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UNITED STATES DEPARTMENT OF AGRICULTURE  
*Miscellaneous Publication No. 110*

GLOSSARY  
OF BOTANICAL TERMS  
COMMONLY USED  
IN RANGE RESEARCH

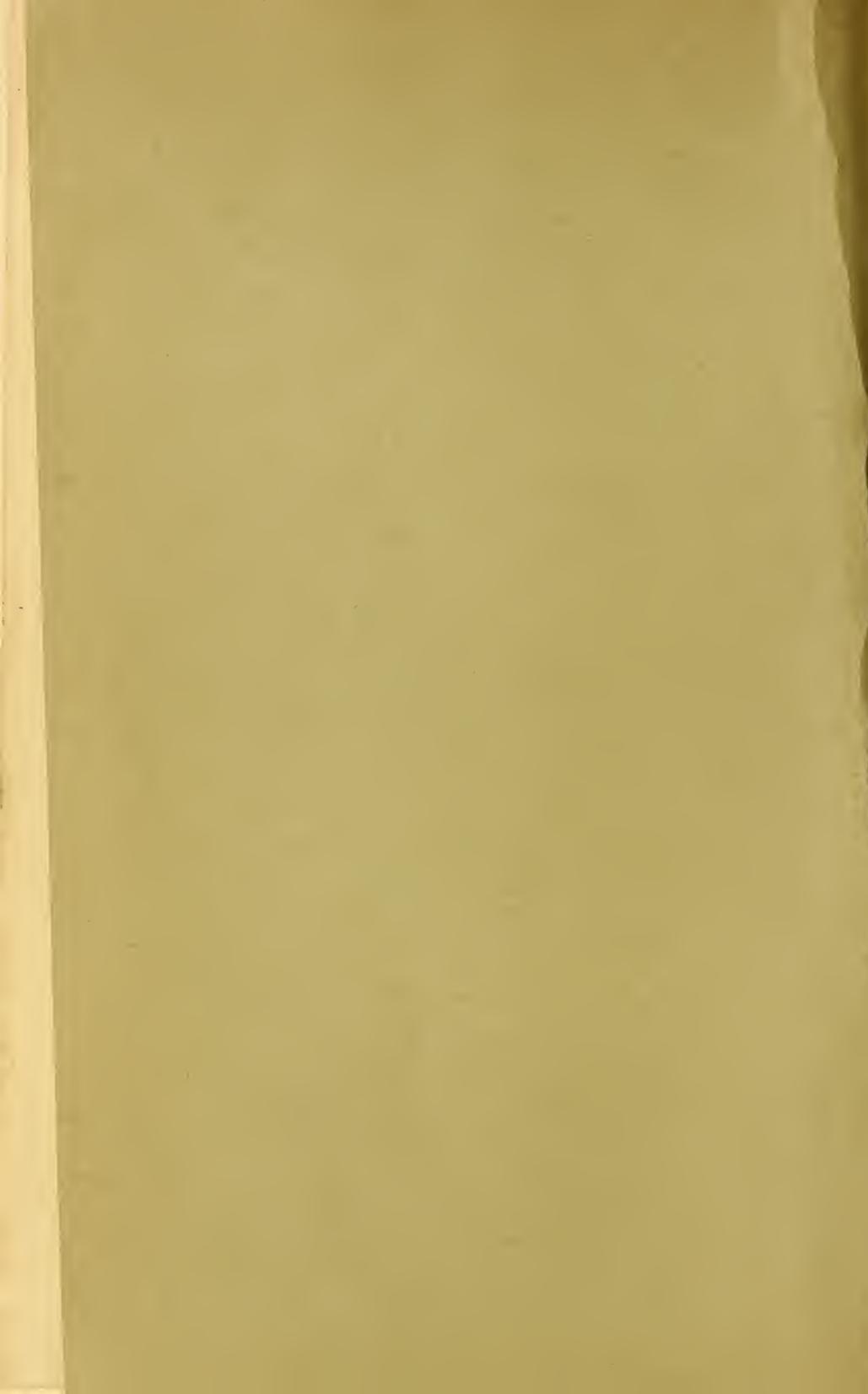
*Compiled by*

W. A. DAYTON

*Plant Ecologist, Branch of Research  
Forest Service*



WASHINGTON, D. C. :: :: :: :: ISSUED JULY, 1931



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## GLOSSARY OF BOTANICAL TERMS COMMONLY USED IN RANGE RESEARCH

Compiled by W. A. DAYTON, *Plant Ecologist,*  
*Branch of Research, Forest Service*<sup>1</sup>

### FOREWORD

This glossary has been collated at the request of field officers of the Forest Service primarily for use in connection with the important western floras and other botanical publications which contain no glossaries. The text as originally prepared included only morphological and taxonomic terms but has been enlarged somewhat to include some of the more common terms used in plant ecology, physiology, and other phases of botany, as well as a few of the more common abbreviations and symbols used in the botanical sciences.

It is obvious that such a reference list as this can lay exceedingly scant, if any, claim to originality but is essentially a compilation; moreover, in view of the circumstances and the nature of these terms, it seems neither necessary nor desirable to attempt to cite authorities consulted; such authorities would be very numerous and, save perhaps in a very few cases, could hardly be claimed as original sources of terminology.

The argot of the botanical sciences is so voluminous that no effort has been made to incorporate herein more than what appears to be a fair share of the terminology in most common use.

### SOME COMMON SYMBOLS USED IN BOTANICAL WORKS

0 = absent, wanting, or none.  
⊙ = (an) annual.  
Ⓜ = (a) biennial.  
℥ = perennial.  
♂ = a hermaphrodite, or perfect, flower.  
♀ = pistillate, or female.  
♂ = staminate, or male.  
× = sign of a hybrid, or cross.  
§ = a section, or subgenus.  
♣ = a shrub.  
♣ = an undershrub, or suffruticose plant.  
> = is greater than, is longer than, or surpasses.  
< = is less than, is shorter than.  
± = more or less.

∞ = an indefinite (mostly large) number.  
! = indication that the writer has personally checked up and corroborated a specific name, or other citation of fact.  
? = indication of uncertainty, *e. g.*, that the writer is not sure that a specific name used is the correct one.  
° = feet; degree(s).  
' = inch(es); minute(s).  
" = line(s) (i. e., twelfths of an inch); second(s).  
∴ = therefore, hence.

<sup>1</sup> The writer wishes to express his appreciation to Frederick V. Coville and S. F. Blake, of the Bureau of Plant Industry, for numerous valuable criticisms and suggestions. A considerable number of the terms are illustrated by 76 small text figures, prepared under the writer's supervision: 70 by the late Mrs. A. E. Hoyle; 5 by Leta Hughey; and 1 by C. L. Taylor, of the Forest Service.

## GLOSSARY

**A-:** A prefix ("alpha privative") signifying "not," as in apetalous, aseptalous, asymmetrical, etc.

**Abortive:** Imperfectly formed or developed; rudimentary; hence sterile.

**Acaulescent:** Without a true or leafy stem; having the leaves in a basal tuft, the flowers or flower head borne on a stalk (pedicel, peduncle, or scape) from the ground. Thus the common dandelion is acaulescent.

**Acerose:** Having a hard, sharp, needle-like tip.

**Achene** (pronounced ay-keen'): A small dry 1-seeded 1-celled indehiscent fruit; the fruit of sedges, buttercups, composites, etc. (Fig. 1.) Sometimes spelled akene.

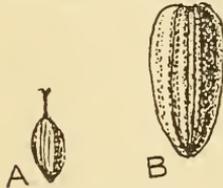


FIGURE 1.—Achenes of (A), a sedge (*Carex* sp.); (B), sunflower (*Helianthus annuus*)

**Acicular:** Needle-shaped, as the leaves ("needles") of a pine tree.

**Acorn:** The characteristic, 1-celled, 1-seeded fruit of oaks (*Quercus* spp.); it consists of a cuplike part called the cup, cupule, or involucre, and the glands or nut which contains the embryo.

**Aculeate:** Beset with prickles (aculei), as a rose or gooseberry bush.

**Acuminate:** Tapering gradually at the end, or apex; taper-pointed; long-acute. (Fig. 2, A.)



FIGURE 2.—Three types of leaf tips: A, acuminate; B, acute; C, obtuse. Other types are illustrated in Figures 5 and 29

**Acute:** Terminating sharply and abruptly in an angle of less than 90°. (Fig. 2, B.)

**Adnate:** Literally "grown to" or "adherent to"; said of parts that are

attached throughout their entire length to other parts of a different series; an adnate anther is so attached to its filament.

**Adventitious:** Said of buds produced without order or in an unusual place on any part of a plant.

**Adventive:** A waif; a plant unintentionally introduced from another locality but not truly naturalized. Used both as a noun and adjective.

**Akene:** Same as achene.

**Alate:** Winged; provided with "wings" (Latin, *alae*), or winglike appendages, as, for example, the fruits of maples, angelicas, and fourwing saltbush.

**Alternate:** Placed singly, not oppositely nor in pairs; first one and then another, as leaves on a stem.

**Alternation of generations:** The alternation of gametophyte and sporophyte in the life history of a plant species. Ferns furnish a familiar example of this phenomenon (which is sometimes called heterogenesis); the gametophyte (plant which bears the sex organs) is a minute, flattish, green plant (called the prothallus or prothallium), whereas the asexual generation, the sporophyte, is the large plant ordinarily recognized as a fern. This phenomenon is one of great scientific and evolutionary interest and, in modified form, occurs in the higher plants as well. It occurs also in the animal world, the hydroid jellyfishes and medusas being well-known examples.

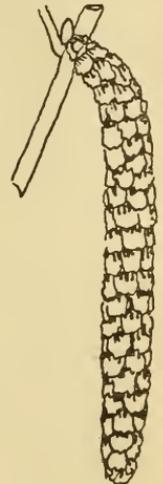


FIGURE 3.—An ament, or catkin, as in birch (*Betula*)

**Ament:** A bracted, pendulous spike; a catkin; as in birches, alders, poplars, oaks, etc. (Fig. 3.)

**Amphitropous:** Half anatropous; said of ovules having a short raphe, the hilum, or place of attachment, about in the middle of one side of the ovule.

**Anabolic:** Of or pertaining to anabolism.

**Anabolism:** That phase of metabolism, or the life processes of plants, which

relates to the building up or constructive processes.

**Anatropous:** Uprturned or inverted; said especially of ovules. An anatropous ovule has its micropyle (orifice through which the pollen tube fertilizes the embryo) bent down and adjoining the funicle, or funiculus (ovule stem), to which it more or less adheres as a raphe.

**Androgynous:** A term applied to those sedges (*Carex* spp.) which have male and female flowers in the same spike but the male flowers uppermost, so that only the lower part of the spike bears fruit. The converse of gynaeacandrous.

**Angiosperm:** A member of the Angiospermae, or angiosperms, the larger of the two groups (of which the other is the Gymnospermae) into which flowering, or seed-producing, plants are divided. Angiosperms have their seeds inclosed in an ovary.

**Annual:** Enduring for not more than a year. A plant which completes its entire life cycle from germinating seedling to seed production and death within a year. It is, of course, somewhat difficult to draw a sharp line, especially in warmer and drier countries, between annuals and biennials. In colder climates typical annuals do not survive the winter, but the so-called winter annuals germinate in late fall or spring, are dormant through the winter, and complete their life history the following spring. Annual is often expressed by the symbol  $\odot$  or  $\textcircled{1}$ .

**Annular:** Ringlike; in the form of a ring (Latin, *annulus*).

**Anther:** The essential or pollen-bearing part of the stamen; a (usually 2-celled) pollen sac. Fig. 4.)

**Antheridium** (pl. *-ia*): The male organ of reproduction in ferns and mosses, corresponding to the anther of a flowering plant.

**Anthesis:** Flowering; the time or action when the floral envelope opens, the pollen is ripe, and the stigma is in condition to receive it.

**Apiculate:** Ending in a short, sharp, abrupt, rather soft tip; said often of leaves, leaflets, and sepals which have the midrib prolonged a little

into a short, somewhat awnlike but not rigid tip. (Fig. 5, A.)

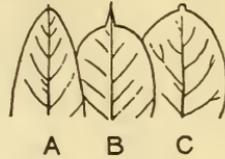


FIGURE 5.—Three types of terminal pointing, as in leaves, leaflets, petals, and sepals: A, Apiculate; B, cuspidate; C, mucronate

**Appressed:** Lying flat or closely against another organ or part; not spreading; said, for example, of leaves against the stem, and of branches of the inflorescence to its main axis.

**Approximate:** Situated close together, but not united; "next to" or "near to."

**Aquatic:** Of or pertaining to water; growing in water. A plant (or animal) inhabiting water.

**Arachnoid:** Beset with cobwebby hairs (Greek, *arachnion*, a spider's web); as, for example, the arachnoid lemma of Kentucky bluegrass. (Fig. 6.)

**Arboreous:** Tree-like, having the form, size, duration, or structure of a tree as distinguished from an herb or shrub. Also

(1) of, pertaining to, frequenting, or growing on trees; (2) wooded, or abounding in trees.

**Arborescent:** Treelike in size or form, or both. Literally, "becoming a tree"; strictly, arborescent represents a stage below that of arboreous, but it is now commonly used, instead of that term, for plants having the tree habit and size.

**Archegonium** (pl. *-ia*): The female reproductive organ in ferns, mosses, and their allies, analogous to the pistil in a flowering plant.

**Arcuate:** Bow-shaped, or bowlike.

**Areola** (pl. *-ae*): A small open space; specifically: (1) In leaves, a space

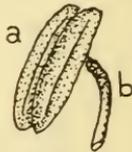


FIGURE 4.—a, anther; b, upper portion of filament

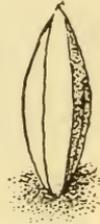


FIGURE 6.—Lemma of Kentucky bluegrass (*Poa pratensis*) showing arachnoid (cobwebby) hairs at base

between the veins, or (2) in cacti, the restricted circular areas where the spines and spicules are borne.

**Aril:** A fleshy growth from the apex of a seed stalk or the placenta, which envelops or becomes attached to the seed. Familiar examples are seen in species of waterlilies and in bittersweet and its congeners (*Euonymus* spp.).

**Aristate:** Provided with an awn (Latin, *arista*); awned.

**Articulate(d):** Jointed, having a node or joint (Latin, *articulus*).

**Ascending:** Upcurved; growing or directed obliquely upward.

**Asexual:** Without sexual conjugation; a term used in reproduction; thus a grass which propagates by rootstocks is said to exhibit asexual reproduction.

**Aspect:** The gross physical appearance of a plant or other organism.

**Assimilation:** The complex process of forming protoplasm in the plant. Anabolism and metabolism convey similar meanings, but anabolism refers only to building-up processes in the plant, whereas metabolism also includes the catabolic, or disintegrating processes.

**Association:** A unit of vegetation; a group of associated plants. There is no one definition of the term association that is entirely satisfactory to all plant ecologists, but there is fairly general unanimity of opinion

that the term association should be confined to the larger or more fundamental plant growth groupings, as, for example, "the yellow pine association of the far West".

**Assurgent:** Ascending, especially when rising by curving obliquely upwards.

**Attenuate:** Long or slender tapering; becoming slender or very narrow.

**Auricled:** Having auricles, or

small earlike appendages or lobes, usually at the base. (Fig. 7.)

**Auriculate:** Same as auricled.

**Awn:** A bristlelike appendage, especially on the floral bracts of grasses

or on the achenes of composites; the "beards" of wheat, rye, etc., are awns. (Fig. 8, a.)

**Awned:** Provided with awns; bearded.

**Axil:** The upper angle formed between a plant stem or other axis and any leaf, branch, or organ arising from it; the axil of a leaf is the point or angle on the upper side at the base of the leaf-stalk or of a sessile blade.

**Axile:** Belonging to an axis, as an axile (central) placenta.

**Axillary:** Of or pertaining to an axil; occurring in or borne at an axil.

**Baccate:** Berrylike.

**Banner:** Topmost petal in the corolla of a member of the pea family (papilionaceous flower); same as standard and vexillum. (Fig. 9, a.)

**Barb:** A twin, sharp, downwardly or backwardly projecting point terminating a bristle (fig. 10, A), as on the fruits of *krameria* and of certain borages and umbellifers.

**Barbate:** Bearded.

**Barbed:** Beset with barbs.



FIGURE 7.—Auriculate leaf, as in mountain magnolia (*M. fraseri*); the earlike lobes at the base of the leaf blade are the auricles

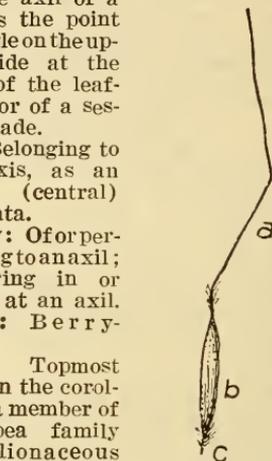


FIGURE 8.—Floret of a needle grass (*Stipa* sp.); a, Awn; b, body of fruit (caryopsis permanently invested by the indurated lemma); c, callus. The callus and base of the awn are plumose, i. e., feathery

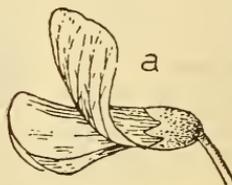


FIGURE 9.—Flower of peavine (*Lathyrus* sp.); a, Banner (known also as standard and vexillum)

**Barbellate:** Minutely bearded with short stiff hairs; also sometimes used as a synonym of "barbed."

**Basifixed:** Attached by the base.

**Bast:** The strong woody fibers in the bark of trees and other woody

plants from which cordage is often manufactured; see "cambium."

**Beak:** A narrow, usually rather elongated, necklike appendage, as on the fruit of common dandelion. (Fig. 11.)

**Berry:** A usually small simple fruit having a fleshy pericarp. Grapes, huckleberries, and currants are familiar examples.

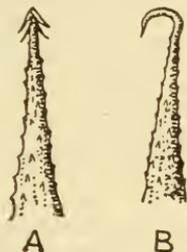


FIGURE 10.—A, Compoundly barbellate, barbed, or glochidiate (in this case double barbed) tip of bristle on fruit of American carrot (*Daucus pusillus*); B, uncinate, or hooked tip of bristle on fruit of *Caulalis microcarpa*, a common annual southwestern umbellifer

**Bi-:** A prefix (Latin) signifying "twice," "two," or "double."

**Biennial:** Enduring for two years. A biennial is an herb which germinates (typically in the spring of) one year and flowers, fruits, and dies (typically in the fall or winter of)

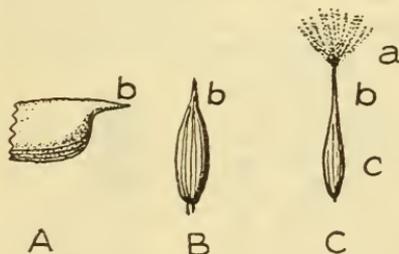


FIGURE 11.—Beaks. A, Keel apex of flower of pointvetch (*Oxytropis* sp.); B, apex of fruit of aniseroot, or sweet cicely (*Osmorhiza divaricata*); C, fruit of certain species of agoseris (*Agoseris* spp.); a, pappus; b, beak or necklike constriction of achene; c, achene body

the succeeding year. Winter annuals, which germinate in the fall of one year and die the following spring, are not true biennials, since

they complete their life history within one year of elapsed time. Biennial is often expressed by the symbol ②.

**Bilabiate:** Two-lipped; as, for example, the flowers of many members of the mint family (Mentaceae) and figwort family (Scrophulariaceae).

**Bipinnate:** Twice pinnate, as of a pinnate leaf that is again divided into leaflike parts. (Fig. 12.)

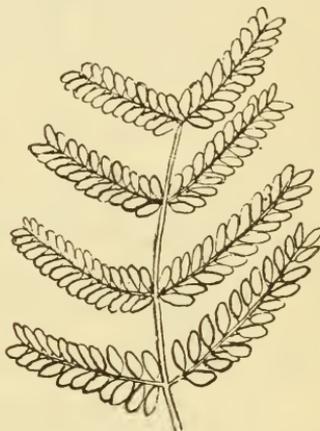


FIGURE 12.—Bipinnate leaf of false-mesquite (*Calliandra*). Each main leaf division is a pinna, while the small individual leaflets are pinnules

**Bipinnatifid:** Twice pinnatifid; that is, having the primary division, as of a pinnate leaflet, again cleft into segments or lobes. (Fig. 13.)



FIGURE 13.—Bipinnatifid leaf. Each main division (pinna) is pinnately lobed, cleft, or sometimes even parted, but not divided

**Blade:** The lamina, or broad portion of a leaf, petal, etc. A leaf consists either entirely of a blade (lamina) or else of a blade and petiole (stalk).

**Bract:** A leaflike or scalelike organ subtending a flower or aggregation

of flowers; a modified inflorescence leaf.

**Bracted:** Provided with bracts or composed of bracts; as the bracted involucre of the aster (composite) family.

**Broad-leaved herb:** A "weed" in the range stockman's sense; a nongrass-like herb.

**Browse:** Twigs and shoots, with their leaves, cropped by livestock from shrubs, trees, and woody vines. One of the four commonly recognized classes of range forage, the others being grasses, grasslike plants, and weeds.

**Bryophyte:** A moss or moss ally; a member of the natural plant group of Bryophyta.

**Bulb:** A (usually subterranean) leaf bud, composed of fleshy scales. Not a root, although often supposed, popularly, to be such.

**Caducous:** Falling very early; very early deciduous; as the caducous sepals of poppies. Partly synonymous with fugacious.

**Caespitose:** Tufted; having the stems in a tuft, as a bunch grass.

**Callus:** A hard point; specifically the hard, sharp-pointed base of certain grass seeds, as in the genus *Stipa*. (Fig. 8, c.)

**Calyx** (pl. *-yces*): The outer series of the floral envelope, or perianth; the parts immediately below the corolla; the sepals as a unit. (Fig. 14, d.)

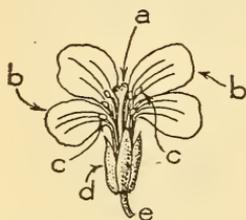


FIGURE 14.—Flower of wallflower (*Cheirinia* sp.); a, Stigma and pistil; b, the four petals which constitute the corolla; c, the six stamens; d, three of the four sepals which constitute the calyx; e, the pedicel; b and d together constitute the perianth

**Cambium:** The thin, mucilaginous, cellular layer between the wood of a tree and its inner bark. This layer is the living portion which is annually converted into wood on its inner surface and bark on its outer,

thus bringing about the thickening of the tree trunk.

**Campanulate:** Bell shaped.

**Campylotropous:** Literally, bent (curved)—turned; said of curved ovules or seeds one side of which has grown faster than the other so that the micropyle (orifice) is near the hilum (point of attachment), the embryo also being curved. An outstanding character of chickweeds, portulacas, and certain other plants.

**Cancellate:** Chambered, or cell-like.

**Canescent:** Hoary, with fine grayish pubescence; grayish white.

**Capillary:** Hairlike.

**Capitate:** Headlike or head shaped; borne in a head or dense cluster.

**Capitulum:** Same as head, especially if small.

**Capsule:** A pod; a dry dehiscent fruit or seed vessel composed of two or more carpels. (Fig. 15.)

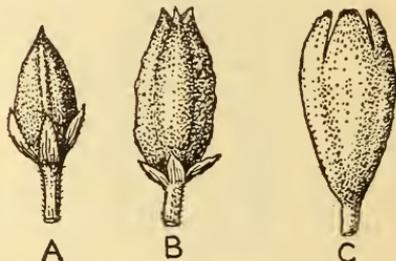


FIGURE 15.—Capsules of: A, *Pentstemon* sp.; B, false-hellebore (*Veratrum californicum*); C, *Iris* sp.

**Carinate:** Keel-like; keeled like the keel of a ship.

**Carpel:** A simple pistil; the modified leaf of which the ovary is formed; also, a part of a compound ovary.

**Carpophore:** A carpel-bearing part; the central organ from which a carpel depends, as in an umbellifer. (Fig. 16, b.)

**Caryopsis:** The fruit of a grass; a grain. The seed and fruit are united, the seed adhering to the thin pericarp, or outer covering of the fruit, throughout. (Fig. 8, b.)

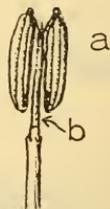


FIGURE 16.—Fruit of an umbellifer: a, Twin mericarps; b, carpophore

**Catabolic:** Of or pertaining to catabolism.

**Catabolism:** The chemical and physical processes involved in cell decay

- or the use of energy (as opposed to anabolism); the destructive or disintegrating life forces. Catabolism is the negative phase of metabolism. Frequently spelled katabolism.
- Catkin:** A bracted, pendulous spike; an ament. (Fig. 3.)
- Caudate:** Provided with a tail (Latin, cauda).
- Caudex:** The trunk or woody axis of a tree; the woody base of a perennial plant.
- Causcent:** Producing a stem above ground. The opposite of acaulescent.
- Cauline:** Of or pertaining to the stem; cauline leaves are leaves which are borne on the main plant stem or its branches.
- Cell:** A chamberlike part or organ; the structural unit of an organism, whether plant or animal. A cell is usually microscopic and largely consists of protoplasm surrounded by a cell wall; its most essential part is the nucleus which is fundamental in the growth, metabolism, and reproduction of both plants and animals.
- Centrifugal:** Proceeding from the center to the outer edge; the order of flowering in a cyme (or other determinate inflorescence) is centrifugal.
- Centripetal:** Proceeding from the outer edge or periphery inwards to the center. In an indeterminate inflorescence (as a corymb, panicle, raceme, spike, and umbel) the order of flowering is centripetal, the outermost or lowest flowers opening first and setting seed first, and the innermost or uppermost flowers and fruit maturing last.
- Cernuous:** Nodding.
- Cf.:** Compare (Latin, confere). Used especially to indicate that authentic material of the plant in question is not at present available.
- Chalaza:** That part where the integuments, or coats, of the ovule cohere with each other and with the nucleus (Greek, pimple or sty).
- Chartaceous:** Papery or paperlike in texture.
- Chlorophyll:** The complex nitrogenous substance, occurring only in chloroplasts, responsible for the prevalent green hue of the vegetable kingdom. In algæ and certain other plants the green hue is frequently obscured by other pigments. Chlorophyll is essential to the formation of starch and other carbohydrates in plants and, if absent altogether, the plant is a parasite or saprophyte, depend-
- ing on chlorophyll-bearing hosts for its existence. Sometimes spelled chlorophyl.
- Chloroplast:** A minute flattened body occurring in a cell and containing the chlorophyll. Chloroplasts are found only in cells exposed to light and containing iron.
- Choripetalous:** Having each of the petals separate and distinct. For example, the corolla of a geranium is choripetalous. Polypetalous is a synonym but has been largely replaced, chiefly because it implies that the petals also are numerous.
- Chorisepalous:** Having the sepals distinct rather than united (gamosepalous); largely synonymous with polysepalous. Thus, geraniums have the calyx composed of five distinct sepals (chorisepalous, or polysepalous), but mints have a united, somewhat bell-like, gamosepalous calyx, the five sepals being indicated by five terminal teeth.
- Ciliate:** Hair fringed; provided with eyelashlike hairs on the edge, or margin. (Latin, cilium, eyelid.)
- Cinereous:** Ashen; said especially of an ashen-gray pubescence.
- Circinate:** Coiled spirally in one plane, like a watch spring or bishop's crozier, as in an unfolding fern frond; partly synonymous with scorpioid. (Fig. 17.)
- Circumscissile:** Dehiscing or opening transversely, the top separating like a lid, as, for example, the capsule or pod (pyxis) of portulacas.
- Clavate:** Club shaped.
- Cleft:** Cut about halfway to the mid-vein or base, especially when the incision is sharp; said, for example, of leaves. (Fig. 18.)
- Cm.:** Centimeter(s), approximately two-fifths of an inch.
- Collenchyma:** A tissue of elastic, non-woody, frequently elongated strengthening cells; plant tissue composed of cells thickened at the angles. It contains a large amount of protoplasm and is very characteristic of actively growing (especially young and tender) vegetative parts.



FIGURE 17.—Circinate frond of a fern unfolding in early spring

**Composite:** A member of the aster, or composite, family (Asteraceæ, or Compositæ).

**Coma:** Hair, especially if tufted, dense, long, and soft. (Latin, coma).

**Comb. nov.:** New combination (Latin, combinatio nova), i. e., a hitherto unpublished scientific plant or animal name based on a rearrangement of names already published.

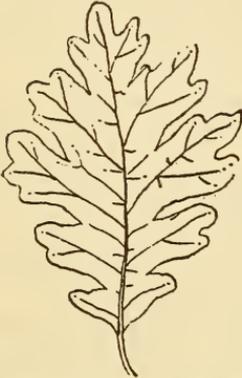


FIGURE 18.—Cleft, as the leaves of certain oaks (*Quercus* spp.)

**Compound:** Composed of two or more separate but similar parts joined together. A compound leaf, for example, is composed of separate leaflets. (Figs. 12, 13, 28, and 46.) A compound ovary is composed of two or more carpels.

**Cone:** The (often conical) dry multiple fruit of pines, spruces, firs, hemlocks, and other conifers, consisting of numerous partially overlapping (imbricated) scales arranged symmetrically around a central axis and bearing naked seeds on their upper surface. Same as strobile.

**Conelet:** A small or immature cone.

**Confluent:** Running together; blended in one.

**Congener:** A plant of the same genus. Thus, white pine and yellow pine are congeners.

**Congeneric:** Belonging to the same genus. Thus nightshade, eggplant, potato, Jerusalem-cherry, and horse nettle are congeneric, since all are species of the genus *Solanum*.

**Conifer:** Literally, cone bearer. A member of the pine family (Pinaceæ, or Coniferæ).

**Connate:** More or less completely united (said of similar organs), as the connate leaves (fig. 19) and berries of honeysuckles (*Lonicera* spp.).

**Consociæ:** An associated group of plant societies; the main subdivision of a plant formation.

**Contorted:** Twisted together; twisted.



FIGURE 19.—Connate, as the leaves of certain honeysuckles (*Lonicera* spp.)

**Convolute:** Literally, rolled together, rolled up lengthwise, either with one edge rolled inside as a sheet of paper is ordinarily rolled, or both edges rolled toward each other, forming a sort of tube, as in many grass leaves. In the latter case the blades may be either involute or revolute.

**Cordate:** Heart shaped; i. e., notched and with two rounded lobes at the base. (Fig. 20.)

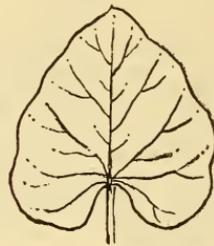


FIGURE 20.—Cordate leaf of common catalpa (*Catalpa bignonioides*)

**Coriaceous:** Of a thick, leathery texture (Latin, corium, hide or skin).

**Corm:** A swollen or enlarged, rounded, solid, fleshy, mostly subterranean stem base. Like a bulb in shape and appearance, except that it is solid, instead of being composed of fleshy scales.

**Corolla:** The inner series of the floral envelope (perianth) parts; the petals as a unit. The five petals of a geranium blossom compose its corolla. A corolla may be composed of separate petals (choripetalous, or polypetalous) (fig. 14, *b*), or have the parts united (gamopetalous, or sympetalous).

**Corona:** A crown, or crownlike organ or part, as in the flower of a milkweed (*Asclepias*). (Fig. 21.)

**Corymb:** A convex or flat-topped open flower cluster, with the pedicels arising from different points on the stem, the flowers developing from axillary buds and the outer and lower ones blooming earliest (fig. 22), the inflorescence thus being indeterminate and centripetal.

**Corymbose:** Borne in a corymb; corymblike. (Fig. 22.)

**Cospecific:** Belonging to the same species.

**Costate:** Ribbed.

**Cotyledon:** An embryo leaf or seed leaf; the leaf, or one of a pair or



FIGURE 22.—Corymbose inflorescence, as in yarrow (*Achillea*)

whorl of the first leaves put forth from a sprouting seed. The number of cotyledons is of primary importance in the classification of flowering (seed) plants. Thus, a grass or sedge is always a monocotyledon; legumes are always dicotyledons.

**Cotype:** Specifically, one or two or more specimens on which the original description of a species, variety, or other nomenclatural unit is based, when such species, variety, or other

nomenclatural unit evidently rests on more than one specimen and the author neglects to indicate a type; a specimen of the original series on which a nonholotypic species (or other nomenclatural unit) is based; a part type (syntype is also occasionally used to convey the same idea). Also, but loosely, an isotype, paratype, or duplicate of a type specimen, i. e., a plant (or animal) of the same species (or other nomenclatural status) as the type specimen (holotype) and collected simultaneously at the same site by the same collector.

**Cremocarp:** The peculiar dry twin fruit, characteristic of the parsnip, or umbellifer family (*Apiaceae*, *Pastinacaceae*, or *Umbelliferae*), which separates at maturity into a pair of opposite, indehiscent, 1-seeded carpels (mericarps) pendulous by threadlike appendages from a central axis (placenta, or carpophore). A form of schizocarp. (Fig. 23.)

**Crenate:** Scalloped; having broad, rounded teeth on the margin. (Fig. 30, E.)

**Crenulate:** Minutely crenate.

**Crucifer:** A member of the mustard or crucifer family (*Brassicaceae*, or *Cruciferae*). Literally, "cross bearer," alluding to the 4-petaled, cross-shaped flowers.

**Cryptogam:** A nonseed-producing plant of lower rank than the flowering plants. Thus, fungi, algae, lichens, mosses, and ferns are cryptogams.

**Cucullate:** Hooded (Latin, *cuculla*, a hood). (Figs. 24 and 32, A, g, and B, g.)



FIGURE 24.—Cucullate petal of flower of *Ceanothus*

**Cucurbit:** A plant of the squash, pumpkin, or melon family (*Cucurbitaceae*).

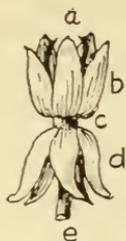


FIGURE 21.—Flower of a milkweed (*Asclepias* sp.);: a, incurved horns of corona hoods; b, corona, composed of five hoods, or cucullate, petaloid segments; c, corona column; d, five reflexed corolla segments, or petals; e, pedicel

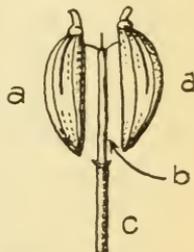


FIGURE 23.—Cremocarp, as in a parsnip or other umbellifer; a a, twin mericarps pendulous on threadlike appendages from b, the carpophore; c, pedicel. The caplike appendage on each mericarp is the persistent base of the style (stylopodium)

**Culm:** The jointed stalk or stem, usually hollow save at the nodes, and mostly herbaceous, of a plant belonging to the grass family (Poaceæ, or Gramineæ). The term is also frequently applied to the usually solid stalks of grasslike plants (sedges and rushes).

**Cuneate:** Wedge shaped.

**Cupule:** A small cup; specifically, the involucre, or cup, of an acorn.

**Cuspidate:** Tipped with a sharp and rigid point, or cusp, especially if lance or spear shaped. (Fig. 25, A.)

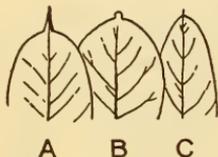


FIGURE 25.—Three types of terminal pointing, as in leaves, leaflets, petals, and sepals: A, Cuspidate; B, Mucronate; C, apiculate

**Cylindric(al):** Shaped like a cylinder; elongated, and round in cross section. Similar to terete.

**Cyme:** A flower cluster (often flat topped or convex) in which the central flowers bloom earliest. (Fig. 26.) The inflorescence represented by a cyme is determinate, since the original flowers always come from terminal buds (and the main axis, therefore, of the inflorescence can not continue to develop), although

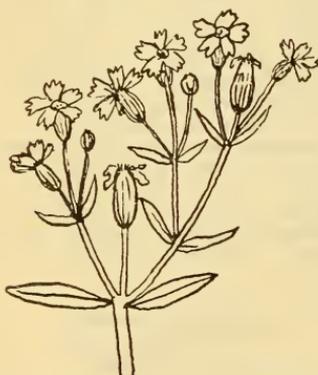


FIGURE 26.—Cymose inflorescence, as in the Catchfly genus (*Silene*)

flowers may subsequently arise from axillary buds lower down on the stem.

**Cymose:** Arranged in cymes; cyme-like. (Fig. 26.)

**Cytology:** The science of plant and animal cells, their structure and functions.

**D. b. h.:** Diameter breast high (said of trees).

**Deciduous:** Falling away; not persistent or evergreen. Said, for example, of leaves which drop off in autumn or of a calyx and petals which fall before the fruit is formed.

**Decomound:** More than once compound.

**Decumbent:** Reclining on the ground but with the end ascending; bending horizontally at the base. Said of stems. Decumbent conveys the idea of weakness.

**Decurrent:** Extending down or prolonged upon another part; said especially of leaves whose petioles or blade bases are perceptibly prolonged along the plant stem, producing a winged appearance of the latter.

**Decussate:** Arranged in pairs at right angles to the next pair immediately above or below, suggesting when looked down upon the form of a Maltese cross. A number of milkweeds (*Asclepias* spp.) afford familiar illustrations of decussate leaves.

**Deflexed:** Bent or directed abruptly downward.

**Dehiscent:** Opening by valves, slits, etc., to discharge the contents. Anther cells dehisce to emit pollen.

**Deliquescent:** Literally, dissolving. Said of tree trunks which do not have a well-defined central axis.



FIGURE 27.—Deltoid leaf form, as in certain species of aspen (*Populus*)

Thus oaks (*Quercus*) usually have a deliquescent habit.

**Deltoid:** Deltalike; broadly triangular and shaped like the Greek letter Δ. (Fig. 27.)

**Dendrology:** That part of botany which deals with trees. Ordinarily the term is confined to taxonomic and morphological investigations of trees, other phases of tree science being dealt with by forestry, arboriculture, horticulture, ecology, phytopathology, etc.

**Density:** The relative degree to which vegetation covers the ground surface, and often expressed in tenths, 1.0 indicating a complete ground cover of such vegetation. Specifically in range reconnaissance in the Forest Service, "average density" is a term used to indicate the proportion of ground surface actually covered by herbaceous or shrubby vegetation within reach of livestock, the lateral spread of the plant foliage, stems, and branches above ground being carefully considered. The density of grasses is based on the spread when the plants are grazed to the proper extent rather than on the normal plant spread when ungrazed or the reduced spread when total use has been made of the plant. The density of erect weeds is based on the amount of ground that appears covered when the vegetation is viewed from directly above. The density of browse is estimated from the ground surface covered by that part of the browse that is readily accessible to livestock.

**Dentate:** Toothed, with the "teeth" nearly equal sided, projecting forward or at a right angle rather than upward, and usually being acutish. (Fig. 30, C.)

**Denticulate:** Minutely dentate.

**Depauperate:** Dwarfed, starved. Said of small, impoverished, undeveloped plants grown in poor soil or under otherwise unfavorable conditions.

**Depressed:** Vertically flattened; i. e., as if pressed downward from above.

**Determinate:** Having a centrifugal inflorescence, the order of flowering being from the center outward or from above downwards, the main axis terminating in a flower. Literally terminated or ended, the main axis of the inflorescence being estopped from further growth. The cyme is probably the most familiar example of determinate inflorescence.

**Dextrorse:** Spirally twisting to the right. Said of vines that twine counterclockwise, as dodder and hops.

**Di-:** A prefix (Greek) signifying two, or double.

**Diadelphous:** Having the stamens more or less united by their filaments into two groups, or clusters; literally, two brotherhoods. The stamens of most clovers and of many other legumes are diadelphous.

**Dichotomous:** Two-forked, the forks, or branches, regular and nearly equal.

**Dicotyledon:** A plant whose embryo and germinating seedling has two cotyledons, or seed leaves. The dicotyledons form one of the two main groups into which angiosperms are separated, the other being monocotyledons.

**Didynamous:** Having four stamens arranged in two pairs, one pair noticeably longer than the other. For example, the stamens of many members of the figwort family (Scrophulariaceae) are didynamous.

**Diffuse:** Loosely, widely, and irregularly spreading, the branches usually numerous.

**Digitate:** Fingerlike; compound with similar parts radiating from a common point; as the digitate leaflets of lupine. (Fig. 28.) The same as palmate.

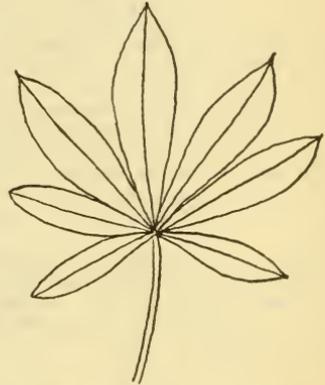


FIGURE 28.—Digitate leaf of lupine (*Lupinus*)

**Diœcious:** Literally, in two houses. One-sexed; male or female only, the staminate (male) and pistillate (female) flowers borne on different individual plants. The flowers of buffalo grass (*Bulbilis*), for example, and of many ashes (*Fraxinus* spp.), maples (*Acer* spp.), and hollies (*Ilex* spp.), are diœcious.

**Discoid:** Disklike, or lacking ray flowers. Said of composites that have only centers, or disk flowers, in the flower heads, like the common nigerhead (*Rudbeckia occidentalis*).

**Disk:** An enlargement or prolongation of the receptacle of a flower around the base of the pistil; also, the head of tubular flowers in composites.

**Dissected:** Cut deeply or divided into numerous and usually narrow or fine lobes or segments.

**Distichous:** Arranged in two ranks. Thus, the leaves and floral bracts of true grasses are distichous.

**Divaricate:** Diverging at a wide angle; widely spreading.

**Divided:** Having the main divisions extending quite to the midrib or rachis. A divided leaf is, therefore, a compound leaf. (Figs. 12 and 13.)

**Dm.:** Decimeter(s), approximately 4 inches.

**Dorsal:** Upon or relating to the back or outer surface of an organ.

**Drupe:** A simple, fleshy, or pulpy fruit, the inner portion of the pericarp being hard and stony. A stone fruit. The fruits of the peach, plum, and cherry are familiar types of drupes.

**Ecesis:** The adjustment of a plant to a new habitat and its establishment therein. The result of a successful migration.

**Ecology:** That part of biology which deals with the relationships of organisms to their respective habitats. Literally, the science of home (habitat). Plant ecology includes the study of all the factors in the environment of the individual plant and of groups of plants and the effects which these various factors have on the forms of plants, their life history, succession, etc.

**E. g.:** For example (Latin, *exempli gratia*).

**Elliptic:** With the outline of an ellipse.

**Emarginate:** Notched or indented at the apex. (Fig. 29, B.) Obcordate is more deeply and retuse more shallowly notched.

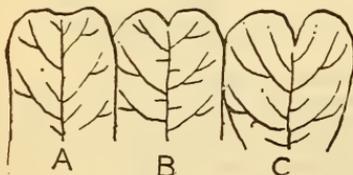


FIGURE 29.—Types of leaf tip: A, Retuse; B, emarginate; C, obcordate

**Embryo:** The rudimentary, undeveloped plant (sporophyte) in a seed, resultant from the union of a staminate (male) and a pistillate (female) cell; it ordinarily consists of a

radicle (embryo stem), one, two, or more cotyledons (seed leaves), and a plumule (minute bud). This last indicates where the stem and next leaf or leaves of the germinating seedling will be developed.

**Emergence:** A growth outward from beneath the epidermis. The prickles of a rose stem, the ligule of a grass, the corona of a milkweed or daffodil blossom are examples of emergences.

**Emersed:** Raised above the surface of the water instead of floating on it; said of certain aquatic plants, especially their leaves and stems.

**Endemic:** Indigenous or native in a restricted locality; confined naturally to a certain limited area or region. Thus, *Silene ingrami* is endemic in the Umpqua National Forest region of southwestern Oregon.

**Endocarp:** The inner layer of a pericarp, or covering of a fruit. The bony part of the stone of a cherry or plum, for example, is botanically an endocarp.

**Ensiform:** Sword shaped.

**Entire:** Without teeth, lobes, divisions, or any marginal cutting; having a smooth and uninterrupted, flowing outline. (Fig. 30, A.)

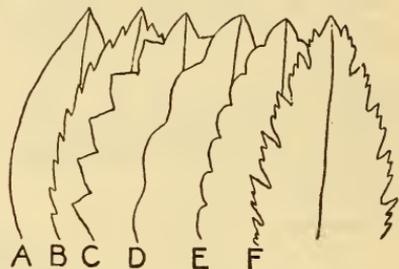


FIGURE 30.—Six types of leaf margin: A, Entire; B, serrate; C, dentate; D, undulate or repand; E, crenate; F, incised

**Ephemeral:** Enduring for a day; evanescent. As the ephemeral flowers of many cacti, which wither the day after blooming.

**Epicarp:** The outermost layer of a fruit, especially in a 3-layered fruit covering.

**Epidermal:** Of or pertaining to the epidermis.

**Epidermis:** Literally overskin. The thin outer cell layer in the higher plants, roughly analogous to the epidermis of animals, usually pigmented but mostly without chloroplasts, and universally present in leaves and herbaceous stems.

- Epigynous:** Said of stamens or other floral parts that are borne on the ovary or adnate to it.
- Epipetalous:** Borne on the petals or corolla. For example, the stamens of gentians and mints are epipetalous, being attached at their base to the basal portion of the corolla.
- Epiphyte:** A plant which grows on another plant but is not nourished by it and hence not a parasite; an air plant. Many lichens, mosses, ferns, orchids, and other plants are epiphytic.
- Epiphytic:** Of or pertaining to an epiphyte; having the nature or characteristics of an epiphyte.
- Erose:** Having an irregularly cut margin as if gnawed.
- Estipulate:** Destitute of stipules.
- Etiolation:** Literally, blanching or yellowing. Especially a paleness in plants caused by absence or inadequacy of light, the green chloroplasts being changed to leucoplasts. The blanching of celery stalks for market and the white sprouts of potato tubers stored in a cellar are familiar examples of etiolation. Etiolation, or paleness of leafage or herbage, may also be hereditary and is a common phenomenon among races or forms of plants in ornamental cultivation; apparently such a condition is "freakish," having no connection with light deficiency.
- Et seq.:** And the following (Latin, *et sequentes*).
- Excurrent:** Running out. For example, a midrib of a leaf projecting beyond the blade in a bristle is excurrent. An excurrent trunk is one that has one main longitudinal axis, as in a typical pine or fir tree.
- Exocarp:** The outer layer of a fruit covering that is separable into two or more layers; in a 3-layered fruit covering, synonymous with epicarp.
- Exotic:** Foreign; not native; introduced from another region. Opposed to indigenous.
- Exserted:** Thrust out of; protruding from; projecting beyond the surrounding organs; said especially of pistils and stamens protruding from their corolla.
- Exsiccate:** Dried, pressed-plant specimens; herbarium specimens; a herbarium collection, especially a numbered suite or set of specimens by a given collector or collectors.
- Falcate:** Sickle shaped.
- Family:** In systematic botany (taxonomy), a (usually natural) group of closely related tribes and genera. As, for example, the grass family, the mint family, the rose family, etc. Under modern rules of nomenclature names of plant families regularly end in -aceæ; as Poaceæ, Menthaceæ, Rosaceæ, etc. In plant ecology the term "family" is sometimes used to denote a portion of a plant community composed entirely of individual plants of the same species; e. g., a pure stand of fireweed on a burn is a family in the ecological sense.
- Farinaceous:** Starchy, mealy.
- Farinose:** Clothed with a whitish, mealy substance, as the lower leaf surface of certain primroses (*Primula*).
- Fascicle:** A dense or close bundle or cluster, especially of like organs having a common source. The leaves of white pine, for example, are fasciculate.
- Fasciculate:** Arranged in fascicles.
- Fertile:** Fruit-producing or capable of proper functioning in reproduction.
- Ff.:** Following.
- Fibrovascular:** Composed of fibrous vessels, or channels. The fibrous skeleton of roots, stems, and leaves is composed of fibrovascular bundles, of which phloem and xylem are the two components.
- Fide:** By the authority of (Latin); indicating the source of an identification or other statement of fact; same as the abbreviation "test." Sometimes abbreviated to *fid.*
- Filament:** The stalk of a stamen, on which is borne the pollen sac or anther.
- Filiform:** Threadlike; long, slender, and cylindrical (terete).
- Fimbriate:** Fringed.
- Fl.:** Flora; flower(s), flowering.
- Flabellate or Flabelliform:** Fan shaped.
- Flexuous:** Bending gently in opposite directions; slightly zigzag or wavy.
- Floccose:** Tufted woolly; with loose tufts of woollike hairs.
- Flora:** The vegetation of a given region, or a botanical manual treating thereof.
- Floral:** Of or pertaining to a flower, a plant, or a flora.
- Floral envelope:** The parts of a flower surrounding or investing the essential reproductive organs (pistils and stamens); the perianth.
- Floret:** A diminutive flower, especially the readily detachable flowers of a grass spikelet, consisting of the lemma and its attendant palea, together with the essential floral organs, the stamens and pistils. (Fig. 39, B, a, b, c, d.)

**Foliaceous:** Leafy or leaflike, as the foliaceous stipules of certain willows (*Salix*) or the foliaceous involucre of carrot (*Daucus*).

**Follicle:** A capsule or pod, matured from a simple pistil, and opening (dehiscent) along one (usually the inner) suture. (Fig. 31.) Larkspur, monkshood, columbine, and milkweed have follicular fruits.

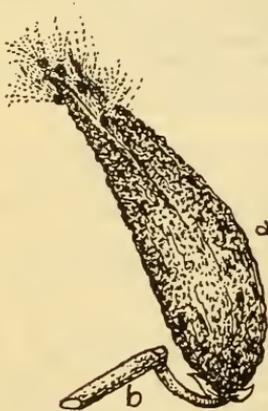


FIGURE 31.—Follicle of antelope-horns (*Asclepiodora decumbens*): *a*, Body of follicle, the pappus-crowned seeds emerging from the dehiscent apex; *b*, peduncle

**Follicular:** Of or pertaining to a follicle.

**Forb:** A weed in the range stockman's sense; a nongrasslike herb. (Greek, phorbe, forage.)

**Formation:** One of the main ecological groups into which vegetation is divided, as (for example) grassland, forest, and meadow; or hydrophytic, mesophytic, and xerophytic formations.

**Fr.:** Fruit(s), fruiting.

**Fronde:** The leaf of a fern.

**Fruit:** The ripened ovary of a seed plant with its contents and various envelopes. (Figs. 15, 31, 35, 42, and 64.) For example, a pea pod, a grain of wheat, a huckleberry, and a rose haw are all, botanically speaking, fruits.

**Frutescent:** Somewhat shrubby, becoming a shrub (*frutex*). Often used, though somewhat loosely, as a synonym of fruticose, but it preferably represents an intermediate stage between suffruticose (undershrubby) and fruticose (shrubby).

**Fruticose:** Shrubby; having the characteristics of a true shrub (*frutex*).

A term applicable to woody, bushy plants of a considerable size, not at all herbaceous (save for the season's growth) and not arborescent, or tree-like.

**Fruticulose:** Minutely shrubby; diminutive in size but otherwise having the aspect and characteristics of a true shrub, or fruticose plant.

**Fugacious:** Falling early; soon dropping off and disappearing; fugitive; short-lived. Partly synonymous with caducous and deciduous.

**Fulvous:** Dull yellow; yellow tinged with brownish or grayish.

**Funicle or funiculus:** The (usually diminutive) stalk of a nonseeds ovule or of the seed which ripens from it.

**Fuscous:** Dusky brown.

**Fusiform:** Spindle shaped; thickest in the middle and tapering toward each end.

**Galea:** A helmetlike or hoodlike enlargement in a flower as, for example, in the upper corolla lip of numerous species of the figwort family (*Scrophulariaceæ*). (Fig. 32, *A*, *g*, and *B*, *g*.)

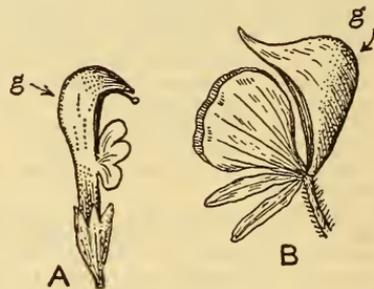


FIGURE 32.—Two types of galea: *A*, Flower of fernleaf, or lousewort (*Pedicularis*); *g*, the galea, or hooded upper lip of the corolla; *B*, flower of monkshood (*Aconitum*); *g*, the galea, or helmetlike upper sepal

**Galeate:** Shaped like a galea, or helmet.

**Gametophyte:** A plant which bears sex organs (stamens and pistils or, in cryptogams, analogous organs). The term is ordinarily used for the sexual stage in plants which exhibit alternation of generations. The gametophyte of a fern is called the prothallus. See "alternation of generations" and "sporophyte".

**Gamopetalous:** Having the petals more or less united. For example, the corolla of a huckleberry, manzanita, bluebell, or foxglove is gamopetalous. The same as sympetalous.

**Gamophyllous:** Having the leaves more or less united. (Fig. 19.)

**Gamosepalous:** Having the sepals more or less united.

**Gen.:** Genus, genera.

**Generic:** Of or pertaining to a genus.

**Genetics:** The science of plant or animal breeding. The branch of biology dealing with heredity and all its phases.

**Geniculate:** Kneelike; bent like a knee; said of stems, the awns of needle grass (*Stipa*), etc. (Fig. 33, a.)

**Genus (pl. -era):** A group of related species showing similar characteristics and appearing to have a common ancestry. Thus, white pine, yellow pine, sugar pine, and the various other pines are species comprised in the genus *Pinus*, which in turn is included in the family *Pinaceæ*.

**Geotropism:** The growth response of a plant or its parts to gravity; said especially of roots. Stems or other aerial portions of the plant are sometimes said to exhibit negative geotropism.

**Gibbous:** Humped or swollen on one side; as, for example, the calyx of a lupine.

**Glabrate:** Becoming glabrous, or nearly so, in age.

**Glabrous:** Devoid of hairs or pubescence; smooth in the sense of absence of all hairiness; literally bald.

**Gland:** A secreting or excretory part or organ. Plant glands are usually small and are often in the form of glandular hairs.

**Glandular:** Pertaining to or possessing glands. Viscid (sticky) plants are familiar examples of glandularity.

**Glans:** The nut of an acorn, as distinguished from the cup.

**Glaucous:** Covered with a bluish or whitish bloom, i. e., a sort of fine waxen powder that may be removed by friction or heat and tends more or less to reduce transpiration, as in a cabbage leaf or on a fresh plum. Moderately pruinose.

**Globose:** Shaped like a globe; spherical or approximately so and round in cross section.

**Glochidiate:** Barb tipped; having the apex furnished with twin, sharp, small, reflexed points like a miniature arrowhead. (Fig. 10, A.)

**Glomerate:** Crowded, congested, dense (said especially of flower and fruit clusters). Thus, if the rays, peduncles, or branches of an umbel, cyme, or corymb become shortened the inflorescence tends to become glomer-

ate, and approaching capitate or headlike.

**Glumes:** The two lowest chaffy bracts of a grass spikelet, which are empty, i. e., do not bear stamens or pistils in their axils. (Figs. 39, A, a, b;

B, c, e, and 68, A, g, h.) The lower one is known as the first glume and the upper one as the second glume. (Fig. 33, d and c, respectively.)

**Glutinous:** Gluelike or gummy; said especially of exudations and glands.

**Grass:** A member of the natural botanical family *Poaceæ* (*Gramineæ*).

Grasses are ordinarily perennial or annual herbs, but certain species (notably of the Bamboo tribe) have more or less

woody stems, some being arborescent (treelike). The stems (culms) are rounded and mostly hollow except at the joints (nodes). The leaves are 2-ranked (distichous) with a sheath and ligule. (Fig. 37, d, e.) The inflorescence is composed of spikelets. (Figs. 33, 39, and 68.) The fruit is a grain (caryopsis). Grasses are by far the most valuable of all plant families to man, including as they do the grains, the canes, bamboos, and a vast host of pasture, hay, and other plants of outstanding economic importance. Grasses comprise one of the four main groups into which our native forage plants are customarily divided, the others being grasslike plants, weeds, and browse.

**Grasslike plants** (the water grasses of the stockman): Plants which resemble true grasses (*Poaceæ*, or *Gramineæ*) superficially but which do not belong to that family and, as a rule, are inferior thereto as forage plants. One of the four main groups into which our native forage plants are ordinarily divided. The most characteristic grasslike plants are sedges (members of the *Cyperaceæ*, or sedge family) and rushes (genera *Juncoides* and *Juncus* of the *Juncaceæ*, rush family). The inflorescence of rushes has a 6-parted

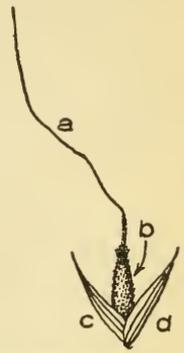


FIGURE 33.—Spikelet of green needle grass (*Stipa viridula*): a, (Geniculate) awn; b, lemma; c, second glume; d, first glume

flower (perianth), showing a close relationship to lilies. Sedges have 3-ranked leaves and usually solid stems which are often triangular in cross section. The floral organs of sedges are in the axils of 2-ranked or spirally imbricated (i. e., more or less overlapping) scales and, in the case of the largest and most familiar genus, *Carex*, the pistillate (female) flower is enveloped in a sac called the "perigynium." Because the majority of rushes and sedges grow in wet sites, grasslike plants are sometimes called "marsh grasses" or "wet meadow grasses." The term "grasses" for them, however, is inaccurate and misleading.

**Gymnosperm:** Literally, naked seed. A member of the Gymnospermæ, one of the two main groups into which flowering, or seed-producing, plants are customarily divided, the other being the Angiospermæ. Gymnosperms (to which pines and other conifers belong) have the ovules and seeds borne on a naked scale; an enveloping ovary, as well as a true floral envelope (perianth) and stigmas are wanting. Botanically gymnosperms are a primitive and relatively rather small group, but economically they are of the highest importance—to the forester probably the most important of all.

**Gynæcandrous:** A term applied to those sedges (*Carex* spp.) which have male and female flowers in the same spike but the upper flowers female, so that only the upper part of the spike bears fruit. The converse of androgynous.

**Habit:** Aspect; manner of growth.

**Habitat:** The site or environment which a plant or plants (as well as animals) natively occupy, and the study of which is the science of ecology.

**Halophyte:** A plant adapted to existence in a saline environment, as greasewood, salt grass (*Distichlis*), and the saltbushes (*Atriplex* spp.).

**Hastate:** Shaped like a spear or halberd head, the basal lobes pointing

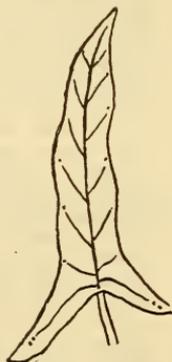


FIGURE 34.—Hastate leaf of sheep sorrel (*Rumex acetosella*)

outward and usually much shorter than the blade. (Fig. 34.)

**Haw:** A hawthorn (*Crataegus* sp.) or, more especially, its fruit; a small pome, or hip, as in a rose. This form of fruit is caused by the fleshy enlargement of the hypanthium.

**Head:** A headlike formation, especially a rounded, congested inflorescence or seed cluster; the characteristic inflorescence of the aster, or composite family (Asteraceæ, or Compositæ). In a true head (capitulum) the individual flowers are sessile or nearly so.

**Helicoid:** Shaped like the spirally coiled shell of a snail (*Helix*). (Fig. 35.)

**Heliotropism:** Response in a plant to the stimulus of sunlight; the turning or growth of the aerial portion of a plant to light emanating from the sun (Greek, helios); as in the radicle and plumule of the embryo.

**Hemi-:** A prefix (Greek) signifying half.

**Herb:** A phanerogam (flowering plant), the aerial portion of whose stem is

destitute of woody tissue and perishes when flowers and fruit are matured. An herb may have an annual, biennial, or perennial root, but the aerial stem is ordinarily annual; when a stem survives into the second or ensuing seasons there is naturally a tendency for woody tissue to form and for the transition to shrub or tree status to ensue.

**Herbaceous:** Of or pertaining to herbs; having the characteristics of an herb and free from woody tissue.

**Hermaphrodite:** A word (both noun and adjective) used to describe an individual having the organs, characteristics, qualities, or attributes of both sexes. Said specifically, in botany, of a perfect flower, i. e., one containing both pistils and stamens.

**Heterogenesis:** Same as alternation of generations.

**Hexamerous:** Having the parts in sixes (Greek, hex, six, + meros, part).

**Hilum:** The scar on the surface of a seed which shows the place of detachment of the matured ovule from its base or seed stalk.

**Hirsute:** Hairy with rather coarse, stiffish, straight, beardlike hairs.

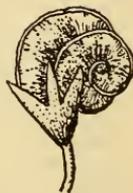


FIGURE 35.—Helicoid pod of alfalfa

- Hirtellous:** Minutely hirsute.
- Hispid:** Bristly; beset with stiff, rough, bristlelike hairs.
- Hispidulous:** Minutely hispid.
- Histology:** Microscopic anatomy; the science or study, by the use of a microscope, of the more minute structures of plants and animals.
- Holotype:** The sole specimen on which a species is based, when that specimen was: (1) The only one observed by the author of the species at the time he prepared the original description of the species; (2) the one definitely and exclusively chosen or indicated by the author as the type of the species; and (3) the one which alone has served to establish an original description (protograph) given or cited.
- Homonym:** The same name for a different plant; a specific or generic name untenable because preoccupied. For example, the generic name *Pinus* would be a homonym, and untenable, if applicable to any other group of plants than the pines.
- Hortus siccus:** A herbarium; literally, a dry garden.
- Host:** The organism from which a parasite derives its sustenance. Thus, clover is a frequent host for dodder.
- Hyaline:** Thin and translucent.
- Hybrid:** The progeny of a male of one race, variety, subspecies, species, or sometimes genus, and a female of another. In general hybridization is confined to congeners unless a narrow generic concept is held. Many authorities prefer to limit the term hybrid to a cross between different species, crosses between races being termed half-breeds, while those between subspecies, varieties, and forms, and sometimes between races also, are known as crossbreeds. Where the ancestry is mixed the term mongrel is often applied. Hybridization is usually indicated by the cross mark (X).
- Hydrophyte:** A plant that grows in water or in wet or saturated soils, as distinguished from its opposite, xerophyte, and the intermediate mesophyte.
- Hypanthium:** The base of a flower; specifically, an enlargement or elongation of the floral axis below the calyx, commonly inclosing the ovary and pistils. An apple or rose have an enlarged, fleshy hypanthium.
- Hypha** (pl. -æ): A threadlike component of a fungus mycelium, lengthening by growth from the tip and often showing transverse partitions. See mycelium.
- Hypogynous:** Said of stamens or other floral parts that are borne at the base of the ovary or below it.
- Hyponym:** An improperly published botanical name (such, for example, as a nomen nudum, or mere name, without any description or figure) and which, because of its indefiniteness and uncertainty, can have no validity or standing under the codes. For example, *Aragallus* is an older name than *Oxytropis* but is rejected as a hyponym.
- I. e.:** That is (Latin, id est).
- Imbricate(d):** Partially overlapping like shingles or tiles on a roof as, for example, the involuclral bracts (phylaries) of a thistle. (Fig. 36, B, a.)
- Immersed:** A term used for aquatic plants or their parts that are entirely submerged.
- Imperfect:** Wanting either stamens or pistils; unisexual. Said of flowers.
- Incised:** Having the margins cut into sharp, deep, irregular incisions or teeth. (Fig. 30, F.)
- Included:** Inclosed in and not protruding from the surrounding organs. For example, the stamens and style of most bluebell (*Mertensia* spp.) blossoms are included.
- Indehiscent:** Not spontaneously splitting open or dehiscing.
- Indeterminate:** The (more usual) type of inflorescence in which the flower buds are axillary or lateral rather than terminal (determinate) so that the main stem may continue its growth. (Fig. 22.)
- Indigenous:** Native. Thus, *Achillea lanulosa* is the common indigenous yarrow of the western United States, while *A. millefolium* is the common yarrow introduced from the Old World.
- Indurated:** Hardened and stiffened.
- Indusium** (pl. -ia): The thin, scalelike outgrowth of the leaf of a fern forming a covering for the immature sori, or fruiting dots.
- Inferior:** Being in a lower position or having the base attached below some other organ. Said especially of the ovary when adnate to the hypanthium and having the calyx lobes and other floral envelopes (if any) above it.
- Inflorescence:** The flowering part of a plant, and especially the mode of its arrangement.
- Infra-:** A prefix signifying below.
- Innovation:** An offshoot from the main stem, which frequently becomes es-

established as a new, independent plant, as in mosses; an incomplete young shoot, as in grasses.

**Intrnodes:** The portions of a stem between the nodes, or joints

**Interrupted:** Not continuous; not uniform, for example, in density, as an interrupted spike, i. e., a spike which has the flowers in some place or places smaller or fewer in number than elsewhere.

**Introduction:** An exotic plant introduced by man or other agency from its native region to another. Thus in the United States wheat and the common dandelion are introductions from the Old World.

**Introrse:** Turned in; facing inward. Said, for example, of an anther attached on the inner side of its filament and facing toward the inside of the flower.

**Involucel:** A secondary involucre; said especially of the whorl of bractlets subtending the umbellets of many umbellifers. (Fig. 36, C, c.)

**Involucre:** A whorl of distinct or united bracts or leaves subtending

wood (*Cornus* spp.) flower cluster are a familiar example of involucre. (Fig. 36, A.) In an umbellifer the involucre subtends the umbel. (Fig. 36, C, a.) In a composite the involucre is the usually cup-shaped envelope of encircling, often imbricated (partially overlapping) bracts subtending the flower head. (Fig. 36, B, a.) The cup, or cupule, of an acorn is also sometimes referred to as the involucre.

**Involute:** Inrolled; i. e., with both edges rolled in toward the middle (as a leaf) each edge presenting a spiral appearance in cross section.

**Isotype:** A duplicate of a type specimen (holotype). A term introduced by F. W. Pennell of the Philadelphia Academy of Natural Sciences. See paratype and cotype.

**Katabolism:** An alternate spelling for catabolism.

**Keel:** A projecting ridge on a surface, like the keel of a boat. When a grass glume or lemma is more or less compressed and boatlike, its midrib, if projecting, is called a keel. The two, often more or less joined, boatlike, forward petals of a pea family corolla are also known as the keel. (Fig. 48, c.)

**Keeled:** Provided with a keel or keels.

**Labiata:** Lipped. A plant of the mint family (Menthaceæ, or Labiatae), whose members have lipped, or labiate, corollas.

**Lacerate(d):** Deeply and irregularly cut along the edges.

**Lacinate:** Narrowly incised or slashed; having the margin cut into deep narrow lobes.

**Lamina:** A leaf blade (fig. 37, b); the broader portion of a leaf or of a clawed petal.

**Lanate:** Woolly, with dense, long, soft, more or less entangled, but not matted (tomentose) hairs.

**Lanceolate:** Lance shaped; several times longer than broad and tapering from the relatively narrow base to the apex. (Fig. 38, B.)

**Lanuginous:** Downy; beset with fine soft hairs; pubescent.

**Lateral:** Of or pertaining to a side of an organism or of its parts.

**Latex (pl. -tices):** A more or less milky and opaque, usually gummy,

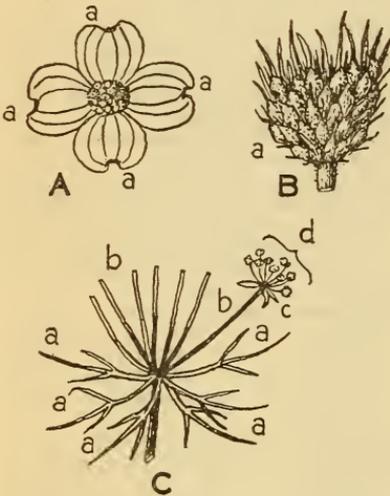


FIGURE 36.—Involucre: A, Flowering dogwood (*Cornus florida*); a, a, a, a, four petaloid involucral bracts forming an involucre about the central flower cluster; B, part of flower head of a thistle (*Cirsium* sp.); a, involucre, composed of involucral bracts (phyllaries) in numerous rows; C, umbel of carrot (*Daucus* sp.); a, a, a, a, a, pinnatifidly lobed involucral bracts, forming involucre; b, b, rays, branches, or peduncles of umbel; c, involucel, composed of involucellar bracts; d, umbellet

a flower or flower cluster. The petallike bracts of a flowering dog-

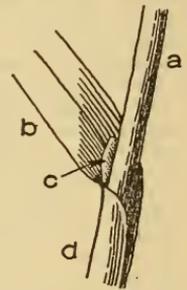


FIGURE 37.—Parts of a grass leaf and stem: a, Culm; b, blade (or lamina); c, ligule; d, sheath

sometimes oily or waxy exudation from a plant. The milky juices of sumacs, lettuce, milkweeds, spurge,

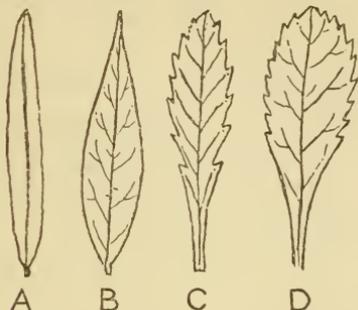


FIGURE 38.—Four common leaf outlines (see also Figures 34, 43, 44, 62, 63, and 73); A, Linear; B, lanceolate; C, oblanceolate; D, spatulate

and polygalas, the resin of a pine, mastic of a pistache, and the caoutchouc or crude rubber of the rubber tree are familiar examples of latices.

**L. c., or loc. cit.:** In the place cited (Latin, loco citato).

**Leaflet:** A single division of a compound leaf. Ashes, boxelders, clovers, locos, lupines, meadowrues, mesquite, and polemoniums are familiar illustrations of plants having leaflets.

**Leg.:** Collected; also, sometimes, explains or interprets (Latin, legit).

**Legume:** A simple pod, 1-carpelled and usually dry, splitting (dehiscing) along the back into two valves or parts; the fruit of any leguminous plant, i. e., a member of the pea family (Fabaceæ) or families closely related thereto (Cæsalpiniaceæ, etc.); also a plant belonging to these leguminous families or subfamilies.

**Leguminous:** Of or pertaining to the natural family Fabaceæ (or Leguminosæ), to which the cultivated peas and beans belong; having the characteristics of a plant of the pea, or legume, family.

**Lemmas:** The so-called "flowering glumes" of grasses (fig. 39, A, c and B, d); the chaffy bracts, which, together with the paleas, inclose the stamens and pistils or essential floral organs. A 1-flowered grass spikelet has, of course, one lemma only, a 2-flowered spikelet has two lemmas, and so on.

**Lenticular:** Resembling a lens in shape, appearance, or characteristics.

**Lepidote:** Covered with scurfy scales. The buffaloberries (*Lepargyrea* spp.) and silverberry (*Elæagnus*)

furnish familiar examples of lepidote foliage.

**Ligneous:** Woody.

**Ligulate:** Provided with a ligule; of or pertaining to a ligule. Occasionally also used as a synonym of lorate.

**Ligule:** The projecting, usually tongue-like, membranous end of the lining of the leaf sheath, seen at the base of the leaf blade, between it and the stalk, and a very characteristic feature of the grass family. (Fig. 37, c.) The ligule is quite constant in a given species and is often an important means of distinguishing grasses; sometimes it is reduced to a mere fringe of hairs or to a hardened ring. Some botanists call the rays of composite flower heads ligules.

**Limb:** Literally, a border or edge; specifically, a free portion, especially the upper, spreading part of a gamopetalous corolla, in distinction to the tube, or tubular, basal portion.

**Linear:** Linelike, narrow and flat, with the margins parallel. (Fig. 38, A.) Most grass leaves are linear or nearly so.

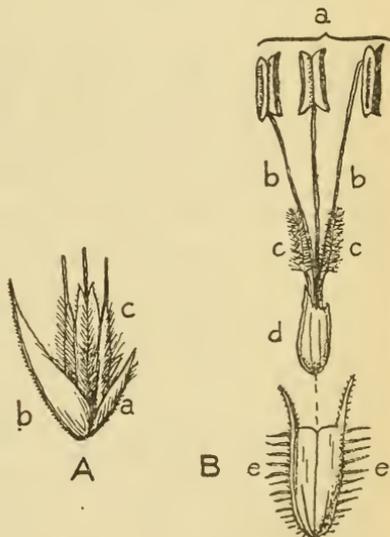


FIGURE 39.—A, Incomplete spikelet of blue grama (*Bouteloua gracilis*): a, first glume; b, second glume; c, lemma; B, spikelet of timothy (*Phleum pratense*): a, b, c, d, floret; a, anthers; b, filaments; c, stigmas (plumose); d, lemma; e, glumes (aristate and ciliate)

**Lip:** The upper or the lower division of a 2-lipped (bilabiate) corolla or calyx; the peculiar, enlarged, apparently lower (but technically upper)

petal in the orchid family (Orchidaceæ).

**Lobed:** Incised, but with rounded rather than sharp margins, and not deeper than about halfway between the outer edge and the blade center—usually less; said of leaves, petals, etc. (Fig. 40.)

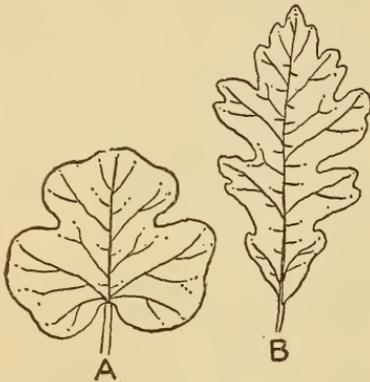


FIGURE 40.—Lobed leaves: A, Palmately lobed leaf, as in floating pennywort (*Hydrocotyle ranunculoides*); B, pinnately lobed leaf, as in certain oaks (*Quercus* spp.)

**Lodicule:** One of two (occasionally three) small hyaline scales, representing the corolla, found in the florets of most grasses inside the lemma and palea and subtending the floral organs (pistil and stamens).

**Loment:** A legume, or pod, constricted between the seeds.

**Lorate:** Shaped like a strap or thong (lorum).

**Lunate:** Crescent shaped (from luna, moon).

**Lyrate:** Lyre shaped; more or less spatulate in outline but with two or more small basal lobes.

**M.:** Meter(s), approximately 39 inches, or about  $3\frac{3}{4}$  feet.

**Major quadrat:** A square sample plot of vegetation larger than the usual 1 square meter quadrat unit.

**Marcrescent:** Withering but not deciduous, as shown, for example, in the dried persistent leaves in certain bunch-grass tufts.

**Membranaceous:** Thin and translucent, resembling a membrane; membranous.

**Membranous:** Of or pertaining to a membrane; membranelike; membranaceous.

**Mericarp:** A division of a compound fruit, especially one of the separate 1-seeded carpels of a schizocarp or one of the dry pendulous halves of a

cremocarp, or fruit of the umbellifer (parsnip) family. Literally, part fruit.

**Meristem:** Growing tissue; embryonic or undifferentiated portions of a plant whose cells are capable of active division.

**Meristematic:** Of or pertaining to meristem.

**-merous:** A suffix (Greek, meros, part) indicating division into parts. For example, a typical 4-merous or tetramerous flower has 4 sepals, 4 petals, 4 stamens, and a 4-celled ovary.

**Mesocarp:** The middle layer of a 3-layered pericarp (outer covering of a fruit). In a fleshy fruit, the same as sarcocarp.

**Mesophyte:** A plant that grows under medium or average moisture conditions; neither an aquatic (hydrophyte) nor a desert species (xerophyte). The vast majority of plants growing in the United States are mesophytes.

**Metabolic:** Of or pertaining to metabolism.

**Metabolism:** The life processes of plants as summed up in the chemical and physical changes involved in their growth, reproduction, and decay. Metabolism may be constructive (anabolism) or destructive (catabolism).

**Micro-:** A prefix (Greek) signifying small, or minute. It has in general a rather more intensive significance than the Latin prefix parvi-, and is preferably applied to microscopic objects and parts.

**Micropyle:** The minute opening of an ovule through which the pollen tube enters and fertilization is accomplished. In the seed the micropyle is closed and usually persists as a small scar.

**Migrant:** That which migrates or has migrated; a plant which, by seed or other means, invades a new area or habitat. As a tree migrant in a meadow.

**Migration:** Invasion, or the movement of plants into new areas.

**Milacre:** A plot one-thousandth part of an acre in extent, one-tenth of a chain or 6.6 feet square; containing 43.56 square feet.

**Mm.:** Millimeter(s), approximately one twenty-fifth of an inch.

**Monadelphous:** Literally in one brotherhood; said of stamens where all in a flower are united by their filaments into a single tubelike or columnlike cluster.

**Moniliform:** Resembling a string of beads, as the moniliform roots

(corms) of *Cogswellia farinosa* or the moniliform pods of certain species of corydalis; torose in an extreme degree.

**Mono-:** A prefix (Greek) signifying one.

**Monocotyledon:** A plant having but one cotyledon, or seed leaf, as a grass, sedge, rush, lily, palm, etc. The monocotyledons are one of the two main divisions of angiosperms, the other being the dicotyledons.

**Monœcious:** Literally, in one house. Having the flowers differentiated as to sex, the staminate (male) and pistillate (female) flowers in separate inflorescences, but borne on the same individual plant, as distinct from one-sexed, or dioecious plants, and hermaphrodites, or plants having perfect flowers (containing both pistils and stamens). Many of our most important American trees, such as pines, oaks, and birches, are monœcious.

**Monostichous:** Borne on one side of an axis; 1-sided, as the inflorescence of blue grama. Same as secund.

**Morphology:** The science of form and structure. Plant morphology is sometimes called structural botany; it deals with the forms of plants and of their organs, their anatomy (gross morphology), relationships, and development. Systematic botany (taxonomy) is based on morphology. Physiology differs in that it deals with the functions, life processes, and activities of plants rather than with form and structure. Cytology (cell science) and histology (microscopic anatomy) deal with the microscopic morphology of the plant.

**Mucro:** A sharp, straight point, especially if abrupt and short.

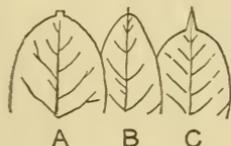


FIGURE 41.—Three types of terminal pointing, as in leaves, leaflets, petals, and sepals; A, Mucronate; B, apiculate; C, cuspidate

**Mucronate:** Ending in a mucro, or sharp point, especially if the tip is abrupt, short, and small. (Fig. 41, A.)

**Multi-:** A prefix (Latin) signifying many or numerous.

**Muricate:** Rough with short hard prominences. (Fig. 42.)



FIGURE 42.—Muricate nutlet (seed), as in certain species of *Amsinckia* and other western annuals of the borage family

**Muticus:** Awnless, pointless, or unarmed. Literally, docked.

**Mycelium:** The interwoven hyphal tissue composing the vegetative thallus, or body, of a higher fungus and from which the sporophores, or reproductive parts, are produced. In mushrooms it is the cobwebby "spawn" of the seedsman, consisting of an entangled subterranean mass of hyphae, or filaments.

**Mycorrhiza:** Literally, fungus root. A symbiotic (or possibly sometimes parasitic) relationship or association between a fungus and the root of some higher plant. Beeches, oaks, birches, conifers, orchids, and heaths are among the plants which provide familiar examples of this condition. Mycorrhizas are either: (1) Ectotrophic, or external, the fungal hyphae, or filaments, forming a mass about the root tips, or (2) endotrophic, or internal, the mycelium of the fungus occupying the parenchyma of the roots of the flowering plant.

**N. s., or n. ser.:** New series; n. s. is also occasionally used for new species.

**N. sp.:** New species; also abbreviated sp. nov., nov. sp., and occasionally n. s.

**Nanism:** Dwarfishness or dwarfing; a depauperate state of a plant, such as at alpine elevations. Some writers, however, prefer to distinguish between nanism and depauperation, using the former term for plants whose diminutive size is hereditary, depauperate plants being starved but nonhereditary forms dwarfed by unfavorable growth conditions.

**Nat.:** Natural, nature.

**Nectar:** The sugary exudation of certain flower glands (nectaries), at-

- tractive to insects, to which the floral perfume is largely or sometimes wholly due, and from which bees derive honey.
- Nectariferous:** Nectar bearing or producing; secreting nectar, as a nectary.
- Nectary:** A gland, usually situated at or near the base of a corolla or perianth, or one of its parts, which secretes nectar.
- Nerve:** A name for ribs or veins, when unbranched and approximately parallel, applied especially in the case of leaves and the chaffy bracts (glumes, lemmas, and paleas) of grass flowers. The terms "nerve" and "vein" in botany, of course, are wholly different in meaning from the same terms used in zoology and human anatomy.
- Nerved:** Provided with nerves, as a 1-nerved glume.
- Node:** A joint or knot. Said especially of stems, whose nodes or joints are enlarged, often dark colored, and are the points whence leaves often spring.
- Nom. nov.:** New name (Latin, nomen novum), i. e., a name, hitherto unpublished, substituted for one in general use but ascertained to be untenable.
- Nom. nud.:** See nomen nudum.
- Nomen conservandum:** Literally, a conserved name. A name retained in Latin plant (or animal) nomenclature regardless of priority. Nomina conservanda are rejected by the American Code of Botanical Nomenclature (used by the United States Department of Agriculture, New York Botanical Garden, Leland Stanford University, etc.) but are admitted under the International Code (used in Europe, the Gray Herbarium of Harvard University, the University of California, etc.) Thus, under the Paris (International) Code, *Glyceria* R. Brown (1810), although published 47 years after *Panicularia* Heister (1763), is retained for the manna grasses as a nomen conservandum. Nomina conservanda usually have a history behind them of long usage (possibly pre-Linnaean), acceptance by the great botanical figures of the past, better and fuller publication, questions of taste and propriety, etc.
- Nomen nudum** (pl. *-ina nuda*): Literally, a naked name, i. e., a name only; a plant name published without any description or figure, and hence which can not be tied in with assurance to any plant or plant group. Nomina nuda are very properly rejected by all codes. For example, in the Flora of Washington is published, without description, a new subspecies of mistletoe, *Razoumofskya douglasii laricis*; such a name is a nomen nudum. Nomen seminudum is a term used to designate a name published with only a word or two, or a description otherwise wholly inadequate.
- Nucleus:** The organ of a plant or animal cell which is essential in anabolism, growth, reproduction, and heredity.
- Nut:** A nonsplitting (indehiscent) 1-seeded fruit, with hard woody shell (pericarp), and developed from an inferior, several to many carpelled ovary. In popular usage almonds, peanuts, and Brazil nuts are nuts, but they are not so botanically; an almond is a drupe (close akin to a peach); a peanut, a legume; while the fruit of the Brazil-nut tree (*Bertholletia excelsa*) is a sort of large, woody-shelled capsule (pyxis) containing nutlike seeds.
- Nutlet:** A small nut or nutlike fruit or seed. (Fig. 42.) For example, the fruits of the borage, verbena, and mint families are nutlets.
- Nyctitropism:** The tendency of some leaves and other plant organs to assume certain positions at night or in darkness; familiar examples are seen in the drooping leaflets of clovers and locusts as night approaches.
- Ob-:** A prefix (Latin) signifying in an opposite direction or other reversion.
- Obcordate:** Reverse heart shaped; with the broader, notched ends forwards or uppermost, as in the leaflets of oxalis and white clover. (Fig. 43.)
- Ob lanceolate:** Reverse lance shaped (lanceolate); with the narrowed, tapering part downward, and the broader end foremost. (Fig. 38, C.)
- Oblique:** Unequal sided; slanting.
- Oblong:** About two to four times longer than broad, and with the sides, though gently rounded, approximately parallel. (Fig. 44, A.)

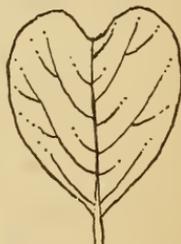


FIGURE 43.—Obcordate leaf

**Obovate:** Reverse egg shaped (ovate) ; in longitudinal section, with the broader end forward or uppermost. (Fig. 44, C.) Used of flat or 2-dimensional figures.

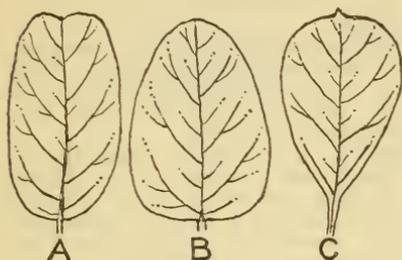


FIGURE 44.—Three common shapes or outlines of leaves (see also Figures 34, 38, 43, 62, 63, and 73) : A, Oblong; B, ovate; C, obovate

**Obovoid:** Reverse ovoid, or egg-shaped, with the broader end foremost or uppermost. Used of solid, or 3-dimensional, objects.

**Obtuse:** Blunt or rounded at the tip; not sharply pointed; as in the ovate leaf shown in Figure 44, B.

**Ochroleucous:** Yellowish white; cream colored.

**Ocreæ:** Literally, boots; a term applied to the characteristic membranous, sheathing, united stipules of the buckwheat family (Polygonaceæ).

**Offset:** A form of short runner; a short basal prostrate lateral branch which roots at the tip and eventually tends to produce a separate individual plant.

**Ontogeny:** The life history or development of an individual plant or animal, as opposed to phylogeny, or the study of a group.

**Oöspore:** In nonflowering plants (cryptogams), where alternation of generation occurs, the egg cell (oösphere), after it is sexually fertilized, develops a hardened outer wall of cellulose and (usually) goes into a resting stage (the oöspore). From it germinates the sporophyte, which is the (usually more conspicuous) plant which produces asexual spores.

**Op. cit.:** Work already cited (Latin, opere citato).

**Opposite:** Arranged in pairs, at an angle of 180°; i. e., on opposite sides of a stem. Said especially of leaves and branches. The leaflets shown in Figure 55, B, are opposite. See alternate and whorled. Leaf and branch arrangement are among the

fundamental ways of distinguishing plants vegetatively, i. e., apart from sexual characters (flowers and fruit).

**Orbicular, or orbiculate:** More precisely, a term applicable to 3-dimensional, or solid objects and synonymous with spherical or globose; in botany, however, through long usage, usually applied to 2-dimensional (plane) objects circular in outline or nearly so, as an orbicular (orbiculate) leaf.

**Organ:** A member; a plant (or animal) part having a special function or functions; e. g., a root, a leaf, a pistil, a stamen.

**Oval:** Broadly elliptical. Some authors, however, have used oval as a synonym of ovate.

**Ovary:** The organ (fig. 45, *d*) in which are borne the ovules, or rudimentary seeds; usually a basal cavity in the pistil. It is found only in angiosperms.

**Ovate:** Having the outline of a hen's egg in longitudinal section, with the broader end downward or inward. (Fig. 44, B.) A term used in describing 2-dimensional, or plane, objects such as a leaf.

**Ovoid:** Shaped like a hen's egg and with the broader end downward or innermost. A term used in describing solid, or 3-dimensional parts, such as a fruit.

**Ovule:** A rudimentary seed occurring in the ovary. (Fig. 45, *c*.)

**Palatability:** An expression of the relative relish with which food is consumed. Specifically, in Forest Service range management, reconnaissance, and research, the degree to which the herbage within easy reach of livestock is grazed when a range is properly utilized under the best practicable range management. The percentage of the readily accessible herbage of a species that is grazed when the range is properly utilized determines the palatability of the species.

**Palea:** A chaffy bract; specifically (1) the chaffy bract which often occurs in a grass floret opposite the lemma

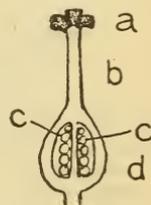


FIGURE 45.—Pistil, or female floral portion of the flower of a cucumber (such as a melon): *a*, Lobed stigma; *b*, style; *c*, ovules (borne on axile placenta) in *d*, ovary

and which, together with the lemma and lodicules, incloses the stamens and pistils and later the grain; (2) one of the chaffy bracts on the stipes of certain ferns; (3) a chaffy bract on the receptacle or in the pappus of some composites. Same as palet.

**Palet:** See Palea.

**Palmate:** Digitate. The term refers to organs (e. g., leaflets) which are



FIGURE 46.—Palmate leaf, as in cinquefoil (*Potentilla* sp.)

radiately lobed or divided, suggesting the outspread fingers of the hand; as, for example, the leaflets of cinquefoil, clover, lupine, and horsechestnut or buckeye. (Fig. 46.) A trifoliolate leaf, as in clover, is 3-palmate or digitate; a quinquefoliate leaf, as in cinquefoil (*Potentilla*) is 5-palmate or digitate.

**Panicle:** A compound raceme; a compound, more or less open inflores-

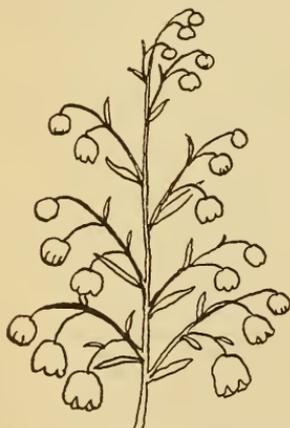


FIGURE 47.—A panicle

cence in which the lower branches are typically longer and blossom earlier than the upper branches. (Fig. 47.) The term is sometimes

loosely applied to any irregular compound inflorescence.

**Paniculate:** Paniced; arranged in panicles; having the form or characteristics of a panicle, as the paniculate inflorescence of Kentucky bluegrass.

**Papilionaceous:** Literally, butterflylike. A term used to describe the shape of the characteristic corolla of the pea family. (Fig. 48.) See keel, standard, and wing.

**Papilla:** A diminutive nipplelike or pimplelike protuberance. Typical papillæ may be seen, for example, on the leaves of certain mertensias, the seeds of certain catchflies (*Silene* spp.) and sparges.

**Papillate:** Beset with papillæ.

**Papillose:** Same as papillate.

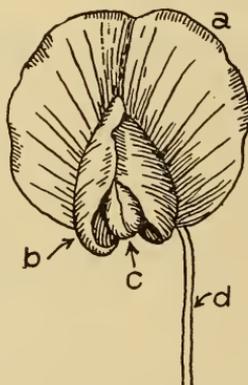


FIGURE 48.—Papilionaceous corolla, as in sweet pea (*Lathyrus odoratus*) and other leguminous plants: a, Banner or standard; b, wing petal; c, keel; d, pedicel

**Pappus:** Thistledown; the peculiar calyx limb of composites (Asteraceæ), etc., surmounting the achene, or fruit, commonly bristlelike, awnlike, or feathery, and an instrument of seed dispersion by wind, animals, etc. The feathery pappus of a dandelion seed is a familiar illustration. (Fig. 49, a.)

**Parasite:** An organism (plant or animal) which derives its sustenance from another. Thus, mistletoes are parasites of oaks, pines, and other woody plants.

**Paratype:** In general, one of the original series of specimens in which the type specimen was collected. According to some authors this definition applies only where the type

specimen is a holotype (q. v.), thus being equivalent to isotype. See also cotype.

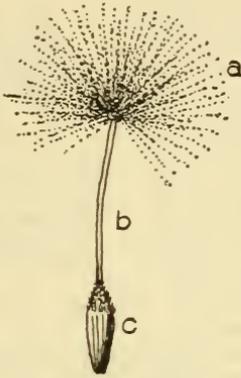


FIGURE 49.—Achene, or fruit, of the common dandelion (*Leontodon taraxacum*): a, Pappus; b, beak; c, body of the achene

**Parenchyma:** Thin-walled, soft cell tissue. One of the two primary types of plant tissues, of which the other is termed prosenchyma. Parenchyma usually occurs in the form of cubical or polygonal cells; familiar examples are seen in stem pith, most leaves (except the veins and midrib), fruit pulp, etc.

**Parietal:** Literally, of or pertaining to a wall (paries) or wall-like part; hence, wall-borne. Applied specifically, in botany, to a placenta or ovule that is attached to the wall of the ovary.

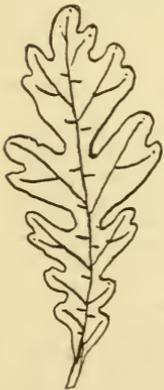


FIGURE 50.—A parted leaf, as in certain species of oak

**Parted:** Not quite divided. Said of simple leaves that are incised almost to the midrib or blade base, and so are not quite compound. (Fig. 50.)

**Pathology:** The science which treats of diseased or morbid conditions. Plant pathology deals with plant diseases, their causes, effects, and treatment or cure.

**Pectinate:** Comblike; arranged or divided like the teeth of a comb (Latin, *pecten*).

**Pedate:** Palmately cleft or parted but with the main divisions having a common stalk, i. e., the primary divisions twice or more cleft or parted. Thus, the leaves of birdsfoot violet (*Viola pedata*) and of dragonroot (*Arisæma dracontium*) are pedate. (Fig. 51.)

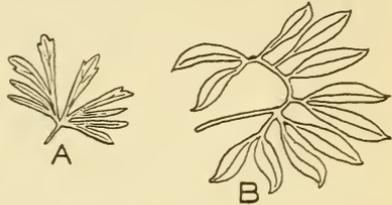


FIGURE 51.—Pedate leaf, as in (A) birdsfoot violet (*Viola pedata*) and (B) dragonroot (*Arisæma dracontium*)

**Pedicel:** In an inflorescence consisting of more than one flower, the foot-stalk or stem of an individual flower or fruit. (Fig. 48, d.)

**Pedicellate:** Provided with a pedicel, or stalk; not sessile. Said of individual flowers or florets.

**Peduncle:** The stalk of a flower cluster or of an inflorescence consisting of but one flower. See pedicel.

**Pedunculate:** Provided with a peduncle.

**Peltate:** Shield shaped; a peltate leaf, as in nasturtium, has the petiole attached somewhere near the center of the blade. (Fig. 52.)

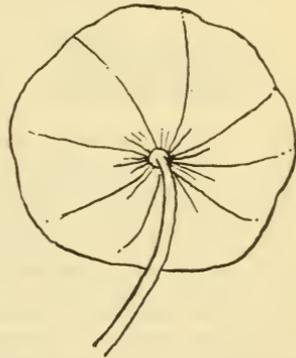


FIGURE 52.—Peltate leaf, as in the common nasturtium

**Pendulous:** Hanging down; suspended from above; pendent; drooping.

**Pentamerous:** Having the parts in fives.

**Pepo:** The characteristic indehiscent fruit of the gourd family (Cucurbitaceæ), such as a cucumber, muskmelon, pumpkin, or squash. It differs from a berry chiefly in having a hard, more or less thickened rind (pericarp).

**Perennial:** Lasting for three or more years; said especially of herbaceous plants that are neither annual nor biennial. A perennial plant. Frequently expressed by the symbol ♁.

**Perfect:** Having both stamens and pistil(s); said of flowers. The great majority of flowers are perfect.

**Perfoliate:** Literally through the leaf; refers to leaves or stipules whose clasping bases are united beyond, and as if pierced by, the stem. (Fig. 53.)

**Perianth:** The floral envelope, consisting of the calyx and corolla, however incomplete or modified. Used particularly for plants, like lilies, in which the calyx and corolla can not readily be distinguished.

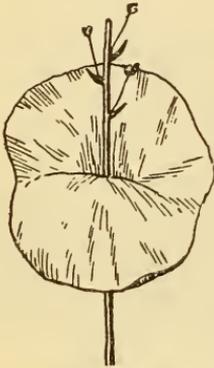


FIGURE 53.—Perfoliate leaf, as in thoroughwort spring-beauty (*Claytonia perfoliata*)

**Pericarp:** The outer covering, varying greatly in texture and thickness, of a fruit and corresponding to the outer walls of the ovary from which it was fashioned. In a pod the pericarp is mostly thin and dry; in a drupe or berry, thick and fleshy; in a nut, bonelike in texture. The pericarp often consists of two layers (endocarp and exocarp) or of three layers (endocarp, mesocarp, and epicarp). In a peach or plum, for instance, the bony stone surrounding the seed is the endocarp, the edible fleshy portion is the mesocarp, or sarcocarp, while the thin outermost rind, or peel, is the epicarp.

**Perigynium** (pl. *-ia*): The saclike organ which completely incloses the ovary, and at maturity the achene (seed), in sedges of the genus *Carex*; the perigynium is usually

more or less beaked and often 2-toothed at apex and affords some of the best characters for distinguishing species of this difficult genus. (Fig. 54, A.)

**Perigynous:** Situated around the ovary; said of petals and stamens when borne on the calyx, as, for example, in the rose family (*Rosaceæ*). Literally, around (the) woman, i. e., encircling the pistil.

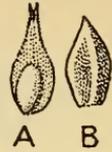


FIGURE 54.—Pistillate (female) floral parts of a sedge (*Carex festivella*): A, Perigynium; B, scale, which subtends A

**Persistent:** Remaining attached, instead of falling away, at the time such parts ordinarily drop off; said of evergreen leaves, calyces remaining at fruiting time, etc.

**Petal:** Typically one of the separate, usually colored, modified leaves of a choripetalous corolla and making up the inner and upper series of the floral envelope (perianth) parts. Also, though less precisely, one of the more or less fused divisions of a gamopetalous corolla (as the five united petals of a manzanita corolla).

**Petaloid:** Petallike, as the petaloid involucre bracts of the flowering dogwoods (*Cornus florida* and *C. nuttallii*).

**Petiolate:** Furnished with a petiole, or leafstalk (said of leaves).

**Petiole:** A leafstalk, whereby the blade of a leaf is attached to the plant stem.

**Petiolulate:** Furnished with a petiolule (said of leaflets).

**Petiolule:** The stalk of a leaflet, corresponding to the petiole of a leaf.

**Phanerogam:** A flowering, seed-producing plant; a seed plant (spermatophyte) as distinguished from a cryptogam. The higher of the two main divisions, or subkingdoms, into which the vegetable kingdom is divided; in turn separated into angiosperms and gymnosperms.

**Phloem:** Soft bast or sieve tissue in plants. The outer of the two component parts of fibrovascular bundles. Phloem consists of sieve tubes with the accompanying cells and parenchyma.

**Photosynthesis:** The complex process by which starch ( $C_6H_{10}O_5$ ) is manufactured by the chloroplasts, or

chlorophyll-bearing cell granules, in the presence of light (normally sunlight) and usually in the leaf. The starch is gradually derived from water and carbon dioxide. The water (H<sub>2</sub>O) is obtained from the soil by means of the root hairs on the roots, and carbon dioxide (CO<sub>2</sub>) is absorbed from the air through the stomata. In the process of photosynthesis free oxygen (O) is given off through the stomata, and this is the scientific basis for the popular dictum that plants purify the air.

**Phototropism:** The common phenomenon exhibited by plants or their organs in growing toward or turning off through the stomata, and this is induced by artificial light.

**Phyllary:** One of the (often sepal-like) involucre bracts subtending the flower head of a composite.

**Phyllo-** (or *-phyll*): An element (Greek) in compound words signifying leaf.

**Phylogeny:** The life history, evolution, or genetic relationship of a group (as an order, family, genus, species, or race) of plants or animals, as distinguished from ontogeny, which concerns the study of an individual plant or animal.

**Physiology:** The branch of biology which deals with life processes and functions. Plant physiology is the study of how plants grow and reproduce and of the varied functions of their organs or other parts.

**Pilose:** Hairy with soft slender hairs.

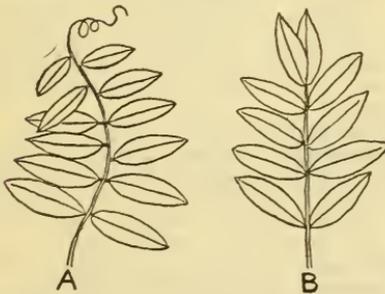


FIGURE 55.—Pinnate leaves: A, Odd-pinnate leaf of vetch (*Vicia*), with the terminal leaflet represented by a tendril; B, even-pinnate leaf, as in *Cassia*

**Pinna** (pl. *-ae*): A main or primary division of a pinnate leaf, a single leaflet if the leaf be simply or once pinnate. Each of the leaflets shown in Figure 55 is a pinna; each of the

main divisions in the bipinnate leaf shown in Figure 12 is a pinna; its individual leaflets are pinnules.

**Pinnate:** Having the parts (usually said of leaves) arranged on each side of a common axis; a compound leaf with opposite leaflets (fig. 55, A, B), as in ashes or peavines, is pinnate.

**Pinnatifid:** Pinnately or oppositely (featherwise) cleft or parted almost to the midrib, or else lobed to the middle. (Figs. 13, 18, 40 B, and 50.) Approaching pinnate.

**Pinnule:** An ultimate leaf division, or leaflet, of a bipinnate leaf (fig. 12); the main division of a pinna. In a thrice pinnate leaf the pinnæ would be divided into pinnules and each of the pinnules, in turn, would be pinnately divided into leaflets.

**Pistil:** The female or seed-producing organ of a flower, consisting typically of ovary, style, and stigma (fig. 56), the style, however sometimes wanting.

**Pistillate:** Female; bearing pistils or seed-producing organs only. Said of flowers which are provided with pistils but not with stamens, and of individual inflorescences and plants having only pistillate flowers. Expressed by the symbol ♀ (Venus's-looking-glass).

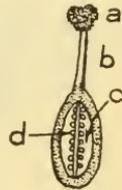


FIGURE 56.—A pistil: a, Stigma; b, style; c, ovary; d, placenta bearing two vertical rows of ovules (rudimentary seeds)

**Placenta** (pl. *-æ*): That portion of the ovary on which the ovules are borne (fig. 56, *d*); placenta of simple pistils are marginal and, compound pistils, usually axile, parietal, or basal.

**Plumose:** Featherly or featherlike; having fine hairs on each side, like the plume of a feather. (Fig. 57, *a*.)

**Plumule:** The little, often featherlike bud, at the summit of the radicle in an embryo or germinating seedling, situated between the two cotyledons in a dicotyledonous plant, and from which the mature plant stem and leaves eventually develop.

**Pollen:** The fertilizing floral dust or powder; fecundating granules developed within the anther.

**Poly-:** A Greek prefix meaning many.

**Polycotyledon:** A seedling with numerous (at least three) cotyledonous leaves, or a plant whose seedlings

are of that sort. Thus, most pines are polycotyledons.

**Polygamous:** Having both perfect and unisexual, or imperfect (i. e., either staminate or pistillate) flowers borne on the same individual as, for example, in certain species of maple.

**Polypetalous:** Having the petals distinct (choripetalous), and especially if numerous; the opposite of gamopetalous.

**Polysepalous:** Having the sepals distinct (chorisepalous), and especially if numerous; the opposite of gamosepalous.

**Pome:** The fleshy, applelike fruit of a member of the apple family (Malacæe); an apple; also, though less exactly, a rose hip or haw or other smaller fruit of somewhat similar character of the rose family.

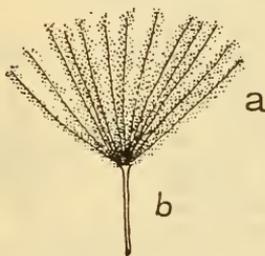


FIGURE 57.—*a*, Plumose pappus bristles at apex of *b*, the beaked fruit (achene) of salsify, or vegetable-oyster (*Tragopogon porrifolius*)

**Prickle:** A sharp, pointed emergence from the bark and readily pulling off with it, as a rose prickle. Spines or thorns partake of the nature of branches or twigs and are more deeply seated than prickles.

**Process:** A projection or emergence, usually small, from the edge or surface, as the spiny processes on the leaf margins of agaves.

**Procumbent:** Lying on the surface of the ground, even from the first, said especially of stems. Same as prostrate.

**Proliferation:** The production of new parts rapidly and repeatedly from buds, offsets, etc.; rapid succession of cell division or a new growth so formed.

**Proliferous:** Reproducing freely by vegetative means, as, for example, offsets or buds; developing leafy shoots from a flower or flower head, etc.

**Prosenchyma:** Vascular tissue composed of elongated, mostly thick-

walled, fibrous, pointed cells, without intercellular spaces; one of the two general types of tissue in the higher plants, the other being the parenchyma.

**Prostrate:** Lying on the surface of the ground, even from the first; said especially of stems. Same as procumbent.

**Prothallium** (pl. *-ia*): The same as prothallus.

**Prothallus:** The sexual stage or generation (gametophyte) of ferns and related cryptogams; it consists of a small, usually flat and green body (thallus) attached to the ground or other growing surface by rootlets (rhizoids) on the under surface, and bears the male and female organs (antheridia and archegonia) either on the same or on separate plants. See alternation of generations.

**Protoplasm:** The colorless, semifluid, highly complex, nitrogenous (protein) material found in all living tissue, both plant and animal, and which is the physical basis of life.

**Pruinose:** Beset, as if dusted, with a white, frostlike bloom, or indument, of fine vegetable wax, as, for example, on the stems and leaves of certain crucifers, on certain berries and other fruits, etc. Glauous to an extreme degree. (Latin *pruina*, hoarfrost.)

**Pseudo-:** A prefix (Greek) signifying false.

**Pteridophyte:** A fern or fern ally. A member of the natural group (phylum) Pteridophyta, consisting of the various orders and families of ferns, horsetails, clubmosses, quillworts, and other of the higher nonflowering plants, or cryptogams; the vascular cryptogam of the older botanists. Save for the tree ferns of the Tropics all living pteridophytes are herbs.

**Puberulent:** Very finely pubescent.

**Pubescent:** In current botanical usage a general term meaning hairy; specifically, however, the term means downy haired; covered with fine, soft short hairs (pubescence).

**Pulvinate:** Resembling a cushion.

**Pulvinus:** A cushionlike appendage, as the hairy pulvini in the axils of the inflorescence branches of beard-cushion witchgrass (*Panicum barbipulvinatum*).

**Punctate:** Dotted, especially if beset with minute holes or depressions, as the small translucent glands in the leaves of St. Johnswort (*Hypericum*). Sometimes used as a synonym of minutely papillate, i. e., be-

set with minute dotlike projecting appendages.

**Pungent:** Tipped with a hard, rigid, prickly point, as a pine needle.

**Pustulate:** Beset with pimplelike or blisterlike, elevated and sharply defined areas (pustules).

**Pustule:** A pimplelike or blisterlike area, raised above the surrounding surface and sharply circumscribed. A pustule may be pathological as the pustules (blisters or cankers) on the stem of a white pine infested with blister rust, or may be normal and morphological as the pustulate glands at the base of a peach or plum leaf.

**Putamen** (pl. *-mina*): The hard stone or pit (endocarp) of a drupe. The pits of cherries, peaches, plums, and the like are putamina and, anatomically, are inner layers of the coat (pericarp) of the fruit rather than belonging to the seed itself.

**Pyriform:** Pear shaped.

**Pyxidium:** Same as pyxis.

**Pyxis:** A capsule or pod which opens horizontally (circumscissile dehiscence), the top of the pod falling off as a lid to permit seed dissemination. (Fig. 58.) A diminutive pyx (box or casket of a conventional shape). The fruits of the Brazil nut, henbane, plantain, and portulacas, for example, are pyxes.

**Q. v.:** To which refer (Latin, quid vide), an abbreviation used in cross references.

**Quadrat:** A rectangular, usually square sample plot used in ecological and other biological studies; especially such a plot containing 1 square meter. (A larger sample plot is often termed a major quadrat.)

**Quinquefoliolate:** Having five leaflets (Latin, quinque, five + foliolum, leaflet), as the leaves of cinquefoils (*Potentilla* spp.).

**Race:** A breed or strain, especially if of a domesticated species and produced by artificial selection; a taxonomic group lower and less constant than a species, as a white-flowered race of a normally blue-flowered larkspur species. Partly synonymous with subspecies and variety but typically of lesser importance.

**Raceme:** A simple, elongated, indeterminate flower cluster, the rachis bearing a series of 1-flowered pedi-

cells, the lower flowers blossoming earlier than the upper flowers (centripetal). (Fig. 59.)

**Racemose:** Having the characteristics of a raceme; racemelike; raceme bearing.

**Rachilla:** The axis of a spikelet, the prolongation of the pedicel.

**Rachis:** The axis of a spike, raceme, or branch of a panicle.

**Radicle:** The rudimentary stem of the plant embryo in a seed; the basal tip of the lower, free portion turns downward into the earth (exhibits geotropism) and becomes the root of the seedling plant, while the upper extremity exhibits heliotropism, pushing the cotyledons into the light.

**Raphe** (pronounced ray'-fee; Greek, rhaps, a seam): A seamlike ridge or furrow (as on the human tongue), especially (1) the ridge connecting the hilum and chalaza of an anatropous or amphitropous ovule, marking the fusion of the stalk (adnate funicle) and body of the inverted ovule, adjoining the point of attachment on the placenta, and (2) a prominent medial line or suture, often showing the union of two symmetrical halves of an organ or part, as on the pod of a pea or loco, a sporocarp of pepperwort (*Marsilea*), a diatom valve, or a seed of pitcherplant (*Sarracenia*). Often spelled rhaps.

**Ray:** In composites (as in daisies) one of the marginal, usually colored and petallike flowers which are called "ligules" by some authors. In umbellifers, a branch of an umbel. (Fig. 74, c.)

**Receptacle:** The axis or support of a flower or flower head; the somewhat enlarged end of the flower stalk upon which numerous flowers or the organs of a flower are borne. Often called torus.

**Reflexed:** Bent abruptly backward.

**Reniform:** Kidney shaped.

**Repand:** Gently wavy or fluted margined. Same as undulate. Uneven,



FIGURE 59.—A raceme, as in pyrola, or shinleaf (*Pyrola*)



FIGURE 58.—A pyxis

slightly sinuous leaf margins which bend moderately inward and outward in succession are repand. (Fig. 60,

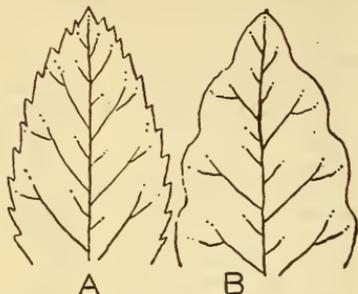


FIGURE 60.—Two types of leaf margin: A, serrate; B, repand, or undulate

B.) Repand, however, is not so deeply wavy as is sinuate.

**Resin-duct:** A canal, tube, or vessel in which resin is secreted. Resin ducts are exemplified in the leaves, wood, and bark of conifers.

**Resiniferous:** Bearing or yielding resin.

**Respiration:** Literally, breathing. In plants, the taking in of free oxygen from the air and the giving off of carbon dioxide (CO<sub>2</sub>) (both in relatively much smaller quantities than in animals), with some rise in temperature as a result of oxidation (combustion); the diffusion and interchange of gases between the atmosphere and the intercellular spaces of plants, especially in the leaves. In photosynthesis (a reverse process) plants utilize so much carbon dioxide (CO<sub>2</sub>) and give off so much oxygen that they may be said to purify the air. The hotbed of gardeners takes advantage of the active respiration of certain bacteria to produce higher growing temperatures.

**Reticulate(d):** Net veined, the leaf veins like a network.

**Retorse:** Directed back or downward; as retrorse hairs or spines.

**Retuse:** With a rounded summit very shallowly notched at apex. (Fig. 61, A.)

**Revolute:** Rolled backward (as a leaf) from the margin or apex upon the lower surface. The opposite of involute.

**Rhaphé:** Same as raphe.

**Rhizome:** A rootstock. In its simplest form, merely a creeping, usually thickened stem or branch growing partly or entirely beneath the sur-

face of the ground. That a rhizome is really a stem and not a root is evident from its manner of growth, from its consisting of a succession of joints, and from the scales which, as true though degenerated leaves, are borne at these joints and which often have buds in their axils.

**Rhombic:** Literally, having the form of a rhombus, an equilateral parallelogram differing from a square in having the angles oblique  instead of square; but used broadly as diamond shaped, or lozenge shaped.

**Rhomboid(al):** Literally, having the form of a rhomboid, but used broadly for an elongated figure roughly quadrilateral, having the opposite sides equal, the angles oblique, and the adjacent sides unequal. .

**Rootstock:** A rootlike stem or branch under or sometimes on the ground; a rhizome.

**Rosette:** A dense basal cluster of leaves, as in the common dandelion, caused by dwarfing of the true (leafy) stem, and so named because of its resemblance to the petals of a double rose. Rosettes are common, for example, among winter annuals and alpine herbs.

**Rostrate:** Beaked, as the rostrate keel of crazy weed or Lambert loco (*Oxytropis lambertii*).

**Rotate:** Wheel shaped; having the parts horizontally flaring. A term often used for gamopetalous corollas having a much reduced tube and a widespread limb. For example, certain genera in the Gentian family (e. g., *Frasera*, *Sabbatia*, and *Swertia*) are largely distinguished by their rotate corollas.

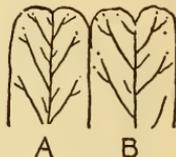


FIGURE 61.—Two degrees of terminal notching, as in leaves, petals, etc.: A, Retuse; B, emarginate

**Rugose:** With wrinkled or creased surface; roughened by wrinkles.

**Rugulose:** Minutely rugose; slightly wrinkled.

**Runcinate:** Coarsely and pinnately lobed with the pointed lobe tips curved toward the base of the leaf, as in the common dandelion. (Fig. 62.)

**Runner:** A long, slender, tendrillike leafless form of creeping branch, prostrate on the ground. Each run-

ner, after having grown to its full length, strikes root from the tip (it sometimes roots at the joints also, in which case it may merge into a stolon), fixing the tip to the ground, then forms a bud at that point, which later develops into a tuft of leaves and so gives rise to a new plant.



FIGURE 62.—Runcinate leaf, as in the common dandelion (*Leontodon taraxacum*)

**Sac:** A soft, membranous, pouchlike appendage or part, usually closed except for a relatively narrow opening, as an anther, or pollen sac.

**Sagittate:** Shaped like an arrowhead, with the acutish basal lobes directed downward. (Fig. 63.)

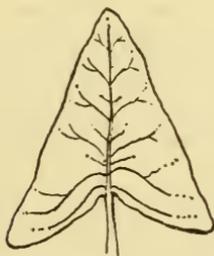


FIGURE 63.—Sagittate leaf, as in butterbur, or false coltsfoot (*Petasites sagittata*)

**Salverform:** A term used to describe a type of gamopetalous corolla with a slender tube and wide, flaring limb, as in a phlox flower.

**Samara:** A dry-winged indehiscent fruit, as the fruit of maples, ashes, ailanthus, hoptree, etc.

**Sarcocarp:** A fleshy mesocarp, or mid-covering of a fruit, as in a peach or plum; also, though more loosely, the fleshy portion of any fleshy fruit.

**Saprophyte:** A plant which lives on decaying organic matter, such as pinesap (*Hypopitys*) and Indianpipe (*Monotropa*), mushrooms, and many other fungi. Such plants are destitute of green coloring matter (chlorophyll).

**Scabrous:** Rough or harsh to the touch.

**Scale:** In botany a plant organ or part more or less reminiscent of the scale of a fish or reptile; specifically: (1) One of the partially overlapping (imbricated) parts of a bulb, as of a lily bulb; (2) a modified leaf forming part of the protective covering of a leaf bud or flower bud; (3) the bract subtending the perigynium in the sedge genus *Carex* (fig. 54, B); (4) a bract of a cone or catkin; and (5) a rudimentary leaf on a rhizome. There is probably a growing tendency in botany to confine, so far as possible, the use of scale to the basal and underground portions of the plant and to use bract for analogous parts in the inflorescence.

**Scape:** A leafless peduncle, or main flower stalk, arising from the underground parts of a plant; the peduncle of an acaulescent or apparently stemless plant. The stalk of common dandelion is a scape.

**Scapose:** Bearing a scape (or scapes), or resembling one.

**Scarious:** Thin, membranous, dry, and not green.

**Schizocarp:** Literally, splitting fruit. A dry compound fruit, as in the mallow family, splitting up at maturity into several indehiscent 1-seeded carpels (mericarps); the peculiar dry twin-fruit of the umbellifer, or parsnip, family (cremocarp) is a form of schizocarp. (Fig. 64.)



FIGURE 64.—A schizocarp, as in round-leaf mallow; or "cheeses" (*Malva rotundifolia*)

**Sclerenchyma:** Hard, thick-walled cell tissue, as in nut shells, the grit cells of pears, etc.

**Scorpioid:** Coiled at the tip, like the tail of a scorpion (said especially of inflorescences). (Fig. 65.) Partly synonymous with circinate.

**Section:** A natural division of a taxonomic group, especially of a genus and, hence, usually more or less

synonymous with subgenus. In very large genera the section is often a division of the subgenus.

**Secund:** Borne on one side of an axis; 1-sided, as the inflorescence of blue grama. The same as monostichous.

**Seed:** A fertilized and matured ovule; the embryo (product of sexual conjugation) of a flowering plant with all its attendant, and matured, envelopes.

**Semi-:** A prefix (Latin) meaning half.

**Sepal:** One of the separate parts (modified leaves) of the outer and lower series of the floral envelope (perianth); a division of the calyx corresponding to a petal in the corolla. (Fig. 66, A, b.) Also, though less precisely, one of the more or less fused divisions of a gamosepalous calyx (as the five united sepals of phlox).

**Septate:** Provided with one or more partitions (septa), as the septate pods of tickclover, or "beggar-ticks" (*Meibomia* spp.).

**Septum** (pl. -ta): A partition, as, for example, between the seeds in a pod of the legume (pea) family.

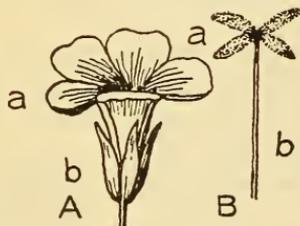


FIGURE 66.—A, Floral envelopes: a, Petals; b, sepals; B, top of pistil; a, stigma; b, style

**Sericaceous:** Silky; closely covered with fine appressed soft straight hairs of silky texture.

**Serrate:** Saw-toothed; having sharp, forward or upward pointed teeth (serrations, or serratures). (Fig. 60, A.)

**Serration, or serrature:** A saw-tooth-like projection, or tooth, as on the margin of a leaf; a state or condition of being toothed like a saw.

**Serrulate:** Finely or minutely serrate.

**Sessile:** Literally sitting, i. e., without a stem or stalk; a sessile leaf is without a petiole, or leafstalk, sitting directly on the axis or stem of the plant. For example, the sessile leaves of St. Johnswort; the sessile cones of hemlock; the sessile anthers of mistletoe. In a spike all the flowers are sessile.

**Seta** (pl. -ae): A bristle, or stiff thick hair.

**Setaceous:** Bristlelike.

**Setose:** Bristly; beset with setae, or bristles.

**Sheath:** That portion of a leaf (as in grasses, sedges, and rushes) which envelops the stem (fig. 67, c), the terminal free portion of the leaf being known as the lamina, or blade. A modified petiole.

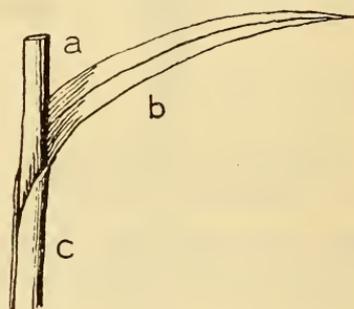


FIGURE 67.—Three parts of a grass; a, Culm; b, blade (or lamina); c, sheath

**Shrub:** A woody (fruticose or frutescent), perennial plant, differing from a perennial herb by its persistent and woody stems, and from a tree by its low stature and habit of branching from the base. There is, of course, no hard-and-fast line between herbs and shrubs or between shrubs and trees; all possible intergradations occur. Under very favorable growth conditions, species of shrubs frequently become trees (arborescent) and vice versa. Also there are a few cases of plants (such as the castor-bean plant, *Ricinus*) which are herbaceous in temperate climates but shrubby or even arborescent in tropical or subtropical regions.

**Sieve tube:** A canal or tubular vessel composed of thin-walled cells placed end to end in rows and separated, usually terminally but sometimes laterally, by thin perforated partitions called sieve plates. Sieve

tubes with their companion cells compose the soft bast (sieve tissue) or phloem of the outer fibrovascular bundles of the higher plants. The sieve-like partitions permit the strands of protoplasm, or living tissue, to extend through the tubes and facilitate the transportation of the products of assimilation, of which transfer the sieve tubes are the chief agency.

**Silicle:** A small silique, especially one that is as broad as or broader than long; as the silicles of peppermint and shepherd's-purse.

**Silique:** The peculiar, mostly elongated, 2-valved capsule or pod of the mustard family (Brassicaceæ, or Cruciferae).

**Simple:** Unbranched or undivided; said, for example, of stems, leaves, and inflorescence; the opposite of compound. A simple pistil is one carpel, representing morphologically a single folded leaf.

**Sinistrorse:** Spirally twisting to the left. Said of vines that twine in a clockwise direction, as bindweed and morning-glory.

**Sinuate:** Strongly wavy margined; more deeply wavy than undulate, or repand.

**Sinus:** The depression between two adjoining lobes (literally gulf or bosom).

**Sorus (pl. -ri):** A fruiting dot on the fertile frond of a fern; an assemblage of sporangia.

**Sp.:** Species (singular); pl. spp.

**Sp. nov.:** New species (Latin, species nova).

**Sp. Pl.:** Species Plantarum (an important work of Linnæus, the first edition of which, published in 1753, is regarded by both the International and American Codes as the starting point of binomial plant nomenclature).

**Spadix:** A floral or fruiting spike with a thickened fleshy axis, usually densely flowered, the flowers often more or less imperfect, and characteristically subtended by a spathe. This type of inflorescence is characteristic, for example, of the arum family (including callas, jack-in-the-pulpits, skunkcabbage, and sweetflag or calamus).

**Spathe:** An enlarged, membranous, sheathing bract or bracts subtending an inflorescence, and especially the characteristic bract (often colored) associated with a spadix as the spathe of a jack-in-the-pulpit or calla lily.

**Spatulate:** Shaped like a spatula; i. e., broad and rounded at apex and with a narrowed, relatively short base. (Fig. 38, D.)

**Species (pl. species):** A group of individuals with so many characteristics in common as to indicate a very high degree of relationship and a common descent. The unit of plant and animal classification. White pine (*Pinus strobus*), aspen (*Populus tremuloides*), Colorado columbine (*Aquilegia cærulea*), and the domestic horse (*Equus caballus*) and sheep (*Ovis aries*) are familiar illustrations of species. Genera are composed of species, which in turn often comprise various subspecies and varieties.

**Specific:** Of or pertaining to a species, as a specific character or specific name.

**Spermatophyte:** A seed-producing plant; a phanerogam.

**Spiciform:** Having a spikelike form, as the spiciform panicle of timothy.

**Spicule:** A very small, needlelike yet more or less fleshy body, appendage, or point as, for example, the spicules of cacti.

**Spike:** An elongated flower cluster in which the flowers are sessile, i. e., without individual flower stalks (pedicels). Wheat, spearmint, and mullein are familiar examples of plants whose flowers are borne in spikes.

**Spikelet:** A name applied to each of the main components of a grass or sedge inflorescence. (Fig. 68.) A grass spikelet usually consists of two glumes and one or more florets; it may be erect or pendulous, sessile, or pedicellate. Grasses are distinguished primarily by differences of spikelet construction.

**Spine:** A sharp-pointed, rigid, deep-seated emergence from a plant. Spines differ from prickles in not pulling off with the bark (epidermis) of the plant; they differ from thorns by absence of vascular tissue.

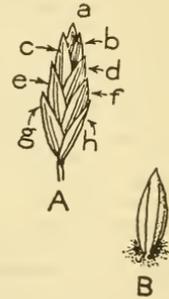


FIGURE 68.—A, Spikelet of Kentucky blue grass (*Poa pratensis*): a-f, lemmas (with their inclosed organs forming florets); g-h, glumes; B, lemma of same showing arachnoid (cobwebby) hairs at base

**Spinescent:** Becoming spiny; tapering to a rigid, sharp point. Said especially of the sharp-pointed tips of branches such as are characteristic, for example, of numerous southwestern shrubs.

**Spinose:** Beset with spines or thorns, as the spinose branches of barberry.

**Spinule:** A small or minute spine.

**Spinulose:** Minutely spiny; beset with spinules.

**Sporange:** Same as sporangium.

**Sporangium** (pl. *-ia*): The minute, usually globular case in which the spores of seedless plants (cryptogams) are produced and somewhat analogous to the ovary of a flowering (seed) plant.

**Spore:** The 1-celled, powderlike fruiting body (somewhat analogous to a seed in a seed plant) of a cryptogam, produced asexually, and without an embryo.

**Sporophore:** That part or organ of a sporophyte which produces the spores.

**Sporophyte:** A spore plant; a spore-producing plant; the asexual plant developed sexually from the gametophyte of a cryptogam. The sexless plants ordinarily recognized as ferns are sporophytes which grow from fertilized eggs (oöspores) produced in the preceding sexual generation. See alternation of generations.

**Spur:** A hollow, saclike, or tubular extension of a floral organ, as in columbine, larkspur, or violet flowers.

**Squama** (pl. *-æ*): A plant organ or part resembling a scale of a fish. Same as scale.

**Squamate:** Same as squamous.

**Squamella** (pl. *-æ*): A chaffy bract or scalelike appendage in the pappus of a composite; a small scale.

**Squamellate:** Same as squamulose.

**Squamose, or squamous:** Scaly; provided with squamæ.

**Squamule:** A small scale. Sometimes used as a synonym of lodicule.

**Squamulose:** Provided with squamellæ, or small bracts or scales; minutely squamous.

**Squarrose:** Having the parts or appendages widespreading. As the squarrose scale prickles of a digger pine cone, or the squarrose involueral bracts (phyllaries) of the *Macheranthera* subgenus of the genus *Aster*.

**Stamen:** A male floral organ which bears pollen grains; it usually consists of a filament, or stalk, and an anther, or pollen sac. (Fig. 69.)

**Staminate:** Male; bearing stamens, or pollen-producing organs, only. Expressed by the symbol ♂ (Mars' dart).

**Standard:** The uppermost petal of a papilionaceous flower (i. e., of a pea family flower). (Fig. 48, *a*.)

Often called the banner, or vexillum.

**Stellate:** Starlike or starshaped, the slender segments or divisions radiating from a common center; as, for example, the stellate hairs of certain species of globemallow (*Sphæralcea*) and whitlowwort (*Draba*).

**Sterile:** Barren; said of shoots that produce leaves but no flowers; of anthers (pollen sacs) that are rudimentary and do not function, etc.; also synonymous with imperfect.

**Stigma:** The part (usually the tip and mostly sticky or hairy) of a pistil through which fertilization by the pollen grain is accomplished. (Fig. 66, *B*, *a*.)

**Stipe:** A stalklike support of an organ or part, as the leafstalk of a fern; a slender stalklike narrowing as of the base of an ovary or a pod. (Fig. 70, *b*.)



FIGURE 69.—A stamen: *a*, Anther; *b*, filament

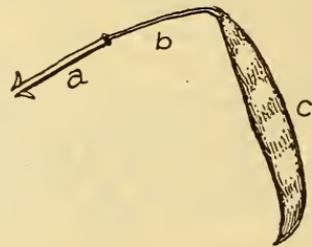


FIGURE 70.—Stipitate capsule or pod of Rocky Mountain bee-weed (*Cleome serrulata*): *a*, Pedicel; *b*, stipe; *c*, body of capsule

**Stipitate:** Provided with a stipe, or slender and stalklike base. (Fig. 70.)

**Stipulate:** Provided with stipules.

**Stipule:** One of a pair of appendages borne at the base of certain petioles, or leafstalks; often the stipules are more or less united. (Fig. 71.)

**Stolon:** A trailing or reclining branch, above ground, which strikes root

where it touches the soil, there sending up new shoots which, later, become separate plants. Many plants multiply vegetatively in this way.

**Stoloniferous:** Bearing stolons.

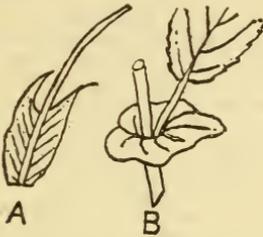


FIGURE 71. — Stipules: A, A pair of stipules united for most of their length and adnate to the base of the petiole; B, connate-perfoliate stipules

**Stoma** (pl. *-ata*): One of the small openings (breathing pores) on the surface of a leaf, especially on the under side, whereby contact is established with the atmosphere, and essential in such vital processes as respiration, photosynthesis, and transpiration.

**Stomate:** The same as stoma.

**Striate:** Marked with slender longitudinal grooves or furrows; minutely channel streaked.

**Strict:** Narrow and erect; said, for example, of panicles, the branches of which are erect and closely appressed to the main axis of the inflorescence, giving a spikelike appearance.

**Strigose:** Beset with appressed, rigid hairs.

**Strobile:** The (often conical) dry multiple fruit of pines, spruces, firs, hemlocks, and other conifers, consisting of numerous partially overlapping (imbricated) scales arranged symmetrically around a central axis and bearing naked seeds on their upper surface. Same as cone.

**Style:** The stalklike and often slender portion of the pistil connecting the stigma with the ovary. (Fig. 66, B, b.)

**Sub-:** A prefix signifying nearly or below.

**Subacute:** Acutish; somewhat acute.

**Subcordate:** Shallowly heart shaped; shallowly 2-lobed at the base.

**Subcoriaceous:** Somewhat leathery in texture.

**Subgenus:** A division of a genus; a group of closely related species

within a genus. Raspberries and blackberries, by way of illustration, are subgenera of the genus *Rubus*; cherries (*Cerasus*) and chokecherries (*Padus*) are subgenera of the plum genus (*Prunus*). Subgenera furnish occasion for a large number of plant synonyms since many botanists will prefer to raise them to generic rank and, of course, there will never be complete unanimity of opinion as to what are genera and what are subgenera. Subgenera, especially of very large genera, are sometimes divided into sections.

**Subspecies:** A taxonomic rank immediately below a species; by some authors regarded as a synonym of variety, but if subspecies and varieties are both recognized, then variety ranks below subspecies.

**Subtended:** Literally, held (from) underneath; included in an axil. Inclosed or embraced. As the florets of a grass spikelet subtended by glumes, or the umbel of an umbellifer subtended by an involucre.

**Subulate:** Awl shaped.

**Subcylindric:** Almost cylindrical but tapering somewhat; terete.

**Succession:** A progressive change in the vegetation of an area or region; complete and continuous invasion resulting in radical changes from the original ground cover. For example, a forested area is denuded of its timber by fire and a succession of shrub or weed species may replace, at least temporarily, the forest.

**Succulent:** Juicy, watery, or pulpy; as the succulent stems of cacti or the succulent fruits of the apple family (*Malaceæ*).

**Sucker:** A branch or shoot from a creeping underground stem which ascends above ground and tends eventually to become a separate individual plant. Suckers are common in many woody plants, such as aspen, blackberry, elder, poplar, rose, sassafras, and willow.

**Suffrutescent:** Literally, becoming undershrubby. A term applied to perennial plants which do not die down quite to the ground each year, but the stem bases, above the ground, tend to be at least a little woody and perennial. Marking the first stage in the transition zone between true herbs and true shrubs, and followed by the suffruticose.

**Suffruticose:** Literally, undershrubby. Applied to low perennials the lower parts of whose stems are truly woody and perennial, but the upper parts herbaceous. Marking approxi-

- mately the second stage in the transition from herbs to shrubs, of which the first is suffrutescence.
- Sulcate:** Grooved, especially if the groove (sulcus) or furrow is deep and longitudinal, as the sulcate stone in the fruit of flowering dogwood or the sulcate pod of sheep loco (*Astragalus nothoxys*).
- Super-:** A prefix (Latin) signifying above, beyond, surpassing, and the like. For example, superlabial means above a lip, and superfoliar refers to a region or object above the foliage.
- Superior:** Lying above another organ or part; said especially of an ovary when the calyx and stamens are free from it and attached below it. Epigynous stamens are sometimes called superior, because growing from (adnate to) the top of the ovary.
- Supra-:** A prefix (Latin) signifying over, above, or beyond, where growth or action is implied. For example, "supracrescent" signifies "growing over" another part or organ.
- Suture:** A seam, raphe, or seamlike ridged or furrowed medial line; a line of splitting or deliscescence. The sutures of a pod are the lines where the valves of the pod separate to discharge the seeds.
- Symbiosis:** The living together of dissimilar organisms; especially (as opposed to parasitism) when the relationship is mutually beneficial. As, for example, the alga and fungus which compose a lichen; the nitrogen-fixing bacteria on the roots of an alfalfa or clover plant; or the yucca moths (*Pronuba* spp.) and species of Yucca.
- Symbiotic:** Of or pertaining to symbiosis, as the symbiotic mycorrhizas of an oak or orchid root.
- Sympetalous:** Having the petals more or less united. The same as gamopetalous.
- Syn.:** Synoptic(al); synonym.
- Synonym:** A different botanical name for the same plant; an untenable specific or generic name. For example, *Abies menziesii* is a synonym of *Picea sitchensis* (Sitka spruce), *Abies* being wrong generically for this tree and the specific name *menziesii* later than *sitchensis*, which is unpreoccupied and properly published. There are two main divisions of synonyms: (1) Typonyms, or absolute synonyms, and which are admittedly based on the same concept or type; (2) those whose identity is a matter of individual taxonomic opinion. To the latter category belong segregated genera and species about whose integration with other genera and species there can never be universal uniformity of opinion among botanists.
- Systematic botany:** See taxonomy.
- Taxonomy:** The science of classification. In botany synonymous with systematic botany, which is the classification or arrangement of plants according to their natural relationships and the principles underlying such classification.
- taxy (or -taxis):** A suffix (Greek) signifying arrangement, as phyllotaxy, the arrangement of leaves on a stem.
- Tegule:** One of the (often sepallike) involucral bracts subtending the flower head of a composite (a term introduced by the late C. V. Piper, of the United States Department of Agriculture). Same as phyllary.
- Tendrill:** A slender, modified branch, commonly spirally coiling at the tip, and serving as an organ of support, as in clematis, cucurbits, grapes, pea vines, and vetches.
- Terete:** Elongated and round in cross section; cylindrical, except that terete may also be tapered.
- Ternate:** Arranged in threes.
- Test.:** By witness, statement, or authority of (Latin, teste); same as *vide*.
- Tetra-:** A prefix (Greek) signifying four.
- Tetradynamous:** Having six stamens, four of them longer than the other two (literally, four having the predominance); a term introduced by Linnæus. The flowers of crucifers (members of the mustard family) are tetradynamous.
- Tetramerous:** Having the parts in fours.
- Thallus:** An often flattened, vegetative organ or body of a plant not differentiated into stem and leaf; the main body of such plants as duckweeds, lichens, and liverworts.
- Thorn:** A hard, sharp-pointed plant emergence, more deeply seated than a prickle. A thorn is a more or less vascular (thus differing from spine), relatively short, modified branch or twig, produced from a bud. Familiar examples are seen in the case of hawthorns (*Crataegus* spp.).
- Thyrse, or Thyrsus:** A more or less compact or contracted, oblong to ovoid-pyramidal, usually densely flowered panicle, differing from a

- typical panicle in that, while the main axis is indeterminate, the branches (secondary and ultimate axes) are determinate and cymose. Certain species of *Oreocarya* and *Pentstemon*, as well as cultivated lilac, horsechestnut and grapes, furnish familiar illustrations of a thyrsoid inflorescence and fruit cluster. The term is derived from the thyrsus, or pinecone-tipped, Bacchanalian wand of antiquity.
- Tomentose:** With a dense woollike covering of closely entangled, matted hairs (tomentum).
- Tomentulose:** Sparingly or minutely tomentose.
- Tomentum:** Vegetable wool; densely matted, woollike hairs.
- Tooth:** A toothlike projection, as a tooth on the margin of a leaf.
- Toothed:** Provided with teeth, i. e., toothlike projections, especially on the margins; dentate; as a toothed leaf or petal.
- Torose:** Knobby; knoblike; provided with bulging prominences, more or less rounded but with alternate swellings and contractions (Latin, *torosus*, having bulging muscles). As the torose pods of catclaw (*Acacia greggii*).
- Torulose:** Minutely torose; as in a small pod constricted between the seeds.
- Torus:** A flower receptacle, or axis or support of a flower head; a socket or bed; a (usually round) swelling or bulging; a knob or knot.
- Toxic:** Poisonous; induced by poisoning.
- Toxicology:** The science of poisons. Plant or vegetable toxicology deals with poisonous plants and their toxic compounds (toxins).
- Toxin(e):** A poisonous organic compound, proteid in nature, occurrent in or from certain secretions of plants and animals.
- Tracheid:** A more or less elongated, often spindle-shaped woody (lignified) cell destitute of protoplasm, the cells occurring end to end in rows, the series of cells serving as a sort of continuous, water-conducting vessel. One of the two important mechanical elements in the structure of wood, of which the other is bast. Tracheids are especially characteristic and constitute the bulk of the wood of conifers, and their walls are marked by bordered pits or other markings due to unequal thickening in the wall structure.
- Transect:** A cross section of vegetation, which may be a belt or merely a line, designed to show zonal differences in the vegetation. In the line transect the names of the individual plants are listed as they are encountered along a measured tape. In the belt transect, commonly delimited by two parallel tapes at varying distances up to a meter apart, the various species encountered may be listed, tabulated, or charted in their respective places on the plotting paper.
- Transpiration:** The giving off into the atmosphere by the plant, mainly through its stomata and from the under surfaces of the leaves, of water in the form of vapor. This water represents a surplus from that taken in from the roots and which is not required for photosynthesis. Xerophytes, or desert plants, exhibit many modifications to reduce transpiration to a minimum.
- Tree:** An arborescent plant; a perennial plant of considerable stature with woody stems and a well-defined, simple main stem (trunk or bole).
- Tri-:** A prefix (Latin) signifying three.
- Tribe:** A group of related genera forming a natural division of a family. For example, the clover tribe (*Trifolieæ*) of the bean family (*Fabaceæ*), which tribe embraces the true clovers (*Trifolium* spp.), sweet-clovers or melilots (*Melilotus* spp.), alfalfas, bur clovers, medics, lucernes, and snail clovers (*Medicago* spp.), etc. Tribe is in practice often loosely used as a synonym of subfamily, but is actually a term of lower rank and intermediate between genus and subfamily.
- Trifoliolate:** Having three leaflets; the leaves 3-divided, as in clover and alfalfa. (Fig. 72.)

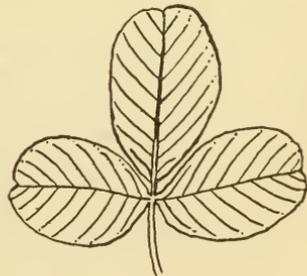


FIGURE 72.—Trifoliolate leaf, as in clover

**Tropism:** A turning or other reaction of a plant or of its parts in response

to some external stimulus. For example, geotropism (turning toward the earth) is the tropism exhibited by the root of a plant; phototropism (or heliotropism) is the turning or response of the aerial portion of the plant to the source of light.

**Truncate:** Squared at the tip; terminating abruptly as if cut off crosswise. (Fig. 73.)

**Tube:** A tubelike part, especially the united, tubular basal portion of a gamopetalous corolla, as distinct from the limb or free portion.

**Tuber:** A thickened, usually starchy (the starch, however, replaced in some tubers by inulin or other carbohydrates) swelling of a subterranean stem serving for food storage and vegetative reproduction. Potato, sweetpotato, dahlia, Jerusalem-artichoke, and yam furnish familiar examples of tubers. Tubers sprout from buds known as eyes.

**Tuberculate:** Beset with small, pimplelike prominences (tubercles) as, for example, the tuberculate nutlets of certain species of the genus *Oreocarya* in the borage family.

**Tuberous:** Of or pertaining to a tuber; resembling a tuber.

**Turbinate:** Inversely conical; top shaped.

**Turio** (pl. *-ones*): Same as turion.

**Turion** (pl. *-ns.*): A scaly shoot (often thick and fleshy succulent) produced from a bud on an underground rootstock; familiar examples are seen in asparagus, cinnamon-vine, and various mints.

**Type:** The specimen or specimens on which a species (or a subspecies or variety) is based and from which the author of that species (or subspecies or variety) described it. For example, the type of *Pentstemon mensarum* Pennell is A. F. McDuffie's plant specimen No. 151, United States Forest Service range research serial No. 7919, United States National Herbarium (where deposited) No. 1012411.

**Type locality:** The place where a type, or type specimen, was collected. Thus, the type locality of *Pentstemon mensarum* Pennell, above men-

tioned, is on the Grand Mesa (formerly Battlement) National Forest, western Colorado.

**Typical:** Having the characteristics of, or well matching the type of a species, variety, etc.

**Typonym:** An absolute synonym in nomenclature, being a name based on the same type, specimen, or concept as another and older name. See synonym.

**U. S. N(at). H(erb):** The United States National Herbarium. The herbarium in the Smithsonian Institution, Washington, D. C., one of the largest herbaria in the world, wherein are deposited the plant types belonging to the Federal Government.

**Umbel:** An indeterminate, convex or flat-topped (umbrella-shaped) inflorescence in which the rays or the pedicels of the cluster arise from a common point, the outer flowers blooming earliest. (Fig. 74.)

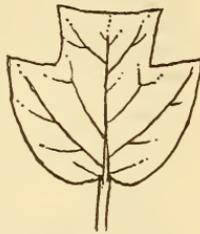


FIGURE 73.—Truncate leaf, as in yellow poplar, or tuliptree (*Liriodendron tulipifera*)

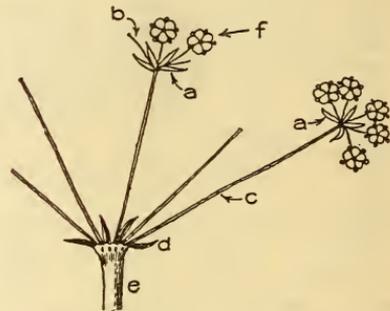


FIGURE 74.—Diagrammatic representation of a compound umbel (as in the parsnip family): *a*, Bractlets constituting involucler; *b*, pedicel (individual flower stalk); *c*, ray; *d*, bracts constituting involucre; *e*, peduncle; *f*, flower. The flowers at the top are arranged in umbellets (secondary umbels)

**Umbellate:** Borne in umbels; umbel-like.

**Umbellet:** A small or secondary umbel; the division of a compound umbel. (Fig. 74, *a*, *b*, and *f*.) In parsnip (*Pastinaca*), for example, each main umbel is divided into about 7 to 15 umbellets, each borne at the apex of a ray.

**Umbellifer:** A member of the umbellifer, or parsnip, family (Umbelliferae, Pastinaceae, or Apiaceae). Literally, umbel bearer.

**Uncinate:** Hook shaped; hooklike or hooked. See barb.

**Undulate:** With gently wavy margins. Same as repand. (Fig. 60, B.)

**Unguiculate:** Clawed; conspicuously narrowed at the base; as, for example, the unguiculate petals of catchfly (*Silene*).

**Uni-:** A prefix (Latin) signifying one.

**Unifoliate:** A morphologically or genetically compound leaf that is reduced to one leaflet and thus apparently is simple. Examples are seen in barberry and viburnum.

**Unisexual:** One-sexed; having the flowers or organs of one sex only—either staminate (male) or pistillate (female). As the unisexual spikelets of buffalo grass, or the unisexual inflorescence of holly.

**Urceolate:** Urn shaped; as the urceolate corolla of a manzanita or a huckleberry.

**Utricle:** A small, bladderlike, indehiscent, 1-celled, usually 1-seeded fruit with a thin, membranous covering (pericarp), as the fruits of the goosefoot family, *Chenopodiaceæ*. (Fig. 75.) Also, the small bladders of bladderwort (*Utricularia*) and of various marine algæ. Sometimes also used for the perigynium of the sedge genus, *Carex*. (From *utriculus*, a small uterus, or womb).

**Utriculate:** Provided with a utricle.

**V. i.:** See below (Latin, *vide infra*).

**V. s.:** See above (Latin, *vide supra*).

**V. v.:** I have seen (the plant) living (Latin, *vidi vivam*); indicating that the plant has been observed in a living state and not merely as a dried herbarium specimen.

**Vaginate:** Provided with or surrounded by a sheath (*vagina*), as the vaginate culm of a grass.

**Valvate:** Opening by valves or provided with valves, as a fruiting capsule; meeting together by the edges without overlapping.

**Valve:** One of the parts or segments into which a dehiscent pod or capsule splits, as the two valves of a pea pod.

**Var. (pl. vars.):** Variety.

**Varietal:** Of or pertaining to a variety.

**Variety:** A division of a species. For example, the white-flowered *Aquilegia caerulea albiflora* is a variety of the typically blue-flowered Colorado columbine (*A. caerulea*). Vari-

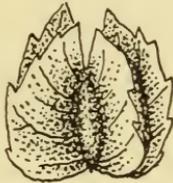


FIGURE 75.—Utricle of fourwing saltbush, known in New Mexico as chamiza (*Atriplex canescens*)

eties are expressed either by trinomials (3-word names) or by the species name, with authorities, followed by the varietal name preceded by var. and followed by the varietal authority. Thus, the Latin name for the common dwarf, mountain, or Siberian juniper might be written either as *Juniperus communis sibirica* (Burgsd.) Rydb. or as *Juniperus communis* L. var. *sibirica* (Burgsd.) Rydb. See subspecies.

**Vascular:** Containing vessels or ducts for the transportation of fluids; vascular tissue is tissue characterized by the presence of such ducts.

**Vein:** One of the fibrovascular bundles forming part of the framework (skeleton) of a leaf; so called because of a fancied resemblance to a human vein. Often a synonym of nerve, but some authors prefer to confine nerve to simple, more or less parallel venations (as in a grass blade).

**Velutinous:** Velvety in texture or to the touch, as the velutinous-pubescent culms and leaf sheaths of velvet grass (*Notholcus lanatus*).

**Venation:** The arrangement or complex of veins in a leaf.

**Ventral:** The opposite of dorsal; of or pertaining to that side of a simple pistil or other organ which faces the axis, or center, of a flower; literally, belonging to the stomach. As the prominent ventral suture of the pod of sheep loco (*Astragalus nothorxys*).

**Ventricose:** Inflated or swollen on one side; as the ventricose corolla (flower) of certain pentstemons, or the ventricose pod of certain loco weeds and other legumes.

**Vernation:** The mode of arrangement of a leaf and its parts in the bud, before unfolding in the spring.

**Verrucose:** Beset with wartlike projections, as in the seedlike nutlets of certain borages. More or less synonymous with tuberculate.

**Versatile:** Attached near the middle, with the ends more or less freely turnable; said of anthers attached by their middle to the filament, as opposed to those attached by their base (basifixed) or by their entire length (adnate).

**Verticil:** An arrangement of three or more leaves or other organs in a circle about a stem or other common axis. (Fig. 76.) The same as whorl.

**Verticillate:** Arranged in a verticil, or whorl. (Fig. 76.)

**Vexillum:** The topmost petal of a papilionaceous corolla (flower in the

pea family); same as banner and standard.

**Villous:** Shaggy; beset with long, soft, weak hairs.

**Virgate:** Wandlike; rodlike; straight, stiff, slender, and elongated. As, for example, the virgate shoots of a willow, or the virgate inflorescence of gayfeather (*Lacinaria* sp.).

**Viscid:** Sticky or gummy to the touch; glutinous.

**Viscous:** Same as viscid.

**Weed:** To the farmer, a plant out of place, especially an aggressive and pestiferous, often coarse, usually herbaceous, introduced plant species (such as crabgrass, dandelion, mustard, plantain, and wild carrot) which takes possession of cultivated and fallow fields and pastures. To the stockman, a weed is a herbaceous, nongrasslike plant occurring on the range. A considerable number of the weeds of the farmer are good range forage plants of the western stockman, especially on those ranges where under unfavorable growing conditions the same aggressiveness which renders a species a pest in agricultural land clothes it with utility if it possesses palatability. Some writers object to the use of the term weed for nongrasslike herbaceous range plants, but it is firmly entrenched in western range parlance, and until a better term is forthcoming and meets with favor, it seems idle to attempt to replace it. Clements has suggested the term "forb." Other suggestions are "wort" and "broad-leaved herb." Weeds, as applied to herbaceous nongrasslike plants, constitute, with browse, grasses, and grasslike plants, the four main groups into which western range plants are customarily divided.

**Whorl:** An arrangement of three or more leaves or other organs in a circle about a stem or other common axis. (Fig. 76.) Same as verticil.

**Whorled:** Arranged in a whorl (fig. 76); same as verticillate.

**Wing:** A thin (or relatively so), wing-like expansion or part, especially: (1) One of the two lateral (side) petals of a pea family blossom (papilionaceous corolla) (fig. 48, b), and (2) a (usually lateral or angular) projection from a fruit, as in many umbellifers, certain species of saltbush (*Atriplex*), and of the four-o'clock family (*Allioniaceæ*), etc.

**Winged:** Provided with wings, as the winged fruits of cow-parsnip (*Heracleum lanatum*).

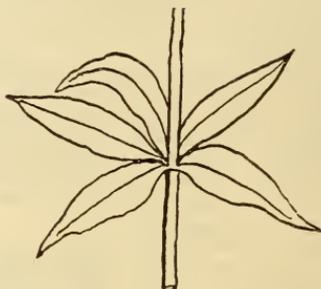


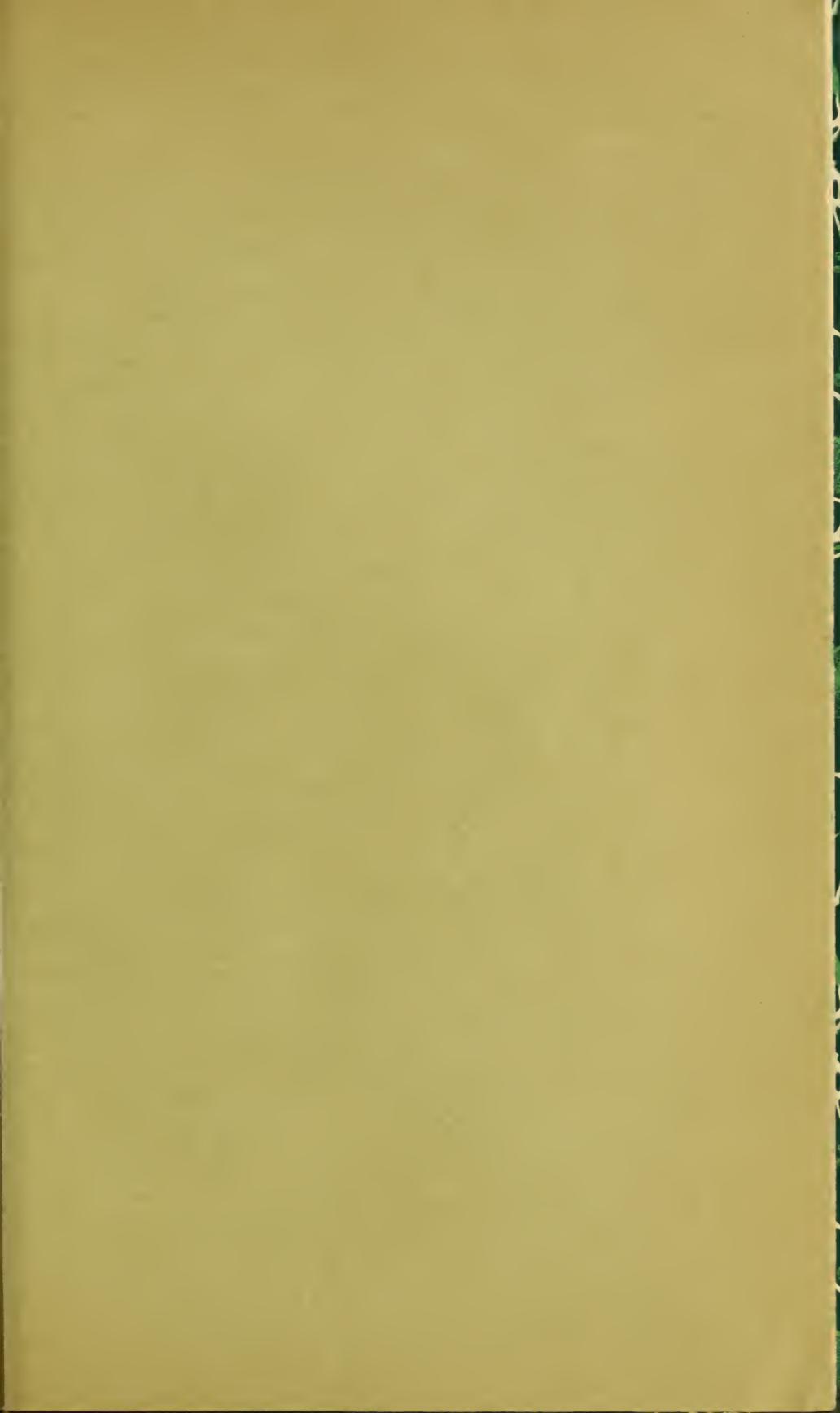
FIGURE 76.—A whorl. Whorled or verticillate leaves, as in bedstraw (*Galium*) or lily (*Lilium*)

**Wort:** An herb. An old Anglo-Saxon word now seldom used except as a suffix; e. g., figwort, St. Johnswort, sandwort, whitlowwort, etc. A possible substitute for the word weed in the stockman's sense. See weed.

**Xerophyte:** A plant adapted to arid conditions; a desert plant. Cacti are familiar examples of xerophytes.

**Xerophytic:** Of or pertaining to xerophytes or desert plants. As a xerophytic habitat, or xerophytic leaf and stem modifications.

**Xylem:** Woody tissue; one of the two main divisions of fibrovascular bundles (the other being phloem), and consisting of wood fibers, tracheal tissue, etc.



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