

BULLETIN

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BOTANICAL CONTRIBUTIONS.

New or Noteworthy North American Crassulaceae.

BY N. L. BRITTON AND J. N. ROSE.

TILLAEASTRUM Britton.

Bulliarda DC. Bull. Soc. Philom. 3⁴⁹: 1. 1801. Not Neck. 1790.

Type species, *Tillaea aquatica* L.

1. TILLAEASTRUM AQUATICUM (L.) Britton.

Tillaea aquatica L. Sp. Pl. 128. 1753.

Tillaea simplex Nutt. Jour. Acad. Phila. 1: 114. 1817.

Bulliarda aquatica DC. Prod. 3: 382. 1828.

Tillaea angustifolia Nutt.; T. & G. Fl. N. Am. 1: 558. 1840.

Tillaea angustifolia Bolanderi S. Wats. in Brew. & Wats. Bot. Cal. 1: 209. 1876.

Tillaea Bolanderi Greene, Fl. Fran. 183. 1891.

Crassula aquatica Schoenl. in E. & P. Nat. Pfl. 3^{2a}: 37. 891. 1891.

In mud, Nova Scotia to Maryland, Louisiana and Texas, Washington to Lower California and Colorado. Europe to northern Africa.

2. TILLAEASTRUM VIRIDE (S. Wats.) Britton.

Tillaea viridis S. Wats. Proc. Am. Acad. 23: 272. 1888.

Chihuahua. San Luis Potosi.

3. TILLAEASTRUM DRUMMONDII (T. & G.) Britton.

Tillaea Drummondii T. & G. Fl. N. Am. 1: 558. 1840.

Muddy places, Louisiana to San Luis Potosi, California and Washington.

4. **Tillaeastrum Pringlei** Rose,* sp. nov.

Delicate little plants growing in masses in damp mountain soil, 2-3 cm. high; leaves linear, 3-4 mm. long, acute; flowers axillary, solitary on very short peduncles, 1 mm. or less long, in fruit becoming 3 mm. long; carpels obtuse; seeds oblong, not papillose-roughened.

Collected by C. G. Pringle, September, 1896, Serrania de Ajusco, Federal District, Mexico (no. 6517).

5. **TILLAEASTRUM VAILLANTII** (Willd.) Britton.

Tillaea Vaillantii Willd. Sp. Pl. 1: 720. 1798.

Bulliarda Vaillantii DC. Pl. Grasses, pl. 74. 1799.

Crassula Vaillantii Schoenl. in E. & P. Nat. Pfl. 3^{2a}: 37. 1891.
Prince Edward Island. Europe and northern Africa.

OLIVERELLA Rose, gen. nov.

Caulescent and much branched perennial; leaves flat but fleshy. Flowers usually solitary (sometimes in pairs), terminating leafy branches. Calyx-lobes unequal, linear, spreading. Corolla very large and elongated, its lobes free nearly to the base, thickish. Stamens 10. Carpels 5, free, rather short, terminated by long slender styles.

Named for Mr. George W. Oliver, for many years connected with the National Botanic Garden at Washington but now employed as an expert in the Department of Agriculture. It was due to Mr. Oliver that we were able to flower this beautiful plant, as well as many more of the species described below, and it gives me great pleasure to name for him this, the most remarkable of all the Crassulaceae of America.

Oliverella elegans Rose, sp. nov.

Caulescent, 3-5 dm. high, branching throughout, densely pubescent; leaves closely set near the ends of young branches, gradually falling away below, oblanceolate to spatulate, thick, but flattened except at base, acute, pubescent, 2-3 cm. long; flowering branches slender, 1 dm. long, with some scattered leaves, but finally becoming naked, terminated by one or two flowers; calyx-lobes linear, spreading, very unequal, green, the longer ones 15 mm. long; corolla 2.5-3 cm. long, bright red except the yellow tips.

Found in cultivation at Amacamaca, near City of Mexico, by J. N. Rose, August, 1901 (no. 6073), and flowered in succulent house, Department of Agriculture, in June, 1902 and July, 1903.

* These descriptions of new species by Dr. Rose are published with the permission of the Secretary of the Smithsonian Institution. All his types unless otherwise stated are in the National Herbarium.

CLEMENTSIA Rose, gen. nov.

Perennial herb with a thick elongated root, and usually with several stems from the base. Stem-leaves numerous. Flowers in a more or less elongated dense spike or raceme. Calyx-segments linear to linear-lanceolate. Petals distinct, rose-colored. Stamens 10, 5 alternating with the petals and distinct, 5 opposite the petals and each adnate to its corresponding petal near the middle. Scales 5, prominent, flat, obtuse. Carpels 5, erect.

Named in honor of Professor Frederic E. Clements of the University of Nebraska, who has prosecuted extensive investigations on the plants of Colorado.

Type species, *Sedum rhodanthum* A. Gray.

CLEMENTSIA RHODANTHA (A. Gray) Rose.

Sedum rhodanthum A. Gray, Am. Jour. Sci. II. 33: 405. 1862.

In meadows and along streams in the Rocky Mountains, Arizona and Utah to Montana.

VILLADIA Rose, gen. nov.

Perennial by fleshy or somewhat tuberous roots; caulescent. Leaves terete and turgid. Inflorescence an equilateral raceme or spike or a very compact panicle. Flowers small. Calyx-lobes 5, nearly equal. Corolla not 5-angled. Petals thin, either distinct or slightly united. Stamens 10; anthers broad and short. Scales conspicuous, thin. Carpels erect.

Named for Dr. Manuel M. Villada, one of the prominent scientific men of Mexico, who has for many years been editor of *La Naturaleza*.

Type species, *Cotyledon parviflora* Hemsl.

1. **VILLADIA TEXANA** (J. G. Smith) Rose.

Sedum Texanum J. G. Smith, Rep. Missouri Bot. Gard. 6: 114. pl. 50. 1895.

Eastern Texas.

2. **Villadia imbricata** Rose, sp. nov.

Caespitose; sterile branches thickly set with small ovate imbricated leaves; flowering branches 2-6 cm. long, thickly set with imbricated leaves; leaves oval, 3 mm. long, acute, keeled on the back, at least in dry specimens, very pale, thickly set with minute tubercles; inflorescence a very short compact leafy spike; sepals distinct, leaf-like, shorter than the corolla; corolla "white,"

4-5 mm. long, its lobes erect, united for about a third their length at base.

Collected by E. W. Nelson near Reyes, Oaxaca, October 20, 1894 (no. 1767).

3. *Villadia cucullata* Rose, sp. nov.

Perennial by rather fleshy roots; stems 1-1.5 dm. high, simple, glabrous, spotted; leaves small, narrow, glabrous, projecting backward at base; inflorescence a short spike or equilateral raceme, 3-4 cm. long; flowers subtended by small ovate bracts; sepals ovate, green, 2 mm. long, distinct; corolla reddish, 3 mm. long, its tube 1 mm. long, its lobes hooded, denticulate on the margin.

Collected by Dr. E. Palmer near Saltillo, Coahuila, Mexico, June, 1898 (no. 374). Only a single specimen was seen, growing under bushes.

4. *Villadia Nelsoni* Rose, sp. nov.

Caulescent, 2-3 dm. high, more or less branched throughout, somewhat roughened; leaves spatulate, flattened (at least in dried specimens), 1-1.5 cm. long; inflorescence spicate; flowers sessile; sepals ovate, 2 mm. long; corolla "white," 5-6 mm. long; carpels long-attenuate.

Collected by E. W. Nelson on road between Ayusinapa and Petatlan, Guerrero, alt. 1500 to 2100 meters, December 14, 1894 (no. 2114).

5. *Villadia Pringlei* Rose, sp. nov.

Perennial by fleshy roots, much branched at base; stems 5-15 cm. high, green; stem-leaves linear in outline, 1-1.5 cm. long; inflorescence sometimes 10 cm. long, either spicate, or a compact panicle; sepals somewhat unequal, distinct, the longer ones 5 mm. long; corolla white (?), 6 mm. long.

Collected by C. G. Pringle in meager soil of dry ledges in the Sierra Madre of Chihuahua, Mexico, October 17, 1887 (no. 1238).

6. *Villadia minutiflora* Rose, sp. nov.

Perennial, with a woody or frutescent base sending up from below numerous simple ascending or erect branches 1-2 dm. tall, terminating in an open spike or raceme or a very narrow compact panicle; leaves very numerous, ascending, linear in outline, perhaps turgid and terete in fresh specimens, 6-10 mm. long, about 1 mm. wide, obtuse, projecting below the insertion at base, pubescent with short stiff hairs; flowers sessile or subsessile, either solitary and axillary or borne in short one-sided spikes; sepals somewhat unequal, 1-2 mm. long, distinct; petals white, 3 mm. long, united at base; stamens shorter than the petals, borne on the corolla-tube; appendages rounded at apex, produced below into a

slender stalk; carpels erect, short; styles short, spreading or even hooked.

Collected by C. G. Pringle on cold ledges of Sierra de San Felipe, altitude 2,550 meters, October 13, 1894 (no. 4981).

7. *Villadia ramosissima* Rose, sp. nov.

Shrubby and much branched at base; branches reddish, glabrous, at first erect, but in age spreading over other plants; leaves rigid, set nearly at right angles to the stems, turgid and nearly terete in section, ovate to oblong, glabrous; sterile branches short and closely covered with pale gray or purplish leaves; inflorescence a loose leafy spike, each flower borne in the axil of a leaf and with a smaller leaf on each side; sepals green, distinct, ovate, acute, 2 mm. long; corolla campanulate, white or with a pinkish tinge (in cultivated specimens), its tube short, but very distinct, the lobes acute, 4 mm. long; stamens 10, borne on the corolla-tube, much shorter than the petals; anthers purplish; appendages conspicuous, yellow, 1 mm. broad; carpels erect (at least when young), distinct.

Common on the limestone hills near Tehuacan, Puebla. Described from living specimens, collected by J. N. Rose, 1901, which flowered in Washington in 1902 (no. 6417).

Pringle's no. 6052 from Sierra de San Felipe, Oaxaca, and Lucius C. Smith's no. 965 from La Solidar de Etla, Oaxaca, are, perhaps, to be referred to this species, although the petals seem to be distinctly reddish.

8. *VILLADIA SQUAMULOSA* (S. Wats.) Rose.

Cotyledon parviflora squamulosa S. Wats. Proc. Am. Acad. 22: 473. 1887.

Sedum squamulosum S. Wats. l. c.

Northern Mexico. Very rare, or at least little known.

9. *VILLADIA PARVIFLORA* (Hemsl.) Rose.

Cotyledon parviflora Hemsl. Diag. Pl. Nov. 1: 9. 1878.

High valleys of Central Mexico.

ECHEVERIA DC. Prod. 3: 401. 1828.

Type species, *Cotyledon coccinea* Cav.

Echeveria pulvinata Rose, sp. nov.

Caulescent, 12 cm. high, naked below, somewhat branching; young branches, leaves and sepals covered with a dense white velvety pubescence; leaves clustered in a rosette at the top, obovate, tapering to a narrow base, 2.5-3 cm. long, 2 cm. broad, rounded at apex

and apiculate, 5-6 mm. thick; flowers in a leafy raceme; pedicels 10-12 mm. long, bracteolate; sepals ovate, acute, unequal, the longest about half the length of the corolla; corolla scarlet, sharply 5-angled, 18-20 mm. long, pubescent without, the lobes apiculate.

Living specimens were collected by J. N. Rose and Walter Hough in Tomellin Cañon, Oaxaca, June 15, 1899, and flowered in the Washington Botanic Garden in April, 1900 (no. 4994, type). Herbarium specimens had previously been collected near the same locality by Mr. Pringle (no. 5641) and by Prof. C. Conzatti on Sierra de San Felipe (no. 107). This is a very singular species, with thick velvety leaves and bright scarlet flowers.

ECHEVERIA PRINGLEI (S. Wats.) Rose.

Cotyledon Pringlei S. Wats. Proc. Am. Acad. 25: 148. 1890.

Only known from type specimens collected by C. G. Pringle near Guadalajara, Mexico.

Echeveria montana Rose, sp. nov.

Caulescent; leaves in a dense rosette at the top of the stem, orbicular or obovate, somewhat narrowed below, glabrous, 5-6 cm. long; flowering stems somewhat granular-roughened above, rather densely leafy-bracted below, 2-3 dm. long, many-flowered; inflorescence an equilateral raceme; sepals ovate-lanceolate, 6-7 mm. long; corolla 1 cm. long.

Collected on ledges, trees, etc., by C. G. Pringle on the Sierra de San Felipe, June 16, 1894 (no. 4706, type). Here seems to belong Charles L. Smith's no. 860 from the same locality. Resembling somewhat *E. Pringlei*, but not pubescent.

Echeveria australis Rose, sp. nov.

Caulescent, 2-3 dm. long, or 5-6 dm. including the inflorescence, glaucous; leaves broadly spatulate, rounded at apex, 3-7 cm. long, sometimes 3 cm. broad and spoon-shaped, somewhat glaucous and often purplish, thickly set at apex of branches, early falling off below; flowering branches stout, bearing numerous large oblong bract-like leaves; inflorescence an elongated equilateral raceme or sometimes more compound, forming a narrow panicle; pedicels 1 cm. long, or less, slender; flower-buds strongly 5-angled, acute; sepals unequal, the longer ones 12 mm. long, ovate-oblong, purplish, glaucous, nearly or quite free to the base; petals bright red, thickish, a little longer than the longest sepals, nearly distinct, cup-shaped at base; stamens 10, the 5 opposite the sepals borne on petals about one fourth the distance above the base.

Distributed by J. Donnell Smith as *Sedum bicolor* (no. 3633) and *Cotyledon Peruviana* (no. 7308), from both of which it seems to differ. H. Pittier has also sent abundant living material from San José, Costa Rica (December, 1902) from which the above description is drawn and which is taken as the type of the species.

Echeveria maculata Rose, sp. nov.

Acaulescent, glabrous throughout; basal leaves in a dense rosette, elongated-lanceolate, thickish, about 1 dm. long, 1.5–2 cm. broad, acute, dark green and somewhat mottled; flowering branches stout, 6–8 dm. long, their lower leaves 8–10 cm. long; inflorescence paniculate, the lower branches bearing 3 or 4 sessile flowers arranged along one side of the branch, the upper flowers in the panicle axillary and sessile; sepals very unequal, somewhat spreading, fleshy, acute; corolla pale lemon-yellow, 10 mm. long; lobes free nearly to the base, acute at tip and slightly spreading.

Collected by J. N. Rose near Dublan, Hidalgo, Mexico, July 2, 1901 (no. 5412), and sent to Washington where it has repeatedly flowered.

This species is somewhat similar to *E. mucronata*, but is certainly distinct.

Echeveria platyphylla Rose, sp. nov.

Acaulescent, glabrous throughout; basal leaves in a dense rosette, somewhat rhomboid in outline, thinnish, pale green, acuminate, tipped with a slender cusp, 4–5 cm. long, about 2 cm. broad; flowering branch 2–3 dm. long, bearing small scattered leaves below; flowers 15 to 20, arranged in an equilateral raceme; pedicels 3 mm. long or less; sepals green, thickish, linear, erect, subequal; corolla reddish yellow, lobes 9 mm. long, tips spreading even in age, tube very short, 1–2 mm. long.

Collected living by J. N. Rose, Valley of Mexico, July, 1901 (no. 6393). The specimens have frequently flowered in cultivation at Washington. This species must be close to *E. mucronata*, but has very different foliage. The above description is drawn entirely from living plants. The Department of Agriculture has many seedlings for distribution.

Echeveria tenuis Rose, sp. nov.

Acaulescent, glabrous throughout; leaves fleshy, numerous, forming a flattened rosette, oblong, 4–5 cm. long, much narrowed at base, acute; flowering branches slender, at first nodding or scorpioid, their leaves linear or at least narrow, with a small rounded spur at base; flowers sessile or nearly so; sepals very unequal,

broadly ovate to linear; corolla 9 mm. long, the segments in dry specimens keeled on the back, with scarious margins, not connivent in age, united for about one fourth their length.

Collected by J. N. Rose among rocks on top of mountains near Monte Escobedo, Zacatecas, Mexico, August 26, 1897 (no. 2640a). This species resembles *E. Desmetiana* in its sessile flowers, but the leaves are of different shape, and the bracts are not two-spurred at base.

***Echeveria humilis* Rose, sp. nov.**

Acaulescent, or with a short woody caudex, glabrous throughout; basal leaves in a dense rosette, thickish, lanceolate, acute, 5-6 cm. long; flowering stems about 1 dm. long, rather weak, leafy below; inflorescence a few-flowered secund raceme, sometimes paniculately branched; pedicels 2-3 mm. long, bractless; sepals lanceolate, very unequal, the longer 4-5 mm. long, acute; corolla 8-9 mm. long, its segments united for about one fourth their length.

Collected by Parry and Palmer, State of San Luis Potosi, 1878 (no. 233 in part, type), and in the same state by J. G. Schaffner, 1879 (no. 769).

***Echeveria obtusifolia* Rose, sp. nov.**

Acaulescent or perhaps sometimes shortly caulescent, glabrous throughout; leaves forming a spreading rosette 2 dm. broad, oblanceolate, rounded at apex, 3.5 cm. broad at widest part, narrowed to 5 mm. at base, thinnish (at least in herbarium specimens); flowering branches 2-3 dm. long (naked in herbarium specimens seen); inflorescence a one-sided (?) raceme, erect or at least becoming so, 12-20-flowered; lower pedicels 10 mm. long, ascending; sepals unequal, ovate; corolla reddish, 10-12 mm. long, rather broad, not strongly angled (as far as indicated by dried specimens).

Collected by C. G. Pringle on bluffs of mountain cañon near Cuernavaca, Morelos, altitude 3,150 meters, September 17, 1899 (no. 7734). This species seems very distinct from all others known to the writer. In foliage it suggests *E. mucronata*, but the inflorescence is secund, as in the *E. glauca* type.

***Echeveria heterosepala* Rose, sp. nov.**

Acaulescent; basal leaves forming a dense rosette, obovate, somewhat acuminate, tipped with a long mucro, glabrous, perhaps also glaucous, 3 cm. long (in specimens seen); leaves on lower part of flowering branches large, above somewhat reduced; inflorescence a secund raceme, 12-15-flowered, at first nodding; lower pedicels longer, 6-7 mm. long; bractlets ascending; sepals ovate, more or

less united at base, very unequal, the longer ones 6-7 mm. long; corolla reddish, short and broad, 8-9 mm. long.

Collected by C. G. Pringle on calcareous hills near Tehuacan, Puebla, August, 1897 (no. 7499, type), and by Henry E. Seaton near Esperanza in the same state, August 4, 1891 (no. 333a).

Very similar to *E. glauca* in habit, but with different flowers.

***Echeveria cuspidata* Rose, sp. nov.**

Acaulescent; leaves in a dense rosette, sometimes a hundred or more, very glaucous on both sides, somewhat tinged with red, obovate in outline, about 6 cm. long, often 3.5 cm. broad at widest point, cuspidate; flowering stalk 2-4 dm. long, glabrous and pale, sometimes rose-colored, bearing throughout its length scattered small ovate leaves free at base and acute at each end; inflorescence a simple secund raceme, at first strongly nodding, about 15-flowered; buds arranged in two rows, obtusish; lower pedicels elongated, 10 mm. long or less; sepals unequal, all much shorter than the corolla, ovate, acute; corolla 1 cm. long, purplish with yellowish slightly spreading acute tips, the lobes united for about one fourth their length; stamens 10, all inserted on the corolla-tube, the 5 opposite the sepals inserted at the top of the tube, the other 5 inserted a little lower down on the tube; carpels erect, free to the base.

Common at Saltillo, Mexico. This description is drawn from specimens collected by Dr. E. Palmer in 1902, which flowered in Washington in February, 1903 (Rose, no. 509).

***Echeveria minutiflora* Rose, sp. nov.**

Flowering stems glaucous, clothed with thick leaves. Basal leaves forming a rosette, 7-10 cm. long, oblong, obtuse, light green, glabrous, tapering at base into a short petiole; inflorescence composed of small cymes, single flowers and twinned flowers arranged in a thick leafy spike; sepals longer than the corolla, somewhat unequal; corolla-segments spreading, ovate, acute, separated nearly to the base, greenish yellow spotted with red.

Collected by C. G. Pringle near Tehuacan, Puebla, August 1, 1897 (no. 7500, type); by J. N. Rose and Walter Hough between Tepeaca and Santa Rosa, Puebla, June 27, 1899 (no. 4704); and perhaps also by E. W. Nelson at Huajuapam, Oaxaca, November 16, 1894 (no. 1980).

Habit and inflorescence of *Villadia parviflora*, but with larger flowers and acute corolla-lobes.

ECHEVERIA SCHAFFNERI (S. Wats.) Rose.

Cotyledon Schaffneri S. Wats. Proc. Am. Acad. 17: 354. 1882.

Collected by C. G. Pringle on alkaline plains, Hacienda de An

gostura, State of San Luis Potosi, June 27, 1891 (no. 3766), and distributed as *C. Grayi*, a very different plant.

Echeveria subrigida (Rob. & Sea.) Rose.

Cotyledon subrigida Rob. & Sea. Proc. Am. Acad. 28: 105. 1893.

Only known from Tultenango Cañon, State of Mexico, where it was first collected by Mr. Pringle in October, 1892 (no. 4326). It is a most beautiful species, worthy of general cultivation. A single specimen collected by Mr. Rose, now in the Missouri Botanical Garden, is the only one in cultivation.

Echeveria Palmeri Rose, sp. nov.

Acaulescent; leaves numerous, erect or slightly spreading, pale green, at first somewhat glaucous, with reddish margins, rhomboid or oblanceolate, the largest ones 2 dm. long, 1 dm. broad at widest point, narrowed at base and there 2-4 cm. broad, flat and fleshy, but not very thick except at base, acute; flowering branches thick and stout, 6-8 dm. high, green and slightly glaucous below, reddish or rose-colored above, bearing a few scattered oblong leaves 4-5 cm. long; inflorescence a rather compact panicle 1-2 dm. long, its branches somewhat glaucous, short, 3-4-flowered; pedicels stout, 3-6 mm. long; calyx deeply 5-parted, its lobes very unequal, linear to narrowly ovate, acute, the longer ones 10 mm. long; corolla-buds sharply 5-angled, acute, broadly ovate in outline, somewhat glaucous; corolla 2 cm. long, 12 mm. broad at base, reddish-yellow, deeply parted into 5 lobes, the tube proper only 3 mm. long, lobes oblong, thickish, somewhat spreading at tip but connivent in age, gibbous at base; stamens 10, all inserted at top of corolla-tube, those opposite the petals broad at base; appendages lunate, deep purple, depressed in the center; carpels erect, distinct or nearly so, tapering into the slender purple styles; ovules many.

Described from living specimens sent by Dr. E. Palmer from the high mountains about Alvarez near the city of San Luis Potosi. One of the showiest of all the Echeverias. Perhaps nearest *E. subrigida*, but with different inflorescence and larger leaves.

COURANTIA Lem. Jard. Fleur. 1: Misc. 92. 1851.

Caulescent. Leaves alternate, closely set, flat and broad. Inflorescence a dense spike; bracts brightly colored. Calyx-lobes equal (?), linear, brightly colored, as long as the corolla. Corolla not 5-angled, yellow, 5-parted. Stamens 10, borne at base of the corolla; filaments united into a tube for half their length; scales none (?). Carpels widely spreading.

Type of genus, *Echeveria rosea* Lindl.

COURANTIA ROSEA (Lindl.) Lem. Jard. Fleur.

3: 244. 1853.

Echeveria rosea Lindl. Bot. Reg. 28: pl. 22. 1842.

Cotyledon roseata Baker, in Saund. Refug. Bot. sub. pl. 55, no. 3. 1869.

Courantia echeverioides Lem. Jard. Fleur. 1: Misc. 92. 1851. Mexico.

PACHYPHYTUM Link, Klotzsch & Otto, Allgem. Gartenz. 9: 9. 1841.

Caulescent and more or less branched; leaves very thick, often terete. Flowers solitary or arranged in secund racemes. Calyx deeply lobed, the lobes appressed to the corolla, ovate to oblong, equal or unequal, shorter or longer than the corolla. Corolla deeply 5-parted, not at all angled; petals erect below, spreading above. Stamens 10; the 5 alternating with the petals free from the corolla; the other 5 borne on the petals, each with a pair of appendages at the base. Scales broad. Carpels 5, erect, free to the base; styles short.

Three species, all Mexican.

Type species, *Pachyphytum bracteosum* Link, Klotzsch & Otto.

Pachyphytum uniflorum Rose, sp. nov.

Perennial, caulescent, about 2 dm. high, either simple, or branched at base, usually erect and stout, woody below; leaves closely set on upper parts of branches, falling off below, very turgid, but slightly flattened, 3-5 cm. long, only slightly narrowed below, rounded at apex, not glaucous, but pale green except near the apex, or even reddish throughout; flower-stems slender, erect or nearly so, appearing from the axils of the uppermost leaves of the rosette, pinkish, not glaucous, naked below, but with about 9 small scattered leaves above, these about 1 cm. long, greenish or purplish, minutely auricled at base; calyx 5-lobed, 8 mm. long, its lobes ovate, pinkish or greenish, acute; corolla 12 mm. long, 5 mm. broad, little or not at all angled in bud; petals spreading, free nearly or quite to the base, acute; stamens 10, the five opposite the sepals free, the other 5 borne on the petals each with two broad truncate appendages at its base; scales broad; carpels 5, erect, distinct.

Plants purchased on the streets of San Luis Potosi, Mexico, by Dr. E. Palmer in 1902 (type). They are said to have come from a mountain cañon in sight of the city. These plants are sold in San Luis Potosi and grown in shady courtyards.

URBINIA Rose, gen. nov.

Acaulescent; leaves closely imbricate, thick and rigid. Inflorescence rather few-flowered, cymose. Calyx small, 5-lobed; lobes

ovate to lanceolate, equal or unequal, much shorter than the corolla. Corolla somewhat cone-shaped, the lobes united at base into a tube. Stamens 10, borne on the corolla. Carpels 5.

A very peculiar genus, quite distinct in its habit and calyx from *Echeveria* and well deserving to be separated. Named for Dr. Manuel Urbina, Acting Director of the National Museum of Mexico.

Type species, *Echeveria agavoides* Lem.

1. URBINIA AGAVOIDES (Lem.) Rose.

Echeveria agavoides Lem. Ill. Hort. 10: Misc. 1. 78. 1863.

Cotyledon agavoides Baker, in Saund. Refug. Bot. 1: pl. 67. 1869.

Echeveria yuccoides E. Morren, Belg. Hort. 24: 168. 1874. Mexico.

2. URBINIA CORDEROYI (Baker) Rose.

Echeveria Corderoyi E. Morren, Belg. Hort. 24: 159. 1874.

Cotyledon Corderoyi Baker, Gard. Chron. 1: 599. 1874.

Very near *E. agavoides* but described as having more leaves and flowers.

Northern Mexico.

3. URBINIA obscura Rose, sp. nov.

Leaves ovate, 8-9 cm. long, 4-5 cm. broad at base, thick but flattened, somewhat rounded at the base; flowering stems thickish, covered with many narrow leaves, the larger ones 3 cm. long, free at base, green except the pungent almost spiny tip; inflorescence a 2-branched cyme; flowers about 10; calyx small, with 5 very unequal lanceolate teeth; corolla 12 mm. long, bright rose colored below, but the slightly spreading lobes yellow.

Described from a plant in collections of the New York Botanical Garden, received from Mr. W. B. Kunhardt; a flowering specimen taken from this plant is in the National Herbarium.

DUDLEYA Britton & Rose, gen. nov.

Caulescent or acaulescent perennials with flat linear to ovate basal leaves and yellow, orange, red or rarely white flowers mostly in panicles. Leaves of the flowering branches usually much shorter and relatively broader than the basal ones, sessile, or clasping. Calyx conspicuous, 5-lobed, the lobes erect, linear-lanceolate to ovate, obtuse to acuminate. Corolla nearly cylindric, or somewhat angled, the segments united below the middle, erect, or their tips somewhat spreading, obtuse to acuminate. Stamens twice as many as the calyx-lobes, distinct. Carpels erect, many-seeded.

Named in honor of Professor William R. Dudley, of Stanford University.

Type species, *Echeveria lanceolata* Nutt.

1. DUDLEYA RUSBYI (Greene) Britton & Rose.

Cotyledon Rusbyi Greene, Bull. Torrey Club, 10: 125. 1883.

Probably perennial, acaulescent; leaves in dense rosettes, rhomboid-ovate, 1.5–2 cm. long, acuminate, glabrous but papillose-roughened; flowering branches erect, 7–12 cm. high, glabrous; leaves of flowering stems linear, scattered and small; inflorescence a two-branched few-flowered cyme; pedicels 2–6 mm. long; calyx-lobes somewhat unequal, ovate, obtuse or acute; corolla deep red or "coral red," 10 mm. long, the lobes acuminate, the tube longer than the calyx.

The only definite locality given is the San Francisco Mountains in southern Arizona, although it has been collected also by Lemmon somewhere in Arizona, station not stated.

2. *Dudleya albiflora* Rose, sp. nov.

Perennial by a multicapital caudex 2–3 dm. in diameter and with 25 or more rosettes crowning the short stems; leaves narrow, 1–1.5 cm. broad, strap-shaped to lanceolate, 4–5 cm. long, becoming purplish, not glaucous, thick and fleshy but distinctly flattened, acute; corolla white.

Living specimens sent by T. S. Brandege, collected at Magdalena Bay, Lower California, in the fall of 1902.

3. DUDLEYA PULVERULENTA (Nutt.) Britton & Rose.

Echeveria pulverulenta Nutt.; T. & G. Fl. N. Am. 1: 560. 1840.

?*Cotyledon pulverulenta* Baker, in Saund. Refug. Bot. 1: pl. 66. 1869.

?*Echeveria argentea* Lem. Ill. Hort. 10: 78. 1863.

Southern California.

4. *Dudleya Anthonyi* Rose, sp. nov.

Resembling *D. pulverulenta*, but basal leaves more elongated, 2 dm. long by 4–5 cm. broad, stem-leaves seemingly narrower; pedicels slender and longer, and calyx-lobes narrower.

Collected by A. W. Anthony on San Martin Island, Lower California, July–October, 1896 (no. 123, type), July 15, 1896, March 13, 1897.

5. *Dudleya tenuis* Rose, sp. nov.

Acaulescent; leaves forming a rosette, oblong-lanceolate, 3-4 cm. long, acuminate, somewhat glaucous; flowering stems slender, 1-2 dm. high; inflorescence a slender panicle, consisting of several elongated erect branches; pedicels very short, 1 mm. long or less; calyx deeply 5-parted, its lobes ovate, acute, 2-2.5 mm. long; corolla 6-8 mm. long, rather narrow, at first yellowish, in age becoming reddish, the segments united for about one half their length.

Collected in the mountains of Lower California by C. R. Orcutt July 5, 1884 (no. 113).

6. *Dudleya angustiflora* Rose, sp. nov.

Acaulescent; leaves forming a rosette, lanceolate, 3-4 cm. long, acute or acuminate, very glaucous; flowering stems slender, 1.5-2 dm. high; inflorescence a somewhat spreading panicle with 2-4 elongated branches; pedicels slender, 4-12 mm. long; calyx glaucous, deeply 5-parted, its lobes ovate-lanceolate, acute, 3 mm. long; corolla very narrow, 10-12 mm. long, reddish (at least drying so), its segments united into a tube 2 mm. long; stamens about two thirds as long as the corolla, borne on its tube; carpels erect.

Collected by C. A. Purpus on rocks near Daunt P. O., Tulare Co., California (no. 5672).

7. *Dudleya Abramsi* Rose, sp. nov.

A very delicate little perennial with a thick caudex crowned by a dense rosette of small (2 cm. long) linear-ovate, acuminate, somewhat glaucous leaves; flowering stems slender, 6-7 cm. long, naked below, and with a few scattered ovate acute bracts above; inflorescence 2-branched (in two specimens seen), each branch bearing a second raceme of several subsessile flowers; calyx 3 mm. long, its lobes ovate or triangular-ovate, acute, about twice as long as the tube; corolla slender, 8-9 mm. long, the tube longer than the calyx, the lobes narrow, acute, yellow, striped on the back with deep red, much longer than the slender styles and stamens.

Collected by L. R. Abrams in wet crevices of rocks west of Jacumba, near San Diego, California, June, 1903 (no. 3707).

Resembling *D. pauciflora* in habit, but with nearly sessile flowers, these suggesting *D. pumila* and *D. angustiflora*; from which, however, it is surely quite distinct.

8. *Dudleya pumila* Rose, sp. nov.

Acaulescent; leaves forming small dense rosettes, very glaucous, 2-3 cm. long, ovate, acute; flowering stems delicate, less than 1 cm. long, bearing small ovate leaves; inflorescence of 2 or 3 slender branches, ascending or spreading; pedicels 6-10 mm. long; calyx

pale, glaucous, its lobes lanceolate-ovate, 2-3 cm. long, acute or sometimes obtusish; corolla 10-13 mm. long, the lobes very narrow, acute, much longer than the stamens.

Collected by H. M. Hall on rocks of hillsides, altitude 2,100 meters, San Bernardino Mountains, California, July 19, 1899 (no. 1350). This species is near *D. angustiflora*, but with basal leaves very different in shape and stem-leaves much smaller.

9. *DUDLEYA FARINOSA* (Lindl.) Britton & Rose.

Echeveria farinosa Lindl. Jour. Hort. Soc. 4: 292. 1849.

Cotyledon farinosa Baker, in Saund. Refug. Bot. 1: pl. 71. 1869.

Coast of California.

10. *Dudleya aloides* Rose, sp. nov.

Tufted, acaulescent; leaves numerous, erect, rigid, very narrow, thick, semiterete, or the upper part subterete, 7-12 cm. long, 10-15 mm. broad at base, gradually tapering to the apex, very pale, hardly glaucous, often spotted with red; flowering stems 2-3 dm. long, reddish, as also the branches and pedicels; stem-leaves ovate, acute, slightly clasping; inflorescence paniculate; pedicels rather slender, 18-20 mm. long, ascending; calyx deeply 5-cleft, the lobes triangular-ovate, acute, 4 mm. long; corolla broad, yellow, drying reddish (?), 10 mm. long, the lobes acute.

Collected at San Felipe, San Diego Co., California, by T. S. Brandegee, April 30, 1894, also by C. R. Orcutt, April, 1903 (living specimens in Department of Agriculture greenhouse, type), and by H. M. Hall, May, 1899.

11. *DUDLEYA SAXOSA* (M. E. Jones) Britton & Rose.

Cotyledon saxosum M. E. Jones, Contr. West. Bot. 8: 28. 1898.

Panamint Cañon, California.

12. *DUDLEYA SETCHELLII* (Jepson) Britton & Rose.

Cotyledon laxa var. *Setchellii* Jepson, Fl. West. Mid. Calif. 267. 1901.

Flowering stems numerous, from the crown of a short thick caudex, about 3 dm. high; leaves very glaucous, numerous, lanceolate to linear-lanceolate, long-acuminate; leaves of flowering stem linear, acuminate, the lower ones elongated; inflorescence a very narrow panicle; pedicels rather stout, ascending, 3-5 mm. long; calyx-lobes lanceolate, acute; corolla pale yellow, its segments narrowly oblong, acute, united at base into a very short tube; stamens much shorter than the corolla.

Coyote Creek, Santa Clara Co., California.

13. *Dudleya grandiflora* Rose, sp. nov.

Caudex very thick, crowned by a dense rosette; basal leaves strap-shaped, slightly broadened at insertion and gradually tapering from the base to apex, rather thin, 1-1.5 dm. long, 1-2 cm. broad just above the base, very glaucous on both sides, especially when very young; flowering stalk 3-5 dm. long, bright red especially above, bearing scattered ovate acuminate leaves; inflorescence rather compact, consisting of a few upright secund racemes; pedicels, especially the lower ones, elongated, 1-1.5 cm. long; calyx usually red, deeply 5-lobed, the lobes ovate, acute, about half the length of the corolla; corolla greenish-yellow, becoming reddish in age, 10 mm. long, erect except the spreading acute tips, its segments united at the base into a very short tube 2 mm. long; stamens shorter than the corolla, attached to its base; carpels erect, distinct.

Collected by T. S. Brandege, at Whitewater, near Banning, California.

14. *DUDLEYA LINEARIS* (Greene) Britton & Rose.

Cotyledon linearis Greene, Pittonia, 1: 285. 1889.

Caudex thick and fleshy, crowned by a dense rosette of leaves; leaves "light green not farinose," broadly linear, acuminate, 3-7.5 cm. long, 6-9 mm. broad, thick; flowering stems 1-1.5 cm. long, more or less bracteate; inflorescence consisting of 2 or 3 secund racemes, more or less glaucous, rather compact; pedicels 4 mm. long or less; calyx deeply 5-lobed, lobes ovate-lanceolate, acute, 5 mm. long; corolla greenish-yellow, 8-9 mm. long, its tube shorter than the calyx.

San Benito Island, off the coast of Lower California.

15. *Dudleya cultrata* Rose, sp. nov.

Caespitose, the caudex bearing several rosettes of leaves; leaves strap-shaped, not glaucous, 6-10 cm. long, gradually tapering from a rather wide base, 10-12 mm. broad, rather thickish, terete near the apex, acute, sometimes sharply so; flowering branch about 30 cm. long, naked below and with scattered leaves above; inflorescence of a few more or less elongated racemes; calyx-lobes triangular-lanceolate, acute; corolla pale yellow, rather narrow, 12 mm. long, 3 times as long as the calyx, the tube proper longer than the calyx, the segments acute; stamens shorter than the corolla; anthers orange.

Described from cultivated plants sent by C. R. Orcutt, which are said to have come from San Quintin, Lower California (type). At the same station similar material was collected by T. S. Brandege, May 23, 1889.

16. *Dudleya Greenei* Rose, sp. nov.

Caudex short and thick; leaves in rosettes, numerous, strap-shaped, 6-7 cm. long, 15 mm. broad at base, acute, very glaucous, drying thick and leathery; flowering stalk 3-4 dm. high, bearing scattered ovate acuminate leaves; inflorescence consisting of numerous secund racemes; pedicels stout, ascending, 2-4 mm. long; calyx 4 mm. high, deeply 5-parted, the lobes ovate and acute; corolla 8-10 mm. long, its tube 2 mm. long.

Only known from specimens collected by Prof. E. L. Greene on the island of Santa Cruz off the coast of southern California, July and August, 1886. Type in Herb. California Academy of Sciences; photograph and fragment in U. S. National Herbarium.

17. *Dudleya Hallii* Rose, sp. nov.

Acaulescent; basal leaves erect or spreading, elongated-lanceolate, acute, very pale and glaucous, thickish, 10-12 cm. long; flowering stems stout, 3-4 dm. long, their leaves ovate, the lower ones somewhat elongated, slightly cordate at base; inflorescence a rather short panicle, not at all glaucous; pedicels very short (about 2 mm. long); calyx-lobes lanceolate, acute, 5 mm. long; corolla 15 mm. long, pale green tinged with rose.

Collected by H. M. Hall near Riverside, California, in 1902, and flowered in Washington, May, 1903 (no. 3722).

18. *Dudleya Candelabrum* Rose, sp. nov.

Basal leaves in a dense broad rosette, oblong-lanceolate, 10-15 cm. long, 3 cm. broad near the base, perhaps not at all glaucous, drying rather thin; flowering stalk about 3 dm. long, rather stout, its leaves lanceolate, acuminate, thin; inflorescence (in herbarium specimens at least) resembling a candelabrum, 20 cm. high, 25 cm. broad at top, each branch an elongated secund raceme; pedicels short (1-4 mm. long); calyx 5-7 mm. long, deeply parted into lanceolate acuminate lobes; corolla 5-9 mm. long.

Collected by Prof. E. L. Greene on the island of Santa Cruz, off the coast of southern California, July and August, 1886; type in Herb. California Academy of Sciences, photograph in U. S. National Herbarium.

19. *Dudleya Bryceae* Britton, sp. nov.

Caudex stout, short; basal leaves very numerous, lanceolate to oblong-lanceolate, 6-8 cm. long, 2-3 cm. wide, flat, about 2 mm. thick, pale green, somewhat shining, sharply acuminate; flowering stems ascending from the lower axils, about 3 dm. long, their leaves lanceolate, acuminate; cyme many-flowered, about 8 cm. broad; pedicels 3-6 mm. long; calyx-segments linear-lanceolate, 4 mm. long, about 1 mm. wide towards the base, gradually tapering

to an acute tip, the tube very short; corolla pale yellow, 1 cm. long, 5-ridged, its linear-lanceolate lobes about as long as its tube; carpels erect, distinct to the base.

Described from a living plant sent to the New York Botanical Garden, April, 1902, from San Diego, Cal., by Miss Mary T. Bryce; probably originally from Coronado Islands.

20. *Dudleya ingens* Rose, sp. nov.

Caudex 3 dm. high or more, densely clothed with the bases of old leaves and crowned by a rosette of large leaves 10-20 cm. long, and 3-4 cm. broad; flowering stems 5-6 dm. long; inflorescence a somewhat open panicle; calyx-lobes narrowly lanceolate, half as long as the corolla, somewhat glaucous.

Collected by T. S. Brandegee at San Telmo, Lower California, June 1, 1893. Closely resembling *D. Bryceae*, but with larger and more open panicles. Type in herb. Brandegee; fragment and photograph in U. S. National Herbarium.

21. *Dudleya candida* Britton, sp. nov.

Caudex stout, about 6 cm. high; basal leaves white-farinose all over, numerous, linear to linear-oblong, sharply acuminate, somewhat widened at the base, 5-7 cm. long, 1 cm. wide or less; flowering branch stout, about 3 dm. tall, its narrowly lanceolate leaves somewhat clasping; inflorescence dense, about 6 cm. broad; pedicels stout, 2-5 mm. long; calyx-segments linear-lanceolate, acute to acuminate, more than one half as long as the linear acute corolla-segments.

Coronado Islands, California, George Thurber, May, 1852 (no. 582).

22. *Dudleya rigidiflora* Rose, sp. nov.

Basal leaves not seen; flowering stem stout, 3-4 dm. long, purplish; inflorescence of numerous long slender secund racemes; pedicels ascending, 4-5 mm. long; calyx deeply 5-cleft, its lobes equal, fleshy, 6-7 mm. long, acuminate, somewhat glaucous; corolla reddish, 12 mm. long, the tube 5 mm. long, the lobes slender, acute and erect; stamens 10, much shorter than the corolla, all attached near the top of the corolla-tube; carpels 5, slender, erect, free to the base.

Plaza Maria, Lower California, collected by A. W. Anthony, July to October, 1896 (no. 142).

23. *DUDLEYA LAXA* (Lindl.) Britton & Rose.

Echeveria laxa Lindl. Jour. Hort. Soc. 4: 292. 1849.

Cotyledon laxa Benth. & Hook.; Brew. & Wats. Bot. Cal. 1: 212. 1876.

Monterey, California.

24. **Dudleya Bernardina** Britton, sp. nov.

Acaulescent, green, or the young leaves and inflorescence somewhat glaucous; basal leaves forming a rosette, spreading, obovate-spatulate to rhombic-obovate, abruptly sharp-acuminate, 5-8 cm. long, 5 cm. wide or less; flowering branch 1.5-2.5 dm. high, leafy to or near the base, its leaves lanceolate to ovate-lanceolate, acute or acuminate, sagittate-clasping; cyme 10 cm. broad or less, many-flowered; pedicels becoming 1-1.5 cm. long; calyx 5-6 mm. long, deeply 5-lobed, the lobes ovate, acute; corolla yellow, about 12 mm. long, cleft to below the middle, its lobes sharply acute; stamens about three fourths as long as the corolla.

San Bernardino Mountains, southern California; type collected by S. B. and W. F. Parish, 1881 (no. 100).

25. **Dudleya Goldmani** Rose, sp. nov.

Acaulescent; basal leaves in small dense rosettes, rhomboid-ovate, acuminate, 2-4 cm. long, green or often bronzed, more or less glaucous; flowering branches rather delicate, about 10 cm. long, their leaves small, ovate, cordate at base, acute; inflorescence few-flowered, the flat-topped cyme very glaucous; pedicels 10-15 mm. long, slender; calyx 4-5 mm. long, its lobes ovate, acutish; corolla pinkish, or deep orange, 10 mm. long, its tube very short, its lobes oblong, acutish, rather thin and perhaps more inclined to spread than in other species; stamens and styles considerably shorter than the corolla.

Collected by E. A. Goldman in Pine Valley, head of Carmel River, Monterey Co., California, August 3, 1902 (no. 763), some of the specimens flowering in Washington, 1903 (type); and by Miss Alice Eastwood, same county, Los Berros Trail, Santa Lucia Mountains, May 1-12, 1897.

26. **Dudleya minor** Rose, sp. nov.

Acaulescent, or very old plants with a carrot-shaped rootstock 5 cm. long, crowned by a small rosette of spreading leaves; leaves rhomboid-ovate, the larger ones 5-7 cm. long, narrowed at base, abruptly acuminate, glaucous; inflorescence slender, with a few elongated one-sided racemes; pedicels slender, 10-15 mm. long; calyx 5-7 mm. long, its lobes ovate to ovate-lanceolate, acute; corolla yellow or pale orange, 12 mm. long, its tube 2 mm. long.

Collected on rocky banks, San Gabriel Cañon, altitude 600 to 700 meters, Los Angeles Co., Cal., by Dr. H. E. Hasse, June, 1902 (Rose, no. 421, type). Here also seems to belong A. J. McClatchie's plant, collected in the same region, May 25, 1896.

27. *Dudleya ovatifolia* Britton, sp. nov.

Glabrous, low, green, 1.5 dm. high or less; flowering stems rigid; basal leaves ovate, shining above, acute, about 2 cm. long; leaves of the flowering stems ovate, or the lower ovate-lanceolate, obtuse, or the lower acute, 5-8 mm. long; cymes few-flowered; pedicels very slender, 1 cm. long or less; flowers about 1 cm. long; calyx-segments triangular-ovate-lanceolate, about 2.5 mm. long, nearly as long as the corolla-tube; corolla bright yellow, its segments lanceolate, acute.

Sierra Santa Monica, California, H. M. Hall, no. 3255, May, 1902.

28. *DUDLEYA NEVADENSIS* (S. Wats.) Britton & Rose.

Cotyledon Nevadensis S. Wats. in Brew. & Wats. Bot. Cal. 1: 212. 1876.

Mountains of middle California. Type locality, Sonora, California.

29. *Dudleya Sheldoni* Rose, sp. nov.

Acaulescent; leaves lanceolate to ovate-lanceolate, acute, very glaucous, 4-5 cm. long, somewhat thickish at base but drying thin and papery; flowering stems rather slender, purplish, 16-20 cm. high, purplish, leafy to the base; lower stem-leaves linear-lanceolate, 4 cm. long, the upper ones ovate, acute; inflorescence a rather compact panicle; pedicels rather slender, sometimes 10 mm. long; sepals reddish, ovate, acute; corolla bright yellow, 10-11 mm. long, the lobes sharply acute, spreading at tip, free nearly to base; stamens attached just above the base of the corolla, about two thirds as long as the lobes; carpels 5, erect.

Collected by Miss Alice Eastwood at the north base of Mt. Tamalpais, California, June, 1903 (type), and by E. P. Sheldon at the same place January, 1903.

30. *DUDLEYA PLATTIANA* (Jepson) Britton & Rose.

Cotyledon Plattiana Jepson, Fl. West. Mid. Calif. 267. 1901.
Mountains of central California.

31. *DUDLEYA PURPUSI* (Schum.) Britton & Rose.

Echeveria Purpusi Schum. Gartenfl. 45: 608. 1896.

Cotyledon Purpusi Nichols. Dict. Gard. Suppl. 263. 1900.

Pale green, somewhat glaucous, tufted; basal leaves 4-7 cm. long, 2 cm. wide or less, rhombic, broadest near the middle, sharply acuminate; flowering branches 1-2 dm. tall, their leaves lanceolate, acute, 2 cm. long or less, sessile, numerous; cyme 4-8 cm. broad; pedicels rather stout, longer than the flowers; flower-buds ovoid, acuminate; longer than thick; calyx-segments ovate, acutish, about

5 mm. long, one third as long as the lemon-yellow corolla; corolla-segments narrowly lanceolate, acuminate, separate nearly to the base.

Mountains of middle California.

32. *Dudleya robusta* Britton, sp. nov.

Acaulescent; basal leaves numerous, ascending, lanceolate, acuminate, light green, sometimes slightly glaucous, 10–15 cm. long, 1.5–2.5 cm. wide; flowering branches stout, leafy to or nearly to the base, 4–5 dm. high, erect-ascending, their leaves lanceolate to ovate-lanceolate, sagittate, the upper ones very small, the lower 4–6 cm. long; cyme many-flowered, about 10 cm. broad; pedicels, or some of them, at length 1–1.5 cm. long, white-glaucous; calyx 5–6 mm. long, deeply cleft, its lobes ovate, sharply acute, white-glaucous; corolla about 1.3 cm. long, orange, cleft to below the middle, the lobes acute.

Described from plants sent to New York Botanical Garden from southern California by Miss Mary T. Bryce in 1902, which flowered the same year. (N. Y. B. G. no. 12,569.)

33. *Dudleya Parishii* Rose, sp. nov.

Acaulescent; basal leaves in a rosette, lanceolate, acuminate, not very thick for this genus, not at all glaucous, becoming red; flowering stems rather stout, reddish, 3–4 dm. high; lower leaves narrowly lanceolate, upper ones smaller, ovate, only slightly clasping at base; inflorescence paniculate, somewhat flat-topped, the branches spreading; pedicels rather slender, 4–8 mm. long; calyx-lobes broadly ovate, acute (in herbarium specimens sharply acute); corolla about 10 mm. long, rather pale orange, drying quite reddish.

Collected by S. B. Parish near San Bernardino, California, altitude 300–450 meters, July 1, 1896, and in 1902 (the latter specimens the type, flowering in Washington, June, 1903); Bloody Basin, near Fort Verde, Arizona, E. A. Mearns, no. 338.

34. *DUDLEYA CYMOSA* (Lem.) Britton & Rose.

Echeveria cymosa Lem. Ill. Hort. 10: Suppl. 79. 1863.

Cotyledon cymosa Baker, in Saund. Refug. Bot. 1: pl. 68. 1869. California.

35. *Dudleya Brandegei* Rose, sp. nov.

Acaulescent; leaves in a dense rosette, rigid, ovate-oblong, long-acuminate, the larger ones 1 dm. long, pale and slightly glaucous; flowering stems 4–6 dm. long, rather stout, reddish; inflorescence of several elongated one-sided racemes; pedicels rather stout, 1–1.5 cm. long; calyx deeply cleft into ovate-lanceolate lobes, these acute and 6–7 mm. long; corolla 10–14 mm. long, yellowish, the

segments nearly erect, a little longer than the tube; stamens shorter than the corolla, attached near the top of its tube; carpels erect, free to the base.

Living specimens sent by Mrs. T. S. Brandegee in June, 1902 (type); probably native of Lower California. In Mr. Brandegee's herbarium is a flowering specimen which seems referable here, collected by him at San Barga, Lower California, in 1889.

36. *Dudleya lurida* Rose, sp. nov.

Acaulescent; basal leaves ascending or nearly erect, very numerous, not at all glaucous at flowering time, at last deeply bronzed, lanceolate, acuminate, 10-15 cm. long, 10-22 mm. broad at the middle, fleshy but not very thick for this genus; flowering stems stout, purplish, 4-5 dm. tall, their leaves broadly ovate, acute; inflorescence paniculate, the branches elongated; pedicels 8-12 mm. long, rather slender; calyx-lobes ovate, acute, 5-6 mm. long, reddish; corolla reddish, 12-15 mm. long, the segments erect, acute.

Collected by Dr. H. E. Hasse on dry ridges, Santa Monica range, Los Angeles Co., California, June 15, 1902 (type), and by Dr. A. Davidson, San Fernando, Los Angeles Co., May 24, 1903.

37. *Dudleya pauciflora* Rose, sp. nov.

Leaves forming dense rosettes, linear, slightly broadened at base, long-acuminate, 2-3 cm. long, 1 cm. broad at base, reddish, perhaps somewhat glaucous; flowering stems 5-10 cm. long, few-leaved; inflorescence a cyme of 6-8 flowers, the longer pedicels 8-10 mm. long; calyx 5-lobed, its lobes ovate, acute, 1.5-2 mm. long; corolla-tube shorter than the calyx, its segments 5-6 mm. long, lanceolate, acute, probably reddish.

Collected on San Pedro Martin Mountain, northern Lower California, by T. S. Brandegee, May 13, 1893.

This species is perhaps nearest the following, but has different leaves and inflorescence, and smaller flowers; it was distributed as *Cotyledon attenuata*, from which it is even more distinct. Type in Herb. California Academy of Sciences; fragment and photograph in U. S. National Herbarium.

38. *DUDLEYA NUBIGENA* (Brand.) Britton & Rose.

Cotyledon nubigena Brand. Proc. Cal. Acad. II. 3: 136. 1891.

Summits of the "Sierra de la Laguna" in southern Lower California.

39. **Dudleya Xanti** Rose, sp. nov.

Resembling *D. nubigena* but of smaller stature; basal leaves in a small but rather dense rosette, broadly ovate, 4-5 cm. long, more or less glaucous; flowering stems 2-3 dm. long, slender, usually 2-branched, forming long slender racemes; pedicels slender, 8-12 mm. long; calyx small, deeply lobed, the lobes broadly ovate, obtuse or even rounded at apex, 2-3 mm. long; corolla 8-10 mm. long, reddish, its tube usually if not always longer than the calyx; stamens much shorter than the corolla; carpels erect.

The following specimens referred here are all from the extreme southern part of Lower California: Vicinity of San Lucas, L. J. Xantus, 1859-60 (type); San José del Cabo, T. S. Brandege, 1892 (no. 207 in part and no. 208), and from the same locality, Carlos Grabendorffer, 1898.

40. **DUDLEYA RUBENS** (Brand.) Britton & Rose.

Cotyledon rubens Brand. Proc. Cal. Acad. II. 2: 155. 1889.

"Cliffs near San Esteban" in the interior of central Lower California about 27° 50' latitude.

41. **Dudleya gigantea** Rose, sp. nov.

Acaulescent or nearly so, with a thick short rootstock; basal leaves in a dense rosette, very glaucous, oblanceolate, 5-7 cm. long, drying very thin; flowering stems rather stout, about 3 cm. long; inflorescence paniculate, with numerous usually erect branches; pedicels rather slender, 5-10 mm. long, erect; calyx-lobes broadly ovate, obtuse or acutish; corolla drying deep red, 9-10 mm. long, the segments erect, acute, united at base into a short tube 1.5 mm. long.

Collected at New York Falls, Amador Co., California by Geo. Hansen, June 15, 1896.

42. **Dudleya rigida** Rose, sp. nov.

Basal leaves numerous, borne on a thick woody caudex, flat but fleshy, oblong, 5-7 cm. long, acuminate, somewhat glaucous; flowering branches long, slender and weak; inflorescence of a few (usually 2) secund racemes; pedicels slender, the lower ones longer, sometimes 10-15 mm. long; calyx-lobes ovate, longer than the tube, acute; corolla 12 mm. long, reddish, with erect segments.

Lower California, J. E. McClelland; described from a specimen which flowered in Washington.

43. **DUDLEYA LANCEOLATA** (Nutt.) Britton & Rose.

Echeveria lanceolata Nutt.; T. & G. Fl. N. Am. 1: 561. 1840.

Cotyledon lanceolata Benth. & Hook.; Brew. & Wats. Bot. Cal. 1: 211. 1876.
Southern California.

44. **Dudleya delicata** Rose, sp. nov.

Leaves in dense rosettes, in clusters of 4-6 or more, erect or somewhat spreading, rather narrow, broadest at the base, the outer ones 2 cm. broad, the inner ones considerably smaller and narrower, gradually tapering to an acute apex, 6-8 cm. long, fleshy but flattened, very glaucous; flowering stems slender, about 20 cm. long, the leaves ovate, acute; pedicels very short, 2-4 mm. long; calyx-lobes equal, ovate, acute, not glaucous; corolla rather narrow, greenish-yellow, the lobes slightly spreading at tip, obtuse or barely acutish, oblong, united at base into short tube barely 2 mm. long.

Collected by L. R. Abrams in Spencer Valley, near Julian, San Diego Co., California, June 22, 1903. Here seems to belong R. D. Alderson's no. 446, from Witches Creek, a nearby locality.

45. **DUDLEYA PALMERI** (S. Wats.) Britton & Rose.

Cotyledon Palmeri S. Wats. Proc. Am. Acad. 14: 292. 1879.
San Simeon Bay, San Luis Obispo Co., California. Only known from type specimens.

46. **Dudleya Brauntoni** Rose, sp. nov.

Plants caespitose, the rootstock crowned by 6-8 rosettes of leaves; leaves elongated, strap-shaped, becoming 20 cm. long and 2 cm. broad, but often at flowering time only 10 cm. long and 1 cm. broad, pale green and very glaucous on the face, acute; flowering stems usually stout, 3-6 dm. long, pale green, their lower leaves often quite large, the upper ones ovate, acute, thickish, slightly cordate at base; inflorescence at first somewhat compact, of 3 or 4 branches, these finally much elongated (10-20 cm. long); pedicels very short (not elongated in fruit), 1-3 mm. long; calyx-lobes broadly ovate, 4-5 mm. long, acute; segments of corolla pale greenish yellow, 10-12 mm. long, erect.

Collected by Ernest Branton on Elysian Hills, Los Angeles, California, April 20, 1903 (no. 869), and May, 1903 (no. 882).

47. **Dudleya brevipes** Rose, sp. nov.

Caespitose, the rootstock crowned by a cluster of 5 or 6 rosettes of leaves; leaves lanceolate to strap-shaped, 8-10 cm. long, 10-18 mm. broad, acute to shortly acuminate, not glaucous, somewhat shining; flowering branches about 30 cm. long, naked only near the base, their leaves ovate, acute, slightly cordate at base, spreading or ascending; inflorescence of several spreading branches;

pedicels very short (3-4 mm. long); calyx deeply 5-parted, the lobes acute, glaucous; corolla-segments reddish yellow, acute.

Collected by C. R. Orcutt near Calmalli, Lower California, April, 1903 (no. 125).

48. *Dudleya compacta* Rose, sp. nov.

Rootstock crowned by a cluster of closely set rosettes of leaves; basal leaves oblong-lanceolate, rigid, very fleshy, bright shining green, sometimes 6 cm. long but usually less, 2 cm. wide or less, broadest at base, gradually narrowed toward the ovate acute tip; flowering stem 2-3 dm. long, reddish, not at all glaucous, its lower leaves ovate-oblong, the upper ones short, broadly ovate, cordate, acutish, very thick; inflorescence rather compact, of several branches bearing a few flowers; pedicels short, the lower ones 3-4 mm. long; calyx-lobes acutish, in herbarium specimens decidedly acute; corolla pale straw-colored, 8-10 mm. long, the segments acutish, spreading at tip.

Common on rocks about San Francisco Bay. Described from specimens sent by Miss Eastwood in 1903 which flowered in Washington in June, 1903.

49. *Dudleya congesta* Britton, sp. nov.

Acaulescent, green throughout, not at all glaucous; basal leaves rhombic-lanceolate to rhombic-ovate, sharply acuminate, dull, 5 cm. long or less, 1.5-2 cm. wide; flowering branch stout, about 13 cm. tall, erect, its cordate-sagittate leaves numerous, triangular, acute to acuminate, the lower 1 cm. long, the upper much smaller; cyme compound, dense, about 6 cm. broad; pedicels very stout and short, 3 mm. long or less, erect; calyx as long as or a little shorter than the pedicels, its lobes ovate, sharply acute, longer than its tube, slightly longer than wide; corolla lemon-yellow, about three times as long as the calyx, its lanceolate segments acute, separate to below the tips of the calyx-lobes.

Type sent by Miss Bryce from southern California to New York Botanical Garden in 1902; flowered June, 1903 (N. Y. B. G., no. 12703).

50. *Dudleya Eastwoodiae* Rose, sp. nov.

Caudex short, crowned by a dense rosette of leaves, these rather short-ovate, broadest at base, acute, 2-4 cm. long, green or becoming bronzed, not glaucous or only slightly so, thickish; flowering stalks rather stout, 15-25 cm. high, densely bracted, their leaves ovate, somewhat clasping; inflorescence a rather compact cyme, the branches short, densely flowered; pedicels stout and short, 2-5 mm. long; calyx small, 3-4 mm. long, cleft to below the middle, the lobes ovate and obtuse; corolla-segments yellow (not turning reddish

in age), 10–12 mm. long, oblong, obtuse, the tube very short; stamens much shorter than the corolla, equally inserted near its base.

Collected by Miss Alice Eastwood at Bodega Point, Sonora Co., California, July 4, 1900. It much resembles the glabrous-leaved *Dudleya compacta*, of the San Francisco region, but is apparently distinct. This species and the next differ from other *Dudleyas* of central California in their very obtuse corolla-segments.

51. *Dudleya septentrionalis* Rose, sp. nov.

Caudex crowned by several crowded rosettes of leaves covered throughout with a white powder; leaves compact in the rosettes, rather short, thickish, acute, ovate, broadest at base, 2–2.5 cm. broad; flowering stems stout, rather weak and short for the genus, 6–8 cm. long, purplish, naked below, but thickly set with small leaves above, these broadly ovate, acute; inflorescence a very compact cyme; calyx deeply cleft, glaucous, the lobes broadly ovate, acute; corolla pale greenish yellow, rather short and broad, the broad obtuse lobes thickish on the back and united at base into a very short tube.

Collected by Miss Alice Eastwood at Crescent City, Del Norte Co., California, June, 1903. This species resembles *D. farinosa* in habit and foliage but has very different flowers, and *D. Eastwoodiae* in its broad obtuse petals but in other respects is quite different. It is by far the most northern species yet discovered.

52. *Dudleya acuminata* Rose, sp. nov.

Caespitose, the 5 or 6 dense rosettes crowning a thick caudex; leaves not very numerous (12–20), erect or ascending, broadly ovate, acuminate, 4–7 cm. long, broadest at base (2–2.5 cm. broad), thickish, pale green but not glaucous; flowering stems 25–30 cm. high, naked below, their leaves 1–1.5 cm. long, ovate, acute, sagittate at base; inflorescence slightly glaucous; pedicels short, 3–6 mm. long; calyx 5 mm. long, deeply 5-cleft, the lobes triangular-ovate, acute (rather sharply so in dried specimens); corolla reddish yellow.

Collected near Calmalli, 50 miles east of Lagoon Head, Lower California, by C. R. Orcutt, April, 1903 (no. 126, type). Here I am inclined to refer T. S. Brandegees specimens collected on Cedros Island, April 1, 1897.

53. *DUDLEYA LINGULA* (S. Wats.) Britton & Rose.

Cotyledon Lingula S. Wats. Proc. Am. Acad. 14: 293. 1879.

San Simeon Bay, California. Only known from type specimen.

54. *DUDLEYA PANICULATA* (Jepson) Britton & Rose.

Cotyledon caespitosa var. *paniculata* Jepson, Fl. West Mid. Calif. 267. 1901.

Acaulescent; leaves in a dense rosette, ovate-oblong, about 10 cm. long, at least the inner ones quite glaucous; inflorescence an elongated panicle, 20-30 cm. long; pedicels 4-10 mm. long; calyx-lobes ovate-triangular, acute; corolla pale yellow.

Morrison Cañon near Niles, California.

55. *Dudleya humilis* Rose, sp. nov.

Caespitose, clinging to the rocks, sometimes a dozen or more rosettes of leaves crowning the rootstock; leaves linear-ovate, somewhat narrowed below, acute or shortly acuminate, 3-4 cm. long, 10-15 mm. broad, very glaucous; flowering branches 2-4 cm. long, their lower leaves lanceolate, somewhat clasping; inflorescence a short panicle, few to very many-flowered; pedicels short, 2-5 mm. long; calyx-lobes ovate, acute; corolla at first pale yellow but drying reddish, 7-8 mm. long, its segments acute, somewhat spreading at tip, about twice as long as the calyx.

Described from living specimens sent by Miss Alice Eastwood from Mt. Diablo, California, June 2, 1903. Here seems to belong the plant collected on the same mountain by Dr. E. L. Greene in June, 1892.

Miss Eastwood says of this species: "The little plants were hugging the rocks very closely and it was very difficult to disengage them. They grow almost at the very summit."

56. *DUDLEYA CAESPITOSA* (Haw.) Britton & Rose.

Cotyledon caespitosa Haw. Misc. Nat. 180. 1803.

Cotyledon linguiformis R. Br. in Ait. Hort. Kew. Ed. 2, 3: 109. 1811.

Cotyledon reflexa Willd. Enum. Hort. Berol. Suppl. 24. 1813.

Echeveria caespitosa DC. Prod. 3: 401. 1828.

Central California. Erroneously cited in original description as from Cape of Good Hope.

57. *Dudleya Helleri* Rose, sp. nov.

Caudex crowned by several (8 in specimens seen) small dense rosettes of leaves; basal leaves linear to ovate-linear, 3-4 cm. long, very glaucous, thickish, acute, 15 mm. wide at the base, 10 mm. wide or less just above the base; flowering branches slender, 10-15 cm. long, bright red, usually naked below (at least for 2-6 cm.), their leaves ovate, the upper ones short and acute; in-

florescence a rather small flat-topped cyme of 2-5 branches, each branch bearing 3-6 flowers; pedicels short, 2-5 mm. long; calyx-lobes ovate, acute; corolla deep yellow, less than 10 mm. long, the lobes united at base into a very short tube, broadly ovate, acute; stamens a little shorter than the corolla-lobes, attached almost at the base of the corolla.

Collected by A. A. Heller in Monterey Co. (exact locality not given), California, in July, 1903. Here seem also to belong specimens collected on Willow Creek, Santa Lucia Mountains, Monterey Co., California, by R. A. Plaskett, May, 1897 (no. 86).

58. *DUDLEYA COTYLEDON* (Jacq.) Britton & Rose.

Sedum Cotyledon Jacq. Eclog. 1: 27. pl. 17. 1811.

Cotyledon Californica Baker, in Saund. Refug. Bot. 1: pl. 70. 1869.

Echeveria Californica Baker, l. c. 1869.

Acaulescent, or very nearly so, tinged with red, basal leaves numerous, linear-lingulate, pale green, slightly glaucous, 6-10 cm. long, 2 cm. wide or less, sharply acuminate, the base widened; flowering branches stout, 4-5 dm. long, erect-ascending, glaucous, their leaves numerous, ovate to triangular-ovate, sagittate, half-clasping, acute, the lower ones about 2 cm. long, the upper gradually smaller, the similar bracts of the inflorescence 5 mm. long or less; inflorescence cymose-paniculate, 2.5 dm. long or less; pedicels stout, 4-10 mm. long; calyx white farinose, its lobes triangular-ovate, acute, 3 mm. long; corolla yellow, 1 cm. long, its tube slighter shorter than the calyx, its oblong-lanceolate segments acute, slightly keeled.

Monterey, California. The plates of Jacquin and of Baker clearly represent the same species, and this has recently been collected by Mr. L. R. Abrams at Monterey and flowered freely at New York Botanical Garden.

59. *Dudleya elongata* Rose, sp. nov.

Stems elongated, at length 2-4 dm. long, simple or branched; leaves nearly linear, broadest near the base, very glaucous, 4-8 cm. long, 9 mm. wide or less, acute to acuminate; flowering stems leafless below, leafy above, the leaves ovate, acute, cordate, 1 cm. long or less; inflorescence cymose-paniculate; pedicels very short, 1-2 mm. long; calyx-lobes ovate, acute, 4 mm. long, twice as long as the tube; corolla 12 mm. long, at first reddish yellow, in age deep red.

Near San Pedro, California, H. E. Hasse.

GORMANIA Britton, gen. nov.

Low, *Sedum*-like species, perennial by horizontal rootstocks. Leaves spatulate to obovate or nearly orbicular, those of the flowering stems similar to the basal ones, but smaller. Flowers cymose or thyrsoïd, yellow to red. Calyx mostly deeply 5-lobed, the lobes acute or obtuse. Petals 5, united below the middle, acute to acuminate, somewhat spreading above. Stamens 10, borne on the corolla; anthers mostly oblong. Carpels many-seeded, united below, erect or nearly so, even in fruit.

Named for Mr. M. W. Gorman, of Portland, Oregon, an assiduous collector.

Type species, *Cotyledon Oregonensis* S. Wats.

1. **GORMANIA WATSONI** Britton.

Cotyledon Oregonensis S. Wats. Proc. Am. Acad. 17: 373. 1882. Not *Sedum Oreganum* Nutt. 1840.

Oregon.

2. **Gormaniana laxa** Britton, sp. nov.

Glabrous, green, about 3 dm. tall; flowering stems erect; leaves spatulate, about 2 cm. long, obtuse; inflorescence loose, cymose-paniculate, about 10 cm. broad and 16 cm. long, its branches lax, slender; pedicels 2-3 mm. long; calyx-lobes ovate-lanceolate, acute, 4-5 mm. long; corolla yellow (?), 10-11 mm. long, its lobes lanceolate, acute, united nearly to the middle; anthers about 2 mm. long; carpels erect, united at the base.

Waldo, Oregon, Thos. Howell, June 4, 1884.

3. **GORMANIA OBTUSATA** (A. Gray) Britton.

Sedum obtusatum A. Gray, Proc. Am. Acad. 7: 342. 1868. Sierra Nevada of California.

4. **Gormaniana Hallii** Britton, sp. nov.

Spreading, matted, green, not glaucous, the flowering stems 8 cm. high or less; leaves spatulate to spatulate-obovate, 15 mm. long or less, 4-6 mm. wide, rounded or slightly retuse at the apex, a little concave on the upper surface, the upper ones similar, narrower; calyx about 3 mm. long, its lobes oblong-lanceolate, obtusish; corolla about 7 mm. long, bright yellow, its tube somewhat shorter than the calyx, its lobes oblong-lanceolate, obtusish; pedicels very slender, 2-8 mm. long; cyme little compound, thyrsoïd, about 3 cm. broad, 3-5 cm. high.

Vicinity of Tuolumne meadows, in the Canadian zone, at 2800-3100 m. altitude, Yosemite National Park, California, H. M. Hall and E. B. Babcock, July, 1902, no. 3545.

5. **Gormaniana anomala** Britton, sp. nov.

Rootstock rather slender; flowering stems 7-10 cm. high; basal and lower leaves spatulate, about 1.5 cm. long, the upper much smaller; cyme dense, 5 cm. broad or less; pedicels 2 mm. long, or those of central flowers 5-6 mm. long; calyx-segments ovate-lanceolate, acute; corolla yellow, 6-7 mm. long, its lobes lanceolate, acute, united by their bases to the length of about 0.5 mm.; carpels nearly erect, their filiform tips half as long as body.

Southern California. Type locality, sandy hills in path of strong daily sea-winds, San Luis Obispo County, Mrs. R. W. Summers, June, 1883.

6. **GORMANIA DEBILIS** (S. Wats.) Britton.

Sedum debile S. Wats. Bot. King's Exp. 102. 1871.

Utah, Nevada, Idaho and eastern Oregon.

7. **GORMANIA OREGANA** (Nutt.) Britton.

Sedum Oreganum Nutt.; T. & G. Fl. N. Am. 1: 559. 1840.

Glabrous, green; rootstock slender, creeping; flowering stems slender, erect or ascending, 8-15 cm. high; leaves spatulate-cuneate, obtuse or rounded at the apex, the lower 1.7 cm. long or less, the upper much smaller; cyme compound, 2-8 cm. broad; pedicels very short, mostly shorter than the calyx; calyx-lobes lanceolate to ovate-lanceolate, acute; corolla 8-10 mm. long, yellow, its linear-lanceolate long-acuminate segments united for about one fifth their length, much exceeding the stamens.

Alaska to northern California. Corolla said to be pale rose-color in original description, apparently erroneously, unless it fades to that tint.

8. **Gormaniana Burnhami** Britton, sp. nov.

Rootstock horizontal, rather slender; basal leaves spatulate to obovate-cuneate, thick, somewhat glaucous, retuse or obcordate, 1-2 cm. long, 1 cm. wide or less, those of the flowering stems similar, smaller; flowering stems 15 cm. high or less, rather stout, reddish; inflorescence thyrsoïd, 6-10 cm. long, about 5 cm. wide, rather loose; pedicels stout, 3-6 mm. long, mostly shorter than the linear bracts; calyx 4-6 mm. long, its ovate or ovate-lanceolate lobes acute or acuminate; corolla cream-color, tinged with rose, about 1 cm. long, its segments oblong-lanceolate, acute, united for about one fourth their length.

Between Lake Eleanor and Lake Vernon, Tuolumne County, California, S. H. Burnham, July 16, 1894 (type); Cañon Creek, Trinity County, California, Alice Eastwood, July 2-18, 1901.

9. **Gormaniana retusa** Rose, sp. nov.

Rootstock rather thick; flowering stems 1-1.5 dm. tall; leaves obovate to spatulate, relatively thin, retuse, 2 cm. long or less, the upper much smaller; inflorescence dense, thyrsoid-cymose, about 6 cm. long; pedicels 3 mm. long or less; calyx-lobes ovate, acute, 3 mm. long; corolla pink or red, 6-7 mm. long, its segments oblong-lanceolate, acutish, united for about one fourth their length.

Sanhedrin Mountains, Lake County, California, alt. 1,500 meters, A. A. Heller, August 6, 1902.

10. **Gormaniana Eastwoodiae** Britton, sp. nov.

Rootstocks stout, horizontal; basal leaves spatulate, thick, obtuse, 1-2 cm. long, 1 cm. wide or less, rather pale green, slightly glaucous, those of the flowering stems similar, smaller; flowering stems 10-15 cm. high; cyme dense, 5 cm. broad or less; pedicels 2-5 mm. long; calyx about 3 mm. long, its triangular-ovate acute lobes about twice as long as the tube; corolla red or dark pink, about 7 mm. long, its segments oblong-lanceolate, sharply acute, united for about one third their length.

Red Mountain, northern Mendocino County, California, Alice Eastwood.

ALTAMIRANOA Rose, gen. nov.

Perennial, low, much branched species, often shrubby at base, with much more the habit of *Sedum* than of *Echeveria*, but petals not distinct, flowers purplish or white, rarely yellow, much smaller than in *Echeveria*. Sepals 5, linear, distinct. Corolla not angled, with a distinct tube, campanulate; the lobes broad and spreading. Stamens 10, borne on the corolla-tube. Carpels 5, erect.

Named in honor of Dr. Fernando Altamirano, who, as the Director of the Instituto Medico Nacional, is doing much to develop the scientific resources of Mexico.

Type species, *Cotyledon Batesii* Hemsl.

I have grouped together here certain anomalous species which have heretofore been resting in *Cotyledon* but with the habit of a *Sedum*, or in *Sedum*, but with united petals. It is possible that the species here brought together may not all be congeneric. It seems clear, however, that they should be taken out of *Cotyledon* and *Sedum*.

Altamiranoa elongata Rose, sp. nov.

Perennial, at first with slender erect branches, but rather weak and becoming prostrate, striking root at every joint, finely puberulent; leaves small, closely set at right angles to the branches, appearing imbricate in dried specimens, linear-ovate, acute, puberulent, 6 mm. long, turgid but somewhat flattened, with a cordate some-

what clasping base; inflorescence paniculate, its ultimate branches secund, bearing a few sessile flowers; sepals linear, 2 mm. long, puberulent; corolla white or pinkish, 5 mm. long, campanulate, its segments united at base into a short tube; carpels distinct.

A common species on the mountains above Pachuca, altitude about 2,850 meters. Collected by J. N. Rose, June 1, 1899 (no. 4461, type), and later in the same year by C. G. Pringle (no. 8233).

ALTAMIRANOA CALCICOLA (Robinson & Greenman) Rose.

Sedum calcicola Robinson & Greenman, Am. Jour. Sci. 50: 150. 1895.

Las Cuavas, San Luis Potosi, Mexico.

ALTAMIRANOA PARVA (Hemsl.) Rose.

Sedum parvum Hemsl. Diag. Pl. Nov. 3: 51. 1880.

Only known from the type locality, which is near the City of San Luis Potosi, Mexico.

Altamiranoa Goldmani Rose, sp. nov.

A low much branched *Sedum*-like plant, glabrous throughout, with tuberous-thickened roots; old stems somewhat woody, procumbent and rooting at the joints, bearing scattered rosettes of leaves; flowering branches more elongated, 5-6 cm. long, rose-colored, bearing many rather closely set leaves; leaves very narrow, linear or nearly so, 10-12 mm. long, flattened, obtuse; inflorescence a very compact few-flowered cyme; flowers sessile; sepals distinct, linear, fleshy but flattened, obtuse, appressed to the corolla, unequal, 4-6 mm. long, reddish tinged; corolla 6 mm. long, not at all 5-angled, very thin when dry, pale yellow, tinged with red, orange colored when dry, its tube a little longer than the lobes; lobes ovate, acute, spreading; stamens 10, all borne at the top of the corolla-tube; scales small, purplish, 0.3 mm. long, about as broad as high, retuse at apex; carpels 5, distinct, oblong, reddish near tip, many-seeded; styles short.

Described from living specimens collected by E. A. Goldman among crevices of the rocks on the summit of Cerro de Patamban, Michoacan, Mexico, altitude 3,600 meters. The species has much the habit of *A. elongata*.

ALTAMIRANOA BATESII (Hemsl.) Rose.

Cotyledon Batesii Hemsl. Diag. Pl. Nov. 1: 9. 1878.

Central Mexico.

Altamiranoa scopulina Rose, sp. nov.

Glabrous throughout; stems more or less creeping and much branched, the lower parts covered with whitish scales (bases of old dead leaves); leaves linear, nearly terete, 4-6 mm. long, sessile and

with a free projection down the stem, closely set but hardly imbricate; flowers few, near the tops of the branches, sessile or short-pedicelled; sepals leaf-like, shorter than the petals, somewhat unequal; corolla-segments pure white, oblong, acute, 5 mm. long, slightly united at base, nearly flat; appendages minute; stamens shorter than the corolla.

Collected by J. N. Rose on dry rocky hills near Tepeaca, south of Puebla, June 27, 1899 (no. 4996). Living specimens were sent to the Washington Botanical Garden and flowered in the open, June, 1900. From these the above description is drawn.

ALTAMIRANOA FUSCA (Hemsl.) Rose.

Sedum fuscum Hemsl. Biol. Centr. Am. Bot. 1 : 395. 1880.

Described as an annual but perhaps a biennial or possibly a perennial, diffusely branching, 1 dm. high or less; leaves broadly oblong, fleshy, 4-6 mm. long, obtuse; inflorescence cymose; pedicels 2 mm. long or less; sepals distinct, free at base; corolla-segments white, united for one fourth their length.

Only known from the region about San Luis Potosi, Mexico.

ALTAMIRANOA CHIHUAHUENSIS (S. Wats.) Rose.

Sedum Chihuahuense S. Wats. Proc. Am. Acad. 23 : 273. 1888.

Described as annual but producing small tubers, simple below, branching above, 7-15 cm. tall; leaves sessile, oblong or oblong-lanceolate, obtuse, 2-3 mm. long; corolla-segments white, united at base, oblanceolate, 4 mm. long; carpels divergent above.

Rocky ledges, Sierra Madre of Chihuahua, Mexico. A very peculiar species and not well understood.

STYLOPHYLLUM Britton & Rose, gen. nov.

Perennials with more or less branched rootstocks; basal leaves linear, elongated, terete, or flattened but always narrow, sometimes abruptly widened below into a broad clasping base; flowering stems with long sessile leaves not clasping at base. Calyx 5-lobed, the lobes ovate, equal and small. Corolla campanulate, not angled, white, red or yellowish, its lobes broad, thin and spreading, united below into a tube. Stamens 10, borne on the corolla-tube. Carpels 5, united below, generally strongly spreading as in *Sedum*.

The type species, *Cotyledon edulis* Nutt., has been referred to both *Sedum* and *Cotyledon*. The name is in allusion to the pencil-shaped leaves of the type species.

1. STYLOPHYLLUM VISCIDUM (S. Wats.) Britton & Rose.

Cotyledon viscida S. Wats. Proc. Am. Acad. 17 : 372. 1882.
Southern California.

2. **Stylophyllum virens** Rose, sp. nov.

The thick and elongated branched stem sprawling over rocks, the lower parts clothed with old leaves, the ends crowned by dense rosettes of bright green leaves; leaves spreading or often reflexed, shining, not glaucous, 5-9 cm. long, gradually tapering from the base and there 10-15 mm. broad, fleshy but flattened throughout; inflorescence a weak many-branched panicle; calyx-lobes ovate, somewhat acutish in living specimens; corolla reddish, campanulate; carpels spreading.

Collected by Blanche Trask on San Clemente Island, California, June, 1903.

3. **Stylophyllum albidum** Rose, sp. nov.

Basal leaves in dense rosette, strap-shaped, widest at base, gradually tapering at the apex, very glaucous, 4 cm. long, 1 cm. broad at base, very thick, the upper one third terete; flowering stems reddish, 2-3 dm. long, their leaves narrow, somewhat acuminate; inflorescence a somewhat flattened cyme; pedicels very stout and short, 2-4 mm. long; calyx-lobes ovate, obtuse, very short, 2 mm. long; corolla 7 mm. long, reddish, its lobes lanceolate, acute, its tube 2 mm. long; stamens all borne at the top of tube, shorter than the corolla; carpels somewhat spreading above and united at base.

San Clemente Island, California, T. S. Brandeggee, August 25, 1894 (type). Also collected on the same island by Blanche Trask in 1903.

4. **Stylophyllum Traskae** Rose, sp. nov.

Caudex thick and woody; leaves forming a dense rosette, strap-shaped, 4-5 cm. long, 8-10 mm. broad, glabrous, acute; flowering branches about 20 cm. long, reddish, with rather small scattered leaves; inflorescence a rather compact flat-topped cyme; pedicels short, 2-4 mm. long; calyx-lobes broadly ovate, acute or obtusish; corolla bright canary-yellow, 8 mm. long, the lobes somewhat spreading; carpels inclined to spread.

Only known from material collected by Blanche Trask on Santa Barbara Island off the coast of southern California, May, 1901. The plant was distributed as *Cotyledon lanceolata*, from which of course it is very distinct.

5. **Stylophyllum insulare** Rose, sp. nov.

Stems very thick and woody, 6-8 cm. in diameter, crowned by a rosette of spreading leaves, the old leaves somewhat persistent; leaves 10-15 cm. long, 1-1.5 cm. broad above the base, 2 cm. broad at base, fleshy, much flattened except toward the apex, acute, more or less glaucous especially when young; flowering branch stout,

purplish, 3-4 dm. long; inflorescence paniculately branched; primary branches short, nearly equal, two or three times dichotomous, the ultimate branches short and few-flowered; calyx 3 mm. long, its lobes twice as long as the tube, ovate, acute; corolla 7 mm. long, reddish, somewhat campanulate, its tube about the length of the carpels; carpels united at base, widely spreading.

Collected on Santa Catalina Island by Blanche Trask in May and June, 1897, and in June, 1902. The latter specimen, in U. S. National Herbarium, is the type.

6. *Stylophyllum Hassei* Rose, sp. nov.

Caudex elongated, sometimes about 3 dm. long, 2-3 cm. in diameter, somewhat branching, covered with the old persistent leaves, crowned with a dense erect rosette; leaves very glaucous, linear, not tapering, except toward the apex, 10 cm. long or less, 1 cm. wide or less, thick but flattened below, terete and obtuse toward apex; flowering stems weak, their primary branches 1-2-dichotomous, the ultimate branches slender and many-flowered; calyx small, glaucous, 4 mm. long, cleft to or below the middle, its lobes ovate, acute; corolla-tube about 1 mm. long; carpels widely spreading in age.

Collected on the sea beach on Santa Catalina Island by Dr. H. E. Hasse, May 30, 1902 (type), and on the same island by Blanche Trask, June, 1902.

7. *Stylophyllum semiteres* Rose, sp. nov.

At first acaulescent but old plants decidedly caulescent and branching; leaves numerous, closely set on the caudex, linear, semiterete, 10 cm. or so long, often becoming reddish, acute; flowering branches about 20 cm. long, their leaves ovate, turgid, acute, the lowest ones often opposite; inflorescence a pair of secund racemes; pedicels very short (1-3 mm. long); calyx 5 mm. long, its lobes 4 mm. long, ovate, acute; corolla 9 mm. long, its segments united below for about 2 mm., oblong, obtuse, yellowish but tinged with red; stamens borne on the corolla, all shorter than the corolla but those alternating with the lobes shorter than the others; carpels somewhat spreading.

Type from Lower California or the Colorado Desert of California sent by Mr. C. R. Orcutt, 1903.

In some respects these specimens correspond, especially in reference to the leaves, calyx, inflorescence and color of the flower, with Mr. Watson's description of *Cotyledon attenuata*, but they differ greatly from living specimens from type locality.

8. *STYLOPHYLLUM EDULE* (Nutt.) Britton & Rose.*Sedum edule* Nutt. in T. & G. Fl. N. Am. 1: 560. 1840.*Cotyledon edulis* Brewer, Bot. Calif. 1: 211. 1876.

Southern California, near the sea.

9. *STYLOPHYLLUM ATTENUATUM* (S. Wats.) Britton & Rose.*Cotyledon attenuata* S. Wats. Proc. Am. Acad. 22: 472. 1887.

San Quintin, Lower California.

10. *STYLOPHYLLUM DENSIFLORUM* Rose.*Cotyledon nudicaule* Abrams, Bull. So. Cal. Acad. Sci. 2: 42. 1903. Not Lam. 1786.

Plants growing in dense clumps with more or less branching root-stocks, very glaucous throughout; leaves numerous, erect, nearly terete, acute, 6-12 cm. long; flowering branches slender and weak; inflorescence a rather dense compact cyme, its ultimate branches rather short, 4-8-flowered; pedicels short, 1-3 mm. long; calyx 2 mm. long, its lobes twice as long as the tube, broadly ovate to orbicular, obtuse; corolla white or pinkish, 6 mm. long, its segments spreading, distinct nearly to the base; stamens 10, a little shorter than the corolla; carpels spreading.

Collected on mossy ledges and crevices of perpendicular cliffs, altitude 350 meters, in San Gabriel Cañon, Los Angeles Co., Cal., by H. E. Hasse, June 21, 1902, and at or near the same station by L. R. Abrams.

11. *Stylophyllum Orcuttii* Rose, sp. nov.

Resembling *S. attenuatum* in its foliage and habit, but stouter and very glaucous; corolla-tube much shorter and shorter even than the calyx, the lobes broader, and more keeled, segments rose-colored, not at all tinged with yellow; calyx-lobes obtusish; anthers red.

Collected on Coronado Islands by Lieut. Charles F. Pond, U. S. N., June 4, 1889; Initial Monument, C. R. Orcutt, R. D. Alderson, T. S. Brandegee (type) and in cultivation in various botanical gardens.

Mr. Orcutt says of this species: "First collected in 1883 by Miss Fanny E. Fisk, at Sanzal, on Todos Santos bay, Lower California; later found growing abundantly at the initial Mexican boundary monument, near San Diego, California, by C. R. Orcutt and others, and living material sparingly distributed as *C. attenuata*, from which it differs chiefly in its inflorescence. Corolla tinged with rose purple, not yellow as in *C. attenuata*. This and *C. attenuata* I cannot distinguish in cultivation except by the flowers,

both are glaucous or at length glabrous and bright apple-green." Recognized first by Dr. E. L. Greene as a new species, but not published by him.

Mr. Brandegee also recognized this as an undescribed species, and it is labelled as such in his private herbarium.

12. **Stylophyllum Parishii** Britton, sp. nov.

Stems not as thick as in *S. edule*, somewhat glaucous; flowering branches 2-3 dm. high, rather weak, glabrous; inflorescence paniculate; pedicels 8 mm. long or less; calyx 5-parted, the lobes 4 mm. long, broadly oblong with rounded apex; corolla-segments twice as long as the calyx, united at the base into a tube 2 mm. long, yellowish (?); stamens 10, borne on the corolla at the top of the tube; carpels united only near the base.

Pala, San Diego Co., Cal.; collected by S. B. and W. F. Parish, June, 1880 (no. 444).

HASSEANTHUS Rose, gen. nov.

Stems several, arising from small globose or oblong corms. Basal leaves linear, terete, narrowed below into flattened petioles; stem-leaves narrowly ovate, turgid but somewhat flattened. Calyx 5-lobed. Corolla-segments united at base into a short tube, yellow or white changing to purple. Carpels 5, united at base (?), widely spreading.

Named in honor of Dr. H. E. Hasse.

Type species, *Sedum variegatum* S. Wats.

1. **HASSEANTHUS BLOCHMANAE** (Eastw.) Rose.

Sedum Blochmanae Eastw. Proc. Cal. Acad. Sci. II. 6: 422. pl. 53. 1896.

Along the road to Pt. Sal near Casmalia beach, Santa Barbara Co., California.

2. **HASSEANTHUS VARIEGATUS** (S. Wats.) Rose.

Sedum variegatum S. Wats. Proc. Am. Acad. II: 137. 1876. San Diego Co., California.

3. **Hasseanthus elongatus** Rose, sp. nov.

Resembling *H. variegatus*, but with long slender stems and cyme-branches, linear elongated leaves, oblong calyx-lobes, and bright yellow corolla; the leaves not at all variegated.

Collected on the San Joaquin Hills, Orange Co., Cal., by L. R. Abrams, June, 1901 (no. 1785).

4. *Hasseanthus multicaulis* Rose, sp. nov.

Perennial by an oblong corm 2-3 cm. long. Stems 2-5, rather stout, 1-1.5 cm. high, variegated, glabrous, not at all glaucous; basal leaves 3-4 cm. long, terete, acute; stem-leaves 1-2.5 cm. long, ovate-oblong, acute or acuminate, turgid or somewhat flattened; inflorescence of several secund, many-flowered racemes; flowers subsessile; calyx-lobes ovate, obtuse; flower-buds pinkish, obtuse; corolla-segments widely spreading above the middle, pale yellow tinged with red, 7-8 mm. long, slightly united at base; stamens 10, borne on base of corolla-segments; carpels widely spreading (?) in age.

Known only from Los Angeles Co., Cal., where it has been collected by H. E. Hasse on sterile clay bluffs near Santa Monica, April, 1891 (type), May 11, 1891 (no. 5241), and May, 1902, at which time flowering specimens were sent to the writer.

It differs from *H. variegatus* in the shape of the corms, stouter and not glaucous stems, obtuse buds and subsessile flowers.

RHODIOLA L.

Perennials with a woody and somewhat branching rootstock. Leaves broad and comparatively thin. Flowers dioecious or polygamous, 4- or 5-parted. Corolla purplish, yellowish or greenish. Carpels erect. Style very short or none.

Type species, *R. rosea* L.

1. *RHODIOLA ROSEA* L. Sp. Pl. 1035. 1753.

Sedum roseum Scop. Fl. Carn. Ed. 2, 326. 1772.

Sedum Rhodiola DC. Pl. Grasses, pl. 143. 1805.

Newfoundland and Greenland to Alaska, south to Maine; two isolated stations in eastern Pennsylvania. Also in Europe.

2. *Rhodiola Neomexicana* Britton, sp. nov.

Stems stout, very leafy, 1-2.5 dm. high; leaves linear-oblong, narrowed at both ends, entire, acute or obtusish, 2-3 cm. long, 3-7 mm. wide, or the lower proportionately shorter and broader and some of them serrulate; cyme terminal, dense, the staminate ones 2-3 cm. broad, the pistillate ones smaller; pedicels shorter than the petals or equalling them; petals linear-lanceolate, cucullate at the apex, longer than the linear calyx-segments; filaments one half longer than the petals.

On White Mountain Peak, Lincoln Co., New Mexico, at 3,500 meters, collected by E. O. Wootton, Aug. 1, 1901.

3. *Rhodiola Alaskana* Rose, sp. nov.

Resembling *R. integrifolia*, but usually taller and more slender (often 20 cm. high), usually quite pale and appearing glaucous in herbarium specimens; leaves oblanceolate, acute, 2-2.5 cm. long, strongly toothed in the upper third, drying very thin; petals purplish, obtuse; carpels 4-6 mm. long, gradually tapering into a slender style 1-1.5 mm. long.

Coast of southern Alaska. Type from Misty Harbor, Nagai Island, Alaska, C. H. Townsend, July 22, 1893.

4. *RHODIOLA INTEGRIFOLIA* Raf. Atl. Journ. 1: 146. 1832.

Sedum rhodioloïdes Raf. l. c. 1832.

Sedum Rhodiola Torr. Ann. Lyc. N. Y. 2: 206. 1827. Not DC. 1805.

Sedum frigidum Rydb. Bull. Torrey Club, 28: 282. 1901.

High mountains of Colorado, Nevada and California to Alaska.

5. *RHODIOLA POLYGAMA* (Rydb.) Britton & Rose.

Sedum polygamum Rydb. Bull. Torrey Club, 28: 283. 1901.
Mountains of Colorado.

6. *RHODIOLA ROANENSIS* Britton.

Sedum Roanense Britton; Small, Fl. So. U. S. 497. 1903.

Stems tufted, stout, leafy, 1.5-2.7 dm. high; leaves oblanceolate, entire, or rarely with a few minute teeth, obtusish or acute, narrowed at the base, 2-3 cm. long, 5-9 mm. wide, the lower much smaller and shorter; cymes dense, 2-3 cm. broad; flowers very short-pedicelled; petals lanceolate, purple, or purplish; follicles 8-10 mm. long, the short widely spreading beak about 1 mm. long.

On Roan Mountain, Mitchell Co., N. C. Type, collected by J. K. Small and A. A. Heller, July 16, 1891.

SEDUM L. Sp. Pl. 430. 1753.

Sedum muscoideum Rose, sp. nov.

Perennial, with branching creeping stems; leaves appressed, and closely set on the branches, minute, thickish, obtuse; inflorescence much reduced, consisting of 1 or 2 sessile flowers at the ends of the branches; calyx-lobes obtuse, ovate, 1 mm. long; corolla yellow; petals lanceolate, 3.5 mm. long, a little longer than the stamens.

Arriba de Papalo, Oaxaca, Conzatti & Gonzales, 1898 (no. 777).

Closely resembling *Sedum cupressoides*, but with yellow flowers. Mr. Hemsley has compared the material with his type of the latter species and agrees with me that it is different.

Sedum submontanum Rose, sp. nov.

Perennial, much branched and spreading, glabrous throughout; leaves very closely set or even imbricate, small, 3–5 mm. long, short-oblong, rounded at tip, free at base, fleshy; flowers few, in short-branched cymes, sessile; calyx-lobes leaf-like, short, 1–2 mm. long, rounded at apex; petals narrow, white (or if pink very pale), 5–6 mm. long; scales small, retuse at apex; carpels spreading above.

Collected by J. N. Rose on rockwork in public plaza at Monte Escobado, Zacatecas, August 27, 1897 (no. 2042, type), and by C. G. Pringle on banks and ledges, Sierra de las Cruces, Jalisco, August 12, 1893. This little plant was distributed as *S. Moranense* from which it differs in its more herbaceous calyx-lobes, and paler and larger flowers.

Sedum calcaratum Rose, sp. nov.

Perennial (?), much branched, 5–8 cm. high, glabrous, more or less purple; leaves linear, "cylindrical," obtuse, 10–12 mm. long, alternate and scattered; flowers arranged along one side of the branches, subsessile; calyx-lobes 5, somewhat unequal, 2–3 mm. long, green; stamens 10; scales linear, about two thirds the length of the filaments; petals red, 5 mm. long, obtuse; carpels 5, widely spreading when mature, with long mucronate tips.

Collected by C. G. Pringle on thin soil of limestone ledge near El Salto near Dublan, Hidalgo, Mexico, 1901 (no. 8620).

Sedum oxycoccoides Rose, sp. nov.

Perennial by creeping fleshy rootstocks, with many slender branches arising from the base, glabrous throughout; leaves numerous, linear, 8–15 mm. long; flowers in small few-branched cymes, sessile or sometimes short-pedicelled; calyx-segments linear, leaf-like, somewhat unequal, the longer ones as long as petals; petals deep red, lanceolate, acuminate, 10 mm. long, longer than the reddish stamens; carpels free to base, spreading.

Collected by J. N. Rose in deep shady ravines near Santa Teresa, Tepic, August 11, 1897 (no. 2198).

SEDUM MINIMUM Rose.

Sedum Pringlei minus Rob. & Sea. Proc. Am. Acad. 28: 105. 1893. Not *S. minus* Haw. 1825.

Delicate perennial, about 2 cm. high, arising from small globose tubers; leaves oval-oblong, obtuse, 4 mm. long; calyx-lobes 3–3.5 mm. long, linear, free at base; petals distinct, violet (?), longer than the calyx; filaments 10, only 5 anther-bearing; scales linear, 0.6 mm. long, obtuse or retuse; carpels united for one third their length; styles very short.

Collected by C. G. Pringle on summit of the Nevada de Toluca, State of Mexico, September, 1892 (no. 4240).

***Sedum Hemsleanum* Rose, sp. nov.**

Perennial, caulescent, 1-3 dm. high, branching, puberulent; basal leaves in small rosettes, orbicular; stem-leaves linear to lanceolate, 2 cm. long, obtuse, puberulent; inflorescence an elongated panicle; flowers sessile, arranged along one side of the axis; calyx-lobes broadly ovate, obtuse, 1.5 mm. long; petals white, 4 mm. long, ovate, acuminate; carpels 5, tipped with long slender styles.

Collected by F. Müller, Orizaba, (no. 322), by C. G. Pringle near Oaxaca City, November, 1894 (no. 6042, type), and by E. W. Nelson on rocks between Petlatcingo and Acatlan, Puebla, November, 1894 (no. 2001).

***Sedum australe* Rose, sp. nov.**

Perennial, procumbent, rooting at the joints; branches woody, tuberculately roughened; leaves numerous, densely imbricate, terete, obtuse, 6-7 mm. long, glabrous; inflorescence a short compact cyme; calyx-lobes leaf-like, half as long as the petals; petals reddish-yellow, 7 mm. long, mucronate on the back below the apex; carpels widely spreading when mature.

Collected by E. W. Nelson on the volcano of Santa Maria, Guatemala, January 24, 1897 (no. 3707).

***Sedum Shastense* Britton, sp. nov.**

Perennial by a slender rootstock, glabrous; stems slender, erect, or the base decumbent, 6-12 cm. high; leaves lanceolate to oblong-lanceolate, 10-15 mm. long, 3-5 mm. wide, acute, papillose, the narrowed base somewhat prolonged below the axil; cyme small, compact, 2-3 cm. broad; flowers few, sessile or nearly so; calyx-segments ovate to triangular-ovate, acute, about half as long as the petals; petals very thin, lanceolate, acuminate, yellow, strongly 1-nerved, about 8 mm. long, exceeding the stamens and pistils; styles subulate; young follicles erect.

North side of Mt. Shasta, Siskiyou County, California, H. E. Brown, July, 1897 (no. 441).

***Sedum Cockerellii* Britton, sp. nov.**

Perennial, glabrous, branched, 2 dm. high or less; basal leaves not seen; stem-leaves lanceolate to oblong-lanceolate, sessile, acute, 1-2.5 cm. long, 6 mm. wide or less; cymes 2.6 cm. broad; flowers subsessile; calyx-segments nearly linear, acute or acutish, a little shorter than the petals; petals linear-lanceolate to linear-oblong-lanceolate, acute, 6-8 mm. long, white; anthers pink; carpels erect; styles subulate.

Tuerto Mountain, east of Santa Fé, New Mexico, T. D. A. Cockerell, in 1895 (type); Mt. Carmel, on the Rio Grande, Parry (Mex. Bound. Surv., no. 403).

***Sedum* (?) *guttatum* Rose, sp. nov.**

Much branched at base, shortly caulescent; leaves glabrous, opposite, 2 or 4 pairs, 2-3 cm. long, thickish, rounded on the back, broadly channeled on the face, sage-gray color, spotted with purple-black blotches, obtuse; inflorescence terminal, cymose; branches 2 or 3, spreading; pedicels very short; sepals free to the base, oblong, 3-4 mm. long, subequal, green, obtuse; petals narrowly oblong, 5 mm. long, obtuse, apparently reddish, free to the base; stamens 10, shorter than the petals, the 5 opposite the sepals free to the base, the other 5 borne on the petals; scales small, obtuse; carpels 5, distinct to the base, erect; styles about as long as the carpels, slightly spreading.

Common in the crevices of the most exposed rocks on summit of hill at Saltillo, Mexico. Collected by Dr. E. Palmer in 1902 (no. 309) and now in cultivation in Washington.

***Sedum* *naviculare* Rose, sp. nov.**

Annual; stems simple or branching at base, glabrous, purplish, 5-10 cm. long; basal leaves not seen; stem-leaves scattered, "spatulate, concavo-convex," obtuse, glabrous, 2-10 mm. long; inflorescence of 2 or 3 more or less elongated, one-sided racemes; flowers scattered, subsessile or sometimes very distinctly pedicelled; sepals linear, nearly equal, green, 1.5-3 mm. long; petals free to the base, purplish, ovate-lanceolate, 4 mm. long, obtuse; stamens 10, all decidedly shorter than the petals, those opposite the petals attached to them above the base; anthers short, purple; scales 5, alternating with the sepals, very distinct, 0.6 mm. long, narrowly club-shaped; carpels erect, glabrous.

Collected by C. G. Pringle on the rocky knobs of Sierra de Tepoxtlán, Morelos, altitude 2,250 meters, October 13, 1900 (no. 8384).

***Sedum* *Conzattii* Rose, sp. nov.**

More or less shrubby at base, 3-4 dm. high, branched, puberulent; leaves alternate, spatulate, rounded or retuse at apex, 2-3 cm. long, thin; inflorescence a short cyme; sepals about 2 mm. long, free to base; petals white or purplish, 6 mm. long, acute; stamens shorter than the petals; anthers reddish; scales very small.

Collected on Sierra de San Felipe, Oaxaca, by C. G. Pringle, October 11, 1894 (no. 4982), and by Professors Conzatti and Gonzalez, September 26, 1897 (no. 495, type). This species some-

what resembles and has been taken for *S. oxypetalum*, but it is of much more open growth, with lighter colored flowers. It must also be related to *S. tortuosum*.

***Sedum nutans* Rose, sp. nov.**

Perennial, with a thick woody caudex; basal leaves forming a broad rosette, thickish, obovate, 4-7 cm. long, 2.5-3 cm. broad at widest point, glabrous; flowering stems about 1 dm. long, bearing small leaves; inflorescence a narrow panicle, 1 dm. long or less, the main branches reflexed; pedicels 3-4 mm. long; calyx deeply 5-parted, its lobes linear-oblong, somewhat unequal, 4-6 mm. long, rounded at apex; petals bright yellow, ovate, 6 mm. long, acute; stamens 10, free to the base; scales retuse; carpels erect.

Collected by C. G. Pringle on mossy cliffs of Tepoxtlán, Morelos, altitude 2,250 meters, February 8, 1899 (no. 6980).

***Sedum Nelsoni* Rose, sp. nov.**

Caulescent, branching, especially above, 1-1.5 dm. high; branches brownish and tuberculately roughened; leaves (at least in herbarium specimens) thin and distinctly nerved, spatulate, 2.5-3.5 cm. long, 6-7 mm. broad at widest point, narrowed at base into a rather distinct petiole and extending below the point of insertion into a broad spur; inflorescence a few-flowered cyme; pedicels 4-5 mm. long; sepals distinct, unequal, the longer ones 8 mm. long; petals free (?) to the base, lanceolate, acute, yellowish but with a broad reddish stripe on the back; stamens opposite the petals borne high upon them, the others attached at or near their bases; carpels widely spreading from the very base.

Collected by E. W. Nelson on the road between Ayusinapa and Petatlán, Guerrero, Mexico, December 14, 1894 (no. 2191).

Resembling somewhat *S. confusum* Hemsl., but the flowers are not sessile.

***Sedum* (?) *longipes* Rose, sp. nov.**

Stems slender, creeping, rooting at the joints; sterile branches bearing dense rosettes of small orbicular leaves; flowering branches seemingly erect, 2-3 cm. high, flowering toward the top; flowers solitary in the axils of the leaves, 8-10 mm. long; sepals ovate, obtuse, 2-3 mm. long; petals purple, 4-5 mm. long, lanceolate, apparently keeled near the tip; scales (for the genus very conspicuous) strongly 2-lobed, each lobe with several teeth at apex; stamens 10, shorter than the petals.

Collected by C. G. Pringle on the mossy ledges of conglomerate of the Sierra de Tepoxtlán, Morelos, February 8, 1899 (no. 8049).

16. *Sedum Wootoni* Britton, sp. nov.

Rootstocks rather stout; stems tufted, slender, erect or ascending, 1-1.5 dm. high, granular-puberulent above, glabrous below; cyme 2.5-5 cm. broad, its branches densely granular-puberulent; pedicels 2 mm. long or less; leaves sessile, 8-14 mm. long, 2.5-5 mm. wide, the basal and lower ones obovate to spatulate, obtuse, the upper narrowly spatulate to linear-oblong, acute to acuminate; sepals narrowly oblong, obtusish; petals white, oblanceolate, acute, longer than the sepals, 6-8 mm. long; carpels erect, subulate-tipped.

Organ Mountains, New Mexico, 2,000 m. altitude, E. O. Wooton, September 17, 1895.

***Sedum Californicum* Britton, sp. nov.**

Rootstock rather stout, nearly horizontal; stems erect, stout, 1.5-2 dm. high; basal leaves and those of rosettes spatulate, obtuse, 1-3 cm. long, 8-10 mm. wide, the flabellately arranged veins uniting in an intramarginal nerve; stem-leaves linear-oblong to oblong-spatulate, acute to acutish, about 1 cm. long; cyme large, 6-10 cm. broad, its branches stout, ascending or somewhat recurved, mostly once or twice forked; flowers sessile or the lower ones on stout pedicels 3 mm. long or less; sepals ovate, acutish or obtuse, about 2 mm. long, one fourth to one third as long as the narrowly lanceolate, white, long-acuminate petals; carpels broad, divergent, finely reticulated, the subulate tips ascending.

North side of Mount Shasta, Siskiyou County, California, 1600-3,000 m. altitude, H. E. Brown, June 11-16, 1897 (no. 336).

***Sedum Yosemiteense* Britton, sp. nov.**

Perennial by rootstocks, very fleshy, stoloniferous; basal leaves obovate-orbicular to broadly obovate, 1 cm. long or less, 6-9 mm. wide, rounded at the apex, green, not glaucous, or scarcely so; flowering stems 1-1.5 dm. high, slender, their leaves spatulate-obovate to oblong, obtuse, small; cyme compound, 5 cm. broad or less, rather densely flowered; pedicels stout, 0.5-2.5 mm. long; calyx deeply cleft, its lobes ovate-lanceolate, acute or acutish; petals light yellow, lanceolate, acuminate, 6-8 mm. long, twice as long as the calyx or longer; follicles somewhat divergent, tipped with filiform styles.

Yosemite National Park, Cal. Type collected by H. M. Hall and E. B. Babcock, between Vernal and Nevada Falls, July, 1902 (no. 3425).

***Sedum diversifolium* Rose, sp. nov.**

Sterile branches short, with small ovate flattened pale roughened leaves; flowering branches elongated, weak, glabrous, with scattered leaves; leaves 5-10 mm. long, turgid, somewhat curved

backward, pale green, smooth; flowers terminal, solitary, short-peduncled, inconspicuous; sepals 5, leaf-like, obtuse, 2-3 mm. long; petals pale yellow, twice the length of the sepals, ovate, acute, or even apiculate; stamens 10, much shorter than the petals.

Living specimens collected in state of Mexico by J. N. Rose (no. 248), and flowered in greenhouses of Department of Agriculture, and of New York Botanical Garden, December, 1901.

SEDELLA Britton & Rose, gen. nov.

Diminutive Californian annuals, with small ovate to ovate-oblong leaves and small yellow cymose flowers. Calyx with 5 very small, triangular acute teeth. Petals linear to ovate-lanceolate, united at the base, spreading (?) Stamens 10. Carpels oblong, 1-seeded, the seed erect.

Type species, *Sedum pumilum* Benth.

1. **SEDELLA PUMILA** (Benth.) Britton & Rose.

Sedum pumilum Benth. Pl. Hartw. 310. 1849.
California.

2. **SEDELLA CONGDONI** (Eastw.) Britton & Rose.

Sedum Congdoni Eastw. Proc. Cal. Acad. III. 1: 135. *pl. 11*.
1898.

Grant's Springs, Mariposa County, California.

The Flora of the Matawan Formation (Crosswicks Clays).

BY EDWARD W. BERRY.

INTRODUCTION.

Some of the earliest of American geological writings refer to the New Jersey Cretaceous, and the accessibility of this area has ever since made it a favorite field for investigation. Interest for a long time centered about the marl deposits and those of the plastic clays because of their economic importance; the present Matawan formation was included in the "plastic clay and sand formation" of the geologists of the first half of the nineteenth century, and their stratigraphic position was considered to be Lower Cretaceous by Rogers in his first report published in 1840, although they were not clearly



Britton, Nathaniel Lord and Rose, J. N. 1903. "New or noteworthy North American Crassulaceae." *Bulletin of the New York Botanical Garden* 3(9), 1–45.

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