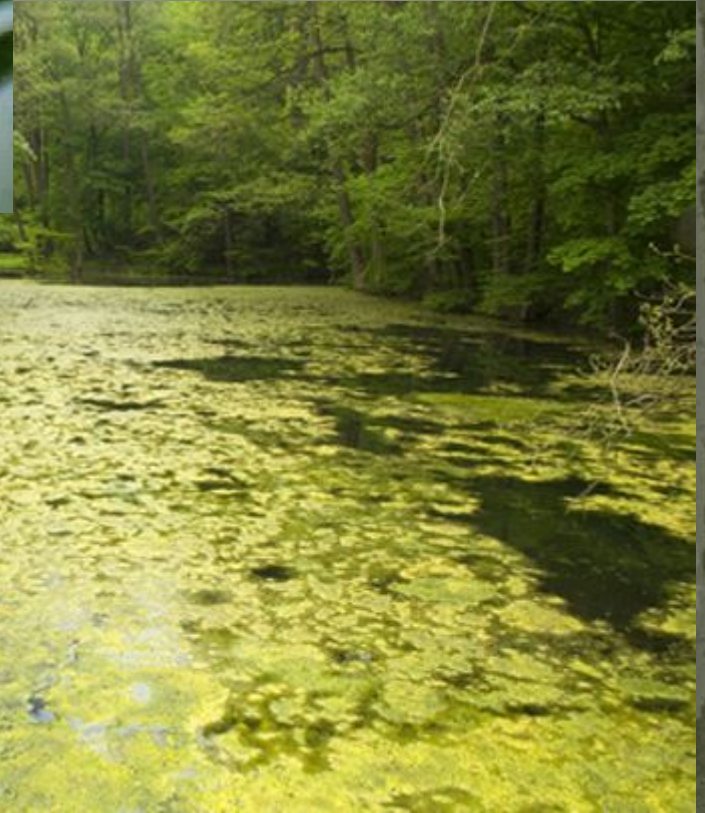
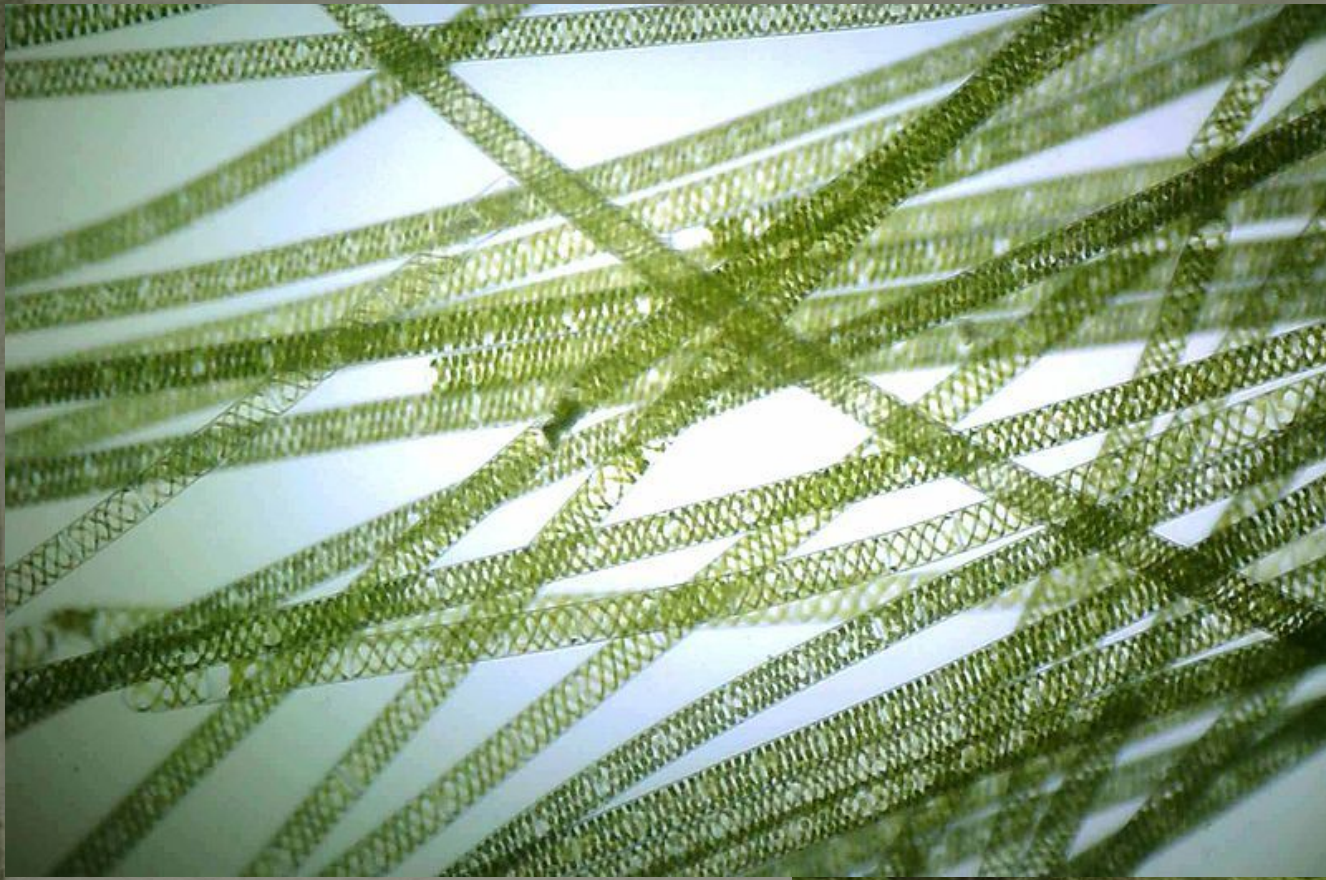


Basic Botany and Plant Identification

- Placing botany in context
- Overview of classification
- Flower parts and variations
- Observing leaves, inflorescences, fruits, etc.
- A few major plant families
- Using a key

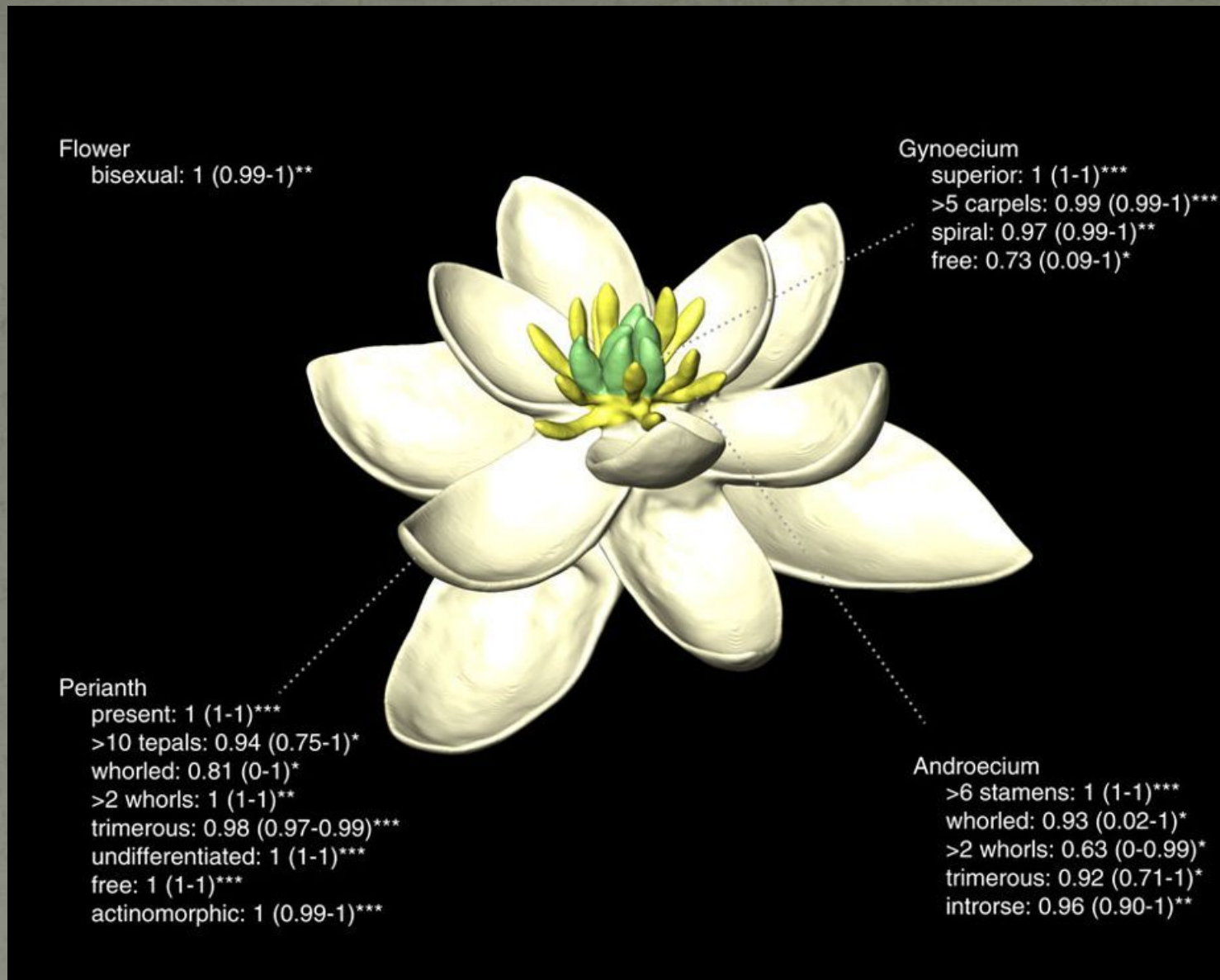










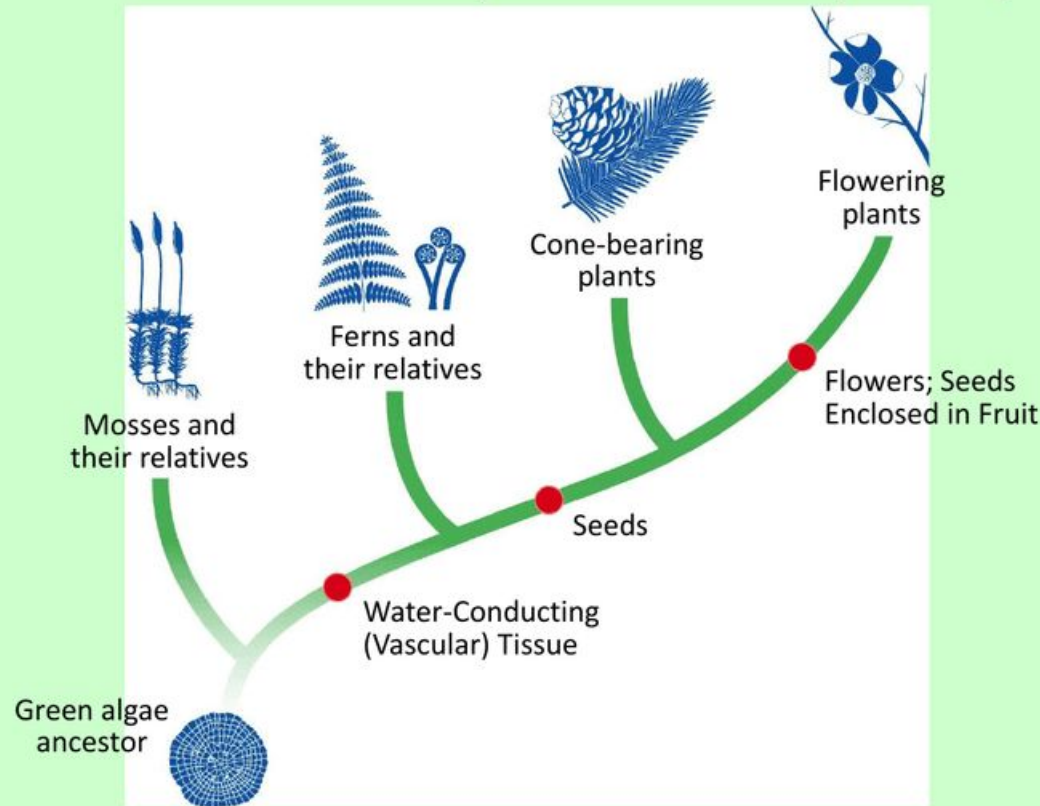


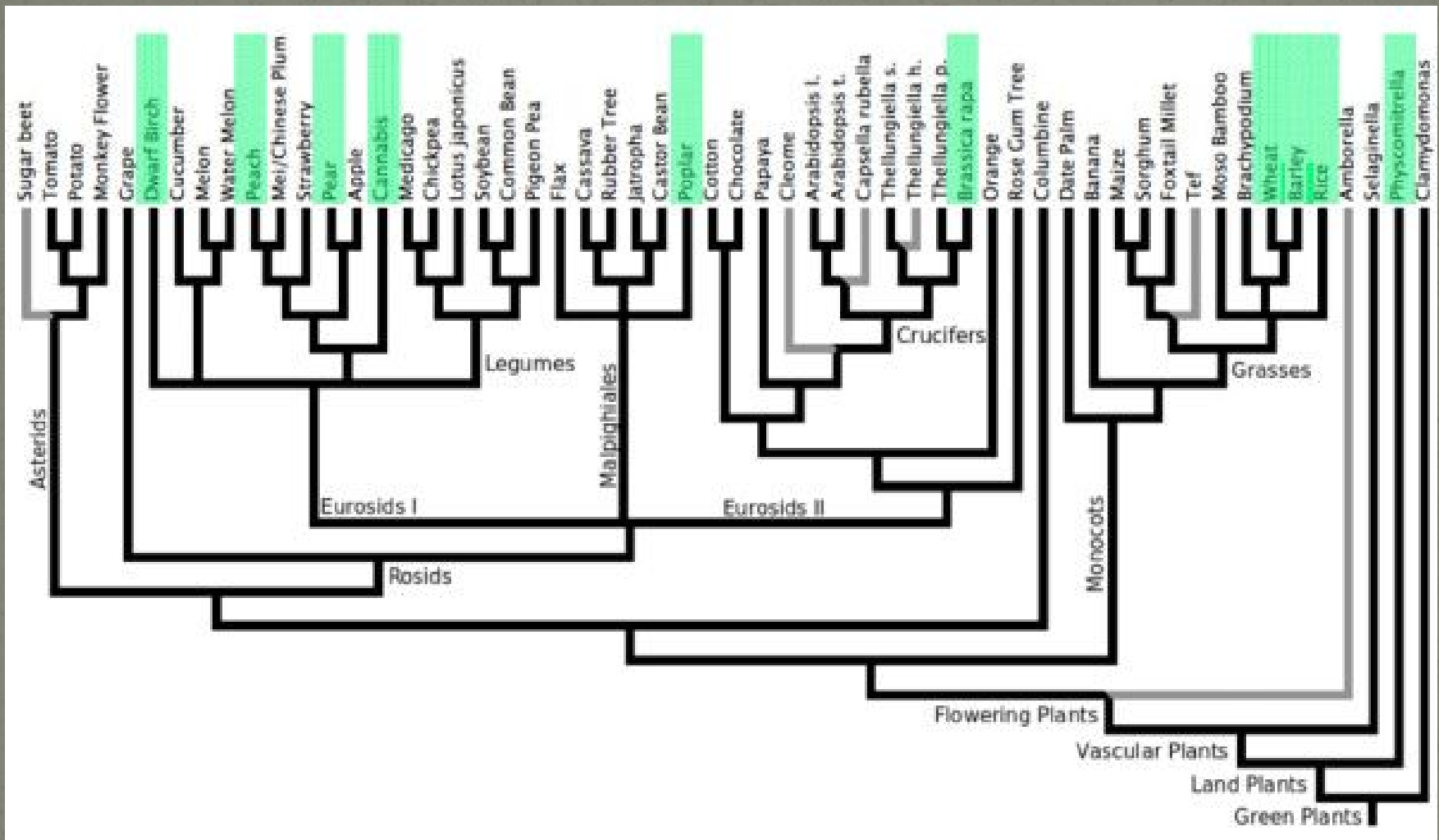
Nature Communications volume 8, Article
number: 16047 (2017)



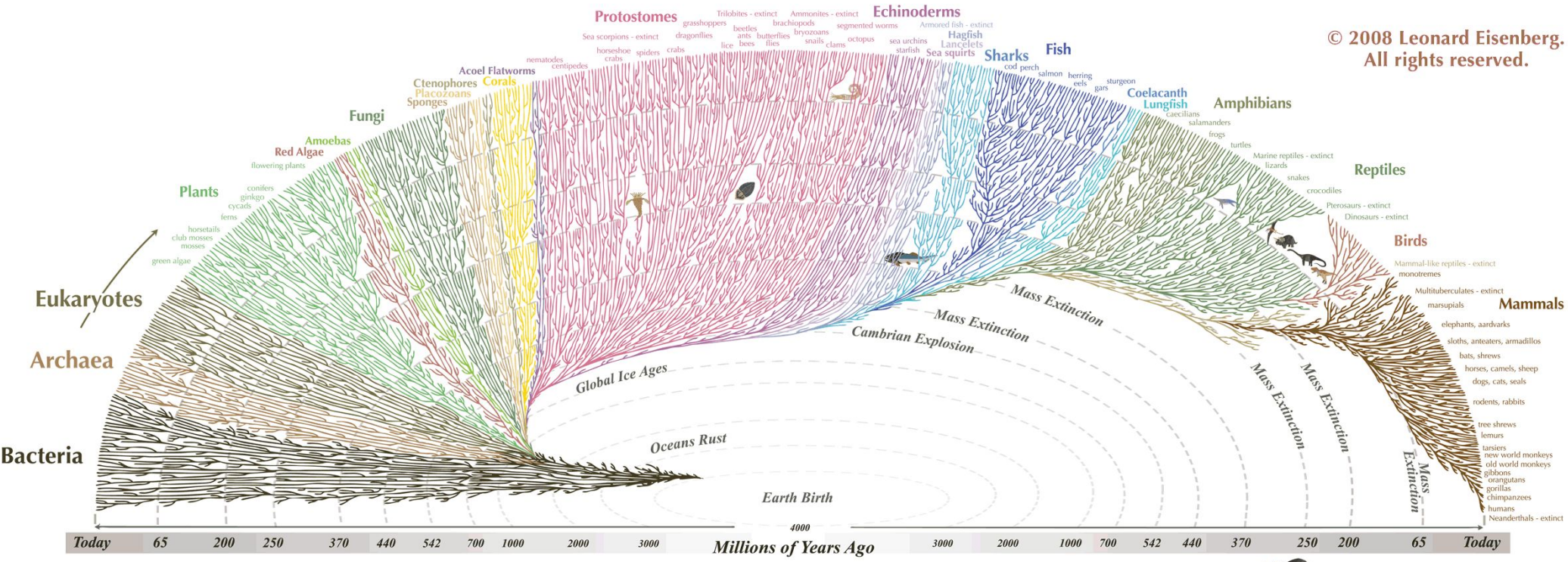
A Cladogram of Plant Groups


– shows evolutionary relationships of plants





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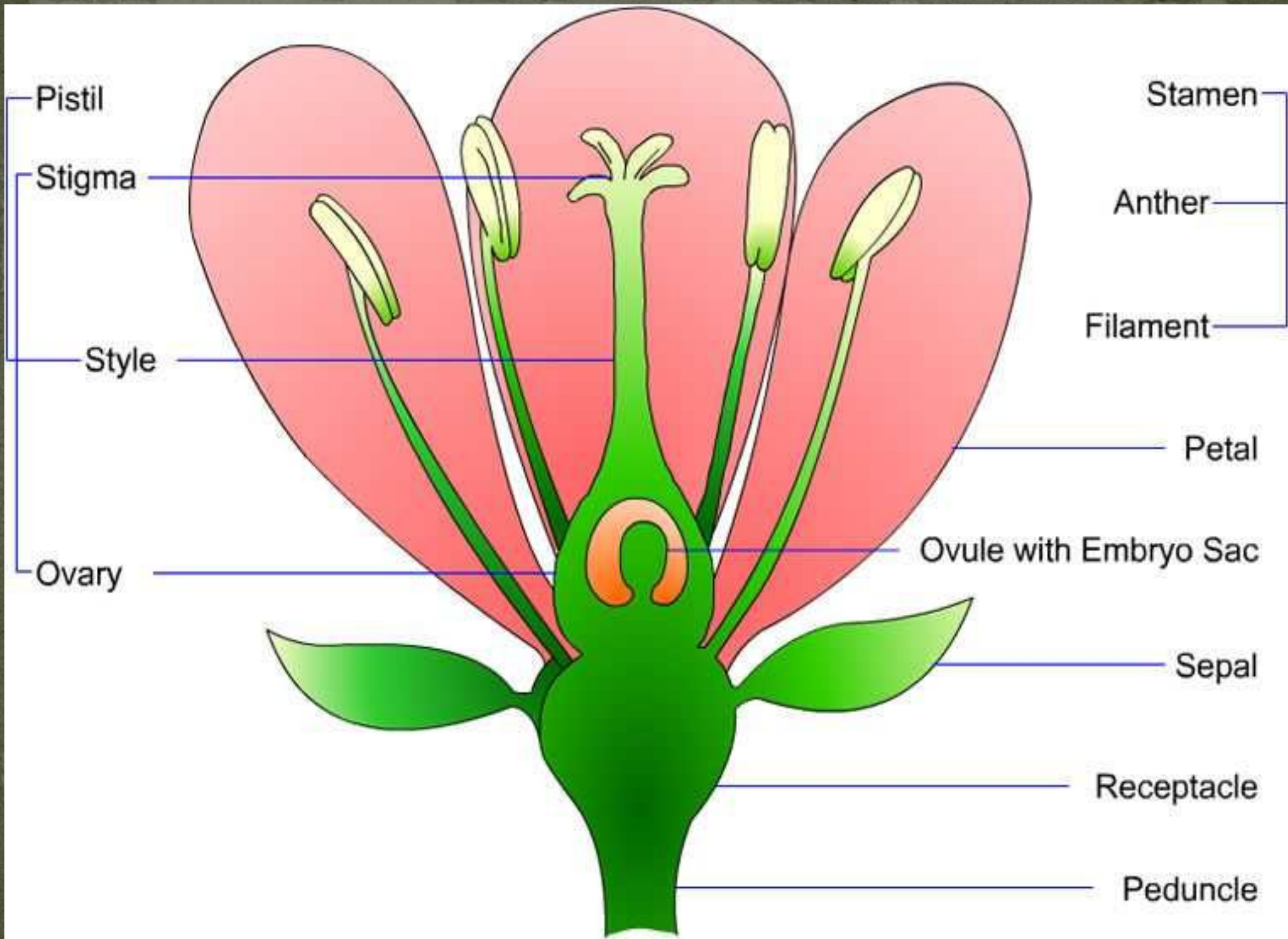


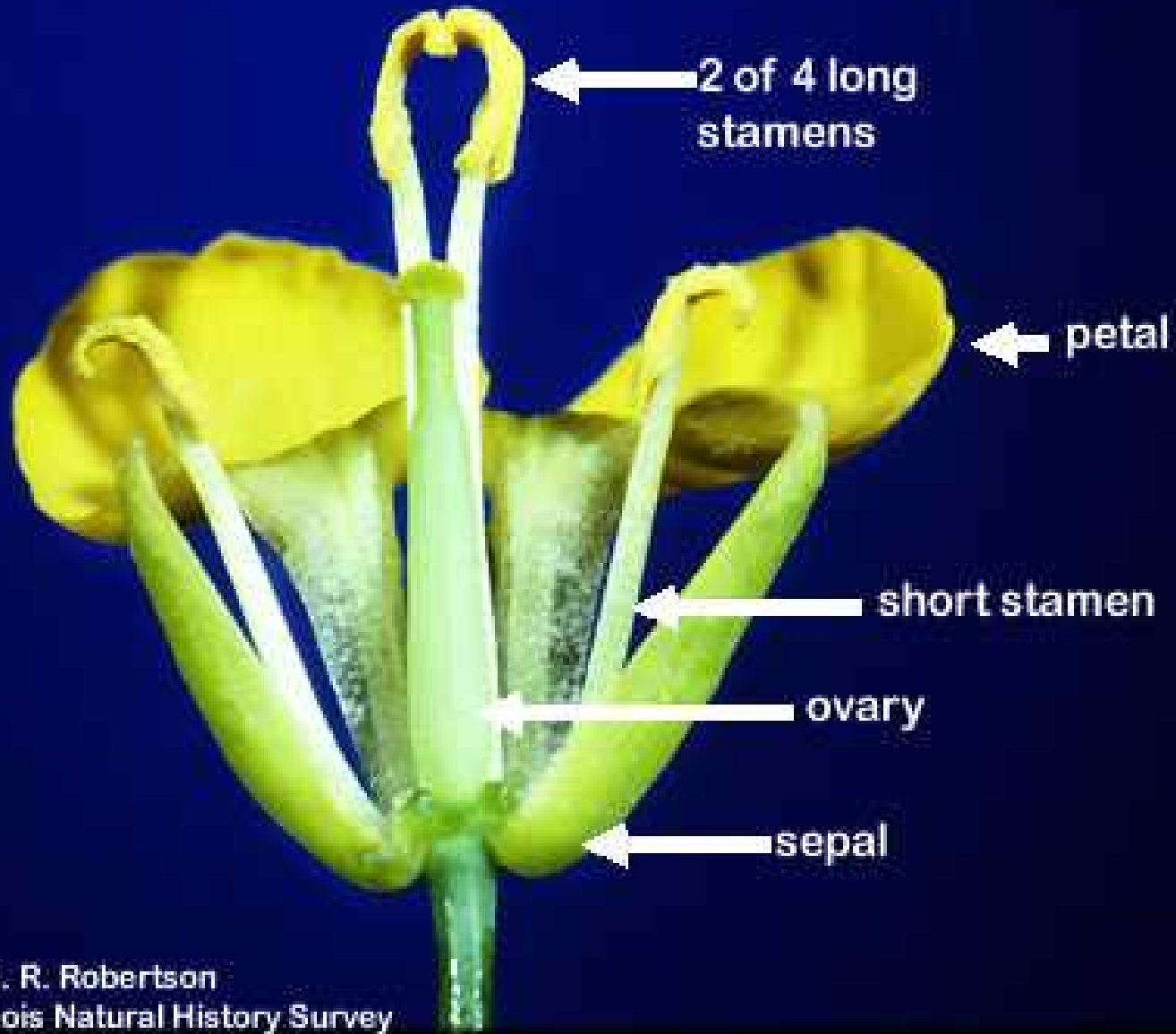
All the major and many of the minor living branches of life are shown on this diagram, but only a few of those that have gone extinct are shown. Example: Dinosaurs - extinct 

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evogeneao.com



FreeFoto.com



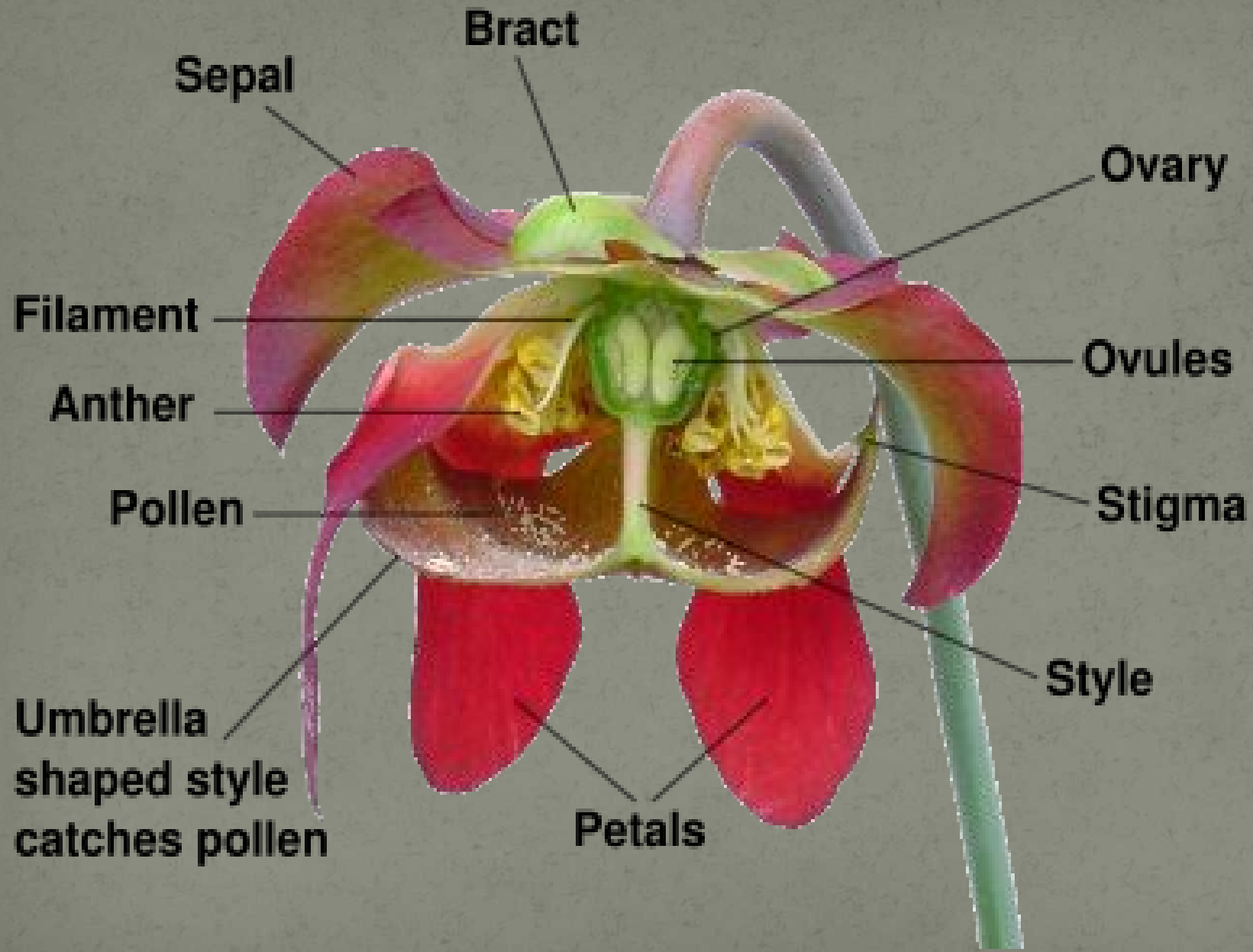


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Illinois Natural History Survey

Capsella bursa-pastoris (L.) MEDIK.
©Thomas Schoepke







Flower symmetry



Radial symmetry (aka regular, actinomorphic)
2 or more lines of symmetry
Like the spokes of a wheel

Flower symmetry



Bilateral symmetry (aka irregular, zygomorphic)
Only one line of symmetry
Like the wings of a butterfly



Number of flower parts





Capsella bursa-pastoris (L.) MEDIK.

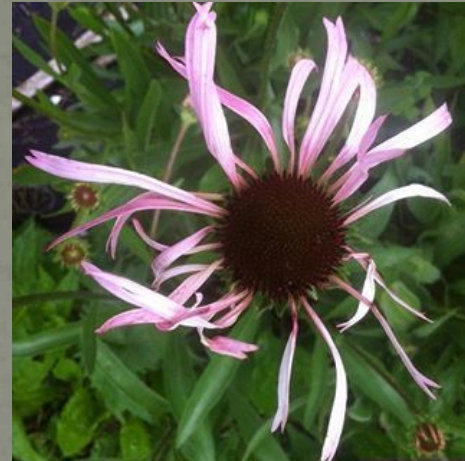
©Thomas Schoepke



Numerous parts



Aster relatives (more later!)

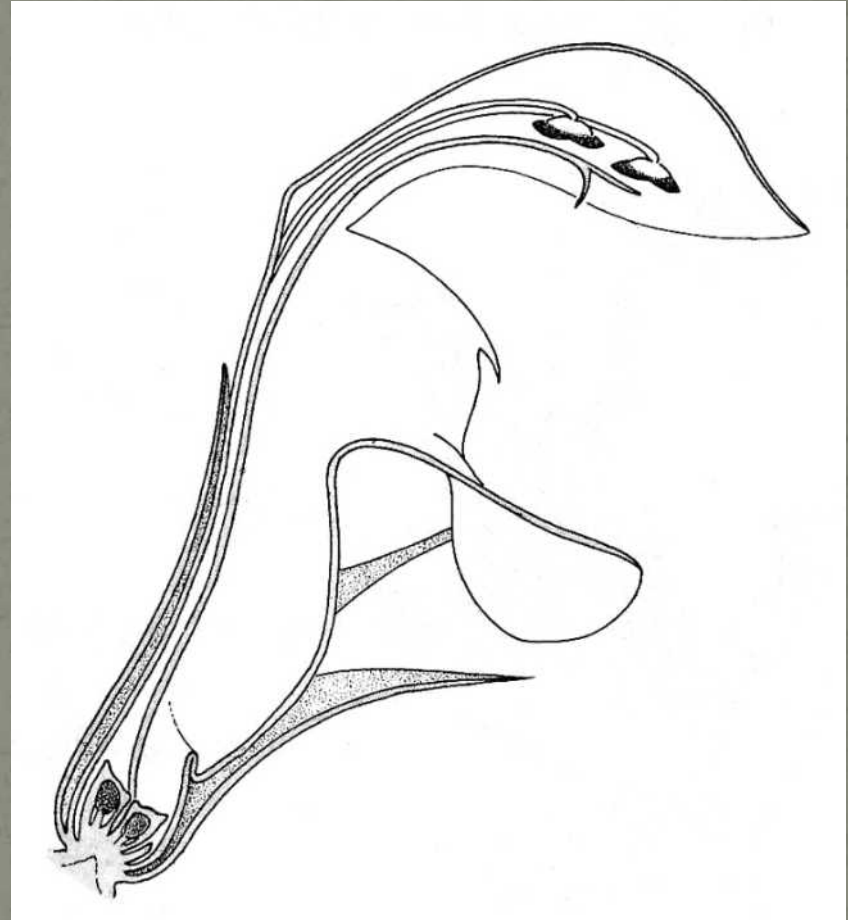


Inconspicuous flowers



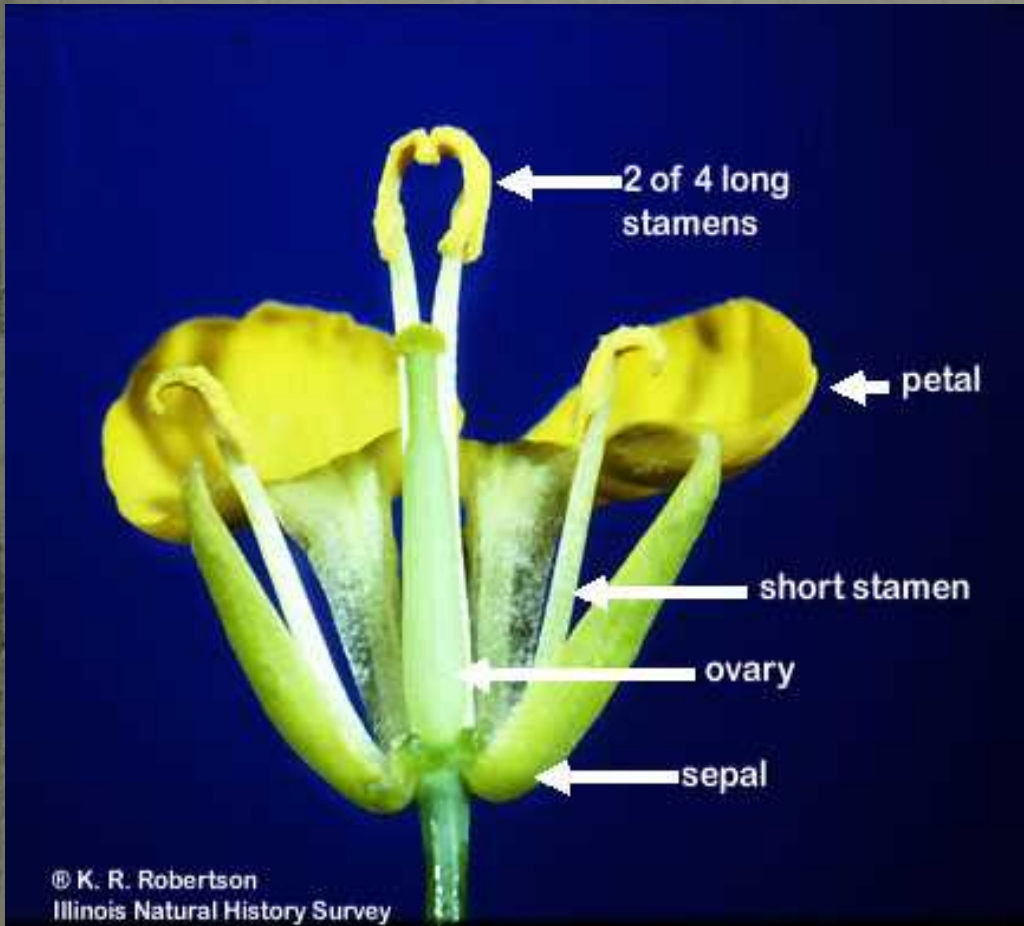
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Stamen variations

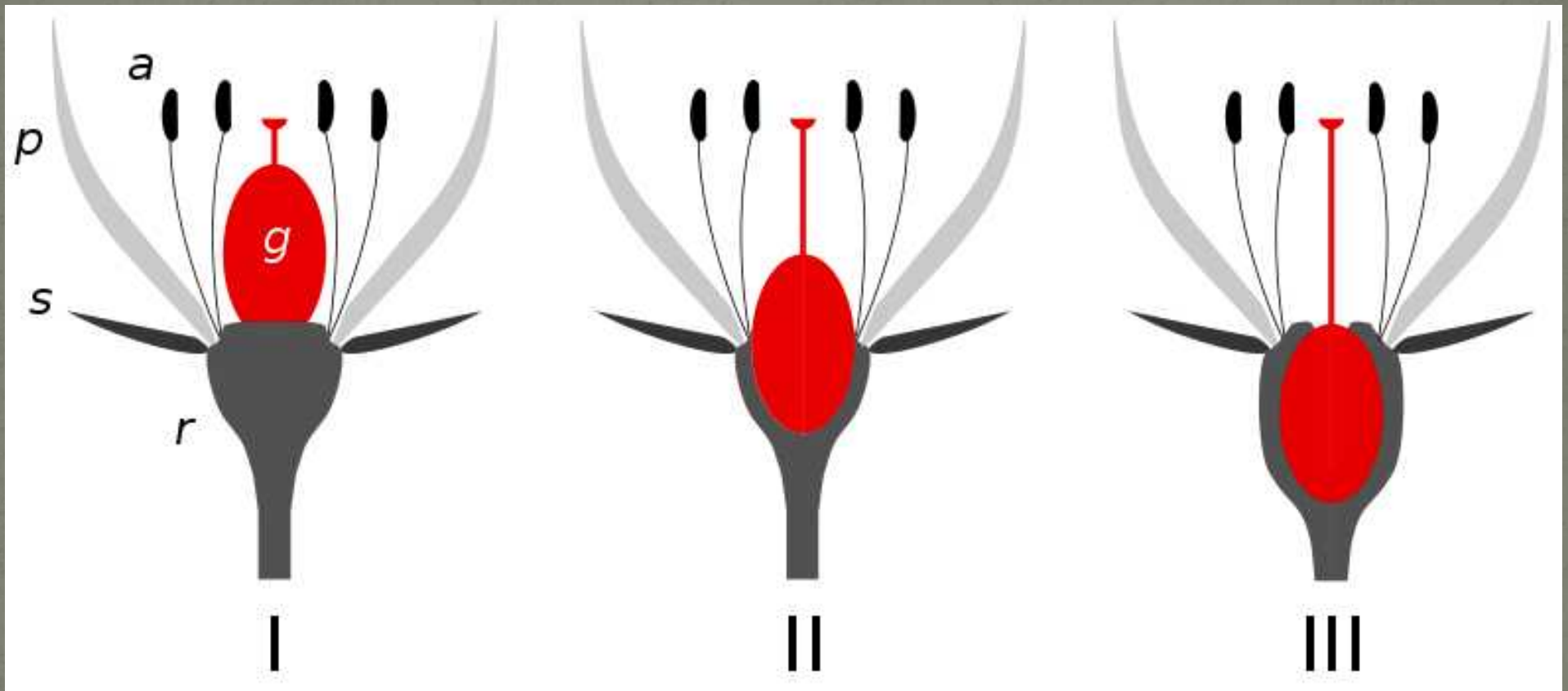








Ovary position



I
Superior

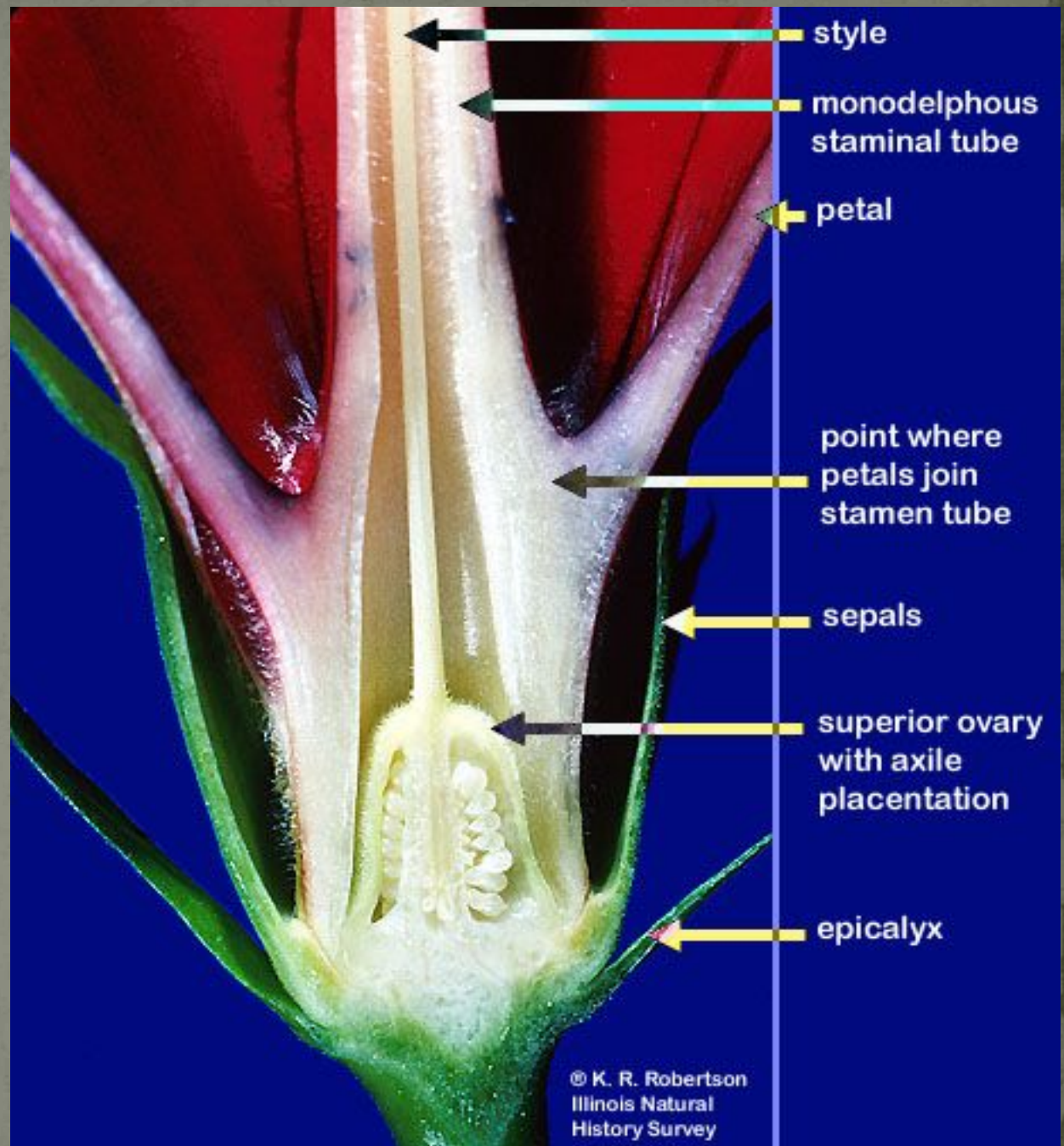
(Hypogynous flower)

II
Half-inferior

(Perigynous flower)

III
Inferior

(Epigynous flower)







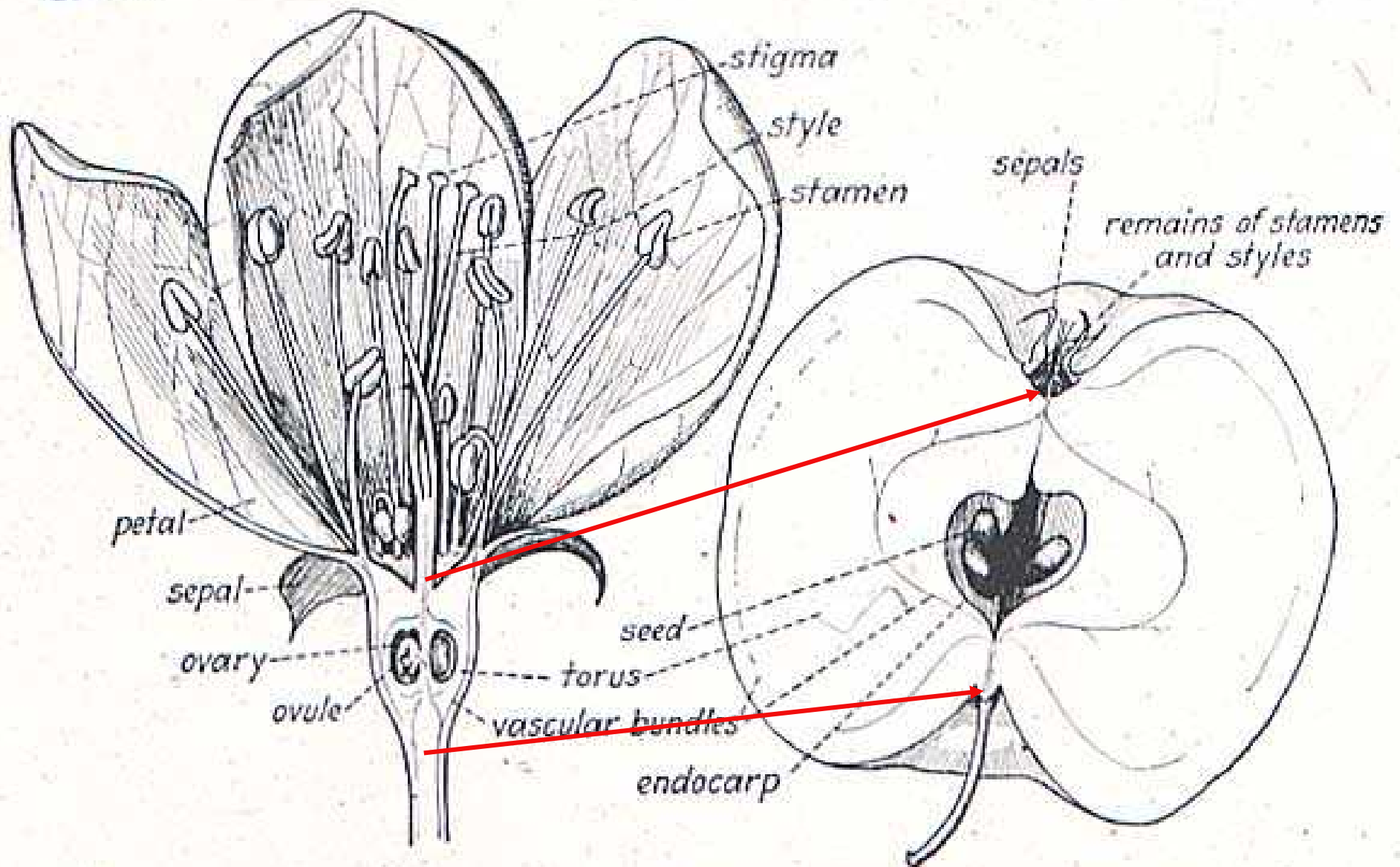


FIG. 381. Flower and fruit of apple (*Malus pumila*), cut lengthwise to show the relation of the parts of the flower to the torus.

PEACH

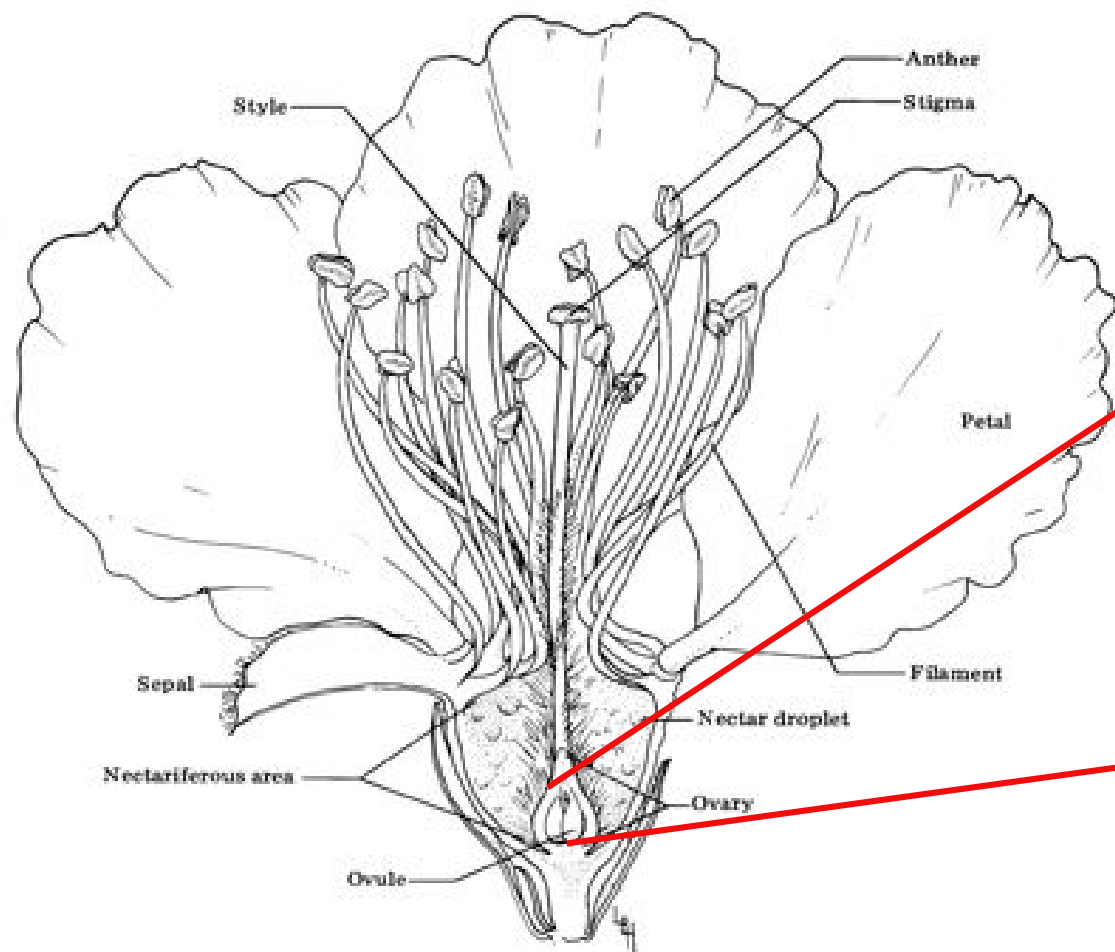
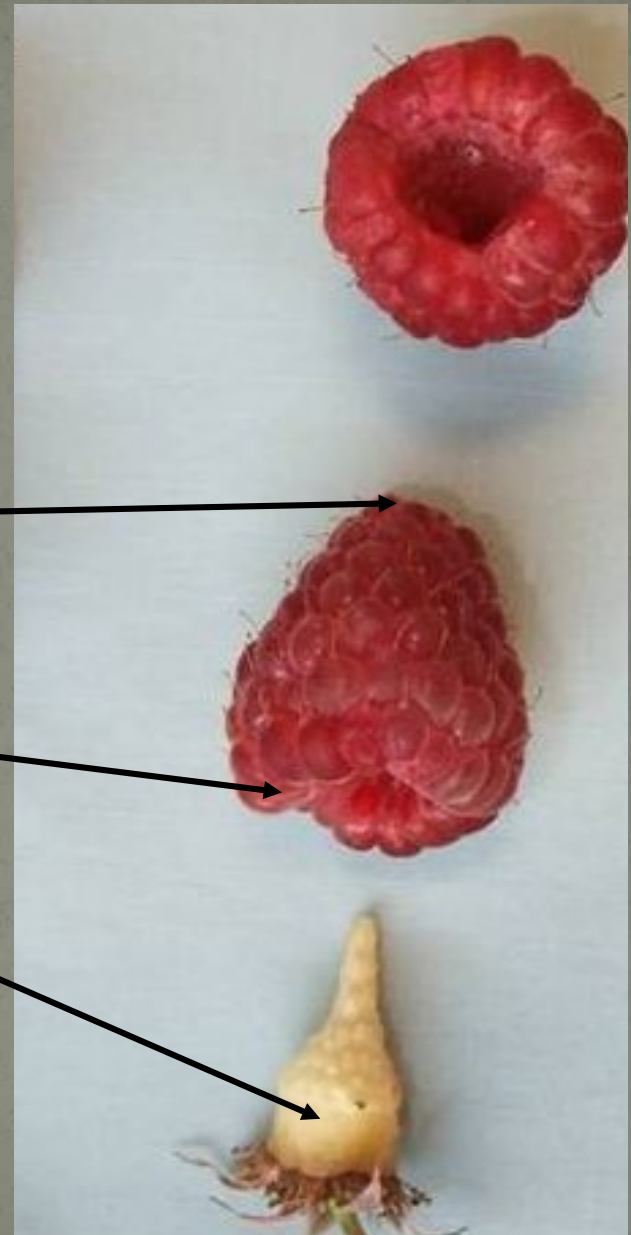
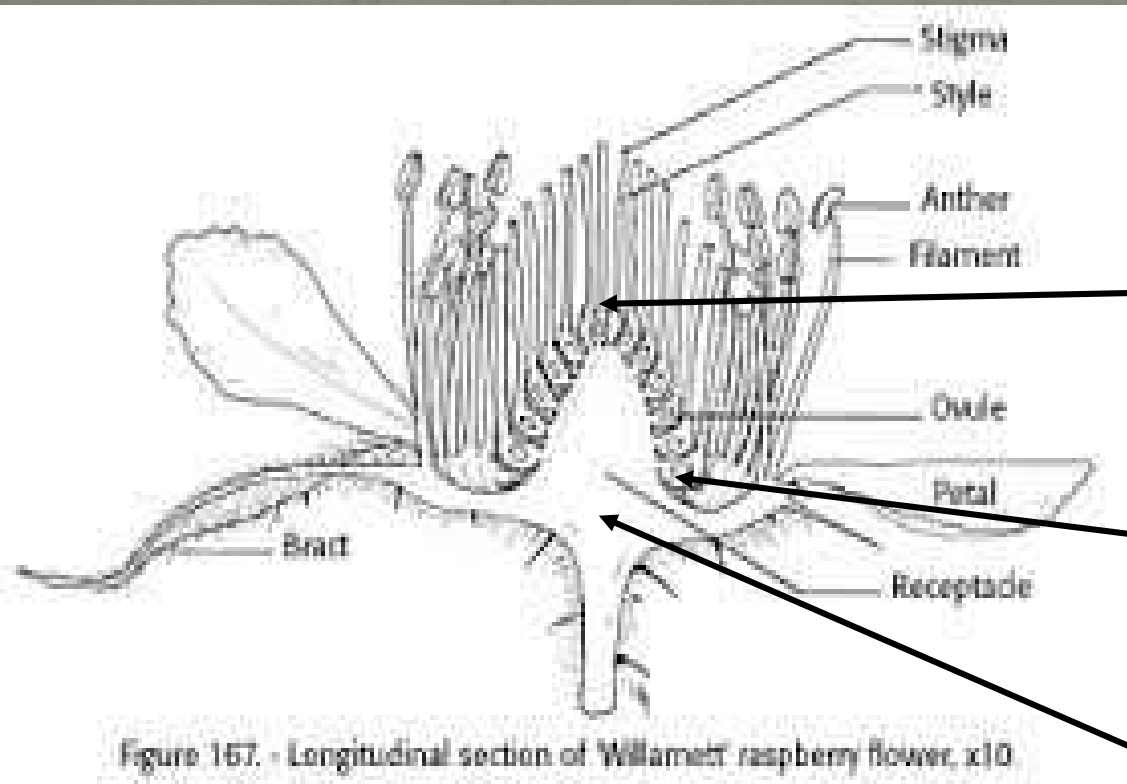
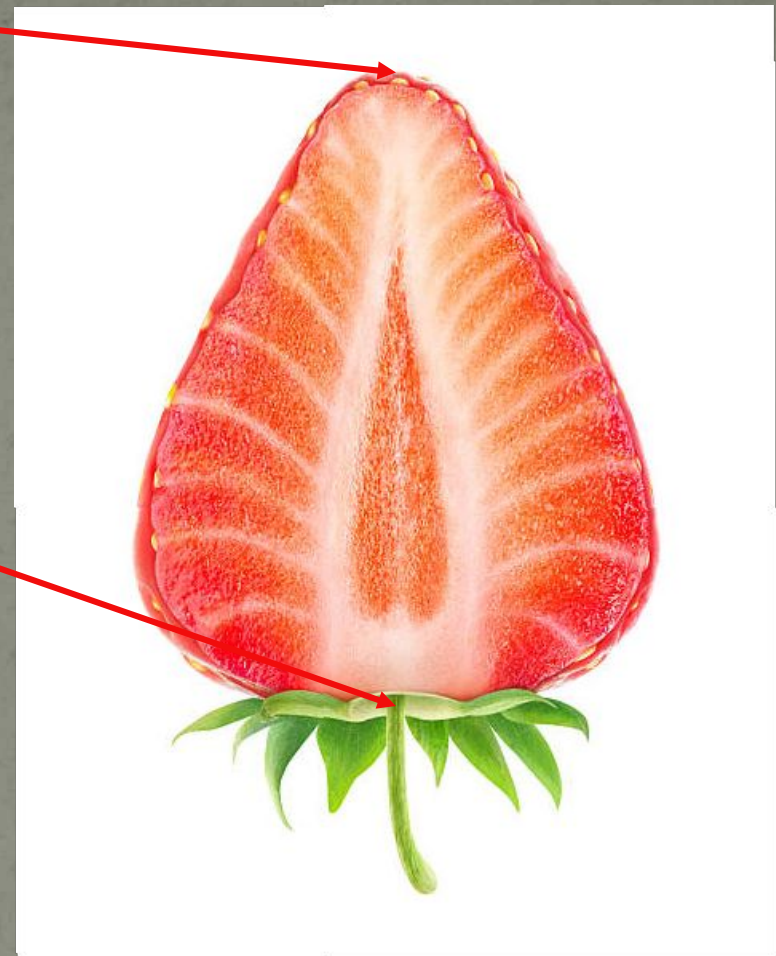
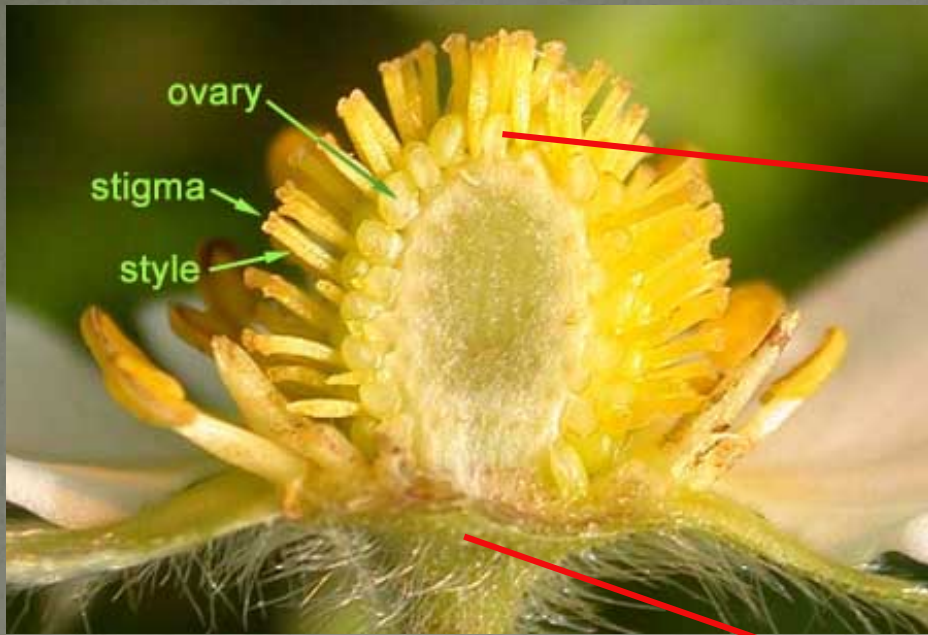
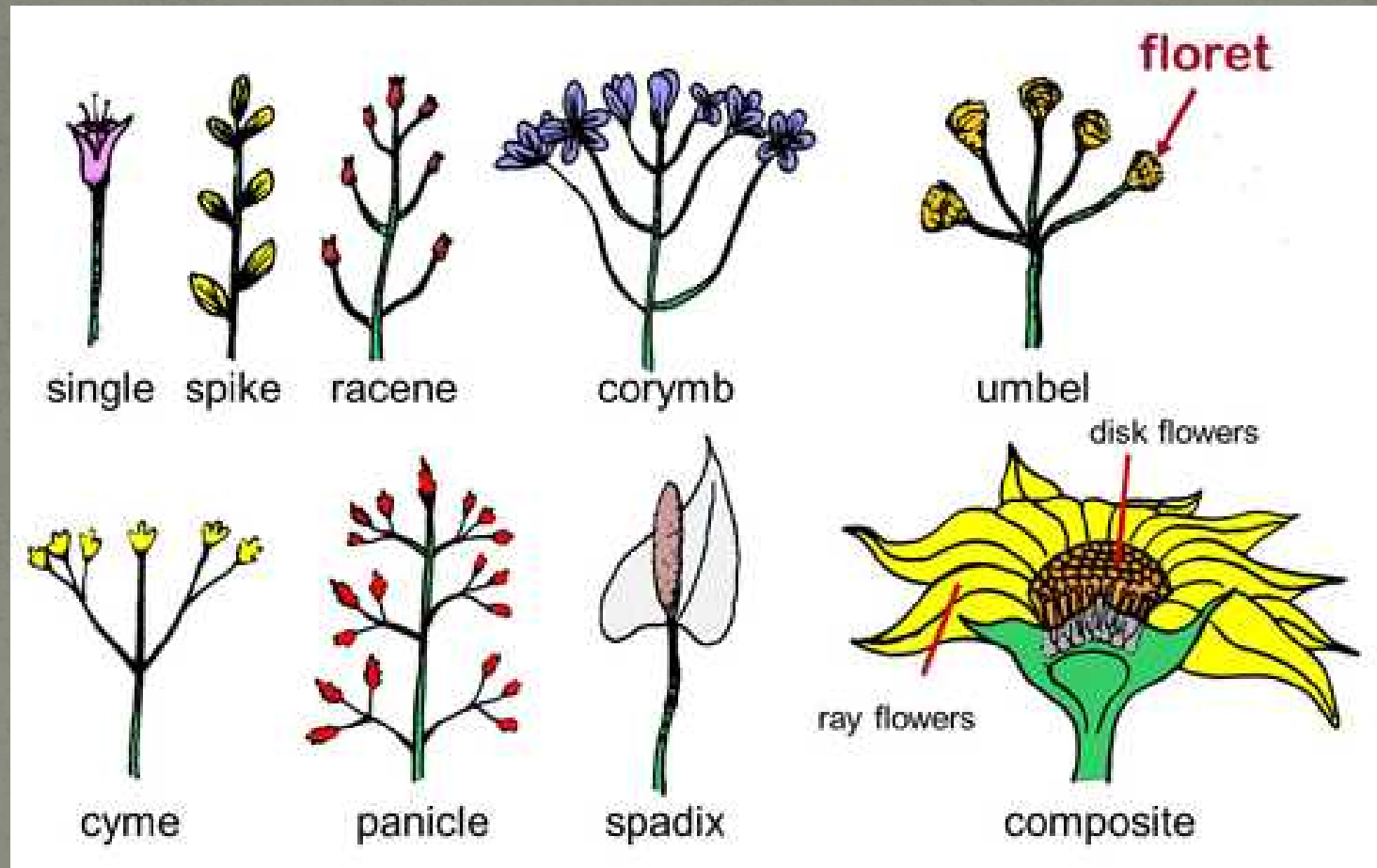


FIGURE 144.—Longitudinal section of 'Babcock' peach flower, $\times 4$.





Inflorescences













By Daniel Schwen - Own work, CC BY-SA 4.0,
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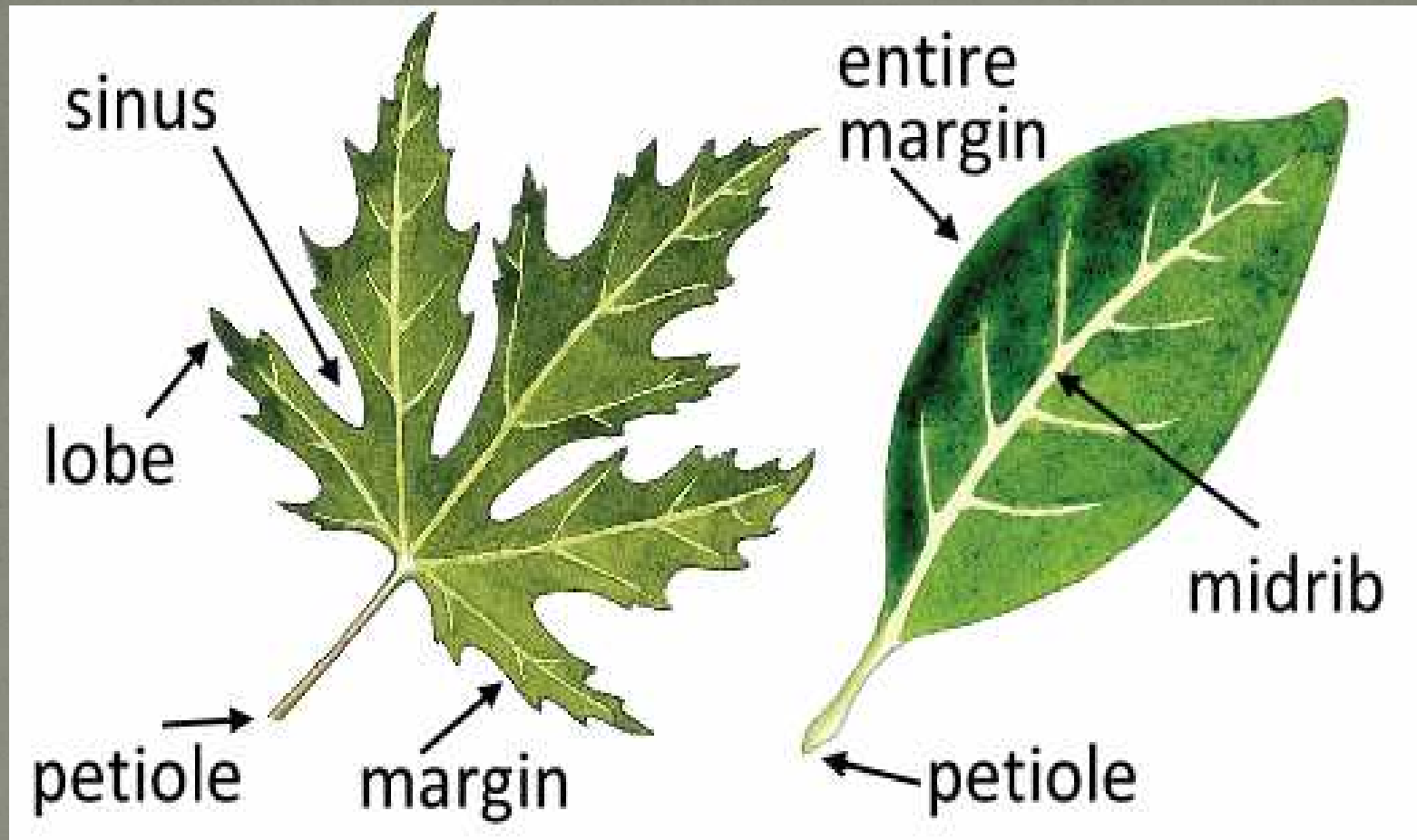


Leaf arrangement: opposite, alternate, whorled



Basal leaves only





C - Shapes



ovate



obovate



oblong



spatulate



lanceolate



oblanceolate



oblique



hastate



elliptic



linear



filiform



cuneate



deltoid



cordate



reniform



orbicular

Common Weeds of the United States
Agricultural Research Service
USDA 1970

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Simple Leaf
(cottonwood)



Palmately Compound Leaf
(white clover)



Pinnately Compound Leaf
(black walnut)



Double Compound Leaf
(honey locust)



© Stephen M. Seiberling, University of North Carolina Herbarium



Plant habit

- **Annual** plants grow from seeds, complete their life cycle, and die at the end of one growing season (e.g. purple dead nettle, chickweed, tomatoes)
- **Perennial** plants live for an indeterminate number of years, completing reproductive cycles annually when able (e.g. echinacea, goldenrod)
- **Biennial** plants complete their life cycle over two growing seasons and then die
- **Herbaceous** plants are tender and the above-ground parts do not persist year after year even when the roots do (e.g. milkweed, clematis)
- **Woody** plants make stems that survive through multiple growing seasons (e.g. trees, shrubs, grape vine, rosemary, lavender)

Environment / ecology

Most plants prefer to grow in a specific type of environment, and this can be an important factor in ID. Some types of environments to consider are:

- Disturbed vs. undisturbed soil (e.g. garden vs. forest)
- Wet vs. dry ecosystem (e.g. riverside vs. upland forest)
- Shade vs. sun
- Specific soil types may be host to unique ecosystems and plant communities
- Ecological range (the area in which a plant has been observed through history-- check references)

Recommended botany books:

Flora of Virginia

Botany in a Day (Thomas Elpel)

Naming Nature (Carol Kaesuk Yoon)

How to Identify Plants (H.D. Harrington)

Families of Flowering Plants (Wendy Zomleffer)

Our Knowledge is not Primitive: Decolonizing Anishinaabe Botanical Teachings (Wendy Geniusz)

Manual of Vascular Plants of the Northeast (Gleason and Cronquist)

Braiding Sweetgrass: Robin Wall Kimmerer

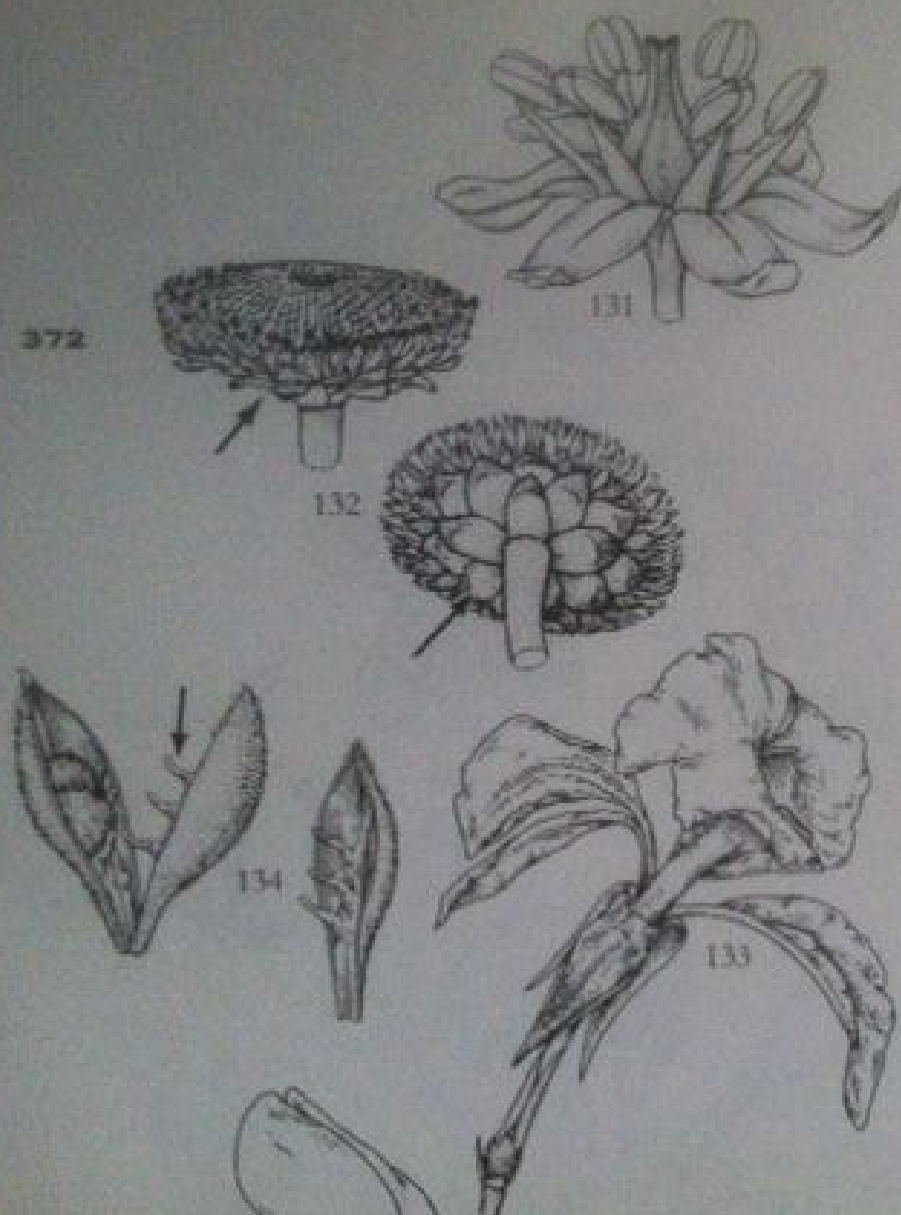
Also: In Defense of Plants podcast

to elliptic, acuminate at both ends, commonly attenuate, glabrous, sometimes ciliate at the base. Cymes terminal or pseudolateral; pedicels to 30 mm, spreading or deflexed; flowers 5–10 mm broad; sepals 3.5–4.5 mm, lanceolate or lance-ovate, acute, scarious-margined or, seldom, oblanceolate; petals about equaling sepals, bifid almost to the base; stamens 5–10. Capsules 4–6 mm, much longer than the calyx, short-to-elongate-conic; seeds 0.7–1 mm, oblong, smooth. P: May–Jul H: Floodplain forests, wet meadows, and other moist, disturbed habitats. S: Infrequent, mountains and Piedmont.

* *Stellaria media* (Linnaeus) Villars; Common Chickweed. [= FNA, Pa.; < *S. media* – C, G, R, W, W.Va., (also see *S. pallida*); < *S. media* var. *media* – F; = *S. media* ssp. *media* – K; < *Alsine media* Linnaeus – S] D: Annual 5–60 cm. Stems prostrate to decumbent or ascending, weak, much branched, pubescent in 1 or 2 lines, terete. Leaves 0.5–4 cm, ovate to elliptic, attenuate to cordate at base, acute or acuminate, entire, often ciliate toward the base or on the petiole, otherwise glabrous; petioles, when present, to 1 cm. Cymes terminal, leafy or with solitary flowers; pedicels 2–25 mm, usually deflexed; flowers 4–8 mm broad; sepals 4.5–6 mm, ovate to oblong, acute or obtuse, scarious-margined, pubescent or glabrous; petals, if present, 2–4 mm, bifid almost to the base; stamens 3–8. Capsules 4–6 mm, slightly longer than the calyx, ovoid; seeds 0.9–1.4 mm, suborbicular, sharply papillate so that margin appears wavy. P: Jan–Dec H: Fields, gardens, and other open, disturbed habitats; also a common invader of floodplain forests and rich, mesic forests. S: Common throughout.

edia
of plant,
r

* *Stellaria pallida* (Dumortier) Piré; Lesser Chickweed. [= C, FNA, Pa.; < *S. media* (Linnaeus) Villars – R, W, W.Va.; >< *S. media* var. *glaberrima* G. Beck – F, possibly misapplied; = *S. prostrata* – G, misidentified; ? *S. apetala* Ucria ex Roemer – G, possibly misapplied; = *S. media* (Dumortier) Ascherson & Graebner – K; < *Alsine media* – S] D: Annual 1–30 cm, often yellowish. Stems prostrate or loosely ascending, weak, glabrous, terete. Leaves 0.4–2 cm, ovate to elliptic, attenuate to cordate at base, acute or acuminate, entire, often ciliate toward the base or on the petiole, otherwise glabrous; petioles glabrous.



internode: The portion of the stem between two nodes.

intraxylary phloem (= internal phloem): Primary phloem that is located internally from the primary xylem (as compared to its typical position, external to the primary xylem).

introrse: (Of anther dehiscence), with the locule openings facing inward toward the center of the flower. (131. *Asparagus densiflorus* [Asparagaceae]: flower with introrse anthers)

inulin: A food reserve polysaccharide (of fructans) that takes the place of starch in certain plants, such as the Asteraceae.

involucre: A series of bracts surrounding a flower or inflorescence. (132. *Eriocaulon compressum* [Eriocaulaceae]: two views of inflorescence)

involute: Rolled inward or toward the upper side.

iridoid compounds: A group of bitter-tasting monoterpene glycosides.

irregular: Not divisible into equal halves (133. *Canna flaccida* [Cannaceae]: flower)

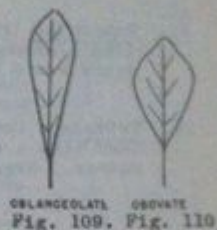
jaculator (= retinaculum): A hook-like appendage on the funicle of certain ovules (in the Acanthaceae), which aids in the expulsion of seeds from the fruit. (134. *Ruellia carolinensis* [Acanthaceae]: dehiscent capsule [left] and one valve of capsule showing jaculators [seeds ejected; right])

HOW TO IDENTIFY PLANTS

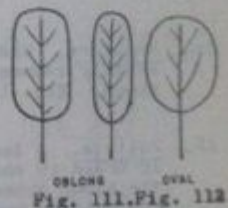
H. D. HARRINGTON
L. W. DURRELL
\$3.95



6. Oblanceolate. Lanceolate but connected by the narrower end. Fig. 109.
7. Obovate. Ovate in shape but connected at the narrower end. Fig. 110.

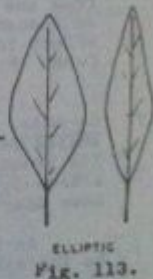


8. Oblong. Two to four times longer than wide, the sides parallel or nearly so. Fig. 111.



9. Oval. Broadest at the middle and the width over half the length. This term is loosely used in some manuals. Fig. 112.

10. Elliptic (or elliptical). Broadest at the middle, the ends rather equal. This is another term that is very loosely used but the length is at least twice the width. The drawings show a broadly elliptic and a rather narrowly elliptic leaf. Fig. 113.



11. Spatulate. Flattened spoon-shaped, connected at the narrow tapered end. Shaped like the old fashioned "spatula". Fig. 114.



12. Deltoid. Triangular like the Greek letter "Delta". The blade is usually connected to the petiole at the middle of one side. Fig. 115.

SPATULATE DELTOID
Fig. 114. Fig. 115.