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# ILLUSTRATIONS

OF THE

# GENUS CAREX.

BY

FRANCIS BOOTT, M.D.,

TREASURER OF THE LINNEAN SOCIETY.

PART THIRD.

TAB. 311-411.

~~~~~  
"The men, who labour and digest things most,  
Will be much apter to despair than boast."

ROSCOMMON.



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## ILLUSTRATIONS

OF

## THE GENUS CAREX.

## PART III.

251. *C. filicina* (Nees); spica elongata fusco-rubra, e spicis partialibus pluribus laxis duplicato-pinnatim vel supra-decompositis rarius singulis, inferioribus plerumque geminis remotis longe inæqualiter exserte pedunculatis erectis, ramis divaricatis, ambitu triangulari; spiculis oblongis divaricatis, apice flosculis masculis 4–12 imbricatis, basi fœmineis pluribus, demum plus minus dissitis, instructis; bracteis latis foliaceis culmo brevioribus; stigmatibus 3; perigyniis ovalibus vel ellipticis triquetris, pallidis vel rarius ferrugineo-maculatis, plus minus longe subulato-rostratis divaricatis arcuatim deflexis, rostro glabro vel ad margines sæpe sparsim dentato, ore integro postice oblique secto ferrugineo membranaceo, glabris, rarius superne sparsim scabris 2–4-nervatis, squama ovata obtusiuscula mutica vel mucronata dorso scabra rubro-fusca longioribus.—*C. filicina*, Nees, *apud Wight*, p. 123. *C. meiogyna*, Nees, *l. c.*

HAB. In montibus temperatis et subtropicis Indiæ borealis et australis, 4–10,000 ped., *Wallich*, *Royle*, *etc.* In montibus Nilghiri, *Wight*. Ceylonia, *Walker*. In Java, *Horsfield*. (TAB. CCCXI.–CCCXVIII.)

*Culmus* 1½–5-pedalis, validus, lævis; pars spicas gerens 1–3 pedes longa. *Folia* 4–8 lin. lata, firma. *Spicæ* partiales singulæ, plerumque geminæ, inæquales, plus minus amplæ, 1½–6 poll. longæ, 1–2½ poll. latæ; ramis divaricatis; rachi scabra. *Spiculæ* 3–8 lin. longæ, 1½–2 lin. latæ, inferne plerumque demum laxifloræ. *Squamæ* masculæ lanceolatae, 4–12, imbricatae, muticae, glabrae: fœmineæ inferiores, scabrae, nunc mucronatae, ovatae, obtusiusculæ, vel lanceolatae, acuminatae. *Perigynium* pallidum, glabrum vel superne et ad margines rostri scabrum: superiora recta: inferiora demum plerumque dissita, divaricata, arcuatim deflexa: ore ferrugineo, membranaceo, postice alte oblique secto: 1½–2 lin. longum,  $\frac{4}{10}$ – $\frac{5}{10}$  lin. latum: rostro plus minus longo,  $\frac{3}{10}$ –1 lin. longo: nervis marginalibus magis prominentibus, inter margines sitis. *Achenium*  $\frac{8}{10}$  lin. longum,  $\frac{4}{10}$ – $\frac{5}{10}$  lin. latum, conforme, basi styli persistente obliqua, apice disco circulari ampliata, basi decidua, clavata.

This is a common species, and in its fullest development is one of the most beautiful of the paniculate group, sometimes 5 feet in

height, with large lax spreading panicles of a dark chestnut colour. It varies in its inflorescence, not only from the size, but the diffuseness of its partial spikes, and the degree of compactness in the arrangement of the florets in the spiculæ, depending partly on the various stages of development in the specimens we see in herbaria, or upon locality. When the development is mature, the spiculæ generally elongate and become lax-flowered. Nees founded his *C. meiogyna* upon young specimens, “spiculis basi laxe squamosis; squamis masculis pluribus;” but I cannot find anything constant in these characters. Taken arbitrarily, with the shorter rostrum of the perigynium, they might be considered a variety, though there are intermediate forms which would not rank under it. The perigynium varies in the length of the rostrum, is often glabrous, or more or less scabrous above and at the margins of the rostrum. The female squamæ are small, not often mucronate, unless it be the lower ones, which are also often scabrous. In specimens from the Peninsula of India and Ceylon they are lanceolate and acuminate and smoother.

Should *C. meiogyna* be considered by Indian botanists hereafter as distinct, the essential characters will be found in the more lax partial spikes, the more elongate lax-flowered spiculæ, and the perigynium with a shorter rostrum. As we see the plants in our herbaria, most of them are not mature, and hence the inflorescence is more compact, and especially in those clearly referable to *C. filicina*, not one of which from Herb. Wight, on which the species was founded, is fully mature, and the spiculæ consequently have not attained their full length, nor are they so lax-flowered as they would be in maturity. I have figured several specimens, which will enable others to understand the species and its variations.

Tab. CCCXI. A specimen from Myrung, *Dr. Hooker*; with compact female florets, and the rostrum  $\frac{8}{10}$ –1 line long, the male florets few and inconspicuous. In Herb. Wight, with the same elongated rostrum, both those characters are modified, the male florets as numerous as they are said to be in *C. meiogyna*.

Tab. CCCXII. A specimen from Saureem, *Dr. Hooker*; the male florets more distinct, and a shorter rostrum. The obliquity of the permanent base of the style, I think, depends on the arched decurvation of the rostrum, not perceptible in the upper perigynia, which are straight.

Tab. CCCXIII. A specimen from Fagu, *Dr. Thomson*; with single partial spikes, scabrous squamæ, and smooth perigynium, and lax-flowered spiculæ. The base of the style is often oblique.

Tab. CCCXIV. Specimens from Mussooree, *Royle*, n. 82, on which Nees founded his *C. meiogyna*. The right-hand specimen has more male florets than the other.

Tab. CCCXV. The two lower spikes, the upper one of which is

geminate, from Annandale, *Edgeworth*. The spiculæ are more or less lax-flowered, and the rostrum varies from  $\frac{3}{10}$  to  $\frac{6}{10}$  line long.

Tab. CCCXVI. The two lower spikes of a specimen from Kathi, *Strachey and Winterbottom*; fully mature, most of the perigynia fallen. The spiculæ elongate and lax-flowered, and the perigynium scabrous. This roughness is generally limited to the upper part of the perigynium, and is very inconstant. This specimen exhibits the character of *C. meiogyna* as Tab. CCCXI. does that of *C. filicina*.

Tab. CCCXVII. A specimen from Lachen, *Dr. Hooker*; depauperate in all its parts.

Tab. CCCXVIII. Small specimens, found in "woods, Lachen, 7-9000 ft." by *Dr. Hooker*, in some respects connecting *C. filicina* with *C. cruciata*, of *Nees*. Larger specimens from "Nyrung," *Hooker*, equally pale, with yellowish etiolated leaves, have the more composite inflorescence and the squamæ of *C. filicina*; the perigynium (occasionally more obtusely triquetrous) with a longer or shorter rostrum, the direction of which is straight or arched downwards.

On a review of the specimens referable to this species, of which I have seen some hundreds, I think it may aid the observations of others by briefly alluding to the principal characters of its various forms.

*typica*; inflorescentia fusco-rubra decomposita, ramis spiculisque divaricatis; flosculis fœmineis contiguus, masculis paucioribus, rostro elongato; foliis latis.

*meiogyna*; spiculis demum elongatis; flosculis fœmineis dissitis, masculis sæpe pluribus; rostro brevior.

*pallida*; inflorescentia foliisque lutescenti-pallidis angustioribus.

*minor*; omnibus partibus depauperatis.

252. *C. cruciata* (*Nees*); spica elongata pallida decomposita, e spicis partialibus subduplicato-pinnatim compositis, superioribus congestis, inferioribus remotis longe exserte pedunculatis, mediis geminis inæqualibus, ramis oblique erectis; spiculis obliquis apice parce masculis basi laxè fœmineis, bracteis culmo longioribus, vaginis superne scabriusculis; stigmatibus 3; perigyniis ovalibus triquetris plus minus longe rostratis, ore integro plus minus obliquo nunc emarginato, vel bilobulato, pallidis glabris, rostro ferrugineo ad margines sparsim dentato, nervatis obliquis vel excurvis, squama ovata deorsum longius hispido-aristata, dorso scabra ciliata fulva lineolis ferrugineis notata longioribus latioribusque.—*C. cruciata, a, Nees, apud Wight, p. 123. (TAB. CCCXIX., CCCXX.)*

HAB. In Himalaya temperata et subtropica, 4-7000 ped. Nipal, *Wallich*. Mussooree, *Royle, n. 86, etc.* Khasia, *Griffith, Hooker*. Shaidevi in Kunawur?, *Strachey and Winterbottom*. Kursing, *Dr. Hooker*.

*Culmus* gracilis, lævis. *Folia* 4-6 lin. lata, flaccida, glabra, apice solum infraque scabriuscula. *Bracteæ* 2-4 lin. latæ. *Vaginæ* superne et extus pulverulento-scabriusculæ. *Pedunculi* graciles, scabri. *Spiculæ* graciles, laxæ, terminales apice flosculis masculis 3-5, basi fœmineis 7-12 alternis instructæ. *Squamæ* masculæ angustiores, mucronatæ vel superiores muticæ, laxæ: fœmineæ inferiores longe hispido-aristatæ, obtusæ vel emarginatæ: superiores longiores, acutæ. *Perigynium*  $1\frac{2}{10}$ -2 lin. longum, (rostro  $\frac{2}{10}$ - $\frac{3}{10}$  lin. longo,)  $\frac{2}{10}$  lin. latum, pallidum, rarius punctis ferrugineis notatum: ore ferrugineo, membranaceo, integro, obliquo: rostro ad margines plus minus sparsim dentato. *Achenium* (cum stipite  $\frac{2}{10}$  lin. longo)  $1\frac{2}{10}$  lin. longum, plus  $\frac{4}{10}$  lin. latum, ellipticum, fuscum, angulis pallidioribus, basi styli persistente, apice ampliata, apiculatum. *Stylus* conicus.

*Nees* described his *C. cruciata, a*, from specimens of *Wallich*, from Nipal, and of *Royle*, from Mussooree, both of which I have in my herbarium. He quotes *Wahlenberg* for the species, though *Wahlenberg's* plant was a native of Canton, and probably the *C. Bengalensis* of *Roxburgh*.

I doubt if *C. cruciata* will be found separable from *C. filicina*. It looks like a variety growing in woods, in which *Strachey and Winterbottom* found it. It is distinguished by its pale colour, laxer and less compound inflorescence; the branches of the spikes and spiculæ obliquely erect; the occasional longer arista of the lower female squamæ, which are sometimes emarginate and ciliate; the variable orifice of the perigynium, which is never arched downward; the slight roughness of the bracteal vaginæ; and the more flaccid leaves.

But I cannot say that all these characters are constant, and it must be left to future observers in India to determine how far different localities affect the plants of this very puzzling group.

The specimens figured are—

Tab. CCCXIX. A specimen from "Shadevi Woods, 6000 ft.," from *Strachey and Winterbottom*.

Tab. CCCXX. One from *Kursing*, from *Dr. Hooker*.

253. *C. amœna* (*Boott*); spica oblonga ferruginea, e spicis partialibus ovatis densis duplicato-pinnatim compositis rarius mediis geminis, superioribus congestis infima vel inferioribus breve exserte pedunculatis subremotis; spiculis brevibus densifloris apice parce masculis, bracteis angustis culmo longioribus, vaginis superne scabridis; stigmatibus 3; perigyniis ellipticis triquetris excurvis longe rostratis, ore obliquo bilobato, glabris vel rostro ad margines sparsim dentato, nervatis ferrugineis, squama lanceolata acuminata deorsum longius aristata glabra vel carina scabra ferruginea longioribus latioribusque.—*C. amœna, Boott. C. cruciata, β, Nees, l. c. p. 123. (TAB. CCCXXI.)*

HAB. Penins. Ind. orient. Nilghiris, *Wight, n. 1917. Madras, Dr. Hooker*.

*Culmus*  $\frac{1}{2}$ - $1\frac{1}{4}$ -pedalis, gracilis, lævis; pars spicas gerens 3-7 poll. longa. *Folia* 1-2 lin. lata, culmo breviora, rigida, infra scabra, marginibus revolutis. *Vagina* infima 6-10 lin. longa, superne scabrida. *Spicæ* partiales 10-12 lin. longæ, 6 lin. latæ: inferiores 2-3 poll. remotæ. *Squamæ* omnes lanceolatæ, aristatæ, masculæ laxæ. *Perigynium* 2-2 $\frac{2}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum (rostro 1-1 $\frac{2}{10}$  lin. longo): ore obliquo, bilobato, rarius integro. *Achenium*  $\frac{2}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum, basi styli persistente et decidua æquali.—In uno flosculo achenium hexagonum, stigmatibus sex!

A *C. cruciata, a*, *Nees*, differt inflorescentia brevior, magis compacta, ferruginea; spiculis brevioribus, congestis, densifloris; squamis angustis, lanceolatis; perigyniis longius rostratis, basi styli æquali; culmo brevior; foliis rigidis, angustis, infra scabris, marginibus revolutis.

*Nees* described his *C. cruciata, β*, from an imperfect specimen of *Wight's*, exhibiting only the upper portion of the spike. I have an entire specimen from *Wight*, with which others brought from *Madras* by *Dr. Hooker* agree, and one of which I have figured; the orifice of the perigynium I suspect is normally entire, and that its bilobed character depends upon a rupture on the protrusion of the stigmata.

254. *C. ramosa* (*Schkuhr*); spica elongata glauco-ferruginea, e spicis partialibus laxis pinnatim vel duplicato-pinnatim compositis, ambitu ovato, superioribus contiguus, inferioribus remotis longe exserte pedunculatis, mediis geminis; spiculis patulis subpaucis apice flosculis masculis 3-6, basi fœmineis pluribus laxè imbricatis;

bracteis inferioribus culmo longioribus; stigmatibus 3; perigyniis ovalibus trigonis glaucis punctis ferrugineis sæpe notatis scabris nervatis rostratis demum arcuatim deflexis contiguis, ore obliquo integro vel bilobato ferrugineo membranaceo, squama ovata aristata ferruginea striato-nervosa scabra ciliata subæquilata longioribus.—*C. ramosa*, Schk. f. 204; Willd. 247; Kunth, 507. *C. cruciata*,  $\beta$ , Nees (ex parte), Herb. Arnott. *C. Mercariensis*, Hochstetter (Herb. Hooker). (TAB. CCCXXII.)

HAB. Mauritius, Schk., Bojer (Herb. Hooker). Penins. Ind. Orient., Courtallum, Wight, n. 998, 1293 (Herb. Boott). Prope Mercara (Hochst.).

*Culmus* bipedalis, gracilis, lævis; pars spicas gerens 8–16 poll. longa. *Folia* 2–3 lin. lata, linearia, culmo longiora, glauco-viridia. *Bractea* inferiores 1–3 lin. latæ, 1–1½-pedales: superiores setaceæ. *Spiculae* divaricatæ, bractcolis longis setaceis sæpe suffultæ. *Squamæ* ferrugineæ vel fulvæ, lineolis ferrugineis notatæ: masculæ lanceolatæ, acutæ, glabræ: femineæ aristatæ, scabræ, ciliatæ. *Perigynium* 1½ lin. longum, ¾ lin. latum, rostro ¼ lin. longo: ore sæpius bilobato: laciniis ferrugineis obtusis subinde ciliatis, scabrum. *Achenium* 1½ lin. longum, ¾ lin. latum, triquetrum, stipitatum, fusco-purpureum, angulis pallidioribus, basi styli æquali depresso-curvata, stipite tortuosa.

I have alluded to the *C. ramosa*, Schk., at p. 102, inferring from his figure, and from a specimen from the Mauritius (Bojer) in Herb. Hooker, that it was distinct from the *C. crinigera* of Bourbon. The specimen I have figured, Tab. CCCXXII., is from Courtallum, in the peninsula of India, sent to me by Dr. Wight. It agrees in all essential points with Bojer's plant from the Mauritius. The roughness of the perigynium, its ferruginous spots, the peculiar depressed and tortuous base of the style and stipes of the achenium, and the squamæ, are the same in both. It is evident from a specimen in Herb. Arnott, that Nees was in doubt about it, and eventually referred it to his *C. cruciata*,  $\beta$ . The specimen 1½ lin. longum, ¾ lin. latum has a ticket on which the name of "*C. filicina*" is scored out, and is followed by "*meiogyne, cruciata,  $\beta$* ." As Nees had no mature perigynia to his *C. meiogyne*, he must have referred the specimen in question, which has them, to his *C. cruciata*,  $\beta$ .

*C. ramosa* differs from *C. amœna* in longer culm, bracts, and inflorescence, broader leaves, scabrous glaucous perigynia, the arched direction of the shorter rostrum, and the tortuous base of the style and stipes of the achenium.

255. *C. vesiculosa* (Boott); spica elongata laxa ferruginea, e spicis partialibus subduplicato-pinnatim compositis remotis, ambitu lanceolatis, inferioribus longe exserte pedunculatis geminis inæqualibus nutantibus; spiculis oblongis apice flosculis masculis pluribus in ramulis 3–6 spiculiferis subsessilibus remotis insidentibus; bracteis culmum subæquantibus; stigmatibus 3; perigyniis ellipticis triquetris rostratis scabris nervatis ferrugineis rectis, ore demum bifido sæpe antice alte fisso, squamam oblongo-ovatum mucronatam glabram ferrugineam æquantibus.—*C. vesiculosa*, Boott. (TAB. CCCXXIII.)

HAB. In montibus Khasiæ, Wallich, Griffith, Hooker.

*Culmus* 2–2½-pedalis, gracilis, lævis, rigidus, basi vaginis foliorum reticulato-fissis tectus; pars spicas gerens 10–15 poll. longa. *Folia* 1–2 lin. lata, culmo breviora, rigida, carinata, supra vesiculis apiculatis sæpe attritis (basi cava circulari demum solum extante), infra punctis indentatis notata. *Spicæ* partiales 2–3 poll. longæ, 6–8 lin. latæ. *Pedunculi* inferiores inæquales, scabri, 4–6 poll. longi, filiformes. *Spiculae* 4 lin. longæ, 1 lin. latæ, contiguæ. *Squamæ* conformes. *Perigy-*

*nium* 1½ lin. longum, ½ lin. latum. *Achenium* 1½ lin. longum, ½ lin. latum, triquetrum, stipitatum, basi styli decidua bulbosa.

Variat inflorescentia magis compacta, spiculis longioribus, ramulis spicarum longius pedunculatis.

This species was first found by Gomez (Herb. Wallich), in 1829, at Chirra Pungee, a specimen being figured in Tab. CCCXXIII. It has since been sent from the Khasia Mountains by Griffith and Dr. Hooker. It is generally too young for a satisfactory character of the perigynia. In some of Wallich's specimens the inflorescence is more compact, and in some of Griffith's the spiculæ are 6–7 lines in length, with the lower rami of the spikes pedunculate. The perigynium is occasionally deeply cleft.

256. *C. Cumingiana* (Steudel); spica elongata gracili laxa olivaceo-ferruginea, e spicis partialibus parvis oligostachyis sæpius compositis singulis vel geminis, inferioribus remotis longe exserte setaceo-pedunculatis erectis; spiculis apice flosculis masculis pluribus ovatis sæpe solitariis in apicem pedunculorum contiguis sessilibus; bracteis superioribus spicis suis longioribus; stigmatibus 3; perigyniis ovalibus trigonis demum turgidis valide nervatis rostratis divergentibus superne scabris marginibus dentatis olivaceis ferrugineo-punctatis, squama ovata acuta vel obtusa emarginata hispido-aristata nervata glabra vel superne scabra ferrugineo-punctata longioribus vel subæquantibus.—*C. Cumingiana*, Steud. Synop. p. 206. *C. rhizomatosa*, Steud. l. c.

HAB. Ins. Philipp., Manilla, Cuming, n. 1795 (Herb. Hooker). Assam (Herb. Hooker), Ins. Sumbawa, Zollinger, n. 3447. Ind. Orient., in ripas fluv. Burrampooter, prope Gowhatty, Booth (ex Herb. Nuttall, Herb. Boott). (TAB. CCCXXIV., CCCXXV.)

*Radix* fibris longis lignosis. *Culmus* 1–1½-pedalis, gracilis, rigidus, lævis, basi reliquiis capillaccis nigris foliorum tectus; pars spicas gerens 4–12 poll. longa. *Folia* 1–1½ lin. lata, culmo breviora, plana. *Bractea* brevis, superiores culmum paulo superantes: infima spicâ suâ longior vel brevior. *Pedunculi* filiformes, scabri, longe exserti: infimus subinde 5-pollicaris. *Spicæ* partiales oligostachyæ, superiores congestæ, sessiles, e spiculis 3–5 compositæ: inferiores remotæ, singulæ vel geminatæ, rarius monostachyæ, plerumque 2–3-stachyæ, vel e geminis una monostachya, altera composita. *Spiculae* 4–5 lin. longæ, in apicem pedunculorum sessiles, basi flosculis femineis 3–6 patentibus, apice masculis pluribus imbricatis, instructæ. *Squamæ* omnes aristatæ, ut folia, bractea, vagina, perigynia, punctis ferrugineis notatæ. *Perigynium* 1½ lin. longum, ¾ lin. latum. *Achenium* 1½ lin. longum, ¾ lin. latum, ovale, triquetrum.

I see no essential difference in the specimens from the Philippine and Molucca Islands, and those from Assam and the banks of the Burrampooter river. The last, sent to me by the late Mr. Nuttall, collected by Mr. Booth, are the more mature, and the perigynia are more turgid, smoother, with a less deep and less acute orifice. I cannot explain the difference in the descriptions of Steudel's species. That of *C. Cumingiana* is correct. I have figured, Tab. CCCXXIV., the plant of Zollinger, from Sumbawa, from the Herb. Mus. Paris, through the kindness of M. Spach; and in Tab. CCCXXV. the plant from the Burrampooter. It has no affinity with *C. gracilis*, Br. (*C. lachnosperma*, Wallich), as Steudel asserts it has.

257. *C. impunctata* (Boott); spica elongata gracili laxa rubro-ferruginea, e spicis partialibus 4–5 ovatis pinnatim vel subduplicato-pinnatim compositis, mediis ge-

minis, inferioribus longe exserte pedunculatis; spiculis oblongis apice masculis; bracteis spicas suas subæquantibus; stigmatibus 3; perigyniis ellipticis triquetris fusco-rubris scabris impunctatis marginibus ciliatis paucinervis rectis vel excurvis plus minus longe rostratis, ore bilobato, squama ovata acuta vel obtusa mucronata fusco-rubra angustioribus longioribus.—*C. impunctata*, *Boott.* (TAB. CCCXXVI.)

HAB. In Java, *Zollinger*, n. 2563 (*Herb. Mus. Paris*).

*Rhizoma* tortum, lignosum, repens. *Culmus* subpedalis, gracilis, scaber; pars spicas gerens 7 poll. longa. *Folia* sublineam lata, culmo breviora, rigida, carinata, marginibus revolutis. *Bractea* superiores spicis breviores. *Spicae* partiales 6–8 lin. longæ, 4 lin. latæ: superiores contiguæ: mediæ geminæ: omnes simpliciter vel una alterave subduplicato-pinnatim compositæ. *Spiculae* 3–4 lin. longæ, alternatim contiguæ. *Squamæ* fœmineæ inferiores mucronatæ: masculæ acutæ, muticæ. *Perigynium* (vix maturum)  $1\frac{6}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum, ellipticum, plus minus rostratum: rostrum nunc anguste lineare, nunc e basi latiore sensim angustatum, bilobatum: lacinia obtusæ, ad margines membranaceæ, nervis ad facies 2–3 inæqualibus, marginibus e basi setose ciliatis. *Achenium* 1 lin. longum,  $\frac{3}{10}$  lin. latum, ellipticum, stipitatum, pallidum, basi styli apiculatum.

The more complex inflorescence, the bilobed impunctate perigynium, with its few slight nerves, distinguish this species from the preceding one. The specimen figured is from the Paris Herbarium, communicated by M. Spach.

I at one time thought that this species might be the *C. rhizomatosa*, Steudel, and that some mistake had been made in the number and habitat of the specimens in Herb. Steudel and Mus. Paris; but Steudel takes no notice of the roughness of the perigynium, so marked in *C. impunctata*, and his "spiculis pluribus dense aggregatis, superioribus masculis, inferioribus fœmineis," is at variance with *C. impunctata*, as it is with *C. Cumingiana*.

258. *C. setosa* (Boott); spicis 4–5 ferrugineis concoloribus cylindricis pedunculatis remotis, terminali mascula, reliquis fœmineis basi attenuatis nutantibus longe exserte pedunculatis, infima subinde basi composita; bracteis inferioribus longe vaginatis spicas subæquantibus vel iis brevioribus; stigmatibus 3; perigyniis oblongo-ovalibus rostratis stipitatis plano-triquetris enerviis glabris vel superne scabris marginibus setis longis e basi ciliatis ferrugineis, ore oblique fisso bidentato, squama lanceolata obtusa truncata vel emarginata vel acuta mutica vel mucronata paulo longioribus.—*C. setosa*, *Boott.* (TAB. CCCXXVII.)

Var.  $\beta$ ; spicis angustioribus brevioribus erectis; squamis muticis, abrupte vel sensim apiculatis, vel obtusis emarginatis, vel nervo centrali superne hispido excurrente; perigyniis scabris. (TAB. CCCXXVIII.)

Var.  $\gamma$ ; spica mascula laxiflora; squamis inferioribus longissime valideque cuspidatis, fœmineis latis truncatis emarginatis cuspidatis. (TAB. CCCXXIX.)

HAB. In Himalaya orientali temperata. Sikkim, 8–12,000 ped., *Dr. Hooker*.

*Culmus* sesquipedalis, lævis, inter spicas scaber; pars spicas gerens 7–11 poll. longa. *Folia* lineam lata, culmo breviora. *Bractea* vaginata. *Pedunculus* infimus 4–5 poll. longus, filiformis, superne scaber. *Vagina* infima bipollicaris. *Spica mascula* 16–20 lin. longa, 1–2 lin. lata: fœmineæ 16–24 lin.

longæ, 2–2½ lin. latæ, basi attenuatæ: infima basi spiculis 1–2 brevibus subinde composita. *Squamæ* masculæ longiores, nervo centrali scabro, infra rarius extra apicem excurrente. *Perigynium*  $1\frac{6}{10}$ – $\frac{7}{10}$  lin. longum,  $\frac{5}{10}$  lin. latum, rostro antice interdum scabro. *Achenium*  $\frac{8}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum, plano-subtriquetrum, stipitatum, pallidum, basi styli apiculatum.

This species belongs to the *Ferrugineæ* group, varying in the degree of roughness on the perigynium, but especially in the form of the squamæ. It is distinguished from *C. hæmatostoma* by its rostrate nerveless perigynium. All Dr. Hooker's specimens were from Lachen.

259. *C. celsa* (Boott); spicis 4 oblongo-cylindricis contiguis fusco-ferrugineis concoloribus, terminali majore androgyna basi mascula, reliquis fœmineis, superioribus sessilibus, infima breve pedunculata; bractea evaginata subulata culmo breviora; stigmatibus 3; perigyniis ovalibus triquetris sensim longiuscule rostratis, ore obliquo bifido, pallide viridibus glabris vel rostro ferrugineo superne dentato plus minus leviter nervatis membranaceis, squama ovata obtusa vel acuta fusco-ferruginea nervo pallido angustioribus longioribusque.—*C. celsa*, *Boott.* (TAB. CCCXXX.)

HAB. In Nipalia, *Herb. Wallich*, n. 3393.

*Culmus* 3-pedalis, triquetrum, gracilis, superne scaber, inferne foliatus, basi rudimentis foliorum ferrugineo-purpureis vaginisque fibrillatis tectus; pars spicas gerens subbipollicaris. *Folia* 1–1½ lin. lata, culmo breviora, plana. *Bractea* infima spiculâ ejus paulo longior vel brevior, evaginata; altera abbreviata: auriculis purpureis, amplis. *Pedunculus* 2–5 lin. longus, scaber. *Spica* terminalis 10–12 lin. longa, 2 lin. lata, basi subdimidiatim vel brevius mascula: fœminæ minores. *Squamæ* conformes: masculæ persistentes, longiores. *Perigynium*  $1\frac{6}{10}$ – $\frac{6}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum. *Achenium*  $\frac{7}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum, ovale, triquetrum, punctulatum, ferrugineum. *Stylus* insertus.

Habitus et aspectus *C. parvibracteata*, Nees, quæ (affinis *C. obscura*) differt culmo breviora, foliis elongatis, spicis 5 inferioribus remotis, perigyniis erostris, ore integro, squamis obtusis ciliatis, stylo exserto.

I have only seen this species in the herbarium of Dr. Wallich. Nees takes no notice of it. It belongs to the *Melananthæ* of Drejer. The specimens of *C. parvibracteata* in Herb. Royle, are young, I suspect not separable from *C. obscura*. The erostrate perigynium, with its entire orifice, sufficiently distinguish it from *C. celsa*.

260. *C. longifolia* (Brown); spica longissima, e spiculis 10–14 pluribusve stramineis cylindricis, superioribus singulis masculis 2–3 sessilibus contiguis, vel 4 infima remota exserte pedunculata, reliquis fasciculatis biquinatis remotis longissime exserte pedunculatis pendulis, superioribus vel omnibus, apice vel basi, vel apice et basi masculis vel sterilibus vel omnino fœmineis; bracteis vaginatis foliaceis elongatis; stigmatibus 3, longis; perigyniis oblongo-ellipticis utrinque attenuatis plano-triquetris rostratis bifidis demum bilobis nervatis marginibus serratis (sub lente) scabridis vel glabris pallidis vel ferrugineis, squama pallide ferruginea margine late albohyalina obtusissima rotundata vel emarginata cuspidata angustioribus longioribusque.—*C. longifolia*, *Brown*, *Prod.* 242; *Kunth*, 472. *C. Brownei*, *Steud. Syn.* 209. (TAB. CCCXXXI.)

HAB. In Australia, *Brown*. In Tasmania, *Gunn*, *Archer* (*Herb. Hooker*).

*Culmus* 4-5-pedalis, obtusangulus, lævis, rigidus; pars spicas gerens nunc 3-pedalis. *Folia* 2-3 lin. lata, plana. *Bractea* longissimæ, vaginatae, spicis suis rarius culmo longiores. *Vagina* infima 2-3 poll. longa. *Pedunculi* filiformes, scabri, inæquales: inferiores quandoque 12-15 poll. longi. *Spicae* masculæ singulæ, erectæ, 1-2 poll. longæ, 1 lin. latæ, reliquæ 1-2 poll. longæ, 3-4 lin. latæ, fasciculatæ (rarius singulæ), inæquales, plerumque medio fœmineæ. *Squamæ* conformes. *Perigynium*  $2\frac{3}{10}$ - $3\frac{2}{10}$  lin. longum,  $\frac{7}{10}$ -1 lin. latum, in specimenibus Australiæ scabridum, rubro-ferrugineum, resinopunctatum: in iis Tasmaniæ glabrum, marginibus scabris, pallidum. *Achenium*  $1\frac{3}{10}$  lin. longum,  $\frac{7}{10}$  lin. latum, ovali-vel obovato-triquetrum, ferrugineum, angulis pallidis punctulatum, basi styli curvata apiculatum; in uno specimine (e Tasmania) racheolâ lineari  $\frac{3}{10}$  lin. longâ apice ferrugineâ instructum.

Var.  $\beta$ . *minor*; spicis 3-6 singulis brevibus, superioribus ima basi masculis; foliis abbreviatis.

HAB. In Tasmania, *Gunn*, *Archer* (*Herb. Hooker*). Coal River, Australia, *Richmond* (*Herb. Hooker*). (TAB. CCCXXII.)

I have seen but few Australian specimens of this fine species. Those from Tasmania in no other respects differ than in the smoothness and pale colour of the perigynium. The habit is the same in both.

I have no hesitation in referring the var.  $\beta$  to the typical form, especially as I see in *Herb. Hooker* specimens from the Coal River having simple spikes, with others bearing fasciculate ones; and in a more mature specimen from Tasmania, given to me by Mr. Archer, since the specimen from Gunn, Tab. CCCXXII., was engraved, I find the size of the perigynium ( $3\frac{2}{10}$  lin. long.,  $\frac{9}{10}$  lin. lat.) agrees with the typical form. We observe the same variation in simple and fascicled spikes in other species, as in *C. Cherokeeensis* and *C. elata*. In Tab. CCCXXXI. I have figured a scabrous perigynium from Australia, the specimen there figured being from Tasmania.

261. *C. Raoulii* (Boott); spicis 5-7 ovalibus vel cylindraceis densifloris approximatis e stramineo-subpurpureis, terminali longiore basi conspicue mascula, reliquis ima basi masculis sessilibus evaginatibus vel infima quandoque remota breve exserte vel inserte pedunculata; bracteis inferioribus longissimis; stigmatibus 2; perigyniis obovatis vel ovalibus late rostrellatis bifidis vel bifurcatis compressis purpureis crebre pallideque nervosis inter nervos scabris marginibus ciliato-serratis subcoriaceis, squama obtusa vel emarginata longe hispido-cuspidata decolori membranacea angustioribus (cuspidate) brevioribus.—*C. Raoulii*, *Boott in Hooker, Fl. N. Zealand*, p. 283. (TAB. CCCXXXIII.)

HAB. Akaroa, New Zealand, *Raoul*, n. 208 (*Herb. Hooker et Herb. Mus. Paris*).

*Culmus* 1-2-pedalis, gracilis, firmus, apice scaber; pars spicas gerens 3-7 poll. longa. *Folia* 2 lin. lata, culmo longiora. *Bractea* nisi infima evaginatae, culmum longe superantes. *Vagina* 3-4 lin. longa. *Spica* terminalis 1-1½ poll. longa, basi subdimidiatim mascula: reliquæ ima basi masculæ, 4-12 lin. longæ, 3-4 lin. latæ. *Squamæ* conformes, stramineæ, tenues, margine hyalinæ, apice subinde ciliolatae. *Perigynium*  $1\frac{4}{10}$ - $1\frac{5}{10}$  lin. longum,  $\frac{8}{10}$  lin. latum, intus (dempto achenio) præcipue purpureum. *Achenium*  $\frac{8}{10}$  lin. longum,  $\frac{6}{10}$  lin. latum, lenticulare, orbiculatum, basi productum.

A *C. testacea*, B., differt spicis omnibus basi masculis, perigyniis obovatis scabris, bracteis longioribus latioribus, culmo validiore.

I am indebted to M. Spach for the figures drawn from specimens in the Paris Herbarium.

262. *C. Jamesoni* (Boott); spica atro-purpurea laxa, e spicis partialibus approximatis, extremis singulis, mediis fasciculatis geminatis ternatisque, inferioribus partim compositis, inæqualiter longe pedunculatis nutantibus, infima longissime bracteata; spiculis pluribus inæqualibus apice masculis; stigmatibus 3; perigyniis lanceolatis glabris vel ovalibus cylindrico-rostratis, rostro inter margines dentato, bidentatis, ore obliquo ciliato, nervatis atro-purpureis, squama lanceolata mucronata purpurea margine albo-membranacea brevioribus angustioribus.—*C. Jamesoni*, *Boott, Lin. Tr.* 20, 124. (TAB. CCCXXXIV.-CCCXXXVII.)

HAB. In America australi. Columbia in montibus ad alt. 13,000 ped., *Jameson* (*Herb. Hooker*). Paramo de Cuchero and de Ruiz, *Purdie* (*Herb. Hooker*). Tunguragua. Escudador, 9-10,000 ped., *Spruce* (*Herb. Bentham*).

Var.  $\beta$ ; spiculis elongatis gracilibus longe pedunculatis. (TAB. CCCXXXV.)

Var.  $\gamma$ ; perigyniis ovalibus, rostro dentato. (TAB. CCCXXXVI., CCCXXXVII.)

*Culmus* 3-4-pedalis, triquetrum, validus, scaber, basi vaginis longis foliorum amplectentibus atro-purpureis reticulato-fissis tectus; pars spicas gerens 6-12 poll. longa. *Folia* 3-4 lin. lata, culmum æquantia, rigida, carinata. *Bractea* basi purpureæ: infima nunc  $2\frac{1}{2}$  pedes longa, breve vaginata, sursum demum squamæformes. *Pedunculus* infimus  $3\frac{1}{2}$  poll. longus, scaber, vel inferiores 4-6 poll. longi. *Spicae* partiales superiores, subsessiles, singulæ sæpe congestæ: proximæ geminatae, simplices: mediæ ternatæ: infima singula quæ et in quoque fasciculo una longior, spiculis minoribus 1-5 composita. *Spiculae*  $\frac{1}{2}$ -3 poll. longæ, 1-4 lin. latæ: omnes apice extremo masculæ. *Squamæ* conformes. *Perigynium* lanceolatum, glabrum,  $2\frac{1}{2}$  lin. longum,  $\frac{4}{10}$  lin. latum: vel ovale,  $1\frac{6}{10}$ - $\frac{7}{10}$  lin. longum,  $\frac{6}{10}$  lin. latum, rostro basi inter margines dentato. *Achenium*  $1\frac{1}{10}$  lin. longum,  $\frac{3}{10}$ - $\frac{4}{10}$  lin. latum, oblongum, triquetrum, pallidum, sæpe indentatum, basi styli æquali recta vel depresso-curvata. *Stigmata* 3; stylo inserto.

This species varies in the more or less lax and compound inflorescence, in the breadth of the spiculæ and form of the perigynium, but I can find nothing constant to justify a specific difference. There is a transition from the lanceolate to the oval form in the perigynium, and the roughness between the margins of the rostrum in the var.  $\gamma$  is not always observable. The achenium is the same in both forms of the perigynium, for the indentation and the depressed base of the style are accidental.

The affinity is with *C. Boryana*, Schk.

Tab. CCCXXXIV. is a specimen of Purdie's from the Paramo de Cuchero.

Tab. CCCXXXV. Var.  $\beta$ , one of Purdie's from Valleseta, on the road to the Paramo de Ruiz.

Tab. CCCXXXVI. Var.  $\gamma$ , from the same locality as the last; the base of the rostrum occasionally rough.

Tab. CCCXXXVII. Var.  $\gamma$  is a specimen of Spruce, from Tunguragua.

263. *C. Borbonica* (Lamarek); spicis 4-5 sanguineo-ferrugineis concoloribus approximatis erectis vel cernuis, terminali mascula vel basi mascula, reliquis fœmineis

oblongo-cylindricis basi attenuatis sessilibus vel brevi exserte pedunculatis; bracteis inferioribus vaginatis angustis culmum subæquantibus; stigmatibus 3; perigyniis ellipticis plano-triquetris rostratis bifurcatis superne marginibus scabris nervatis subinflatis sanguineis vel pallidis maculatis membranaceis, squama lanceolata acuta rarius emarginata cuspidata longioribus vel cuspide brevioribus.—C. Borbonica, *Lam. Ency.* iii. 387 (1789); *Willd.* 267; *Schk. p.* 55; *Spreng.* 817; *Kunth.* 522. (TAB. CCCXXXVIII.—CCCXL.)

HAB. In Ins. Bourbon, *Commerson, Boivin* (*Herb. Mus. Paris*).

*Culmus* 1½-pedalis, triqueter, lævis, inter spicas scaber, validus, rigidus, basi foliosus, sursum foliis vaginantibus munitus; pars spicas gerens 2–3 poll. longa. *Folia* 1–3 lin. lata, culmo paulo breviora, plana, carinata, striata, erecta, rigida, acuta: basi involuta purpurea. *Bractea* angustæ, inferiores vaginatæ, culmo subinde paulo longiores, 1–2 steriles, 2–4 poll. remotæ, longius vaginatæ. *Vagina* infima 6–9 lin. longa. *Pedunculi* 3–12 lin. longi. *Spica* terminalis mascula, pollicaris, 2 lin. lata, sessilis: vel basi subdimidiatim mascula, vel basi et apice mascula vel sterilis, pedunculata, 18–21 lin. longa: reliquæ fœmineæ, 10–22 lin. longæ, 3–4 lin. latæ, acutæ: infima interdum 2 poll. remota. Infra spicam terminalem subinde adsunt flosculi fœminei 1–2 alterni, quasi rudimenta spicarum. *Squamæ* conformes, sanguineo-ferrugineæ, rarius emarginatæ. *Perigynium* 2 $\frac{7}{10}$  lin. longum,  $\frac{7}{10}$ – $\frac{8}{10}$  lin. latum, achenium laxè vestiens. *Achenium* 1 $\frac{1}{10}$  lin. longum,  $\frac{6}{10}$  lin. latum, oblongo-ovatum vel ellipticum, triquetrum, fuscum, punctulatum, basi styli recta vel curvata apiculatum.

I am indebted to M. Spach for specimens of this plant, collected by Boivin in the Isle of Bourbon. Notwithstanding the evident difference in the breadth and length of the leaves and bracts, I doubt the specific distinction of the following species. The presence of sterile bracts in *C. Borbonica* would suggest the probability of spikes being occasionally developed in them, and the inflorescence would then be similar to that of *C. Simensis*. No dependence can be placed on the position of the male florets. The perigynia are alike, varying in the degree of roughness at the margins.

264. *C. Æthiopica* (Schkuhr); spicis 4–5 cylindricis e viridi castaneis, masculis 1–3, fœmineis superioribus masculæ contiguis, suprema nunc ima basi mascula, inferioribus remotis longe exserte pedunculatis cernuis; bracteis inferioribus vaginatis late foliaceis culmo longioribus; stigmatibus 3; perigyniis ellipticis plano-triquetris subinflatis rostratis bifidis nervatis pellucide demum sanguineo-maculatis pallidis glabris vel superne marginibus subscabris, squama ovata emarginata cuspidata medio late viridi nervata lateribus castanea apice ciliata longioribus vel brevioribus.—*C. Æthiopica*, *Schk. Z. fig.* 83, p. 107 (1801, *excl. pl. Retz*); *Boott, Lin. Tr.* xx. 146. *C. lævigata*, *Wahl. Act.* 153; *Willd.* 295; *Smith, Eng. Bot.* (1804); *Schk. Nachtr. p.* 74 (1806); *Smith, Eng. Fl.* 122 (1828); *Kunth.* 493; *non Smith, Lin. Tr.* v. 272 (1799). *C. iridifolia*, *Kunth.* 492 (1837). *C. Simensis*, *Hochst. Unio Itin.* 1842, n. 1180; *Richard, Fl. Abyss.* ii. 514. (TAB. CCCXLI.—CCCXLIV.)

HAB. In Africa. Cape of Good Hope, *Thunberg, Cafferland, Gill, Uitenhage, Zeyher* (*Herb. Hooker*). Georgetown, *Dr. Alexander Prior*. Ruigtevaleey, ad fluvium, *Drége*. In Abyssinia! in pratis humidis montis Bachit, supra fines arborum et fruticum, *Schimper*, 1838;

et ad montem Roahit, 11,000 ped., *Schimper*, 1851 (*Herb. Mus. Paris*).

*Culmus* 2-pedalis, lævis, apice scabriusculus, basi foliosus; pars spicas gerens 7–15 poll. longa. *Folia* 3–6 lin. lata, culmo longiora, plana, glauco-viridia. *Bractea* inferiores 4 lin. latæ, culmo longiores, vel angustiores eo breviores, vaginatæ. *Vagina* 8 lin. ad 3 poll. longæ. *Pedunculus* infimus 2–7 poll. longus. *Spica* 1–3 poll. longæ, 2–4 lin. latæ: terminales 1–3 masculæ, vel summa subdimidiatim basi mascula: aliæ 1–4 ima basi masculæ, infima fœminea: vel inferiores 3–4 fœmineæ. *Squamæ* omnes vel acutæ vel truncatæ vel emarginatæ, plus minus longe cuspidatæ. *Perigynium* 2 $\frac{4}{10}$ – $\frac{8}{10}$  lin. longum,  $\frac{9}{10}$ –1 $\frac{1}{10}$  lin. latum, laciniis marginibusque plus minus scabris, rarius glabris. *Achenium* 1–1 $\frac{2}{10}$  lin. longum,  $\frac{6}{10}$ – $\frac{8}{10}$  lin. latum, ellipticum, basi productum vel obovatum, triquetrum, basi styli contorta apiculatum.

Schkuhr, in his Riedgr. p. 107 (1801), had been misled in referring his *C. Æthiopica*, which he received indirectly from Thunberg, to the Isle of Bourbon, as in his Nachtr. p. 74 (1806), he says that it was from the Cape of Good Hope. Wahlenberg, Act. Holm. 1803, excluding the native habitat, appears to have first quoted *C. Æthiopica* as a synonym to *C. lævigata*, Smith, in which he was followed by Smith in Eng. Bot. 1804, and by Willdenow in 1805, and eventually, though doubtingly, by Schk. in his Nachtr. 1806; and this error, notwithstanding the observations of Schkuhr, was persisted in by Smith, Eng. Flora, iv. 122 (1828), and by Kunth, Cyp. (1837). I first met with the plant in Herb. Hooker, where specimens from the Cape, collected by Gill and Zeyher, are found, and I have since been indebted to Dr. Alexander Prior for specimens he brought from the Cape. To my late friend Dr. Charles Lemann, I am indebted for specimens of *C. Simensis* from the Unio Itin., and to M. Spach, for others sent by Schimper as late as 1853. *C. iridifolia* is in Herb. Hooker, and M. Spach has furnished me with a note on the specimen in Herb. Mus. Paris. I have no doubt of the specific identity of the three plants, and I suspect when *C. Borbonica* is more known, it will be found inseparable, judging from the identity of its perigynium with that of the others. The distribution of the male florets is variable. In *C. Simensis* the terminal spike is male or male at base, as in *C. Borbonica*. In *C. Æthiopica* and *C. iridifolia* the terminal spikes 1–3 are male. The bracts in *C. Borbonica* contrast with those of *C. Æthiopica*, and the leaves are narrower and shorter; but in *C. Simensis*, which has long and broad leaves, the bracts are like those of *C. Borbonica*.

The specimens figured are Tab. CCCXLI. and CCCXLII. *C. Æthiopica*, from Dr. Alexander Prior; one young, to show the foliage.

Tab. CCCXLIII. and CCCXLIV. are Schimper's specimens of *C. Simensis* (1853).

265. *C. Boryana* (Schkuhr); spica elongata laxa e viridi sanguineo-ferruginea; spiculis pluribus cylindricis elongatis inæqualibus, omnibus apice masculis, vel summis 1–2 masculis, superioribus sessilibus congestis, inferioribus geminatis remotis longe exserte pedunculatis, nutantibus, una ex geminis simplici, altera basi spiculis 1–5 composita; bracteis inferioribus vaginatis foliaceis, infima culmum superante; stigmatibus 3; perigyniis ovalibus vel lanceolatis plano-triquetris rostratis bicuspidatis nervatis, marginibus superne plus minus scabris, pallidis vel sanguineo-tinctis pellucide demum sanguineo-maculatis membranaceis, squama lanceolata acuta rarius emarginata longe cuspidata latioribus, brevioribus vel æquantibus.—*C. Boryana*, *Schk. fig.* 191; *Kunth.* 506; *Spr.* 814. *C. subulata*, *Wahl. Act.* 152 (fide *Wahl. Fl. Lap.* 250). (TAB. CCCXLV.—CCCXLVII.)



*β. minor!*; spica abbreviata; spiculis paucis brevibus, superioribus sæpe masculis, omnibus singulis, simplicibus vel geminatis; culmo gracili; foliis bracteisque angustis.—*C. typhoides?* *Bory, Itin.* iii. 24. *Willd. Enum. Hort. Berl.* 954 (1809); *Kunth*, 506; *Spr.* 814. (TAB. CCCXLVIII., CCCXLIX.)

HAB. In Ins. Bourbon and Mauritius. Bourbon, *Sonnerat, Boivin, Richard*. Mauritius, *Bory*. Fernando Po, *Mann*.

*Culmus* 3-4-pedalis, lævis, basi foliosus; pars spicas gerens sesquipedalis. *Folia* 3-5 lin. lata, longissima. *Bracteæ* inferiores sæpe culmo longiores, vaginatae, sursum decrescentes, evaginatae, setaceae, demum squamæformes. *Vagina* infima sæpe 4 poll. longa. *Spiculæ* inæquales, 1-4 poll. longæ, 3½ lin. latae, basi attenuatae, laxifloræ: omnes androgynæ, plus minus apice masculæ, vel summæ 1-2 masculæ, singulæ; inferiores geminatae, quarum una simplex, altera basi spiculis 1-5 plus minus elongatis androgynis, nunc pæne omnino masculis composita. *Squamæ* conformes, sanguineo-ferrugineæ, rarius pallidæ; inferiores longius cuspidatæ. *Perigynium* 1-3 lin. longum, rarius lanceolatum, 3½-4 lin. longum, 6-9 lin. latum. *Achenium* obovatum, 9 lin. longum, vel ellipticum, 1-3 lin. longum, 5-7 lin. latum, triquetrum, fuscum, basi styli depresso-contorta apiculatum.

*C. Boryana* differt spiculis 5-20 vel pluribus, geminatis vel singulis, simplicibus vel ramosis, sublaxifloris vel sparsi-rarius densifloris, elongatis 4-pollicaribus multifloris, vel abbreviatis subpollicaribus paucifloris, nutantibus vel erectis, sanguineo-ferrugineis vel pallidis, omnibus apice masculis vel summa, rarius superioribus omnino vel pæne masculis; perigyniis 1-4 lin. longis, 6-9 lin. latis, ovalibus brevius rostratis vel lanceolatis longius rostratis plus minus alte bicuspidatis, laciniis divergentibus, ore interdum postice obliquo, glabris vel superne ad lacinias oris vel ad margines, vel ad unum marginem solum serrato-scabris, pallidis vel sanguineo-tinctis, semper (lucc subjectis) pellucide demum sanguineo-punctatis; achenio obovato 9 lin. longo, 7 lin. lato; vel elliptico 1-3 lin. longo, 5-9 lin. lato; squamis acutis, plus minus cuspidatis, rarius subtruncatis vel emarginatis apiceque dentatis; culmo valido vel gracili; foliis latis rigidis vel angustis gramineis.

I am indebted to M. Spach for the opportunity of examining a large suite of specimens of *C. Boryana* from the Herb. Mus. Paris, collected by Boivin and H. Richard in the Isle of Bourbon, and as in the case of *C. Kæstlini*, I could not see any abrupt transition from the more compound to the simple forms, and I cannot but believe that the *C. typhoides*, Bory, is referable to the latter. In none was the perigynium more than 3 lines long, but in a specimen from the Mauritius in Herb. Hooker it varies from 3½ to 4 lines in length. I have figured a perigynium from that specimen in Tab. CCCXLIX.

Tab. CCCXLV. the lower part, and Tab. CCCXLVI. the upper part, of a specimen of Richard.

The others from specimens of Boivin, all from the Isle of Bourbon.

Tab. CCCXLVIII. is the form like that found by Mann on "Clarence Peak, Fernando Po, 8500 ft. Dec. 1860" (Herb. Hooker).

266. *C. insularis* (Carmichael); spicis 7-9 cylindricis crassis approximatis ferrugineis, terminalibus 1-3 masculis arcte contiguis, foemineis deorsum longius pedunculatis, superioribus sæpe apice masculis contiguis evaginatibus, inferioribus pendulis, infima interdum remota longe exserte pedunculata; bractea infima lata vaginata, omnibus (inferioribus longe) culmum superantibus; stigmatibus 2; perigyniis ovatis breve rostratis acute bifidis,

plano-convexiusculis nervatis glabris membranaceis olivaceis, squama oblonga truncata vel acuta apice ciliata longe hispido-aristata rubro-ferruginea brevioribus.—*C. insularis*, *Carmichael, Lin. Tr.* xii. p. 508 (1818), "Carex spicis pluribus masculis foemineis pedunculatis," *Aubert du Petit Thouars, Fl. de Trist. d'Acugna*, p. 36, in *Mélanges de Botanique*. (TAB. CCCL.)

HAB. In Ins. Tristan d'Acunha, on the plain, *Car.*, *Pet. Thouars*.

*Culmus* 2½-pedalis, acute triqueter, scaber, validus, rigidus, basi foliosus; pars spicas gerens 9-12 poll. longa. *Folia* 6 lin. lata, culmo longiora, plana, rigida. *Bracteæ* foliaceæ: infima vel binæ inferiores vaginatae. *Vagina* ½-2½ poll. longæ. *Pedunculi* scabri: infimus 3½-6 poll. longus. *Squamæ* conformes, longe aristatae, masculæ majores. *Spica mascula* suprema 1½ poll. longa, 2 lin. lata; sæpe ad basin spiculis 1-2 brevibus arcte contiguis instructa. *Spica foemineæ* 2-2½ poll. longæ, 4-6 lin. latae: omnes pedunculatae. *Perigynium* 2-2¼ lin. longum, 8-10 lin. latum, subcompressum. *Achenium* 1 lin. longum, 6-7 lin. latum, late ovale, lenticulare, castaneum, basi styli apiculatum. *Stylus* supra basin contortus.

This species has escaped the observation of authors, though described in the Transactions of the Linnean Society nineteen years previously to the publication of the 'Cyperographia' of Kunth, Steudel, in his Synopsis, has not included it. Its affinity is with *C. paludosa*, Good., which occasionally has two stigmas. The transverse section of the perigynium in the Tab. CCCL. does not accurately show the plano-convex form.

267. *C. Wahuensis* (Meyer); spicis 2-6 cylindricis approximatis pallidis vel lutescenti-vel olivaceo-ferrugineis comosis stricte erectis, terminali mascula densiflora, foemineis subdimidiatim apice masculis crassis inserte vel exserte pedunculatis, infima subremota subinde radicali; bracteis vaginatis angustis plerumque culmo brevioribus; stigmatibus 3; perigyniis ellipticis vel obovatis obtuse inæqualiter trigonis rostratis bicuspidatis creberrime striato-nervosis, superne ad margines scabris, squama oblonga ovata obtusa emarginata longe hispido-aristata æquilata longioribus, cuspidate subduplo brevioribus.—*C. Wahuensis*, *Meyer, Cyp. Nov. Mem. Ac. St. Petersb.* i. 218. t. 10; *Kunth*, 515. (TAB. CCCLI.—CCCLIV.)

HAB. Ins. Wahu (Owhyee), *Meyer, Nuttall*; Ins. Atooi, *Nuttall (Herb. Boott)*. Sandwich Islands. Ins. Loochoo, *Wright (Herb. Gray)*. Simoda, Japan, *Wright (Herb. Gray)*. Port Hamilton, Korea, *Wilford (Herb. Hooker)*.

*Radix* fibrosa. *Culmus* 2½-24 pollices altus, rigidus, lævis vel scaber, basi foliosus, rudimentis reliquiisque fibratis foliorum atro-purpureis tectus; pars spicas gerens 2½-12 pollices longa. *Folia* ½-5 lin. lata, culmo longiora, rigida, marginibus revolutis, apice attenuata, curvata. *Bracteæ* vaginatae, sæpe spicas suas subæquantes, rarius culmo longiores. *Squamæ* conformes, pallidæ vel ferrugineæ. *Spica mascula* 1-3 poll. longa, 1½-3 lin. lata. *Spica foemineæ* plus minus longæ, apice masculæ, 1-3 poll. longæ, 3-5 lin. latae: infima interdum basi spicula altera brevi aucta. *Perigynium* 2-3 lin. longum, 8-10 lin. latum, pallidum vel olivaceum, demum purpureum lucidum. *Achenium* 1-2 lin. longum, 8-10 lin. latum, obovatum, obtuse triquetrum, angulis sæpe indentatum vel distortum, subinde abortivum, atro-purpureum, basi styli crassa depresso-

curvata. *Antheræ* (polline effuso) cineræ, spiraliter tortæ.—*Racheola* ligulata intus perigynium sæpe adest.

The specimens figured are,—

Tab. CCCLI. From Wahu or Owhyhee, from Nuttall. In one of the florets was a racheola, and the penultimate female spike has a small branch at base. These specimens contrast in size with the one figured by Meyer. I have others from the same locality  $3\frac{1}{2}$  inches high, with leaves only half a line in width.

Tab. CCCLII. A specimen from Port Hamilton, Korea, with a radical lower spike and normal achenium.

Tab. CCCLIII. From Port Hamilton, with broad leaves.

Tab. CCCLIV. From Loochoo; the bracts longer than the culm.

A *C. pumila*, Thunb. (*C. littorea*, Labill.), satis distincta, perigyniis obtuse triquetris bicuspidatis, margine scabris; squamis longe ligulato-hispido-aristatis; culmo altiore; nec vaginis foliorum culmum arctissime circumvolventibus; nec radice longe repente.

I can see nothing essentially distinct in the specimens of this species from its various remote localities. The achenium is generally more or less indented or distorted, occasionally abortive from the imperfect development of its nucleus. There is such an evident transition in the breadth of the leaves, that I have not thought it necessary to make the leaves a ground for varieties. Meyer's figure represents them as too flaccid. Steudel describes the female squamæ as *muticæ*, by an oversight.

268. *C. riparia* (Curtis); spicis sæpius 6–7 cylindricis densifloris erectis remotis, masculis 3–5 ferrugineis, foemineis 2–3 rarius 4 crassis olivaceis, superioribus sæpe apice masculis sessilibus, infima basi attenuata, nunc longe exserte pedunculata nutante; bracteis late foliaceis evaginatis, vel infima plus minus vaginata sæpe culmum superante; stigmatibus 3; perigyniis lanceolato-conicis vel obtuse trigonis rostratis bifurcatis crebre nervosis glabris olivaceis coriaceis, squama ovata cuspidata ferruginea sæpius longioribus.—*C. riparia*, Curtis, *Fl. Lond.*, etc.; *Muhl.* 259; *Elliott*, 554. *C. lacustris*, Willd. 306; *Schk. fig.* 152; *Kunth*, 489; *Schw. et Tor.* 369; *Torrey, Cyp.* 423; *Dewey*, x. 43; *Carey*, 530; *Sartwell, Exs. n.* 131. *C. exaltata*, *Peterm.*; *Steudel*, 237. *C. Chilensis*, *Brongn.*, *Kunth*, 420. *C. vacillans*, *Steudel*, 235. *C. incrassata*, *Schlecht. Linnæa*, x. 119; *Kunth*, 490; *Steudel*, 238. (TAB. CCCLV.)

HAB. In America Sept. et Merid., Canada to Florida. Chili, *D'Urville*; *Lechler*, n. 439. Montevideo, *St. Hilaire*. Brazil, *Gaudichaud*.

*Culmus* 2–3-pedalis, triqueter, validus, basi vaginis foliorum reticulato-fissis tectus; pars spicas gerens 1–18 poll. longa. *Folia* 3–5 lin. lata, reticulatim nodosa. *Bractea* infima interdum vaginata. *Spicæ masculæ*  $\frac{1}{2}$ –3 poll. longæ, extremæ longiores, 2–2 $\frac{1}{2}$  lin. latæ. *Spicæ foemineæ* 2–3 poll. longæ, 4–6 lin. latæ. *Perigynium*  $2\frac{2}{10}$ – $3\frac{1}{2}$  lin. longum,  $\frac{2}{10}$ –1 lin. latum, bifurcatum, dentibus plus minus longis. *Achenium*  $1\frac{2}{10}$ – $\frac{4}{10}$  lin. longum,  $\frac{7}{10}$  lin. latum, ellipticum, utrinque acutum, triquetrum, flavidum, basi styli curvata.

*C. lacustris* differs in no essential respects from the *C. riparia* of Europe and Asia. There is scarcely a single character in the one that may not be found in the other. *C. lacustris* is generally paler, with longer and narrower perigynia, the squamæ shorter and less cuspidate, and the vaginæ of the lower leaves more uniformly reticulate. But there is nothing constant in these characters in either plant.

I find, in 35 specimens of *C. riparia*, Curt.:

|                  |                |                  |
|------------------|----------------|------------------|
| 1 with 3 spikes. | 4 with 2 male. | 2 with 2 female. |
| 4 " 5 "          | 10 " 3 "       | 15 " 3 "         |
| 8 " 6 "          | 14 " 4 "       | 13 " 4 "         |
| 11 " 7 "         | 3 " 5 "        | 1 " 5 "          |
| 10 " 8 "         |                | 1 " 6 "          |
| 1 " 9 "          |                |                  |

In 1 all the spikes were female.

- 1 the terminal spike was basi mascula.
- 2 the terminal spike was basi et apice mascula.
- 10 the upper female spike was apice mascula.
- 2 the 2 upper female spikes were apice masculæ.
- 5 all the females were apice masculæ.
- 2 the lower females were basi compositæ.

1 the lower female had a peduncle 8 inches long.

The lower bract occasionally with a vagina  $\frac{1}{2}$ –2 poll. long.

The perigynium  $2\frac{2}{10}$ –3 lin. long.,  $\frac{7}{10}$ – $1\frac{2}{10}$  lin. lat.

The achenium  $1$ – $1\frac{4}{10}$  lin. long.,  $\frac{5}{10}$ – $\frac{8}{10}$  lin. lat., ellipticum vel obovatum, basi styli curvata vel contorta flavidum.

In 38 specimens of *C. lacustris*, W.:

|                  |                 |                  |
|------------------|-----------------|------------------|
| 6 with 5 spikes. | 11 with 3 male. | 1 with 1 female. |
| 12 " 6 "         | 19 " 4 "        | 17 " 2 "         |
| 15 " 7 "         | 8 " 5 "         | 15 " 3 "         |
| 3 " 8 "          |                 | 5 " 4 "          |
| 2 " 9 "          |                 |                  |

In 9 the upper female was apice mascula.

- 2 the 2 upper females were apice masculæ.
- 2 the 2 lower females were basi compositæ.
- 2 the lower female had a peduncle 8 inches long.

The lower bract occasionally with a vagina  $\frac{1}{2}$ –1 poll. long.

The perigynium  $2\frac{2}{10}$ – $3\frac{1}{2}$  lin. long.,  $\frac{8}{10}$  lin. latum.

The achenium  $1\frac{2}{10}$ – $\frac{4}{10}$  lin. long.,  $\frac{7}{10}$  lin. latum, ellipticum, flavidum, basi styli curvata.

With relation to the reticulated vaginæ, I observe them in a Swedish specimen from Wahlenberg. Lang (Car. Germ. et Scand.) p. 140, in describing *C. riparia* says, "Vaginæ reticulato-fissæ." Ledebour (Fl. Altaica, 221) says, "Vagiæ in filamenta reticulatim connexa lacerantur." Steudel (Cyp. 237) inserts the "*C. exaltata*, Petermann," from Saxony (which is evidently *C. riparia*) and says, "Vaginæ demum reticulato-fissæ." Torrey (Cyp. 423) says, "*C. lacustris* is distinguished by its strongly-nerved fruit, with a more acutely bifid mouth." But I see no difference in the two plants in these respects; and Treviranus (in Fl. Rossica) remarks, under *C. riparia*, "Fructus valide nervosus cum rostro peracute bifido, quo *C. lacustrem* à *C. riparia* distingui vult cl. Torrey, non minus insigniter in planta Germanica observatur."

Kunth (under *C. lacustris*) says, "Nescio quomodo à *C. paludosa*, Good., distinguenda." It differs as much as *C. riparia* does. *C. paludosa* is always a smaller plant, with an ovate compressed perigynium, with an emarginate mouth, and more prominent nerves, and stigmas 3–2; more nearly approaching in aspect the *C. stricta*, Good.

I am indebted to M. Spach for the opportunity of examining the *C. Chilensis*, Brongn., which certainly has 3 stigmas; and to M. Sonder, of Hamburg, for a specimen of *C. vacillans*, Steud. I have not seen any specimen of what Dewey (Sill. 49, 1845) considers the *C. riparia* of New England, etc., but I am not surprised at his finding it in the States, since I agree with Schkuhr (p. 84) and Schlechtendal (Linnæa, 1835) in considering *C. lacustris* as inseparable from *C. riparia*.

The only authentic specimeu that I have seen of *C. incrassata*, Schlechtendal, is in Herb. Hooker, differing in no respect from the usual forms of *C. riparia*. Schlechtendal describes the male spikes occasionally to be 10, which is double the number I have ever seen.

269. *C. alpina* (Swartz); spicis 3–4 rarius 2–5 parvis confertis aurantiaco-purpureis, terminali basi mascula majore, reliquis foemineis subrotundis vel ovalibus obtusis sessilibus vel infima pedunculata sæpe remota; bractea foliacea auriculata rarius vaginulata spicam superante

subinde abbreviata; stigmatibus 3; perigyniis suborbiculatis vel obovatis abrupte rostellatis, vel ellipticis utrinque acutis trigonis, angulo introrso, ore emarginato, aurantiacis, rostro apice purpureo, granulato-asperulis superne margine serratis rarius scabris enerviis vel plus minus nervatis, squama late ovata obtusa vel acuminata atro-purpurea margine demum decolori longioribus.—*C. alpina*, Swartz; *Wahl. Act.* 160; *Fl. Lap.* 241; *Anderson*, 38. t. 6. f. 66; *Fl. Ross.* 286. *C. Vahlia*, *Schk. f.* 94 et 154; *Willd.* 254; *Kunth*, 431; *Koch*, 874; *Drejer*, *Rev.* 30; *Lang*, 87; *Reich.* 16. t. 235; *Ledeb. Fl. Alt.* 217; *Eng. Bot. t.* 2666; *Bertol.* 72; *Steudel*, 202. *C. media*, *Brown, Fr. Nar. App.* 763. *C. brachylepis*, *Turez.* (TAB. CCCLVI. et CCCLVII.)

HAB. In Europa, Asia, America septentrionali. Iceland. Lapland to Swiss Alps. Altai, Dahuria. In Himalaya temperata et alpina ad Kumaon, 10,000 ped., *Royle*, n. 123; *Strachey et Winterbottom*; et ad Sikkim, 10–12,000 ped., *J. D. Hooker*. Greenland, Arctic America, Rocky Mountains.

*Culmus* 2–24-pollicaris, rigidus, crectus, basi foliatus, apice sæpe scaber. *Folia* 1–1½ lin. lata, culmo breviora. *Bractea* foliacea, plerumque spicam superans, altera sæpe brevis: infima nonnunquam sterilis, remota. *Vagina* rarius 2 lin. longa. *Pedunculus* 2–5 lin. longus. *Spica* congesta, e spiculis sæpius 3 subsessilibus, 3–4 lin. longis, 2–3 lin. latis, vel 2–5: infima subinde 10 lin. remota, plus minus pedunculata. *Squamæ* conformes, obtusæ vel acuminatæ, muticæ, atro-vel rubropurpureæ, margine demum decolorès. *Perigynium* 1–1½ lin. longum, ¼–⅓ lin. latum, in eadem spicula forma varians. *Achenium* ⅞ lin. longum, ¼–⅓ lin. latum, ellipticum vel obovatum, triquetrum, pallidum, basi styli apiculatum.

Wahlenberg, in the *Act. Holm.*, speaks of this species as “egregie varians;” but in the European forms it is I think easily distinguishable from its allies. Lang says of the figures of Schkuhr, “si habitum spectas, minus accurate delineata,” an opinion in which I cannot concur. Wahlenberg, in his *Flora Lap.*, says, “capsulis subglobosis,” as in Schkuhr’s fig. 94, which has been most objected to, but which may often be observed with the elliptic form in the same spike. Wahlenberg also says, “capsulis subpubescentibus.” I have never seen any to confirm this observation. In the Lapland, Scotch, and Norwegian plant, the perigynium is not only rough from the protuberant granulations, but the upper surface is occasionally rough, as the margins are, as shown in Tab. CCCLVII. In some Norwegian, but especially in the Arctic American plant, the nerves are distinct and the roughness disappears. In the Altai plant the perigynium is often subexcurved. In the specimens from the Himalaya there are forms like those of Europe, others which differ in the size of the spiculæ, in the occasional cuspidation of the squamæ, and the curvature of the culm. Nees has separated this last under the name of *C. infuscata*, making no allusion to its affinity with *C. alpina*. But Drejer (*Symb.* p. 13), in contrasting it with the var.  $\beta$  of Nees (*C. Lehmanni*, Drej.), says, “*C. infuscata* multo propior est *C. Vahlia*, Schk.” With the exception of the above differences from the European type, I think it can be regarded only as an exceptional form of *C. alpina*, but, in deference to Nees, I have adopted his name, and I have done the same with the *C. parviflora* of Meyer, which in the *Fl. Rossica* is the var.  $\gamma$  of *C. alpina*.

Tab. CCCLVI. Specimens figured, No. 1, from the Clova Mountains, Scotland; No. 2, from Arctic America.

Tab. CCCLVII. Specimens: No. 1, from Norway; No. 2, from the Altai; No. 3, from Dahuria. The details from the Norwegian and Altai specimens.

Var.  $\beta$ . *infuscata*; spiculis majoribus 4–5 lin. longis

2½ lin. latis; perigyniis 1½ lin. longis, ⅔ lin. latis, ellipticis vel obovatis, obtuse subturgide trigonis, nervatis, nervis superne evanidis, squama oblongo-ovata acuminata vel cuspidata atro-purpurea brevioribus vel longioribus; culmo sæpe curvato, vaginis foliorum punctis ferrugineis maculatis; achenio ⅞ lin. longo, ⅔ lin. lato, ovali vel obovato.—*C. infuscata*, *Nees; Wight Contr.* 125; *Kunth*, 431; *Drejer, Symb.* 13 (sub *C. Lehmanni*); *Steudel*, 202. (TAB. CCCLVIII. et CCCLIX.)

HAB. In Himalaya temperata et alpina. Kunawur, *Royle*, n. 123; *Jaquemont*. Kishtwar, 10–14,000 ped., *Dr. Thomson*. Sikkim, *Dr. Hooker*. Tibetia occident., ad Hasora, *Winterbottom*.

Nees alludes to the truncate orifice of the perigynium, which is occasionally observable, but the usual form of it is (as in *C. alpina*) a more or less distinct emargination. Drejer says, “perigyniis lenticulari-convexis,” but this can only apply to the more turgid forms, in which the achenium fails to impress its internal angle on the perigynium.

Tab. CCCLVIII. The specimens figured are, No. 1, *Royle*, n. 123, Pungee; No. 2, from *Dr. Thomson*, 14/6/1848; No. 3, from *Strachey and Winterbottom*, Garais Valley; No. 4, from *Jaquemont*, Chini, Kunawur, n. 1560, Herb. Mus. Paris.

Tab. CCCLIX. No. 1, *Strachey and Winterbottom*; No. 2, *Dr. Hooker*, Sikkim.

The spiculæ oblong, more laxly alternate, and narrower.

Var.  $\gamma$ . *parviflora*; spiculis 4–5 lin. longis, 3 lin. latis, confertis, infima subinde composita; perigyniis majoribus, 1½–⅞ lin. longis, ⅔–⅞ lin. latis, ellipticis, bifidis, enerviis, fusco-purpureis, basi pallidis, squama ovata fusco-purpurea nervo concolori rarius extra apicem producto longioribus; culmo rigido, stricto; foliis 1–2 lin. latis, bractea reflexa, ligula amplectente oblonga; achenio ⅞ lin. longo, ⅔ lin. lato, elliptico vel obovato; stylo subinde contorto.—*C. melanocephala*, *Turez. MSS.* *C. parviflora*, *Meyer; Kunth*, 436. *C. alpina*,  $\gamma$ , *Fl. Rossica*, iv. 286. *C. Vahlia*, var., *Steudel*, 202. (TAB. CCCLX.)

HAB. In Alpe Urgudei. Dahuria, *Turez.* In humidis ad nives deliquescentes Alpium, Alatau ad fl. *Lepsa*, *Karelin et Kirilow*, n. 2080 (*Herb. Hooker*).

In the ‘*Flora Rossica*’ this is considered the same as the *C. alpina*,  $\beta$  *nigrescens*, *Anderson*, Cyp. Scand., but it is much larger than any of the northern European forms I have seen. The specimens figured are: No. 1, those of *Turez.*, sent to me by *M. Fischer*; and No. 2, from Dahuria, Herb. Mus. Paris.

270. *C. Lehmanni* (*Drejer*); spicis 3–5 parvis ovalibus vel oblongis e flavide-atro-purpureis subsessilibus congestis vel contiguis, terminali basi mascula sæpe majore, reliquis fœmineis, infima plus minus pedunculata remota, tamen superiores attingente nisi rarius radicali longissime exserte pedunculata, basi composita; bracteis evaginatibus, infima culmum sæpe longe superante; stigmatibus 3, brevibus; perigyniis obovatis obtuse trigonis abrupte rostellatis, ore subintegro vel emarginato, glabris obsolete nervatis flavidis, rostello purpureo, squama ovata acuta vel cuspidata atro-purpurea concolori longioribus.—*C. Lehmanni*, *Drejer, Symb.* 13. t. 2. *C. infuscata*,  $\beta$ , *microcarpa*, *Nees*, 125; *Kunth*, 431. (TAB. CCCLXI.)

HAB. In Himalaya tropica et alpina. Nipal, *Wallich*, n. 3381. Kumaon, *Strachey et Winterbottom*, 14–15,000 ped. Sikkim, *Dr. Hooker*, 12,000 ped.

*Culmus*  $\frac{1}{2}$ –2-pedalis, triquetus, apice scaber, gracilis, basi foliatus; pars spicas gerens plerumque  $\frac{1}{2}$ –3 poll. longa. *Folia* 1–3 lin. lata, elongata, culmum æquantia vel eo breviora, plana, graminea. *Bractea* evaginata: infima angusta vel  $1\frac{1}{2}$  lin. lata,  $1\frac{1}{2}$ – $5\frac{1}{2}$  poll. longa, altera spicam superans vel æquans. *Pedunculus* infimus plerumque 2 lin. ad 2 poll. longus: vel radicalis pedalis, bractea æquilonga suffulta. *Spicæ* omnes congestæ, parvæ, subæquales, sessiles: vel oblongæ, 3–6 lin. longæ, 2 lin. latæ, contiguæ: infima plus minus remota, tamen semper alias attingens, nisi rarius radicalis, remota, basi subinde spiculis 2 brevibus basi composita. *Squamæ* conformes. *Perigynium* 1– $1\frac{1}{10}$  lin. longum,  $\frac{5}{10}$ – $\frac{6}{10}$  lin. latum, pallide flavescens, apice purpureo tinctum. *Achenium* conforme,  $\frac{8}{10}$  lin. longum,  $\frac{6}{10}$  lin. latum, obovatum, obtuse triquetrum, olivaceum.

Allied to *C. alpina*, but evidently distinct in inflorescence and form of perigynium. Drejer considered it to be allied to *C. Shortiana* from the form of the perigynium. "Mihi videtur," he says, "quasi immediate à *C. Shortiana* ad *melananthas* ducere, intimamque affinitatem clarius ostendere."

271. *C. atrata* (Linn.); spicis 3–5 rarissime 6 ovalibus vel oblongo-cylindraceis rubro- vel demum atro-purpureis contiguis; superioribus sessilibus vel omnibus (deorsum longius) pedunculatis terminali basi mascula; reliquis fœmineis rarius omnibus vel una alterave ima basi parce masculis erectis vel cernuis; bractea evaginata, auriculata, culmo paulo longiore vel æquante, superioribus squamæformibus, infima rarius remota sterili vaginata; stigmatibus 3; perigyniis late vel subrotundo-ovalibus compresso-ventricosis abrupte vel sensim rostellatis, ore emarginato vel bidentato, flavidis ferrugineo tinctis glabris tenuiter granulatis enerviis sessilibus, squama ovata obtusa vel acuta æquilata vel ad apicem spicarum lanceolata acuminata angustiore rubro-ferruginea vel atro-purpurea brevioribus vel longioribus.—*C. atrata*, *Lin.*; *Good. Lin. Trs.* ii. 189; *Willd.* 221; *Schk.* x. f. 77; *Wahl. Act.* 106; *Fl. Lap.* 242; *Gaud. Agrost.* 114; *Kunth*, 433; *Koch*, 875; *Eric. Mant.* iii. 137; *Anderson*, 37. t. 6. f. 67; *Drejer, Rev.* 31; *Lang.* 89; *Lcd. Fl. Alt.* 214; *Fl. Rossica*, 287; *Reich.* 16. t. 237; *Bertol.* 74; *Light*, 555; *Smith, Eng. Fl.* 103; *Eng. Bot. t.* 2044; *Schw. et Tor.* 320; *Torrey, Cyp.* 406; *Carey*, 520; *Dewey*, x. 271; *Sartwell, Eas. n.* 63. *C. aterrima*, *Hoppe, Icon.*; *Koch*, 874; *Reich. t.* 236; *Kunth*, 434. *C. atrata*,  $\beta$ , *Gaud. Agrost.* 115; *Fl. Rossica*, 287. *C. nigra*, *All. Ped.* 267; *Bellard. App.* 44; *Willd.* 266; *Schk. f.* 115; *Kunth*, 435; *Koch*, 874; *Reich.* 16. t. 236; *Bertol.* 73. *C. atrata*,  $\gamma$ , *Gaud.* *C. saxatilis*, *Scop. Carn.* 221. *C. æthostachya*, *Schk. f.* 196. *C. distachya*, *W. Schk. f.* 33. *C. ovata*, *Rudge, Lin. Trs.* vii. 96. t. 9. f. 1. *C. caucasica*, *Stev. Bieb. t.* iii. 613. *Kunth*, 433. *C. atrata*, *Fl. Rossica*, 287. (TAB. CCCLXII.–CCCLXV.)

HAB. In Europa. Islandia usque ad Alp. Germaniæ et Helvetiæ. In Asia, Caucasus, Altai, Himalaya orient. temp. et alpina, Sikkim, alt. 12–17,000 ped. In America, Grœnlandia, Am. Arctica, Mont. Alb. et Sax.

*Radix* fibrosa. *Culmus*  $\frac{1}{2}$ – $2\frac{1}{2}$ -pedalis, triquetus, lævis vel apice scabriusculus. *Folia*  $1\frac{1}{2}$ –4 lin. lata, culmo breviora. *Bractea* infima rarius infra spicas sita, sterilis, remota, vaginata, plerumque auriculata: auriculis sæpe concretis. *Spicæ*

6–12 lin. longæ, 2–3 lin. latæ, erectæ vel cernuæ, ovals, latiores; vel cylindraceæ, angustiores, deorsum longius pedunculatæ. *Perigynium*  $1\frac{4}{10}$ – $2\frac{3}{10}$  lin. longum,  $\frac{7}{10}$ – $1\frac{5}{10}$  lin. latum, viride, demum fulvum vel ferrugineum vel (in *C. aterrima*) atropurpureum; rostello cylindrico purpureo. *Achenium*  $\frac{8}{10}$ – $1\frac{2}{10}$  lin. longum,  $\frac{5}{10}$ – $\frac{7}{10}$  lin. latum, inæqualiter triquetrum, ellipticum. *Stamina* 3 vel 2. *Flosculi* rarius hermaphroditici!

*C. atrata*, L., variat culmo plus minus alto, lævi vel scaberimo; longitudine et latitudine foliorum; spicis ovalibus vel obovatis vel cylindricis, plus minus latis, omnibus rarius, vel una alterave, basi masculis: erectis vel cernuis, inferioribus nunc basi compositis, infima subinde subradicali longe exserte pedunculata; squamis rubris vel atro-purpureis, concoloribus vel margine albidis, latoribus obtusis perigynio brevioribus, vel angustioribus acuminatis acutis eo longioribus; perigyniis latoribus ovalibus vel obovatis, vel angustioribus ellipticis, plus minus ventricosis abrupte cylindrico- vel sensim rostellatis vel erostribus, ore emarginato vel bidentato rarius integro; flavidis demum fulvis plus minus purpureo tinctis vel atropurpureis, plus minus grosse granulatis vel ad margines raro dentatis, enerviis vel obsolete tenuiter nervatis.

I have taken the description of this species from European specimens, noticing above the variations it undergoes in other countries. It is not possible to describe its varieties without attributing to one characters that are more or less to be found in the others.

The following may give a general idea of them:—

*C. atrata*, L.; spiculis ovalibus; perigyniis fulvis enerviis, squamis superioribus sæpe lanceolatis acutis.

Var. *aterrima* (*C. aterrima*, Hoppe, etc.); spiculis oblongis perigyniisque atro-purpureis foliis latoribus.

Var. *ovata* (*C. ovata*, Rudge, etc.); spiculis ovalibus rubro-ferrugineis. (TAB. CCCLXII.)

Var. *nigra* (*C. nigra*, All., etc.); spiculis ovalibus plerumque sessilibus congestis, terminali subinde mascula; stigmatibus 3 et 2; perigyniis atro-purpureis, marginibus pallidis sæpe dentatis, squamis obtusis. (TAB. CCCLXIII.)

Var. *caucasica* (*C. caucasica*, Stev.); spiculis cylindraceis vel clavatis; perigyniis tenuiter nervatis, squamis abrupte acuminatis; foliis elongatis.

Var. *pullata*; spiculis cylindraceis; perigyniis oblongis, ore sæpe integro, nervatis minime ventricosis, squamis lanceolatis acuminatis acutis. (TAB. CCCLXIV.)

Var. *glacialis*; spiculis ovalibus; perigyniis achenium arcte vestientibus, ore subinde subbifido, squamis lanceolatis acuminatis acutis. (TAB. CCCLXV.)

*C. aterrima*, Hoppe, as Kunth and especially Ledebour remark, is not distinguishable from *C. atrata*, L., the dark purple colour of the perigynia and breadth of the leaf affording no constant character. In *C. atrata* the colour of the perigynium is fulvous, more or less spotted or tinged, sometimes entirely with a ferruginous hue. Ledebour says, "perigynia (fructu maturascente) sensim sensimque nigrescunt et demum sæpissime atro-purpurea evadunt."

Beyond the rufous colour of the spikes in *C. ovata*, I know nothing that is observable distinguishing it from the usual character of *C. atrata*, and this colour, as well as the occasional narrow cylindrical spikes, are found in European specimens, and in those from the White Mountains of New Hampshire.

The variety *nigra* (*C. nigra*, All.) appears to be confined to the Alps of Germany and Switzerland. It is, from its alpine habitat, more contracted in all its parts, the terminal spike occasionally male, and the stigmas at times only 2, with a corresponding lenticular achenium. The perigynium varies in width, and consequently is more or less ventricose; the upper margins at first pale and often dentate, but the colour eventually is more or less dark purple, as in *C. aterrima*, except at base. In *C. atrata* and

its varieties the angle of the achenium is posterior, and hence Koch describes the perigynia as "dorso obtuse carinata."

Spicis 3-5 ovalibus fuliginosis quasi capitatis, terminali basi rarius omnino mascula, reliquis plerumque fœmineis, superioribus vel omnibus sessilibus; bractea sæpe spicam superante; stigmatibus 3, rarius 2; perigyniis ovalibus vel obovatis vel ellipticis brevissime vel vix rostellatis, ore emarginato, granulato-asperulis sanguineo-denum atro-purpureis basi marginibusque superne pallidis sæpe dentatis subinde obscure nervatis, squama ovata obtusiuscula vel abrupte apiculata atro-purpurea nervo rarius extra apicem producto paulo longioribus.

*Culmus* 4-8-pollicaris, lævis. *Folia* 1-2 lin. lata. *Perigynium*  $1\frac{1}{2}$  lin. longum,  $\frac{4}{10}$  lin. latum, vel  $1\frac{7}{10}$  lin. longum,  $\frac{7}{10}$  lin. latum. *Achenium*  $\frac{7}{10}$ - $\frac{8}{10}$  lin. longum,  $\frac{4}{10}$ - $\frac{5}{10}$  lin. latum, inæqualiter triquetrum, vel lenticulare. (TAB. CCCLXIII.) *C. atrata (nigra)*.

This variety in its development is like the var. *glacialis* of the Himalaya, but the lanceolate squamæ and acutely bifid orifice of the perigynium of the last are peculiar to it. Wahlenberg (Fl. Lap. 242) says of *C. atrata*, "capsulæ in summis alpebus fuscae occurrunt adeo ut de differentia *C. nigra*, All., adhuc dubito." Tuckerman, when at Upsala, had a specimen of *C. nigra* from Germany given to him by Wahlenberg, and on the ticket he has added these words, "nicht gut (dicente Wahlenbergio)." I observe male florets occasionally at the top of the spikes, as in the *C. distachya*, Willd.

Tab. CCCLXIII are specimens of *C. nigra* from the Alps of Germany.

I have never seen authentic specimens of *C. Caucasica*, Stevens, but M. Spach has sent me those cultivated in the Paris Garden from seeds sent from St. Petersburg, which I think are not specifically different from *C. atrata* :—

Spicis 4-5 cylindricis vel clavatis (10 lin. longis, 2-3 lin. latis) erectis; perigyniis ( $1\frac{8}{10}$  lin. longis,  $\frac{8}{10}$  lin. latis) ellipticis rostellatis, ore bidentato, tenuiter nervatis flavidis ventricosis, squama ovata subabrupte acuminata vel cuspidata ferrugineo-purpurea margine albida paulo brevioribus angustioribus; culmo  $1\frac{1}{2}$ -pedali scabriusculo; foliis  $1\frac{1}{2}$ -2 lin. latis, culmo longioribus.

Stevens says, "fructibus squamam longitudine æquantibus triplo latioribus." In the Paris plant the squamæ are longer than the perigynium, and it is only the narrowing apex of them which, as it lies over the perigynium, gives the appearance of the perigynium being "triplo latioribus." The base of the squamæ is rather broader than the perigynium.

The length of the leaves in *C. atrata* varies. I have a specimen from Glen Dole, Scotland:—Culmo 2-pedali; foliis 3 lin. latis, superioribus culmum fere æquantibus; spiculis 5, cylindraceis, summa mascula vel sterili, inferioribus 3 basi masculis compositis, ramulis 2-3 fœmineis remotiusculis ad basin sitis.

In one from Russia, sent by Fischer, the spiculæ are 15 lines long,  $2\frac{1}{2}$  lines wide, approaching in aspect to *C. Mertensii*, Pres.

The specimens from the Himalaya vary and exhibit characters belonging to *C. atrata*, *aterrima*, and *Caucasica*. Some from Lachen, from an elevation of 11,000 feet, are in no respect different from the European forms of *C. atrata*, with obtuse squamæ. Others from the same locality, with one or all the spikes male at base, have lanceolate-acuminate squamæ, longer or shorter and often narrower than the perigynium, which in a fully mature specimen has the dark-purple perigynium, with the very short abrupt rostellum of *C. aterrima*, the orifice sometimes entire, and without the white membranous margin generally observable.

In Tab. CCCLXIV. I have figured specimens from Lachen and Yeumtung, 12-15,000 feet, from Dr. Hooker :—

Spicis 3-5 oblongis vel cylindraceis erectis, summa vel omnibus ima basi masculis; perigyniis oblongis vel ellipticis erostribus vel brevissime rostellatis, ore subinde integro, atro-purpureis interdum leviter 2-3-nervatis apice ad margines nunc parce dentatis plus minus ventricosis, squama lanceolata acuminata acuta brevioribus.

*Culmus*  $1\frac{1}{2}$ -pedalis, gracilis, scaberrimus, vel validior, lævis. *Spicæ* 10-12 lin. longæ, 2-4 lin. latæ, vel 3-4 subsessiles æquialtæ, bracteis brevibus, vel 5 inferiores pedunculatæ, bracteis foliaceis. *Squamæ* atro-purpureæ, acumine sæpe scabro. *Perigynium*  $1\frac{2}{10}$ -

$\frac{8}{10}$  lin. longum,  $\frac{4}{10}$ - $\frac{6}{10}$  lin. latum. *Achenium*  $\frac{7}{10}$ - $\frac{8}{10}$  lin. longum,  $\frac{4}{10}$ - $\frac{5}{10}$  lin. latum, ovale, flavidum.—*C. atrata (pullata)*.

In Tab. CCCLXV., specimens from the Himalaya, 15-17,000 feet, Dr. Hooker.—*C. atrata (glacialis)*.

Spicis 3-4 ovalibus atro-purpureis, infima pedunculata una alterave basi mascula; bracteis brevibus; perigyniis ovalibus erostribus vel obovatis rostratis, ore emarginato vel subbifido (achenium arcte vestientibus), enerviis fulvis superne ferrugineo-purpureis, squama lanceolata acuminata acuta atro-purpurea æquilata subduplo brevioribus; stigmatibus 3.

*Culmus* 2-8 pollices altus, lævis. *Folia* 1-2 lin. lata, culmo breviora. *Spicæ* 4-6 lin. longæ,  $2\frac{1}{2}$ -3 lin. latæ. *Perigynium*  $1\frac{2}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum. *Achenium* conforme,  $\frac{6}{10}$  lin. longum,  $\frac{3}{10}$  lin. latum, fulvum.

In Tab. CCCLXII., specimens from the Rocky Mountains, like those of *C. ovata*, Rudge, from Newfoundland. In one perigynium were 2 achenia, each with 3 stigmas as shown in the figure.

272. *C. atropicta* (Steudel); spicis 2-3 ovalibus arcte contiguis ima basi masculis subsessilibus atro-purpureis; bractea evaginata amplectente culmum vix æquante; stigmatibus 2; perigyniis elliptico-obovatis rostellatis, ore emarginato scabro compressis atro-purpureis marginibus superne pallidis acutis subalatis e medio sursum aculeatis obscure leviter nervatis membranaceis stipitatis, squama ovato-lanceolata acuta vel mucronata atro-purpurea nervo concolori scabro latioribus paulo longioribus.—*C. atropicta*, Steudel, *Syn.* 204. (TAB. CCCLXVI.)

HAB. In pratis uliginosis prope Sandy Point. Fuegia, Lechler, *Pl. Magellan.*; Steudel, *n.* 1188.

*Culmus* sesquipedalis, basi foliatus, superne angulis acutissimis scabris. *Folia* 2 lin. lata, rigida, marginibus revolutis, culmo breviora. *Spicæ* 7-9 lin. longæ, 4-5 lin. latæ, omnes basi parce masculæ. *Squamæ* conformes. *Perigynium*  $2\frac{3}{10}$ - $\frac{6}{10}$  lin. longum,  $1-1\frac{2}{10}$  lin. latum. *Achenium* (cum stipite  $\frac{1}{2}$  lin. longo)  $1\frac{1}{2}$  lin. longum,  $\frac{6}{10}$  lin. latum, ovale, lenticulare, punctulatum, basi styli æquali apiculatum.

Allied to *C. atrata*, var. *nigra* (*C. nigra*, All.), which has the upper margins of the perigynium equally pale and occasionally 2 stigmas.—Differs in the compressed perigynium with aculeate margins, and the long stipes of the achenium and tall culm. The specimen figured was communicated by M. Spach from the Herb. Mus. Paris. I have since, through the kindness of M. Sonder, of Hamburg, received one with 3 spiculæ.

273. *C. Bonplandii* (Kunth); spiculis 8-12 basi masculis congestis ferrugineis vel castaneis, inferioribus plus minus longe bracteatis; perigyniis ovatis vel ovato-lanceolatis sensim in rostrum attenuatis, ore integro antice secto, inalatis marginibus plus minus serrato-scabris nervatis plano-convexis, squamam ovatam subacutam æquantibus.—*C. Bonplandii*, Kunth, 380. *C. Purdiei*, Boott, *Illustr. t.* 67. (TAB. CCCLXVII.)

Var.  $\beta$ . *angustifolia*.—*C. Tatanara*, Steudel, *n.* 2560, 2603.

HAB. In America meridionali. South America, *Bonpland*. Columbia, Jameson, *n.* 172. Andes of Quito, *Couthouy*. Condorasto, Escudor, in pratis alpinis, *n.* 5901 *a*, et Tunguragua, in saxosis, *n.* 5901, *Spruce* (*Herb. Hooker*). Chicapayos, Peru, *Mathews*.—Var.  $\beta$ . *Tatanara*, Peru, in uliginosis, *Lechler*, *n.* 2560. Sachapata, *Lechler*, *n.* 2603.

I have, through the kindness of M. Klotsch, had the opportunity of examining the specimen in the Berlin Herbarium, from

which Kunth drew his description of this species, and M. Spach subsequently sent me one of Bonpland's for examination from the Herb. Mus. Paris. The spikes of the Berlin specimen, and the entire specimen of Bonpland, are figured in Tab. CCCLXVII. I owe to my late friend Dr. Charles Lemann the specimens from Jameson and Mathews; to Dr. Gray for Couthouy's; to Mr. Bentham for a sight of Spruce's; and to M. Sonder, of Hamburg, for those of Lechler. I have no hesitation in referring Purdie's plant, described at p. 26 and figured in Tab. LXVII. of these Illustrations to that of Kunth. The spiculæ in the specimens of Bonpland are male at base, though Kunth described them "spiculis mere fœmineis." As usual, the species varies in the size and colour of the spike, the number of the spikelets, 6-12, the lower ones occasionally distinct, the number and length of the bracts, 2-5, the longer or shorter rostrum and the degree of its marginal roughness. The perigynium varies from  $1\frac{6}{10}$  to  $2\frac{1}{10}$  lin. long,  $\frac{5}{10}$ - $\frac{7}{10}$  lin. wide, and the achenium  $\frac{8}{10}$  lin. long,  $\frac{4}{10}$ - $\frac{5}{10}$  lin. wide, in its mature state oblong-ovate, pointed at base. The stem is from 1 to 3 feet in height, and the spike 10 to 20 lines in length. Lechler's specimens have a slender weak culm and narrow leaves and a small spike, but do not differ in the perigynium.

Its nearest ally is *C. elongata*, L.

Tab. CCCLXVII. No. 1, the spikes of the authentic specimens from Berlin; No. 2, the specimen of Bonpland, from Paris.

#### 274. *C. scoparia*, etc.

The claims of this plant and its allied forms to specific distinction have given rise to much difference of opinion. Torrey, in his monograph (1836), confining his view to the perigynium, thought specimens might be found so as to exhibit "a gradation from the narrow fruit of *C. scoparia* to the almost orbicular and broadly winged fruit of *C. straminea*;" and he might have added *C. alata*. His arrangement was—

1. *C. scoparia*.  
*C. arida*.  
*C. lagopodioides*.
2. *C. festucacea*.  
*C. mirabilis*.
3. *C. cristata*.
4. *C. straminea*.  
*C. tenera*.  
*C. fœnea*.
5. *C. alata*.

Tuckerman, in his 'Enumeratio Methodica' (1843), admitted but two species—

1. *C. scoparia*.  
*C. arida*.  
*C. lagopodioides*.
2. *C. straminea*.  
*C. fœnea*.  
*C. tenera*.  
*C. festucacea*.  
*C. mirabilis*.  
*C. cristata*.  
*C. alata*?

Carey, in the second edition of Gray's 'Manual' (1856), omitting his *C. adusta*, which is not the plant of the Fl. Bor. Amer., has six species,—

1. *C. arida*.
2. *C. scoparia*.
3. *C. lagopodioides*.  
*C. cristata*.
4. *C. festucacea*.  
*C. tenera*.  
*C. mirabilis*.
5. *C. fœnea*.
6. *C. straminea*.

*C. alata*, then supposed to be confined to the Southern States, did not come within the limits of the 'Manual.' *C. arida*, which I have previously noticed (Tab. LIV.), is admitted now on all hands to be distinct; and *C. Liddoni* (Tab. LIII.), a single speci-

men of which I have, through the kindness of Dr. Torrey, lately seen from Santa Rita del Cobra, New Mexico (*Dr. Bigelow*), must still be left to future observation, though I think it distinct from *C. arida*.

Those at present under view may, from the prevailing form of the perigynium, be arranged as follows:—

Perigyniis ovali- vel ovato-lanceolatis:—

1. *C. scoparia*.
2. *C. lagopodioides*.
3. *C. cristata*.

Var. *mirabilis*.

Perigyniis ovatis orbiculatis vel obovatis:—

4. *C. fœnea*.
5. *C. alata*.
6. *C. adusta*.
7. *C. straminea*.

Var. *tenera*.

- „ *aperta*.  
„ *festucacea*.  
„ *typica*.  
„ *Crawei*.  
„ *Meadii*.

274. *C. scoparia* (Schkuhr); spicis 5-7 rarius 3-10, ovalibus utrinque acutis demum apice obtusis apertis alternatim approximatis vel coarctatis fulvis nudis vel inferioribus setaceo-bracteatis; perigyniis elliptico-lanceolatis attenuato-rostratis bidentatis plus minus alatis utrinque nervatis imbricatis, squama lanceolata acuminate acutissima superne pallide fulva longioribus.—*C. scoparia*, *Schk. f.* 175; *Willd.* 230; *Kunth*, 396; *Schw. et Torrey*, 313; *Torrey, Cyp.* 394; *Dewey*, viii. 94; *Carey*, 515; *Sartwell, Eas. n.* 41; *Chap.* 535. (TAB. CCCLXVIII.)

HAB. In America sept. Arctic America to South Carolina.

*Culmus* sæpe 2-pedalis, gracilis, apice acute triqueter, scaber. *Folia*  $\frac{3}{4}$ - $1\frac{1}{4}$  lin. lata, culmo breviora. *Spica* 10 lin. ad 2 pollices longa, 3-5 lin. lata. *Squamæ* masculæ latiores, obtusæ, fulvæ, margine albo-hyalinæ. *Perigynium*  $2\frac{5}{10}$ - $\frac{8}{10}$  lin. longum,  $\frac{7}{10}$ - $\frac{8}{10}$  lin. latum, attenuato-rostratum. *Achenium*  $\frac{6}{10}$  lin. longum, plus  $\frac{3}{10}$  lin. latum, ovale, lenticulare, stipitatum.

Var. *minor*!; spicis ferrugineis concoloribus contiguis vel capitatis; bracteis 2-3, spica longioribus; perigyniis minoribus ( $1\frac{5}{10}$ - $\frac{7}{10}$  lin. longis,  $\frac{4}{10}$  lin. latis), postice subinde enerviis. (TAB. CCCLXIX.)

HAB. Arctic America, New Hampshire.

*Culmus*  $\frac{8}{10}$ -pollicaris. *Spica* 6-7 lin. longa.

A. *C. lagopodioides* differt culmo gracili; foliis angustioribus; vaginis arete vestientibus; spicis fulvis ovalibus utrinque acutis; perigyniis longioribus latioribus, rostro attenuato, imbricatis, demum superioribus apertis; squamis fœmineis acutissimis.

In only one specimen out of very many the lower spike was compound.

The specimens figured are,—

Tab. CCCLXVIII. Penn Yan, from Herb. Tuckerman, exhibiting his var. *moniliformis*.

Tab. CCCLXIX. The var. *minor*, from pastures at the base of the White Mountains, *Tuckerman*.

275. *C. lagopodioides* (Schkuhr); spicis 10-15 vel pluribus ovalibus vel obovatis obtusis in capitulum oblongum coarctatis pallide viridibus demum brunneis con-

coloribus, inferioribus subinde discretis compositisque, infima nunc anguste longiuscule bracteata; perigyniis ellipticis vel lanceolatis sensim plus minus rostratis utrinque nervatis anguste alatis ciliolatis, squama ovata subacuta vel acuminata longioribus.—*C. lagopodioides*, *Schk. f.* 177; *Willd.* 230; *Kunth*, 398; *Dewey*, viii. 95; *Schw. et Tor.* 313; *Carey*, 515; *Sartwell*, *Ews. n.* 42. *C. scoparia*,  $\beta$ , *Tor. Mon.* 394;  $\delta$ , *Tuck. Enum. Chap.* 535. *C. tribuloides*, *Wahl. Act.* 145. (TAB. CCCLXX.)

HAB. America septentrionali. Canada to S. Carolina. California, *Thurber*.

*Culmus* 2–2½-pedalis, validus, scaber. *Folia* 1½–3 lin. lata, apice attenuata, elongata; vaginis triquetris, laxis, apice ampliatis. *Spica* 14 lin. ad 2 pollices longa, 6–8 lin. lata. *Bractea* subinde foliacea. *Perigynium* 1 $\frac{8}{10}$ –2 $\frac{4}{10}$  lin. longum,  $\frac{5}{10}$ – $\frac{7}{10}$  lin. latum. *Achenium*  $\frac{7}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum.

It varies in a shorter, broader, elliptic perigynium, or a longer, narrower, lanceolate one, with a more attenuated rostrum.

A *C. scoparia* dignoscitur culmo validiore; foliis latioribus, longioribus, apice attenuatis, vaginisque triquetris laxis; spica majore, pluristachya, pallide viridi; perigyniis minoribus, angustioribus, sæpe minus attenuato-rostratis, magis apertis; squamis minoribus.—Variat spica angustiore; spiculis basi conica masculis, inferioribus 4–6 alternatim discretis; culmo elatiore, flaccido. (TAB. CCCLXXI. No. 1.)

The variety is found "in moist shady borders of the forest," *Tuckerman*. In a poor soil the spike is abbreviated, with fewer spiculæ. It resembles *C. festucacea* and *C. mirabilis*.

The specimens figured are,—

Tab. CCCLXX. From *Sartwell*; and in one the lower spicula is remote on a long exerted peduncle! showing, in these androgynous species, the same tendency in the upper vaginæ of leaves to produce spiculæ, as is so often seen in the higher groups of the genus.

Tab. CCCLXXI. 1. Specimens from *Tuckerman*: the variety with the narrow spike and lower subremote spiculæ. 2. Specimens from *Drummond*, Texas, of *C. straminea*, var.; the *C. hyalina*, *Boott*, *Boston Journ. Nat. Hist.* v. (1845).

276. *C. cristata* (*Schweinitz*); spicis 8–12 pluribusve rigidis squarrosis rotundis arcte congestis obtusis pallide viridibus subinde infima foliaceo-bracteata; perigyniis oblongo-ovalibus vel ovatis rostratis anguste alatis ciliolatis sursum serratis utrinque nervatis apertis vel subrecurvis, squama lanceolata obtusa mutica longioribus.—*C. cristata*, *Schweinitz, An. Tab.*; *Schw. et Tor.* 315. t. 25. f. 1; *Dewey*, x. 44; *Sartwell, Ews. n.* 43. *C. lagopodioides*, var., *Carey*. *C. straminea*,  $\zeta$ , *Tuck.* *C. remotiuscula*, *Wahl. Act.* 147? (TAB. CCCLXXII., CCCLXXIII.)

HAB. America septentrionali. Arctic America to Pennsylvania. Oregon, *Lyall*. Siberia, *Wahl.*

*Culmus* 2–2½-pedalis, rigidus, sæpe validus, acute triquetris, scaberrimus. *Folia* 1–3 lin. lata, elongata, apice attenuata; vaginis triquetris, laxis. *Bractea* infima nunc foliacea, spicam duplo superante. *Spica* 10 lin. ad 1½ pollicem longa, 4–6 lin. lata. *Squamæ* obtusæ. *Perigynium* 1 $\frac{7}{10}$ – $\frac{8}{10}$  lin. longum,  $\frac{8}{10}$  lin. latum, utrinque crebre nervosum, anguste alatum, ad margines basi ciliolatum, sursum serratum, divergens vel recurvatum. *Achenium*  $\frac{7}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum, obovatum, ferrugineum.

Ad *C. lagopodioidem* propius accedit quoad culmum, folia,

vaginas, et inflorescentiam. Differt spiculis minoribus rotundis rigidis, perigyniis ovatis recurvatis.

I have a specimen from M. Fischer, of Moscow, with a ticket, "*C. festucacea*, Heming legit." Heming travelled to the south of the river Don, and I infer that the specimen is from that locality, and probably is the *C. remotiuscula* of Wahlenberg, *Act. Holm.* 147, which is referred to Siberia, and by Sprengel also to North America. It is not included in the 'Flora Rossica,' where it is merely alluded to as possibly a form of *C. remota*, L. I have the same plant from the garden of my late friend Edward Forster, Esq., under the name of *C. festucacea*, and he received it from Mr. Borrer, who thought the seeds came from the north of Europe. In Tab. CCCLXXIII. are specimens figured from the Paris Garden, exactly agreeing with those from M. Fischer and Mr. Forster, and differing only from the American *C. cristata* in having a narrower spike with smaller and more alternating spiculæ, such in fact as are occasionally observable in American specimens.

I am indebted to M. Spach for the following detailed description of the plant, as growing in the Hort. Mus. Paris, which is valuable as showing its affinity to *C. lagopodioides*—

"Planta dense cæspitosa, fasciculorum sterilium loco, agens culmos steriles creberrimos, culmis spicigeris inordinatim intermixtos, simulque cum istis ortos, ½–1½-pedales, ad apicem usque foliosos, ubique foliorum vaginis obtectos, gemma foliari indefinite exerescente terminatos. Folia rigidula, infima brevia, sequentia gradatim longiora: fasciculorum sterilium superiora 4–5 in fasciculum approximata. Vaginæ foliorum insigniter carinato-triquetræ, laxæ, sursum sensim ampliata, dorso carinata. Culmi spicigeri acute triquetri, secus apicem fere tripteri, faciebus planis, plerumque carinato-costatis: angulis scabris: pars foliosa obtusa trigona. Spica plus minus tortuosa, imoque fractiflora (eo manifestius quo laxius), speciminibus gracilioribus cernua, oblique porrecta. Spiculæ nunc laxæ remotæ, nunc plus minus confertæ, tristiche alternæ (ita ut plerumque spicula quarta spiculæ infimæ superpositur), volumine vario; forma ludentes, ab exacte sphaeroidea ad ovoideam et ovalem vel turbinatam, basi nunc angustata, nunc rotundata. Spicula terminalis plerumque clavata. Perigynia sæpissime jam juvenilia patentia, excepto summa haud raro minus divergentia vel interdum suberecta; accedente maturitate plus minusve recurva, infima haud raro subdeflexa. Rarius observantur spiculæ etiam maturitate perfecta, perigyniis omnibus vel saltem plerisque vix aut ne vix divergentibus, vel perigyniis inferioribus erectis, superioribus plus minusve divergentibus."

M. Spach adds the further evidence that *C. cristata* is allied to *C. lagopodioides*, as *Carey* thought, rather than to *C. straminea*. He says:—"Culmi steriles *C. cristatæ*, eodem modo ut *C. lagopodioidis*, omni evolutionis statu facillime à *C. straminea* distinguunt; vaginæque *C. stramineæ* nec triquetræ nec laxæ et sursum ampliores, ita ut specimen vivum imo juvenile hujus speciei cum *C. cristata* confundere non licet. *C. lagopodioides* autem quoad culmum, folia eorumque vaginas, et perigyniorum directionem eodem modo se habet ac *C. cristata*—nam spiculæ, perigyniis omnibus erectis vel parum divergentibus, plus minus squarrosæ, frequentius in *C. lagopodioides* occurrunt."

As future researches into the intricacies of this puzzling group can alone satisfactorily fix its limits, I leave the question of specific claims to those who can study it in its varied native haunts, feeling at the same time that its transitions from one form or habit to another, whether considered as varieties or species, are equally interesting and important.

The specimens figured are,—

Tab. CCCLXXII. From Ohio, *Sullivant*.

Tab. CCCLXXIII. From the Paris Garden; like the *C. festucacea*, Fischer, from *Heming*, and *Hort. Borrer*, and *Forster*.

In Tab. CCCLXXIV. are specimens of *C. mirabilis*, *Dewey*, No. 1, from *Dewey*; 2, per *Dr. Barrett*; 3, Ohio, *Sullivant*; and, 4, New Jersey, *Kneiskern*.

Spicis 5–12 pallide viridibus subrotundis basi parce masculis coarctatis vel inferioribus vel omnibus discretis nudis vel setaceo-bracteatis; perigyniis ovatis vel suborbiculatis sensim plus minus attenuato-rostratis anguste alatis apertis, squama acuta longiori-

bus.—*C. mirabilis*, Dewey, *Sill.* xxx. 63; *Sartwell, Eas. n.* 46. *C. straminea*, var., *Tuckerman. C. festucacea*, var., *Carey.* (TAB. CCCLXXIV.)

HAB. Massachusetts to Ohio; along fences in pastures. Columbia River.

*Culmus*  $1\frac{1}{2}$ –3-pedalis. *Folia*  $1\frac{1}{2}$ – $2\frac{1}{2}$  lin. lata; superiora elongata. *Perigynium*  $1\frac{6}{10}$ –2 lin. longum,  $\frac{6}{10}$ – $\frac{9}{10}$  lin. latum. *Achenium*  $\frac{7}{10}$  lin. longum,  $\frac{5}{10}$  lin. latum.

An intermediate form, in colour like *C. lagopodioides* and *C. cristata*, differing from the first in its ovate sometimes suborbicular perigynium, and from the last in its less rigid spiculæ; and from *C. straminea* (*festucacea*) in its subrotund spiculæ, which, from the absence of numerous male squamæ, are of a prevalent green colour.

277. *C. fœnea* (Willdenow); spiculis 3–8 argenteo-viridibus demum stramineis ovalibus, plerumque contiguus, terminali subinde basi magis conspicue conico-mascula, infima plus minus setaceo- vel subfoliaceo-bracteata; perigyniis late ovalibus orbiculatis vel obovatis breve rostratis late alatis appressis, transversim corrugatis, squama ovata obtusiuscula vel lanceolata acuta paulo longioribus.—*C. fœnea*, *Willd. Enum.* 957 (1809); *Kunth*, 397; *Muhl.* 227; *Elliott*, 533; *Dewey*, x. 284 et xxv. 142; *Schw. et Tor.* 315; *Carey*, 516; *Chapman*, 535; *Sartwell, Eas. n.* 47. *C. straminea*,  $\beta$ , *Gay, Ann. Sc. Nat.* x. 362. *C. straminea*,  $\gamma$ , *Tor. Mon.* 395. (TAB. CCCLXXV.)

HAB. In America septentrionali et occidentali. New England to Florida. New Orleans, *Drummond, n.* 433. Mexico, *Scheide, Berlandier (Herb. Mus. Paris)*. New Granada, *Purdie (Herb. Hooker)*.

*Culmus* 1– $2\frac{1}{2}$ -pedalis, sæpe validus, lævis vel apice scabriusculus. *Folia* plana, carinata, culmo breviora. *Spiculæ* ovales, sæpius basi apiceque acutæ. *Perigynium*  $1\frac{6}{10}$ – $\frac{7}{10}$  lin. longum,  $1$ – $1\frac{1}{10}$  lin. latum, vel  $2$ – $2\frac{1}{10}$  lin. longum,  $1\frac{2}{10}$ – $\frac{4}{10}$  lin. latum. *Achenium*  $\frac{7}{10}$  lin. longum,  $\frac{5}{10}$  lin. latum, ovale, ferrugineum.

Willdenow founded his *C. fœnea* on a specimen from the Berlin Garden; and Kunth says of it, "Nil nisi forma hortensis *C. Scopariæ*." Dewey thought it intermediate between *C. straminea* and *C. scoparia*. Schw. and Torrey say it is nearly related to *C. lagopodioides*, though Torrey eventually, in his monograph, and Gay, in the *Annales*, consider it a variety of *C. straminea*. Carey thinks it differs principally from *C. festucacea* in the colour of the spikes, the constantly erect and more broadly margined perigynia. No dependence can be placed on the stoutness or smoothness of the culm. The perigynium is oval, subacute at base, or suborbicular, rounded at base and generally with a short abrupt rostrum. Olney finds it on the sandy banks of ponds and on the rocky seashore of Rhode Island; and Tuckerman on rocks near ponds at Stoneham, Massachusetts. The Mexican specimens have larger elliptic spiculæ, acute at both ends, as seen in some of the New Jersey specimens. The pale oval spiculæ with the appressed perigynia are the more apparent distinctions between *C. fœnea* and *C. straminea*.

Var.  $\beta$ ; spiculis 1–5 vivide ferrugineis ovalibus acutis vel ovatis contiguus nudis vel infima setaceo-bracteata; perigyniis ovalibus vel suborbiculato-ovatis sensim sæpe longiuscule rostratis basi subacutis rarius rotundatis, squama lanceolata acuta vel mucronata longioribus. (TAB. CCCLXXVI.)

HAB. Ohio, *Sullivant, Lesquereux*.

*Perigynium*  $2\frac{2}{10}$ – $\frac{6}{10}$  lin. longum,  $\frac{2}{10}$ – $1\frac{2}{10}$  lin. latum. *Achenium*  $\frac{7}{10}$  lin. longum, vix  $\frac{5}{10}$  lin. latum, ovale.

This variety, which in several respects is like *C. fœnea*, differs in the bright ferruginous colour of the spiculæ, and the larger rostrum. It resembles *C. scoparia*, and shows a transition between *C. fœnea* and *C. straminea*, under the last-named of which I have it from Mr. Carey. I have only seen it from Ohio. It is however not very different from the "*C. tenera*" of Olney, from Rhode Island.

Var.  $\gamma$ ; spiculis 2–10 pallidis demum stramineis plerumque alternatim remotiusculis omnibus (terminali sæpe magis conspicue) basi conico-masculis, nudis, infima subinde composita; perigyniis ovalibus vel orbiculatis e basi late alatis brevi plerumque sensim rostratis compressis appressis, plus minus plurinerviis, squama lanceolata acuminata acuta latioribus paulo longioribus vel æquantibus.—*C. adusta*, *Carey, Tuckerman (non Fl. Bor. Amer.)*. *C. festucacea*, *Sartwell, Eas. n.* 44 (ex parte), *Dewey, Olney. C. straminea*, var., *Sartwell, Eas. n.* 49. (TAB. CCCLXXVII.)

HAB. Warwick, Rhode Island, *Olney*. Chelsea, seabeach and rocky seashores. Maine, *Tuckerman*. Ipswich, in sand, *Oakes*. New York, *Sartwell*.

*Culmus* 1– $1\frac{1}{2}$ -pedalis, obtusangulus, lævis vel apice triqueter, scaber. *Folia* 1 lin. lata, rigida, basi involuta. *Bractæe* lanceolatae, squamæformes, spiculis breviores. *Spiculæ* extremæ basi magis conico-masculæ: intermediæ ovatae, parcius masculæ: omnes plerumque discretæ vel remotiusculæ. *Perigynium*  $2$ – $2\frac{3}{10}$  lin. longum,  $1\frac{2}{10}$ – $\frac{3}{10}$  lin. latum, appressum. *Achenium*  $\frac{2}{10}$  lin. longum,  $\frac{5}{10}$ – $\frac{6}{10}$  lin. latum, ferrugineum.

I have this variety under the name of "*C. straminea* with narrow fruit," from Mr. Oakes. Olney has sent it under the name of *C. straminea* and *C. festucacea*. Tuckerman included it in his *C. straminea*, var. *moniliformis*, and believed it to be *C. adusta*, from which it differs in inflorescence and compressed appressed perigynia. It is near the typical form, but differs in colour, and in the alternate spiculæ, and often nutant spikes, and involute leaves.

In Tab. CCCLXXV. are figured specimens,—

1. From New Jersey, *Torrey*.

2. New Orleans, *Drummond, n.* 433.

3. Rhode Island, *Olney*.

4. Florida, *Chapman*.

5. New Granada, *Purdie*. The spiculæ elongated, the lower remote, stalked, a *lusus* occasionally observable in other androgynous species.

In Tab. CCCLXXVI. specimens from Sullivant.

In Tab. CCCLXXVII. No. 1, specimens from Oakes; No. 2 from Olney.

278. *C. alata* (Torrey); spiculis 3–10 pallidis demum ferrugineis ovatis vel subrotundis contiguus, inferioribus subinde majoribus, suprema plus minus basi conico-mascula, infima vel inferioribus brevi setaceo-bracteatis; perigyniis orbiculato-obovatis vel obcordatis vel late ovalibus basi subacutis vel cordatis basi rotundatis abrupte vel sensim plus minus longe rostratis bifidis, late alatis ad latera late spongiosis transversim corrugatis, apertis, squama lanceolata vel ovata acuta vel hispido-mucronata longioribus triplo latioribus.—*C. alata*, *Torrey, Mon.* 396; *Sartwell, Eas. n.* 77. *C. straminea*, *Sartwell, Eas. n.* 48. *C. fœnea*, *Chapman*, 535. (TAB. CCCLXXVIII.)

HAB. New York to Florida. Rio Brazos, Texas, *Drummond*. Western Texas, *Wright*.

*Culmus*  $1\frac{1}{2}$ –3-pedalis, sæpe validus, apice nutans. *Folia*  $1\frac{1}{2}$ – $2\frac{1}{2}$  lin. lata, culmo breviora. *Spiculæ* omnes rotundatæ,



minores (5 lin. longæ, 3 lin. latæ), vel inferiores majores (9 lin. longæ, 5 lin. latæ), sæpe omnes basi parce vel subconico-masculæ. Squamæ plus minus longe mucronatæ. Perigynium 2 lin. longum,  $1\frac{6}{10}$  lin. latum, vel  $3\frac{2}{10}$  lin. longum,  $2\frac{3}{10}$  lin. latum. Achenium  $1\frac{2}{10}$  lin. longum,  $\frac{7}{10}$ — $\frac{8}{10}$  lin. latum, ovale, stipite subinde  $\frac{2}{10}$  lin. longo.

Torrey founded his *C. alata* on specimens from North Carolina and Georgia. Its range has since been extended from New York to Mexico, or Western Texas. The size of the spiculæ varies, often not much larger than those of *C. straminea*, and the mucro of the squamæ varies in length or is absent. The stipes of the achenium is not peculiar, as one longer or shorter is observable in other forms. It seems to me to be a fuller development of the *fænea* group, connecting it with the typical form of *C. straminea*. The broad obovate outline of the perigynium is perhaps the prevailing form, though the orbicular cordate form, as seen in the fully mature perigynium from Wright's specimen from Texas, is observable in northern specimens. Tuckerman, from the description of the plant, was inclined to refer it to his *C. straminea*, *a*. I have a specimen, given to me forty years ago in Paris, by M. Delisle, as the "*C. leporina*, Michaux, oryzetis Carolinæ Sept.," and I infer from the observations of Gay in the Ann. Sc. Nat. x. 362, where he remarks that Michaux's plant was *C. straminea* (*ex parte*) and from his quoting the specimen of Drummond from the Rio Brazos under *C. straminea*, var. *intermedia*, that he referred the present one to that variety, as Drummond's specimen from that locality in my own herbarium is clearly *C. alata*. Michaux included *C. scoparia* under his *C. leporina*.

In Tab. CCCLXXVIII. I have figured,—

No. 1. Specimens from Florida, *Chapman*.

No. 2. One from New York, the n. 48 of Sartwell, Car. Exs., and a perigynium and squama from Wright's specimen from Western Texas, in which the squama is without the mucro, and the perigynium  $3\frac{2}{10}$  lin. longum, and  $2\frac{3}{10}$  lin. broad.

279. *C. adusta* (Boott); spiculis 4–10 subrotundis vel basi conico-masculis pallidis vel stramineis, inferioribus remotiusculis subinde compositis bracteatis; perigyniis ovatis, orbiculatis vel ovalibus plerumque sensim rostratis bidentatis, superne anguste alatis, demum plano-convexis turgidis pallidis dorso plurinerviis, squamam lanceolatam acutam subæquantibus.—*C. adusta*, *Boott*, in *Hook. Fl. Bor. Am.* ii. 215. *C. argyrantha*, *Tuckerman*.  $\beta$ . minor, var. *angustifolia*, *Boott*, *Fl. Bor. Am.* *C. pratensis*, *Drejer*, *Rev. Crit. Car. Bor.* p. 24. (TAB. CCCLXXIX.—CCCLXXXIII.)

HAB. In America septentrionali. Arctic America to New Jersey. Carlton House, Methye Portage, etc., *Sir John Richardson*. North-west coast, in "dry shady open woods," *Douglas*, *Scouler*. Rocky Mountains, *Drummond*. Massachusetts, *Oakes*. New Hampshire, *Tuckerman*, "on rocks in woods." Rhode Island, *Olney*. New Jersey, *Knieskern*.—VAR.  $\beta$ . Greenland, *Vahl*. Carlton House, *Sir John Richardson*.

*Culmus*  $1\frac{1}{2}$ -pedalis, gracilis, obtusangulus, lævis vel apice scabriusculus. *Folia* 1–2 lin. lata, plana, culmo breviora. *Bracteæ* inferiores 1–2 subfoliaceæ, superiores squamæformes acutæ. *Spiculæ* rotundatæ, vel extremæ majores clavatæ: omnes simplices vel inferiores compositæ, subinde e spiculis 3–4 in spicam brevem dispositis. *Squamæ* lanceolatæ, pallide ferruginæ vel stramineæ vel argenteo-albidæ, perigynium longitudine et latitudine subæquantibus. *Perigynium* 2 lin. longum, 1 lin. latum, pallidum, antice 10–12-nerviis, superne anguste alatum, marginibus basi obtusis. *Achenium*  $1\frac{1}{10}$  lin. longum,  $\frac{1}{10}$  lin. latum, suborbiculatum, biconvexum, sessile, ferrugineum.

In Tab. CCCLXXIX. are figured the specimens from Cumberland House, on which the species was originally founded many years ago in the Flora Bor. Americana. They are fully mature, and with others less mature had been variously named by Dewey and Torrey in Herb. Hooker; the younger ones as *C. bromoides*, *C. leporina*, *C. straminea*, and *C. festucacea*, and the mature ones as *C. Muhlenbergii*. The specimens from the States, as is usual with *Carex*, vary in size.

In Tab. CCCLXXX. are less mature specimens from the Methye Portage, from *Sir John Richardson*.

In Tab. CCCLXXXI. a specimen from Derby County, Massachusetts, from *Mr. Oakes*, who had named it "*C. straminea*, var. *fænea*;" spiculis 12, argenteo-viridibus, inferioribus compositis; perigyniis squama lanceolata acutissima latioribus paulo brevioribus.—*Culmus*  $3\frac{1}{2}$ -pedalis, apice triqueter, scaber. *Perigynium*  $1\frac{7}{10}$ — $\frac{8}{10}$  lin. longum,  $1\frac{2}{10}$  lin. latum. *Achenium*  $\frac{8}{10}$  lin. longum,  $\frac{5}{10}$  lin. latum.

In Tab. CCCLXXXII. No. 1, a specimen from Rhode Island, *Olney*. *Perigynium*  $1\frac{9}{10}$  lin. longum,  $1\frac{2}{10}$  lin. latum. *Achenium*  $\frac{8}{10}$  lin. longum,  $\frac{5}{10}$ — $\frac{7}{10}$  lin. latum. No. 2, the *C. argyrantha*, from *Tuckerman*, from Amherst, found on rocks in woods; a more delicate form. *Perigynium*  $1\frac{5}{10}$ — $\frac{8}{10}$  lin. longum,  $\frac{8}{10}$ — $1\frac{1}{10}$  lin. latum. *Achenium*  $\frac{7}{10}$  lin. longum,  $\frac{4}{10}$ — $\frac{6}{10}$  lin. latum.

In Tab. CCCLXXXIII. small specimens too young for details. No. 1, from Carlton House, *Richardson*; the "var. *angustifolia*," Fl. Bor. Americana. No. 2, specimen from Greenland, sent to me by *Vahl* as the "*C. pratensis*, *Drejer*," *Rev. Crit. Car. Bor.* p. 24.

*C. adusta* has not been clearly understood in the United States, nor was I fully aware till lately, that it had been several times found in them. *Oakes* referred his specimen to *C. fænea*. *Tuckerman* included it in *C. straminea*, and *Carey* mistook what I have figured in Tab. CCCLXXXII. as a form of *C. fænea* for it. In 1859 *Tuckerman* described a delicate form, found on rocks in woods at Amherst, under the name of *C. argyrantha*, which, without any allusion to *C. adusta*, he thought had affinity in squamæ, etc., with *C. Deweyana*, and in fruit with *C. remota*, L. In Tab. CCCLXXIX. I have figured the original specimens from Arctic America, on which the species was founded, the turgid perigynium, with its narrow wing and many nerves, and the large orbicular achenium, leading me to consider it distinct from its allies. The figures I have given will, I hope, make it sufficiently known in its different forms, and when these are more carefully contrasted with *C. straminea* and *C. fænea*, its admitted distinction or its merging into the one or the other will be determined.

The wing of the perigynium is more or less extended downward, sometimes rather abruptly terminating below the middle of the achenium, or reaching much narrowed to the base. The nerves are generally prominent, but in the Arctic specimen with mature fruit, they would seem to become more or less obliterated, and in those perigynia with the large orbicular achenium this organ seems to encroach on the wings and lessen their breadth. In the Arctic specimens the squamæ are of the same silvery whiteness as those from the States, or are of a light chestnut or fulvous colour, white and hyaline at the margins, or eventually of a straw-colour, a difference depending on locality or age. The achenium varies in form and size, oval and narrower, or suborbicular and broader; those in *Olney's* specimen approaching the larger form of the Arctic specimens.

280. *C. straminea* (Schkuhr); spiculis 2–12 ovatis subrotundis ovalibus obovatis vel clavatis aggregatis vel approximatis vel subremotis, inferioribus rarius compositis stramineo-albo-vel glauco-viridibus, demum ferrugineis, terminali vel omnibus basi plus minus conico-vel parce masculis, nudis vel infima vel inferioribus setaceo-raro subfoliaceo-bracteatis; perigyniis compressis orbiculatis ovatis obovatis vel ovalibus basi rotundatis cordatis, vel subacutis abrupte brevi vel sensim longius rostratis, ore subintegro bidentato vel bifido antice subinde

alte secto, ad latera sæpe spongiosis corrugatis marginibus anguste vel late alatis tenuissime serrulatis utrinque plus minus nervatis appressis vel apertis, squama ovata obtusiuscula vel lanceolata acuta vel acutissima sæpe mucronulata vel aristata albo-hyalina vel superne vel omnino straminea longioribus vel subæquantibus sæpe duplo vel subtriplo latioribus.

Before alluding to the varieties of this species, I think it best to give the description of it by M. Spach, as observed by him in the Paris Garden; a large suite of specimens from which accompanied his note.

"*C. straminea* (*Hort. Paris.*) densos, e culmis numerosis (2-300) omnibus spicigeris, cæspites efformat: fasciculis sterilibus, per ætatem saltem, nullis intermixtis. Desunt omnino etiam culmi steriles, quales constanter agunt *C. lagopodioides* ejusque var. *C. cristata*, et ? *C. mirabilis*, necnon *C. arida*."

"*Culmus* obtusangulus, fructifer haud raro elegantissime reclinatus. *Folia* profunde viridia, planiuscula, substricta. *Vaginæ* arctæ, obtuse vel obsolete trigonæ; ore haud ampliato. —Facillime hoc caractere distinguitur in vivo culmus imo juvenilis *C. stramineæ* à *C. lagopodioides* et *C. cristata*, quarum vaginæ sunt sursum ampliatae, laxæ, et conspicue carinato-triquetræ. In eodem rhizomate variat, spicis strictis densis vel plus minusve laxis, rachi flexuosa, haud raro cernua; spiculis longius vel brevius clavatis, aut (præsertim in spicis densioribus) ovoidis vel ovalibus, basi vix aut ne vix angustata, et parce masculiflora. Spiculas etiam vidi rarius ex toto foemineas. Culmis aliis strictioribus et validioribus, aliis debilioribus gracilibus diffusis, plerisque foliis conspicue longioribus: paucioribus folia parum superantibus, paucissimis folia haud æquantibus. Perigynia, quoad figuram et amplitudinem polymorpha ovata, orbiculata, ovalia, obovata, abrupte brevi vel sensim longius rostrata, late vel anguste alata, modo squama vix latiora, modo squamam plus minusve superantia, nunc imo perfectissima maturitate (planta in viva) adpressa, nunc jam juventute quam scrius plus minusve divergentia, haud raro stellatim patentia. Plerumque cito brunescunt, et etiam observari haud pauca, quamvis submatura, colore viridi aut pallide stramineo adhucdum gaudentia."

In the general character I have given above of this species, I have enumerated the variations observable in it, and now proceed to notice the principal forms it assumes. It will be found that no dependence can be placed on any one single character; and if we look at specimens from various localities, we shall find the difference supposed to exist between the several recorded species to elude us. I have figured these and some others from my herbarium, which contains a large suite of specimens, and I believe that any one patiently studying the group from equally ample materials, will be obliged to admit that it is impossible to discover exclusive characters on which any satisfactory specific distinctions can be founded.

*C. straminea*, var. *tenera*; spiculis 3-6 parvis ovalibus vel obovatis contiguis vel plus minus approximatis ferrugineis nudis vel bracteatis, rachi sæpe flexuosa; perigyniis ovatis vel orbiculatis sensim brevi lateque conico-rostratis plus minus alatis pallidis, squama ovata obtusiuscula vel acuta fulva paulo latioribus longioribus. — *C. tenera*, *Dewey*, viii. 97; *Sartwell*, *Exs.* n. 45. *C. straminea*, var. *minor*, *Dewey*, xi. 318; *Tor. Cyp.* 395. *C. festucacea*, var. *tenera*, *Carey*. (TAB. CCCLXXXIV.)

HAB. Arctic America to New York.

*Culmus* 1½-pedalis, gracillimus, scaber, nutans. *Folia* ½-1 lin. lata. *Perigynium* 1- $\frac{5}{10}$ - $\frac{6}{10}$  lin. longum,  $\frac{3}{10}$  lin. latum.

*Achenium*  $\frac{6}{10}$  lin. longum,  $\frac{5}{10}$  lin. latum, sæpe suborbiculatum. *Squama* 1- $\frac{3}{10}$  lin. longa,  $\frac{3}{10}$  lin. lata.

Dewey describes the perigynium both in his *C. tenera* and his *C. straminea*, var. *minor*, as ovate, the "oblong-lanceolate" scale in *C. tenera* being about two-thirds the length of the perigynium, and in *C. straminea minor* as "ovate acute" about equal to it. This, the smallest form of the group, is clearly through the preceding variety insensibly connected with the var. *festucacea* and the typical form, and I think that gradations will be found hereafter equally connecting *C. fœnea* and *C. alata* with them.

In Tab. CCCLXXXIV. the specimens figured are from Dewey. No. 1, his "*C. tenera*," No. 2, his "*C. straminea minor*" (with perigynia and a squama from Olney's "*C. tenera*," which is referable, from the longer acuminate squama, to the following variety).

*C. straminea*, var. *aperta*; spiculis 4-8 ferrugineis omnibus plus minus (terminali sæpe conspicue) basi conico-masculis nudis; perigyniis late ovalibus vel suborbiculatis longe conico-rostratis, ore bidentato antice alte secto, divergentibus ad latera spongiosis corrugatis, squama lanceolata acuminata acutissima longioribus triplo latioribus. — *C. festucacea*, *Sartwell*, *Exs.* n. 44 (*ex parte*). *C. tenera*, *Olney*. (TAB. CCCLXXXV.)

HAB. America septentrionali. New England to New Jersey.

*Culmus* 2-pedalis, apice gracillimus, nutans. *Folia* lineam lata. *Squamæ* omnes lanceolatae, acutissimæ. *Perigynium* 2-2 $\frac{3}{10}$  lin. longum,  $\frac{3}{10}$ -1 $\frac{2}{10}$  lin. latum (rostro  $\frac{3}{10}$  lin. longo). *Achenium*  $\frac{7}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum, ovale.

I have figured these specimens to show how one form passes into others. They are intermediate between the typical form, the var. *festucacea* and *tenera* differing from *festucacea* in the gracile nutant culm, larger conical rostrum, and acuminate squamæ; and from *tenera* in the larger, more numerous spiculæ, longer acuminate squamæ, and the larger perigynium, which has a more marked divergence than in either of the above. In aspect they resemble *C. adusta*, but differ in the colour of the spiculæ, fewer nerves on the perigynium, and in the narrow oval achenium.

I have specimens from Nuttall (Cambridge), marked with a star, which was usual with him when he thought the species was new; and from Tuckerman, who found it in "wet ground by a pond, in Amherst," and who includes it in his "*C. straminea (moniliformis)*." I have two copies of Sartwell's 'Carices Exsiccatæ,' in one of which, under n. 44, he has distributed this plant as *C. festucacea*, and in the other, under the same number and name, the form I have referred in Tab. CCCLXXVII. to *C. fœnea*. The specimens from Rhode Island, sent as *C. tenera* by Olney (two perigynia and a squama of which I had figured in Tab. CCCLXXXIV. before I had received the larger form from Nuttall on the sale of his herbarium last year), merely differ in their smaller size, the squama equalling the perigynium.

In Tab. CCCLXXXV. the smaller specimen figured is the n. 44 (*ex parte*) Sartwell, *Exs.*; and the larger one from Nuttall.

*C. straminea*, var. *festucacea*; spicis 5-8 ferrugineis vel albo-viridibus, omnibus plus minus clavatis alternatim approximatis nudis, vel infima brevi setaceo-bracteatis; perigyniis ovalibus ovatis orbiculatis basi rotundatis vel subcordatis vel subacutis sensim longiuscule vel subabrupte brevius rostratis sæpe anguste alatis apertis, squama acuta vel mucronata longioribus. — *C. festucacea*, *Schkuhr*, *f.* 173; *Willd.* 242; *Kunth*, 401; *Dewey*, viii. 96; *Schw. et Tor.* 316; *Tor. Cyp.* 394; *Darlington*, 347; *Carey*, 516. *C. straminea*, var., *Gay*, *Tuckerman*, *Chapman*. *C. albo-lutescens*, *Schweinitz*. (TAB. CCCLXXXVI.)

HAB. Massachusetts to Pennsylvania, "in meadows and open woodlands," *Darlington*.

*Culmus* 1-4-pedalis, triqueter, scaber. *Folia* 1-2 lin. lata. *Perigynium*  $1\frac{4}{10}$ - $2\frac{2}{10}$  lin. longum,  $\frac{9}{10}$ -1 lin. latum. *Achenium*  $\frac{8}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum, stipitatum.

The most characteristic specimens of this form which I have are from Westchester, Pennsylvania, from Mr. Townsend, the spiculæ all conspicuously clavate, the lower half with closely imbricate male squamæ of a ferruginous colour, as in the figure of Schkuhr, but in specimens from Connecticut, from Dr. Barratt, they are white, and the upper portion of the spiculæ smaller and round. Dr. Darlington, in his 'Flora Cestrica,' describes the culm as occasionally four feet in length and decumbent. Specimens in no respect different are found with others like *C. straminea* on the same root. The specimens figured are from Westchester.

*C. straminea*, Schk. (typica); spicis 3-6 stramineis, subrotundis, omnibus basi parce masculis vel ovatis, summa vel omnibus brevi conico-masculis plus minus approximatis coarctatis vel discretis sæpe nudis; perigyniis orbiculatis abrupte brevi vel ovatis vel ovalibus sensim longius rostratis basi plerumque rotundatis late alatis apertis, squama ovata obtusiuscula vel acuta vel mucronata subduplo latioribus paulo longioribus.—*C. straminea*, Schk. f. 34 et 174; Willd. 242; Kunth, 398; Wahl. 145; Schw. et Tor. 314; Dewey, vii. 276 et xi. 157; Tuck. 17; Carey, 516; Chapman, 535; Darlington, 347; Gay, Ann. Sc. Nat. x. 362; Tor. Mon. 395; Sartwell, Exs. n. 76. (TAB. CCCLXXXVII.)

HAB. In America septentrionali.

*Culmus* 1-2-pedalis, triqueter, scaber, firmus. *Folia* 1-1½ lin. lata, culmo breviora. *Perigynium*  $1\frac{8}{10}$  lin. longum,  $1\frac{5}{10}$  lin. latum (rostro  $\frac{3}{10}$ - $\frac{4}{10}$  lin. longo), vel  $2\frac{2}{10}$  lin. longum,  $1\frac{1}{10}$ - $\frac{5}{10}$  lin. latum (rostro  $\frac{6}{10}$  lin. longo), ad latera sæpe spongiosum corrugatum. *Achenium*  $\frac{8}{10}$  lin. longum et latum, ferrugineum.

I have described above as the typical form mature specimens sent to me by Dr. Barratt from Connecticut, and which are figured in Tab. CCCLXXXVII. Among them were spikes having the character of *C. festucacea*. The inflorescence is at times coarctate or with the spiculæ alternate, more or less approximate, and with bractæ more or less setaceous, characters equally variable in all the forms. The prevalent form of the perigynium is orbicular, with a short abrupt rostrum, but it is occasionally oval or broadly ovate, with a rounded or subcordate or more or less subattenuated base, and with a longer conical rostrum.

*C. straminea*, var. *Crawei*; spiculis 6, majoribus basi conico-masculis pallidis contiguis nudis; perigyniis ovalibus ovatis vel suborbiculatis sensim longe rostratis ad latera spongiosis corrugatis late alatis, squama ovata acuta vel obtusa mutica subduplo longioribus. (TAB. CCCLXXXVIII.)

HAB. Michigan, *Crawe*. Wisconsin Prairies, *Lapham*. Darby Plains, Ohio, *Sullivant*. Connecticut, *Barratt*.

*Culmus* sub-3-pedalis, validus. *Folia* 2-3 lin. lata. *Spiculæ* 9-10 lin. longæ, 4 lin. latæ, omnes basi conico-masculæ. *Squamæ* sæpius obtusæ, muticæ. *Perigynium*  $3\frac{1}{2}$  lin. longum,  $1\frac{8}{10}$  lin. latum. *Achenium*  $1\frac{1}{10}$  lin. longum,  $\frac{7}{10}$  lin. latum.

The specimen figured is from Michigan, and *Crawe* had marked it "*C. alata*?" but it differs in the form of the perigynium and squamæ from that variety. Mr. Carey had named the Ohio speci-

mens as *C. straminea*. The pale fulvous ovate squamæ, as contrasted with the pale green of the perigynia, is striking, and while the habit is that of *C. festucacea*, the large perigynia with their broad wings and long rostrum are marked distinctions from that variety.

To this form I refer, as a small variety, the Texas plant which I published in 1845 as *C. hyalina*, the pale uniform glaucous colour of the spiculæ of which, with the undulate wings of the perigynium, led me, when I was less familiar with the variations of the group, to consider it distinct. Scheele has so considered it since, but there are no specific characters about it.

*C. hyalina*, Boott, *Boston Journ. Nat. Hist.* 1845. *C. tetra-stachys*, Scheele, *Steudel*, 198. (TAB. CCCLXXI, No. 2.)

*Culmus* flaccidus. *Folia* angusta. *Spiculæ* 2-4. *Perigynium*  $2\frac{3}{10}$ - $\frac{7}{10}$  lin. longum,  $\frac{9}{10}$ - $1\frac{3}{10}$  lin. latum, late alatum. *Achenium*  $1$ - $1\frac{1}{10}$  lin. longum,  $\frac{4}{10}$  lin. latum, oblongo-obovatum. *Squamæ* muticæ.

HAB. Texas, *Drummond*. Labady Prairies, Texas, *Schlottmann*.

I am indebted to M. Sonder for Scheele's plant, and I have the same from Chapman, without a habitat or name.

*C. straminea*, var. *Meadii*; spiculis 5-6, subrotundis contiguis pallidis basi parce masculis nudis; perigyniis ovalibus orbiculatis vel cordatis longe rostratis apertis, squama longe acuminata vel subhispidulo cuspidata latioribus longioribus. (TAB. CCCLXXXIX.)

HAB. Illinois, *Dr. Short*, *Dr. Mead*.

*Culmus* 2-pedalis, subvalidus. *Squamæ* masculæ pallide stramineæ, marginibus late albo-hyalinæ. *Perigynium*  $2\frac{3}{10}$ -3 lin. longum,  $1\frac{2}{10}$ - $\frac{4}{10}$  lin. latum, nec ad latera spongiosum. *Achenium* 1 lin. longum,  $\frac{6}{10}$  lin. latum, ovale.

The long cuspidation of the squamæ, with their broad hyaline margins, give a peculiar aspect to this form. I have it from Dr. Short, and from Mr. Carey from Dr. Mead, under the name of *C. straminea*. Mr. Carey remarks that "the broad chestnut-coloured wing and hyaline margins of the squamæ render the spiculæ less rigid." I have only seen it from Illinois. It differs from the preceding variety in the long cuspidation of the squamæ. The specimen figured is from Dr. Mead.

281. *C. stipata* (Muhlenberg); spica cylindrica vel oblongo-ovata vel hastata sæpe maxima crassa densiflora pallide olivacea demum flavida decomposita, e spiculis numerosis squarrosis congestis, inferioribus vel fere omnibus compositis nudis vel brevi setaceo-bracteatis; stigmatibus 2, brevibus; perigyniis e basi turgida truncata ovatis sensim in rostrum longum lineare attenuatis bifidis, marginibus superne acutis serratis, utrinque plurinervatis stipitatis membranaceis ima basi insigniter spongiosis divergentibus, squama ovato-lanceolata acuta vel cuspidata albida nervo viridi longioribus.—*C. stipata*, *Muhl.* 220; *Schk. f.* 132; *Willd.* 233; *Kunth*, 382; *Ell.* 529; *Schw. et Tor.* 304; *Carey*, 512; *Dewey Sill.* vii. 271 et x. 277; *Chap.* 533; *Sartwell, Exs. n.* 18. *C. vulpinoidea*, *Tor. Mon.* 390 (non *Michaux*). (TAB. CCCXC. et CCCXCI.: var. maxima, *Chapman*.)

HAB. In America septentrionali et Japan. Arctic America to Florida, Columbia River; Hakodadi, Japan, *Wright (U. St. Exp. Exped., Ringgold et Rogers)*.

*Culmus* 1-3-pedalis, latus, angulis acutissimis, faciebus concavis, flaccidus, apice scaber. *Folia* 2-9 lin. lata, culmo breviora vel æquantia. *Vaginæ* sæpe transversim corrugatæ. *Bractææ* setacæ, spiculis vix, nisi infima, longiores. *Squamæ*

conformes. *Spica* 1-4 poll. longa, 5-18 lin. lata. *Perigynium*  $2\frac{7}{10}$ -3 lin. longum, basi  $\frac{8}{10}$  lin. latum, supra basin turgidam spongiosam transversim sulcatum. *Achenium* 1 lin. longum,  $\frac{8}{10}$  lin. latum, ovatum, basi abrupte productum, lucidum, castaneum, ima basi styli clavata.

This species, as Dr. Chapman remarks to me, "attains a large size in Florida, and is very handsome." Carey describes the base of the style as "not tumid." It is clavate, and in the Florida plant subbulbous. I have observed what I have termed a spathe, or modified perigynium, giving origin to the spiculæ, as in the Indian paniculate group.

Tab. CCCXC. Specimens from Florida, *Chapman*.

Tab. CCCXCI. From the Apalachicola, Florida, *Chapman*, his "var. *maxima*."

282. *C. conjuncta* (Boott); spica lanceolata acuta pallida, e spiculis 6-12 superioribus parvis simplicibus, inferioribus laxè contignis compositis brevi setacco-bracteatis; perigyniis subcordato-ovatis sensim breviuscule conico-rostratis bidentatis membranaceis basi spongiosis utrinque 5-7-nervatis, antice nervis centralibus magis prominentibus, aliis, et postice sursum evanidis, stipitatis, squama ovata acuta vel acuminata latioribus longioribus.—*C. conjuncta*, *Boott*. *C. vulpina*, *Carey*, 512; *Dewey*, vi. 348, 2nd ser. (*non L.*) (TAB. CCCXCII.)

HAB. In America septentrionali. New York, *Torrey*. Kentucky, *Short* ("C. stipata"). Ohio, *Sullivant*. Illinois, *Mead*.

*Culmus* sæpe  $3\frac{1}{2}$ -pedalis, latus, flaccidus, angulis acutissimis, scaber, inferne foliatus. *Folia* 3-4 lin. lata, plana, glaucoviridia; vaginis membranaceis transversim corrugatis. *Spica* 2-2 $\frac{1}{2}$  poll. longa, basi 6, apicè 3 lin. lata, pallida. *Spiculæ* superiores parvæ, semper simplices; inferiores laxè contiguæ, compositæ. *Perigynium*  $1\frac{7}{10}$ - $\frac{8}{10}$  lin. longum,  $1-1\frac{2}{10}$  lin. latum, marginibus acutis scabris. *Achenium* 1 lin. longum,  $\frac{8}{10}$  lin. latum, orbiculatum, basi styli bulbosa.

A *C. vulpina*, *L.*, differt culmo flaccido; vaginis foliorum transversim corrugatis; spica laxiore pallida acuta; squamis acutis; perigynio membranaceo bidentato, rostro breviorè; achenio orbiculato, basi styli bulbosa.

The wide, very acute-angled, flaccid culm, the transverse corrugation of the vaginæ of the leaves, the pallid colour of the inflorescence, and the general aspect of the plant, would have induced me to refer it to *C. stipata*, as Dr. Torrey and Dr. Short have done, were it not for the marked difference in the form, nervation, and less prominently turgid base of the perigynium. Carey referred it to *C. vulpina*, *L.*, but I have alluded to the points in which it differs from that species.

Dewey, in Wood's Botany, refers the Nebraska plant to *C. vulpina*, but the specimen sent to me by Mr. Sartwell from that Territory, has a nerveless perigynium, and is the same as Sartwell's Exs. n. 75, "*C. cephaloidea*, Dewey." This name has been a source of confusion. I have from Dewey two distinct plants so named by himself, *C. sparganioides*, var. *minor*, and the large form of *C. cephalophora*; and Sartwell has distributed another under the same name. This last, which is the *C. sparganioides*, var. *cephaloidea*, of Carey, and which he tells me he had received from Dewey as his *C. cephaloidea*, had better retain this name, though the description in Wood's Botany is really not applicable to it, for it is there described as having an "obtusish perigynium, twice as long as the short ovate obtusish glume," characters which certainly do not apply to Sartwell's n. 75.

Tab. CCCXCII. The specimens figured are from Columbus, Ohio, *Sullivant*.

283. *C. vulpina* (*L.*); spica oblonga vel subelongata crassa obtusa densiflora decomposita demum fusco-ferru-

ginea, e spiculis pluribus squarrosis multifloris congestis, omnibus vel inferioribus compositis plus minus longe setaceo-bracteatis; stigmatibus 2; perigyniis ovatis vel ovato-vel subcordato-lanceolatis acuminato-rostratis bifidis plano-convexis, marginibus scabris plus minus sæpe obsolete nervatis, nervis 5-7, rarius pluribus, superne plerumque evanidis, stipitatis coriaceis, inferne spongiosis divergentibus ferrugineis, squama ovata acuta rarius obtusa cuspidata latioribus longioribus.—*C. vulpina*, *L.*; *Good. Lin. Trs.* ii. 161; *Schk. f.* 10; *Reichenb. t.* 217; *Kunth*, 383; *Koch*, 866; *Fries, Sum.* 73; *Anders.* 66. t. 3. f. 17; *Lang*, 34, etc. etc. *C. nemorosa*, *Rebent.*; *Schk. f.* 186; *Fries, Sum.* 73. *C. vulpina*,  $\beta$ , *Reichenb. t.* 216; *Koch*, 866. (TAB. CCCXCIII.)

HAB. In Europa, Asia, Africa.

*Radix* valide fibrosa. *Culmus* 2-3-pedalis, triquetèr, angulis acutissimis, validus, scaberrimus, "rachi spica multo auctior" (*Good.*), tamen subinde gracilior, angulis minus argutis. *Folia* 2-4 lin. lata, culmo breviora. *Bracteæ* setacæ, breves vel plus minus (sæpe conspicue) elongatæ: infima subinde foliacea. *Spica* 1-2 $\frac{1}{2}$  poll. longa (nunc abbreviata), 5-8 etiam basi 10 lin. lata, obtusa, usque ad apicem æquilata. *Spiculæ* congestæ: omnes vel inferiores (quasi lobatæ vel ramosæ) compositæ: infima rarius subdiscreta. *Perigynium* 2-2 $\frac{1}{2}$  etiam  $2\frac{8}{10}$  lin. longum,  $\frac{7}{10}$ - $1\frac{1}{10}$  lin. latum, coriaceum, inferne spongiosum; nervis utrinque 5-7, superne evanidis, sæpe subobsoletis, rarius 10-12, mediis antice sursum conspicuis. *Achenium*  $1-1\frac{2}{10}$  lin. longum,  $\frac{6}{10}$ - $\frac{8}{10}$  lin. latum, ovatum, ferrugineum, basi styli subæquali.

This species is widely diffused, and I suspect hereafter will be considered as the typical form to which, as in the case of *C. divisa*, many recorded species are to be referred. It is the var. *crassior* of Anderson (No. 1 and 2 of Tab. CCCXCIII.). His var. *nemorosa* is represented by No. 6 and 10, and his var. *elongata* by No. 3, the last having a simpler, narrower, but not longer, spike. He says these forms are analogous to those of *C. muricata*, but in none can I think there is an affinity with *C. paniculata* or *C. disticha*. The variety *nemorosa*, with its long bracts, is described as paler and with a laxer spike. Koch remarks that it is found "in umbra sylvarum;" but Lang correctly says, "interdum ad fossas apricas." I have found it in Battersea Fields, near London, in open ditches. No dependence can be placed upon the bracts or form of the spike.

I have figured spikes from various localities. In specimens from Pisa and Lisbon the nerves on the perigynium are most numerous. In those from Lisbon the perigynium is sometimes  $2\frac{8}{10}$  lines long. I have not given all the references to authors or to the synonyms of this common plant, as they can be obtained by a reference to the Floras of Europe, my chief object having been to contrast it with the American plant which Carey had referred to *C. vulpina*, *L.*

In Tab. CCCXCIII. the spikes figured are,—No. 1. From Germany, *Reichenbach*; 2. Scotland, *Dickie*, the typical form; 3. Upsal, *Fries*, his "spica elongata;" 4. Lisbon, *Sharpe*; 5. Pisa, *Parlatore*; 6. Battersea Fields, *Boott*, var. *nemorosa*; 7. Canaries, *Watson*; 8. ditto, *Bourgeau*; 9. ditto, *Webb*; 10. Sicily, *Parlatore*. The details are of No. 1, 4, 5, and 6.

284. *C. sparganioides* (Muhlenberg); spica elongata cylindrica pallida interrupta e spiculis 6-12 apice masculis densifloris, omnibus vel superioribus rotundis contiguis nudis simplicibus, inferioribus deorsum remotioribus oblongis compositis, infima nunc subfoliaceo-bracteata; stigmatibus 2; perigyniis late ovatis acuminato-rostratis vel suborbiculatis, rostro breviorè bidentatis superne e medio marginibus acutis vel subalatis serrulatis

enerviis usque ad basin membranaceis pallidis demum aureis lucidis divergentibus, squama albida ovata acuta mutica vel subinde acuminata cuspidata sæpe duplo longioribus latoribusque.—*C. sparganioides*, *Muhl.* 223; *Schk. f.* 142; *Willd.* 237; *Kunth*, 381; *Dewey, Sill.* viii. 265; *Schw. et Tor.* 305; *Elliott*, 531; *Carey*, 513; *Darlington*, 345; *Chapman*, 534; *Sartwell, Exs. n.* 20. (TAB. CCCXCIV. No. 1.)

HAB. In America septentrionali. New England to Georgia.

*Culmus*  $1\frac{1}{2}$ – $2\frac{1}{2}$ -pedalis, acutangulus, scaberrimus, strictus, firmus, gracilis, basi foliosus. *Folia* 3–4 lin. lata, flaccida, culmum subæquantia. *Vaginæ* inferiores subinde plus minus transversim corrugatæ. *Bracteæ* setaceæ, spiculis plerumque breviores, vel longiores: infima rarius foliacea,  $2\frac{1}{2}$ –4 poll. longa. *Squamæ* superiores, sæpe muticæ: inferiores cuspidatæ. *Spica* 2–4 poll. longa. *Spiculæ* inferiores, sæpe compositæ, 6–8 lin. longæ, subremotæ. *Perigynium*  $1\frac{6}{10}$ – $2\frac{2}{10}$  lin. longum, 1 lin. latum. *Achenium*  $\frac{8}{10}$ – $1\frac{1}{10}$  lin. longum,  $\frac{7}{10}$  lin. latum, ovato-orbiculatum, basi abrupte productum, basi styli decidua plus minus clavata.

Var.  $\beta$ . *minor*; spica abbreviata; spiculis paucioribus contiguis; squamis muticis; foliis angustioribus; culmo brevior; perigyniis membranaceis.—*C. cephalophora*,  $\beta$ , *Tor. N. Am. Cyp.* 389. *C. cephaloidea*, *Dewey (ex parte)*. *C. muricata*,  $\beta$  *cephaloidea*, *Dewey, Sill.* ii. 307. (TAB. CCCXCIV. No. 2.)

The var.  $\beta$  is simply a reduced form. It resembles what I have figured (Tab. CCCXCV.) as the *C. cephaloidea* of Dewey, but differs in its membranous perigynium and squamæ.

Tab. CCCXCIV. The specimens figured are,—No. 1. N. York, *Sartwell's Exs. n.* 20. 2. Var. *minor*, Michigan, from *Dewey*, sent to *Carey* as "*C. cephaloidea*, Dewey."

285. *C. cephaloidea* (*Dewey*); spica pallida demum straminea oblonga, e spiculis 5–6 ovatis contiguis bracteatis apice masculis; stigmatibus 2; perigyniis ovatis vel orbiculato-ovatis rostratis acute bifidis marginibus superne subalatis scabris enerviis basi spongiosis pallidis, squama lanceolata acuminata cuspidata brevioribus vel subæquantibus.—*C. cephaloidea*, *Dewey (ex parte)*; *Sartwell, Exs. n.* 75. *C. sparganioides v. cephaloidea*, *Carey*, 513. (TAB. CCCXCV.)

HAB. In America septentrionali. Illinois, *Vasey*. Nebraska, *Heyden (e Sartwell, Herb. Boott)*.

*Culmus*  $1\frac{1}{2}$ – $3\frac{1}{2}$ -pedalis, gracilis, scaber, inferne foliatus. *Folia*  $1\frac{1}{2}$ –3 lin. lata, culmo breviora. *Bracteæ* setaceæ: inferiores spiculis longiores. *Spica* 9–16 lin. longa, 4 lin. lata. *Squamæ* inferiores longius cuspidatæ. *Perigynium*  $1\frac{8}{10}$ –2 lin. longum,  $\frac{8}{10}$ – $1\frac{2}{10}$  lin. latum, membranaceum, divergens, rostro subinde brevi. *Achenium*  $\frac{9}{10}$  lin. longum,  $\frac{8}{10}$ – $\frac{9}{10}$  lin. latum, orbiculatum, basi styli decidua bulbosa.

In habit and aspect like *C. sparganioides*, var. *minor*, but differs in the lanceolate cuspidate squamæ, in the spongy base of the perigynium, which is winged at the margins and acutely bifid, and in the bulbous base of the deciduous style. All the spiculæ are occasionally furnished with setaceous bracteæ. The vaginæ of the leaves not corrugate.

I am not aware that Dewey has anywhere described his *C. cephaloidea*, except in Wood's Botany; and the description, as I have remarked under *C. conjuncta*, does not apply to the present plant. I have ventured to give the name to it, as Dewey has included it under the name of *C. cephaloidea*. I have pointed out in what re-

spects it differs from the small form of *C. sparganioides*, with which it has been confounded. Future observers will, I have no doubt, diminish the number of species of this androgynous group; but before they can do so satisfactorily, they must have clear notions of the forms that have been described as species by different authors.

Tab. CCCXCV. The specimens figured are from Illinois, *Vasey*.

286. *C. cephalophora* (*Muhlenberg*); spica parva rotunda ovata vel suboblonga capitata pallida concolori, e spiculis 3–6 parvis simplicibus plerumque arctissime congestis, inferioribus setaceo-bracteatis; bracteis sæpius reflexis; stigmatibus 2; perigyniis ovatis ovalibus vel suborbiculatis acuminato-rostratis bifidis marginibus subalatis serrulatis enerviis vel dorso 3–4-nervatis membranaceis patentibus vel reflexis, squama ovata acuta vel obtusa plus minus cuspidata alba nervo viridi latoribus longioribus vel (cuspidate) brevioribus.—*C. cephalophora*, *Muhl.* 218; *Schk. f.* 133; *Willd.* 220; *Kunth*, 387; *Dewey, Sill.* x. 268; *Schw. et Tor.* 300; *Tor. Mon.* 389; *Ell.* 526; *Darlington*, 345; *Carey*, 513; *Chap.* 534; *Sartwell, Exs. n.* 22 et n. 21, "*C. cephaloidea*." *C. cephaloidea*, *Dewey (ex parte)*. (TAB. CCCXCVI., CCCXCVII.)

HAB. In America septentrionali. Canada to Florida, "on grassy hillsides and shady river-banks, often in very dry situations, seldom twenty inches high, or four to five feet, decumbent among bushes," *Schw. et Tor.*

Var.  $\beta$ . *angustifolia*; minor.—*C. Leavenworthii*, *Dewey, Sill.* ii. 246, 2nd ser.; *Sartwell, Exs. n.* 73. (TAB. CCCXCVIII.)

HAB. Louisiana, Texas, N. Mexico, *Wright*. Guiana (*Herb. Hook.*). Rocky Mountains, *Nuttall (Herb. Boott)*.

*Culmus* 9-pollicaris, erectus, vel 4–5-pedalis, decumbens, obtusangulus, apice acute triqueter, scaber, firmus, basi foliatus. *Folia*  $1$ – $2\frac{1}{2}$  lin. lata, elongata, plana, culmo longiora vel breviora. *Bracteæ* setaceæ, spiculis sæpe longiores, infima subinde spica longior, patentibus vel reflexis. *Spica* parva, rotundata vel ovata, densa, capitata vel suboblonga, 4–9 lin. longa, 3–5 lin. lata. *Spiculæ* congestæ: inferiores vix unquam discretæ. *Squamæ* acutæ vel obtusæ; inferiores longius cuspidatæ: masculæ sæpe muticæ. *Perigynium*  $1\frac{4}{10}$ – $\frac{9}{10}$  lin. longum,  $\frac{7}{10}$ –1 lin. latum; nervis antice 3–4 sæpius obsoletis vel carentibus; membranaceum, pallidum, demum flavidum vel purpureum, marginibus pallidis. *Achenium*  $\frac{7}{10}$ – $\frac{8}{10}$  lin. longum et latum, orbiculatum vel ovatum, basi styli plus minus bulboso-castaneum.

This species is allied to *C. Muhlenbergii*, to the small form of *C. sparganioides*, and to what I have considered as the *C. cephaloidea* of Dewey. It differs from *C. Muhlenbergii*, in its soft, membranous, and generally nerveless perigynium, and its longer plane leaves; from *C. sparganioides*,  $\beta$ , in its smaller spike, cuspidate squamæ, and occasionally nerved perigynium; and from *C. cephaloidea* in the smaller, ovate, often obtuse squama, and smaller perigynium, which in the typical form is not spongy at base. In its most characteristic form it is distinguishable from all by its small capitulate spike. If this should be considered merely as a depauperate form, then I think that, with *C. cephaloidea*, it must merge into *C. sparganioides*, from the texture of the perigynium.

I can see nothing to justify the separation of *C. Leavenworthii*. Specimens from Illinois from Dr. Mead show the transition from the one to the other. The perigynium of *C. cephalophora* is generally membranous to the base, but in some specimens, as in *C. Leavenworthii*, it is spongy at base or at the lower margins,—a character in some cases the result of a deposition of spongy matter

as the fruit ripens. Muhlenberg describes the perigynium of *C. cephalophora* as "flavescens, demum atra." I observe this dark colour in a specimen from New Mexico from *Wright*, and in others from the Rocky Mountains from *Nuttall*.

The specimens figured are,—

Tab. CCCXCVI. No. 1. Pennsylvania, *Schweinitz*. 2. Dexter, New York, *Vasey*.

Tab. CCCXCVII. Auburn, New York, *Carey*. These specimens represent the "*C. cephaloidea*," Sartwell, n. 21, and I suspect are those described under that name by Dewey in Wood's Botany.

Tab. CCCXCVIII. are the "*C. Leavenworthii*," Sartwell, Exs. n. 73, from Louisiana, *Hale*.

287. *C. Muhlenbergii* (Schkuhr); spica ovata vel oblongo-cylindracea pallida, e spiculis 3-9 ovatis, superioribus vel omnibus simplicibus congestis vel inferioribus subdiscretis longiuscule setaceo-bracteatis, infima rarius composita: stigmatibus 2; perigyniis orbiculatis ovalibus vel ovatis brevi lateque rostratis alte bifidis utrinque crebre valideque nervosis, superne anguste alatis serratis, imbricatis demum patentibus subcoriaceis pallidis, squama lanceolato-ovata acuta vel obtusa plus minus longe cuspidata albida nervo viridi latioribus brevioribus vel longioribus.—*C. Muhlenbergii*, *Schk. f.* 178; *Willd.* 231; *Kunth*, 381 (*excl. descript. ejus*); *Muhl.* 221; *Schw. et Tor.* 304; *Dewey, Sill.* viii. 265; *Ell.* 529; *Carey*, 513; *Darlington*, 346; *Chap.* 534; *Sartwell, Exs.* n. 23. *C. piniaria*, *Bose*. *C. pinetorum*, *Willd. Herb. Schlecht. Linnæa*, x. 265. (TAB. CCCXCIX.)

Var.  $\beta$ . *enervis*; squamis sæpe muticis; perigyniis obsolete vel prorsus enerviis. (TAB. CCCC.)

HAB. In America septentrionali. Dry fields and hillsides, in sand and gravel. Hudson's Bay to Texas.

*a. Culmus* 1-2-pedalis, gracilis, striatus, rigidus, scaber. *Folia* 1-2 lin. lata, rigida, carinata, plus minus conduplicata, culmo breviora vel æquantia. *Bractea* setacea, spiculis plerumque longiores: ad aspectum (cum squamis longiuscule cuspidatis) comosum, spicæ præbentes; infima subinde 4-polliearis. *Squama* plus minus cuspidata, rarius muticæ. *Spica* 6-18 lin. longa, 3-5 lin. lata, abbreviata, ovata, vel oblonga, cylindracea. *Perigynium* orbiculatum, vel ovatum, basi rotundatum; vel ovale, basi acutum,  $1\frac{7}{10}$ -2 lin. longum,  $\frac{7}{10}$ - $1\frac{2}{10}$  lin. latum, breve lateque rostratum, rostro (in formâ ovali) paulo longiore: *typice* plurinervium, rarius nervis plus minus obsolete, subcoriaceum (nec basi spongiosum), marginibus recurvis. *Achenium*  $\frac{9}{10}$ - $1\frac{2}{10}$  lin. longum,  $\frac{8}{10}$ -1 lin. latum, orbiculatum; vel oblongum, basi productum, demum ferrugineum. *Stylus* perbrevis, basi decidua, clavata vel bulbosa, sessili.

Var.  $\beta$ ; spiculis ebracteatis; squamis breve cuspidatis, etiam muticis; perigyniis subcoriaceis, nervis minus distinctis, antice ad latera obsolete, postice (vel utrinque) carentibus.

This species, in its typical form, with orbicular strongly-nerved perigynia, long bracts, and aristate squamæ, is sufficiently distinct. But it varies in the form and degree of nervation of the perigynia, in the length of the bracts, and arista of the squamæ. Still, in all its forms it is recognizable by the rigid culm and leaves, and the firm, not membranous texture of the perigynium, which in *a* and *\beta* is not spongy at base. The base of the very short style is sessile on the body of the achenium, varying in thickness, and Schkuhr's beautiful figure in this respect is an exception to what I have observed. In the nerveless form of the perigynium, the resemblance is great to *C. cephaloidea*, but the broader flexible leaves and the thin membranous perigynium, which is spongy at base, of that plant, afford marks of distinction.

The specimens figured are,—

Tab. CCCXCIX. From Connecticut, *Dr. Barratt*.

Tab. CCCC. Highlands, Hudson River, *Mr. Russell*.

288. *C. Brongniartii* (Kunth); spica ovata oblonga vel cylindracea densiflora demum ferruginea, e spiculis pluribus multifloris apice masculis congestis, inferioribus compositis subinde discretis bracteatis; stigmatibus 2; perigyniis ovatis vel suborbiculatis rostratis bidentatis compressis nervatis marginibus acutis scabris appressis fusco-ferrugineis basi spongiosis, squama rotundata obtusa vel ovata acuta cuspidata latioribus longioribus.—*C. Brongniartii*, *Kunth*, 380; *Desv. Fl. Chil.* vi. 208. *C. Muhlenbergii*, *Brongn. (Duperry, It. Bot.)* 151. *C. muricata*, *Schlecht. Linnæa*, vi. 29 (*fide Kunth*). *C. Xalapensis*, *Kunth*, 350. *C. hypoxanthus*, *Steud. Syn.* 193. (TAB. CCCCI.-CCCIII.)

HAB. In Mexico, California, Chili, Xalappa, *Kunth*. Valdivia, *Gay*. Napa Valley, San Francisco, Mariposa, *Thurber*. Arigua, *Lechler*, n. 738. Concepcion, *D'Urville*.

*Radix* lignosa, valide fibrosa. *Culmus* 1-2-pedalis, gracilis, triquetus, apice scabriusculus, inferne foliatus. *Folia* 2 lin. lata, firma, plana, culmo breviora, demum flavida. *Bractea* infima subsetacea, spica brevior, vel plures, subfoliaceæ, longiores. *Spica* abbreviata, vix 1- vel  $1\frac{1}{2}$ -pollicaris, 6 lin. lata. *Squama* pallidæ, lateribus ferrugineis. *Perigynium*  $1\frac{5}{10}$ - $\frac{9}{10}$  lin. longum,  $\frac{8}{10}$ -1 lin. latum (rostro  $\frac{5}{10}$  lin. longo), nervis antice 7-9 postice 4-5 sursum conspicuis. *Achenium*  $\frac{8}{10}$ - $\frac{9}{10}$  lin. longum,  $\frac{5}{10}$ - $\frac{6}{10}$  lin. latum, late ovatum, basi productum. *Stylus* bulbosus, ima basi constrictus.

A *C. vulpina*, L., differt perigyniis sæpe orbiculatis, appressis, magis compressis; rostro brevioribus; basi styli bulbosa; culmo gracili.

A *C. Muhlenbergii*, Schk., differt perigyniis basi spongiosis appressis fusco-ferrugineis, rostro longiore, ima basi styli constricta; spica majore multiflora.

Kunth, as *Gay* remarks (*Ann. Sc. Nat.* x. 356, 1838), does not seem to have had a clear conception of *C. Muhlenbergii*, Schk., for he has given Willdenow's character with a reference to *Schkuhr's figure*, 178, but has appended the description of a specimen from Jacquemont, which he had received under the name of *C. vulpinoidea*, and which, as *Gay* has shown, was the true plant of Michaux. The "spicæ propriæ complures: utriculi enerviî stramineo-flavidi" apply to it and do not to *C. Muhlenbergii*.

I have adopted Kunth's name for Brongniart's plant, thus separating it from *C. Muhlenbergii*, to which Brongniart had referred it, and have united with it *C. Xalapensis*, Kunth, and *C. hypoxanthus*, Steudel, a specimen of which I owe to the kindness of M. Sonder of Hamburg, who procured for me several of the plants of Lechler.

The specimens figured are,—

Tab. CCCCI. No. 1. The authentic specimen of *C. Brongniartii* of Kunth, from the Berlin Herbarium, sent to me for examination. 2. A specimen from Valdivia, *Gay*.

Tab. CCCCII. Specimens from California, *Bigelow*, in Whipple's Exploration to the Pacific (from *Herb. Hooker*), like a rough outline of *C. Xalapensis*, which I have from the Berlin Herbarium.

Tab. CCCCIII. Specimens of the *C. hypoxanthus*, Steudel, from *Lechler*, n. 738, procured for me by M. Sonder.

289. *C. vulpinoidea* (Michaux); spica composita vel decomposita oblonga vel elongata conglomerata sæpe basi interrupta pallida demum straminea vel ferruginea, e spiculis numerosis androgynis apice parce masculis densifloris deorsum in ramis sessilibus compositis insi-

dentibus plus minus setaceo-bracteatis; stigmatibus 2 perigyniis ovatis sensim acuminato-rostratis compressis membranaceis vel suborbiculatis abrupte brevius rostratis plano-convexis bifidis lateribus demum spongiosis, marginibus superne acutis serratis antice medio 3-4 leviter nervatis, postice enerviis, arcte imbricatis demum divergentibus, squama ovata acuta vel obtusa pallide ferruginea nervo viridi cuspidata latioribus (cuspidate) brevioribus vel subæquantibus.—*C. vulpinoidea*, *Mich.* ii. 169; *Gay, Ann. Sc. Nat. tome x. 356. 2nd ser. 1838; Carey, l. c. 512; Darlington, l. c. 345; Sartwell, Exs. n. 16; Chap. 533.* *C. microsperma*, *Wahl. Act. Holm. 144 (Fl. Lap. 250).* *C. multiflora*, *Muhl. 222; Willd. 243; Schk. f. 144; Kunth, 387; Elliot, 530; Schw. et Tor. 306; Tor. Mon. 390; Dewey, ix. 60, et xi. 316.* *C. polymorpha*, *Schw. Ann. Tab. C. bracteosa*, *Schw. Ann. Tab.* ("quam nusquam inveni," *Kunth*). *C. Muhlenbergii*, *Kunth, 381 (descript. ejus), non Schk.* *C. setacea*, *Dewey, ix. 61; Tor. et Schw. 307; Tor. Mon. 390.* *C. scabrior*, *Sartwell, Exs. n. 72; Dewey, vi. (2 ser.) 349.* *C. vulpinæformis*, *Tuck. En. 9.* (TAB. CCCCIV.—CCCCIX.)

HAB. In America septentrionali et meridionali, et regione Caucasica! Arctic America, *Richardson.* Texas, *Drummond.* Louisiana, *Hale.* Paramo de Cuchero, New Granada, *Purdie, Herb. Hooker.* Caucasus, *Fischer.* "*C. nemorosa*" (*Herb. Boott*).

*Culmus* 1-2½-pedalis, triquetus, plus minus validus, scaber, inferne foliatus. *Folia* ½-2 lin. lata, plerumque culmo longiora, firma. *Vaginæ* intus membranaceæ, demum transverse corrugatæ, sæpe punctis resinosis ferrugineis conspersæ. *Bracteæ* plerumque setaceæ, admodum variabiles: infima quandoque subpedalis, inferiores sæpe clongatæ, vel omnes abbreviatæ vel inconspicuæ. *Spica* ½-3 etiam 5½ poll. longa, 3 vel basi 6-10 lin. lata, coarctata, vel basi ramis ovatis lobatis vel oblongis sessilibus magis compositis distinctis interrupta. *Spiculæ* ovatæ, dense aggregatæ, apice parve masculæ, densifloræ. *Squamæ* conformes, acutæ vel obtusissimæ: masculæ brevius cuspidatæ: fœminæ plus minus cuspidatæ, rarius cuspidate perigynium subæquantæ vel eo brevioræ. *Perigynium* 1- $\frac{2}{10}$ - $\frac{6}{10}$  lin. longum,  $\frac{1}{10}$ - $1\frac{1}{10}$  lin. latum: *immaturum* pallidum, membranaceum: *maturum* aurantiacum, demum, præcipue ad latera, spongiosum, achenio duplo vel triplo latius, quandoque enervium, plerumque antice medio 3-4 leviter nervatum, postice enerve, rarius 2-3-nervatum, rostro plus minus longo. In speciminibus e *Louisiana* et *Texas* perigynium latius ( $1\frac{1}{10}$  lin. latum) utrinque nervatum, fusco-ferrugineum, punctis resinosis conspersum. *Achenium*  $\frac{7}{10}$  lin. longum,  $\frac{5}{10}$  lin. latum, subrotundum, basi productum, abrupte apiculatum, basi styli clavata vel bulboso-incrassata, ferruginea.

This species, which is very common in the United States, extending from the British possessions to Texas, varies exceedingly in all its parts, but so insensibly that I know not how any one form, unless arbitrarily, can be distinguished even as a variety. The apparent distinction is in the size of the spike, the presence of several long, or the absence of, bracts, the length of the cuspidate of the scales, and the form and texture of the perigynium. This variation in the perigynium is certainly very striking, depending on its form, the length and more or less abruptness of the rostrum, and the membranous or almost subcoriaceous character of its substance. I think the substance and the form in some degree depend on the deposition of spongy matter, as it ripens, especially at the sides, but also throughout the whole body of the perigynium. It is owing to this deposition that the early ovate shape

becomes more subrotund, and changes from a compressed to a distinctly plano-convex form, and the rostrum, which on one and the same specimen varies in length, ultimately from the lateral distention of the body of the perigynium, becomes more abrupt. This deposition however of spongy matter would seem to be greater in some specimens than others, and the perigynia, where it is less, to preserve more of the membranous texture even to maturity. The *C. setacea*, Dewey, and *C. scabrior*, which are undistinguishable, were founded on immature specimens. No dependence can be placed on the degree of roughness either on the margins of the perigynium or of the culm, on the length of the bracts, or scales, or rostrum. The figure of Schk. was taken from too young a specimen, and Wahlenberg must have had as young a one, as his name of *C. microsperma* would imply. He refers his plant to Schkuhr's figure and makes *C. cephalophora* a variety of it. What Dewey means by his var. *microsperma* I know not, for neither his specimens nor his description differ from his specimens of *C. multiflora*, all in a young state. I observe in many specimens small resinous spots on the membranous portion of the foliaceous vaginæ: and these occur even on the perigynia of the specimens from Louisiana and Texas. This last character I have not noticed in the more northern plant. In Tab. CCCCIV. I have figured the spike of the specimen from the Caucasus, sent to me several years ago by the late M. Fischer of Moscow, under the name of *C. nemorosa*, W. Mr. Purdie has found this species in New Granada.

Gay (Ann. Sc. Nat. x. 356; 1838), remarks,—“Non *C. Muhlenbergii* nec *C. vulpinoidea*, Kunthio satis cognita fuisse videtur, qui Caricem, nomine *vulpinoidea*, à *Jacquemontio* acceptam ad *C. Muhlenbergii* retulit. Quæ *vulpinoidea* (inscripta in *Herb. Jacquemont*) reapse ad *C. vulpinoideam veram* pertinet.”

The specimens figured are,—

Tab. CCCCIV. No. 1. From Massachusetts, from Mr. Lowell, No. 2, a spike from Dewey. No. 3, one from Barratt; his “var. *glomerata*,” from Middletown Meadows, Connecticut.

Tab. CCCCIV. No. 1. Specimens from Ohio, *Sullivant*, with the vaginæ transversely corrugate, as is often the case. No. 2. A spike from the “*C. nemorosa*,” Fischer, from the Caucasus.

Tab. CCCCIV. No. 1. Specimens from Connecticut, the “var. *ambigua*,” Barratt, the perigynia differing in form, occasionally orbicular, with a short rostrum, like those from Texas and Louisiana, but without resinous spots.

Tab. CCCCIV. No. 1. Specimens from Arctic America, *Richardson*, the perigynia with a cordate base.

Tab. CCCCIV. No. 1. Specimens of Sartwell's Exs. n. 72, “*C. scabrior*,” the vaginæ occasionally spotted. No. 2. Perigynia and squamæ of “*C. setacea*,” Dewey.

Tab. CCCCIX. Specimens from Ohio, *Sullivant*, his “*C. setacea*?” No. 2. Perigynia and achenium of specimens from Texas, *Drummond*; the form “*platycarpa brevirostris*” of Gay, Ann. Sc. Nat. (1838) p. 357.

290. *C. disticha* (Hudson); spica oblonga vel subelongata pallide vel fusco-ferruginea, e spiculis pluribus polygamis contiguis vel inferioribus discretis, extremis plerumque subfœmineis apice masculis, intermediis submasculis, vel rarius inferioribus vel omnibus fœmineis vel apice masculis; bracteis squamæformibus cuspidatis, infima sæpe elongata; stigmatibus 2; perigyniis ovatis vel ovalibus plus minus rostratis, ore antice secto demum bifido plano, convexis utrinque nervatis marginibus superne acutis vel anguste alatis scabris stipitatis membranaceis, squama ovata acuta ferruginea margine hyalina longioribus.—*C. disticha*, *Huds.; Koch, 865; Anderson, 60. t. 3. f. 15; Lang, 31; Sartwell, Exs. n. 71.* *C. intermedia*, *Good. Lin. Trs. ii. 154; Willd. 244; Kunth, 376; Schk. f. 7; Fl. Brit. 972; Eng. Bot. t. 2042; Wahl. Act. 144; Reichenb. t. 210; Ledebour, 210; Dewey, Sill. iv. 343 (1847); Fl. Ross. 273.* *C.*

spicata, *Pall. Lam.* *C. arenaria*, *Leers, t. 14. f. 2.* *C. multiformis*, *Thwill.* *C. pseudo-arenaria*, *Pers.* *C. modesta*, *Gay, Ann. Sc. Nat. x. 304 (1838).* *C. Sartwellii*, *Dewey, Sill. xliii. 90; Sartwell, Ews. n. 12; Carey, 511.* *β. repens*, *Reich. t. 210. n. 553.* *C. repens*, *Bellard, Schk. f. 135.* (TAB. CCCCX.)

HAB. In Europe, Norway to Italy. Asia, Altai, Baikal, Davuria. N. America, Carlton House, *Richardson.* Saskatchewan Prairies, *Bourgeau.* New York, *Sartwell.* Wisconsin, *Lapham.* Illinois, *Vasey.*

*Rhizoma* profunde repens, squamis lanceolatis obtectum, fasciculos foliorum culmosque spicigeros ad intervalla proferens. *Culmus* 1-2-pedalis, acute triqueter, scaber, basi rudimentis vaginisque foliorum clausus. *Folia* 1-2 lin. lata, culmo breviora, plana, læte viridia. *Bractea* e basi ovato-lanceolata cuspidatæ: inferiores spiculis sæpe longiores, vel infima spicam subæquans. *Squamæ* ovatæ, acutæ, ferrugineæ vel pallidæ. *Spica* 1-3 poll. longa, 3-8 lin. lata, forma varians, oblongo-ovata vel lineari-elongata, vel lanceolata, vel ad mediam partem contracta. *Spiculæ* distributione staminum æque variabiles: *terminalis* et *mediæ* masculæ vel apice masculæ: *intermediæ* masculæ vel fere omnino masculæ: *inferiores* fœminæ: rarius *omnes* fœminæ vel apice masculæ, ovatæ, ellipticæ, vel subrotundæ, congestæ, vel inferiores discretæ. *Perigynium* 1½-2½ lin. longum,  $\frac{7}{10}$ - $\frac{8}{10}$  lin. latum, plus minus longe rostratum. *Achenium*  $\frac{8}{10}$  lin. longum,  $\frac{1}{2}$  lin. latum, ovatum, ferrugineum, basi styli æquali.

I see no characters to distinguish *C. Sartwellii* from the European *C. disticha*. It is often of a paler colour, more slender, and with smaller spiculæ, as if growing in a drier clime, but I have specimens from France and Germany entirely agreeing with it. In the distribution of the stamens there is the same variableness, the general character in both being "spiculis apice masculis," though there is a tendency in some spiculæ to a predominance of the male or female florets, some being entirely male or female. Goodenough says,—“Spiculis 8-20 infimis et terminali subfœmineis; in fœmineis scilicet sæpius flos unus aut alter masculus, et in masculis fœmineus conspiciendus est; flores fœminei semper inferiores.”

The perigynium in the European plant varies in length (1½-2½ lines long); in the American it is smaller (8½-2 lines long). I believe in both the orifice is normally entire. The margin is sometimes simply acute, or there is a narrow wing extending nearly to the base.

Smith, in the Eng. Fl., refers the *C. repens*, Bellard, to *C. arenaria*. Reichenbach considers it as a variety of his *C. intermedia*, and, I think, correctly.

Bentham (Handbook, 561) considers *C. disticha* as “an inland variety, growing in marshy ground and wet meadows, of *C. arenaria*, L.”—certainly a very variable plant. The chief distinctions are, that *C. arenaria* is found in the deep sand of the sea-

coast, with a much more diffused rhizome, shorter, often fasciated culms, rigid canaliculate leaves ending in an attenuate curved apex, a broader spike, the spiculæ occasionally male at base (which has never been observed in *C. disticha*), cuspidate squamæ, perigynium spongy at the sides and base, with generally a broader wing, which is often obliquely truncate at base.

Tab. CCCCX. The specimens figured are from Illinois, *Vasey*, with perigynia and achenia (No. 2) from a specimen from France, showing the difference of their form and size in the European plant.

291. *C. Gayana* (Desvaux); spica (subinde dioica!) ovata capitata fusco-ferruginea, e spiculis apice masculis (*Gay*), vel masculis vel fœmineis pluribus arcte congestis, inferioribus compositis; bracteis setaceis spica brevioribus; stigmatibus 2; perigyniis suborbiculatis brevi conico-rostellatis, ore minimo hyalino antice alte secto, superne ad margines scabris nitidis crasse spongiosis castaneis, squama ovata acuminata cuspidata fusco-ferruginea apice albo-hyalina angustioribus brevioribus.—*C. Gayana*, *Desv. Fl. Chil.* p. 205 (*fide spec. in Herb. Mus. Paris*). (TAB. CCCCXI.)

“Spicis crebris, apice masculis, fere in uno eodemque culmo totis masculis vel fœmineis in paniculam spicæformam ovatam dense congestis, saturate fuscis; utriculo 1-1½ lin. longo nervio nitido ovato-rotundato, rostro fere nullo, superne angulis denticulato-scabris, ore truncato scarioso bidentato; achenio obovato-rotundato.”—*Fl. Chil.*

HAB. In Chili, *Gay.* Nov. Mexico, *Fendler, n. 881.* Base of the Rocky Mountains, *Bourgeau (Herb. Hooker).*

*Rhizoma* repens. *Culmus* subpedalis, triqueter, scaber. *Folia* 1 lin. lata, culmo breviora, pallide viridia. *Spica* 8-10 lin. longa, 6-7 lin. lata. *Perigynium* 1-1½ lin. longum,  $\frac{7}{10}$  lin. latum; ore antice secto, una margine albo-hyalina supra alteram jacentæ, ad mediam partem antice quasi sulcatum, ibique 2-3 nervis notatum, lateribus convexis, postice enerve. *Achenium*  $\frac{7}{10}$  lin. longum,  $\frac{5}{10}$  lin. latum, orbiculatum, basi productum.

*C. decompositæ*, *Dewey*, proxima; differt et ab affinibus spica congesta capitata.

In Fendler's and Bourgeau's specimens I could not discover any male florets. Willdenow remarks their occasional absence in *C. paradoxa*, one of the group to which *C. Gayana* belongs. With Gay's specimen in the Herb. Mus. Paris, which I examined, there was one, about 3 or 4 inches high, with lax male spiculæ; and not having then seen the 'Flora Chilensis,' in which the dioicous character of the species is mentioned, I did not suppose that it belonged to it, and thus failed to figure it.

Tab. CCCCXI. The specimens figured are from the base of the Rocky Mountains, *Bourgeau (Herb. Hooker).*

THE END.





C. FILICINA.γ.





C. FILICINA.





C. FILICINA.





C. FILICINA (MEIOGYNE)



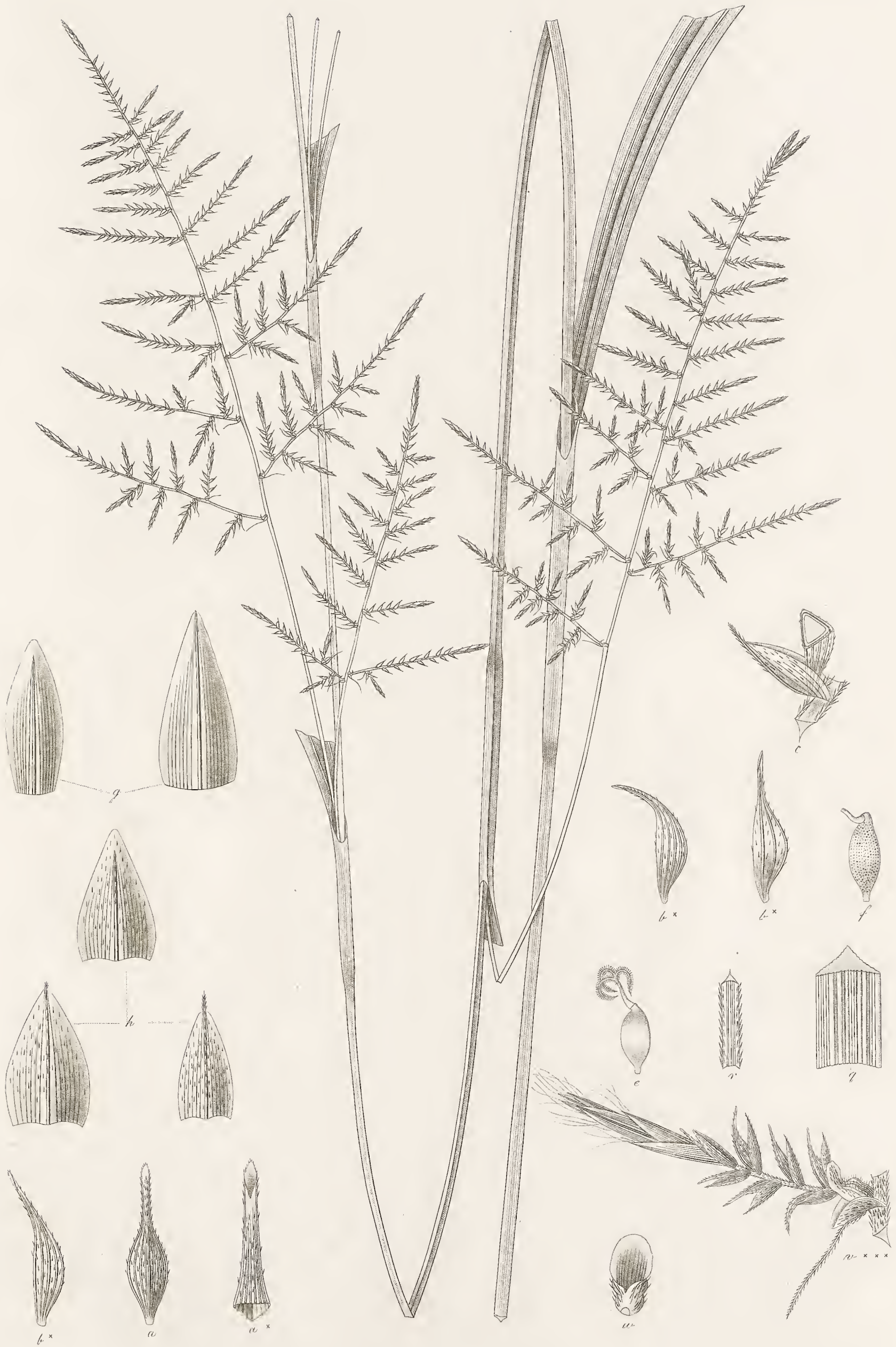




C. FILICINA.

M





C. FILICINA.

M.





C. FILICINA. (MINOR)





C. FILICINA. (MINOR)







C. CRUCIATA.





C. CRUCIATA.





C. A M O E N A.

57





C. RAMOSA.







C. VESICULOSA.

M.

p.





C. CUMINGIANA.

(Spec. Gam.)





C. CUMINGIANA.

11.

12.





C IMPUNCTATA.











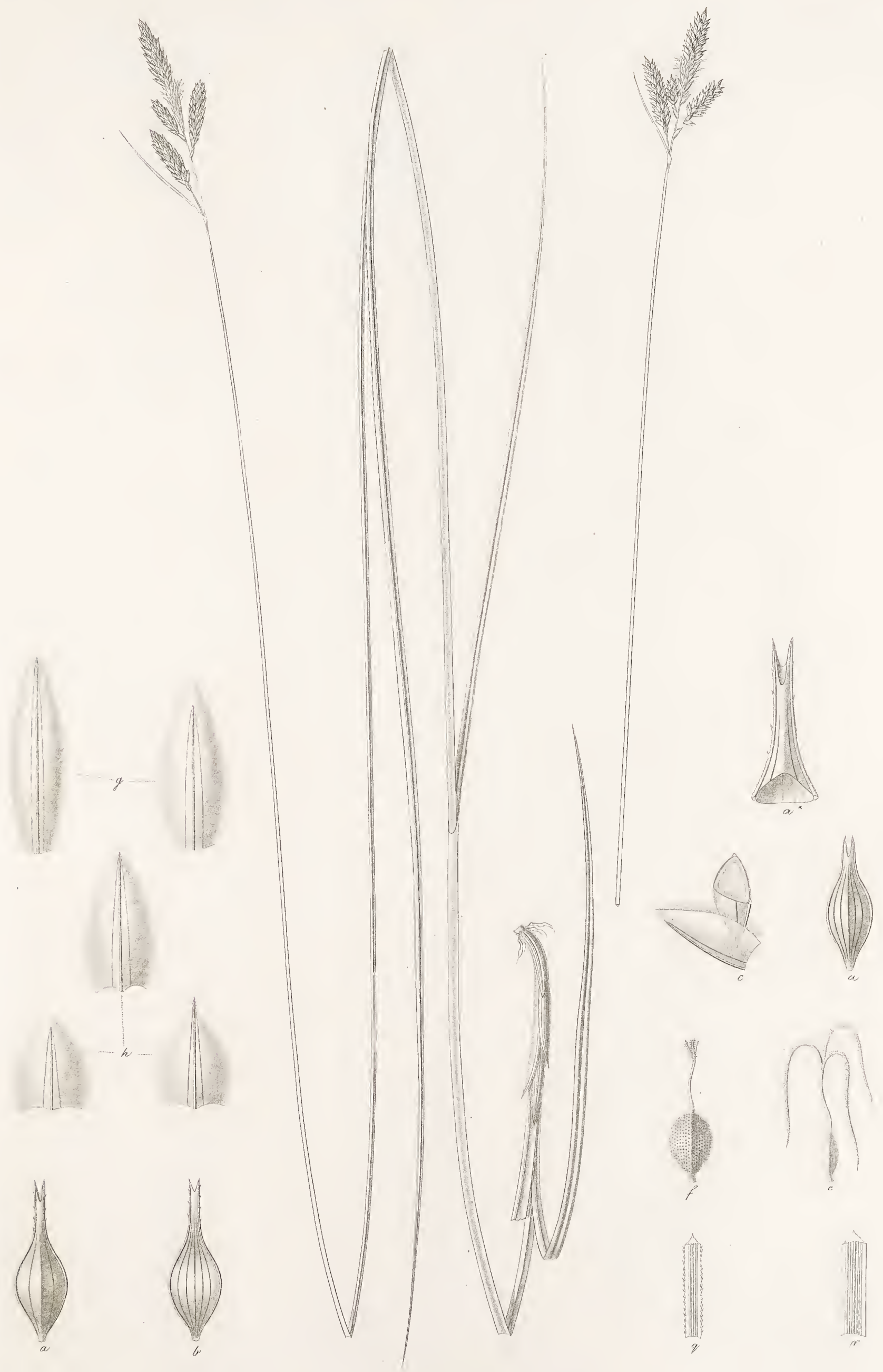
C. SETOSA  $\beta$ .





C. SETOSA γ.





C . C E L S A .



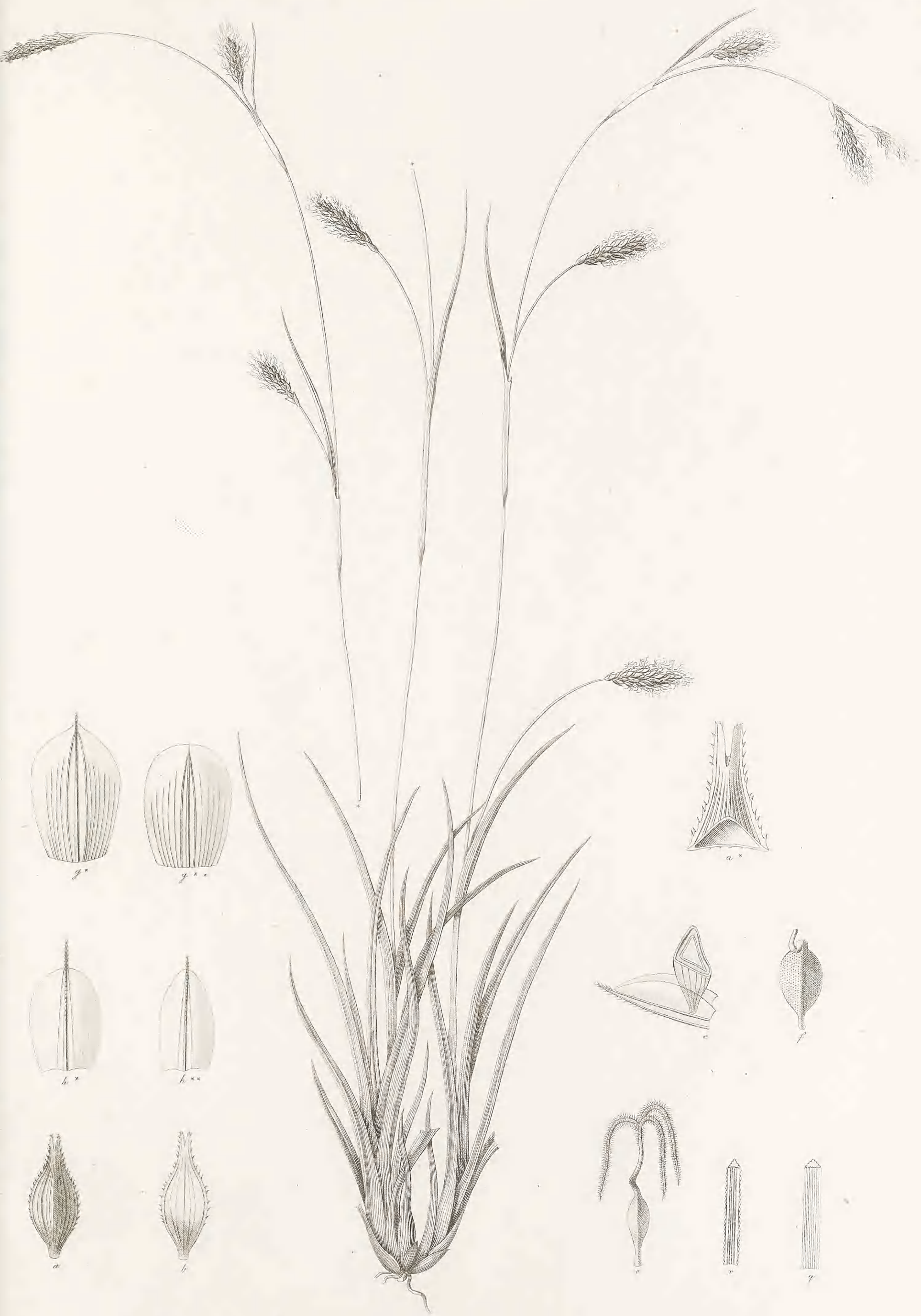




C. LONGIFOLIA

M.





C. LONGIFOLIA B.





C. RAOULII.





C. JAMESONI.







C. JAMESONI VAR. B





C. JAMESONI VAR. y

11.





C. JAMESONI  $\gamma$ .





C B O R B O N I C A .







C. BORBONICA.





C. BORBONICA.





C. CETHIOPICA.

M





C. CETHIOPICA.

A

P







C. CETHIOPICA.

M.

F.





C. CEPHALOPICA.

M.





C. BORYANA.

1





C. BORYANA.

M

P.







C B O R Y A N A

12





C. BORYANA VAR. MINOR.





C. BORYANA VAR. MINOR





C. INSULARIS.







C. WAHUENSIS.





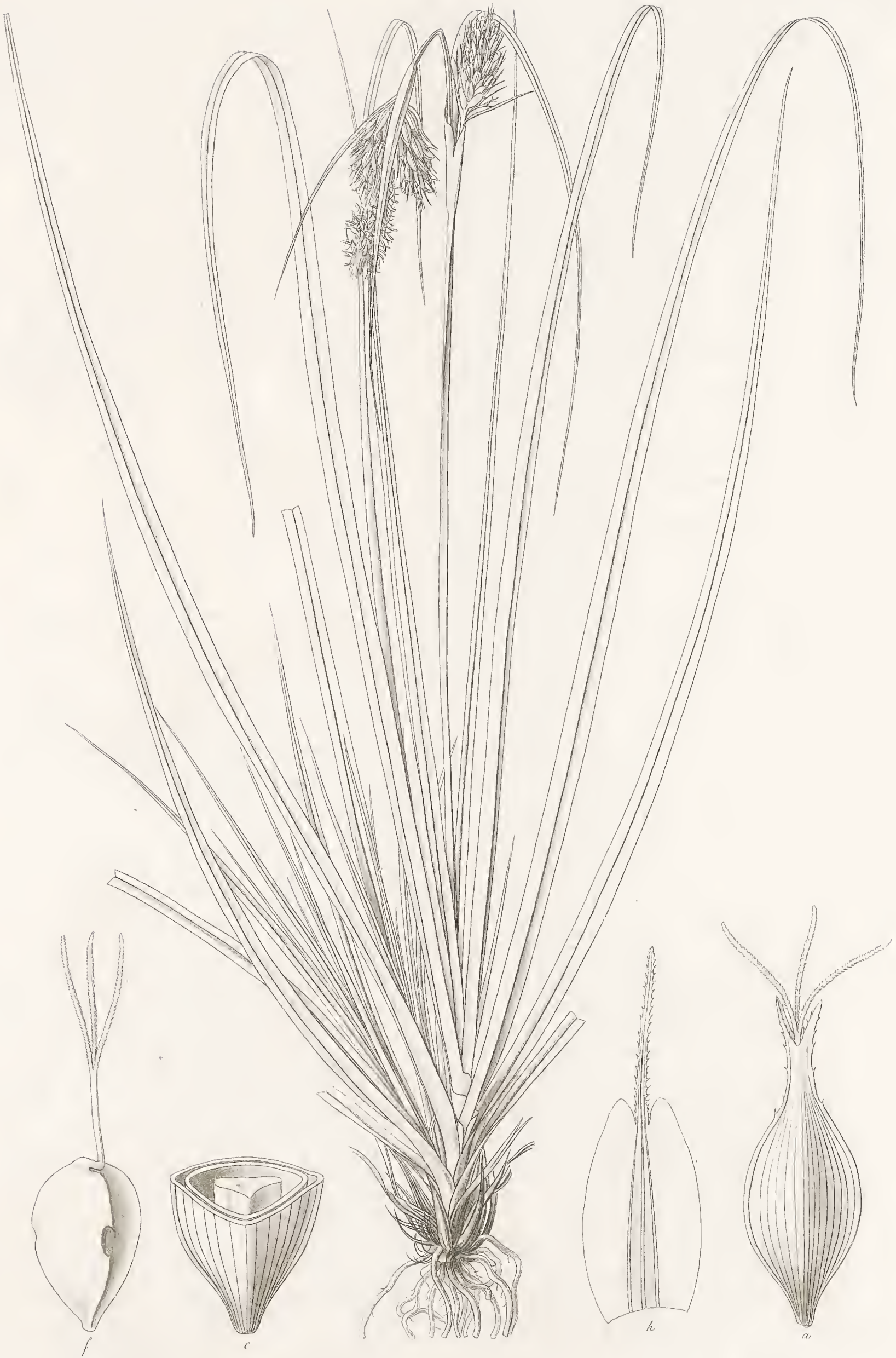
C. WAHLENSIS.





C. WARUENSIS





C. WAHUENSIS.







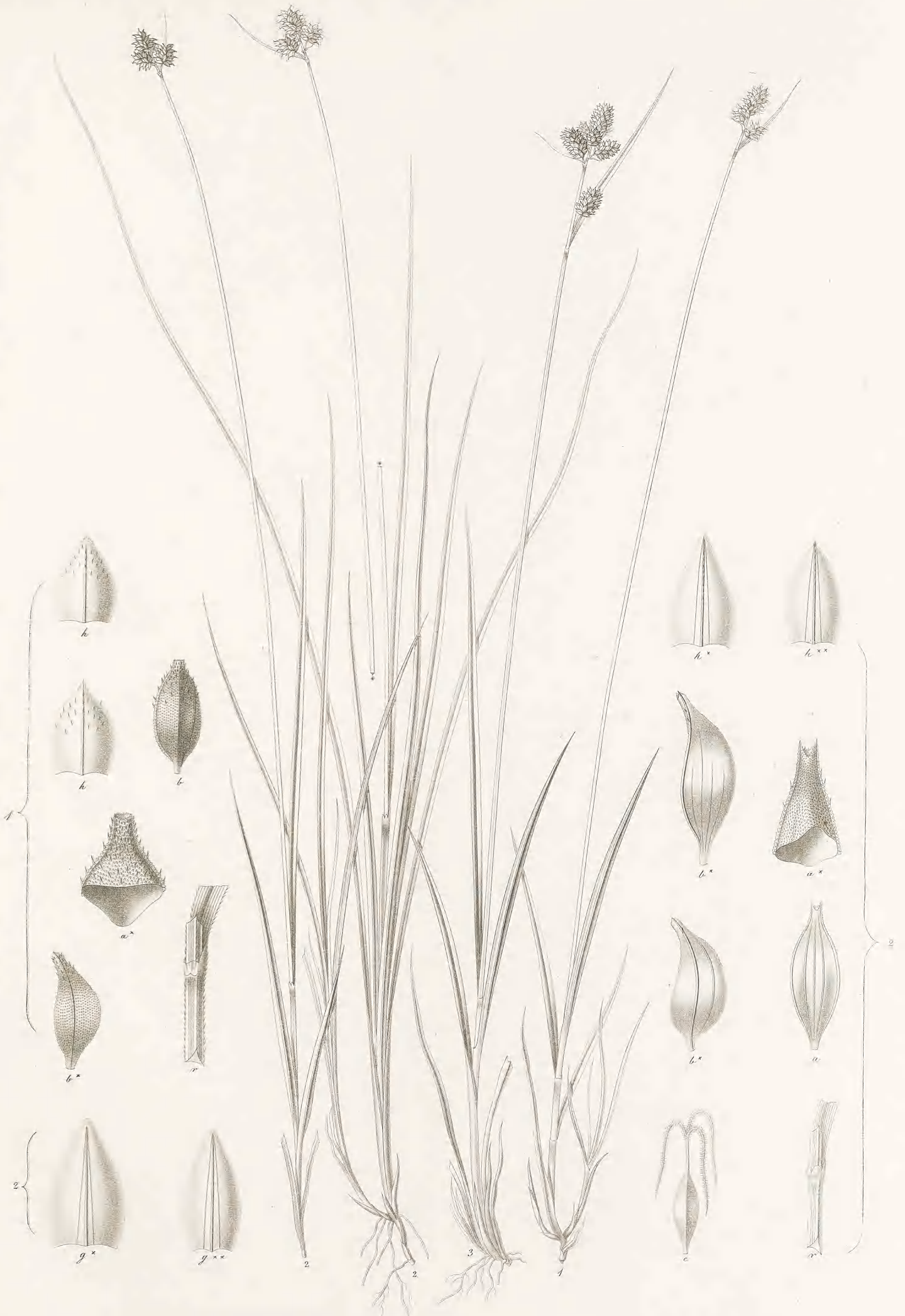
C. RIPARIA (LACUSTRIS)





C. ALPINA.





CALPINA.

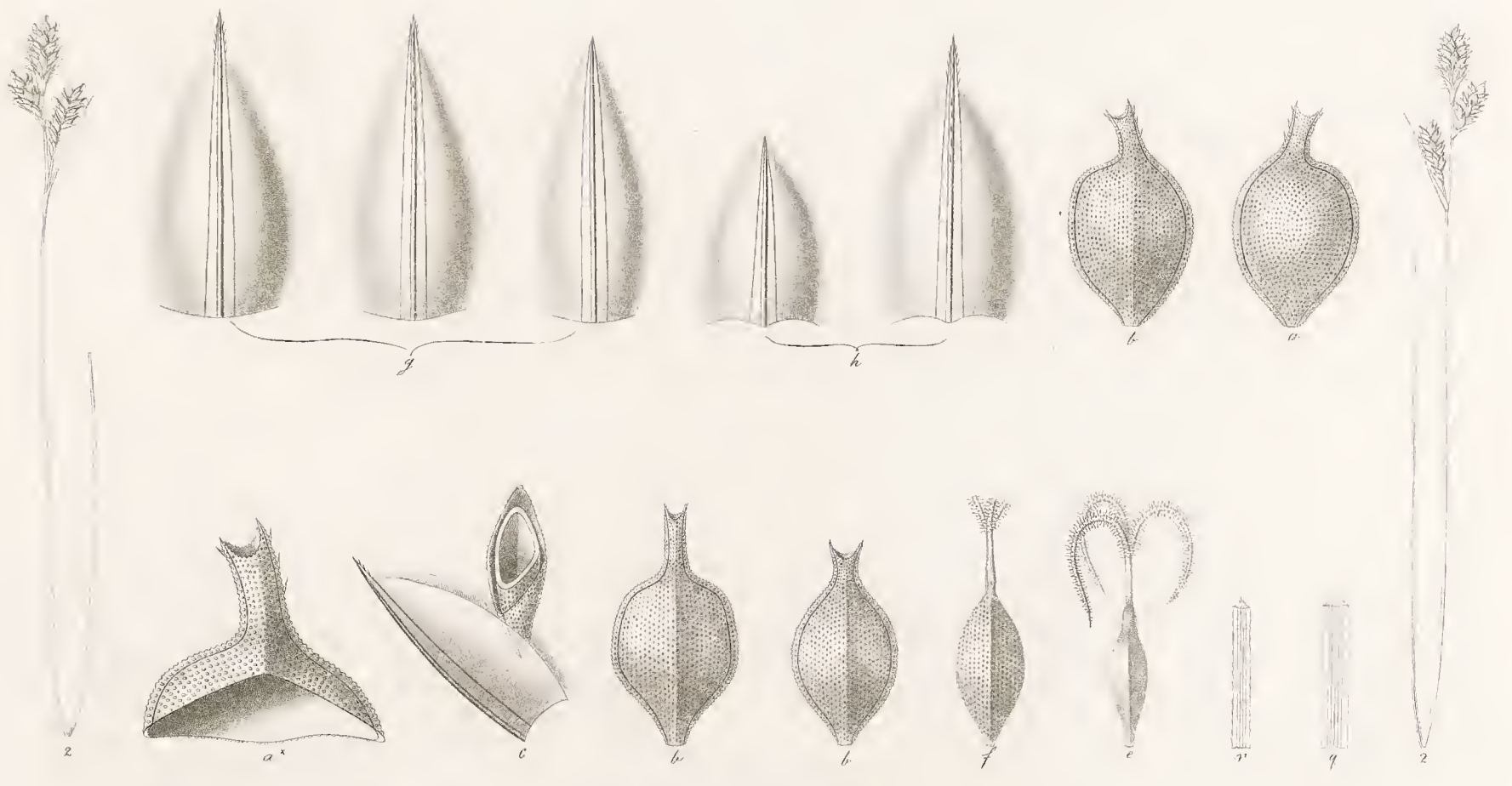




C. ALPINA VAR. B.







C. ALPINA B.





C. ALPINA VAR.  $\gamma$ .

at





C. LEHMANNI.

3.





C. ATRATA (OVATA)







C. ATRATA (NIGRA)

F.





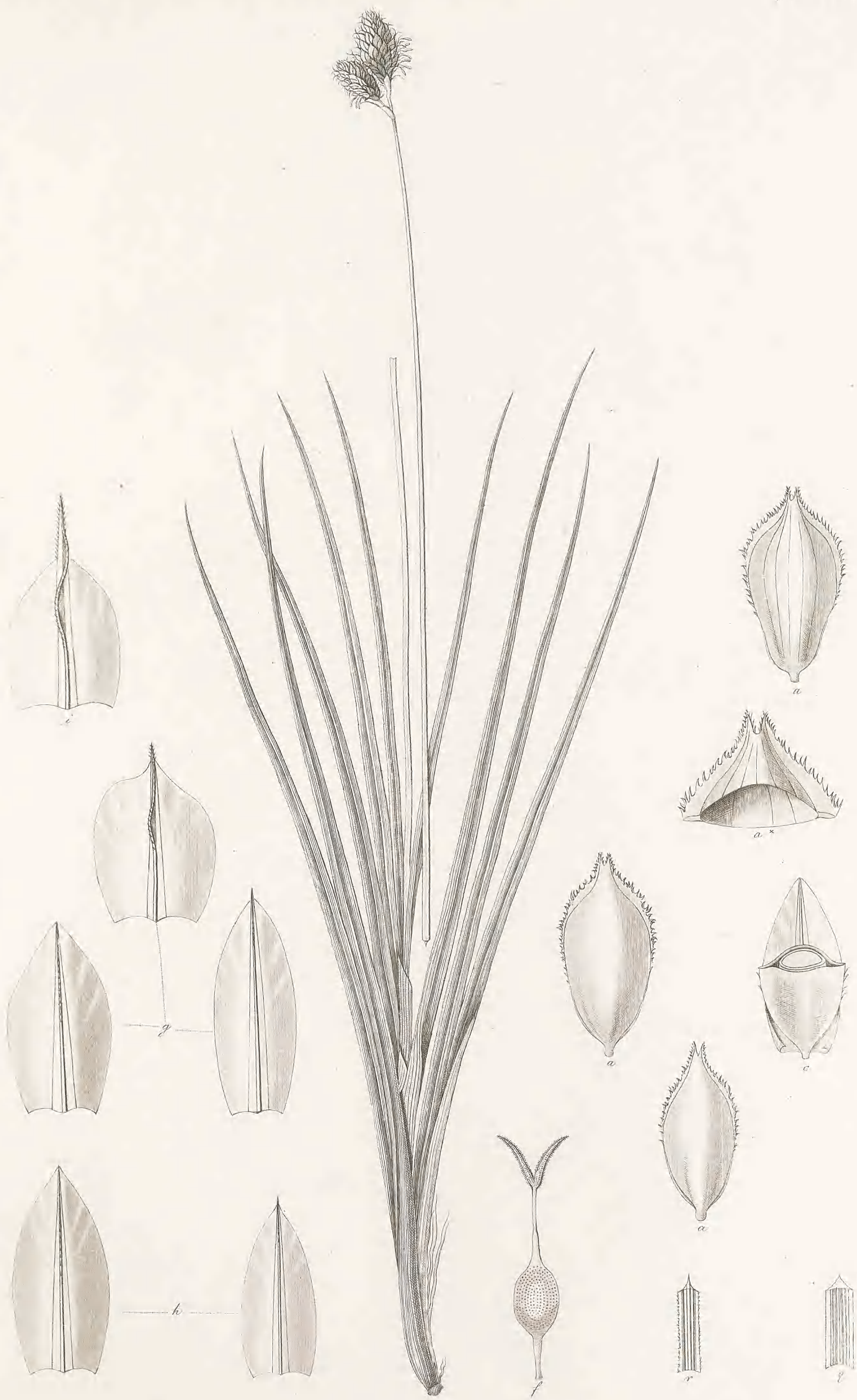
CAREX (PULLATA)





C. ATRATA. (GLACIALIS)





C. ATROPICTA.







C. BONPLANDII.





SCOPARIA.





C. SCOPARIA (VAR. MINOR)





CALAMAGROSTIS

M.







1. C. LAGOPODIODES VAR.  
 2. C. STRAMINEA (HYALINA)





C. CRISTATA.





C. CRISTATA.





C. CRISTATA (MIRABILIS)







C. FOENEA.





C. FOENEA B

M.

Ca.





C. FOENEA γ





C. ALATA.





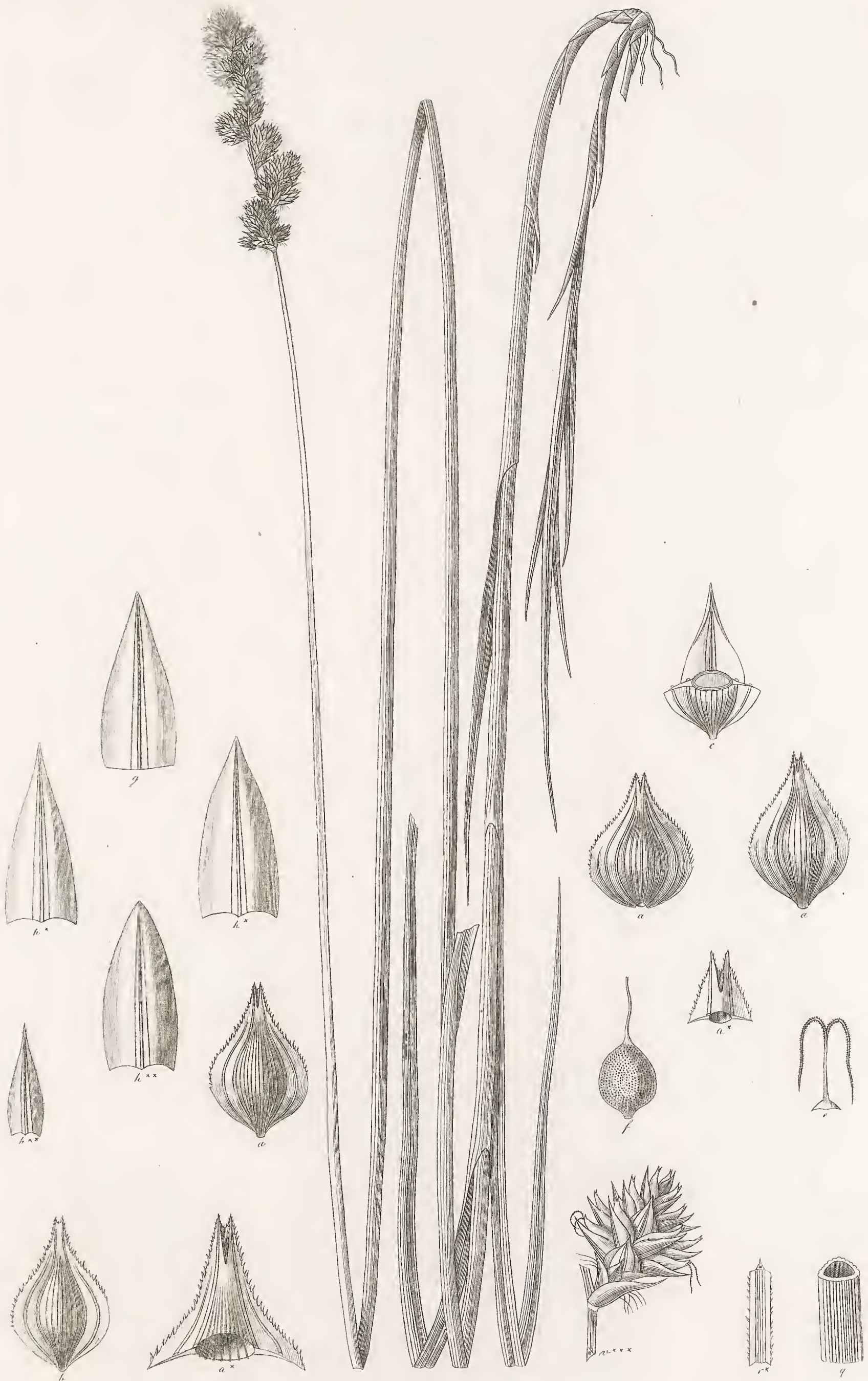






*POGONIA*





C. A. D. O. T. A.





CLADUSA.





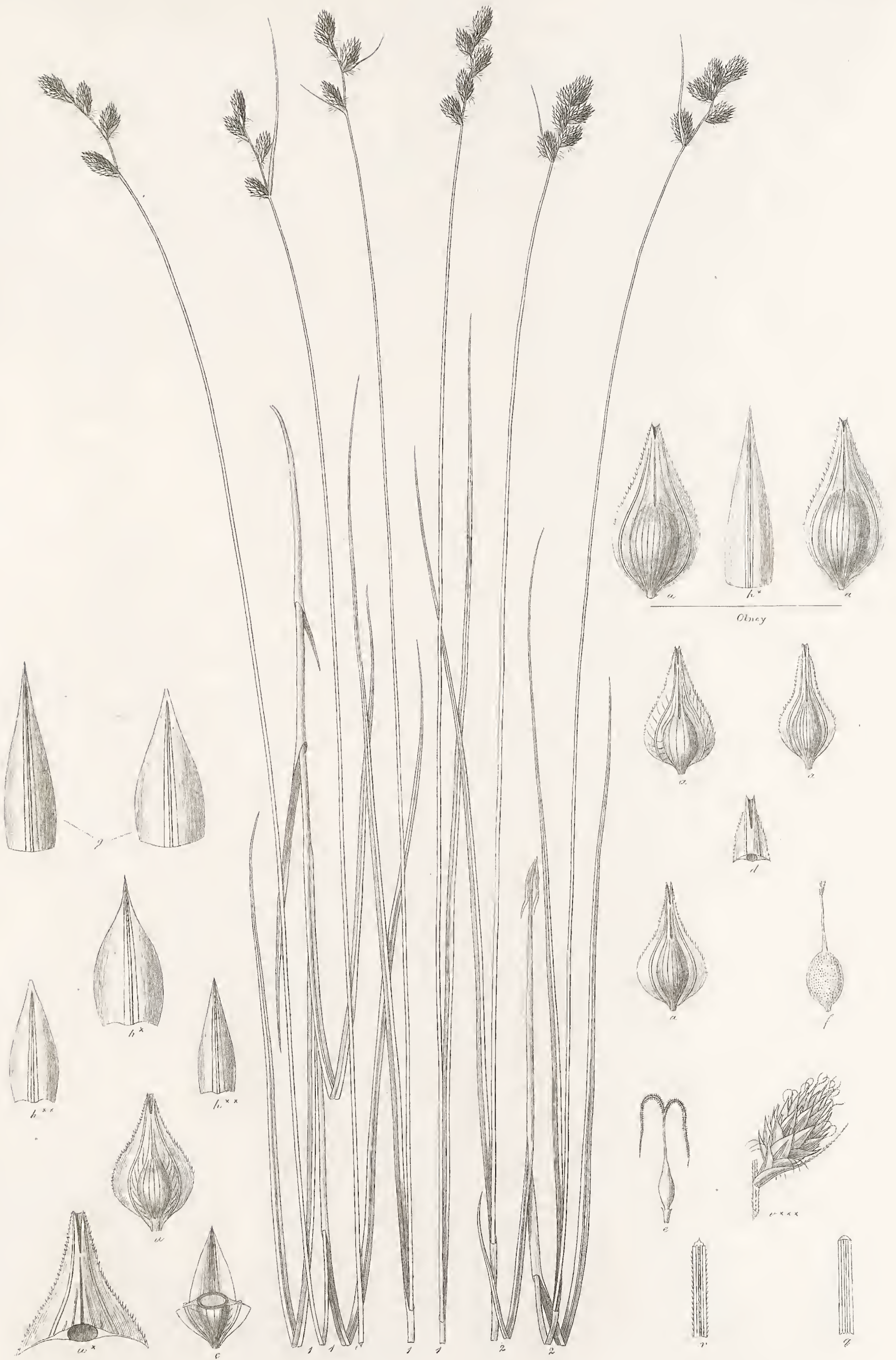


C. ADUSTA V. MINOR.

32.

10.





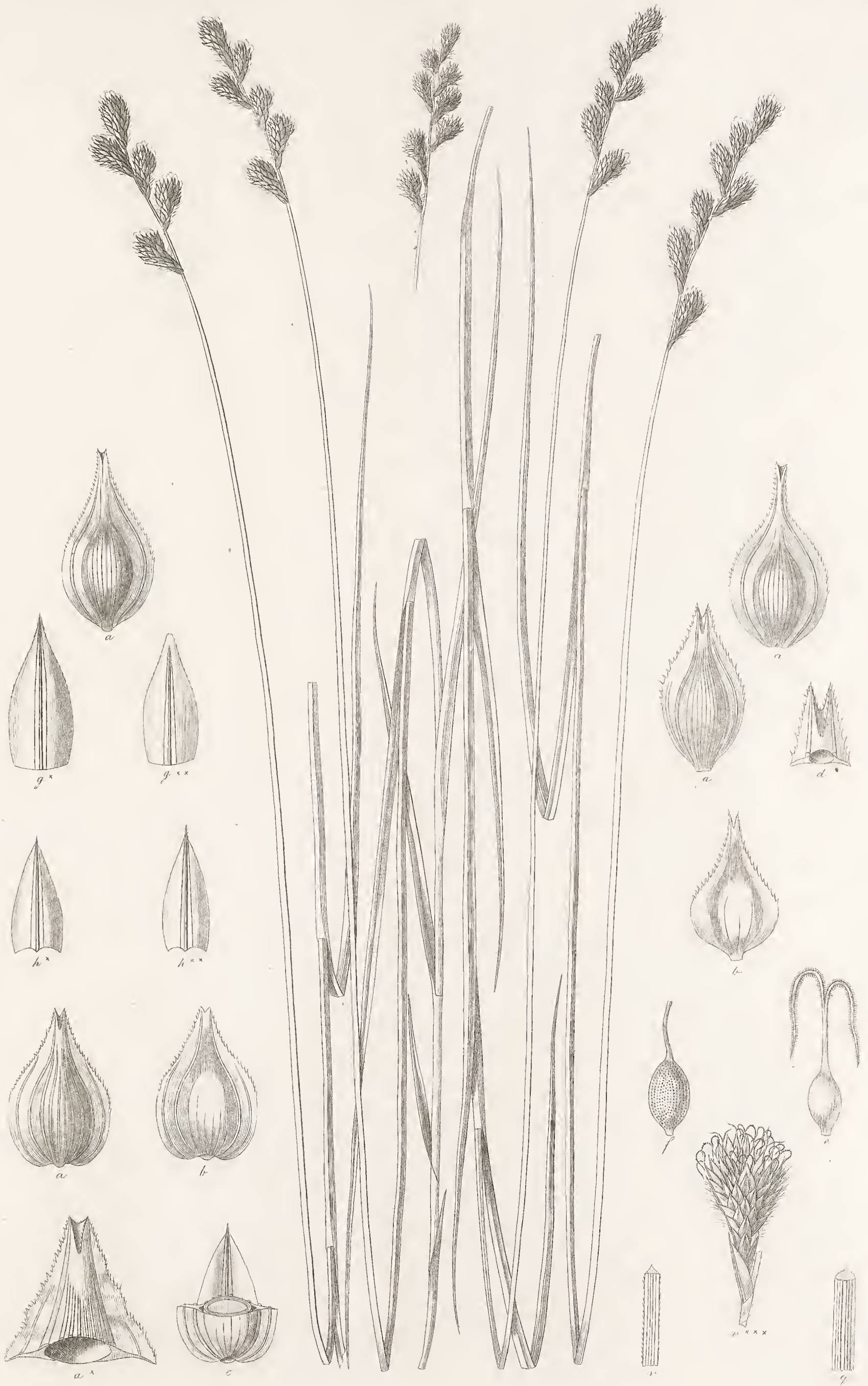
C. STRAMINEA. (TENERA)





C. STRAMINEA (APERTA)





C. STRAMINEA (FESTUCACEA)



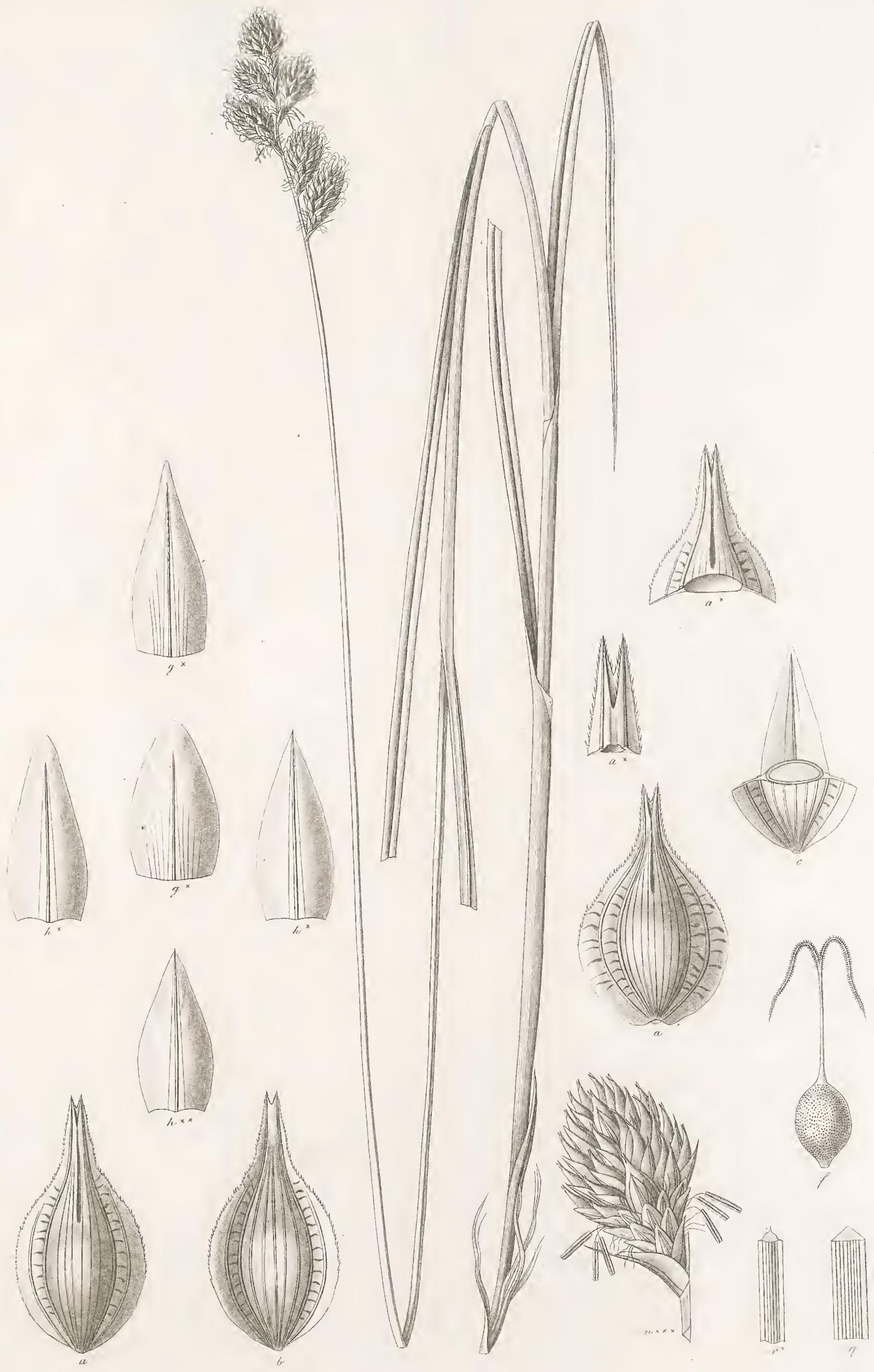




C. STRAMINEA (TYPICA)

11





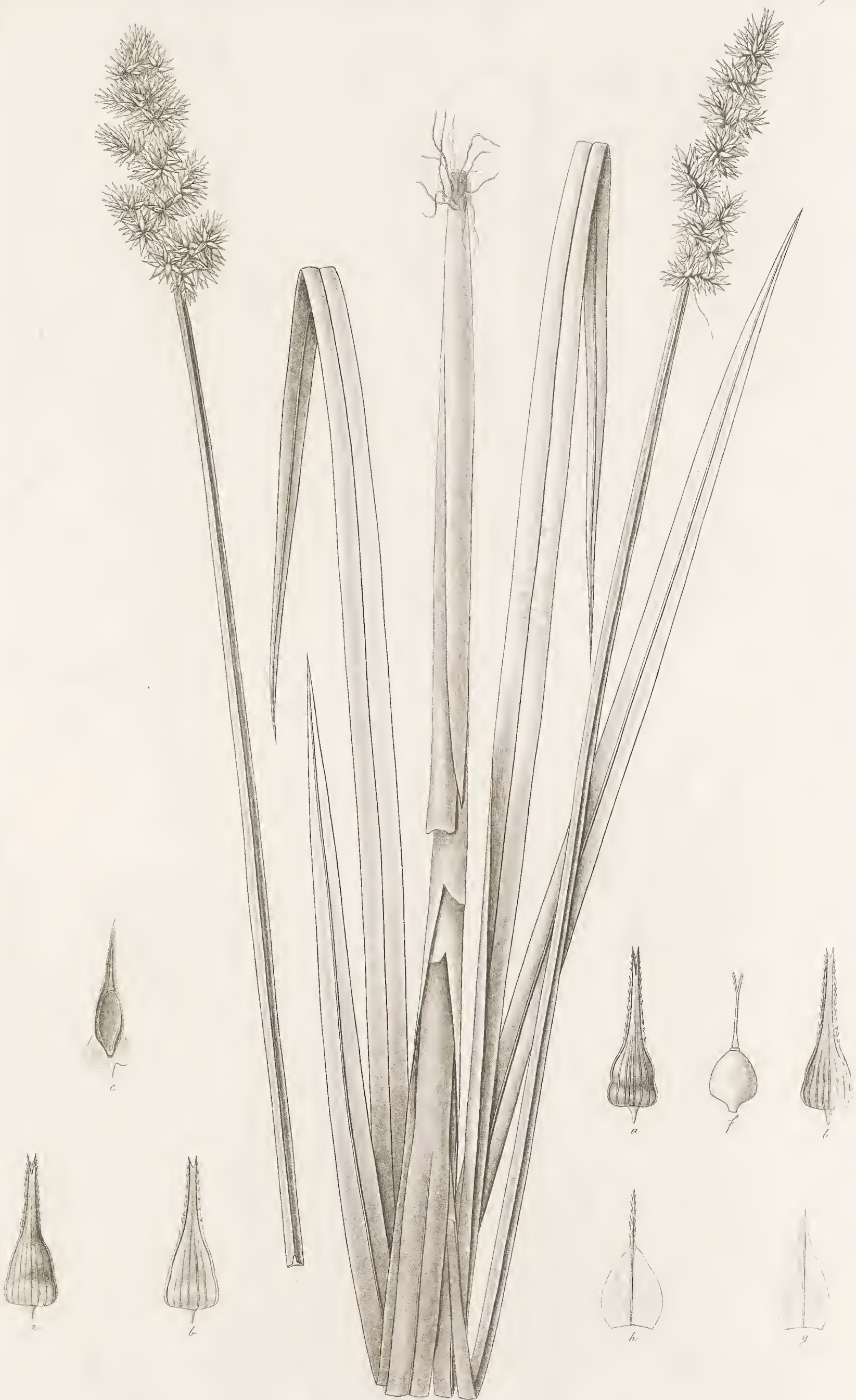
C. STRAMINEA (C. WE.)





C. STRAMINEA (MEADII)





C. STIPATA







C. STIPATA V MAXIMA.

h





C. CONJUNCTA

u.





C. VULPINA.





*C. SPARGANIODES.*  
*VAR. MINOR*







C. CEPHALOIDEA.

12.





C. CEPHALOPHORA.





C. CEPHALOPHORA.





C. CEPHALOPHORA B.







C. MUHLENBERGII.





C. MUHLENBERGII B.





C. BRONGNIARTII.

h





C. BRONGNIARTII.

F







C. BRONGNIARTII.





C. VULPINOIDEA.

11





C. VULPINOIDEA.





C. VULPINOIDEA.







*C. VULPINOIDEA.*





PULPINOIDEA.





C. VULPINOIDEA.





C. DISTICHA.







C G A Y A N A.

1  
P  
1683 (H)











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