 6 feet, slender, erect.

Twigs slender, usually lustrous deep mahogany red, glabrous; lenticels minute, white, not raised, inconspicuous; prickles, if present, gray, slender, straight, needle-like.

X-section round; pith white, continuous.

Buds small, diverging, sometimes supra-axillary, globose to ovoid, blunt, same color as the twig; exposed scales several, glabrous, the margins minutely white-ciliate, or glabrous, or with minute reddish glands.

Leaf scars alternate, low, linear, extending more than half way around the stem; bundle scars 3.

Fruit reaching $\frac{1}{2}$ inch in length, globose or slightly elongated, with a short neck, color generally a clear, translucent dark red; calyx lobes persistent, upright, sometimes glandular; fruits generally several, borne in a corymb.

Common, open woods and thickets.

Prunus L.

Shrubs or trees; twigs slender to moderately stout, rounded or angled below the nodes; pith pale to brown, continuous; buds sessile, mostly ovoid, with several exposed scales, these morphologically petioles; leaf scars alternate, raised, small, half-round to half-elliptical; bundle scars 3; stipule scars present.

PLATE IX-42

Prunus emarginata Walp.

Wild Cherry

Cerasus emarginata Dougl. ex Hook., Fl. Bor. Am. 1:169. 1834. *Cerasus mollis* Dougl. l.c. *Prunus emarginata* Walp., Rep. 2:9. 1843. *Prunus mollis* Walp., l.c. *Cerasus erecta* Presl. Epim. Bot. 194. 1849. *Prunus erectus* Walp., Ann. 3:854. 1853. *Cerasus glandulosa* Kell., Proc. Cal. Acad. 1:69. 1855. *Cerasus pattoniana* Carr., Rev. Hort. 135. 1872. *Cerasus californica* Greene, Fl. Fr. 50. 1891. *Cerasus arida* Greene, Proc. Biol. Soc. Wash. 18:57. 1905. *Cerasus prunifolia* Greene, l.c. *Cerasus rhamnoides* Greene, l.c. 58. *Cerasus kelloggiana* Greene, l.c. *Cerasus obliqua* Greene, l.c. 59. *Cerasus parvifolia* Greene, l.c.

Shrubs or small trees reaching 50 feet; branches slender, tending to be upright, the crown symmetrical; bark brown to red-brown, smooth.

Twigs slender, whip-like, the new growth mostly glabrous but occasionally gray-woolly, usually lustrous orange-brown; lenticels many, low, conspicuously pale, usually elongated horizontally; epidermis on older portions turning silvery gray but soon peeling horizontally, leaving the bark lustrous brown with tints of red or orange.

X-section round, or angled below the nodes; pith brown, continuous, 5-angled; bark bitter, odor strong.

Buds under $\frac{1}{4}$ inch, the terminal scarcely larger than the laterals, the apical internode shortened, making the buds appear multiple; buds conical, slightly appressed; scales mostly obcordate, acute, the lowermost swollen at the bases, glabrous, sometimes keeled, the margins scarious, serrate, or glandular.

Leaf scars alternate, raised, 3-lobed or triangular, sometimes covered by a closely adherent ridge; bundle scars 3; phyllotaxy 2/5.

Fruiting structures corymbose.

Margins of woods and along streams.

PLATE IX-43

Prunus demissa (Nutt.) Walp.

Western Chokecherry

Cerasus demissa Nutt. in Torr. and Gray, Fl. N. Am. 1:411. 1840. *Prunus demissa* Walp., Rep. 2:10. 1843. *Padus demissa* M. Roem., Fam. Nat. Syn. 3:87. 1847. *Prunus virginiana* L. var. *demissa* Torr., Bot. Wilkes Exp. 284. 1874. *Padus virginiana* var. *demissa* Schn., Ill. Handb. Laubk. 1:642. 1906.

Shrub or small tree reaching 25 feet; crown spreading, the main stems mostly erect; bark smooth or scaly, red-brown to brown.

Twigs moderately slender to stout, scarcely whip-like as in *P. emarginata*, red-brown to orange-brown, glabrous or pubescent; lenticels many, not conspicuously raised at first, mostly vertically elongated; older portions of epidermis turning silvery gray but not exfoliating; spurs present.

X-section round; pith pale brown, 5-angled, continuous; bark bitter, odor strong.

Buds reaching $\frac{1}{2}$ inch, the terminal larger than the laterals; apical internodes shortened, causing the buds to appear multiple; lateral buds slightly diverging, ovoid, acute, brown with a dull luster; scales many, the lowermost swollen at the base, often obcordate, the margins often scarious, ragged, sometimes glandular.

Leaf scars alternate, raised, 3-lobed or triangular; bundle scars 3; phyllotaxy 2/5.

Fruiting structures racemose.

Thickets and stream banks.

ANACARDIACEAE

The Sumacs and Their Allies

Rhus L.

Shrubs, small trees, or vines; stems when cut exuding a sometimes poisonous sap; pith moderately large, round in cross-section, continuous; buds medium to small, solitary, the pubescent scales often poorly formed or absent; leaf scars alternate, slightly raised.

PLATE IX-44

Rhus diversiloba T. and G.

Poison Oak

Rhus lobata Hook., Fl. Bor. Am. 1:127. 1830, not Poir, 1804. *Rhus diversiloba* T. and G., Fl. N. Am. 1:218. 1838. *Rhus toxicodendron* var. *diversiloba* K. Bdg., Zoë. 2:345. 1892. *Toxicodendron diversilobum* Greene, Lfts. Bot. Obs. 1:119. 1905. *Toxicodendron oxycarpum* Greene, op. cit. 121. *Toxicodendron isophyllum* Greene, l.c. *Toxicodendron comarophyllum* Greene, op. cit. 120. *Toxicodendron vaccarum* Greene, op. cit. 122.

Erect shrub or a climbing vine reaching a height of 30 to 40 feet, or sometimes treelike; bark gray, rough or warty; branches of shrubby form ascending closely parallel to the main stem, giving the plant a broom-like aspect.

Twigs moderately stout, the short branches of the current year red with predominating overcoating of gray, ribbed below the leaf scars, short-pubescent especially near the tip; lenticels numerous, small, slightly raised, producing a pebbled appearance.

X-section round; pith large, white, crenately round; taste undetermined.

Buds naked, sessile, solitary, exuding a small amount of dark brown fluid when broken; exposed leaf rudiments densely pubescent with appressed short stiff hairs.

Leaf scars alternate, low, broadly U-shaped; bundle scars 5, with sometimes many small auxiliary traces; phyllotax 2/5; stipule scars small.

Fruit a panicle of dry drupes, compressed, grooved, gray-white.

The source of a highly poisonous skin irritant, poison oak is identified quickly in the field by the uniform gray color, roughened appearance of twigs from the elevated lenticels, and, in the shrubby form, the broomlike habit produced by the numerous, slender, erect, parallel branches.

Thickets and open woods; common along roadsides in the Willamette Valley; variously distributed elsewhere.

CELASTRACEAE

The Bittersweets and Their Allies

Euonymus L.

Shrubs or small trees; twigs mostly 4-ribbed or some cylindrical, characteristically green; buds sessile, scales serrulate; leaf scars half-round or half-elliptical, small, elevated; bundle scars single, horizontally elongated near the upper margin of the leaf scar; stipule scars minute.

PLATE IX-45

Euonymus occidentalis Nutt. **Western Burning Bush**

Euonymus occidentalis Nutt., Pac. R. Rep. 4:74. 1856. *Euonymus parishii* Trel., Trans. Acad. Sci. St. Louis 5:354. 1889.

Shrub reaching 15 feet; branches slender, weak, drooping; bark smooth, gray.

Twigs 4-angled, green the first season, ultimately turning gray, slender, glabrous.

X-section 4-angled.

Buds $\frac{1}{4}$ to $\frac{1}{2}$ inch long, narrow, purple, 2 or 4 purplish or greenish scales exposed.

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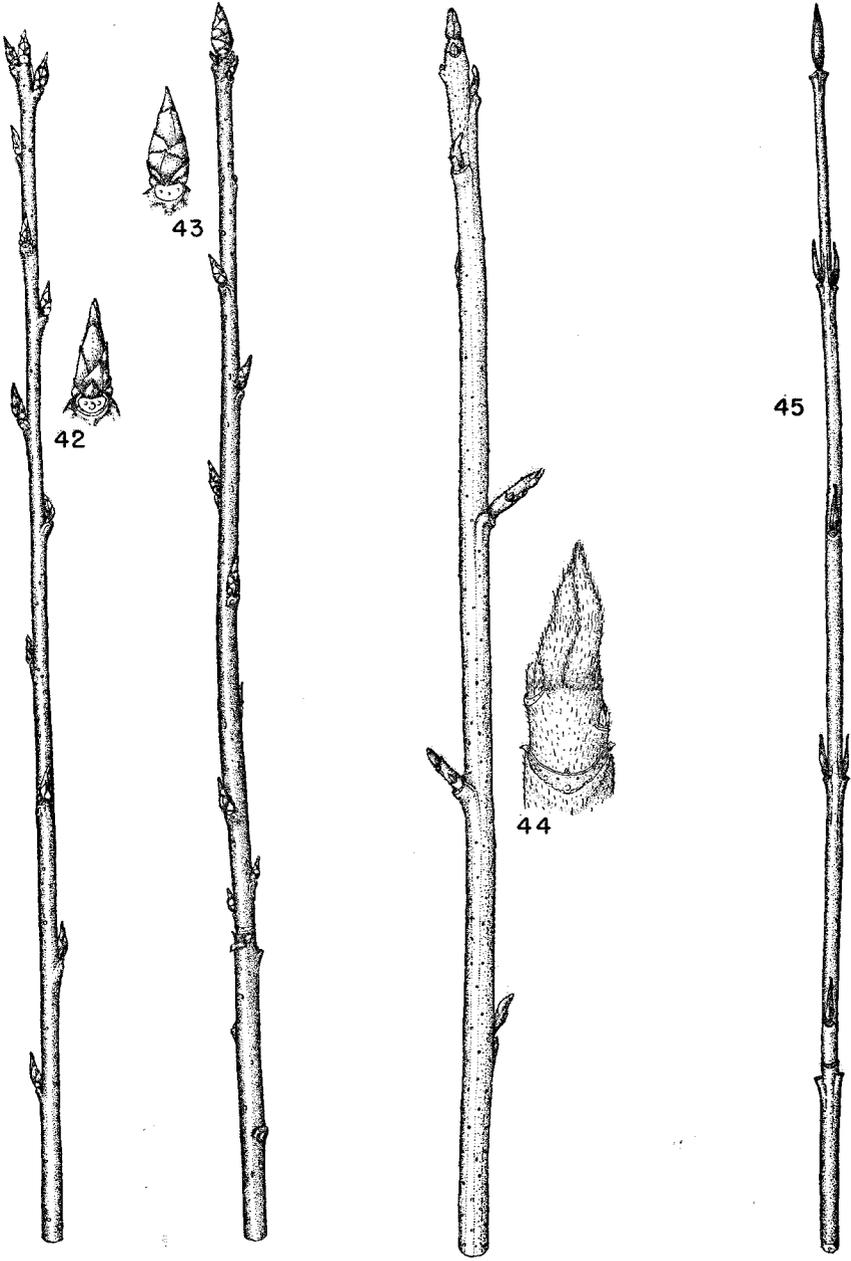


PLATE IX

Leaf scars opposite or nearly so, raised; the leaf scars of a pair not connected around the stem; bundle scar single, horizontally elongated, borne at the upper margin of the leaf scar.

Along shady streams; not common.

ACERACEAE

The Maples and Their Allies

Acer L.

Shrubs or trees; twigs stout to moderate, nearly round to obscurely 6-angled in cross-section; pith round, continuous, pale; buds solitary or laterally multiple, ovoid to conical, sometimes distinctly stalked, with 2 or more visible scales, these morphologically petioles, one or more of the outer scales frequently tipped with leaf-blade rudiments; inner scales commonly markedly accrescent; leaf scars U- to V-shaped; bundle scars 3 or more; stipule scars wanting.

PLATE X-46

Acer macrophyllum Pursh

Big-leaf Maple

Acer macrophyllum Pursh, Fl. Am. Sept. 1:267. 1814. *Acer palmatum* Raf., New Fl. N. Am. 1:48. 1836. *Acer flabellatum* Greene, Lfts. Bot. Obs. 2:249. 1912. *Acer coptophyllum* Greene, l.c. 250. *Acer platypterum* Greene, l.c. *Acer auritum* Greene, l.c. 251. *Acer stellatum* Greene, l.c. 252. *Acer hemionitis* Greene, l.c. *Acer dactylophyllum* Greene, l.c. 253. *Acer leptodactylon* Greene, l.c. *Acer politum* Greene, l.c. 254.

Trees reaching 100 feet under favorable conditions. Branches large, crown round topped, dense; bark on old trunks pale, gray to red-brown, rough with scaly ridges, or smooth and checkered when young.

Twigs stout, the new growth red or green, glabrous, lustrous; lenticels numerous, small, pale, vertically elongated, not raised.

X-section round or oval; pith large, round, pale.

Buds increasing in size toward the apex, from minute at base of twig to large above; terminal bud present, $\frac{1}{2}$ inch, more or less, long, apical internode suppressed, causing terminal bud to appear multiple; lateral buds appressed, 3 sided, slightly stalked; exposed scales about 4, green or red-brown with pale ciliate margins, and tipped with a tuft of longer hairs or frequently with leaf blade rudiments; buds in axils of the outer scales; inner scales densely pubescent; leaf rudiments conduplicate.

Leaf scars V-shaped, low, tawny-colored, joined around the stem in an ascending point; bundle scars 7.

Fruit a double samara, brown during winter, the veined wings as long as 2 inches, not widely spreading; body of the ovary covered by stiff tawny bristles.

Common.

PLATE X-47

Acer douglasii Hook.

Dwarf Maple

Acer douglasii Hook., Lond. Journ. Bot. 6:77. pl. 6. 1846. *Acer glabrum* subsp. *douglasii* Wesml., Bull. Bot. Belg. 29:46. 1890. *Acer glabrum* var. *douglasii* Dippel, Handb. Laubh. 2:438. 1892.

Shrubs or small trees ranging from 6 to 30 feet; branches small, the crown narrow; bark smooth, gray.

Twigs flattened at the nodes, smooth, lustrous, glabrous, red or with shades of purple; lenticels elongate, pale, not raised.

Buds $\frac{1}{4}$ inch long, the terminal slightly larger than the laterals, ovoid, appressed, deep red or purple; scales 2, sharply keeled, the keel extending down the stalk.

Fruit a double samara, wings not widely spreading, glabrous. Mountains along streams.

PLATE X-48

Acer circinatum Pursh

Vine Maple

Acer circinatum Pursh, Fl. Am. Sept. 1:267. 1814. *Acer modocense* Greene, Pitt. 5:4. 1902.

Shrub or occasionally a small tree, ranging from 3 to 30 feet, sometimes sprawling, vine-like and rooting at the nodes; much branched, the branches crooked, irregular in shape; bark smooth, gray with red tinge.

Twigs slender, much branched in open-grown plants, the new growth glossy red, shading into greenish red, glabrous, occasionally ribbed below the leaf scars; lenticels obscure; twigs slightly gummy.

X-section round; pith somewhat angled, continuous.

Buds $\frac{1}{8}$ inch long, the terminal generally wanting, the lateral buds of the nearest node appearing terminal, enlarged, the lower laterals very small; visible scales usually 4, red or green at the base, glabrous, shining, with white-ciliate margins and a tuft of longer hairs at the tip; whole bud subtended by a fringe of long white hairs from upper margin of the leaf scar.

Leaf scars narrowly linear at base of the season's growth, broader approaching the tip, sometimes enclosed for a time by a persisting subtending ridge; bundle scars 3.

Fruit a double samara, the wings at nearly right angles to the petiole, red, at maturity becoming tawny, glabrous. Along streams and in woods; common.

RHAMNACEAE

Chittim and Its Allies

Rhamnus L.

Shrubs or small trees; twigs cylindrical; pith round in cross-section, continuous, solid; buds naked or scaly, alternate or opposite; leaf scars slightly raised; bundle scars 3; stipule scars minute.

PLATE X-49

Rhamnus purshiana DC.

Cascara; Chittim

Rhamnus alnifolia Pursh Fl. Am. Sept. 1:166. 1814, *non* L'Her, 1788. *Rhamnus purshiana* DC., Prod. 2:25. 1825. *Rhamnus anonaefolia* Greene, Pitt. 3:16. 1896.

Shrub or small tree reaching 35 feet or more, the crown tending to be pyramidal; bark smooth, gray, sometimes with brown tints.

Twigs moderately slender, dark red-brown, sometimes with a dull luster on the lower portions, short gray pubescence above, occasionally becoming velvety toward the ends, obscurely ribbed from the stipule scars, somewhat keeled below the leaf scars; lenticels pale, vertically elongated; twigs branching the first season, the branches 4-ranked, leaf scars frequently displaced to one side of the branch base.

X-section round; pith moderately large, round, pale with darker center, continuous.

Buds naked, leaf rudiments tawny, covered by short, stiff, rusty pubescence, conduplicate; lateral buds small, becoming stalked in spring as shoot elongation begins before expansion of the leaf rudiments; internodes of the twig progressively shortened, passing into the partially elongated lower internodes of the terminal bud; leaves tardily deciduous.

Leaf scars small, raised, oval to broadly lunar, grouped in decussate pairs; phyllotaxy $2/4$; leaf scars appearing originally to have been opposite, the units of each pair now having become separate; oval stipule scars present.

Common in open woods and thickets.

Ceanothus L.

Shrubs or small trees with spreading branches; twigs slender, cylindrical, green or brown, ours with minute glandular blisters; pith white, continuous, round in X-section; buds small, branches often developing the first year; bud scales morphologically stipules, only the lower scales distinct, usually exposing the very hairy leaf rudiments; leaf scars raised, small, half round; bundle scars 1 to 3; stipule scars present.

PLATE X-50

Ceanothus integerrimus H. and A.

Deer Brush

Ceanothus integerrimus H. and A., Bot. Beech. Voy. 329. 1839-40. *Ceanothus andersonii* Greene, Lfts. Bot. Obs. 1:66. 1904.

Shrubs 3 to 8 feet tall, with widely diverging, pliant, drooping branches; bark red-brown, becoming gray.

Twigs very slender, sparsely puberulous, rough with minute glandular blisters, ribbed below the leaf scars, mostly dull red, sometimes green or a nondescript dark color, becoming a smooth dull red-brown on older portions; branchlets ascending.

X-section round or faintly angled; pith white, round, continuous.

Buds $\frac{1}{8}$ inch or less, appressed, terminal bud larger, poorly covered by several narrow acuminate keeled scales, these sparingly pubescent, brown, usually black-tipped, the margins scarios; densely pubescent leaf rudiments exposed, these longer than the scales.

Leaf scars alternate, half-round to elliptical, sometimes obscured by a subtending ridge; phyllotaxy 2/5; bundle scars 3.

Fruiting panicle often persistent, with remains of 3-lobed circumscissile capsules.

Dry hillsides.

PLATE X-51

Ceanothus sanguineus PurshOregon Tea; Buckbrush;
Shushula

Ceanothus sanguineus Pursh, Fl. Am. Sept. 1:167. 1814. *Ceanothus oregonus* Nutt. ex Torr. and Gray, Fl. N. Am. 1:265. 1838.

Shrub reaching 9 feet tall, the branches slender, red or occasionally green, with a gray or dark overcoating.

Twigs moderately slender, dull, dark or deep maroon red, green on shaded portions, glabrous, roughened by many minute dark granular blisters.

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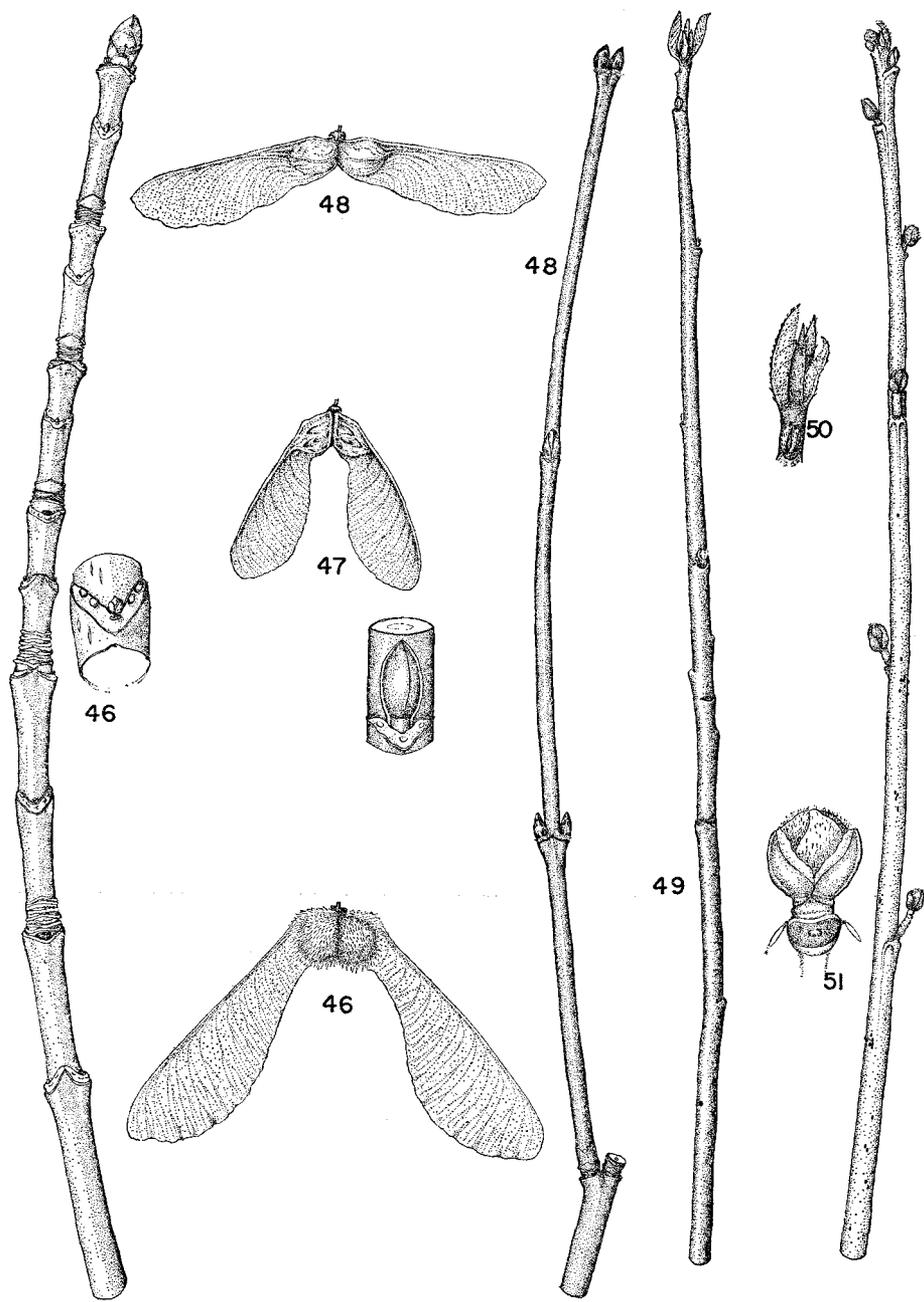


PLATE X

X-section round; pith white, crenately round, continuous; bark astringent and bitter.

Buds becoming long-stalked by spring, flower buds globose, terminal and other leaf buds conical, protected by several stipular scales, these broad, acute, keeled, the margins scarious; outer scales sparingly pubescent, inner scales densely woolly.

Leaf scars alternate, raised, minute, half round, often with a persistent petiole cap; bundle scars 3; phyllotaxy 2/5; stipule scars long-linear.

Remains of fruiting panicles sometimes persisting for more than a season; capsule 3-lobed, circumscissile.

Thickets and roadsides, Willamette Valley, Oregon, northward.

ARALIACEAE

The Ginseng Family

Oplopanax Koch

Stout, erect, mostly spiny shrubs; leaf scars alternate.

PLATE XI-52

Oplopanax horridum (Sm.) Miq.

Devil's Club

Panax horridum Sm. in Rees' Cycl. 26:10. 1813. *Aralia erinacea* Hook., Edinb. Journ. Sci. 6:64. 1827. *Oplopanax horridum* Miq., Ann. Mus. Bot. Lugd. 1:16. 1863. *Fatsia horrida* Benth. and Hook., in Brew. and Wats. Bot. Calif. 1:273. 1876. *Ricinophyllum horridum* Nels. and MacBr., Bot. Gaz. 61:45. 1916.

Stout erect shrubs from 3 to 12 feet; stems cane-like, $\frac{1}{2}$ inch or more in diameter, straw-colored, densely covered by cortical prickles $\frac{1}{2}$ inch long, arranged in spiral series on the internodes, subtending the leaf scars, and surrounding the buds.

X-section round; wood thin; pith large, white, continuous. Terminal bud well developed, conical, over $\frac{1}{2}$ inch long; laterals small, hidden by a collar of closely-appressed prickles; scales brown-papery, the outer two loose.

Leaf scars alternate, U-shaped; bundle scars about 13, in a single series; stipule scars wanting; phyllotaxy 2/5.

Moist woods.

CORNACEAE

The Dogwoods and Their Allies

Cornus L.

Small trees and shrubs with slender curved branches; pubescence often appressed, the hairs attached by their centers; bark mostly smooth; buds naked or with poorly-developed scales, mostly stalked; leaf scars opposite, joined around the stem, the subtending ridges from petiole bases persistent the first season; bundle scars 3; stipule scars wanting.

PLATE XI-53

Cornus Nuttallii Aud.

**Common Dogwood;
Flowering Dogwood**

Cornus nuttallii Aud. *ex* Torr. and Gray, Fl. N. Am. 1:652. 1840. *Cynoxylon nuttallii* Shafer in Britt. N. Am. Trees 746. 1908.

Small tree reaching 40 feet, often straggling; bark smooth, gray.

Twigs slender, curved between the distant nodes, mostly dull gray, or occasionally red or green on new growth, at first pubescent with short appressed 2-branched hairs, becoming glabrous.

X-section round or obscurely 6-angled; pith oval or 6-angled, spongy, pale brown.

Leaf buds narrow, $\frac{1}{4}$ inch or more long, usually with 2 pairs of narrow, keeled, green, red, or purple scales, covered by gray, closely-appressed, short, stiff, recurved hairs; flower buds with 2 scales opening early, exposing the hemispherical, long-stalked bud, this $\frac{1}{2}$ inch in diameter, the 2 scales persisting at the base, with leaf buds in their axils.

Leaf scars opposite, not raised, narrowly triangular, subtended by a ridge left from petiole base, this persistent the first season; bundle scars 3.

Common in woods and at their margins, from low to medium altitudes, particularly in the Willamette Valley, Oregon; more localized in western Washington.

PLATE XI-54

Cornus occidentalis (T. & G.) Cov. **Western Red Dogwood**

Cornus sericea var. *occidentalis* Torr. and Gray, Fl. N. Am. 1:652. 1840. *Cornus pubescens* Nutt., N. Am. Sylva 3:54. 1849, non Willd. *Cornus occidentalis* (T. & G.) Cov., Contr. U. S. Nat. Herb. 4:117. 1893.

Shrubs reaching 15 feet; bark thin, brown, smooth or scaly on mature specimens.

Twigs slender, red with purple tints, lustrous, with short, white, appressed straight hairs (pointed at each end and attached by their centers), or with some spreading hairs; twigs ribbed below the leaf scars.

X-section round; pith obscurely 6-angled, white, continuous. Buds about $\frac{1}{4}$ inch long, short-stalked, appressed, covered by 2 dark pubescent scale-like leaves; flower buds terminal, turbinate.

Leaf scars opposite, raised, narrowly V-shaped, usually covered by persistent petiole bases; bundle scars 3.

Stream sides.

ERICACEAE

The Huckleberries and Their Allies

Cladothamnus Bong.

Erect branching shrubs, leaf scars alternate; fruit a depressed-globose capsule, the 5 to 6 carpels partially splitting apart at maturity.

PLATE XI-55

Cladothamnus pyrolaeiflorus Bong.

Copper
Rhododendron

Cladothamnus pyrolaeiflorus Bong., Mem. Acad. St. Pétersb. VI. 2:155. 1832. *Tolmiea occidentalis* Hook., Fl. Bor. Am. 2:45. 1834.

Shrub as tall as 6 feet, branches erect, rigid; bark exfoliating. Twigs straight, dark red-brown, becoming glaucous and gray, angled, glabrous except for short spreading red-brown pubescence along the ridges; bud scales persisting; bark exfoliating and shredding after the first year; inner bark red-brown.

X-section angled; pith brown.

Buds $\frac{1}{3}$ inch or less, ovoid, acute, glabrous; scales 2 keeled, margins scarious.

Leaf scars alternate, low, covered by the torn epidermis, the single bundle scar protruding; phyllotaxy 2/5; stipule scars none.

In Oregon, known only from Saddle Mountain in Clatsop County, found at scattered stations in the Cascade Range in Washington.

Menziesia Smith

Shrubs with slender cylindrical twigs and shreddy bark; pith small, round in cross section, continuous; buds solitary, sessile, ovoid, small; terminal and subterminal buds larger than the lower laterals, each with several exposed scales; leaf scars crowded near the tips of the twigs, small, tending to be 3-sided; bundle scar single; stipule scars none.

PLATE XI-56

Menziesia ferruginea Sm.**Fool's Huckleberry**

Menziesia ferruginea Sm., Ic. Pl. 3: pl. 56. 1791. *Menziesia urceolaris* Salisb., Par. Lond. pl. 44. 1806. *Menziesia glabella* Gray, Syn. Fl. 2:39. 1878.

Shrub reaching 6 feet, erect; bark red-brown, shredding; branches often grouped, appearing whorled.

Twigs slender, rigid, short-pubescent, faintly lined below the leaf scars; internodes greatly shortened near the tips; bark becoming shreddy the second or third season, the inner bark red-brown.

X-section round; pith small, pale brown, continuous.

Buds conical, acute, about $\frac{1}{4}$ inch long, the terminal bud larger, with 3 or 5 visible scales, these short-pubescent, strongly keeled, at least the lowest with long-, yellow-ciliate margins; most nodes and buds near ends of the twigs, the lower buds not greatly developed.

Leaf scars alternate, shield-shaped to transverse at base of the season's growth, continuous with the epidermis and exfoliating with it on older stems, leaving only the single bundle scar visible on lower portions of the stems; stipule scars wanting.

Fruit a 5-loculed capsule splitting into 5 valves at maturity and persisting like a small brown flower during the winter.

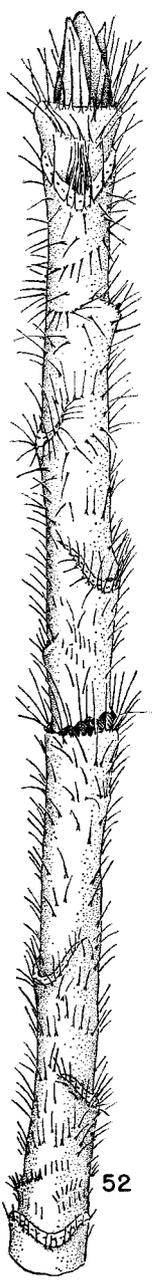
Along the coast and in the Cascade Mountains.

Vaccinium L.

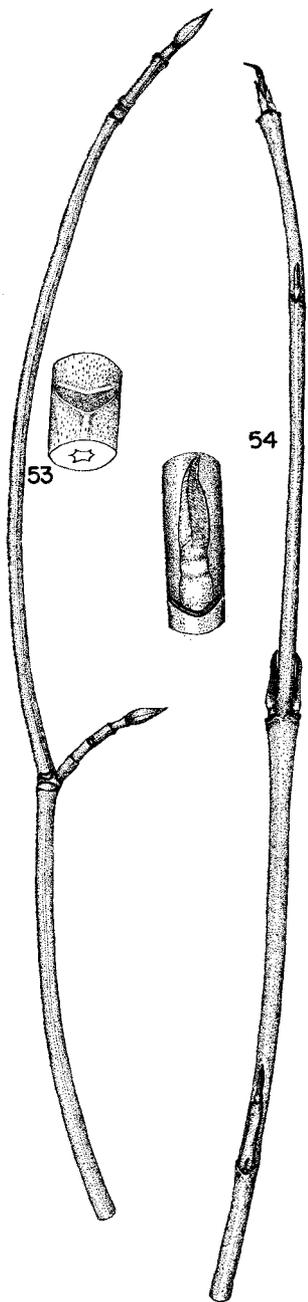
Low shrubs with slender, usually angled, twigs; pith small continuous; buds small, solitary, sessile, with 2 subvalvate to several imbricate scales; terminal bud wanting; leaf scars alternate, small, raised; bundle scar 1; stipule scars wanting.

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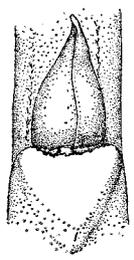


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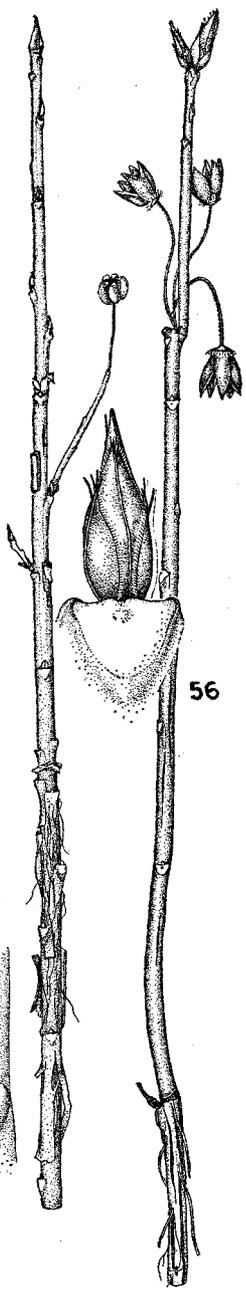


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PLATE XI

PLATE XII-57 *Vaccinium caespitosum* Michx. **Dwarf Huckleberry***Vaccinium caespitosum* Michx., Fl. Bor. Am. 1:234. 1803.

Low densely tufted shrub, 1½ feet or less in height.

Twigs slender, rigid, orange-brown, neither angled nor ribbed, sparingly pubescent with minute upward-pointing hairs; bark exfoliating near the base.

X-section round or nearly so; pith small.

Buds small, mostly under ¼ inch, appressed, ovoid, blunt, glabrate, lustrous orange-brown; visible scales 2, subvalvate, brown, shading to red, not keeled.

Leaf scars alternate, greatly raised, half-round to elliptical, sometimes subtended by a low ridge; bundle scar single; phyllotaxy 2/5.

Sphagnum bogs of coast and mountains.

PLATE XII-58 *Vaccinium occidentale* Gray **Western Huckleberry***Vaccinium occidentale* Gray, Bot. Cal. 1:451. 1876.

Low rigid shrubs reaching 3 feet; branches dense; bark gray, exfoliating and shredding, leaving smooth red inner bark.

Twigs slender, rigid, unlined, sometimes with a slight bloom at the tips, glabrous, the new growth pale orange-brown, turning dark gray, the exfoliating bark exposing a smooth red-brown stem; bud scales persistent.

X-section round.

Buds 1/16 inch, globose; visible scales at first 2, these soon exposing the inner scales, bluntly keeled, glabrous, sometimes with a bloom.

Leaf scars alternate, half-round, raised, sometimes subtended by a small ridge; bundle scar single.

Mountain swamps and bogs.

PLATE XII-59 *Vaccinium uliginosum* L. **Bog Huckleberry***Vaccinium uliginosum* L., Sp. Pl. 350. 1753.

Low shrubs reaching 3 feet, abundantly branched, decumbent or erect; bark brown or dark gray.

Twigs slender, orange-brown, turning gray or red-brown, not ribbed, the pubescence stiff, white, spreading; bark becoming shreddy; bud scales persisting.

X-section round.

Buds 1/16 inch, ovoid, diverging, brown, shining; exposed scales 4 to 6, acute, mostly glabrous, strongly keeled, the inner scale hood-like over top of bud.

Leaf scars alternate, raised, half-round to crescent-shaped;
bundle scar single; phyllotaxy 2/5.
Coastal and mountain swamps and bogs.

PLATE XII-60

Vaccinium scoparium Leib. **Small Red Huckleberry**

Vaccinium myrtillus L. var. *microphyllum* Hook., Fl. Bor. Amer. 2:33. 1834. *Vaccinium microphyllum* Rydb., Bull. Torr. Bot. Club 24:251. 1897, non Reinw. 1826. *Vaccinium scoparium* Leib., Mazama 1:196. 1897.

Low wispy shrub less than 2 feet tall; branches dense, green, upright.

Twigs very slender, frequently twisted, sharply angled and winged, green, with sparse long, soft, white hairs.

X-section 5-angled; pith small, white, 5-angled, continuous. Buds 1/16 inch long, yellow, appressed, ovoid, acute, the 2 exposed scales imbricate at the base, subvalvate above, glabrous or with long fine hairs.

Leaf scars alternate, raised, oval, sometimes subtended by a low ridge; bundle scar single; phyllotaxy 2/5.

Mountains.

PLATE XII-61

Vaccinium parvifolium Smith **Red Huckleberry**

Vaccinium parvifolium Smith in Rees' Cycl. 36 (3). 1817.

Shrubs irregular in form, sometimes reaching 15 feet.

Twigs moderate in size, bright green, sharply 5-angled, stiff, generally curving upward, glabrate or with sparse minute hairs; lenticels inconspicuous.

X-section 5-sided; pith green, irregularly shaped, often eccentric, continuous.

Buds ¼ inch long or less, ovoid, appressed, tips flattened, diverging; exposed scales 2, imbricate at the base, subvalvate above, red or rosy.

Leaf scars alternate, raised, sometimes subtended by a low ridge; bundle scar single; phyllotaxy 2/5.

Not uncommon in thickets and on burned-over or logged-over areas, particularly along the coast and at low altitudes in the mountains.

PLATE XII-62

Vaccinium membranaceum Dougl. **Mountain Huckleberry**

Vaccinium myrtilloides var. *macrophylla* Hook., Fl. Bor. Am. 2:32. 1834. *Vaccinium membranaceum* Dougl. l.c. as synonym; Dougl. ex Torr., Bot. Wilkes Exp. 377. 1878. *Vaccinium macrophyllum* Piper, Contr. U. S. Herb. 11:443. 1906.

PLATE XII

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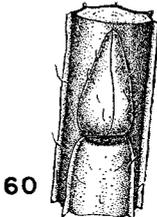
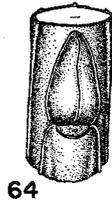
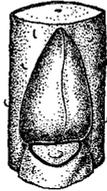
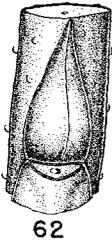
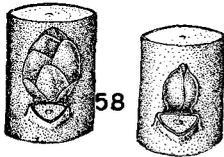
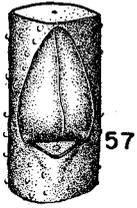


PLATE XII

Shrub, sometimes reaching 5 feet, generally shorter; the branches slender, erect or spreading; bark gray, shredding, exfoliating.

Twigs slender, gray or straw-colored to deep red, sharply angled, ribbed below the leaf scars, glabrous, or pubescent with minute upward-turning hairs.

X-section 5-angled; pith oval or irregular in shape, green. Buds $\frac{1}{8}$ inch, appressed, acute, flattened at the tips, the 2 exposed scales imbricate at the base, subvalvate above, glabrous, keeled, mostly pale red; inner scales pink; leaf rudiments imbricate.

Leaf scars alternate, raised, subtended by a small ridge; bundle scar single.

Mountains, 3,000 feet and above.

PLATE XII-63

Vaccinium deliciosum Piper **Blue-leaved Huckleberry**

Vaccinium deliciosum Piper, Mazama 2:103. 1901.

Low shrubs 1 foot or less in height, tending to be prostrate; branches short, rigid, erect; bark gray or red-brown.

Twigs slender, strongly ribbed below the leaf scars, red-brown, glabrate, occasionally with pubescence of short, stiff, white, upward-turning hairs; bark exfoliating after several seasons.

X-section 5-angled.

Buds under $\frac{1}{8}$ inch in length, appressed, not flattened at the tips, ovoid; exposed scales 2, glabrous, shining, not keeled, colored like the twig.

Leaf scars alternate, raised, crescent-shaped, often subtended by a small ridge; bundle scar single; phyllotaxy 2/5. High Cascades.

PLATE XII-64

Vaccinium ovalifolium Smith **Tall Blue Huckleberry**

Vaccinium ovalifolium Smith, Rees' Cycl. 36 (2). 1817.

Shrubs reaching 6 feet or more; branches slender, straggling; bark gray.

Twigs slender, sharply 5-angled, strongly ribbed, almost winged, glabrous or glabrate, the new growth rosy, becoming gray and shreddy.

X-section 5-angled; pith small, white, 5-angled, continuous. Buds $\frac{1}{8}$ inch, the youngest bud a little longer, ovoid, appressed or slightly spreading, tips not flattened; exposed scales 2, imbricate at the base, subvalvate above, keeled, glabrous, rosy.

Leaf scars alternate, crescent-shaped, raised, subtended by a small ridge; bundle scar single; phyllotaxy 2/5.

Deep woods near the coast and in low mountains.

OLEACEAE

The Olive Family

Fraxinus L.

Trees or shrubs; twigs stout, often compressed at the nodes; pith 6-angled or elliptical; buds sessile, in some species superposed; leaf scars opposite, rarely alternate, large and broad, covered by a membrane that in some species also partially covers the bud; bundle scars many; stipule scars wanting.

PLATE XIII-65

Fraxinus latifolia Benth.

Oregon Ash

Fraxinus latifolia Benth., Bot. Sulph. 33. 1844. *Fraxinus oregona* Nutt., N. Am. Sylva 3:59. pl. 99. 1849. *Fraxinus americana* L. var. *oregona* Wesmael., Bull. Soc. Belg. 31:110. 1892. *Fraxinus oregona* Nutt. var. *latifolia* Lingelsh., Engl. Bot. Jahrb. 40:220. 1907.

Trees reaching 120 feet; branches large, crown wide, round-topped; bark thick, deeply furrowed, light gray to gray-brown.

Twigs stout or moderately so, compressed at the nodes, red or green, becoming brown, finally gray with green tones, sometimes glabrous, generally with white to brown woolly pubescence; lenticels pale, slightly raised, vertically elongated; bark with astringent taste.

X-section round or oval; pith moderately large, continuous, 6-angled, white.

Terminal bud $\frac{1}{4}$ inch, conical, sometimes subtended by a pair of laterals, densely brown-scurfy or pubescent; lateral buds minute, partially covered by a membrane.

Leaf scars opposite, large, shield-shaped, as long as or longer than broad, covered by a yellowish or tawny membrane; bundle scars many in an ellipse, usually visible through the membrane.

Common along river bottoms and swales.

CAPRIFOLIACEAE

The Honeysuckles and Their Allies

Lonicera L.

Shrubs or twining vines; twigs round in cross-section, mostly slender; pith often hollow; buds single or superposed, sessile; scales 2 or more, opposite, 4-ranked; leaf scars small, on raised petiole bases connected by lines encircling the twigs; bundle scars 3.

PLATE XIII-66

Lonicera involucrata
(Richards.) Banks

**Bush Honeysuckle;
Twinberry; Inkberry**

Xylosteum involucratum Richards., Bot. App. Frankl. Journ. 733. 1823. *Lonicera involucrata* (Richards.) Banks ex Spreng. Syst. 1:759. 1825. *Lonicera ledebourii* Esch., Mem. Acad. Petersb. 10:284. 1826.

Shrub reaching 8 feet, erect; bark smooth, gray or tawny, tending to shred.

Twigs moderately slender, sharply keeled and ribbed below the leaf scars, pale orange-brown, glabrous or, when young, densely clothed with minute glandular hairs, or somewhat long-hairy.

X-section round or oval; pith oval, sometimes obscurely 6-angled, white, continuous.

Buds small, lateral buds $\frac{1}{8}$ inch, the terminal longer, compressed, appearing triangular, about as wide as high; scales of the same color as the twigs, glabrous, dry, 2 pairs exposed.

Leaf scars opposite, joined by a narrow line, slightly raised, obscured by a corky callus; bundle scars 3, along the upper margin.

Largely coastal, along streams and on sand dunes; less common inland.

PLATE XV-78
(Page 99)

Lonicera utahensis S. Wats.

**Rocky Mountain
Honeysuckle**

Lonicera utahensis S. Wats., Bot. King Explor. 133. 1871.
Lonicera ebractulata Rydb., Mem. N. Y. Bot. Gard. 1:372. 1900.
Xylosteon utahensis (Wats.) Howell, Fl. N. W. Am. 282. 1900.

Shrub 3 to 6 feet tall, bushy-spreading; bark smooth, shredding with age.

Twigs slender, rather sharply ribbed, greenish, brownish, or mahogany; glabrous or, when young, with sparsely scattered, minute, stalked, dark glands, and with occasional long hairs.

X-section essentially round; pith white, continuous.

Buds small, the terminal larger than the lateral, broadly acute; scales broad, keeled, generally dark with contrasting pale margins; usually 3 (sometimes more) pairs exposed.

Leaf scars opposite, nearly joined by a narrow line, raised, narrow, soon obscured by a corky growth; bundle scars 3.

Found at high altitudes. In our area, known only at timberline in the Olympic Mountains.

PLATE XIII-67

Lonicera hispidula (Lindl.) Dougl. **Pink Honeysuckle**

Caprifolium hispidulum Lindl., Bot. Reg. 21: pl. 1761. 1836. *Lonicera hispidula* (Lindl.) Dougl. ex T. & G. Fl. N. Am. 2:8. 1841. *Lonicera hispidula* var. *douglasii* Gray, Proc. Am. Acad. 8:628. 1873. *Lonicera microphylla* Hook., Fl. Bor. Am. 1:283. 1833, non Willd., 1819. *Lonicera californica* T. & G., Fl. N. Am. 2: 7. 1841. *Caprifolium californicum* K. Koch, Hort. Dendr. 294. 1853. *Lonicera hispidula* var. *vacillans* Gray, Proc. Am. Acad. 8:628. 1873. *Caprifolium hispidulum* var. *californicum* Greene, Fl. Fran. 347. 1892. *Lonicera hispidula* var. *californica* Rehd., in Bail. Cyc. Am. Hort. 3:943. 1900.

Stems twining or trailing, reaching 9 feet in length, slender, widely branched, hispid to nearly glabrous, often with stalked glands, purple to straw-colored; lenticels inconspicuous, white, not raised.

X-section round, scarcely woody; pith white, round or 6-angled, hollow.

Buds small, diverging, dorsally flattened; exposed scales 2 or more pairs, acuminate, strongly keeled, purple and glaucous at first, becoming straw-colored and dry, margins ciliate, often with stalked glands; the lowest pair of scales saccate at the base, pubescent; upper scales glabrous.

Leaf scars opposite, roughly triangular, joined by stipule scars, raised on petiole bases, obscured by a corky development, surrounded by a few long simple pointed hairs.

Open woods and thickets.

PLATE XIII-68

Lonicera ciliosa (Pursh) DC. **Climbing Honeysuckle**

Caprifolium ciliosum Pursh, Fl. Am. Sept. 1:160. 1814. *Lonicera ciliosa* (Pursh) DC., Prodr. 4: 333. 1830. *Caprifolium occidentalis* Lindl., Bot. Reg. 17: pl. 1457. 1831. *Lonicera occidentalis* Hook., Fl. Bor. Am. 1: 282. 1832.

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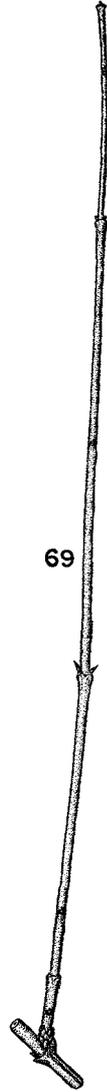
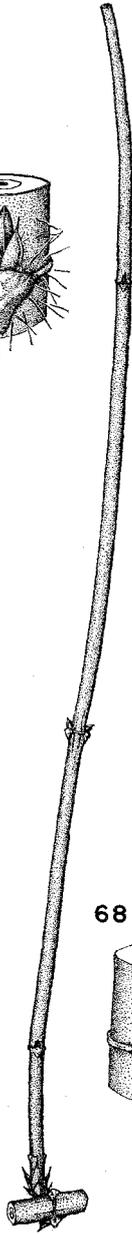
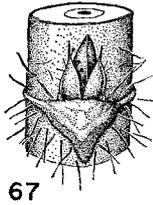
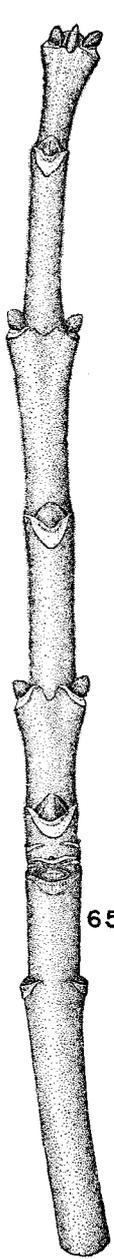


PLATE XIII

Vines, climbing or twining, the slender stems sometimes reaching 20 feet.

Twigs slender, flexible, straw-colored or with purple tints, glabrous except for a few short hairs around the buds; epidermis exfoliating; bark shredding; bud scales persisting.

X-section round or oval; pith white, obscurely angled, hollow. Buds partially hidden behind persisting petiole bases, small, dorsally flattened; exposed scales 2 to 4, straw-colored or tinted with purple, dry, sharply keeled, the inner scales green-margined, with stalked glands; leaf rudiments imbricate.

Leaf scars opposite, joined by a transverse line, raised, obscured by a corky development, roughly triangular; bundle scars 3.

Margins of damp woods, and in thickets.

Symphoricarpos L.

Small shrubs with very slender branches, usually pubescent; pith small, round, brown, usually hollow; buds small, usually compressed, sessile with about 3 pairs of keeled scales exposed; leaf scars opposite, small, usually torn, on permanent petiole bases, connected by transverse lines; bundle scars indistinct.

PLATE XIII-69

Symphoricarpos albus (L.) Blake

Snowberry

Vaccinium album L., Sp. Pl. 350. 1753. *Symphoricarpos racemosus* Michx., Fl. Bor. Am. 1:107. 1803. *Lonicera racemosa* Pers., Syn. 1:214. 1805. *Symphoria racemosa* Pursh, Fl. Am. Sept. 162. 1814. *Symphoricarpos racemosus* var. *laevigatus* Fern., Rhod. 7:167. 1905. *Symphoricarpos albus* (L.) Blake, Rhod. 16:118. 1914. *Symphoricarpos albus* var. *laevigatus* Blake, Rhod. 16: 119. 1914. *Symphoricarpos albus* f. *laevigatus* G. N. Jones, U. Wash. Pub. Biol. 5:236. 1936. *Xylosteum album* Moldenke, Rev. Sud. Bot. 5:3. 1937. *Symphoricarpos rivularis* Sukstd., Werdenda 1:41. 1927.

Shrubs reaching 5 or more feet, erect, widely branched; branches very slender, tawny or dead gray, epidermis shredding.

Twigs slender, greatly flattened at the nodes, keeled below the leaf scars, glabrous, the new growth tawny, mostly dull.

X-section round or oval, pith green or brownish, hollow. Buds less than $\frac{1}{8}$ inch long, globose to ovoid, sometimes laterally multiple; exposed scales several pairs, tawny and

papery, or green with brown tips, triangular and acute; terminal bud generally wanting.

Leaf scars opposite, roughly triangular, raised, connected by a flange in a transverse line or a descending V; bundle scars 3, obscured by a corky development, generally only the central scar visible.

Fruit globose, white, berry-like, about $\frac{1}{3}$ inch in diameter. Common in thickets, on margins of woods, and along roadsides.

Symphoricarpos mollis Nutt. **Mountain Snowberry**

Symphoricarpos mollis Nutt., Fl. N. Am. 2:4. 1841. *Symphoricarpos ciliatus* Nutt., l.c. *Symphoricarpos mollis* var. *acutus* Gray, Syn. Fl. 1²:14. 1884. *Symphoricarpos acutus* Dieck, Hamb. Gart. Blumenzeit. 1888. *Symphoricarpos rotundifolius* var. *acutus* Fr. & Rigg, N. W. Fl. 366. 1912. *Symphoricarpos albus* var. *mollis* Keck, Bull. So. Cal. Acad. Sci. 25:72. 1926. *Symphoricarpos hesperius* G. N. Jones, Journ. Arn. Arb. 21: 220. 1940. *Symphoricarpos mollis* ssp. *hesperius* G. N. Jones, Contr. Dud. Herb. 5 [99] 1958. *Symphoricarpos mollis* var. *hesperius* (G. N. Jones) Cronq., Vasc. Pl. Pac. N. W. 4:465. 1959.

Shrubs, widely branched, stems averaging 2 feet long, spreading or nearly prostrate.

Twigs slender, flattened at the nodes, keeled and ribbed below the leaf scars, short-pubescent, tawny with shades of purple, turning dark gray; epidermis exfoliating; bark shredding.

X-section round or oval; pith green or brown, hollow.

Buds under $\frac{1}{4}$ inch, diverging, dorsally flattened, brown or purple; scales in 2 or 3 pairs, acute or acuminate, keeled; margins scarious, ciliate.

Leaf scars opposite, raised, roughly triangular, connected by a flange; bundle scars 3, obscured by a corky development, rarely more than the central scar visible.

Fruit globose, white, about $\frac{1}{4}$ inch long.

Dry woods, usually at higher altitudes than *S. albus*.

Viburnum L.

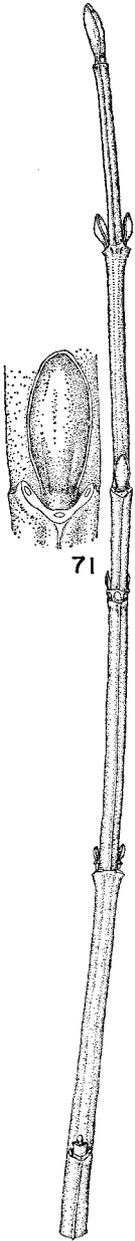
Shrubs, or some species small trees; twigs moderate in size, or slender; pith round or 6-angled in cross-section, continuous; buds mostly stalked, ovoid or oblong; scales wanting, or a single connate pair, or several free pairs; leaf scars opposite; bundle scars 3; stipule scars wanting.

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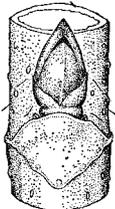
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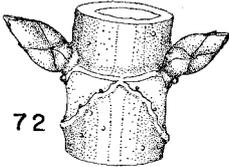
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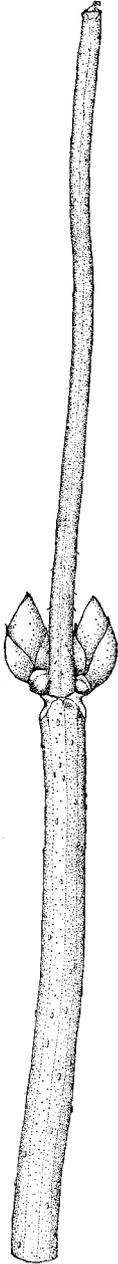


PLATE XIV

PLATE XIV-70 *Viburnum ellipticum* Hook. Western Wayfaring Tree

Viburnum ellipticum Hook., Fl. Bor. Am. 1:280. 1833. *Viburnum ellipticum* var. *macrocarpum* Suksd., Bot. Monats. 18:97. 1900.

Shrubs reaching 12 feet.

Twigs slender, keeled and ribbed below the leaf scars, gray with shades of green or red, glabrous; lenticels minute, slightly swollen, inconspicuous, becoming warty on the second year's growth.

X-section round; pith moderately large, white, continuous. Buds stalked, about $\frac{1}{4}$ inch long, the terminal longer than the lateral, the flower buds turbinate, the leaf buds ovoid; exposed scales in 2 or more pairs, sometimes keeled, ciliate at the tips, glabrous or with scattered hairs, green with red or rosy tips.

Leaf scars narrow, V-shaped, constricted between the bundle traces, sometimes subtended by a fringe of long white hairs.

Along streams and edges of deciduous woods; not abundant.

PLATE XIV-71 *Viburnum edule* (Michx.) Raf. High-bush Cranberry

Viburnum opulus var. *edule* Michx., Fl. Bor. Amer. 1:180. 1803, *Viburnum opulus* Raf., Med. Repos. N. Y. II, 5:254. 1808. *Viburnum pauciflorum* Pylaie ex. T & G. Fl. N. Am. 2:17, 1841.

Shrubs reaching 6 or more feet, slender, with straggling gray branches.

Twigs moderately stout to slender, 6-angled, glabrous, light orange to tawny, turning gray, the epidermis slightly exfoliating.

X-section somewhat 6-angled; pith large, white, more or less clearly 6-angled, continuous.

Buds stalked, about $\frac{1}{4}$ inch long, oblong, blunt; single pair of scales connate, heavily keeled, glabrous.

Leaf scars opposite, raised, broadly U- to V-shaped, narrow, expanded at the bundle scars; bundle scars 3, large, raised, horizontally elongated.

Woods in the Cascades, northward and eastward.

Sambucus L.

Shrubs or small open-branched trees; twigs stout, obscurely many-angled; pith very large, continuous; buds frequently multiple, supra-axillary, occasionally developing the first year, the terminal bud usually absent; leaf scars mostly opposite, very large; bundle scars variable in number, 3, 5, 7; stipule scars commonly wanting.

PLATE XIV-72

Sambucus caerulea Raf.

Blue Elderberry

Sambucus caerulea Raf., Alsographia Am. 48. 1838. *Sambucus glauca* Nutt. ex. T & G., Fl. N. Am. 2:13 1841. *Sambucus maritima* Greene, Man. Bay Reg. 1:163. 1894. *Sambucus decipiens* M. E. Jones, Bull. U. Mont. Biol. 15:46. 1910.

Shrubs or small trees reaching 25 feet; branches stout, spreading, producing a round-topped crown; bark thin, brown, often red-tinged, furrowed, ridged in older specimens.

Twigs stout, obscurely ribbed and bluntly keeled below the leaf scars, lustrous olive-brown; lenticels numerous, orange, shining, only slightly raised, not breaking the epidermis of new growth.

X-section round or obscurely angled; pith very large, white, or discolored in water sprouts, continuous; odor of broken twig unpleasant.

Buds conical, diverging, supra-axillary or apparently stalked, generally superposed, rarely laterally multiple also, the uppermost bud over $\frac{1}{2}$ inch long; exposed scales in several pairs, green, turning purple in cold weather, glabrous, the apices 3-parted, markedly so in the upper scales, the lowest scales short, keeled; leaf rudiments involute; terminal bud frequently not developing, the last internode dying back.

Leaf scars opposite, meeting around the stem, very deep vertically, paler than the twig, the upper margin notched, the superposed buds extending into the notch; bundle scars 7, arranged along the lower margin of the leaf scar.

Moist locations along streams, or on moist, more or less shaded, hillsides.

PLATE XIV-73

Sambucus callicarpa Greene

Red Elderberry

Sambucus racemosa L. var. *arborescens* T. & G., Fl. N. Am. 2:13. 1841, non *S. arborescens* Gilib. 1792. *Sambucus callicarpa* Greene, Fl. Fran. 342. 1892. *Sambucus leiosperma* Leib., Proc. Biol. Soc. Wash. 11:40. 1897. *Sambucus arborescens* How., Fl. N. W. Am. 279. 1900.

Shrubs or small trees reaching 20 feet; branches spreading.

Twigs stout, gray-green with a silvery sheen, 8-angled; lenticels raised, breaking the epidermis of last season's growth, pinkish-brown, vertically elongated, fewer than the lenticels of *S. caerulea*, but larger and more prominent.

PLATE XV

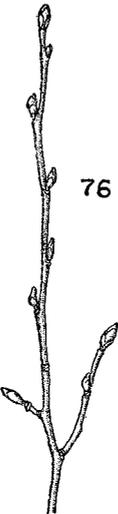
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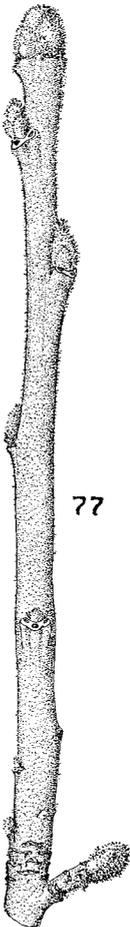
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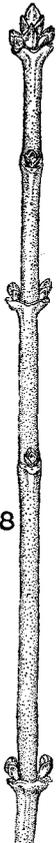
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PLATE XV

X-section 8-angled, less definitely woody than in *S. caerulea*; pith very large, brown, continuous; odor unpleasant. Buds appressed, ovoid and acute, laterally multiple, rarely superposed, the main bud over $\frac{1}{2}$ inch long; exposed scales in several pairs, green, the exposed portions turning purple in cold weather, glabrous, the margins sometimes ciliate; lower pair of scales short, bluntly keeled, sometimes bearing buds in their axils; terminal bud frequently not developing, the last internode dying back.

Leaf scars opposite, usually not quite meeting around the stem, deeper than broad, the upper margin extending over the base of the bud, not at all notched; bundle scars 5 to 7, arranged along the lower margin of the leaf scar.

Moist situations, principally west of the Cascade Mountains.

Glossary

- Accessory.** Additional; accompanying.
- Accrescent.** Said of scales which lengthen as the bud develops.
- Acorn.** The nut of an oak; generally subtended by a scaly cup.
- Acuminate.** Tapering to a slender point.
- Acute.** Narrowing rather abruptly to a point.
- Alternate.** Said of buds arranged spirally on a stem, with generally a single axillary bud at each node.
- Annual.** Maturing in a single growing season.
- Appressed.** Pressed closely against a surface.
- Armed.** Bearing prickles, spines, or thorns.
- Asymmetrical.** Not symmetrical; irregular.
- Auxiliary.** Additional to the typical number; accessory.
- Axil.** Upper angle between the leaf (or leaf scar) and the stem.
- Axillary.** Occuring in the axil.
- Biennial.** Requiring two growing seasons to reach maturity.
- Bifid.** Divided into two approximately equal lobes.
- Blade.** The typically expanded portion of a leaf.
- Bloom.** A thin powdery coating of wax.
- Branchlet.** A secondary branch.
- Bud.** A rudimentary shoot, flower, or inflorescence.
- Bud scale.** A modified leaf or part of a leaf protecting bud rudiments.
- Bud scar.** The generally multiple scar left by detachment of bud scales at the beginning of a new season's growth.
- Bundle scar.** The scar, within a leaf scar, left by dismemberment of a vascular bundle.
- Callus.** A tough or hardened part or projection.
- Calyx.** The outer whorl of organs in a typical flower; the sepals, collectively.
- Calyx lobes.** The free tips of partially fused sepals.
- Catkin.** An inflorescence consisting of a bracted, generally pendulous, spike of minute apetalous flowers, as in Birch, Willow, and the staminate inflorescence of Alder.
- Chambered.** Lamellate; divided into thin plates.
- Checked.** Marked, by fissuring, into a checkered pattern.
- Ciliate.** Fringed.
- Circumscissile.** Splitting around the circumference.
- Compound.** Divided into units, as leaves composed of leaflets.
- Conduplicate.** Folded lengthwise along the midrib.
- Connate.** Fused from the beginning.
- Cortical.** Occurring on or pertaining to the cortex.
- Corymb.** An approximately flat-topped indeterminate inflorescence; applies also, of course, to fruit arrangement.
- Corymbose.** Corymb-like or pertaining to a corymb.
- Crenate.** Cut into rounded scallops.
- Crown** (of tree or shrub). The trunk, branches, and foliage, as a whole.
- Cup or Cupule** (of an acorn). The cup- or saucer-shaped arrangement of bracts subtending the acorn.
- Deciduous** (leaves, bud scales, etc.). Becoming detached, typically at end of the normal time of functioning.
- Deciduous** (trees or shrubs). Those whose foliage normally falls at end of the growing season.
- Decumbent.** Prostrate, but with the tip erect.
- Decussate.** Arranged in pairs, each pair at a right angle to that above or below.

Dehiscent. Splitting, generally along definite lines.

Depressed-globose. Said of an otherwise globose structure which has a somewhat shortened longitudinal axis.

Determinate. In an inflorescence, having the axis terminated by a flower, thus ending further elongation; in twig growth, having elongation regularly and abruptly ended by the formation of a terminal bud.

Dichotomous. Regularly dividing into pairs.

Diverging (buds). Leaning away from the stem.

Drupe. An indehiscent fruit with a fleshy or fibrous outer, and a hard inner, layer, surrounding the seed; "a stone" fruit.

Eccentric. Off center; excentric.

Emarginate. Notched at the apex.

Endemic. Growing naturally in a certain limited area.

Entire. Without teeth or irregularities.

Epidermis. The outer tissue of a plant structure.

Excentric. Off center; eccentric.

Exfoliating. Scaling or flaking off.

Fascicled. In bundles or clusters.

Flange. A widened flattened rim or ridge.

Floral. Pertaining to flowers.

Floral bud. A bud containing rudiments of a flower or an inflorescence.

Fluted. Grooved or channeled.

Foliolate. Divided into leaflets.

Fragmenting. Separating into fragments.

Fusiform. Tapering at each end; spindle-shaped.

Genera. Plural of *Genus*.

Genus. A major classification category between a family and a species.

Glabrate. Glabrous or nearly so; becoming glabrous with age.

Glabrous. Having a smooth surface, without hairs.

Glandular. Bearing glands.

Glaucous. Having a whitish bloom.

Globose. Spherical.

Herbaceous. Having the qualities of an herb; not woody.

Hispid. Bearing stiff hairs or bristles.

Imbricated. Overlapping in regular order, like shingles on a roof.

Incised. Having the margin deeply and generally irregularly cut.

Indeterminate. Indefinitely terminating. Said of an inflorescence whose flowers open in succession from below, upward on the axis; of a twig which continues to grow until unfavorable conditions kill the apex, no terminal bud having been formed.

Inflorescence. The arrangement of flowers on an axis; the axis with its flower or flowers.

Internodal. Borne on the internode.

Internode. The length of stem between two nodes.

Involute. Rolled inward at the margins.

Keeled. Having a longitudinal ridge-like process.

Lamellate. Formed of or bearing thin plates; chambered.

Lanceolate. Lance-shaped; narrow, tapering to a long apical point, and often to a shorter basal one.

Lateral bud. A bud formed on the side of a stem, as opposed to a terminal bud.

Laterally multiple buds. Collectively, a lateral bud plus one or more horizontally-placed accessory buds.

Leaf bud. A bud containing the rudiments of a shoot.

Leaf scar. The scar remaining when a leaf falls.

Lenticel. A cortical pore on a woody stem, generally surrounded by a corky rim.

Linear. Narrow; line-like.

Locule. A cavity; the seed-bearing cavity of an ovary.

Lunate. Crescent-shaped.

Membranous; membranaceous. Thin, colorless.

Mixed bud. A bud containing rudiments of both shoot and flower.

Morphologically. Structurally; pertaining to the structural origin.

Mucronate. Abruptly ending in a sharp point.

Mucronulate. Tipped by a minute point.

Multiple. Consisting of more than one. Said of buds or of bundle scars when accessory units are present.

Naked buds. Those without protective scales.

Nodal. Pertaining to nodes.

Nut. A hard-shelled dry fruit typically containing a single seed.

Nutlet. A minute nut; or a separate small nut-like section of a compound fruit which divides, at maturity, into individual carpels or half-carpels.

Obcordate. Inversely heart-shaped.

Obtuse. Blunt.

Opposite (buds, bud scales, etc.). Paired at a node, the two units on opposite sides of the stem, and perpendicular to the preceding and following pairs.

Ovoid. Egg-shaped, with the larger end at the base.

Palmate. Having lobes or divisions radiating from a common point.

Panicle. A compound raceme; an inflorescence having racemose branches.

Pedicel. A stalk of a single flower in a compound inflorescence.

Peduncle. The stalk of an inflorescence, whether simple or compound.

Perennial. Living for a number of years; or, generally, fruiting year after year after reaching maturity.

Persistent. Remaining attached beyond the average time of functioning.

Petiole. The stalk of a leaf.

Petiolule. The stalk of a leaflet.

Phyllotaxy. The mathematical law of distribution of leaves on a twig.

Pistillate. Bearing pistils; or pertaining to pistils.

Pith. The central generally spongy tissue of the stems of typical trees and shrubs.

Plaited. Folded.

Plicate. Folded; plaited.

Prickle. A sharp pointed process produced from the epidermis or subepidermis.

Prostrate. Lying flat or nearly so.

Puberulent; puberulous. With minute hairs.

Pubescence. Hairiness; hairy covering.

Pubescent. Hairy.

Raceme. A simple-branched inflorescence, the flowers opening successively from base to apex of the axis.

Racemose. Pertaining to a raceme.

Recurved. Curved downward or backward.

Reflexed. Turned sharply downward or backward.

Reniform. Kidney-shaped.

Revolute. Rolled backward or downward, as leaf margins.

Samara. A dry winged fruit; *single samara*, if one-winged, as in Ash; *double samara* if two-winged, as in Maple.

Scale. One of the small modified leaves protecting the flower or shoot rudiments in most buds; any small flattened accessory structure.

Scaly bud. A bud bearing protective scales.

Scarious. Thin and generally colorless; papery.

Scurf. Minute scale-like pubescence.

Scurfy. Pertaining to scurf.

Serrate. Saw-toothed; having marginal teeth pointed toward the apex.

Serrulate. Minutely serrate.

Sessile. Without a stalk.

Shoot. A young stem with its leaves.

Shredding. Fragmenting; peeling in fragments.

Shrub. A woody-stemmed perennial, typically shorter than a tree, and generally with several to many trunks.

Simple. Undivided.

Sinuous. Wavy; slender and bending in wavy lines.

Solitary. Standing alone; single.

Species. A major classification category below a genus. Both singular and plural.

Spine. A sharp stiff process, generally woody.

Spur. A very short branch bearing flower buds, and increasing little in length year by year.

Staminate. Bearing stamens, or pertaining to stamens.

Stigma. The area of a pistil receptive to pollen.

Stipule. One of a pair of appendages borne at the leaf base in certain plants.

Subterminal. Immediately below the apex.

Subvalvate. Scarcely meeting edge to edge.

Supernumerary. Above the usual number; extra; accessory.

Superposed. One above another.

Supra-axillary. Above the axil.

Tardily deciduous. Said of leaves or bud scales which, in certain plants, normally fall later than those of other plants.

Terete. Cylindrical; round in cross-section.

Terminal. Formed at apex of the stem.

Thorn. A sharp stiff outgrowth; often, morphologically, a short modified stem.

Tree. A woody perennial, generally taller than a shrub, and typically with a single trunk.

Turbinate. Top-shaped.

Unarmed. Without spines or prickles.

Valvate. Meeting edge to edge, without overlapping.

Vegetative. Pertaining to growth or organs of growth, as opposed to reproduction.

Vernation. Pertaining to arrangement of foliage leaves in the bud.

Vine. A climbing or trailing plant whose stem requires external support.

Whorled. With several to many units in a circle.

Wispy. Resembling a small bundle of slender branches.

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