side Junior College, is of interest to California botanists because of the close relationships between the flora of the Charleston Mountains and of the high desert ranges of eastern and southern California.

The genus Haplopappus is the title of a Carnegie Institution Publication, no. 389 (Washington, 1928, pp. 1-391), by Dr. H. M. Hall. This paper is an intensive and thoroughgoing study of a group that has a large representation in western America. There are 114 figures and 16 plates.

"A Systematic Study of the genus Lessingia Cham." has been completed by John Thomas Howell (Univ. Cal. Publ. Bot. 16:1-44, figs. 1-70,—1929). The author recognizes seven species and a considerable number of varieties, of which three are new. For specific criteria reliance has been placed chiefly on gland character, structure of style branches and habit. The author considers that the Tehachapi region represents the geographic center of the genus.

A REVISION OF CALIFORNIAN UMBELLIFERAE.—V.

WILLIS LINN JEPSON

(Concluded from page 162)

1 or 2, linear-acuminate; fruit broadly oblong, slightly pubescent, 3 to 4 lines long; lateral wings thick and corky, as broad as the body; oil-tubes solitary in the intervals; seed deeply sulcate beneath the oil-tubes.—Along the coast, mostly on or near the sea-bluffs, 5 to 200 ft.: San Mateo Co. to Humboldt Co. North to Wash.

Locs.—Pt. Lobos, San Francisco, (Fl. W. Mid. Cal. 356); Pt. Reyes, Davy 6869; Newport, Mendocino Co., Jepson 13,487; Loleta, Humboldt Co., Jepson 2133.

Refs.—Angelica Hendersoni C. & R. Bot. Gaz. 13: 80 (1888), type loc. Long Beach, Ilwaco, Wash., *Henderson* 2158; Jepson, Man. 727, fig. 711 (1925).

2. A. tomentôsa Wats. Stout, 2 to 5 ft. high, the stems and especially the leaves puberulent, or sometimes nearly glabrous; leaves bipinnate or ternate or quinate and then pinnate; leaflets ovate, acute, acutish or often long-pointed, sometimes varying to lanceolate or roundish, irregularly serrate, obliquely 2-lobed, or not lobed and merely oblique, 1½ to 3 (or 6) in. long; petioles strongly dilated at base; fruiting rays 1 to 5 in. long; fruiting pedicels 2 to 3 lines long; ovary tomentulose; fruit oblong or elliptic, glabrous, 3 to 4½ lines long; dorsal and intermediate ribs small and acutish; lateral wings nearly equaling the body in breadth; oil-tubes 1 in the intervals, or sometimes 2 in the lateral intervals, mostly 2 on the commissure; seed somewhat sulcate beneath the oil-tubes.—Dry woods, 300 to 4000 ft.: coastal S. Cal.; n. through the Coast Ranges to Humboldt Co.

Locs.—French Valley, Palomar Mt.; Mt. San Jacinto (Univ. Cal. Publ. Bot. 1:98); San Bernardino Mts. (Pl. World 20: 247); West Fork Cucamonga Cañon, San Gabriel Mts.; Big Pine Mt., Santa Barbara Co., J. R. Hall; Berkeley, H. A. Walker; Mt. Tamalpais, Jepson; St. Helena, Jepson 13,483; Calistoga, Jepson 13,484; Peanut, Trinity Co., J. W. Patton; Eureka, Tracy 6902; Alton, Humboldt Co., Tracy 6560.

Var. CALIFÓRNICA Jepson. Rays very unequal (1¼ to 5¾ in. long), scaberulous at the ends; oil-tubes 2 (or 3) in the intervals, mostly 4 in lateral pairs on the commissure.—Vaca Mts.

Refs.—ANGELICA TOMENTOSA Wats. Proc. Am. Acad. 11:141 (1876), type loc. San Francisco; Jepson, Man. 728 (1925). Var. elata Jepson, Fl. W. Mid. Cal. 356

(1901), type loc. Napa Valley, Jepson. Var. CALIFORNICA Jepson Fl. W. Mid. Cal. 356 (1901). A. californica Jepson, Erythea 1:8 (1893), type loc. Gates Cañon, Vaca Mts., Jepson.

3. A. breweri Gray. Stems 3 to 5 ft. high; herbage glabrous; leaves ternate, or quinate, then pinnate; leaflets lanceolate to oblong or occasionally ovate-lanceolate, acuminate, sharply serrate, 1½ to 4 in. long; rays many, 1½ to 2½ in. long in fruit; pedicels 2 to 3½ lines long; rays and pedicels not "web-footed" or very obscurely so; pedicels and ovaries whitish-puberulent; fruit oblong or somewhat narrowed below, pubescent or becoming glabrous, 3 to 4½ lines long; dorsal and intermediate ribs more or less prominent; lateral wings as wide as the body; oil-tubes 1 or 2 in the intervals.—Dry wooded slopes or flats, 3000 to 8000 ft.: Sierra Nevada from Mariposa Co. to Tehama Co. East to western Nev.

Locs.—Chilnualna Falls, Mariposa Co., Congdon; Hetch-Hetchy, Jepson 3451; Dorrington, Calaveras Co., A. L. Grant 591; Kennedy Mdw., Tuolumne Co., A. L. Grant 445; Bear Valley, Nevada Co., Jepson 13,486; Bowman Lake, Nevada Co., A. M. Carpenter; Rich Point, Middle Fork Feather River, Jepson 10,610; Manzanita Lake, e. Tehama Co., Jepson 15,330.

Refs.—Angelica breweri Gray, Proc. Am. Acad. 7:348 (1868), type loc. Ebbetts Pass, Alpine Co., Brewer; Jepson, Man. 728 (1925).

4. A. lyallii Wats. Plants 2 to 4 ft. high; herbage and inflorescence glabrous; leaves biternate, then pinnate; leaflets ovate-lanceolate, serrate, $1\frac{1}{2}$ to $3\frac{1}{2}$ or 5 in. long; fruiting rays $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long, the outer row somewhat coalescent at base so as to be web-footed; outer row of pedicels similarly coalescent; fruit broadly oblong to obovate, 3 to $3\frac{1}{2}$ lines long; dorsal and intermediate ribs sharply salient, equal; lateral wings about as broad as the body; oil-tubes solitary in the intervals.—Siskiyou Co. North to Alberta.

Refs.—Angelica lyallii Wats. Proc. Am. Acad. 17:374 (1882), type loc. "Galton and Cascade Mountains", n. Wash., Lyall; Jepson, Man. 728 (1925).

5. A. lineariloba Gray. Stout, glabrous, 2 to 3 ft. high; leaves 2 or 3 times ternate, then pinnate with about 5 (3 to 9) leaflets; leaflets linear or linear-lanceolate, 1 to 3 in. long, 1 to 2 lines wide, entire or often with a pair of coarse teeth towards the base, frequently decurrent on the rachis; fruiting rays 1 to 2 or 3¾ in. long; involucre and involucels none; fruit oval-oblong, glabrous, 4 to 6 lines long; dorsal and intermediate ribs filiform; lateral wings thickish, a little narrower than the body; oil-tubes solitary in the dorsal intervals, in pairs in the laterals.—Montane slopes, dry soil, 6400 to 9500 ft.: Sierra Nevada from Mariposa Co. to Tulare Co.

Locs.—Farewell Gap Jepson 1140; Mineral King, Jepson 1155; Kern Cañon, Tulare Co., Jepson 968; Bubbs Creek, Jepson 791.

Var. Culbertsonii Jepson. Leaf-segments 4 to 4½ lines wide.—Little Kern River. Refs.—Angelica lineariloba Gray, Proc. Am. Acad. 7:347 (1868), type loc. Ostranders Mdws., Yosemite, Bolander; Jepson, Man. 728 (1925). Var. Culbertsonii Jepson l. c., type loc. Little Kern River, Culbertson 4276.

37. COELOPLEURUM Ledeb.

Very stout perennial herb of the sea-coast with glabrous herbage. Leaves uni-, bi- or tri-ternate, with large inflated petioles. Flowers greenish-white, in many-rayed umbels. Involucre of few narrow bracts, sometimes foliaceous. Involucel of many linear-lanceolate bractlets. Fruit elliptic-oblong, not flattened dorsally. Ribs very thick and corky, becoming hollow, equal or the lateral ones a little broader. Oil-tubes small, 1 in the intervals, 1 or 2 under each rib, 2 to 4 on the commissure. (Greek koilos, hollow, and pleuron, rib, referring to the cavity made by the intruded ribs.)

1. C. maritimum C. & R. Stems cormybosely branched, 2 to 3 ft. high; leaflets roundish to ovate, crenate, 1¼ to 4 in. long; rays 1 to 1¾ in. long; fruits 2½ to 3 lines long, the lateral ribs twice as broad as the others.—Salt

marshes or low ground along the coast, 5 to 500 ft.: central Humboldt Co. North to Wash.

Locs.—Loleta, John Mathiesen; Hookton, Humboldt Bay, Tracy 4581.

Refs.—Coelopleurum Maritimum C. & R. Bot. Gaz. 13:145 (1888), type loc. Long Beach, Ilwaco, Wash., *Henderson* 384. *C. lucidum* Jepson, Man. 728 (1925). The proper name for this plant of our north coast is, to us, uncertain at this time and the problem must be deferred for further investigation.

38. SPHENOSCIADIUM Gray

Perennials with thick roots. Stems stout, tall, nearly simple, glabrous. Leaves once or twice pinnate with bladdery dilated petioles. Flowers white (or sometimes purplish), sessile on enlarged receptacles and forming compact heads, the heads borne on tomentose rays in a medium-sized umbel. Involucre none. Involucels of many linear-setaceous bractlets. Calyx-teeth none. Fruit cuneate-obovate, flattened, subglabrous. Ribs prominent, winged above, the dorsal and intermediate ones narrow, the lateral broader. Oil-tubes solitary in the intervals, 2 on the commissure. Seed face plane. (Greek sphenos, a wedge and sciadios, an umbrella, referring to the umbel.)

1. S. capitellatum Gray. Fig. 712. Stems very stout, 3 to 8 ft. high; leaves large, glabrous or puberulent; leaflets or segments linear-lanceolate to oblong or oblong-ovate, serrate or coarsely and saliently few-toothed above, more or less entire below; rays 4 to 8 (or 14), subequal, 1 to 2 (or 4) in. long; flowers pubescent; involucels of a few deciduous bractlets; fruit cuneate-obovate, 3 lines long.—Montane, along streams or borders of meadows, 3500 to 10,000 ft.: San Bernardino Mts.; White Mts.; Sierra Nevada from Kern Co. to Modoc Co., thence w. to Siskiyou Co. East to western Nevada; s. to San Pedro Martir in Lower California; n. to eastern Oregon and to Idaho. July-Oct.

Locs.—Bluff Lake, San Bernardino Mts., Parish; Bitter Creek, Mt. Pinos; Bisses sta., Tehachapi Mts., W. R. Dudley; Mt. Silliman; Bench Mdw., Kaiser Ridge, Jepson 13,275; Line Creek, Huntington Lake, Jepson 13,096; Red Mdw., near Devils Postpile, Madera Co., A. L. Grant 1563a; Hetch-Hetchy, Jepson 3484; Soda Springs Cañon, Kennedy Lake, Tuolumne Co., A. L. Grant 504; Poison Creek, White Mts., Jepson 7373; Barrette Camp, Tells Peak, Eldorado Co., Kennedy 79; Donner Lake, Sonne; Susanville, Pearl Safford; Mill Creek, Warner Mts., L. S. Smith 998; Shasta Sprs., Jepson 13,482; Shackelford Creek, w. Siskiyou Co., Butler 460; Asa Bean Flat, ne. Mendocino Co., Cronemiller.

Three varieties are recognized in the Manual of the Flowering Plants of California, var. scabrum Jepson (leaves typically scaberulous), var. validum Jepson (leaf segments ovate) and var. eryngiifolium Jepson (leaves glabrous or tending to be). All need further study but the first two are probably of little moment. The third var. eryngiifolium, is fully connected by a series of intergrades with the species. The type of Selinum eryngiifolium Greene represents a dwarfed and probably much starved state most likely growing on granite. The original, collected July 12, 1889 by Drew (really by Chesnut and Drew), is from the granite dome, Cloud's Rest, above Yosemite. The ovate-acute spinulose-tipped leaf-segments are only 1 to 1½ lines long, the segments and pinnae noticeably divaricate. Every intergrade between this state and a more usual or normal form with narrowly linear or lanceolate segments 1½ to 10 lines long is represented in the higher Sierra Nevada and on its eastern slope: Upper Funston Mdws., Kern Cañon; Minarets, Madera Co., Congdon; Crescent Lake, Mariposa Co., Congdon. This latter state with linear leaf-segments, in turn, intergrades to the usual form of the Sierra Nevada.

Refs.—Sphenosciadium Capitellatum Gray, Proc. Am. Acad. 6:537 (1865). type loc.

Refs.—Sphenosciadium Capitellatum Gray, Proc. Am. Acad. 6:537 (1865), type loc. Ebbetts Pass, Brewer; Jepson, Man. 729, fig. 712 (1925). Var. scabrum Jepson l. c. Var. validum Jepson, l. c. S. validum Congdon, Erythea 7:185 (1900), type loc. Wawona, Congdon. Var. eryngiifolium Jepson l. c. | Selinum eryngiifolium Greene, Pitt. 2:102 (1890), type loc. above Yosemite, Drew. | Sphenosciadium eryngiifolium C. & R. Contrib. U. S. Nat. Herb. 7:128 (1900). Selinum capitellatum B. &. W. Bot. Cal. 1:265 (1876).

39. CYMOPTERUS Raf.

Perennial herbs with basal leaves. Herbage glabrous (except in no. 6). Leaves usually ternate, then once to thrice pinnate and much dissected or incised. Involucre usually lacking. Involucels always present. Flowers yellow, white or purple, in compound umbels. Calyx-teeth usually evident. Fruit oblong to orbicular, mostly dorsally flattened, the carpels 3 to 5-winged. Stylopodium wanting. Oil-tubes several in the intervals, 2 to many on the commissure. Seed

flat to very slightly or not at all dorsally flattened. (Greek kuma, wave, and pteron, wing, the ribs in some species with undulate wings.)

Wings of carpels commonly thickened or corky at insertion, sometimes corky throughout. Small plants of the deserts and desert slopes of mountain ranges.

Flowers in umbels; wings of carpels entire.

Leaves light green, the ultimate segments lanceolate or oblong, 1 to 2 lines long; involucre none or of a few small bracts....2. C. panamintensis.

Flowers in dense globose heads.

Wings of carpels with shredded margins; foliage glabrous...4. C. deserticola.

C. terebinthinus (Hook.) T. & G. Plants ½ to 1½ ft. high, the leaves all basal; peduncles about twice as long as the leaves, arising from the shortly branched caudex which is clothed with persistent leaf sheaths; leaves 2 to 6 in. long, on petioles about as long, usually ternate, then 1 to 3 times pinnate and pinnately dissected into short linear segments about 1 line long; umbels with unequal rays, no involucre and involucels of linear acuminate bractlets; flowers yellow; fruiting rays 1 to 3 in. long; fruiting pedicels 3 to 5 lines long; fruit broadly oblong to nearly orbicular, 4 to 6 lines long; carpels with 3 to 5 broad thin undulate crisped wings, or one carpel with broad wings (especially the lateral wings) and the companion carpel with wings narrow and much reduced; oil-tubes very small, 4 to 9 in the intervals, 8 to 16 (or 20) on the commissure side.—Montane, in dry granite soil, 5000 to 9000 ft.: Sierra Nevada from Tulare Co. to Lassen Co. North to Wash.

Locs.—North Fork Middle Tule River, Jepson 4688; Putnam Cañon, Tulare Co., Walter Fry 335; Bubbs Creek, Jepson 794; Huntington Lake, A. L. Grant 1137, 1170; Jackass Mdw., Fresno Co., E. V. Ferguson 437; Dana Fork, Tuolumne River, Jepson 3264; Muir Gorge to Table Lake, Tuolumne River, Jepson 3390; Rancheria Mt., Tuolumne Co., Jepson 4597; Kennedy Lake, Tuolumne Co., A. L. Grant 248; Barrette Camp, 3 mi. s. of Tells Peak, Eldorado Co., Kennedy 106; Echo Lake near Fallen Leaf, Ottley 1185.

Plants from high altitudes (9700 to 11,000 ft.) resemble closely the prevailing form of C. terebinthinus but are much reduced (1½ to 4 in. high) with the root crown very densely clothed with old leaf bases and the umbellets without bractlets. This state may be C. foeniculaceus T. & G., a plant of the Blue Mts. of Oregon. Our material is only in flower, namely: Muir Pass, E. Ferguson 493; Mary Lake near Tower Peak, Jepson 4555.

Var. CALIFORNICUS Jepson. Wings of carpels not undulate-crisped; leaves with ultimate divisions ovate to almost linear; involucels of small linear bractlets; fruit oblong, 3 to 4 lines long; intermediate and dorsal wings sometimes reduced in breadth; oil-tubes 3 to 5 in the intervals, 6 on the commissure.—N. Sierra Nevada, 1500 to 5000 ft., from Nevada Co. to Lassen Co., thence w. to Siskiyou Co.

Locs.—Sisson, Jepson 13,488; Forks of Salmon to Cecilville, Jepson 2080.

Refs.—Cymopterus terbinthinus T. & G. Fl. 1:624 (1840); Jepson, Man. 730, fig. 713 (1925). Selinum terebinthinum Hook. Fl. Bor. Am. 1:266, t. 95 (1834). Pteryxia terebinthina C. & R. Contrib. U. S. Nat. Herb. 7:171 (1900). Var. Californicus Jepson, Man. 730 (1925). Pteryxia californica C. & R. Contrib. U. S. Nat. Herb. 7:172 (1900), type loc. Sisson, Siskiyou Co., H. E. Brown.

2. C. panamintensis C. & R. Plants low (3 to 10 in. high); peduncles purplish, arising from a short caudex sheathed with old leaf bases; leaves 2 to 234 in. long, on petioles about as long, ternate, then once or twice pinnate, the pinnae finely dissected; ultimate segments 1 to $1\frac{1}{2}$ lines long, tipped with a slender bristle-like apiculation; rays in fruit 1 to $1\frac{1}{2}$ in. long; pedicels short; involucre none; involucels small, gamophyllous, somewhat one-sided, purplish, cleft into ovate acuminate segments; flowers greenish-yellow; fruit $4\frac{1}{2}$ lines long, glabrous, each carpel with 5 broad wings, the wings very thick at insertion; oil-tubes 3 or 4 in the intervals, 4 or 5 on the commissure; seed face deeply concave.—Dry rocky cañon sides, 5000 to 6000 ft.: e. Mohave Desert; Death Valley region.

Locs.—Hanaupah Cañon, Panamint Mts., Jepson 6991; Argus Mts. (Contrib. U. S. Nat. Herb. 7: 177).

Refs.—CYMOPTERUS PANAMINTENSIS C. & R. Contrib. U. S. Nat. Herb. 4: 116 (1893), type loc. Johnson Cañon, Panamint Mts., Coville 508; Jepson, Man. 730 (1925). Aulospermum panamintense C. & R. Contrib. U. S. Nat. Herb. 7:177 (1900). Var. acutifolium C. & R. l. c., type loc Newberry Sprs., Lemmon.

3. C. utahensis Jones. Plants 3 to 5 in. high, the peduncles equaling or exceeding the leaves; leaves gray-pallid, ternate, then bipinnatifid; ultimate segments ovate in outline, 4 to 6 lines long, crenate or incised; umbels more or less compacted; involucres of conspicuous hyaline bracts with prominent green or purplish nerves; involucels resembling the involucres; flowers purple; fruit orbicular, 4 to 6 lines long, its body oblong; ribs with broad membranous wings (often corky-thickened next the body of the carpel); carpels flattened with 5 broad thin wings; oil-tubes 2 in the intervals, 4 on the commissure.—E. Mohave Desert. East to Utah and N. Mex.

Refs.—CYMOPTERUS UTAHENSIS Jones, Proc. Cal. Acad. ser. 2, 5:684 (1895), type loc. Paguma, Ariz., Jones 5098; Jepson, Man. 730 (1925).

4. C. deserticola Bdg. Plants 4 to 6 in. high, the peduncles and leaves rising from among the old petioles of the root-crown, peduncles ascending a little exceeding the leaves; leaves glabrous, triangular in outline, 2 in. long, bi- or tri-ternate, then pinnately parted; segments with acute bristle-tipped lobes; petioles 2½ to 3½ in. long; involucre with short linear bracts; flowers dark purple, crowded in a globose head ½ to ¾ in. in diameter; fruits 2 lines long, sessile; lateral wings thick, corky, narrow, pubescent, with the margins shredded; oil-tubes minute and numerous, forming a continuous chain.—Dry plains or flats, 2000 to 3000 ft.: central Mohave Desert.

Loc.—Betw. Victorville and Rabbit Sprs., Parish 9742.

Refs.—Cymopterus deserticola Bdg., Univ. Cal. Publ. Bot. 6:168 (1915), type loc. Kramer, Mohave Desert, K. Brandegee; Jepson, Man. 731 (1925).

5. C. cinerarius Gray. Plants 2 in. high, the peduncles and leaves from a short more or less horizontal subterranean caudex; leaves (in outline) somewhat cordate, bipinnate, with pinnately divided segments, glaucous and cinereous with a very minute harsh pubescence; rays few, short or almost none; involucels of numerous united somewhat membranous long-acuminate segments; flowers purplish; fruit 2½ lines long, the 5 wings of each carpel rather narrow and thick at insertion; oil-tubes 3 in the intervals, several on the commissure; seed face with narrow and deep concavity.—Granite slopes, 8,000 to 9,000 ft.: e. slope of the Sierra Nevada in the Mono Lake region; White Mts., Inyo Co.

Refs.—CYMOPTERUS CINERARIUS Gray, Proc. Am. 6:535 (1865), type loc. Sonora Pass, Brewer; Jepson, Man. 731 (1925). Aulospermum cinerarium C. & R. Contrib. U. S. Nat. Herb. 7:178 (1900).

6. C. littoralis Gray. Peduncles and leaves spreading or prostrate peduncles and leaves arising from very short stems; leaves simply ternate, longer than the peduncles, densely white-tementose beneath; petioles 2 to 4 in. long; leaflets ovate or roundish in outline, 1 to $2\frac{1}{2}$ in. long, either the terminal or lateral or all 3 leaflets often 3-parted or -divided, their margins callous-serrate or -dentate; umbel compact, hemispherical, resting on the sand; rays $\frac{3}{4}$ to $\frac{1}{4}$ in. long; umbellets capitate; flowers white, bracts and bractlets subulate; fruit dorsally flattened, each carpel bearing 5 equal broad corky wings $\frac{1}{2}$ to 2 lines wide, the fruit therefore subglobose in outline, 4 to 5 lines in diameter; oil-tubes 2 or 3 in the intervals. 4 or 6 on the commissure; seed face somewhat concave.—Sandy sea-beaches: Mendocino Co. to Del Norte Co. North to Alas.

Refs.—Cymopterus Littoralis Gray, Pac. R. Rep. 12: 62 (1860), type loc. Shoalwater Bay, Puget Sound, J. G. Cooper; Jepson, Man. 731 (1925). Glenhia littoralis F. Schmidt, Ann. Mus. Bot. Lugd. Bat. 3:61 (1867). Phellopterus littoralis F. Schmidt, Mem. Acad. Petrop. ser. 7, 12:138 (1868).



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