

much longer than the bracts and calyx, abruptly widened into the obconic throat and oblong obtuse lobes: flowers purple to pink or straw-color; with yellow throat. Common on dry open hillsides, Puget Sound to California.

L. ciliatus Greene l. c. 260. *Gilia ciliata* Benth. Rough-pubescent throughout: stem rigid, 4-12 inches high, virgate: divisions of the leaves acerose, 2-8 lines long: tube of the calyx cylindraceous, half as long as the subulate pungent lobes: tube of the corolla filiform, 4-6 lines long, but little if any longer than the hispid-ciliate bracts and calyx: throat of the corolla funnellform, yellow, nearly as long as the oblong rounded lobes. In groves, southern Oregon to California.

* * Wholly glabrous: very dwarf: leaves entire: anthers sessile in the throat of the corolla, the cuneate lobes of which are sometimes undulate-toothed or 1-3-dentate at the apex: ovules 10-16 in each cell.

L. nudicaule. *Gilia nudicaulis* Gray. Very glabrous: stem 1-10 inches high, at length branching from the base, leafless from the cotyledons to the inflorescence which is a close head or glomerule subtended by an involucre of several ovate-lanceolate or lanceolate foliaceous bracts: corolla white, pink or yellow; the tube 3-4 lines long, about 3 times as long as the calyx, rather longer than the lobes. Sandy plains, interior of Oregon to Nevada and Colorado.

5 NAVARRETIA Ruiz & Pavon Prodr. Fl. Per. et Chil. 20.

Low annuals with alternate pinnatifid leaves and small flowers in leafy-bracted capitate clusters. Tube of the calyx scarious between the 5 prominent green angles or costa, its lobes unequal, erect or spreading, pungent tipped, all entire, or the 2 larger ones spinulose-toothed or cleft. Corolla tubular-funnelform or almost salverform, with rather small oval or oblong lobes. Stamens inserted in or below the throat: anthers short. Capsule dehiscent from above or from below, or indehiscent. Seeds one to many in each cell, mostly mucilaginous and developing spiral threads when wetted.

* Some of the leaves and bracts more than once pinnately parted, that is their primary divisions incised or parted.

+ Herbage very glandular-viscid and unpleasantly aromatic-scented: stamens included in the throat of the corolla, commonly unequal in length and slightly so in insertion: ovules and seeds 8-12 in each cell:

N. squarrosa H. & A. Bot. Beech. 368. *Gilia squarrosa* Gray. Very glandular-viscid: stem rather stout and rigid, 3-12 inches high, simple or much branched: leaves twice pinnatifid, or pinnately parted and the divisions either parted or incised; upper ones and bracts spinulent: lobes of the calyx subulate and spinescent-tipped, mostly entire, longer than the tube: corolla blue to whitish, 4-6 lines long, with slender tube and funnellform throat, but little surpassing the calyx: capsule ellipsoid, inclined to be stipitate. Common on plains and along roadsides, western California and Oregon to Brit. Columbia.

+ + Herbage neither viscid nor glandular: stamens exerted out of the throat of the corolla, at length mostly equalling the lobes: ovules 1-4 in each cell.

N. stricta. Stem strict, 4-6 inches high, divaricately branched above: leaves few, bipinnate, the divisions all spinose: bracts similar to the leaves,

white-pubescent: calyx pubescent, the teeth all spinose-tipped and toothed, very unequal: corolla pale blue, with filiform tube and funnelform throat; not exceeding the bracts: stamens about equalling the oblong corolla-lobes: capsule obovoid few-seeded: seeds winged. Southwest Oregon.

N. intertexta Hook. Fl. ii, 72. *Gilia intertexta* Steud. Neither viscid nor glandular: stem erect, simple or widely branched, 4-8 inches high, rather stout; leaves nearly glabrous with divaricate acerose spinescent divisions sparingly divided or simple: flowers densely glomerate: tube of the calyx and base of the bracts strongly villous with white spreading hairs; its unequal spinescent and entire lobes equalling the white corolla: ovules and seeds 3-4 in each cell. In damp places, Brit. Columbia to California and the Rocky Mountains.

N. Suksdorfii. Low and depressed, or erect, 1-3 inches high, much branched; leaves linear, an inch or two long, entire or with a pair or two of linear lobes near the base, not spinose: flowers in dense globular heads, the subtending bracts bipinnate with spinose lobes: lobes of the calyx shorter than the cylindraceous tube, which is but slightly contracted at the sinuses; the smaller ones entire: corolla white, barely exceeding the calyx: stamens as long as the corolla: capsule very thin, 3-seeded: seeds oblong. Low grounds, Falcon Valley, Klickitat Co. Washington. Distributed by Mr. Suksdorf. as *Gilia minima*, from which it differs in its dense heads and 3-lobed calyx-teeth.

N. minima Nutt. Pl. Gamb. 160. Depressed, often forming broad tufts, $\frac{1}{2}$ -2 inches high glabrate: leaves acicular with simple and few divisions: flowers in small loose heads the subtending bracts spinosely pinnate: tube of the calyx white-hairy in the broad sinuses, as long as the spinose entire lobes which equal or exceed the white corolla: ovules 1-3 in each cell: capsule oblong-obovate, attenuate below. Interior of Oregon and Washington to Arizona and Nebraska.

N. Breweri Greene l. c. 137, *Gilia Breweri* Gray, Erect or at length much branched and diffusely spreading, 1-10 inches high, very minutely glandular-puberulent throughout: leaves with mostly simple acicular-subulate divisions: flowers in lax glomerules; the subtending bracts similar to the leaves: tube of the calyx a line long, 2 or 3 times shorter than the unequal entire lobes: corolla yellow, the slender tube equalling the calyx: stamens and style equalling the oblong corolla-lobes: ovules 1 or 2 in each cell. Southeastern Oregon to Wyoming, Nevada and California.

N. leucocephala Benth, Pl. Hartw. 160. Glabrous except some woolly pubescence at the summit of the stem and scarious calyx-tube: stem slender, 4-10 inches high, seldom rigid: leaves soft, their often simple divisions slender-spinulose: flowers in rather small heads, the subtending bracts with barely pungent divisions: calyx-tube contracted at the sinuses, about equalling the subulate entire lobes: corolla white, longer than the calyx: stamens exserted: ovules 2 in each cell. In wet places, southern Oregon to California

* * Leaves simply pinnatifid or incised or many of them entire.

N. divaricata Greene l. c. *Gilia divaricata* Torr. Stem slender, 1-6 inches high divaricately branched not glandular-viscid but glabrate: leaves slender and filiform, or the upper with acerose divisions and passing into the bracts of the small heads which are palmately 3-5-cleft: calyx woolly-pubescent; the scarious tube much shorter than the unequal entire lobes: corolla rather slender, 3-4 lines long; the slender tube about equalling the calyx-teeth: stamens included: ovules 5-7 in each cell. Washington to California, in the high mountains.

N. atractylroides H. & A. Bot. Beech. 368. Pubescent and very viscid:

rather stout 6-8 inches high, very rigid, especially the leaves and bracts; these lanceolate or the uppermost ones ovate, all pinnatifid and with divaricate subulate-spinose lobes: flowers glomerate: calyx cylindraceous with unequal, entire or 3-cleft, pungent teeth: corolla purple about twice the length of the calyx; ovules 6 or 7 in each cell. On dry ridges, southwest Oregon to California.

6 HUGELIA Benth. Bot. Reg. 1652.

Low floccose-lanate plants with narrow or narrowly lobed alternate leaves and blue or white flowers in leafy-bracted terminal glomerules. Calyx densely woolly, 4-5-lobed, with acerose or subulate and cuspidate or pungent lobes. Corolla salverform; with ovate or oblong lobes. Filaments filiform, exserted: anthers deeply sagittate. Seeds few in each cell.

H. floccosa. *Gilia floccosa* Gray. Floccose-woolly, at least when young: stem 2-12 inches high, simple or branched, often diffuse or spreading: lobes of the calyx subulate, unequal, one large and three smaller ones, pungent: corolla yellow with blue or white lobes; its tube 3-4 lines long, surpassing the calyx-lobes: anthers narrowly oblong: seeds 1 or 2 in each cell. Dry plains, southeastern Oregon to California, Utah and Arizona.

7 GILIA Ruiz & Pav. Prodr. Fl. Per. & Chil. 25, t. 4.

Herbs with alternate or opposite simple or compound leaves and various inflorescence. Calyx campanulate or tubular, 5-toothed or 5-cleft, the sinuses usually scarious. Corolla funnelform or salverform, or sometimes campanulate or nearly rotate, regular. Stamens equally or unequally inserted in the tube or in the throat of the corolla: the mostly slender filaments sometimes unequal in length. Ovary oblong or ovoid, 3-celled with solitary or several ovules in each cell. Seeds 1-10 in each cell, usually developing mucilage, and often spiral threads, when wetted.

* Bracts and calyx-lobes commonly cuspidate or aristulate, and pubescent with long and many-jointed somewhat viscid hairs: flowers capitate-congested or sometimes more loosely cymose.

G. congesta Hook. Fl ii, 75. White-pubescent throughout: root perennial: stems erect or spreading, 3-12 inches long from a tufted base, bearing simple terminal, or few and corymbose capitate cymes: leaves mostly petioled, $\frac{1}{2}$ -2 inches long, pinnately divided into 3-9 narrowly linear mucronate divisions, or the uppermost entire: calyx campanulate; with very short tube and oblong cuspidate-pointed lobes: corolla white, with oval lobes nearly as long as the tube, which does not exceed the calyx-lobes: filaments short, at length as long as the anthers: ovules 1-4 in each cell. Dry plains, eastern Oregon to California and Nebraska.

* * Rather tall biennials with thyrsoid-paniculate inflorescence.

G. aggregata Spreng. Syst. i, 626. Somewhat pubescent: stems erect, 1-4 feet high, leafy, simple, or sometimes loosely branched: leaves thickish, 1-3 inches long, mostly petioled, pinnately parted into narrowly linear mucronulate segments: flowers in a thyrsoid narrow loose or interrupted panicle, sessile, in small mostly short-peduncled clusters: calyx commonly glandular, 3-4 lines long; the campanulate tube about as long as the subulate teeth: corolla from scarlet to pink or white, 12-18 lines long, tubular-funnelform; its lobes ovate or lanceolate, acute or acuminate, 3-4 lines long, widely spreading, soon recurved: stamens inserted in the throat or

below the sinuses of the corolla, not longer than its lobes; filaments slender; anthers short, oblong or oval: ovules numerous in the cells: seeds developing mucilage and spiral threads when wetted. On dry ridges in mountainous districts, California to Brit. Columbia and Nebraska.

* * * Flowers scattered, crowded or rarely capitate-glomerate, inconspicuously bracted or ebractate.

+ Ovules and seeds few or numerous in the cells: stamens inserted in or just below the sinuses: annuals.

++ Corolla more or less funnelform, having a distinct tube.

= Leaves once or twice pinnately parted or cleft: seeds developing mucilage and spiral threads when wetted.

G. capitata Dougl. Hook. Bot. Mag. t. 2698. Nearly glabrous: stem rather slender, usually 1-3 feet high, paniculately branched: leaves 2-3-pinnately divided into slender or even filiform lobes: flowers numerous, in dense capitate clusters terminating long naked peduncles: calyx glabrous or nearly so, the lanceolate acuminate lobes not longer than the campanulate tube: corolla blue to white, 4-5 lines long; its tube about as long as the narrowly oblong or lanceolate-linear lobes: stamens inserted in the very sinuses of the corolla and equalling its lobes: anthers elliptical. Common in open places and fields, California to Brit. Columbia.

G. achillæfolia Benth. Bot. Reg. 1622. Somewhat pubescent: stem rather stout, 1-2 feet high, loosely branched above: leaves once or twice pinnately parted into linear lobes: flowers numerous, in dense capitate clusters terminating long peduncles: calyx pubescent; its ovate almost spinose-tipped lobes longer than the tube: lobes of the blue corolla obovate or broadly oblong; its throat abruptly and amply dilated: stamens inserted in the sinuses of the corolla and about equalling its lobes. Western California and Oregon to Brit. Columbia.

G. inconspicua Dougl. Hook. Bot. Mag. t. 2883. Viscid, and usually with slight woolly pubescence when young: stem stoutish, 4-12 inches high, branching from the base: leaves mostly pinnatifid or pinnately parted, or the lowest bipinnatifid with short cuspidate lobes, the upper becoming small, subulate and entire: flowers somewhat crowded and subsessile, or at length loosely paniced and some of them slender-pediceled: calyx 2 lines long, the short subulate teeth not half as long as the tube: corolla narrowly funnelform, with proper tube shorter or slightly longer than the calyx: seeds several in each cell. Dry hillsides and sandy plains, California and eastern Oregon to Brit. Columbia and the Rocky Mountains.

Var. sinuata Gray Proc. Am. Acad. viii, 278. Corolla becoming thrice the length of the calyx, with the tube more exserted, with the throat and lobes more ample. Dry plains, eastern Oregon to California and N. Mex.

= = Seeds destitute of mucilage and spiral threads when wetted.

G. gracilis Hook. Bot. Mag. t. 2924. Stem stout, simple, or at length corymbosely much branched and spreading. 2-10 inches high: leaves linear or the lower ones obovate to lanceolate, entire, sessile, the lower ones mostly opposite, 4-10 lines long: calyx rounded at base, deeply cleft, with strongly carinate subulate lobes: corolla about 5 lines long, purple or violet, the slender tube yellowish, and seldom longer than the calyx: seeds flat and somewhat winged. Common in open places, Brit. Columbia to California and Nebraska.

G. leptomeria Gray l. c. Somewhat glandular-viscid: stem 6-12 inches high: leaves mainly radical, oblong or broadly lanceolate, incisedly toothed or sinuate-pinnatifid the obtuse teeth or lobes minutely cuspidate; the cauline small and reduced upward to the subulate bracts of the oper