Encyclopédie Économique de Sylviculture III.

LES CHÂTAIGNIERS

Monographie des genres

CASTANEA

ET

CASTANOPSIS

PAR

A. CAMUS

Lauréate de l'Institut. – Académie des Sciences

ATLAS

PAUL LECHEVALIER

EDITEUR

12, Rue de Tournon, 12

PARIS (VI^e^)

1929

Monographie

des Genres

Castanea et Castanopsis

GENRES

CASTANEA

ET

CASTANOPSIS

par

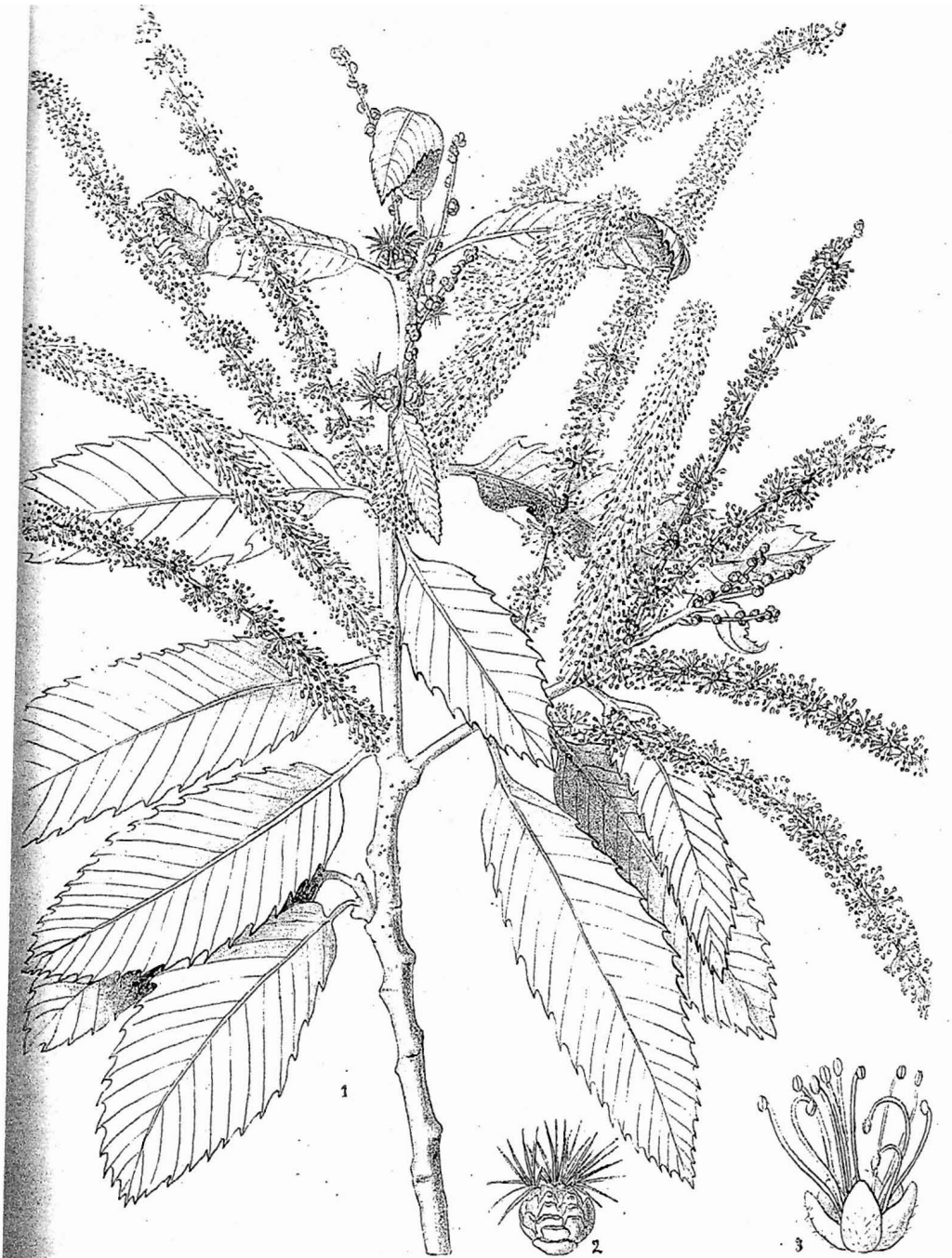
A. CAMUS

Lauréate de l'Institut
(Académie des Sciences)

ATLAS

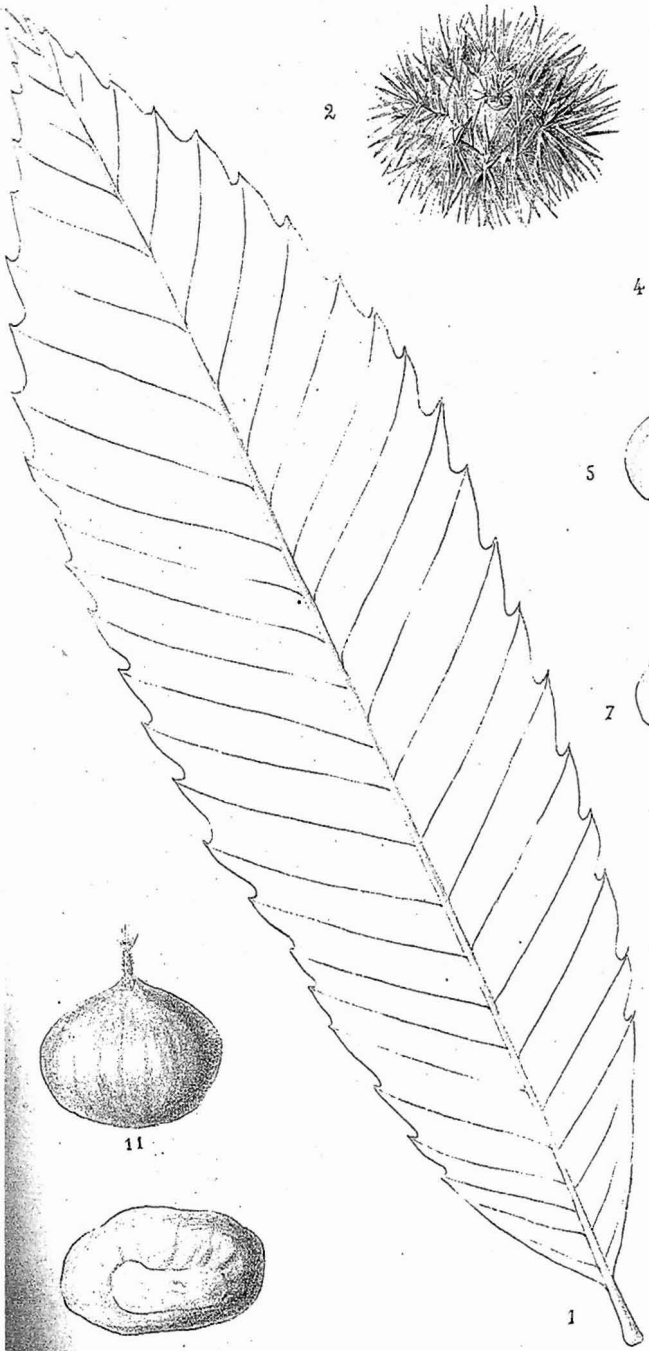
PAUL LECHEVALIER
ÉDITEUR
12, rue de Tournon, 12
PARIS-VI^{e}

1928

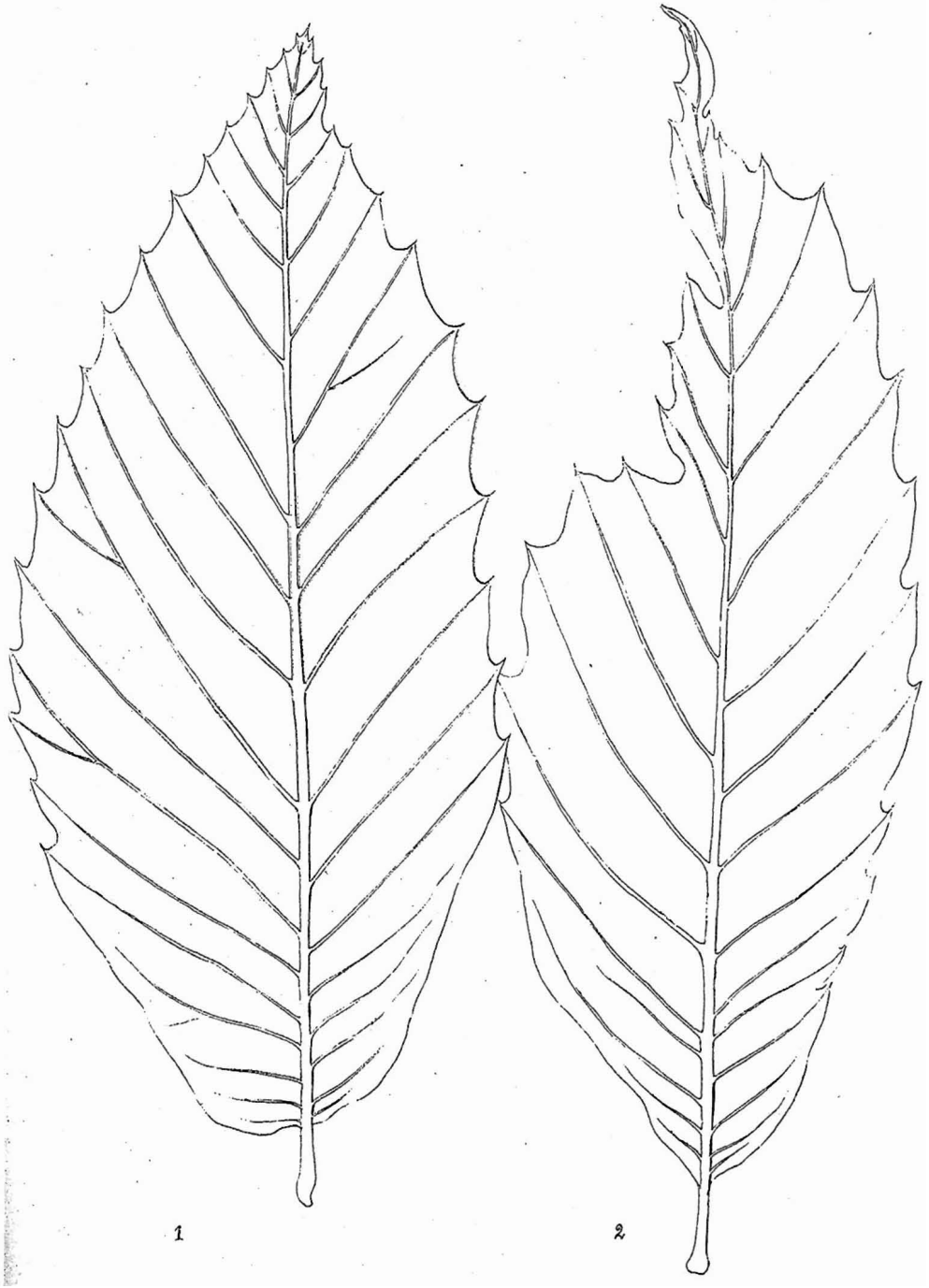


CASTANEA SATIVA Miller

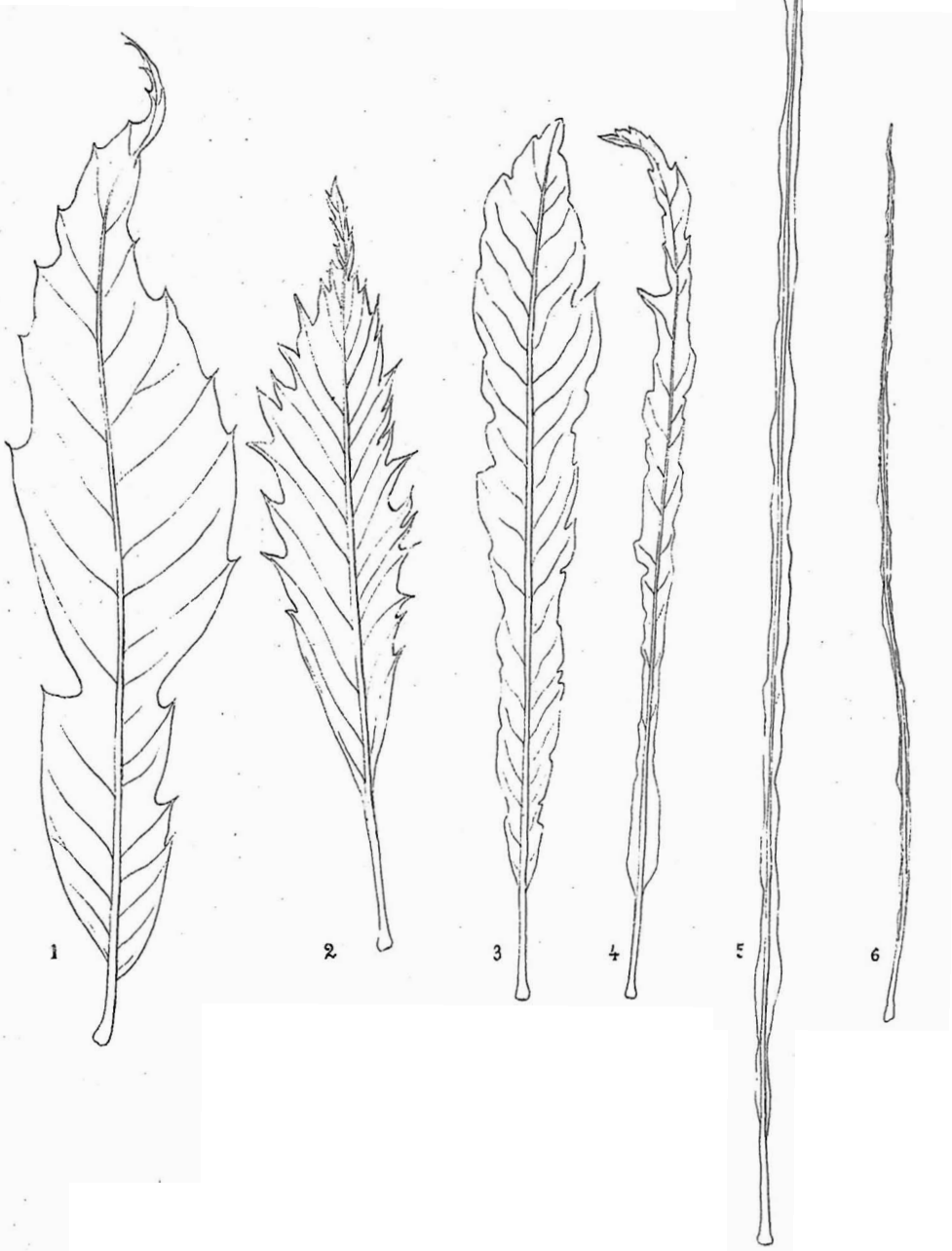
CASTANEA SATIVA Miller



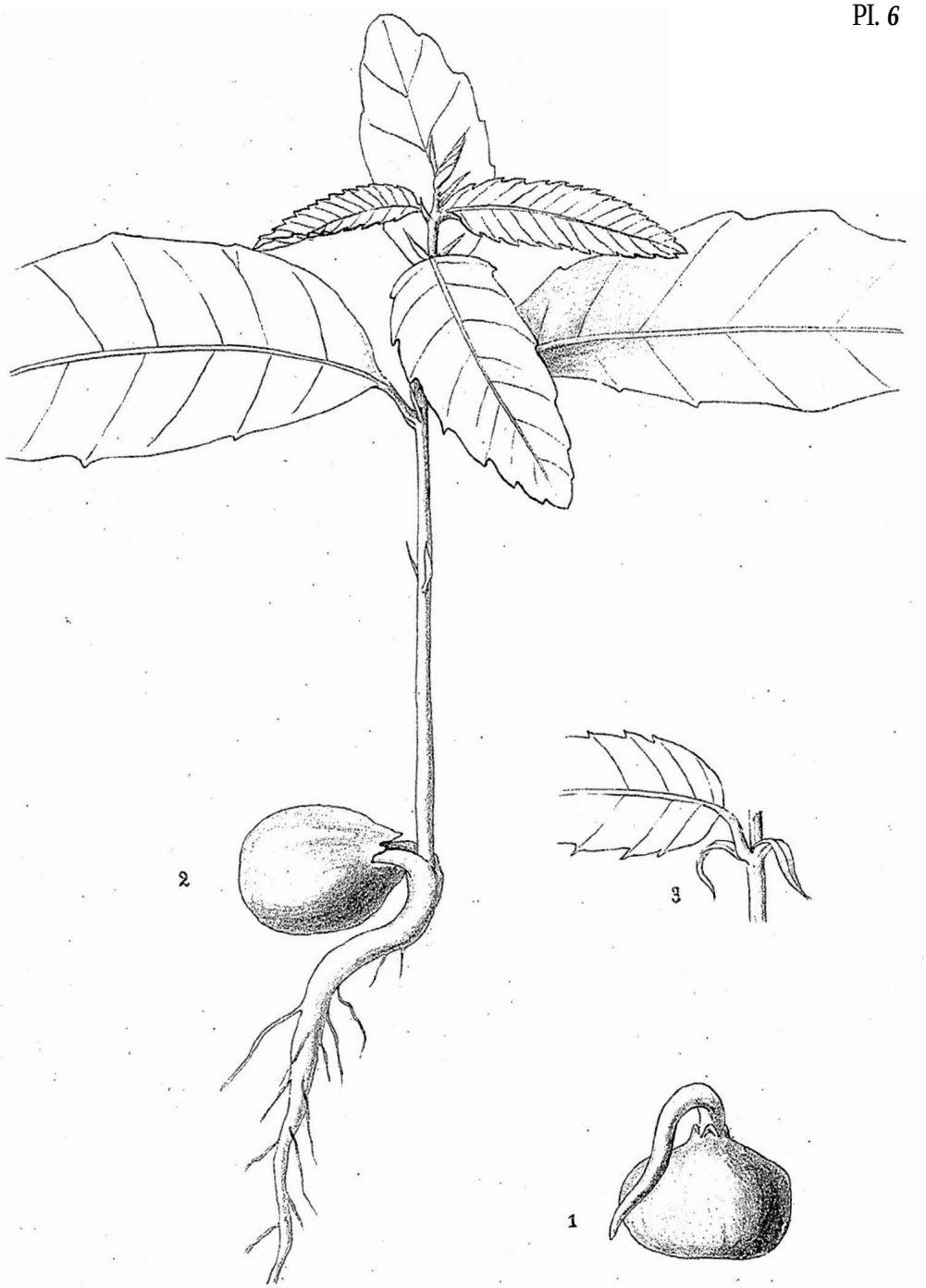
CASTANEA SATIVA Miller



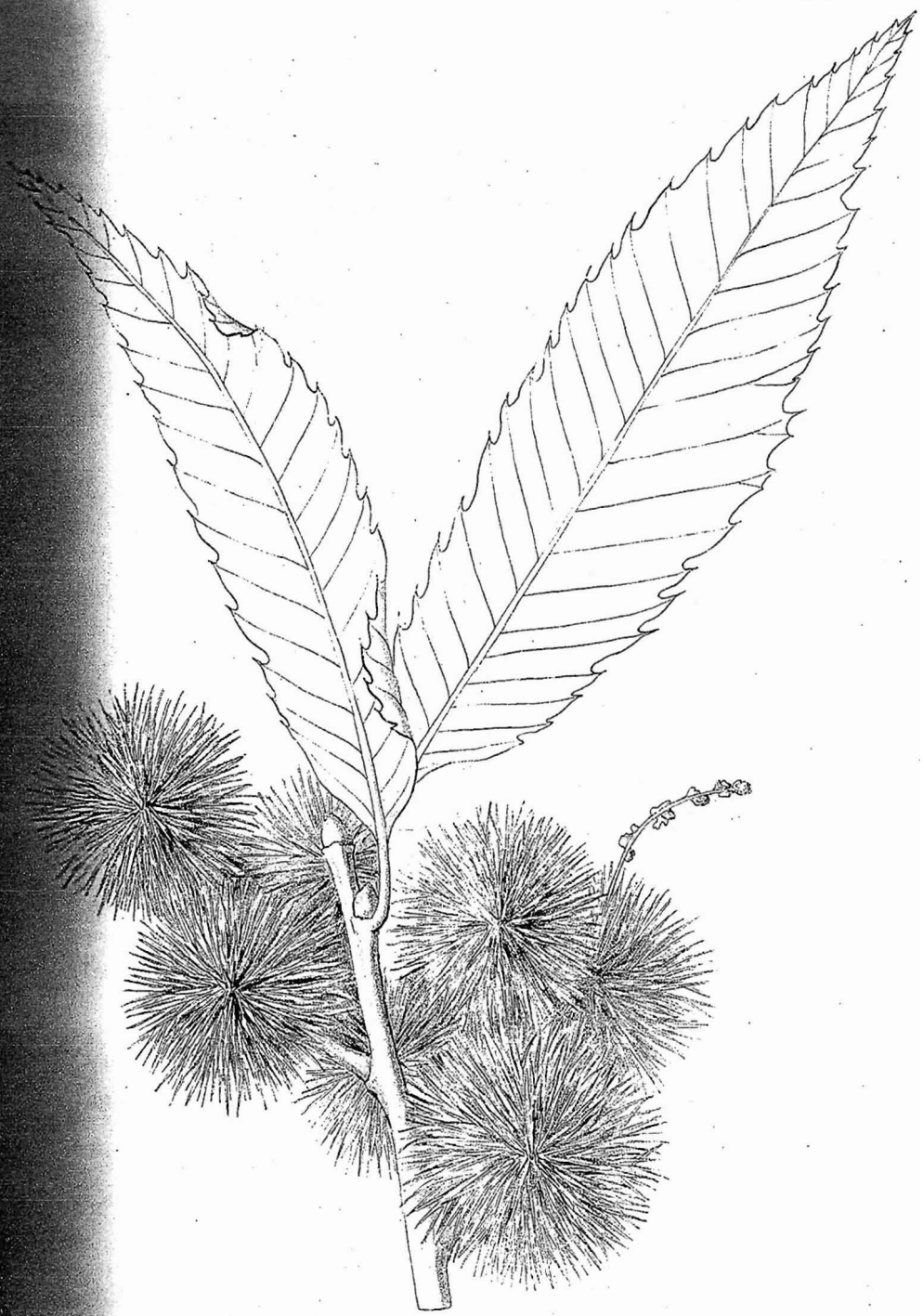
CASTANEA SATIVA Miller var. heterophylls E.et H.



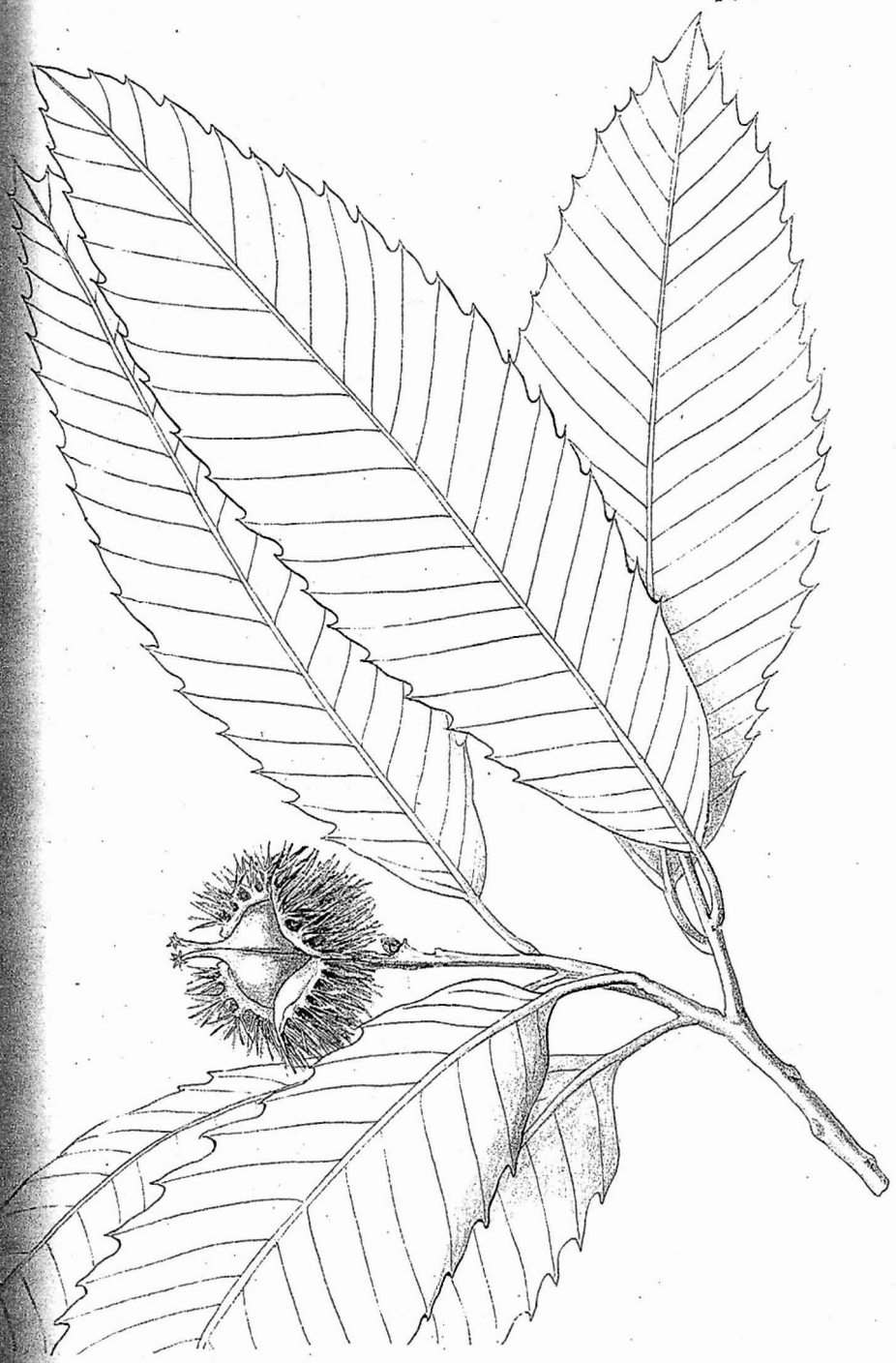
CASTANEA SATIVA Miller var. heterophylla E.et H.



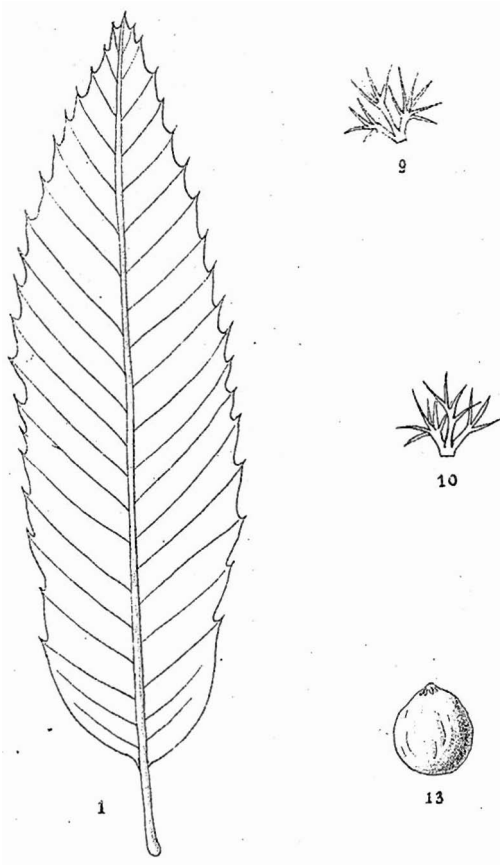
CASTANEA SATIVA Miller

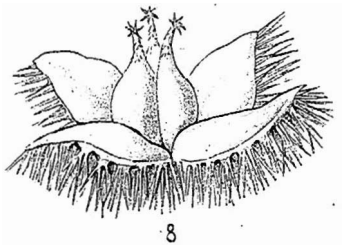


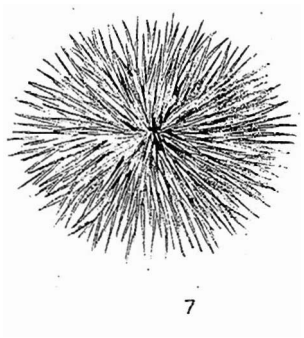
CASTANEA SATIVA Miller var.

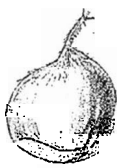


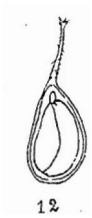
CASTANEA DENTATA Borkh.

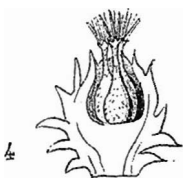


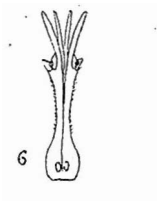




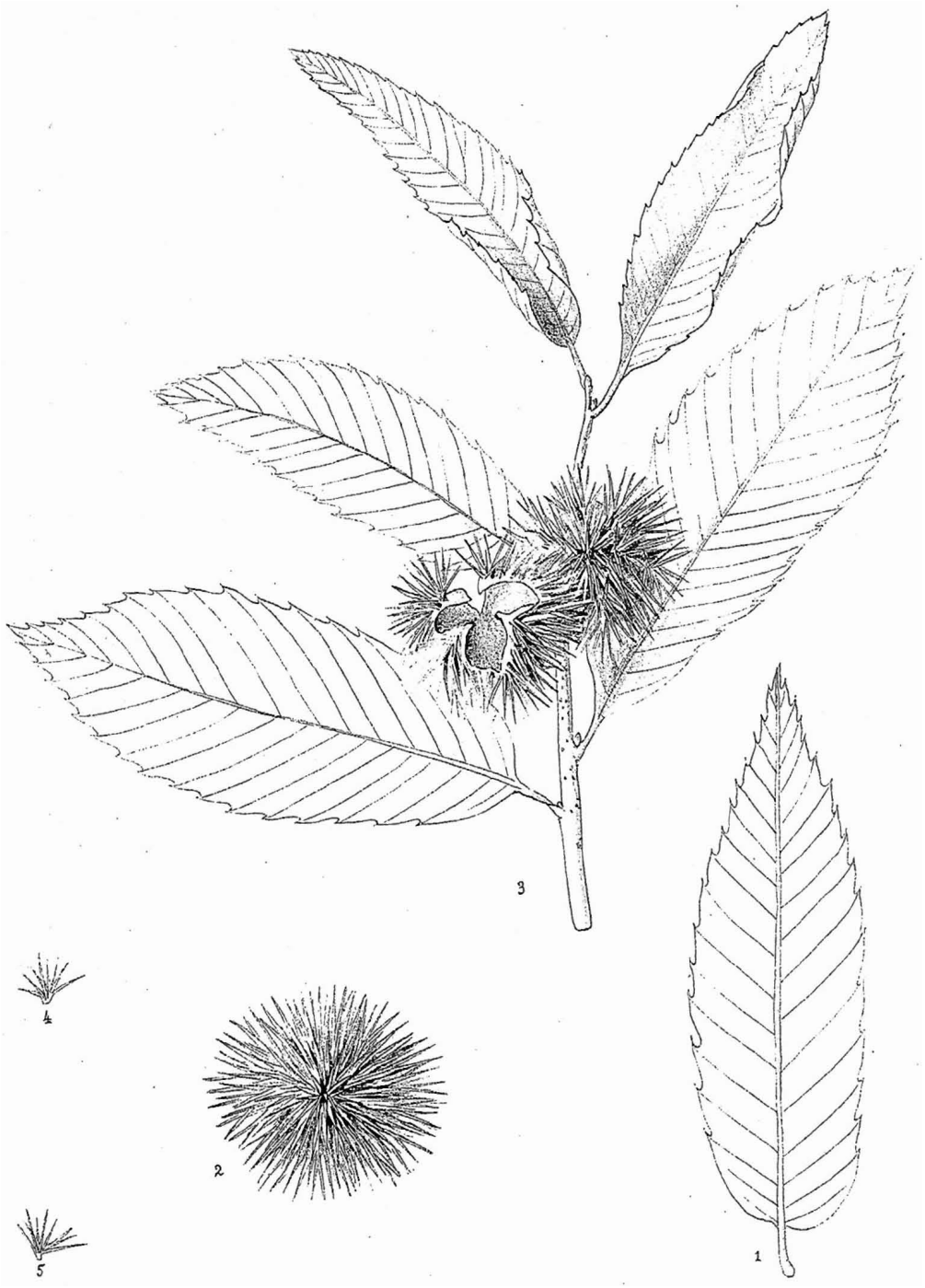








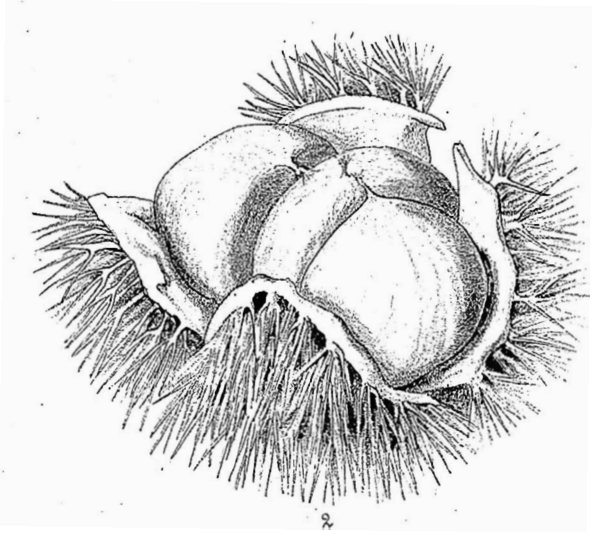
CASTANEA DENTATA Borkh.



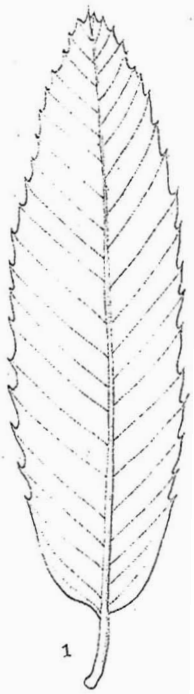
CASTANEA **CRENATA** S.et Z. et var.

CASTANEA CRENATA S. et Z. var.

Pl. 12

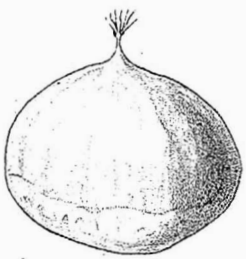


2

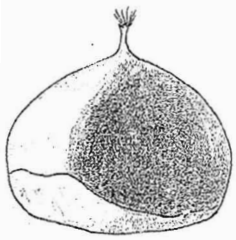


1

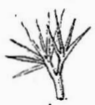
3



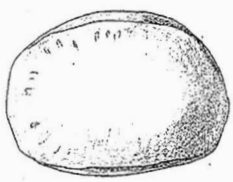
5



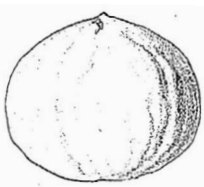
7



4

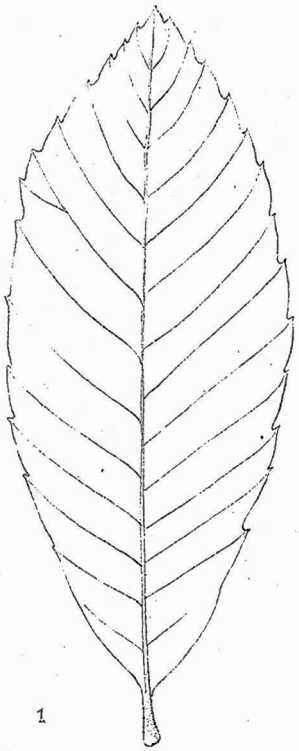


6



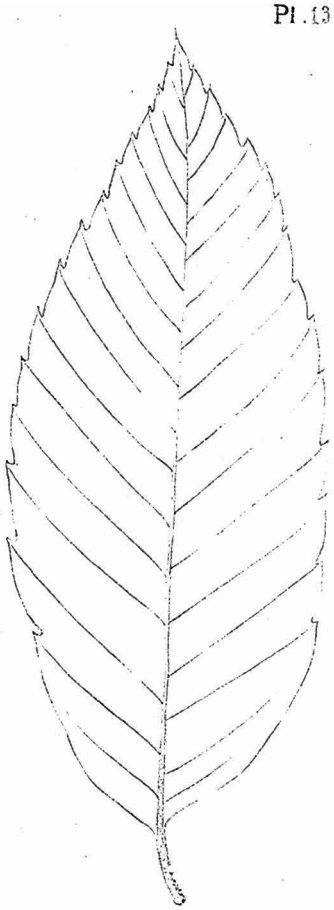
8

CASTANEA CRENATA S.etZ. var.

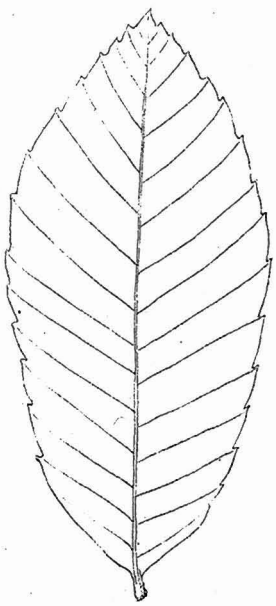


1

3



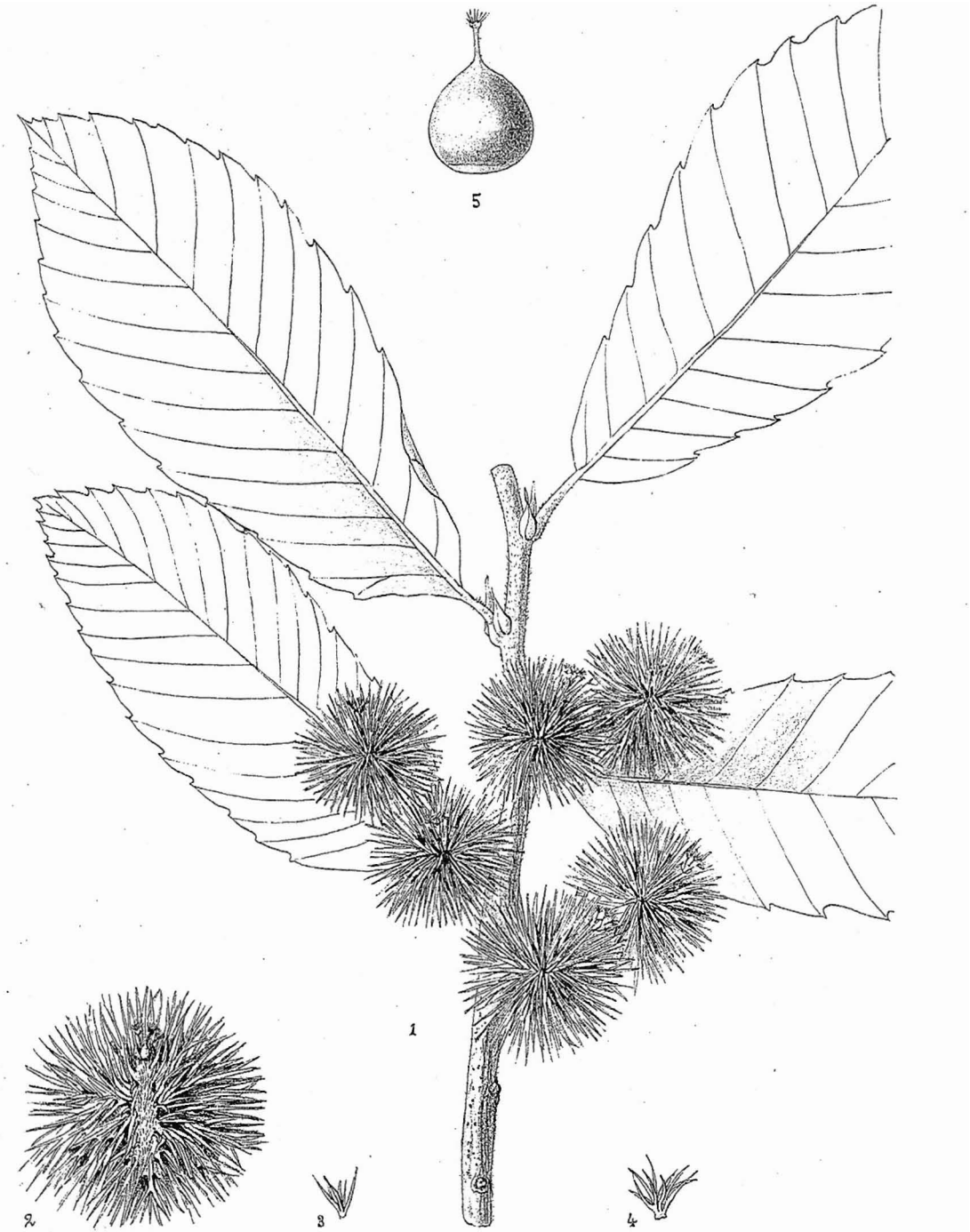
2



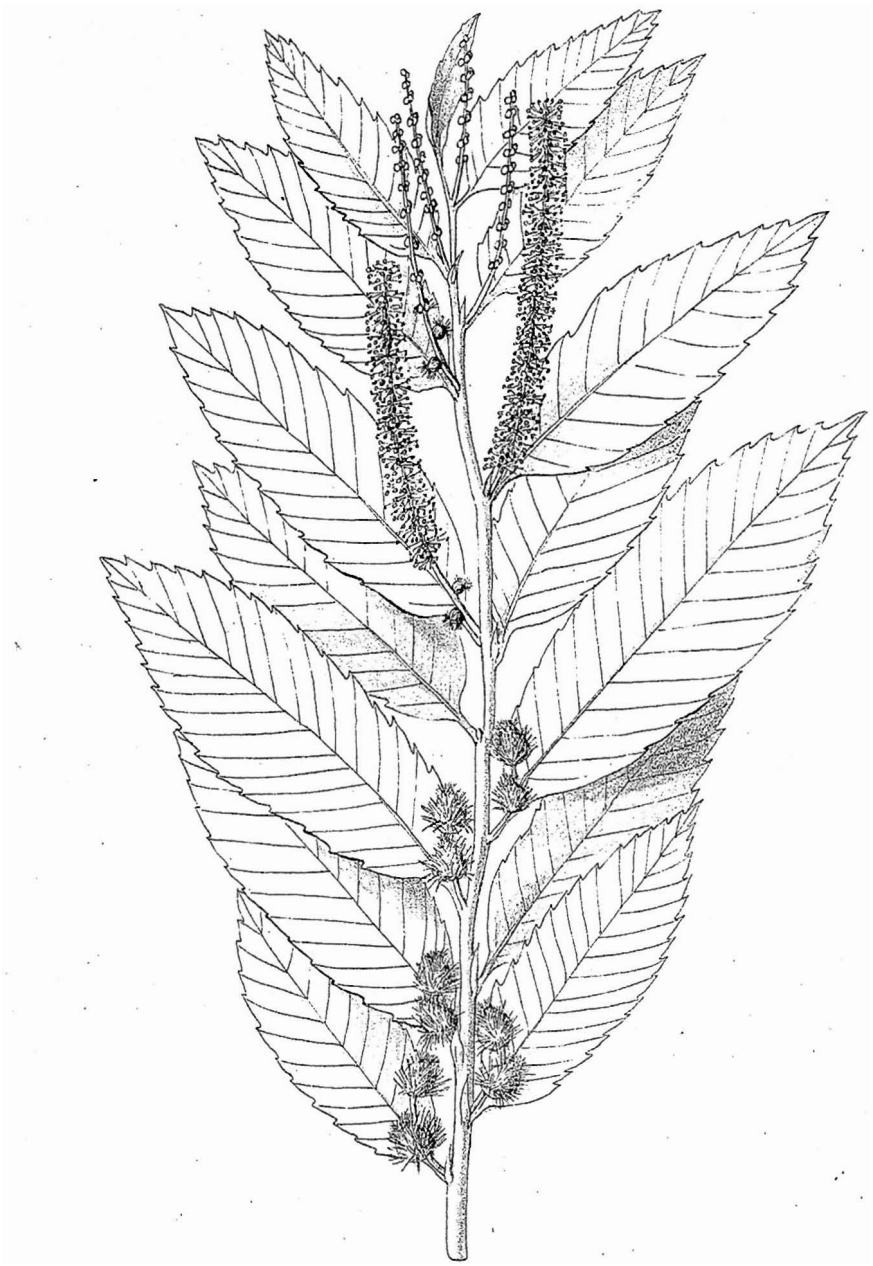
4

5

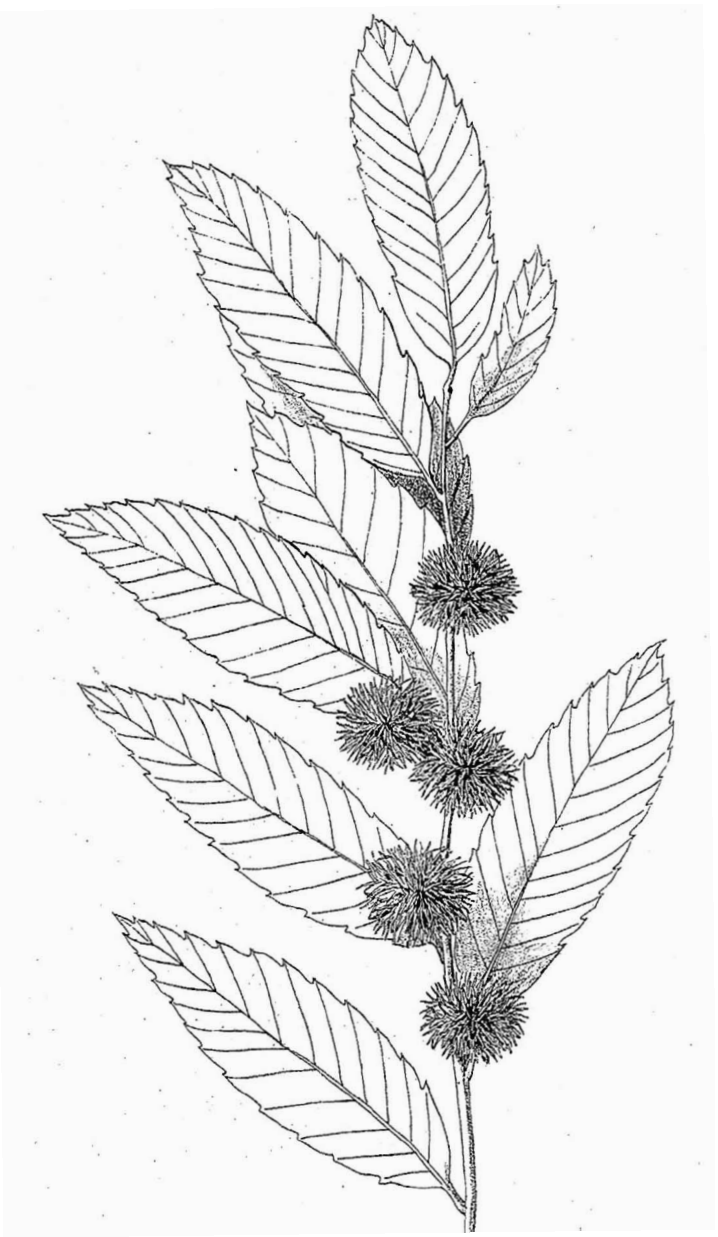
CASTANEA MOLLISSIMA Bl.

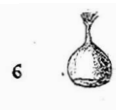


CASTANEA MOLLISSIMA Bl.

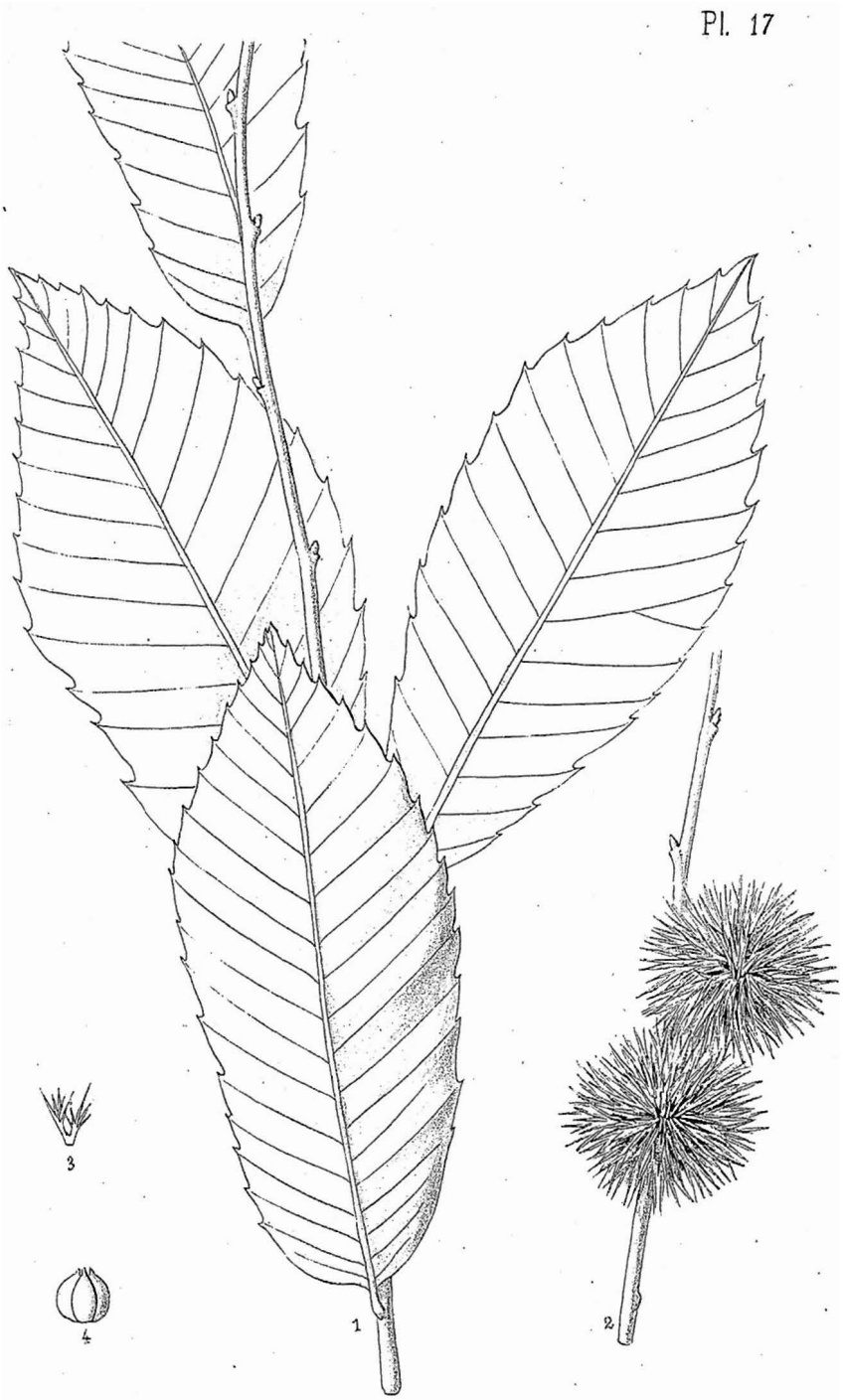


CASTANEA DAVIDII Dode

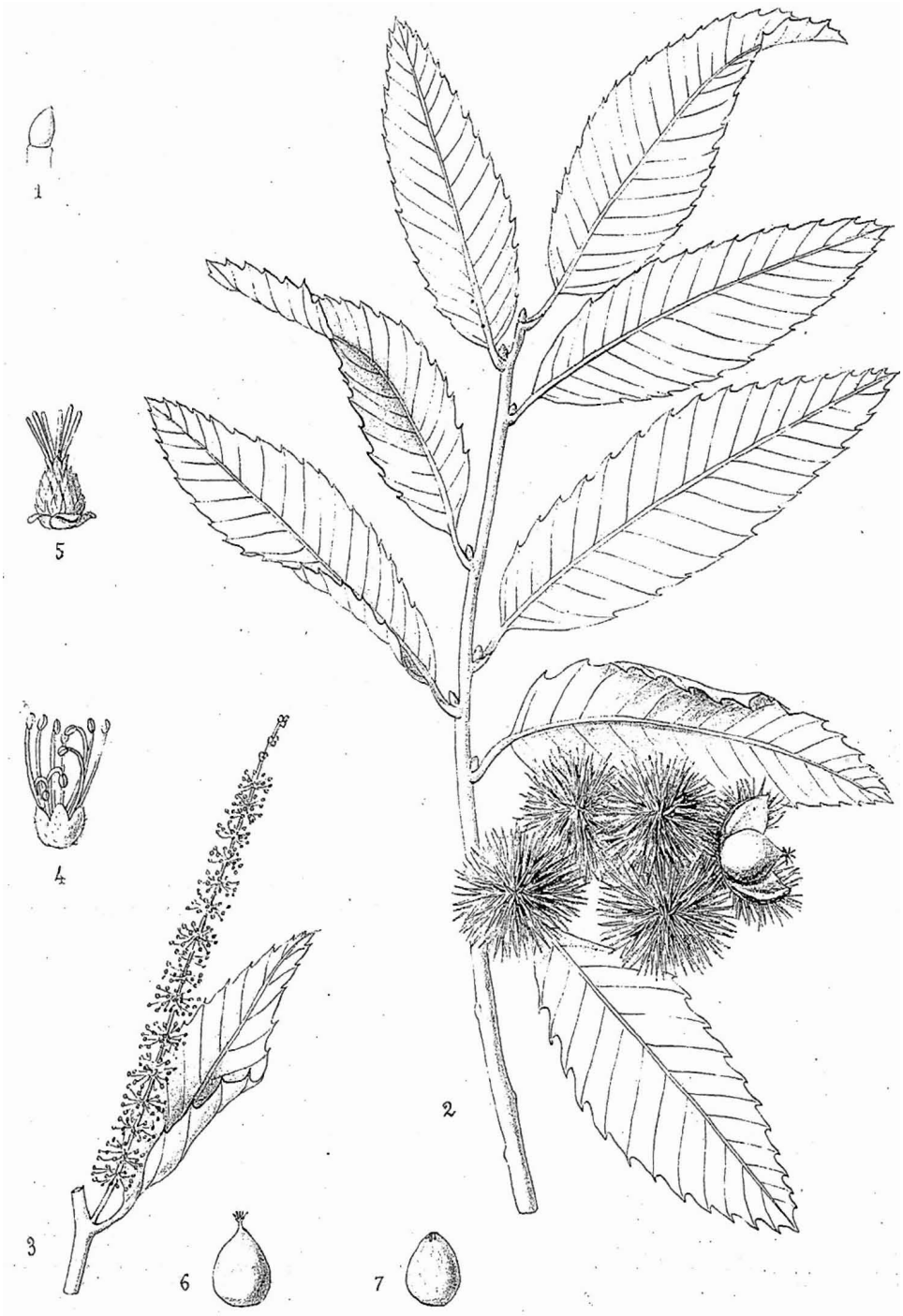




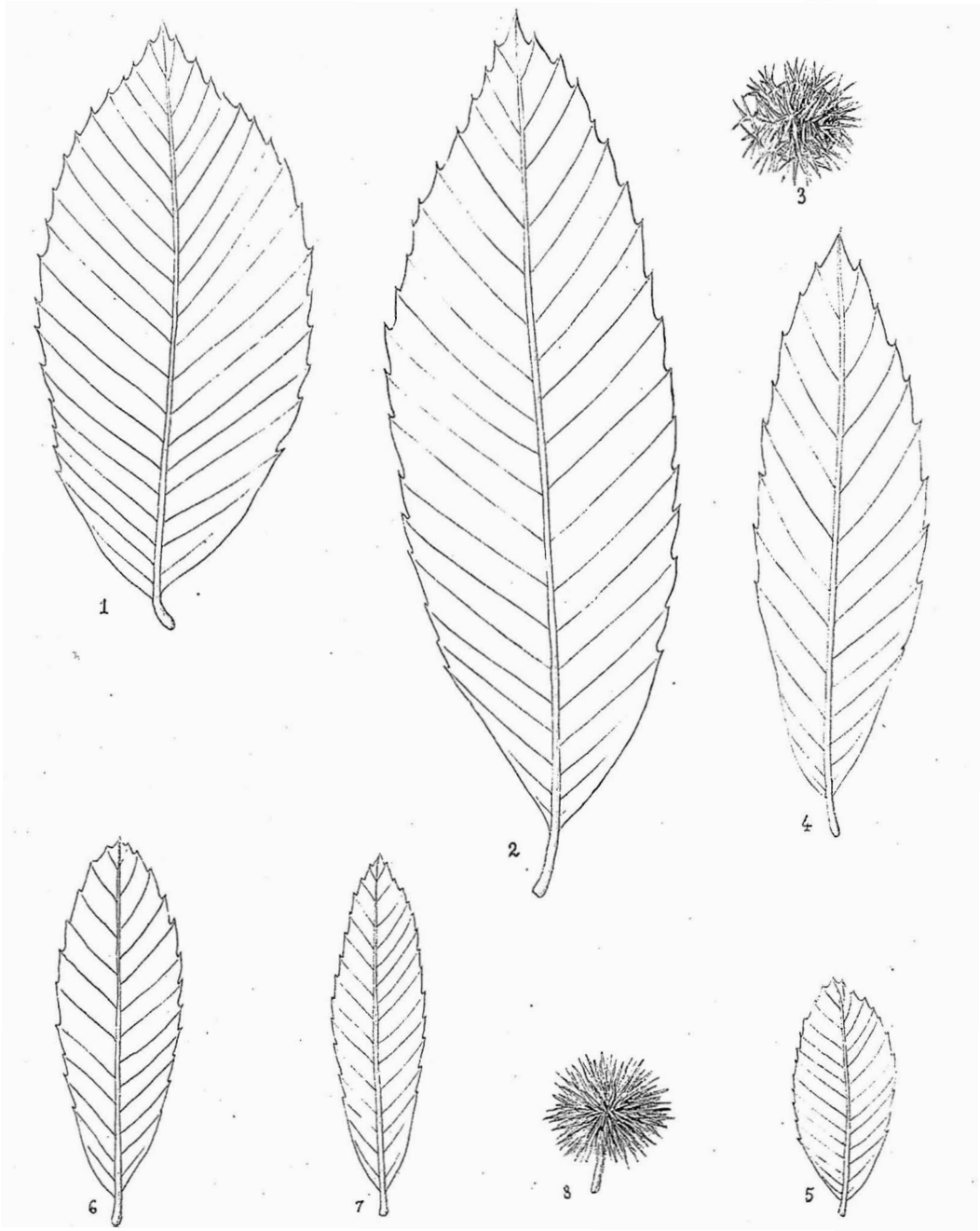
CASTANEA DAVIDII Dode



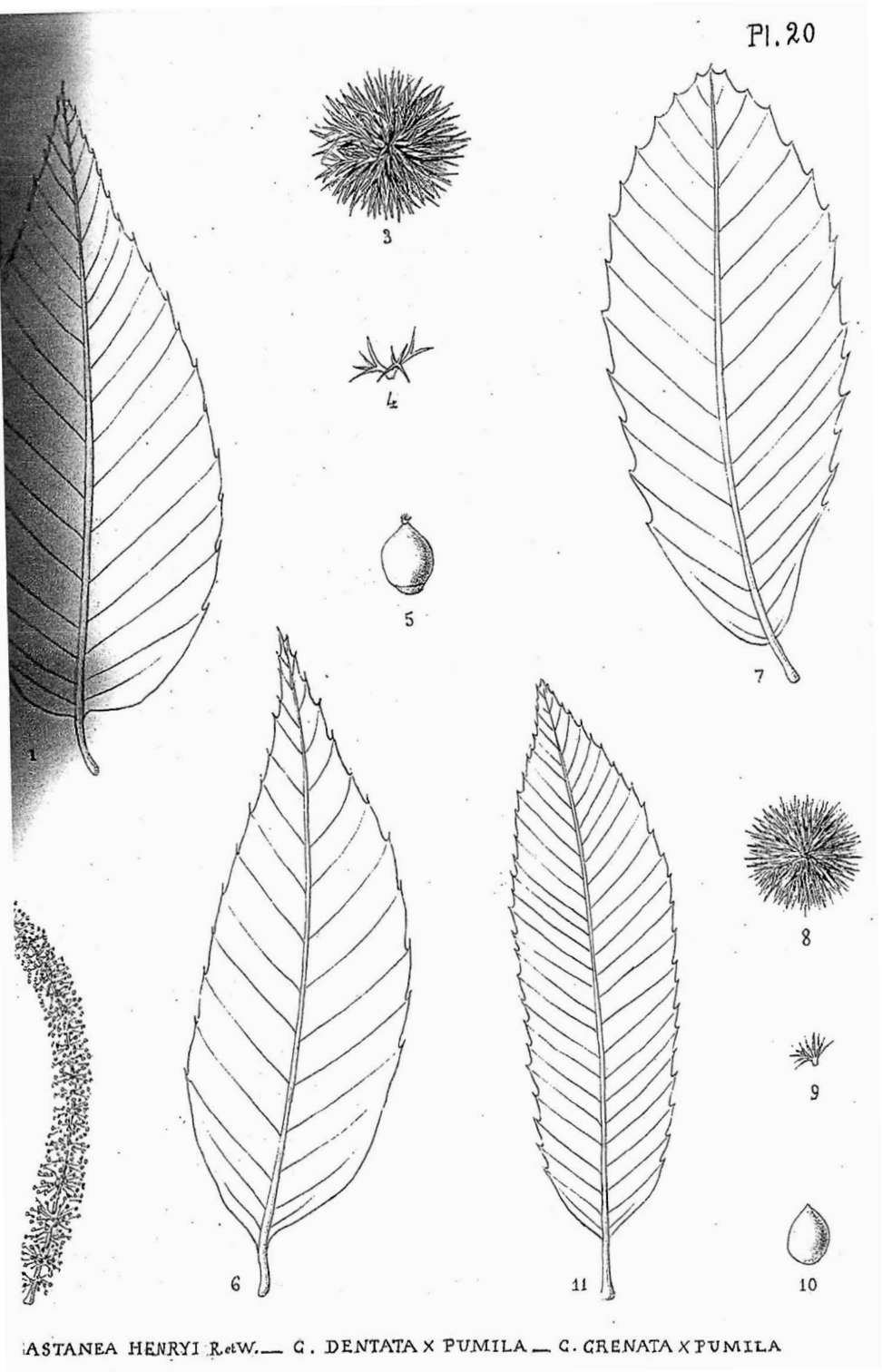
GASTANEA SEGUINII Dode



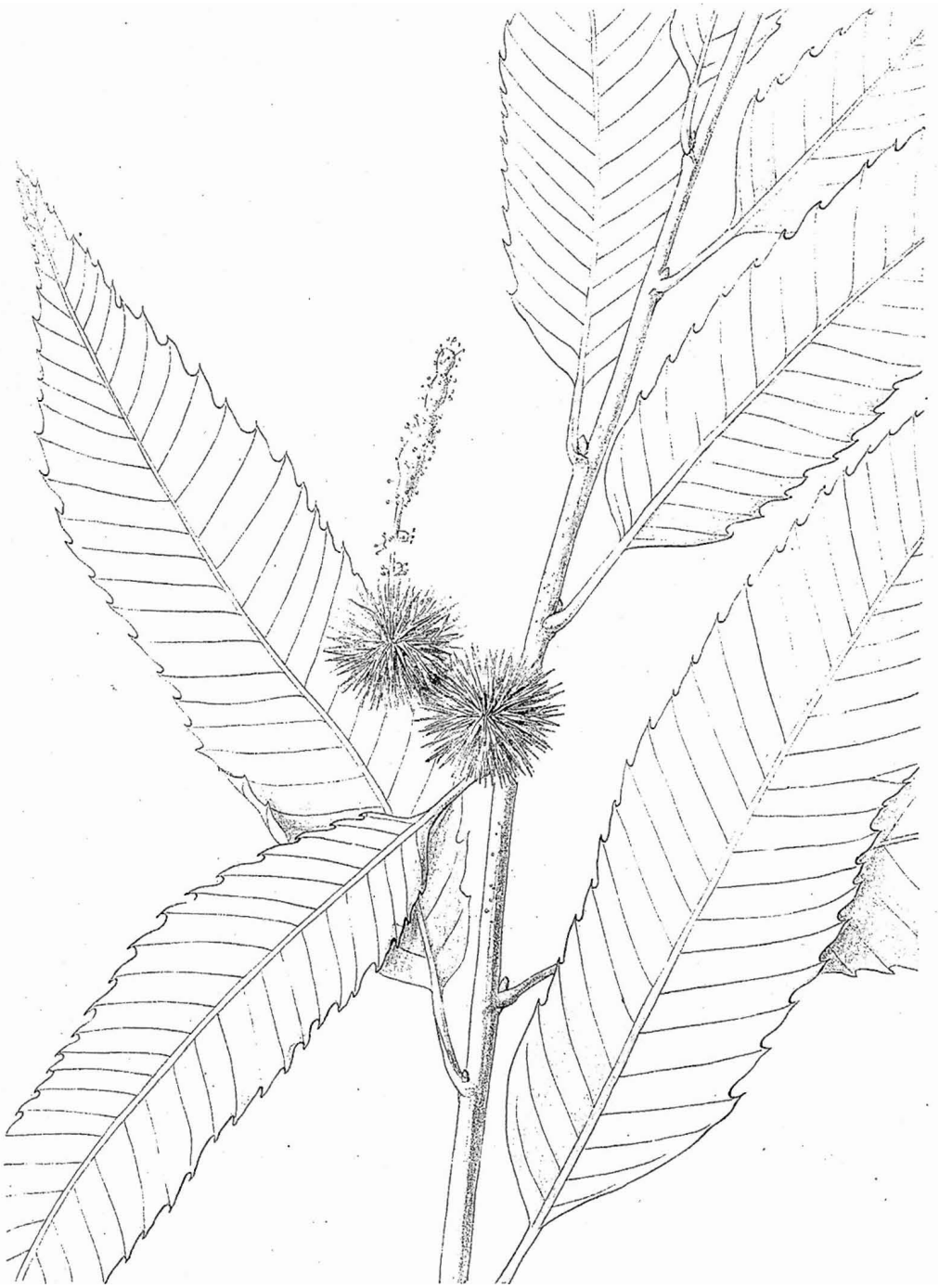
CASTANEA PUMILA Miller



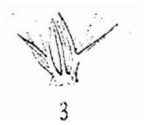
CASTANEA PUMILA Miller var. ___. C. ALNIFOLIA Nutt.



CASTANEA HENRYI R.etW.— C. DENTATA X PUMILA — C. GRENATA X PUMILA

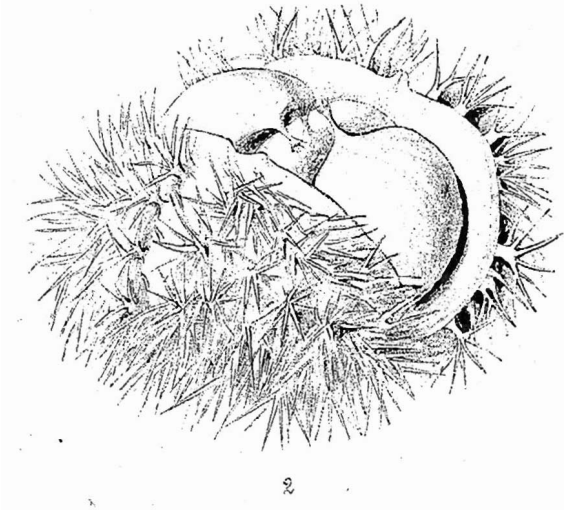


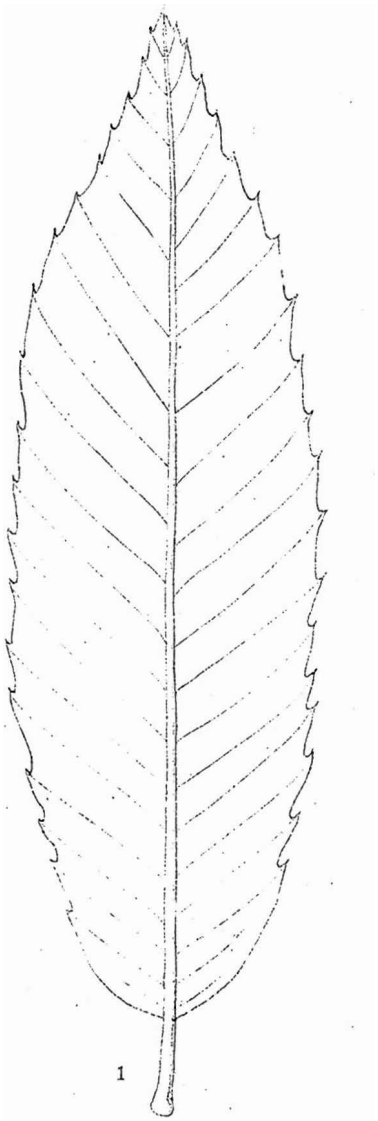
CASTANEA CRENATA X SATIVA

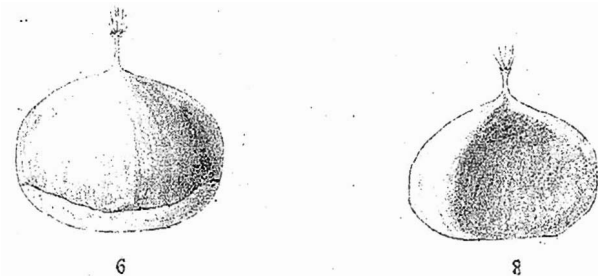

3


4

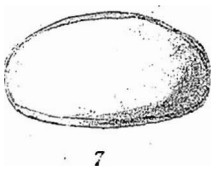

5

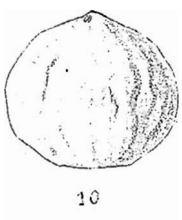

2

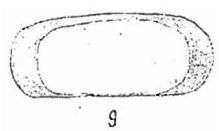

1


6

8


7


10


9

CASTANEA CRENATA X SATIVA

Plate I - C. sativa Miller

1. Diagram of a "group" of 7 male flowers : B, b, B are bracts.
2. Schematic figure of a "group" of male flowers. A bipartite cyme with contracted peduncle (7 flowers.
3. Diagram of a 3 flowered "group" of female flowers.
4. Schematic figure of a "group" of three female flowers.
5. Schematic of a cupule (future burr) containing three flowers.
6. Transverse section through part of the primary root (radical) of a plant 15 cm ta
7. Schematic diagram of a primary root (radical) (transverse section) which is very ya
8. Transverse schematic diagram of a secondary root primordium arising in a young primary root (radical). v
9. Schematic diagram of a transverse section of a young stem
10. Transverse section of the internal cortex of a branch, this tissue containing crystals.
11. Transverse section of the branch phloem of a branch.
12. Transverse section of the medullary pith of a branch.
13. Transverse section of the secondary xylem of a branch. X 25.
14. Tangential section in the secondary xylem of a branch. x 100.
15. Radial section of the secondary xyem of a branch. x100.
16. Wood fiber (xylem fiber) isolated from a branch. x100.
17. Tyloses in a vessel in secondary xylem. x 10
18-22. Secretory hairs (glandular) of a young branch.
23-27 "Regular" hairs of a young branch.

Plate II C. sativa Miller

1. Schematic diagram of a transverse section passing through the base of a cotyledon of a developing plant.
2. Glandular hairs of a cotyledon
3. Schematic diagram of a transverse section passing through the base of a petiole of a leaf.
4. Schemati- diagram of a transverse section passing through the "summit" of a petiole of a leaf.

5. Schematic diagram of a transverse section passing through the "middle" of the midrib (mid vein).
6. Schematic diagram of a transverse section passing through the base of a secondary vein.
7. Transverse section of the blade of a leaf.
8. Upper epidermis of a leaf.
9. Lower epidermis of a leaf.
10. Schematic diagram of a transverse section of the tooth of a leaf.
11. ~~Schematic~~ Transverse section of the edge of a leaf (not a tooth of one).

12-17 Secretory hairs of the upper epidermis of a young leaf

18-23 Secretory hairs of the lower epidermis of a young leaf.

24, 25 Secretory hairs of the upper epidermis of a stipule.

26-28 Secretory hairs of the lower epidermis of a stipule.

29. "Regular" hair isolated from the lower epidermis of a leaf.
30. Stellate hair from the lower epidermis of a leaf.
31. Transverse section in the interior of a very large anther (bur)
32. Schematic diagram of a transverse section in the interior of a large cupule
33. Schematic diagram of a transverse section in a style (one "branch")
34. Transverse section in the region where the "branches" of a style separate
35. ~~Secretory hair from a spike of a bur.~~
35. Schematic diagram of a transverse section in the middle of a spike of a bur.
36. Secretory hair of a spike of a bur.
37. Transverse section in the inside of the pericarp of an adult fruit
38. Transverse section in the integument of a seed x 100.
39. Transverse section of part of a cotyledon x 100.
40. Starch grains of a fruit of the Garde-Freinet variety.

Plate III C. dentata (Marsh) Borkh.

1. Schematic diagram of a transverse section passing through the base of a petiole.
2. Transverse section passing through the "summit" of a petiole.

3. Section passing through the middle of a midrib.
4. Schematic diagram of a transverse section of a secondary vein.
5. Cells of the upper epidermis of a leaf blade (no veins).
6. Secretory hair of the upper epidermis of an adult leaf.
7. Secretory hair of the lower epidermis of an adult leaf.
8. Stellate hair of the lower epidermis of a leaf before it has completely developed.
9. Transverse section of a leaf blade.
10. Transverse section of a leaf blade which is very thin.
11. Schematic diagram of a transverse section through the edge of a leaf.
12. Schematic diagram of a transverse section of a tooth of a leaf.
13. Transverse section of the edge of a leaf (possibly the tip?)

C. crenata Sieb. & Zucc.

14. Cells of the internal cortex; transverse section
15. Schematic diagram of a transverse section passing a little above the base of the petiole.
16. Schematic diagram of a transverse section of the summit of a leaf.
17. Schematic diagram of a transverse section passing through the middle of a midrib.
18. Schematic diagram of a transverse section of a secondary vein.
19. Schematic diagram of a transverse section of the edge of a leaf.
20. Transverse section of a leaf.
21. Single hair of a petiole.
22. Cells of the upper epidermis of a leaf.

23. Secretory hair of the upper epidermis of a young leaf, profile view.
24. Secretory hair of the upper epidermis of a young leaf, view from above.
25, 26. Secretory hair of the lower epidermis of a young leaf
27, 28, 29 "Regular" hairs of the lower epidermis of a leaf
30. Secretory hairs of the lower epidermis of a young leaf.

Plate IV C. mollissima Blume

1. Stellate hair of the stem.
2. Schematic diagram of a transverse section of the base of a ~~leaf~~ petiole.
3. Schematic diagram of a transverse section of the summit of a leaf.
4. Schematic diagram of a transverse section of a secondary vein of a leaf.
5, 6, 7. Secretory hair of the upper epidermis of the midrib.
8 Cells of the upper epidermis of a leaf showing the base of a "regular" hair.
9, 10. Regular hairs of the lower epidermis of a vein.
11–18. Secretory hairs of the upper epidermis of a young leaf.
19–25. Secretory hairs of the upper epidermis of an adult leaf.
26. Secretory hair of the lower epidermis found over a secondary vein of an adult leaf.
27. Stellate hair of the lower epidermis of a leaf.
28. Schematic diagram of a transverse section passing through the base of ~~the~~ a tooth of a leaf.
29. Schematic diagram of a transverse section passing through the summit of a tooth of a leaf.
30. Schematic diagram of a transverse section passing through the middle of one of the spines on a bur; the ark of the fiber bundle envelops the vascular bundles.
31. A few fibers of this ark-like fiber bundle in transverse

32-34. Figures in box are C. Davidii Dode.

Plate V

1-17. C. Sequinii Dode

18-27. C. Alnifolia Nutt

Plate VI C. Pumila Miller

1. Schematic diagram of a transverse section of a base of a petiole.
2. " " " " " of a summit of a petiole.
3. " " " " " passing through the middle of the midrib and two veinlets.
4. Schematic diagram of a transverse section passing through a secondary vein.
5. " " " " " passing through the edge of a leaf.
6. Transverse section of a leaf blade showing a bifid hair.
7. Secretory hairs of the lower surface of the midrib.
8. Cells of the upper epidermis of a leaf.
9. Base of hairs of the upper epidermis.
10. Hairs of the upper epidermis.

11-25. C. Henryi Rehder & Wilson.

Key To The Abbreviations Used in the Plates

B, Xylem (bois) C, collenchyma; cl, wall (cloison); Cp, cupule, bur; Cr, crystal (of Ca oxylate); Cs, cells with liquified secondary walls; Ec, cortex (écorce); End, endodermis; Ep, epidermis; Ee, external epidermis; Ei, internal epidermis; Es, superior epidermis; F, fibers; Fil, phloem fibers (fibres libériennes); Fl, vascular bundles (faisceux libéro-ligneux; G, gelatinized (?) epidermis (épiderme gélifié); H, hypodermis; L, phloem ~~sieve tube element~~ (liber); M, pith; Mi, internal pith (?); Pa, parenchyma; P, pericycle; Pd, periderm; Pl, palisade cells; Pi, thin walled uncolored parenchyma; Pp, pericarp; R, ray; Rp, multiseriate ray (rayon pluriséné); S; sclerified cell; Sb, cork (liège); Tl, lacunar tissue; V, vessel.

Leave

Petiole. Initial (Pl II, f. 3). — Elongated section. Sub-epidermal collenchyma with very thick walls. Cortical parenchyma containing extremely numerous {~~wide-meshed mats~~ twin ~~star~~ crystals (macles), and, in the int. part, some sclerites with thick walls, grouped between the moristeles, the median formed from 5 fascicles. Very few above the initial one, libero-ligneous fascicles, ~~irregular~~ arranged in rings. — Characteristic (Pl. II, f. 4). Slightly elongated section. Epidermis having short structural ~~hairs~~ and secretory hairs like those of the limb. Collenchyma and parenchyma like {below lower. Peridesm in an extremely thick ring, formed of fibres with very thick walls. More or less interrupted libero-ligneous ring surrounding a libero-ligneous fascicle, int. elongated, more or less continuous, furnished with infraphloem fibres with thick walls. Pith int. formed of cells with thick walls

~~Median Middle~~

Midrib. Base - Biconvex section. On both surfaces collenchyma with slightly thick walls, extending a little on the {~~sides~~ limbus leaf blade p 54 to the upper surface. Oxaliferous parenchyma. Peridesm and lib.-lign. ring same as on the summit of the petiole. — Center (Pl II, f. 5). Biconvex section, abruptly ~~curved~~ bulging above. Collenchyma and parenchyma like {lower part below. ~~Peridesm~~ Thick peridesm. Lib.-lign. system more or less interrupted, especially the middle fascicle; phloem containing numerous {~~wide-meshed mats~~ twin crystals of oxalate of calcium; lignified vessels and parenchyma; no fibres with thick walls. Pith int. formed of ~~small~~ cells with thin and lignified walls; sometimes a few fibres of the phloem in the int. lib.-lign fascicle.

Secondary ribs (Pl. II, f. 6). - Biconvex section. Collenchyma with thin walls on both surfaces; parenchyma containing some twincrystals on the inferior surface. Peridesm formed of fibres with thick walls. Lib.-lign. ring with interrupted phloem. Int ~~Int~~ pith relatively large, formed of cells with thin walls.
- Nervilles with smooth sections; peridesma with slightly thick walls attached to the epidermis by some lignified tissue or by colorless parenchyma with thin walls.

Parenchyma of the {limbus / leaf blade (Pl. II, f. 7). - Thickness = 160-180 μ. Upper epidermis glabrous in the adult stage, ~~length~~ ~~of~~ 18-20 μ {high / deep, formed of cells reaching a diagonal measurement of 40-50 μ, with recticurvilinear? ~~rectiurvilignes~~ latitudinal lat. walls, ordinary ~~midiocre~~ (pl. II, f. 8), with ordinary ~~midiocre~~ ext. walls, not perceptibley bulging. On the young leaves, upper epidermis having numerous glandular hairs, pedicels, with multicellular top, rounded or wider than tall, ord. 8-cellular, with contents colored more or less by acetic orcanet. Tissue palisade-like in 2 layers, 1 towards the edge of the {limbus / leaf ~~limbus~~ blade, the upper {depth / height of 25-30 μ. Lacunose tissue rather loose, containing some twin crystals. Inferior epidermis 8-10 μ {high / deep, formed of cells of rather unequal size, sometimes attaining a diagonal measurement of 60-70 μ, with latitudinal thin walls, undulating (pl. II, f. 9), with ext. thin walls, slightly bulging, having secretory hairs with multicellular tops, with dividing walls less numerous than in those of the upper epidermis, often lacking in the adult leaves, and ~~double or [illegible]~~ structural hairs single, double or in bundle ~~fasc~~ sometimes reaching 500-750 μ, when they are single, 250-300 long when they are in threes or fours, at first numerous

then ~~not~~ rare or lacking in the adult stage; stomata 25-30 μ long, numerous. — Edges of the {limbus / leaf blade} (Pl. II, f. 11) strongly {bent backward / recurved}. Marginal epidermis with little cells furnished with an ext. bulging wall, of medium thickness. Several layers of collenchyma with thin walls; no hypodermis extending on the {limbus / leaf blade}. — Teeth (Pl. II, f. 10). Base of the tooth formed by a {limbus / leaf blade} 150 μ thick towards the center and 90 μ towards the edge. Epidermis with ext. wall thicker than on the {limbus / leaf blade}. There is a palisade-like layer and some lacunose tissue. This {limbus / leaf blade} is traversed by a developed midrib, with flat-convex or concave-convex sections, with a lib.-lign. fascicle in an arc which is attached to the upper epidermis formed of little cells with ext. wall bulging and thin, by some lignified cells and to the lower epidermis by a sclerified arc and 3-4 layers of collenchy. ~~with~~ sometimes having thin walls. Towards the edge, on ~~both~~ each side, one sees a nerville with fascicle hardly developed and abundant support tissue. At the very edge, the epidermis is formed of cells a little smaller, with ext. walls slightly thick. Under the epidermis there are several layers of water-bearing tissues.

Stipules. — Epidermis having numerous capitate secretory hairs (pl. II, f. 24 and 25).

Key

p.38

Anatomy

A. Secretory hairs furnished with ordinary horizontal and vertical dividing membrane on the top.

a.) Secretory hairs rare on the lower surface of the adult leaves; top sometimes as wide as tall; teeth of the leaves traversed by 3 libéro - ligneous fascicles.

Young branches furnished with numerous structural (?) and secretory hairs; secretory hairs of the leaves usually with rounded top ..... 1. *C. sativa*

Young branches with rare structural and secretory hairs; secretory hairs of the leaves rarer than in *C. sativa*, with the top rounded at the summit, attenuated at && ..~ALL ..... 2. *C. &'LA.*~