

Smithsonian Contributions to Knowledge.

*Dr. George Engelmann  
from his friend the author.*

PLANTÆ FRÉMONTIANÆ;

OR,

DESCRIPTIONS OF PLANTS COLLECTED BY COL. J. C. FRÉMONT IN  
CALIFORNIA.

BY JOHN TORREY, F. L. S.

MISSOURI  
BOTANICAL  
GARDEN.

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[ACCEPTED FOR PUBLICATION, SEPTEMBER, 1850.]

COMMISSION

TO WHICH THIS PAPER HAS BEEN REFERRED.

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JOSEPH HENRY, *Secretary S. I.*

DESCRIPTIONS  
OF  
SOME NEW PLANTS

COLLECTED BY

COLONEL J. C. FRÉMONT, IN CALIFORNIA.\*

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THE important services rendered to science by that distinguished traveller, Colonel Frémont, are known to all who have read the reports of his hazardous journeys. He has not only made valuable additions to the geographical knowledge of our remote possessions, but has greatly increased our acquaintance with the geology and natural history of the regions which he explored. His First Expedition was made in the year 1842, and terminated at the Rocky Mountains. He examined the celebrated South Pass, and ascended the highest mountain of the Wind River Chain, now called Frémont's Peak. The party moved so rapidly (travelling from the frontier of Missouri to the Mountains and returning in the short space of four months) that much time could not be given to botany. Nevertheless, a collection of 350 species of plants was made, of which I gave an account in a Botanical Appendix to his first Report. The Second Expedition of Colonel Frémont, that of 1843 and 1844, embraced not only much of the ground which he had previously explored, but extensive regions of Oregon and California. In this journey, he made large collections in places never before visited by a botanist; but, unfortunately, a great portion of them was lost. In the gorges of the Sierra Nevada, a mule loaded with some bales of botanical specimens gathered in a thousand miles of travel, fell from a precipice into a deep chasm, from whence they could not be recovered. A large part of the remaining collection was destroyed, on the return of the Expedition, by the great flood of the Kansas river. Some of the new and more interesting plants that were rescued from destruction, were published in the Botanical Appendix to Colonel Frémont's Report of his Second Expedition.

\* An Abstract of this memoir was read before the American Association for the Advancement of Science, at its meeting held in New Haven, August, 1850, and published in the volume of its Proceedings.

Very large collections were also made in his Third Expedition in 1845 and the two following years; but again, notwithstanding every precaution, some valuable packages were destroyed by the numerous and unavoidable mishaps of such a hazardous journey. Very few of the new genera and species that were saved have as yet been published, excepting several of the Compositæ, by Dr. Gray, in order that the priority of their discovery might be secured for Colonel Frémont. There was still another journey to California made by that zealous traveller; the disastrous one commenced late in the year 1848. Even in this he gleaned a few plants, which, with all his other botanical collections, he kindly placed at my disposal. I had hoped that arrangements would have been made by the Government for the publication of a general account of the Botany of California; but as there is no immediate prospect of such a work being undertaken, I have prepared this memoir on some of the more interesting new genera discovered by Colonel Frémont. The drawings of the accompanying plates were made by Mr. Isaac Sprague, of Cambridge, Massachusetts, who ranks among the most eminent botanical draughtsmen of our day.

### SPRAGUEA. Nov. Gen.

Calyx disepalus, persistens; sepalis suborbiculatis, basi cordatis, emarginatis, membranaceis, patentibus. Corollæ petala 4, æstivatio imbricata, libera, duobus exterioribus sepalis alternantibus, interioribus sepalis oppositis. Stamina 3, petalis opposita. Ovarium uniloculare. Ovula 8–10, basilaria. Stylus filiformis, apice trifidus; lobis intus stigmatosis. Capsula membranacea, compressa, unilocularis, bivalvis. Semina 2–5, lenticulari-compressa, nigra, nitida, estrophiolata.—Herba Californica, perennis, glabra; caulibus 1–5, scapiformibus, e caudice brevi ortis, remote squamosis; floribus confertis scorpioideo-spicatis; spicis pluribus, aphyllis, umbellatis, terminalibus.

### SPRAGUEA UMBELLATA. TAB. I.

HAB.—Forks of the Nozah river, in the foot-hills of the Sierra Nevada of Northern California. In flower and fruit, May 22. Other specimens, not ticketed, were in the collection, perhaps obtained on the same ground a little earlier in the season.

The root of this remarkable plant is short and tapering, soon dividing into a tuft of thick fleshy fibres. The caudex is short and thick, throwing up from its summit from one to five or six simple scape-like branches, which are from three inches to a span high, and somewhat diverging. All the proper leaves are situated at the crown of the caudex, forming a dense rosulate cluster. They are from an inch to nearly two inches in length, of a fleshy consistence, obovate-spatulate, with a long tapering base, obtuse, and perfectly entire. The scapes are furnished with several

lanceolate distant scales, which are scarious on the margin. Spikes six to twelve in a terminal spreading umbel, at first conspicuously scorpioid, and gradually unfolding from the base upwards. The peduncles are about half an inch long, and the ovate bracts at their base form an involucre. Flowers closely imbricated, on short pedicels. The calyx consists of two persistent hyaline sepals, which are right and left of the axis; they are nearly orbicular, emarginate, undulate on the margin, obscurely veined, and of a pale rose-color, except the broad green midrib. Petals four, obovate, rose-color, much shorter than the calyx, two of them nearly opposite the sepals, the others alternate with them, gelatinous-colliquescent after flowering, as in many other Portulacaceæ, and in a withered state, remaining attached to the summit of the young fruit like an indusium. The stamens are constantly but three, and are inserted opposite three of the petals; the fourth (belonging to a lateral petal) wanting: filaments longer than the petals: anthers ovate, fixed by the middle, two-celled, opening longitudinally. The ovary is globose-ovoid, much compressed, one-celled, and contains from eight to ten ovules, on conspicuous stalks, which arise from a basilar placenta. Style slender, as long as the stamens, undivided; the stigma minute and three-lobed. Capsule membranaceous, much compressed, two-valved; the valves parallel with the persistent sepals. Seeds lenticular, black and shining, with a crustaceous testa. Embryo hippocrepiform, embracing mealy albumen.

This remarkable plant undoubtedly belongs to the family of the Portulacaceæ; and, judging from the description, it seems to be a near ally of the Chilian genus *Monocosmia* of Fenzl. In the latter, however, there is but a single stamen; the ovules are only from two to four in number; the style is very short as well as two-cleft, and the habit is different.

I have dedicated this genus to Mr. Isaac Sprague, of Cambridge, Massachusetts, so well known as a botanical draughtsman, and especially for the admirable illustrations of the *Genera of the Plants of the United States*, by himself and Dr. Gray.

### FRÉMONTIA. Nov. Gen.

Calyx basi tribracteatus, patenti-campanulatus, quinque-partitus, subpetaloideus basi foveolatus æstivatione quincuncialis. Corolla nulla. Stamina quinque: filamenta vix ad medium monadelphia: antheræ oblongo-lineares, biloculares, subanfractuosæ, extrorsæ; loculis longitudinaliter dehiscentibus. Ovarium quadriquinque-loculare: ovula in loculis plurima, biserialiter inserta, horizontalia, anatropa: stylus filiformis, subincurvus: stigma indivisum, acutiusculum. Capsula\*

\* Just as this memoir was sent to press I received from the Rev. Mr. A. Fitch a collection of plants which he obtained while acting as a missionary in California. In his extensive travels through that country he availed himself of favorable opportunities of collecting botanical specimens, which from time to time he placed at my disposal. In the last parcel, which he brought home himself, I was greatly pleased to find the *Frémontia*. I am now able to describe the fruit of this rare plant, but unfortunately the only capsule that was received had shed its seeds, the characters of which I have given from the verbal description of Mr. Fitch.

ovata, turgida, plerumque quinquelocularis, loculicide dehiscens, pilis rigidis stellatis dense vestita; loculis polyspermis. "Semina ovata, glabra."—Frutex Californicus, stellato-pubescent; foliis alternis cordatis, lobatis; stipulis nullis vel caducis; pedunculis oppositifoliis unifloris; floribus amplis flavis.

## FRÉMONTIA CALIFORNICA. TAB. II.

HAB.—Sources of the Sacramento, in the northern part of the Sierra Nevada of California. Also hill-sides, Mariposa county, especially near the gold works of the Merced Company; flowering in May.—Rev. Mr. A. Fitch.

A beautiful shrub, usually from three to four feet high, but occasionally reaching a height of ten feet, and having very much the appearance of an ordinary fig-tree. The bark is of a brownish gray color; the wood is hard, and apparently of slow growth. Most of the leaves and flowers are produced at the extremity of very short lateral branches or spurs. The former are petiolate, roundish in outline, from three fourths of an inch to an inch, or sometimes even three inches, in diameter,\* three to seven-lobed; the lobes entire, or crenate-toothed, of a thick (and when old of a somewhat coriaceous) texture, green and sparsely stellate-pubescent on the upper surface, ferruginous-tomentose underneath; the petioles from four to six lines long. In the specimens from Mariposa county, the leaves of the young shoots are less deeply and more numerously lobed. The peduncles are about as long as the petioles, stout, straight or somewhat recurved. Immediately under each flower, and closely applied to the calyx, are three small lanceolate bracts. The calyx is sulphur-yellow widely campanulate, about an inch and a quarter in diameter, deeply five-parted; the segments roundish-obovate, and usually with a short abrupt point, or sometimes mucronate. Externally the calyx is sparsely stellate-pubescent, and on the inside at the base it is densely villous. The stamens are equal, shorter than the calyx, and opposite to its segments: the filaments are glabrous, the upper half filiform, spreading and distinct; the lower part united into a tube which embraces the ovary and nearly conceals it: the anthers are about three lines long, extrorse, adnate, tortuous, and incurved at each end. In the bud they are four-celled, but only two-celled in the expanded flower; the cells are distinct and open longitudinally their whole length. Under the microscope the pollen appears triangular-globose and reticulated. The ovary is ovoid, and densely clothed with short conical hairs or processes. It is usually five-celled;† each cell containing eight or ten horizontal anatropous ovules: the style is about one third longer than the stamens, and gradually tapers towards the summit, where it terminates in a minute undivided stigma. The capsule is about as large as that of *Hibiscus Syriacus*, and is closely covered with short stiff reddish stellate hairs; a portion of the calyx remaining at its base. At maturity it splits loculicidally nearly

\* The plate of *Fremontia* was engraved and printed before the specimens with larger leaves were obtained.

† Only four cells are represented in the plate, and no more were found in the flowers first examined.

to the base into five valves. Only two or three seeds ripen in each cell; and these are smooth, resembling those of the *Ochra*.

This genus is a near ally of the celebrated *Cheirostemon* of Humboldt, the Hand-tree of Mexico. The latter differs, however, in the form and texture of the calyx, the lobes of which are deciduous; in the much longer stamineal column and second mucronate free portion of the filaments; in the straight parallel anther-cells, and in some other characters of less importance.

The genus *Cheirostemon* has long been regarded as an anomalous member of the order *Bombaceæ*, which by many botanists is reduced to a tribe of *Sterculiaceæ*. It differs, as does also *Frémontia*, from the rest of the tribe in the apetalous flowers, imbricated calyx, and definite stamens; characters which, in this family, are of sufficient value to constitute a distinct division, which may be called *FRÉMONTIÆ*. The genus *Ochroma* of Swartz, another anomalous *Bombacea*, has some resemblance to *Cheirostemon*, as Kunth noticed many years ago, especially in its five-lobed stamineal crown and in the subimbricated calyx; but in most other respects it resembles its congeners.

Those *Bombaceæ* which have the stamineal tube five-cleft at the summit, with each segment bearing two anthers, may be regarded as composed of ten stamens, the filaments of which are monadelphous below and pentadelphous above; the upper portions of the filaments being united in pairs, with (usually) one-celled anthers. This view may be taken of *Frémontia* as well as of *Cheirostemon*.

In my memoir on *Batis*, published in the present volume, I have given the reason for relinquishing the former genus *Frémontia*, and my intention of bestowing the name on a new plant from California, first detected by the distinguished traveller himself, whose valuable services to North American Botany it is thus intended to commemorate.

### LIBOCEDRUS. Endl.

*LIBOCEDRUS* Endl. Synops. Conif. p. 42; Gen. Pl. Suppl. IV. pars 2, No. 1794.

*THUYÆ* species auct.

### LIBOCEDRUS DECURRENS. TAB. III.

*L. ramulis compressis subancipitis; foliis late ovatis breviter acuminatis apice serrulatis longe decurrentibus, lateralibus carinatis, facialibus planis; strobilis ovato-oblongis erectis; squamis infra apicem spina tuberculiformi recurva auctis, superioribus multo majoribus; seminibus bialatis, ala altera maxima.*

**HAB.**—Upper waters of the Sacramento, particularly from lat. 38° 40' to about 41° N. lat., where it was also found (without fruit) by the botanists of the United States Exploring Expedition, and by Dr. G. W. Hulse.

A noble tree, sometimes attaining a height of 120 or even 140 feet; and a trunk of seven feet in diameter is not uncommon. It rises from 80 to 100 feet without a



limb. The leaves are four-ranked, as usual in this genus, very small, and closely imbricated; their bases prolonged downward and contracted, with strongly-marked longitudinal lines where the two exterior overlap the two interior ones. In the younger branchlets, the decurrent bases are from two to three times longer than their diameter, and in the older ones, about four times longer. None of the leaves are acerose. The two interior of each joint are marked on the face with a slight depression, beneath which there is often a small obscure gland, although none appears externally. The staminiferous aments terminate the branchlets. They are ovoid-oblong, and from two to three lines in length. The stamens are from twelve to fourteen, four-ranked; the connective produced into a suborbicular excentrically peltate scale, and bearing on its under surface about four oblong anther-cells, which open longitudinally. The seminiferous aments are nearly an inch in length, ovate-oblong, and consist of four scales, of which the two exterior are very short, the two interior rounded externally, with the flattened septum-like axis prolonged between them, and equalling them in length; all the scales mucronate with a short recurved point below the tip. Beneath each interior scale are two seeds. These are furnished with two very unequal wings.

This tree much resembles *Callitris quadrivalvis* in its foliage. It has probably been confounded by some botanists with *Thuya gigantea* of Nuttall, from which, however, it can be distinguished by the foliage alone; the long decurrent bases of the leaves being characteristic of the *Libocedrus*. Endlicher has described three other species of this genus, all of which are natives of South America and New Zealand. Our *L. decurrens* is most nearly related to *L. Chilensis* *Endl.* (*Thuya Chilensis* *Hook. Lond. Jour. Bot.* 2. p. 199. t. 4.)

### COLEOGYNE. Nov. Gen.

Calyx basi bibracteolatus, coriaceus, petaloideus, quadrisepalus; sepalis basi connatis persistentibus. Corolla nulla. Stamina numerosa; filamentis ima basi disci tubæformi inserta. Ovarium uniovulatum, uniloculare, tuba disci inclusum: ovulum hemitropum: stylus lateralis, filiformis, intus longitudinaliter stigmatosus. Fructus . . . —Frutex Californicus, ramosissimus, rigidus; ramulis sæpe subspinescentibus; foliis parvulis, oblongis, crassis, oppositis, confertis, brevissime petiolatis; lamina decidua, stipulis cum petiolo minutissimo persistentibus; floribus solitariis, terminalibus, basi bracteis trifidis suffulti.

### COLEOGYNE RAMOSISSIMA. TAB. IV.

**HAB.** Sources of the Mohave and Virgin Rivers, tributaries of the Colorado of the West, in the mountains of Southern California. Flowering in April and May.

A shrub with the aspect of *Krameria*, five to six feet high, and clothed with a grayish bark; the branches spreading, short, crowded, and mostly opposite.

Leaves crowded toward the summit of short, spur-like branches, which often become spiny, appearing fasciculate, but truly opposite. They are oblong, on very short pedicles; from five to eight lines long, rather obtuse, tapering at the base, very thick and coriaceous, marked with five longitudinal ribs on the upper surface, but flattish underneath, clothed with appressed hairs, which are fixed by the middle. The stipules are minute and scale-like, partly adherent to the short and persistent petiole, from which the lamina of the leaf falls away, their minute points giving to the spurs a squarrose appearance. The flowers are about half an inch in diameter, terminal, solitary, on short stalks, and are subtended by two (or sometimes four) trifid bracts which resemble the ordinary leaves, except that the points of the stipules are more strongly produced, and the articulated lamina is much smaller. The persistent sepals are ovate or obovate, coriaceous, somewhat united at the base, obtuse or mucronate at the summit, spreading, one or more of them rarely furnished with a single lateral tooth. Externally they are hairy like the leaves, but glabrous and yellowish on the inner surface; the two outer are flat, the two inner obvolute or half equitant. There are from thirty to forty stamens, which are about as long as the calyx: the filaments slender, distinct, except at the base, where they are confluent with a singular sheath which encloses the pistil: anthers oblong-cordate, introrse, two-celled, opening longitudinally. Pollen very minute, obtusely triangular. The sheath arises from the base of the calyx, and is about the length of the stamens. It gradually tapers from below upwards, and is somewhat five-toothed at the summit. The pistil is solitary and simple; the ovary sessile and oblong: style lateral, arising from a little below the middle of the ovary, tortuous, exserted, very villous, the upper third compressed, somewhat recurved, and stigmatose on one side. Ovule single in all the specimens examined, hemitropous on a very short funiculus, which is inserted opposite the origin of the style. Ripe fruit unknown: probably an achenium. In a partially mature state the seed appeared to be destitute of albumen, and the broad flat cotyledons could be distinctly seen. The radicle is erect.

It is difficult to refer this puzzling genus with certainty to any natural order hitherto indicated. Its nearest affinities are doubtless with Rosaceæ, and with the suborder Chrysobalanæ; from which it differs in its opposite leaves, persistent stipules, lateral stigma, and solitary ovules, as well as in habit. One undoubted genus of this suborder, and three anomalous genera referred here by most botanists, are apetalous. In several others, the filaments are united at the base; in two or three there are lateral or interior sterile filaments; and in *Trilepisium* there is a tube between stamens and pistils, as well as a solitary ovule. The sheath or tube may be regarded as belonging to the andrœcium either by the deduplication of the interior stamens, or as consisting of the monadelphous filaments of an abortive inner series of stamens.

*Coleogyne* also resembles some of the proper Rosaceæ with solitary carpels; especially those of the Tribe Dryadeæ, *Torr. & Gr.* In its elongated lateral stigma, it is like *Purshia*. To *Cliffortia*, it is allied in its foliage and stipules, as well as in other respects. Finally, we are inclined to place this new genus in Rosaceæ, between Chrysobalanæ and Dryadeæ; although it is more nearly related to the

former than to the latter. The opposite leaves, which are so closely approximated that I was not aware of their true arrangement until the engraving of the plant was finished, are not found in any other Rosaceæ, so far as I know.

### EMPLECTOCLADUS, Nov. Gen.

Calyx obconico-campanulatus; tubo ad faucem nudo haud contracto; limbo æqualiter quinquepartito, persistente. Petala 5, erecto-patentia. Stamina 10–13, biserialia. Pistilla 1–2 (plerumque solitaria) unilocularia: ovula 2, collateralia, pendula. Stylus brevissimus, crassus, subobliquus: stigma capitatum. Fructus . . . — Frutex Californicus, ramosissimus; ramis rigidis, patentibus, subspinescentibus; foliis minutis, spathulatis, e gemmis subglobosis quasi fasciculatis; stipulis minutis deciduis; floribus subsolitariis, sessilibus, terminalibus, parvulis.

### EMPLECTOCLADUS FASCICULATUS. TAB. V.

HAB.—Sierra Nevada of California; probably in the southern part of the range.

A shrub, with numerous widely spreading branches, which have a knobbed appearance from the short rounded buds or spurs; the bark smooth and of an olive color. The leaves are crowded on the spurs, three to four lines long, cuneate-spatulate, obtuse, sessile, of a thick and somewhat coriaceous texture, flat, marked with a single nerve underneath, sparsely hirsute with mostly deciduous hairs, and furnished with minute scarious stipules. The flowers are mostly solitary, surrounded by the closely set leaves, and are scarcely more than a fourth of an inch in diameter. Externally the calyx is glabrous, but woolly inside; the teeth short and obtuse. The petals are apparently white, ovate-oblong, obtuse, about one line and a half long, and are destitute of a claw. There are usually about eleven stamens, the slender filaments of which are inserted in two rows near the summit of the calyx-tube, the superior or exterior ones being about as long as the petals: anthers subglobose-didymous, introrse; the cells distinct, opening longitudinally. Pollen obtusely triangular (as is also the case in *Adenostoma* and many other Rosaceæ). Pistils usually solitary, but sometimes in pairs, seated at the bottom of the calyx, and free from it. The ovary is ovoid, abruptly contracted above into a very short and somewhat oblique style, which is terminated by a depressed-capitate stigma. There are two ovules, which are anatropous, and suspended from the summit of the cell opposite the style. Nothing is yet known of the ripe fruit.

The only specimens of this plant brought by Colonel Frémont had unfortunately lost their labels, so that we have no certain information as to its precise station, and of the size which it attains. Neither, for want of the fruit, can we determine its nearest affinities. It is probable, however, that the genus belongs to the Tribe Dryadeæ. In many respects it resembles *Adenostoma* of that tribe, but it differs

in the even calyx without glands\* in the throat; in being almost destitute of a style, as well as in the mode of inflorescence, the form of the ovary, &c. There may also be considerable difference in the fruit, as the appearance of the ovary seems to indicate. The generic name is derived from Ἐμπλεκτος, *entangled*, and κλάδος, *a branch*.

CHAMÆBATIA, Benth. Plant. Hartw. p. 308.†

Calycis tubus turbinato-campanulatus; limbus persistens, laciniis 5 æstivatione valvatis. Petala 5. Stamina numerosa, pluriseriata, ad faucem calycis inserta. Ovarium in fundo calycis unicum, erectum, liberum: stylus ex apice ovarii erectus, latere interiore fere ad medium fissus et stigmatifer. Ovula 2, erecta, anatropa. Achenium siccum, calyce subinclusum. Semen unicum erectum.—Frutex Californicus, ramosissimus; foliis tripinnatisectis, segmentis ultimis confertis numerosissimis; stipulis lineari-lanceolatis; floribus cymosis albis.

CHAMÆBATIA FOLIOLOSA, Benth. l. c. TAB. VI.

HAB.—Higher parts of the Sierra Nevada, as well as on the sides of the foothills; in great abundance: Colonel Frémont. Mountains of the Sacramento: Mr. Hartweg and Mr. Shelton.

A shrub, growing from two to three feet high, of agreeable balsamic odor, with very smooth bark, and numerous upright branches; the young twigs clothed with a glandularly pubescent epidermis, which easily separates. The leaves are broadly ovate in outline, about two inches long, tripinnately dissected; the ultimate segments oval and obtuse, scarcely half a line long, hispidulous-pubescent, each tipped with a minute gland. Stipules minute, adnate to the petiole. The cymes are four-five-flowered, and terminate the young shoots: each pedicel is subtended by a foliaceous bract, which is toothed or pinnatifid. The flowers are about three fourths of an inch in diameter. Externally the calyx is glandularly pubescent, and the inside of the tube is densely woolly. The petals are white, obovate, emarginate, with a very short claw. There are fifty or more stamens, the filaments of which are inserted in several series in the throat of the calyx. The pollen is obtusely triangular. The ovary is ovoid; one-celled, with two

\* The so-called glands in the throat of *Adenostoma* are only lobes of the free margin of the disk.

† The plant on which this genus was founded was first discovered by Colonel Frémont, in his second expedition, while traversing the Sierra Nevada and other parts of California, early in the year 1844, as well as in his third expedition. His specimens were too imperfect for description. It was afterwards found in good condition, but without mature fruit, by the well known and zealous botanical collector, Mr. Hartweg. Mr. Bentham kindly offered me the privilege of describing this fine new genus, but I thought the right fairly belonged to him, as he first determined its character and affinities. I have but little to add to the accurate description which he has given of it in his *Plantæ Hartwegianæ*.

collateral and erect ovules, which arise from the base of the cell: style as long as the stamens, nearly straight, and with a longitudinal stigmatose fissure or groove on the inside (as in *Cercocarpus*). Achenium oblong, compressed, almost wholly enclosed in the persistent and membranaceous calyx, apiculate with the base of the style. The seed is erect, with amygdaloid cotyledons, and a short inferior radicle.

The foliage of this plant is so different from that of most other *Rosaceæ*, that it was at first sight taken for a *Mimosa* or *Acacia*. It clearly belongs to the subtribe *Cercocarpeæ*, *Torr. & Gr.*,\* although it differs in its valvate calyx. The æstivation of *Cercocarpus* is difficult to determine, as the calyx is open in the very young flower-bud, and the teeth are very short; it seems, however, to be imbricated. The characters of the subtribe *Eudryadeæ* must be altered, for the calyx in *Cowania* (described by Don, Endlicher, and Zuccarini as valvate) is certainly imbricate in all the species. Dr. Englemann noticed this character in his genus *Greggia*† (which is *Cowania plicata*, *Don*, and *C. purpurea*, *Zucc.*)‡ There will be nothing therefore to distinguish the subtribes, as they now stand, but the number of ovaries in the flower, which being a character of no great importance, they may be united; and then *Cowania* will stand next to *Purshia*, to which it is very nearly allied in habit.

### CARPENTERIA, Nov. Gen.

Calycis tubo late hemisphærico, basi ovarii adnato; limbo 5-6-(rarius 7-) partito, laciniis valvatis persistentibus. Petala 5-6, orbiculari-obovata, æstivatione convoluta. Stamina numerosa: filamenta filiformia. Styli in unicum coadunati, brevi: stigmata 5-7, lineari-oblonga, distincta. Capsula (nisi basi) libera, 5-7, locularis, loculicide dehiscens: placentæ subglobosæ, intra loculos projectæ, polyspermæ. Semina divergentia, oblonga; testa utrinque laxa, reticulata, ad hilum crenata.—Frutex Californicus; foliis oppositis integerrimis; floribus magnis, albis, in cymis racemosis simplicibus terminalibus dispositis.

### CARPENTERIA CALIFORNICA. TAB. VII.

HAB.—Sierra Nevada of California, probably on the head waters of the San Joachin.

A shrub, with upright dichotomous branches, and a loose grayish bark, which

\* *Flora of North America*, 1. p. 426.

† *Bot. Append. to Wislizenus's Tour in Northern Mexico*, p. 114.

‡ A remarkable new species of *Cowania*, with entire linear leaves (*C. ericæfolia*, *Torr.*), has very recently been found on the Rio Grande, by Dr. Parry of the Mexican Boundary Commission. It will be described in the appendix to the second part of Dr. Gray's *Plantæ Wrightianæ*, now in press, and soon to be published.

is disposed to separate in plates. Leaves from two to three inches long, elliptical-oblong, gradually tapering at the base into a petiole, the margins (when dry) narrowly revolute, glabrous above, densely and minutely tomentose underneath, and with scattered appressed hairs. These hairs are muricate-scabrous, as in *Philadelphus*, *Decumaria*, *Deutzia*, and *Jamesia*. Stipules wanting. The cyme is on a long straight peduncle, and is from five to seven-flowered. The pedicels are from an inch and a half to two inches and a half in length. They are furnished at the base with oblong foliaceous bracts, which resemble the leaves, but are smaller; and about half an inch below the flower, there is a pair of subulate bracteoles. The (fructiferous) calyx is very obtuse and almost truncate at the base, tomentose externally, with the segments ovate, acute, entire, and spreading. The petals are white, about three fourths of an inch long, nearly orbicular, and alternate with the segments of the calyx. There are fifty or more stamens, which are inserted with the petals at the base of the free portion of the calyx: the filaments are slender, shorter than the petals, glabrous, and furnished with subglobose, two-celled, didymous anthers, which open longitudinally. The pollen is subglobose and simple. The ovary was destroyed by insects in the withered flowers that were found with the specimens. The styles are combined, and the oblong stigmas are free. Capsule broadly ovoid-conical, crowned with the united styles; the thin exocarp finally separating from the coriaceous endocarp, and persistent at the base, so as to resemble accessory valves. The endocarp opens longitudinally on the back. The placentæ are large, subglobose from a narrow base, projecting into the cavity of the cells, and covered with very numerous seeds, which radiate in all directions. The seeds are oblong, anatropous; the reticulated testa a little produced at each end, but not enough to form a wing, crenate at the hilar extremity. Nucleus oblong, nearly as long as the seed. The embryo is in the axis of fleshy albumen, which it nearly equals in length; with ovate plano-convex cotyledons, and a cylindrical thick radicle.

The only specimens of this plant brought home by Colonel Frémont, were in fruit; but I found attached to them a few withered and imperfect flowers. These materials, however, were sufficient to show the essential characters of nearly all the organs. The genus is very near *Philadelphus*: which differs, however, in the usually tetramerous flowers, in the calyx adhering to the greater part of the ovary and fruit, in the form of the placentæ, and in the seeds being strongly imbricated and pendulous, as well as fimbriate at the hilum. In very old fruit of *Philadelphus*, especially after it has been exposed to the action of frost, the exocarp separates as in this genus, but not in such regular valves. The same character exists also in *Decumaria*.

This genus is named in memory of my excellent departed friend, the late Professor Carpenter of Louisiana, who for many years laboriously and successfully investigated the Botany of his native State, but who was suddenly arrested in his career, while preparing an account of his researches.

## HYMENOCLEA, Torr. &amp; Gray.

HYMENOCLEA, Torr. & Gray, in Emory. Rep. p. 143 (sine char.) ; Gray, Pl. Fendl. p. 79.

Capitula monoica, homogama, glomerato-spicata. **MAS.** Involucrum Franseriæ, 5-6—lobum, 15-20—florum. Receptaculum parvum, paleis scariosis unguiculatis obovato-dilatatis vel spathulatis onustum. Corolla cyathiformis, quinque-dentata. Antheræ conniventes, vix connatæ, appendicula deltoidea inflexa superatæ. Stylus apice radiato-pencillatus. **FEM.** Involucrum fructiferum obovoideum seu fusi-formi-clavatum, coriaceum, clausum, uniloculare, apice in rostrum tubiforme superne scariosum pervium desinens, extus squamis 9-12 magnis scariosis persistentibus, aut spiraliter imbricatis, aut univerticillatis, insigniter alatum.—Frutices Neo-Mexicani, Texani, et Californici, in aridis salinis vigentes, ramosissimi, glabrati, foliosi ; foliis alternis filiformibus, inferioribus pinnato-triquinque-partitis, summis integerrimis ; capitulis axillaribus et terminalibus.—Gray, Pl. Fendl. l. c.

## HYMENOCLEA SALSOLA, Torr. &amp; Gray, l. c. TAB. VIII.

**H.** involucre fructifero strobiliformi squamas a basi ad apicem spiraliter dispositas suborbiculares undique gerente.

**HAB.**—Sandy saline uplands, near the Mohave River, Southern California ; flowering in August.

This singular plant, looking, when in fruit, so much like one of the Chenopodiaceæ, is a stout shrub, attaining the height of about two feet, with numerous branches which are invested with a loose and pale bark. The leaves are mostly entire, from one to two inches long, and scarcely a line wide, semiterete (when dry), paler, and somewhat hoary underneath. Only the lower ones are from three to five parted. In the axils of the leaves, along the upper branches are clustered the sessile little heads of flowers. The staminate heads are hemispherical, and consist of a somewhat hairy involucre of five obtuse, undulate or crenate lobes, enclosing from fifteen to twenty minute flowers, which contain not even the rudiment of an ovary. The corolla is glabrous and five-lobed. The chaff, which is nearly as long as the corolla, is obovate or oblong, with a long and narrow claw. Although destitute of an ovary, the flower contains a slender filiform style, which at length projects through the included tube of anthers, and is furnished with a capitate pencillate stigma. The fructiferous involucre is the most conspicuous part of the plant. It is about one third of an inch in diameter, of an obovoid form, and is

surrounded, in a spiral manner, with usually about ten broad spreading winglike scales of a silvery color. The scales are thickened and indurated at the base. The achenium is of a dark purple color, and is completely enclosed in the coriaceous body of the involucre. It is tipped with the long and persistent style, which is much exerted through the tubular rostrum.

The only specimens of this plant which I have ever seen, were collected by Colonel Frémont, in the place above mentioned. Afterwards another species of the same genus was discovered by Major Emory on the Gila River, and is briefly noticed in the Botanical Appendix to his Report, under the name of *H. monogyra*, Torr. & Gray. The same plant has since been found in California by Colonel Frémont; at Ojito, in New Mexico, by the late Dr. Gregg; and in Texas by Mr. Charles Wright. It is described by Dr. Gray, in his *Plantæ Fendlerianæ*, p. 79. In my specimens of *H. monogyra* from the Gila, the scales in several of the fructiferous involucre are broad, and not contracted at the base. The sterile heads are rather smaller than in *H. Salsola*, and the chaff is spatulate.

This genus is very nearly allied to *Franseria*, but differs in the remarkable winglike scales of the fructiferous involucre, as well as in habit. Perhaps the following interesting plant, found by Colonel Frémont on his return from California in 1849, may unite *Franseria* and *Hymenoclea*.

### FRANSERIA.

*FRANSERIA DELTOIDEA* (sp. nov.): caule erecto suffruticoso glabriusculo; foliis deltoideis indivisis erosodenticulatis subtus dealbatis; involucribus fœmineis subglobosis bilocellatis bifloris; squamis lanceolatis breviter spinescentibus, margine submembranaceis, exterioribus latioribus.

**HAB.**—On the Gila River, Southern California: collected by Colonel Frémont, in returning from his fourth journey. Found also by Dr. C. C. Parry, on the same river.

Stem apparently suffrutescent, with slender angular branches, which are clothed with a deciduous pubescence. The leaves are deltoid, or deltoid-ovate, scarcely an inch long, obtuse or subcordate at the base, irregularly erose-toothed, tomentose on both sides, almost white underneath, except the reticulated veins. The heads are not larger than a small pea, and are disposed in racemose spikes, which are about two inches long. The sterile ones are pedicellate, with the involucre pubescent, 5-6-toothed, and about fifteen-flowered. Corolla of the sterile flowers tubular-infundibuliform and glabrous; the bracteole or chaff at its base broadly ligulate. The fertile involucre is sessile; the base surrounded with imbricated broadly ovate membranaceous mucronate bracts, which are crenulate on the margin; scales numerous, membranaceous on the margin, terminating in a sharp stout scabrous spine, which is often a little curved or uncinatate at the tip. Styles filiform and obtuse.

\* Journ. of the Acad. Sc. Philad. n. ser. vol. 1. p. 172.



A remarkable species, partaking of the character both of *Hymenoclea* and *Franseria*. There is a transition from the broad and somewhat membranaceous bracts at the base of the fertile head, to the lower scales of the involucre, and from these, with a broad base and spiny top, to the narrow prickles that occur in many species of *Franseria*.

A genuine and apparently new species of the latter genus occurs among the plants collected in California by Colonel Frémont. It belongs to the section *Centrolæna* of De Candolle, and may be thus characterized.

*FRANSERIA ALBICAULIS*: frutescens, incano-pubescens; foliis bipinnatifidis, laciniis oblongis vel lineari-oblongis obtusis integris vel pauci-dentatis; capitulis dense spicato-racemosis; involucreo masculino 8-dentato, fructifero biloculari aculeis lanceolato-subulatis rigidis incurvis armato.

*HAB.*—Southern California, probably on the Gila: Colonel Frémont. It was also found, without flower or fruit, by Major Emory, on the sandhills of the Gila; and is the plant referred to in my botanical appendix to his Report, as an apparently new species of *Ambrosia*.

A shrub with numerous branches, which are clothed with a short whitish pubescence. The leaves are about an inch long, grayish pubescent on both sides, and pinnately or bipinnately divided; the narrow ultimate segments being from one to three lines in length. The heads are about the size of a small pea, and are disposed in close leafless spiked racemes. Some of the racemes are wholly staminate; others have fertile heads intermixed. Sterile heads on short pedicels, with the involucre obtusely 7–8-toothed. The chaff is filiform and bearded. Corolla five-toothed. The fructiferous involucre are globose, and thickly covered with rather rigid, compressed, curved prickles, which are slightly roughened, and about as long as the semidiameter of the involucre.

This species is near *F. dumosa* Gray, described in my Botanical Appendix to Frémont's Second Report; but it differs in the more divided leaves, and in the rigid, nearly glabrous, curved, and larger scales of the involucre.

### AMPHIPAPPUS, Torr. & Gray.

Capitulum plerumque sexflorum, heterogamum; nempe flore radii unico ligulato, femineo, fertili, et floribus disci quinque, tubulosis, hermaphroditis, sed sterilibus. Involucrum obovoideum, squamis septem ad novem, subæqualibus, concavis, subcarinatis, appresso-imbricatis. Receptaculum angustum, subalveolatum. Ligula brevis, obovata, discum vix superans: corolla disci e tubo gracili infundibuliformis, limbo profunde quinquefido. Styli rami breves Linosyridis; appendiculo ovato-deltaideo superati. Achenium radii oblongum, compressum, villosum, pappo

uniseriali paleaceo (e squamellis pluribus setaceis varie modo concretis) achenio dimidio brevior superatum. Achenia disci infertilia, turbinata, pappo piloso uniseriali elongato instructa; setis rigidulis, tortuosis, denticulatis, valde inæqualibus, interdum subramosis.—Frutex Californicus, ramosissimus; foliis alternis, brevibus, obovato-spathulatis, integerrimis, subsessilibus; capitulis dense corymbosis; floribus aureis.\*

\* *Amphipappus*, Torr. & Gray, in *Bost. Journ. Nat. Hist.* 5. p. 4.

### AMPHIPAPPUS FRÉMONTII, Torr. & Gray, l. c. TAB. IX.

HAB.—Interior of California, in the mountains between 35° and 36° of North latitude; particularly on the Mohave River and other tributaries of the Colorado: flowering in April.

A smoothish shrub, growing about a foot and a half high, with numerous slender, whitish, corymbose branches. The leaves are from half an inch to three fourths of an inch long, nearly glabrous, of a rather thick texture, mucronate at the tip, and tapering at the base into a short petiole. The flowers are yellow, in numerous heads, which are three or four lines long, in clusters of from three to five each, and disposed in somewhat naked corymbs. The involucre is nearly glabrous; and the oblong obtuse scales are of a pale straw color. There is but a solitary ray-flower, the ligule of which is obovate, entire, and about one third as long as the involucre. Its achenium is villous, and crowned with a paleaceous pappus of five or six scales, which are deeply cut into several unequal subulate segments, or rather consist of bristles variously united. The disk flowers are usually five in number, infundibuliform, with a slender tube, 5-cleft; the segments revolute. Stamens at length exerted; the anthers furnished with a subulate appendage at the tip. The achenia of the disk are apparently always infertile, though containing a large and well formed ovule. They are crowned with a setose pappus which is nearly as long as the corolla. Its bristles are usually very tortuous, and sometimes forked or rather united in pairs, at the base.

This rare *Composita* belongs to the subtribe *Asterineæ* of the tribe *Astereæ*, and to the division *Chrysocomeæ*. It resembles in many respects *Solidago*, particularly the sections *Euthamia* and *Chrysoma* of that genus, from which it differs in the involucre and in the dimorphous pappus. In its involucre and general habit it more nearly resembles *Guttierrezia*, and might be referred to that genus were it not for the truly pilose or setose pappus of the disk-flowers.

### SARCODES, Nov. Gen.

Calyx quinquesepalus, marcescens; sepalis concavis, basi vix gibbosis. Corolla campanulata, persistens, quinquelobata; lobis ovatis, erectis. Stamina 10, hypogyna: filamenta subulato-filiformia: antheræ oblongæ, biloculares, didymæ, fere

ad basim introrsum affixæ ; loculis sacculæformibus, apice oblique truncatis, foramine amplo hiantibus. Ovarium hemisphæricum, quinquelobatum, quinqueloculare ; loculis multiovulatis. Ovula horizontalia, anatropa. Stylus elongato-columnaris : stigma capitatum, subquinquelobum. Discus nullus. Capsula depresso-globosa, subquinqueloba, quinquelocularis. Semina numerosissima, ovata, aptera ; testa reticulata. Embryo in basi albuminis, minutissimus, indivisus.—Herba Californica, carnosâ, rubra ; caule simplici, squamis carnosâ vestito, in spicam conferte bracteata desinens ; floribus pedicellatis.

### SARCODES SANGUINEA, TAB. X.

**HAB.**—Valley of the Sacramento ; the precise locality not recorded, but probably on the Yuba River.

A very interesting plant, belonging to the small group of Monotropeæ. It is of a fleshy texture and blood-red color. The stems are apparently clustered, and spring from a thick coralloid root. They are from six to ten inches high, perfectly simple, and clothed with long erect scales, which are broader below, and gradually become narrower above, where they pass into bracts. The lowest scales are broadly ovate and clasping, very thick, and of a firmer texture than the others : upper ones an inch or two inches long, and two or three lines wide, rather obtuse, ciliate on the margin. The flowers are numerous (from 30 to 50), about as large as in *Hypopithys lanuginosa*, and occupy the upper half of the stem, each subtended and partly concealed by a long bract. All of them are decandrous. Peduncles of the lower flowers are nearly an inch long ; of the upper flowers much shorter. The calyx is composed of five appressed, oblong, obtuse, glandularly pubescent sepals, which are imbricated in æstivation. The corolla is about one third larger than the calyx, monopetalous, obtusely five-lobed, without gibbositities at the base, and glabrous. The stamens are hardly more than half the length of the corolla, and arise from its base : the glabrous filaments are somewhat flattened. The anthers are attached to the filament by the back towards the base. They are about two lines long, and consist of two oblong, tubular, saccate cells, which in the bud are erect,\* and almost or quite divided into two loculi. Each cell is obliquely truncated at the apex, where it opens by a large hole. The pollen is simple, very minute, and somewhat hemispherical. The ovary is distinctly five-lobed, and with as many cells, into which protrude the large placentæ, covered with innumerable oblong anatropous ovules. The style is erect, stout, about the length

\* The anthers of *Schweinitzia*, while in the flower-bud, are singularly turned to one side at a right angle, so that one cell stands directly over the other. Even in the expanded flower, they do not become perfectly erect. My friend, Dr. Gray, in his admirable description of this genus (*Chloris Bor.-Amer.* p. 17), gives me credit for adopting, in my *Flora of the Northern and Middle States*, published in 1824, the true view of the position of the anthers of *Pyrola*. It was in the *Flora of New York* (1843) that I corrected the error : in the former work the prevailing view was given.

of the filaments, and terminates in a capitate, slightly five-lobed stigma. The capsule is similar in form to the ovary, only larger. It is of a chartaceous texture, and apparently opens by chinks at the margin of the valves, which do not separate from the axis. Seeds covering the large two-lobed placentæ, ovoid, obtuse at the base; the reticulated testa covering closely the nucleus, except at the apex, where it is produced into a short, conical, oblique appendage. The embryo is exceedingly minute, obovoid, undivided, and situated near the base of fleshy and oily albumen, with the radicle pointing to the hilum.

This genus is intermediate between *Hypopithys* and *Schweinitzia*. Like the former, it has a long style; but it differs from it in the gamopetalous corolla, the two-celled biporose anthers, close testa, &c. *Schweinitzia*, which has a similar corolla, differs in its short thick style, and in the form as well as the insertion of the anthers.

There can be no doubt respecting the position of the embryo in this genus and in *Pterospora*. After much patient dissection, I have obtained it repeatedly in both genera. The ripe seeds of *Monotropa* and *Hypopithys* I have not examined, but they have anatropous ovules, and therefore the radicle must be next the hilum. Lindley and De Candolle, however, state that the embryo is situated at the *apex* of the albumen; but this I am convinced is a mistake. As, therefore, all the genera of this group but one have two-celled anthers, there would seem to be nothing to distinguish *Monotropeæ* from *Pyroleæ*, except the parasitic habit, the want of verdure, and the erect position of the anthers in the flower bud. There is, however, a leafless species of *Pyrola* which serves as a connecting link between them; and I have already alluded to the half turning of the anthers in the unexpanded flowers of *Schweinitzia*. In comparing these groups, there is still another character which, I believe, has been hitherto overlooked. Some years ago,\* I remarked that the pollen in all the *Ericaceæ* that I had examined was compound, consisting of three or four united spherules, as in *Epacridaceæ*. At that time, I had only looked at the pollen of the *Ericaceæ* proper, and the *Vaccineæ*. Afterwards, I found that, in *Monotropeæ*, the pollen is simple; while, in *Pyroleæ*, it is compound, consisting usually of three united grains; but these are not so easily observed as in the suborders just noticed.

The genus *Galax*, which was first referred to *Ericaceæ* by Michaux,† and afterwards to a separate tribe of *Pyrolaceæ* by De Candolle, ought, perhaps, to be the type of an order, or at least of a suborder. It is remarkable for its monadelphous stamens and truly one-celled anthers. From genuine *Pyroleæ* it differs besides in its simple pollen, wingless seeds, and cylindrical, axile, divided embryo. According to Sir J. E. Smith,‡ it was referred by Mr. Dryander to *Saxifragaceæ*; and the late Prof. D. Don placed it in his heterogeneous order *Galacineæ*, which was characterized so as to include *Francoa*.

Endlicher enumerates among *Pyroleæ* the little known genus *Shortia*,§ although Dr. Gray gives no opinion of its affinities, merely observing, that it has the habit

\* Flora of the State of New York, i. p. 229.

† Michx. Fl. Bor.-Am. ii. p. 48.

‡ Grammar of Botany, p. 164.

§ Gray in Sill. Amer. Jour. 42, p. 48.

of *Pyrola* and the foliage of *Galax*. It seems to be more nearly related to the latter than to the former. Until, however, the flowers of this plant (of which only a single specimen, in fruit, is extant) are obtained, it will be impossible to determine its place in the system with certainty.

Of the five genera and seven species that constitute the suborder *Monotropeæ*, so far as at present known, four of the genera and five of the species are peculiar to North America.

Several of the species have a very wide range, both in latitude and longitude. *Monotropa uniflora*\* occurs from Canada to Florida, and from the Atlantic to the Pacific coasts. On the western side of the continent it seems to be confined to Oregon. *Hypopithys lanuginosa* is spread almost as widely. *H. multiflora*, if it be really indigenous to North America, has not been found within the limits of the United States. The rare *Schweinitzia* is a somewhat southern genus, never having been observed in a higher latitude than Baltimore; while *Pterospora* is exclusively northern, the State of New York being its limit to the south, although it has been found as far west as the Cascade Mountains of Oregon. *Sarcodes* is wholly a Californian genus.

\* *Monotropa Morisoniana* is certainly nothing but *M. uniflora*, in which the flower is always erect after fertilization.

## EXPLANATIONS OF THE PLATES.

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### PLATE I. SPRAGUEA UMBELLATA, PAGE 4.

- FIG. 1. Plan of the flower.  
2. A flower, magnified.  
3. One of the sepals, magnified.  
4. A petal, more magnified.  
5. A stamen, seen in front, magnified.  
6. The pistil, showing a longitudinal section of the ovary, more magnified.  
7. A ripe dehiscent capsule, with the persistent sepals, equally magnified.  
8. A seed, highly magnified.  
9. Longitudinal section of the same.

### PLATE II. FRÉMONTIA CALIFORNICA, PAGE 6.

- FIG. 1. Plan of the flower. The ovary should have been represented as 5-celled.  
2. The andrœcium, magnified.  
3. An anther, with the free portion of its filament magnified; front view.  
4. The same; side view.  
5. Transverse section of an anther, showing the two loculi of each cell.  
6. Pistil, considerably magnified.  
7. Longitudinal section of a flower, only part of the calyx remaining, equally magnified.  
8. An ovule, more highly magnified.  
9. One of the stellate hairs, highly magnified.

PLATE III. *LIBOCEDRUS DECURRENS*, PAGE 7.

- FIG. 1. A branch bearing male aments, of the natural size.  
 2. Portion of the same, magnified.  
 3. A branch bearing mature fertile aments, of the natural size.  
 4. An anther, seen from the inside, magnified.  
 5. The same seen from the outside.  
 6. A mature cone, of the natural size.  
 7. A seed, slightly magnified.  
 8. Vertical section of the same, more magnified.  
 9. The embryo separated, and still more magnified.

PLATE IV. *COLEOGYNE RAMOSISSIMA*, PAGE 8.

- FIG. 1. Plan of the flower.  
 2. A flower-bud, magnified.  
 3. A bract, equally magnified.  
 4. An expanded flower, moderately magnified.  
 5. A stamen, front view, more magnified.  
 6. The same, seen from behind.  
 7. A flower laid open longitudinally, magnified.  
 8. The pistil, equally magnified.  
 9. A leaf, magnified.  
 10. One of the centrally fixed hairs.

PLATE V. *EMPLECTOCLADUS FASCICULATUS*, PAGE 10.

- FIG. 1. A flower, on its short branch or spur, magnified.  
 2. The same laid open, and more magnified.  
 3. A petal, magnified.  
 4. A stamen, back view, equally magnified.  
 5. Front view of the same.  
 6. A grain of pollen, highly magnified.  
 7. Pistil, moderately magnified.  
 8. Longitudinal section of the same.  
 9. An ovule, more magnified.

PLATE VI. CHAMÆBATIA FOLIOLOSA, PAGE 11.

- FIG. 1. A flower, magnified.  
 2. The same laid open longitudinally, more magnified.  
 3. A stamen, front view, more magnified.  
 4. The same, back view.  
 5. The fruit enclosed in the calyx, magnified.  
 6. Longitudinal section of the same, somewhat more magnified.

PLATE VII. CARPENTERIA CALIFORNICA. TAB. VII., PAGE 13.

- FIG. 1. A petal of the natural size.  
 2. Front view of a stamen.  
 3. Back view of the same.  
 4. A capsule, with the persistent calyx, showing the manner in which the exocarp separates: slightly magnified.  
 5. Longitudinal section of a capsule, exposing one of the placentæ, more magnified.  
 6. Transverse section of the same. The notches in the margin indicate the lines of dehiscence of the exocarp.  
 7. A separate cell, or carpel, after the removal of the exocarp.  
 8. A seed, highly magnified.  
 9. Longitudinal section of the same, equally magnified.  
 10. Embryo, still more highly magnified.

PLATE VIII. HYMENOCLEA SALSOLA, PAGE 14.

- FIG. 1. A staminate head, moderately magnified.  
 2. The involucre of the same, with a single staminate flower, and the chaff at its base.  
 3. A staminate flower laid open.  
 4. One of the stamens, considerably magnified.  
 5. Style and stigma of the sterile flower.  
 6. Fructiferous involucre, magnified four or five times.  
 7. The same, cut open longitudinally, showing the enclosed achenium and the seed.  
 8. Transverse section of the fructiferous involucre.  
 9. An achenium, with its persistent styles.  
 10. The embryo.



## PLATE IX. AMPHIPAPPUS FRÉMONTII, PAGE 17.

- FIG. 1. A head of flowers, magnified.  
2. The ray-flower, more magnified.  
3. Pappus of the same, laid open, highly magnified.  
4. A disk-flower, moderately magnified.  
5. Pappus of the same, highly magnified.  
6. Branches of the style, showing the stigmatic lines.

## PLATE X. SARCODES SANGUINEA, PAGE 18.

- FIG. 1. Plan of the flower.  
2. A flower, moderately magnified.  
3. Front view of a stamen.  
4. The same, seen from the inside; the anther cut transversely to exhibit its two cells: both more magnified than fig. 1.  
5. Vertical section of a magnified flower, showing all the organs in their relative situations.  
6. The pistil, with one of the stamens, magnified.  
7. Transverse section of the ovary.  
8. An ovule, highly magnified.  
9. A ripe seed, more magnified.  
10. Vertical section of the same.  
11. The embryo detached, very highly magnified.



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SPRAGUEA UMBELLATA.



Engraved by Sargent

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FREMONTIA CALIFORNICA.

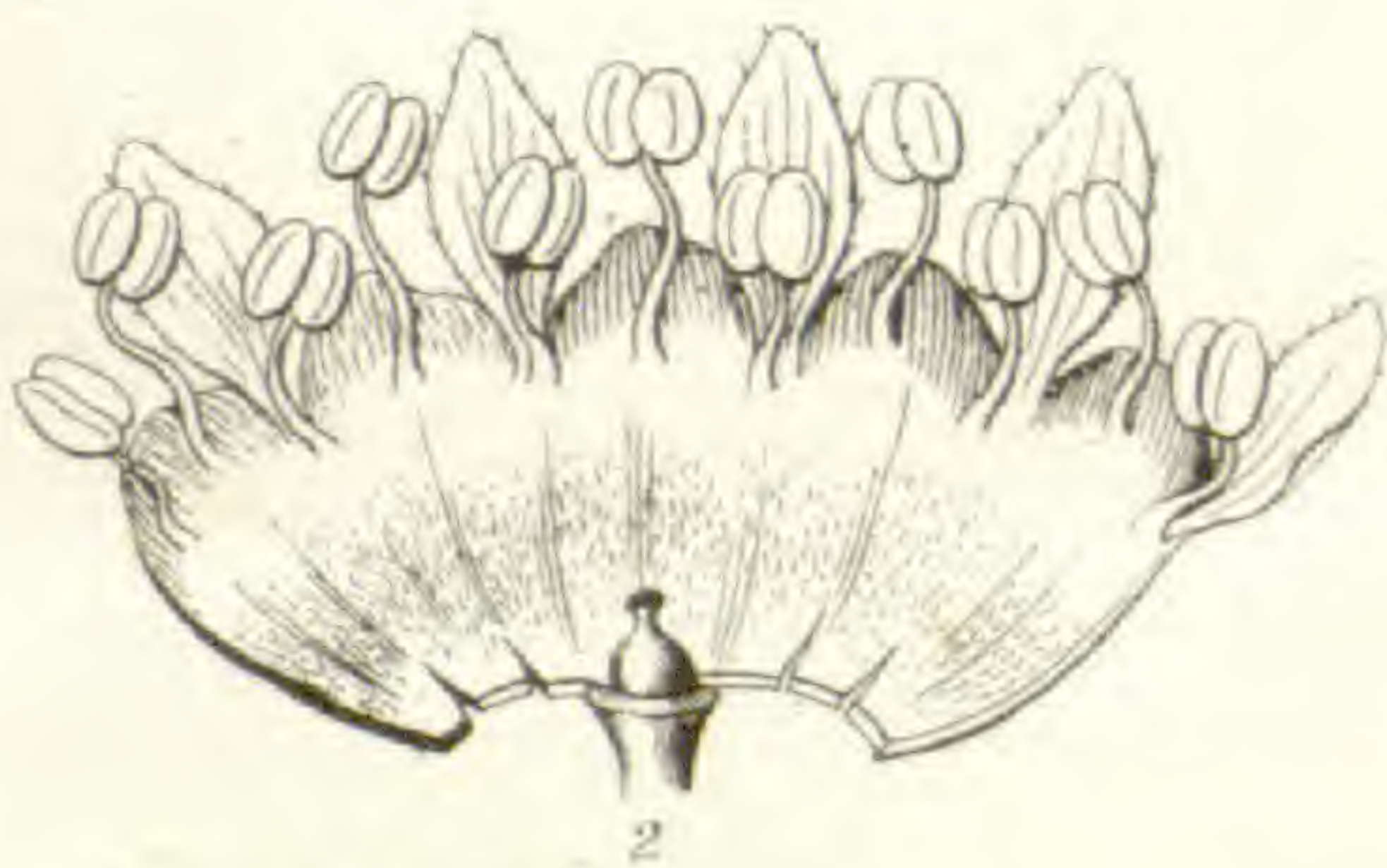




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COLEOGYNE RAMOSISSIMA.



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EMPLECTOCLADUS FASCICULATUS.



Engraved by J. Presler

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CHAMÆBATIA FOLIOLOSA.

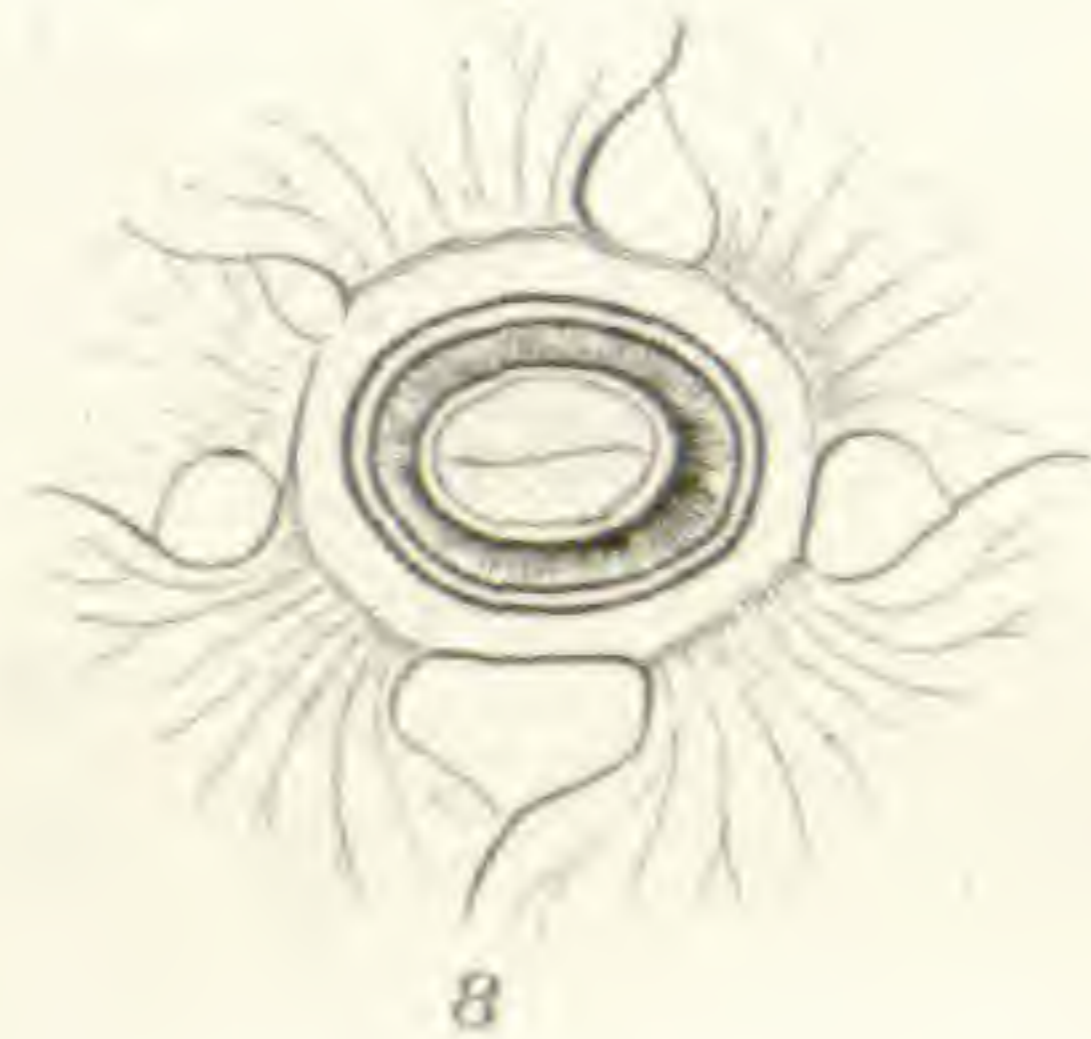
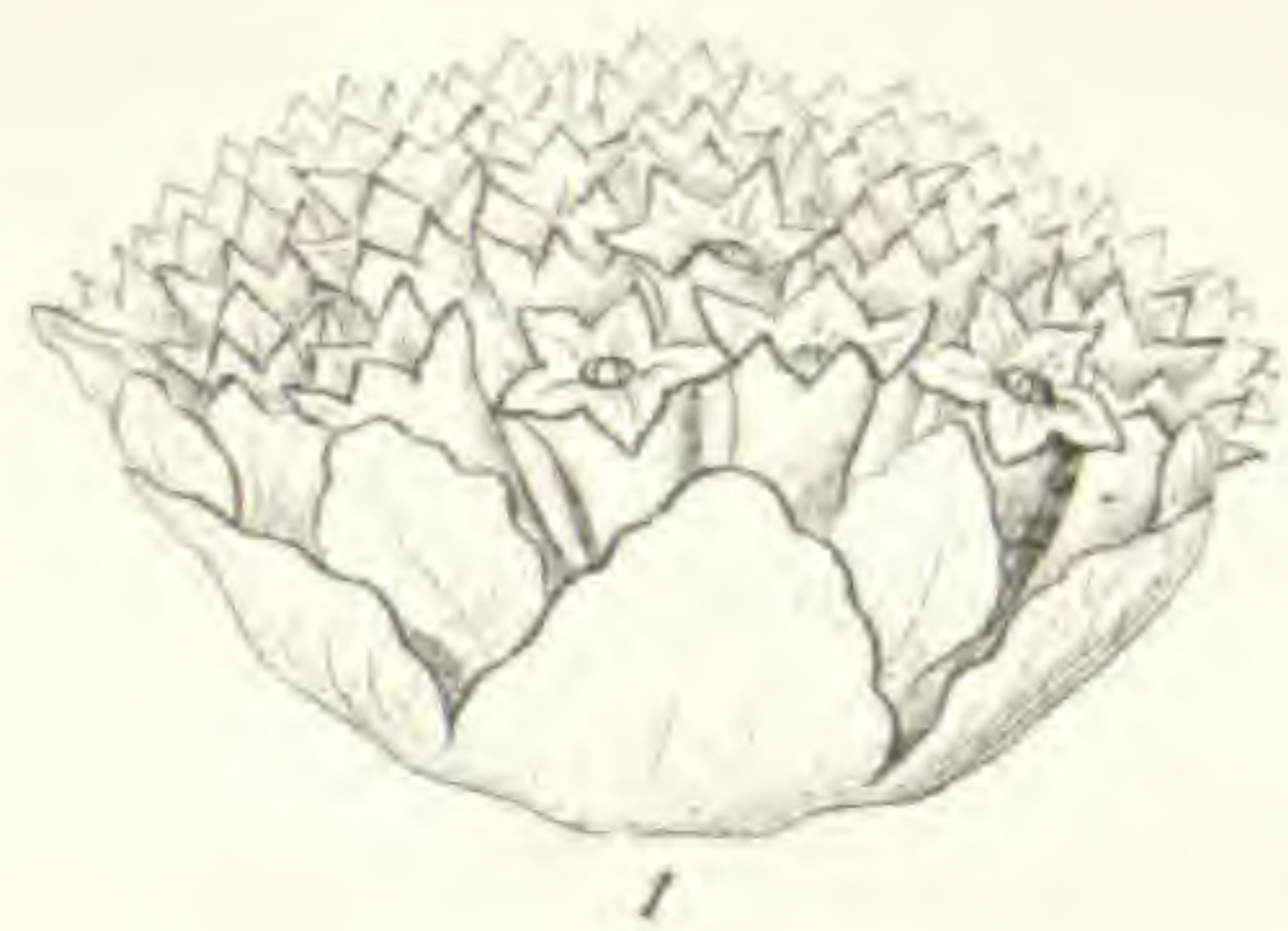


Engraved by J. Prestele.

Lith. of Wm. Endicott & Co. N.Y.

CARPENTERIA CALIFORNICA.





Engraved by J. Pringle

Litho at Wm. Endicott & Co. N.Y.

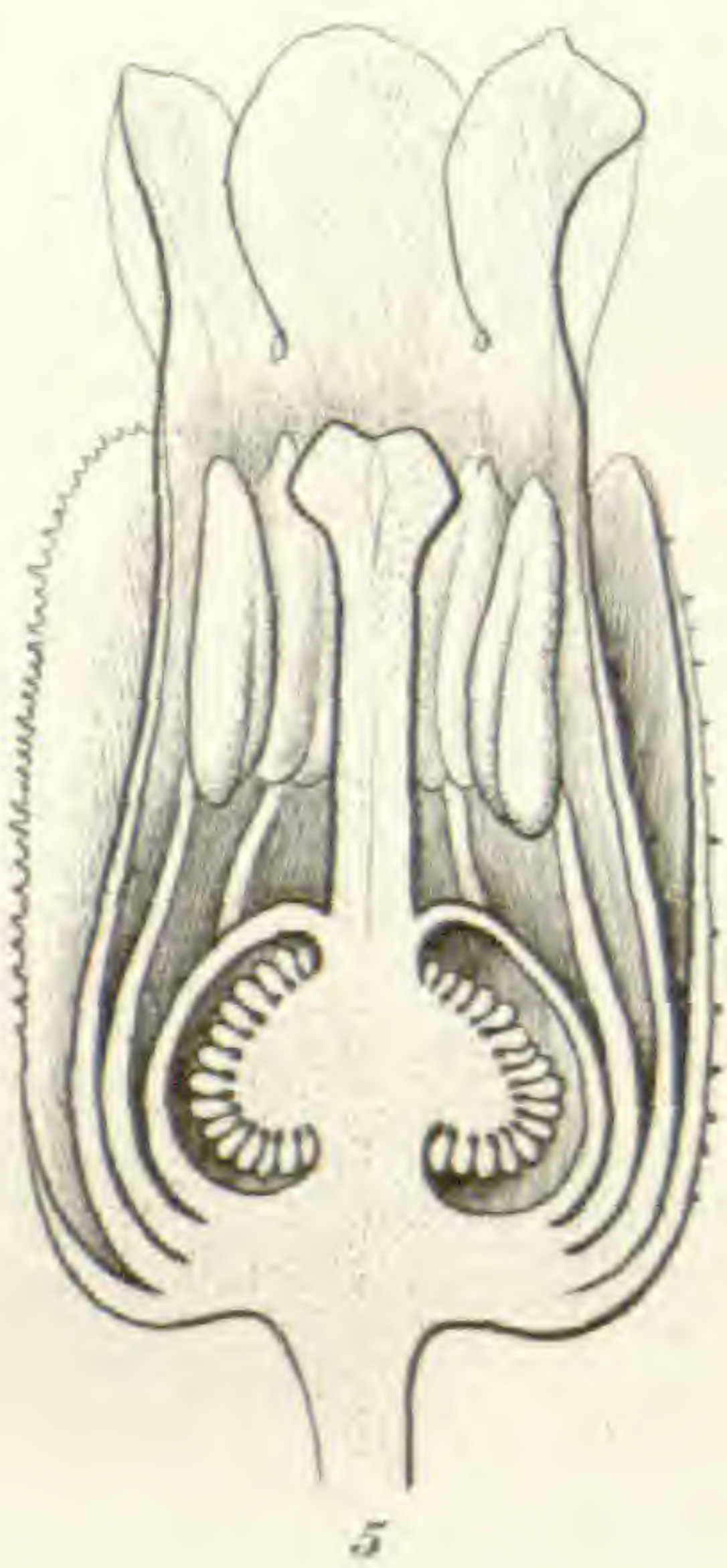
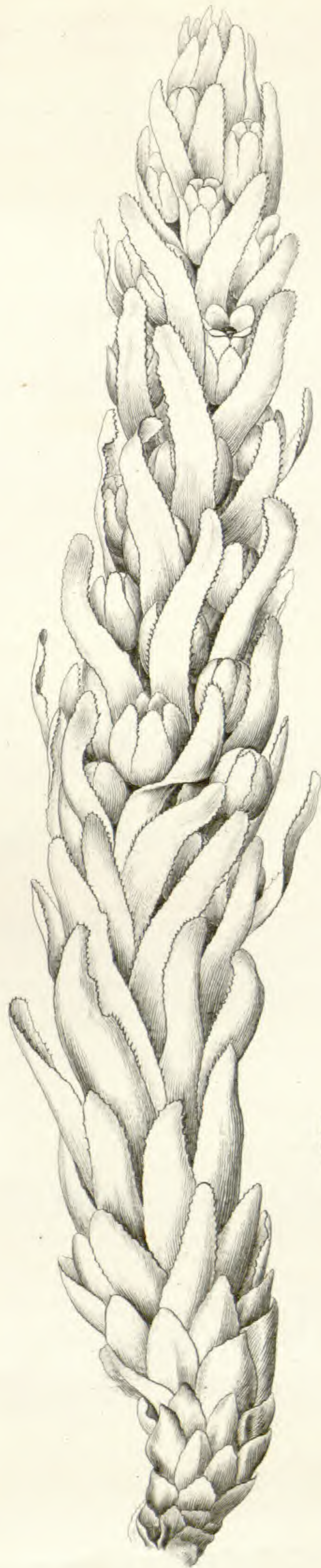
HYMENOCLEA SALSOLA.



Engraved by J. Pratte

Litho. of Wm. Endicott & Co. N. York

AMPHIPAPPUS FREMONTII.



Engraved by J. Prestelo.

Lith. of W<sup>ts</sup> Endicott & C<sup>o</sup> N York.

SARCODES SANGUINEA.