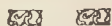


Repertorium specierum novarum regni vegetabilis.

Herausgegeben von Professor Dr. phil. Friedrich Fedde.



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A Revision of Hedeoma

with

A Review of Allied Genera

by

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Within the *Labiatae* lies a group of genera which are heterogeneous in some respects but nevertheless of close interrelationship. They are predominantly cordilleran (in the Western Hemisphere) or mediterranean. While they have been variously treated, their taxonomic disposition has been largely around *Satureja* on the one hand, and *Melissa* on the other, depending upon the number of stamens.

As a whole they are characterized by an herbaceous or fruticose habit, small flowers which tend to be disposed in axillary verticils rather than in spikes or heads, a tubular calyx with usually 13—15 veins, the teeth being for the most part relatively short although sometimes drawn into subulate tips, and usually bilabiate. An annulus of erect hairs is commonly present at the base of the teeth. The corolla tends to be funnelform and usually dilated, sometimes abruptly, beyond the point at which the stamens are seated. A hairy annulus may close the corolla tube. The corolla is always clearly bilabiate, the upper lip being frequently entire or merely notched, rarely galeate. The stamens are 4 and didymous, or 2, in which case the upper pair is abortive or vestigial. The filaments are mostly glabrous and tend to ascend toward or under the upper lip, which rarely encloses them. They are usually somewhat exserted, but may be contained within the tube. The anthers are rather variable. The connective may be slight, the anther-sacs then being either divaricate or, more commonly, parallel, or may be well developed and conspicuous, the anther-sacs then being usually widely divaricate and sometimes widely separated. In one genus (*Zizyphora*) one anther-sac may have aborted in various degrees. The stamens are usually more or less equally exserted and are commonly adnate in pairs along the margins of the divaricate anther-sacs. The style is usually glabrous, rarely hispidulous, and is unequally and shortly branched (? the upper branch sometimes aborted).

The difficulties inherent in this group were clearly recognized by Bentham, as is shown by his note to the genus *Micromeria*: „This genus is very closely allied to *Satureja* and to *Melissa*. It differs from the former by the nervation and form of the calyx, and by the stamina, which are more distinctly ascending in pairs. From *Melissa* it scarcely differs excepting in the calyx, which is less distinctly bilabiate. The sections *Piperella* and *Hesperothymus* have also a very different habit from that of *Melissa*; the *Pseudomelissae*, however, in this respect resemble *Melissa*, but with the calyx of *Micromeria*. These sections are natural and distinct in habit, but it appears difficult to assign characters sufficiently im-

portant to distinguish them as genera.“¹⁾ And again in a note to *Hedeoma*: „It scarcely differs from *Micromeria*, except in the abortion of the upper stamina.“²⁾

These difficulties were no less apparent to Briquet, who took a view somewhat different from that of Bentham. In a note to *Hedeoma* he said: "Die Unterscheidung von *Hedeoma*, *Keithia* und *Poliomintha* (which with *Eriothymus* Briquet united with *Hedeoma*) als Gattungen, wie sie von Bentham und A. Gray angenommen worden ist, verträgt sich nicht mehr mit dem jetzigen Zustand unserer Kenntnisse. *Hedeoma* unterscheidet sich lediglich von *Keithia* durch die eingeschlossene Blumenkronenröhre, während dieselbe bei *Keithia* lang exsert ist. Derartige Unterschiede, welche mit einer Anpassung an die Befruchtung durch langrüsselige Schmetterlinge zusammenhängen, finden sich aber innerhalb zahlreicher Labiatengattungen. Überdies machen jetzt zwischen beiden Gattungen manche Arten die Brücke (z. B. *Hedeoma tenella* Hemsl., Habitus von *Hedeoma*, Blkr. 3 mal länger als der Kelch!). *Poliomintha* ist durch keinen deutlichen Character von den beiden vorigen abzugrenzen; namentlich findet man bei Arten von *Hedeoma* Spuren der Staminodien, welche für *Poliomintha* charakteristisch sein sollen.“³⁾

And further in a note to *Satureja*: "Bentham hat in der Unterscheidung der Gattungen bei den *Melissinae* einen Maßstab angewandt, wie nirgends in den übrigen Abteilungen der Familie. Hätte er nach denselben Principien seine *Monardeae*, *Ajugeae* und *Ocimeae* behandelt, so wären Gruppen wie *Salvia*, *Teucrium* und *Hyptis* in zahlreiche Gattungen zersplittert worden, welche zum mindesten besser gegen einander abgegrenzt gewesen wären, als z. B. *Micromeria*, *Satureia*, *Gardoquia* und *Calamintha*. Hat man aber einmal beschlossen, welche Principien man bei Gattungsunterscheidungen in einer Familie anwenden will, so muß man sich doch dabei logisch halten. Nun gehört zu den wichtigsten, von Bentham auch angenommenen dieser Principien, daß durch allmähliche Übergangsreihen verbundene Sippen in eine Gattung vereinigt werden müssen. Es ist leicht einzusehen, daß, wenn man nachher derartig konstruierte systematische Sippen in verschiedene Gattungen losreißt, man dem Leser ganz falsche Ideen über den jetzigen Zusammenhang der unterschiedenen Gruppen gibt.“⁴⁾

It is true that the genera outlined above offer many transitional forms one to the other as suggested by Bentham and Briquet. The latter has stated the dilemma but has etched its contours too sharply. The fact that no single constant point of difference may be brought forward wherewith to distin-

¹⁾ Bentham, Lab. Gen. et Sp. 369. 1834.

²⁾ Ibid. p. 366.

³⁾ Briquet in Engler u. Prantl, Die Nat. Pflanzenf. IV. 3a. 294. 1897.

⁴⁾ Ibid.

guish *Hedeoma* and *Poliomintha* is not presumptive of their unity. At the same time, it does not follow that since both genera have only two stamens (a clear point of difference) they are therefore quite separable from *Satureja*. It is conceivable and I think probable, that they were derived from different points within *Satureja* (sensu latiore). It is entirely possible that *Poliomintha* may be closer to some forms of *Satureja* than to any of the species of *Hedeoma*. Indeed, *Hedeoma*, even as limited here, may possibly have had a diverse origin.

Again, it is not simply a question of the "lumping" or "splitting" of units which have equal value. These units (that is, the species groups or genera) do not have equal value but vary in content according to the degree to which speciation has advanced, as well as the nature of the evolutionary processes at play. The word unit is itself misleading. The units of measurement are of necessity quantitative and are arbitrarily chosen. The relationship between a meter and a millimeter is fixed. The "units" of taxonomy are qualitative, and the relationship between a genus and its species is in no wise analogous with the first mentioned. This fact is frequently lost sight of.

If one wishes to portray probable relationships it is not only impossible but undesirable to apply to a given family a preconceived "principle" or "rule" for segregation of genera. Each case must order its own procedure, and one sometimes finds it difficult to be logical or at any rate to remain consistent in his dispositions, in the degree to which characters have been interchanged between groups.

The genera cited for comparison by Briquet do not pertain to those under consideration here and his comparison is not valid. While it is true that both *Hyptis* and *Salvia* sect. *Calosphace* are extensive groups, nevertheless they impress one with a natural unity. The categories into which both may be subdivided suggest closely related species-groups derived by fragmentation of previously existing species. The lines which separate these groups are tenuous but sharp. It is otherwise with the *Saturineae-Melissineae*. These are generic groups which suggest a much more confused and diverse ancestry, doubtless polyphyletic, perhaps through hybridization. Or they might suggest the earlier stage, whatever its previous history, through which *Salvia* and *Hyptis* have passed, the species of *Hedeoma*, for example, being the ancestral forms of as yet unformed species-groups.

As stated above, these genera are largely cordilleran in the Western Hemisphere or are mediterranean. The senior author has thus far studied only the former. In treating the group for South America he followed Briquet's suggestion in combining *Satureja*, *Micromeria* and *Gardoquia*, for no very clear line of cleavage presented itself. In studying the genera characterized by two stamens, referred by Briquet to *Hedeoma*, *Glechon* and *Cunila*, he perceiv-

ed more and more that Bentham's observation concerning *Micromeria* had equal force here: "These sections are natural and distinct in habit, but it appears difficult to assign characters sufficiently important to distinguish them as genera." But in view of these facts and the fact that a polyphyletic origin in the four-stamen groups seems certain, he preferred to "split" these genera even further. Accordingly he recognized not only *Glechon*, *Cunila* and *Hedeoma*, but *Eriothymus*, *Keithia* and *Rhabdocaulon* and established a seventh genus, *Hesperozygis*. The desirability of this course has been further impressed upon him after a joint study of the North American genera and species with the junior author. It seems not improbable that further study of the four-stamen groups, particularly the Mediterranean forms, may show the desirability of joining, for example, some parts of *Hedeoma* with *Satureja* or with *Micromeria* as Bentham indirectly suggested.

The present study limits itself to the genera with two stamens which are found in the new world together with a fragmentary study of *Ziziphora*, a Mediterranean genus closely allied to *Hedeoma*. The South American genera are treated in outline only, since more complete descriptions of them have appeared or will appear in a series of regional papers.

A Key to the Genera Considered

- 1 a Lower anther sacs completely or partially aborted; calyx teeth connivent and subequal, narrowly deltoid; wiry herbs, annual or perennial. *Ziziphora*
- b Lower anther sacs not at all aborted: 2.
- 2 a Upper lip of the corolla manifestly longer than the lower, rarely subequal, more or less galeate, falcate, and enclosing the stamens. *Glechon*
- b Upper lip of the corolla shorter than the lower, less often equal, sometimes laterally reflexed or folded but essentially plane, not enclosing the stamens: 3
- 3 a Stamens exerted from the middle of the corolla tube and clearly exceeding the upper lip, not ascending against or toward it; corolla tube rarely more than 5—6 mm long. *Cunila*
- b Stamens ascending against the upper corolla lip, rarely included in the tube, usually somewhat longer than the upper lip; corolla tubes usually longer: 4
- 4 a Calyces and calyx teeth wholly glabrous within, not at all annulate, sparsely pilose-setose without, chiefly on the veins and margins (ciliolate in *H. minima*); corolla tubes glabrous within; stems with elongate marginate internodes, thinly setose. *Hoehnea*
- b Calyx teeth and the orifice either pubescent within or hirsute-annulate, the teeth rarely wholly glabrous, being

hispid-ciliolate on the margins if not hirtellous on the inner surfaces; corolla tubes usually retrorsely hirtellous within or more or less strongly annulate: 5

- 5a Calyx teeth sparingly hirsute on the inner surfaces and ciliate on the margins, the orifice scarcely annulate however; corolla tubes glabrous within, the limb half the length of the tube which is gradually enlarged upward; shrubs of Rubiaceous habit with subentire leathery shingling leaves. *Eriothymus*
- b Calyx teeth either hispid-ciliate on the margins but otherwise often glabrous, or hirtellous with soft hairs at least within, the orifice clearly hirsute-annulate (weakly in two species of *Rhabdocaulon*, three species of *Hedeoma* and in *Stachydeoma*) 6
- 6a Herbs with trailing rootstocks and erect, sparingly branched stems, the internodes of which are obviously marginate and elongate, often exceeding the narrow leaves, glabrous or variously pubescent but not setose, the nodes usually constricted. *Rhabdocaulon*
- b Annual or perennial herbs or small shrubs, the annual stems frequently arising from a woody caudex but rarely (*Stachydeoma*) from a trailing rootstock, the stems not materially margined nor the internodes materially elongate: 7
- 7a Perennial herbs suggesting the habit both of *Hoehnea* and *Rhabdocaulon* with erect stems from a woody caudex or sometimes trailing rootstock, glandular puberulent with stalked and sessile glands in the upper parts and setose; calyx limb subequal to the campanulate tube, the upper teeth joined above the middle, the lower subulate; annulus sparse; anther sacs separate and parallel. *Stachydeoma*
- b Perennial herbs with wiry usually numerous stems arising from a woody caudex, annual herbs or small shrubs, never glandular, setose only in *Rhododon*, calyces tubular, the tube materially shorter than the limb or if about equal, strongly annulate and more or less constricted; anther sacs divaricate and approximate: 8
- 8a Annual herbs more or less dichotomously and divaricately branched with sessile or subsessile glabrate leaves which are strongly setose on the margins; cymules several flowered, crowded into interrupted or compact spikes, calyx tubes strongly setose, the teeth ciliolate with the same hairs as in the annulus, subequal, about as long as the tube; corolla tube strongly annulate. *Rhododon*
- b Perennial herbs (annual in *Hedcoma pulegioides*, *hispidum* and *acinoides*) or small shrubs, sometimes hispid

but scarcely setose; flowers infrequently spicate; calyx tubes clearly longer than the teeth, or if equal, the plants shrubby, the teeth erect or recurved; corolla tube glabrous or hirtellous within, or if annulate, the plants shrubby: 9

- 9a Calyx teeth similar, hirtellous within or softly ciliolate on the margins, deltoid-lanceolate or somewhat acuminate, subequal, erect and parallel, not closing the orifice, the upper not at all reflexed, strongly annulate below the base, the annulus at or near the middle of the calyx, which is constricted at its base; corollas hirtellous within the tube; small shrubs or fruticulose herbs. *Hesperozygis*
- b Calyx teeth similar, hirtellous within, deltoid-lanceolate, subequal, erect and parallel or connivent, the upper not at all reflexed, strongly annulate at the base of the lower teeth, the annulus well above the middle of the tube which is not constricted; corollas strongly annulate toward or below the middle of the tube; small shrubs. *Poliomintha*
- c Calyx teeth dissimilar, the upper tending to be deltoid (joined more or less up to the middle), and usually reflexed, (connivent in *H. multiflorum*, *Drummondii* and *Reverchoni*) the lower subulate (see *H. floribundum*, however) usually longer than the upper, hispid-ciliate along the margins, the annulus usually well developed at the base of the lower teeth and visible; corollas hirtellous within; herbs with wiry stems, infrequently fruticulose. *Hedeoma*.

Cunila L.

Cunila L., Sp. Pl. ed. 2. 30. 1762, Pl. III, L, a—c), (Pl. III, a—c), based upon three species of which *C. mariana* may be considered the type.

Half-shrubs or decumbent herbs with more or less pubescent branches, the pubescence branched in *C. incana*; leaves varied, tending to be ovate-lanceolate or oval, less often obovate or ovate, medium sized or small, petioled or sessile, entire or obscurely serrate, more or less pubescent; cymules 1-several-flowered, sessile or shortly pedunculate, disposed in the axils of undiminished leaves or in the axils of bracts, thus forming interrupted or continuous usually slender spikes or even terminal capitula; calyces usually 13-veined, tubular or turbinate, the teeth deltoid to subulate, erect, equal to the tube or shorter, the lower somewhat longer, the upper somewhat joined at the base, definitely annulate within although not markedly constricted, the annulus seated at the base of the lower teeth (somewhat lower in *C. menthoides*, nearly wanting in *C. incana*), either puberulent or glabrous throughout or ciliolate on the margins and otherwise glabrous (*C. microcephala*, *spicata*, *menthiformis*); corolla small, the upper lip erect, usually

notched, about equalling the lower lip or shorter, the tube pubescent within, especially at the base of the stamens; stamens seated near or somewhat above the middle of the tube, ascending from the orifice and not appressed to the upper lip, clearly exceeding it, connective variously developed, the anther sacs usually divergent, or parallel, contiguous or separated; style glabrous. Ranges from the eastern United States to eastern Argentina, being principally Brazilian.

A genus of considerable diversity, having only the corollas in common, distinguished by the nature of stamen exertion. Perhaps heterogeneous and better referred to other 4-stamen genera, at least in part. A review of this genus will follow.

Glechon Spreng.

Glechon Spreng., Syst. IV. Cur. Post. 227. 1827, based upon a single species, *Glechon thymoides* (Pl. II, F, a—c).

Perennial rather small leafy herbs, sometimes fruticulose, with usually appressed-hirtellous branchlets (with secondary spreading setae in *G. ciliata* and *Hoehneana*, the latter glandular as well); leaves commonly ovate or rotund-spatulate and appressed-hirtellous or ovate, being then glandular and ciliate, or elliptical and ciliate, sessile or shortly petiolate, entire or rarely obscurely toothed; cymes 1-several flowered, sessile in the axils of foliage leaves; calyces 13-15-veined, turbinate, the teeth subequal, erect or somewhat spreading, deltoid or deltoid-subulate, the lower sometimes slightly longer, all annulate at the base and puberulent or hirtellous, scarcely ciliolate; corolla tubes ample, abruptly expanded without the calyx and saccate below the lower lip in section *Incanae*, hairy within the sac and more or less hairy or annulate at the base of the stamens or within the contracted portion of the tube, the upper lip about equal to the tube, galeate and falcate, subequal to the lower lip or longer; stamens seated below the middle of the tube, within the sac or at the annulus, geniculate at the base and hairy, ascending under the galea and included within it; the connective well developed, the anther sacs being divergent or parallel; style glabrous. — Found in Brasil, Uruguay, Paraguay and contiguous Argentina.

Sect. *Cordatae* Epl. in Rep. Spec. Nov., Beiheft 85: 143 1936. based upon *G. Hoehneana* (Pl. II, F. b).

Perennial herbs with ascending stems and subcordate rather leathery clasping leaves; corolla tube ample without the calyx but scarcely saccate.

1. *Glechon Hoehneana* Epl. (Pl. II, F. b). — Brasil: Sao Paulo.

Sect. *Ciliatae* Epl., loc. cit., based upon *G. ciliata*. (Pl. II, F. c).

Small perennial herbs with several stems ascending from a woody caudex, more or less villous, the leathery leaves more or less setose with spreading hairs.

2. *Glechon ciliata* Benth. (Pl. II, F. c). — Brasil: Minas Geraes, Sao Paulo, Rio Grande do Sul; Paraguay; Uruguay; Argentina: Misiones.

var. *organifolia* (Benth.) Epl. — Brasil: Minas Geraes.

Sect. *Incanae* Epl., loc. cit., based upon *G. thymoides*. (Pl. II, F. a).

Small leafy shrublets incanous with minute hairs, their leaves usually rotund-spatulate; flowers commonly solitary in the axils; corolla tubes more or less saccate without the calyx.

3. *Glechon marifolia* Benth. (Pl. II, F. c). — Brasil: Minas Geraes, Santa Catharina, Rio Grande do Sul; Uruguay; Paraguay.

4. *Glechon spathulata* Benth. — (Pl. II, F. a). — Brasil: Rio Grande do Sul.

5. *Glechon thymoides* Spr. (Pl. II, F. a). — Brasil: Rio Grande do Sul.

6. *Glechon discolor* Epl. (Pl. II, F. b). — Brasil: Santa Catharina.

Hoehnea Epl.

Hoehnea Epl. gen. nov. based upon *Keithia* Benth., loc. cit. (not Spreng. 1822). — (Pl. III, F. k). — *Keithia* sect. *Keithia* Benth., Lab. Gen. et Sp. 409. 1934, based upon two species of which I consider *K. scutellarioides* the type species. — *Hedeoma* sect. *Keithia* Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1., IV. 3a. 294. 1897.

Perennial herbs with trailing rootstocks; stems with elongate internodes and margined angles; leaves thickish, sessile, broadest at the truncate base, essentially glabrous but setose-ciliate or (*H. minima*) ciliolate; cymules 1-3 (or more) flowered, in the axils of foliage leaves which are but little diminished; calyces setose-ciliate (*H. minima* ciliolate) chiefly along the veins, otherwise quite glabrous inside and out, the tube 5-angled, 10-13-veined, oblique, clearly bilabiate, the teeth deltoid-lanceolate, equalling the tube, the upper longer than the lower, tending to flare at maturity; corolla tube naked within, the upper lip erect, shorter than the lower; stamens seated close to the middle of the tube at base of expanded portion, about equalling the upper lip, the connectives well developed, the anther-sacs widely divergent and usually widely separate; style glabrous. — (Pl. III, K).

Chiefly Brazilian, extending into contiguous Paraguay and Argentina.

1. *Hoehnea scutellarioides* Epl. comb. nov. — *Keithia scutellarioides* Benth., Lab. Gen. et Sp. 410. 1834. — *K. pilosa* Benth., loc. cit. p. 410. — *K. scutellarioides* var. *pilosa* Schmidt in Martius, Fl. Brasil, 8:172. 1858. — *Hedeoma scutellarioides* Briq. in Engler u. Prantl, Die Nat. Pflanzenf. ed. 1, IV. 3a. 294. 1897. — Brasil: Minas Geraes, Sao Paulo, Parana.

2. *Hoehnea epilobioides* Epl. comb. nov. — *Keithia epilobioides* Epl. in Rep. Spec. Nov. Beiheft 85:131. 1936. — Brasil: Parana, Rio Grande do Sul; Paraguay.

3. *Hoehnea parvula* Epl. comb. nov. — *Keithia parvula* Epl., loc. cit. — Brasil: Parana.

4. *Hoehnea minima* Epl. comb. nov. — *Keithia minima* Schmidt in Mart., Fl. Bras. 8: 173. 1858. — Brasil: Minas Geraes, Sao Paulo, Parana; Argentina: Chaco.

Eriothymus Schmidt.

Eriothymus Schmidt in Mart., Fl. Brasil 8: 171. t.32. f.2. 1858, based upon *E. rubiaceus*. (Pl. III, F. h). — *Keithia* sect. *Eriothymus* Benth., Lab. Gen. et Sp. 410. 1834. — *Hedeoma* sect. *Eriothymus* Briq. in Engler u. Prantl, Nat. Pflanzenf., ed. 1, IV. 3a. 294. 1897.

Shrubs of Rubiaceous habit with margined angles and pubescent branches; leaves leathery, ovate, subsessile, glabrous and glistening; cymules 3-flowered, disposed in the axils of more or less reduced leaves; calyx tube about twice the length of the lips, pilose, 13-15-veined, the upper lip somewhat longer, the teeth of which are erect, connate to the middle and sparingly hirsute within but scarcely annulate, their margins pilose; corolla tube glabrous within, the limb half as long as the tube which is gradually enlarged upward, the lower lip somewhat longer than the upper, the upper notched almost to the base; stamens seated between the middle of the tube and the orifice, the anther sacs subparallel, the connective slight; style glabrous.

A single Brazilian (Minas Geraes) species: *Eriothymus rubiaceus* (Benth.) Schmidt (*H. rubiacea* Briq., loc. cit. *Keithia rubiacea* Benth., loc. cit.). — Pl. III, H).

Rhabdocaulon Epl.

Rhabdocaulon Epl. in Rep. Spec. Nov., Beiheft 85: 134. 1936; the type species is *R. denudatus*. — (Pl. I, E). — *Keithia* sect. *Rhabdocaulon* Benth., Lab. Gen. et Sp. 411. 1834. — *Keithia* sect. *Gymnocylix* Benth., Lab. Gen. et Sp. 412. 1834. — *Hedeoma* sect. *Rhabdocaulon* et *Gymnocylix* Briq. in Engler u. Prantl, Nat. Pflanzenf. ed. 1, IV. 3a. 295. 1897.

Perennial herbs with trailing rootstocks and erect sparsely branched stems which are strongly margined on the angles, glabrous or pubescent but not setose,

the nodes constricted, the internodes elongate; leaves linear, linear-lanceolate or lanceolate, sessile, entire, acute; cymules 3-6-flowered or more (1-3 in *R. coccineus*), disposed in the axils of reduced leaves or bracts and usually in interrupted or cylindrical often pedunculate spikes; calyces 13-veined, hispidulous or hirtellous, even appressed-silky, the lips never more than half the length of the tube, usually much less, the teeth spreading, more or less hirtellous or glabrate, hispidulous along the margins in *R. coccineus* and *R. strictus*, the lower teeth equal to or longer than the upper, the upper joined only at the base, infrequently to the middle, the tube annulate at the base of the teeth but weakly so in *R. coccineus* and *R. strictus*, forming more or less of a constriction at the base of the annulus in the other species; corolla tube gradually expanded, glabrous within or retrorsely hirtellous, the upper lip half as long as the tube or less, equalling the lower lip or less; stamens about equalling the upper lip, seated generally toward the middle but below in *R. coccineus*, anthers divaricate, the connective well developed. Chiefly Brazilian herbs, two species extending into Paraguay, Uruguay and contiguous Argentina.

Sect. *Gymnocylis* Epl., based upon *R. coccineus*. — *Keithia* sect. *Gymnocylis* Benth., Lab. Gen. et Sp. 412, 1834. — *Hedeoma* sect. *Gymnocylis* Briq. in Engler u. Prantl, Nat. Pflanzenf., ed. 1, IV, 3a. 295. 1897.

Herbs intermediate with *Keithia* in respect to habit, with the flowers more like those of *Eriothymus*. Readily distinguished from all allied species by the red corolla, the tube of which is 20-25 mm long. The verticils are interrupted-spicate but very lax. The stamens are seated below the middle of the tube and the annulus of the calyx is weak and the orifice is not constricted; calyx teeth narrowly deltoid.

1. *Rhabdocaulon coccineus* (Benth.) Epl.¹⁾ (*Hedeoma coccinea* Briq., loc. cit.). — Brasil: Rio de Janeiro, Minas Geraes.

Sect. *Rhabdocaulon* Epl., based upon *R. denudatus*. — *Keithia* sect. *Rhabdocaulon* Benth., Lab. Gen. et Sp. 411. 1834. — *Hedeoma* sect. *Rhabdocaulon* Briq. in Engler u. Prantl, Nat. Pflanzenf. ed. 1, IV, 3a. 295. 1897.

More or less denudate herbs with elongate internodes, the flowers in more or less compact cylindrical spikes; calyx orifice strongly hirsute-annulate within and constricted, the teeth hirtellous and tending to spread, subulate.

2. *Rhabdocaulon denudatus* (Benth.) Epl. (*Hedeoma denudata* Briq., loc. cit.). — Brasil: Minas Geraes, Goyaz, São Paulo.

3. *Rhabdocaulon gracilis* (Benth.) Epl. (*Hedeoma gracilis* Briq., loc. cit.). — Brasil: São Paulo, Parana, Rio Grande do Sul.

¹⁾ For full synonymy see Fedde, Rep., Beih. 85 p. 134-137.

4. *Rhabdocaulon stenodontus* (Briq.) Epl. (*Hedeoma stenodonta* Briq.). — Brasil: Santa Catharina, Rio Grande do Sul; Paraguay; Argentina: Chaco.

5. *Rhabdocaulon erythrostachys* Epl. — Brasil: Parana.

6. *Rhabdocaulon lavanduloides* (Benth.) Epl. (*Hedeoma villosa* var. *lavanduloides* Briq. in Engl. u. Prantl, op cit.). *R. lavanduloides* var. *villosus* (Benth.) Epl. (*Hedeoma villosa* Briq., loc. cit.). — Brasil: Minas Geraes, São Paulo, Parana.

Sect. *Cuniloides* Epl. based upon *R. strictus*.

Herbs similar in habit to sect. *Rhabdocaulon* the calyces more suggestive of *Cunila*, glabrate, the teeth aristate, hispidulous along the margins, weakly annulate.

7. *Rhabdocaulon strictus* (Benth.) Epl. (*Cunila stricta* Benth., Lab. Gen. et Sp. 362, 1834). — Brasil: Rio Grande do Sul; Uruguay; Argentina; Corrientes, Misiones.

Stachydeoma Small.

Stachydeoma Small, Fl. Southeastern U. S. 1040, 1337, 1903, based upon *Hedeoma* sect. *Stachyhedeoma* Gray, loc. cit. — *Hedeoma* sect. *Stachyhedeoma* Gray in Proc. Am. Acad. 8: 367. 1873, based upon *H. graveolens* and *H. ciliata*. The name was amended to *Stachydeoma* in the Syn. Fl. 2: 363. 1878. Since neither Gray nor Small have indicated a type species I have arbitrarily designated *H. graveolens* (Pl. III, J), as being more nearly like *Hedeoma*, this in accord with a suggestion from Dr. Small.

Herba perennis habitu modo ad *Rhabdocaulon* modo ad *Keithiam* spectans suffruticosa caulibus paucis gracilibus erectis e caudice lignoso vel rhizomata repente superne ramosis et pilis minutis capitatis et glandulis sessilibus glandulosis etiam longioribus setaceis sparse ornatis; foliorum laminis ovatis vel rotundato-ovatis subsessilibus subintegrifolius utrimque glandulosis et ad margines setosis; cymulis 1-floribus in foliorum deminutorum axillis anguste spicatis; calycum tubo companulato 13-veinis glanduloso et setoso, dentibus inferioribus subulatis setosis superioribus ad medium et ultra connatis ambobus tubum subaequantibus in basi sparse hirsuto-annulatis; corollarum tubo vix ampliato intus hirtello, labia superiore concava leniter arcuata quam inferior brevior; staminibus in faucibus positibus labium superiorem paulo superantibus, antheris subparallelis separatis inaequaliter positibus; styli glabri ramo postico subnullo.

1. *Stachydeoma graveolens* Small, Fl. Southeastern U. S. 1041, 1337. 1903, based upon the following (Pl. III, J). — *H. graveolens* Chapman ex Gray in Proc. Am. Acad. 8: 367. 1873, based upon a specimen collected by Chapman near Apalachicola, Florida; the type is in the U. S. National Herbarium.

Perennial herbs 30-40 cm tall with few erect stems arising from a woody caudex or trailing rootstock, glandular in the upper parts with stalked and sessile glands and more or less setose; leaves ovate to broadly oval, spreading or drooping, 0,5-1,5 cm long, entire or obscurely dentate, usually fringed with ciliate hairs, blunt at the tip, rounded-truncate at the sessile base, often pilose above, usually glabrous but punctate with sessile glands; cymules usually 1-3 flowered, borne in the upper parts of the stems, crowded into slender spikes 5—10 cm long; pedicels not longer than the calyx, puberulent; calyx hardly distended, the tube usually 3 mm long, about one-half as wide, thinly ciliate, the lower teeth more than twice the length of the upper, strict, curving and subulate in form, the upper teeth reflexed, short pointed, joined above the middle; annulus slight, silky, barely exceeding the tube; corolla tube 6-6,5 mm long, hirtellous within.

Florida: pine barrens near Iola, 22.VI.1880, Hoke; low pine barrens on the north side near the mouth of Poorhouse Branch, 4 mi. N.W. of Appalachicola, Chapman.

Hesperozygis Epl.

Hesperozygis Epl. in Rep. Spec. Nov., Beiheft 85: 132. 1936 (Pl. I, F. d), based upon *H. myrtoides*. — Pl. I, D.

Leafy shrubs or fruticose herbs with more or less leathery leaves either ovate or obovate, elliptical-lanceolate in *H. ciliolata*, sessile or shortly petiolate; branchlets puberulent (with branched hairs in *H. marifolia*); cymules sessile or shortly peduncled, 1-3-flowered, disposed in the axils of the upper more or less diminished leaves yet scarcely spicate; calyces appressed-hirtellous or glabrous, 13-15-veined, the teeth similar, subequal, deltoid-lanceolate or acuminate, scarcely subulate, erect and parallel, not closing the orifice, the upper somewhat connate at the base, the tube strongly hirsute-annulate within below the base of the lower teeth and somewhat constricted, the annulus being seated near the middle of the calyx; corolla tube more or less pubescent within, but scarcely annulate unless at the very base, the palate usually hairy in two descending lines, the upper lip more or less erect, notched, about equal to or longer than the lower lip; stamens seated near or somewhat above the middle of the tube, ascending under the upper lip but not exceeding it; anther sacs widely divaricate, the connective well developed; style glabrous or (*H. marifolia*) hirtellous. Brazilian or Mexican plants.

Sect. *Australes* Epl., based upon *H. myrtoides*.

Puberulent or glabrous shrubs with simple hairs, the leaves ovate or obovate; corolla palate pubescent in two decurrent lines; style glabrous.

1. *Hesperozygis nitida* (Benth.) Epl.¹⁾ (*Hedeoma nitida* Briq., loc. cit.). — Brasil: Rio de Janeiro, Minas Geraes.

¹⁾ For full synonymy see Rep. Spec. Nov., Beiheft 85. p. 132—134.

2. *Hesperozygis ringens* (Benth.) Epl. — Brasil: Rio Grande do Sul.

3. *Hesperozygis myrtoïdes* (Benth.) Epl. (*Hedeoma Schwackeana* Glaz. in Bull. Soc. Bot. Fr. 58. mém. 3. 557, 1911; *Hedeoma Itatiaiae* Wawra in Oestr. Bot. Zeitschr. 31: 70, 1881). — Brasil: Rio de Janeiro, Minas Geraes.

4. *Hesperozygis spathulata* Epl. — Brasil: Parana, Santa Catharina.

Sect. *Incanae* Epl., based upon *Hesperozygis marifolia*.

Incanous shrubs much of the habit of *H. myrtoïdes*, the hairs minute and branched, the leaves ovate or obovate, entire; style hirtellous with branched hairs.

5. *Hesperozygis marifolia* Epl. comb. nov. — *Polio-mintha marifolia* Gray in Proc. Am. Acad. 8: 365, 1872, based upon *Keithia marifolia* Schauer, loc. cit. — *Keithia marifolia* Schauer, Linnaea 20: 705, 1847, based upon a specimen collected near Zimapan by Aschenborn (no. 212); I have not seen the type. — *Hedeoma marifolia* Briq. in Engler u. Prantl, Die Nat. Pflanzenf. IV. 3a. 294. 1897, based upon the same.

A small half shrub 20-40 cm high, its branchlets ashy with small branched hairs, the leaf scars prominent; leaves spreading or ascending, oval, 5—15 mm long, entire, thickish, cinereous above, paler and often incanous beneath, both surfaces covered with minute branched hairs, rounded or blunt at the apex, rounded to a petiole about one-third the length of the blade; cymules 1-6 flowered, usually 3; pedicels about 1 mm long bearing a pair of subequal bractlets; calyx tube 4,5—6 mm long, 13-veined, ashy with minute branched hairs, the teeth lanceolate-subulate, usually straight and erect; annulus dense, seated at the middle of the calyx, which is somewhat constricted; corolla tube 8—10 mm long, thinly hispidulous within with short coarse hairs, but scarcely annulate, the lower portion nectariferous.

Mexico: Hidalgo: Zimapan, Coulter 1080; San Luis Potosi: San Jose Pass, 1890, Pringle 3674; San Luis Potosi, 1878, Parry and Palmer 749; Cardenas, 16. X. 1891, Pringle 3915; without locality, XI. 1910, Purpus 4867.

Sect. *Muellerostachys* Epl., based upon *H. ciliolata*.

Small fruticulose herb with numerous stems from a woody caudex much of the habit of *Hedeoma*; leaves elliptical or elliptical-lanceolate, sessile, entire, nicely ciliolate on the margins; flowers solitary in the upper axils.

6. *Hesperozygis ciliolata* Epling & Stewart sp. nov. per specimen in Mexico prov. Nuevo Leon inter Pablillo et Santa Clara ad Galeana a Mueller et Mueller (no. 1062) lectum constituta est; typum in herb. Univ. Calif. (Los Angeles) vidi.

Herba perennis suffruticosa caespitosa altitudine 5-10 cm caulis numerosis ramosis e caudice lignoso pilis minutis retrorsis

hirtellis; foliorum laminis duris ascendentibus elliptico-lanceolatis magnam partem 6-8 mm longis acutis vix tamen apiculatis integerrimis sessilibus utrimque glaberrimis tamen ad margines pulchre ciliolatis subnitidis pagina inferiore costata; cymulis plerumque 1-floribus; pedicellis 3-4 mm longis; calycum tubo 5,5-6 mm longo sparse appresso-hirtello sub annulo constricto, dentibus 2-2,5 mm longis subaequilongis acuminatis intus pubescentibus annulo denso in tubo incluso; corollarum tubi 17-27 mm longo ad basim pilis crassiusculis retrorsis vel extensis dense et late annulato.

Mexico: Nuevo Leon: Pablillo, near Galeana, 26.VI.1934, Pennell 16974; beyond Pablillo toward Santa Clara, 15 mi. S.W. of Galeana, 18.VII.1934, Mueller and Mueller 1062; Hacienda Pablillo, Galeana, 13.VIII.1936, Taylor 155; between Cienequillas and Pablillo, 17.VI.1934, Mueller and Mueller 861.

Rhododon Epl. Gen. Nov.

Rhododon gen. nov. per *Keithiam ciliatam* Benth., loc. cit., constitutus est. — *Hedeoma* sect. *Stachyhedeoma* Gray in Proc. Am. Acad. 8: 367. 1873 (partim). — *Stachydeoma* Small, Fl. S. S. U. S. 1040, 1337, 1903. (partim). Since Gray gave no indication whatever as to which species might be considered the typical for *Stachydeoma*, I have arbitrarily chosen *H. graveolens*.

Annual erect divaricately branching herbs; leaves essentially glabrous but setose on the margins, subsessile; cymules 3-6-flowered, crowded in the axils of the uppermost leaves to form compact or interrupted spikes; calyces strongly setose in the lower half, tapering, the teeth connivent, or parallel, deltoid-lanceolate, subequal, about as long as the tube, ciliolate on the margins and densely pubescent within, strongly annulate at the base, the sinuses membranous; corolla tube strongly villous-annulate near the middle, equal to or shorter than the lower lip; stamens seated at or above the middle of the tube, the anthers connate, scarcely or not at all exerted from the tube, the anther sacs widely spreading, but joined; style hispidulous.¹⁾

1. **Rhododon ciliatus** Epl. comb. nov. (Pl. I, C). — *Keithia ciliata* Benth., Lab. Gen. et Sp. 732. 1835, based upon a

¹⁾ Herbae annuae erectae divaricate ramosae; foliis magnam partem glabris nisi ad margines setosis, subsessilibus; cymulis 3-6 floribus in foliorum supremorum axillis in spicas congestis; calycibus infra medium valde setosis ad apices angustatis, dentibus conniventibus vel parallelis, deltoideo-lanceolatis, subaequalibus, tubum subaequantibus, ad margines ciliolatis et intus dense pubescentibus, ad basim valde annulatis, sinibus membranaceis; corollarum tubo ad medium valde villosulo-annulato, quam labia inferior brevior vel subaequante; staminibus ad tubi medium vel supra positis, antheris connatis vix e tubo exertis, thecis late divaricatis et subconfluentibus; stylo hispidulo.

specimen collected in Texas by Berlandier; the type is in the herbarium of the Royal Botanic Gardens at Kew. — *Hedeoma ciliata* Benth. in DC. Prodr. 12: 245, Nov. 1848 (not Nutt. in Proc. Acad. Nat. Sci. of Phila. 4: 25. April 1848). — *H. texana* Cory in Rhodora 38: 405, 1936, based upon the same. — *Stachydeoma ciliata*. Small Fl. SE. U. S. 1041, 1337, 1903, based upon the same.

Annual, 15-25 cm tall; stems erect, branching freely, usually villous in the upper parts with coarse & curved hairs, pubescent below; leaves elliptic-oblong, spreading or ascending, 1.5-2 cm long, entire, rounded at the tip, rounded-truncate at the base, sessile, the margins long-ciliate, both surfaces green and glabrous; cymes 1-4 flowered, borne in colored spikes 3-6 cm long; pedicels about one-half the length of the calyx, densely retrose-pubescent; calyx slightly distended, bristling in lower portion with coarse cilia 2 mm long, the tube 4.5-5 mm long, the lower teeth scarcely longer than the upper, all parallel or convergent, all deltoid-lanceolate and acute, annulus dense, slightly exceeding the tube; corolla tube 5-6 mm long, densely annulate near the middle.

Texas: Limestone; Milam: sandhills near Milano; Austin: Bellville, San Felipe; Montgomery: Magnolia; Burleson: Lyons; Waller: Hempstead.

Poliomintha Gray.

Poliomintha Gray in Proc. Am. Acad. 8: 295, 365. 1870, 1872 (Pl. I, G), based upon *P. incana* and *P. longiflora*; the type species is *P. incana*. — *Hedeoma* sect. *Poliomintha* Briq. in Engler u. Prantl, Nat. Pflanzenf. IV, 3a. 294. 1896.

Small ashy or whitened shrubs with minute and usually appressed pubescence which is sometimes silky; leaves small, oval, elliptical or linear, entire, sessile or shortly petiolate; cymes 1-3-flowered, disposed in the axils of the upper diminished leaves; calyces tubular, 13-15-veined, the teeth subequal, narrowly deltoid, acute, more or less connivent and closing the orifice which is hirsute-annulate within, softly ciliolate on the margins and inner surfaces or silky-hirsute; corolla tubes hirtellous within and strongly annulate below the middle, the lips subequal, the upper notched; stamens seated well above the middle of the tube, ascending against the upper lip and somewhat exerted beyond it; anther sacs widely divaricate, the connective well developed; style glabrous. Plants of N. E. Mexico and contiguous parts of the United States.

Key to the Species.

Corolla tube 20-26 mm long	<i>P. longiflora</i>
Corolla tube 6-10 mm long	
Glabrate shrublets, at most cinereous with minute spreading hairs	<i>P. glabrescens</i>
Incanous shrublets covered with a dense felt-like tomentum	<i>P. incana</i>

Sect. *Incanae*.

Half-shrubs with a minute felt-like tomentum; calyces silky pilose, 15-veined; corolla tube incompletely annulate somewhat above the middle with coarse ascending hairs.

1. *Poliomintha incana* Gray in Proc. Am. Acad. 8: 296. 1870, based upon *Hedeoma incana* Torrey, loc. cit.¹⁾ — *Hedeoma incana* Torrey in U. S. Mex. Bound. Surv. 130. 1858, based upon a specimen collected near El Paso by Parry, Wright, and Bigelow (Wright 1523); the type is in the herbarium of the New York Botanical Garden.

Suffrutescent herbs or half shrubs as much as a meter tall; branchlets strict, incanous with a minute felt-like tomentum; leaves narrowly elliptical or linear-oblong to linear-lanceolate, mostly 10-20 mm long, ascending or erect, thickish, entire, rounded at the top, narrowed to the sessile base, incanous with a minute felt-like tomentum; cymules 1-3 flowered, sometimes subspicate, pedicels 1-2 mm long; calyx 15-veined, the tube 3.5-4.5 mm long, one-third as wide, pilose with silky, spreading hairs, the teeth subequal, about 2 mm long, more or less connivent, the annulus borne in the throat, exceeding the tube; corolla tube 6-9 mm long, strongly but incompletely annulate somewhat above the middle with coarse ascending hairs, the tube beneath nectariferous.

Distribution: Utah: Grand: Court House Wash near Moab; Garfield: Escalante, 6000 ft.; Emery: San Rafael Swell; Kane: Kanab; Sevier: Fish Lake; Wayne: Motum Beach, 5000 ft.; — Colorado: (?) Archuleta: San Juan Valley; — Arizona: Cocino: Willow Springs, Moqui Village; Navajo: Holbrook; Mohave: House Rock; — New Mexico: San Juan: sand hills along Cuba Road south of Bloomfield; Otero: sand dunes west of Alamogordo; Dona Ana: Chimapavi Valley, White Sands; — Chihuahua: sand hills near El Paso del Norte. — Texas: Hudspeth: 3 miles east of McNary.

Sect. *Saturejoides*.

Ashy or greenish shrubs with minute more or less spreading hairs; calyces 13-veined; corollas annulate near the middle with retrorse hairs; the type species is *P. longiflora*.

2. *Poliomintha longiflora* Gray in Proc. Am. Acad. 8: 296. 1870, based upon a specimen collected near Saltillo, Coahuila, by Gregg (no. 313); the type is in the Gray Herbarium. — *P. bi-*

1) Following are representative specimens: Arizona: Holbrook, 20. VIII. 1883, Rusby 784; Houserock, 17. VI. 1930, M. E. Jones 25504; New Mexico: Alamogordo, 3. V. 1930, M. E. Jones 26207; White Sands, 19. VI. 1899, Wooton; White Sands, 17. VII. 1897, Wooton 166; without data, 1851-52, Wright 1523; — Utah: Courthouse, 16. VI. 1913, M. E. Jones; Fish Lake, 10. VIII. 1894, M. E. Jones; Moab, 16. VI. 1913, M. E. Jones; Mexico: Chihuahua: Paso del Norte, 9. IV. 1885, Pringle 275.

color Wats. in Proc. Am. Acad. 25: 160. 1890, based upon a specimen collected in Nuevo Leon in the Sierra de la Silla by Pringle (no. 2536); the type is in the Gray Herbarium. — *Hedeoma bicolor* et *H. longiflora* Briq. in Engler u. Prantl, Nat. Pflanzenf. IV. 3a. 294. 1897. — (?) *H. et P. Greggii* Briq. in Ann. Conserv. et Jard. Bot. Genève 2: 185. 1898 (nom. nuda).

Half shrubs 15-40 cm tall with branching stems mostly from a woody base, the branchlets cinereous with short upwardly appressed or spreading hairs; leaves oval to linear-elliptical, mostly 5-10 mm long, 2-7 mm broad, spreading or drooping, entire, blunt at the tip, rounded to the short-petiolate base, the upper surfaces hirtellous and green, the lower incanous with a dense tomentulum usually appressed, both sometimes becoming glabrous; cymules commonly 2-flowered; pedicels 1-2 mm long; calyx 13-veined, its tube 5,5-6 mm long, incanous with fine spreading or appressed hairs; teeth subequal, acute, connivent, 2-3mm long, the annulus sparse, of inwardly extended hairs, the inner faces of the teeth densely pubescent; corolla tube 20-26 mm long, densely and broadly annulate near the base with coarse hairs.

Mexico: Coahuila: Sierra Guadalupe, South of La Cuchilla, 2400-2500 m, 15. VII. 1934, Pennell 17376; San Lorenzo Canyon near Saltillo, 16. IV. 1905, Palmer 694; same, 21-23, 1904, Palmer 417; same, 1898, Palmer 203; Saltillo, VII-VIII. 1934, Lundell 5021; Saltillo, 1870, Gregg 313; — Nuevo Leon: Summit ledges, Sierra de la Silla, 5. VI. 1889, Pringle 2536; Zacatecas: crevices of limestone canyon above Aranzazu, 2700-2800 m, 19. VII. 1934, Pennell 17457.

3. *Poliomintha glabrescens* Gray in Hemsl., Biol. Centr. Am. Bot. 2: 549. 1881-82, based upon a specimen collected by Palmer (no. 1056) at Soledad, 25 miles southwest of Monclova, Coahuila; the type is in the herbarium of the Royal Botanic Gardens at Kew. — *H. glabrescens* Briq. in Engler u. Prantl, Nat. Pflanzenfam. IV. 3a. 294. 1897.

A half shrub 30-60 cm tall, stems branching throughout, the branches stiffish, ascendant, brittle, ashy with minute spreading hairs; leaves spreading or ascending, oblong to elliptical, about 1 cm long, entire, rounded at the tip, narrowed to the sessile base, ashy with minute spreading hairs, especially beneath; cymules 3-6 flowered; pedicels about 1 mm long; calyx 13-veined, its tube 3-3,5 mm long, appressed-hirtellous, the teeth about one-fourth as long as the calyx tube, subequal, the posterior connate toward the base, all connivent and closing the orifice, annulus light, seated in the throat; corolla tube about 1 cm long, annulate near the middle, with rather coarse retrorse hairs.

Mexico: Coahuila: Soledad, 1880, Palmer 1056; 25 miles S.W. of Monclova, IX. 1880, Palmer 1056; — Texas: Maxon Springs, VII. 1883, Harvard 32.



Ziziphora L.

Annual or perennial herbs, rarely suffruticose, with slender wiry branches which are commonly puberulent or pubescent, sometimes setose; leaves elliptical to lanceolate, rarely obovate, more or less puberulent or pubescent, sometimes ciliate-setose; cymules several-flowered, crowded into leafy or bracteate spikes or heads; calyces 13-veined, cylindrical, tapering from base to apex but scarcely distended at the base, the teeth subequal, deltoid-lanceolate, acute, connivent and closing the orifice, more or less annulate at the base, hairy within and softly ciliolate or hispidulous along the margins as in *Hedeoma*; corolla tube slender, more or less retrorsely hairy within; sometimes closed by the hairs, the upper lip erect, notched, the lower somewhat longer; stamens ascending near the upper lip, scarcely, if exceeding it, the lower anther sac abortive in some degree or completely wanting; style glabrous. — (Pl. I, B, a and b).

The species have been incompletely studied and will be treated later; Mediterranean in distribution.

Hedeoma Pers.¹⁾

Hedeoma Pers.²⁾, Syn. Pl. 131. 1807, based upon *H. pulegioides*, *H. glabrum* and *H. thymoides*. *H. pulegioides* is the standard species.

Small annual or perennial herbs with usually several wiry stems arising from a woody caudex, the stems usually retrorsely hairy in the upper parts and puberulent below (incanous with branched hairs in *H. molle*); leaves ovate, elliptical or lanceolate, sometimes rhomboidal, entire or serrulate, mostly sessile; cymules usually several-flowered, disposed in the axils of but little diminished leaves even to the base of the plant, rarely spicate; calyces tubular, usually more or less distended at the base, tapering toward the apex in *H. multiflorum*, *H. Reverchoni* and *H. Drummondii*, the teeth usually half as long as the tube or less, dissimilar (essentially similar in *H. Palmeri*), the upper more or less deltoid and variously united to the middle, glabrous, reflexed, the lower subulate, mostly longer, curving upward, hispid-ciliolate on the margins (the teeth of *H. floribundum* are much reduced and deltoid, without the cilia, those of *H. molle* have branched hairs) hirsute-annulate at the base or (*H. piperitum*, *H. polygalaeifolium*, *H. jucundum*, *H. medium*, *H. Reverchoni*, *H. Drummondii* and *H.*

¹⁾ The following treatment of *Hedeoma* was submitted by the junior author in partial fulfillment of the degree of Master of Arts in the Graduate School of the University of California at Los Angeles.

²⁾ *Hedeoma* is neuter in form and in combination as indicated by Persoon's use of *H. glabrum*. There is no apparent reason for Bentham's change to a feminine gender.

multiflorum) below the base; corolla tubes either cylindrical and abruptly expanded into the throat (*H. acinoides*), or more commonly funnellform, glabrous or hirtellous within, scarcely annulate; stamens seated somewhat above the middle, ascending under the upper lip and somewhat exerted beyond it, the anthers mostly divaricate, the connective being well developed, less often (*H. polygalaeifolium*, *H. jucundum*, *H. medium*, *H. piperitum* and *H. floribundum*) not widely divaricate, the connective less developed; style glabrous. Plants chiefly of the United States and adjacent Mexico; four species occur in South America. — (Pl. I, A). — Maps 1-5.

Introduction

The genus *Hedeoma*, found in the United States, Mexico, and South America, was established by Persoon¹⁾ in 1807, based upon three species: *H. thymoides*, *H. glabrum*, and *H. pulegioides* (Maps 1-5). It was accepted by Bentham²⁾ in his monograph of the *Labiatæ*, who further expanded the genus to include five New World species. In 1897 it was enlarged by Briquet³⁾ to include the genera *Keithia*, *Poliomintha*, and *Eriothymus*. It is true that these genera form a closely related complex, but to be consistent with Briquet's viewpoint, one would not only have to include *Keithia*, *Poliomintha*, and *Eriothymus* but *Zizyphora*, *Glechon*, *Cunila*, *Rhabdocaulon*, *Stachydeoma*, and *Hesperozygis* as well. The view taken in this paper is essentially that of Bentham, which it is felt, yielded a more natural, logical, and consistent interpretation of the relationships involved than that of Briquet, who, for lack of single clear-cut differences between these acknowledged groups, lumped them together.

Within the genus thus delimited twenty-six species are recognized. Some are distinct, some merge imperceptibly into others, while at least one, *H. dentatum*, is considered to have arisen as a hybrid form. The genus seems to be composed of twelve natural species groups. These groups are indicated numerically in the text.

The most reliable basis for specific differentiation is the configuration of the calyx, including size and proportions as well as form. Some characters found useful but not always constant or in every instance "specific", were: the habit of the stems, i. e. procumbent, erect, branching at the base, etc.; the kind of pubescence, spreading, downward curling, branching, etc.; the leaf form, color, and disposition; the distribution of the cymules; the number of flowers per cymule; the shape of the calyx teeth; the kind of annulus present in both the calyx and the corolla; the configuration of the corolla; and, the type of connective between the anther

1) Syn. Pl. 131, 1807.

2) Lab. Gen. et Sp. 365, 1834.

3) Engler u. Prantl, Nat. Pflanzenf. IV, 3a, 293. 1897.

sacs. Other less tangible characteristics no doubt entered into the segregation and were instrumental in unconsciously aiding in the development of a "feel" toward a species.

The distribution of *Hedeoma* is mainly North American. Four species occur in South America. The North American plants are found chiefly in Northern Mexico and the South-western portion of the United States. (Maps 1, 2, 4.) Of the twenty-three North American species, four have a very wide range: *H. Drummondii*, which extends from Central Mexico to Idaho, Wyoming, and eastward over the Great Plains States; *H. pulegioides* and *H. hispidum* which range from the Mississippi River to the Atlantic coast and north as far as Newfoundland; and finally, *H. nanum*, (Maps 1, 2, 5.), which is more restricted in range but still has a comparatively wide distribution in the foothills of numerous sierras in the South-western United States and Mexico. The remaining species are restricted either to areas in the Southwest and Mexico about the size of the State of New Mexico or else they are extremely localized, being known only from single locations.

It is interesting to note that the South American species seem to occupy habitats similar to those of the North American species-groups to which they have been assigned. For example: *H. multiflorum* (Map 3) of South America is found growing on the plains of Buenos Aires. It is morphologically similar to *H. Drummondii* which is found on the plains of the Midwestern United States, while *H. Mandonianum*, whose range is on the eastern slope of the Bolivian Andes, may be thought of as having its counterpart in *H. nanum*. It may also be significant that only those two complexes (*H. Drummondii* and *H. nanum*), which have the widest distribution in the arid parts of North America, should have clearly related South America forms.

For the ranges of the species the reader is referred to the distribution maps.

Key to the Species.

- A. Calyx teeth connivent at maturity, rarely parallel, and usually closing the calyx tube.
 - B. Corolla tube 9-14 mm long; leaves ascending, mostly deciduous below the middle of the plant by flowering time.
 - C. Stems 20-35 cm tall; leaves pubescent; calyx tube 6.5-9.0 mm long. 16. *H. Reverchoni*
 - CC. Stems 10-20 cm tall; leaves glabrous and apiculate; calyx tube 4-5 mm long. 2. *H. apiculatum*.
 - BB. Corolla tube 4-8 mm long; leaves not usually deciduous in lower parts of the plant.

- C. Calyx tube 4-7 mm long; leaves ascending, spreading or drooping, not strict and stiffish; plants of the eastern United States and adjacent Mexico. 15. *H. Drummondii*
- CC. Calyx tube 3-4,5 mm long, leaves ascending, usually strict and stiffish; plants of Brasil and Argentina.
- D. Corolla tube 5-6 mm long; calyx tube 3-3,5 mm long. 14. *H. multiflorum*
- DD. Corolla tube 7,5 mm long; calyx tube 4,5 mm long. 13. *H. polygalaeifolium*
- AA. Calyx teeth parallel or spreading, the upper usually reflexed to some extent, the calyx thus clearly bilabiate.
- B. Calyx tube 2,5-3 mm long at flowering; corolla tube 3-4,5 mm long (see also *H. nanum*).
- C. Cymules crowded into spicate panicles 3-8 cm long; calyx teeth nearly equal, all deltoid. 8. *H. floribundum*
- CC. Cymules borne loosely in the upper parts of the stems, rarely spicate, the bracts then conspicuously spreading; upper calyx teeth sharply reflexed, the lower teeth longer, subulate, and curving.
- D. Upper calyx teeth narrowly deltoid or acuminate, free to the middle or below; pedicels as long as or longer than the calyx; plants perennial. 18. *H. tenuipes*
- DD. Upper calyx teeth deltoid, acute, free in the upper third; pedicels rarely longer than the calyx.
- E. Plants annual, North American.
- F. Leaves linear-elliptical, sessile, about 2 cm long, veins conspicuous; calyx clothed with hispid hairs. 3. *H. hispidum*
- FF. Leaves oblong, elliptical, or rhomboid, petiolate, the petiole 1-4 mm long, the blade 2-3 cm long, veins not conspicuous; calyx covered with spreading hairs. 4. *H. pulegioides*
- EE. Plants perennial, South American. 5a. *H. medium*
- BB. Calyx tube 3-6 mm long at flowering; corolla tube seldom less than 5 mm long.
- C. Stems and leaves cinereous throughout with branching hairs. 27. *H. molle*
- QC. Stems and leaves clothed to a varying degree with simple spreading or decurved hairs or glabrous.
- D. Cymules 16-20 flowered (but see also *H. oblongifolium*); calyx teeth equal, more than half the length of the calyx tube, subulate. 28. *H. Palmeri*
- DD. Cymules 1-6 flowered, rarely more; calyx teeth unequal.

- E. Leaves clearly and usually sharply dentate, at
 ming more than half the length of the tube,
 the tube about one-third as wide as long;
 leaves essentially entire; upper calyx teeth
 united to the middle or beyond, the annulus
 included in the tube.
- F. Corolla tube 6-8 mm long, glabrous within;
 leaves about 1 cm long, glabrous, except for
 a few hairs borne along the veins, green;
 plants of Central Mexico. 12. *H. piperitum*
- FF. Corolla tube 3—7 mm long, leaves 5-10 mm long
 or more, puberulent, often cinereous.
- G. Leaves subrotund, rounded at the tip; stems
 mostly prostrate; corolla tubes (?) always
 glabrous within; plants of the central
 Andes. 7. *H. Mandonianum*
- GG. Leaves ovate, abruptly acuminate; corolla tu-
 bes hirtellous above the middle; plants
 of the southwestern United States and ad-
 jacent Mexico. 5. *H. nanum*
- EE. Calyx tube only slightly distended, about one-fourth
 as wide as long; leaves frequently sharply
 serrate (see also *H. quercetorum*)
- F. Leaves clearly and usually sharply dentatus, at
 least in the upper half.
- G. Leaf blades costate-plicate, the veins prominent
 on the lower surface, straight, unbranched
 and elevated; corolla tubes mostly 5-7,5
 mm long. 19. *H. plicatum*
- GG. Leaf blades scarcely costate, the veins not
 prominent, often branching, unelevated.
- H. Leaves oval or ovate, mostly twice as long
 as broad or less; calyx tube 4-6 mm
 long, about one-fifth as wide, lower
 teeth 2-3 mm long; corolla tubes comm-
 only 11-15 mm long but sometimes as
 short as 6 mm. 23. *H. costatum*
- HH. Leaves elliptical to rhomboid, usually 2-3
 times as long as broad; corolla tubes 5-
 10 mm long.
- I. Calyx tube 5,5-6,5 mm long; corolla tubes
 10 mm long, distinctly annulate near
 the middle. 25. *H. montanum*
- II. Calyx tube 3,5-4,5 mm long; corolla tubes
 5-10 mm long, not annulate but re-
 trorsely hairy or glabrous within.

- J. Leaves with 10-14 dentations in upper half, veins apparent; corolla tubes retrorsely hairy within; early leaves villous. 20. *H. dentatum*
- JJ. Leaves with 4-6 dentations in upper half, or none, veins inconspicuous; corolla tubes glabrous within; early leaves glabrous. 24. *H. oblongifolium*
- FF. Leaves entire or sometimes obscurely dentate.
- G. Leaves linear-lanceolate and pointed, strict, stiffish, the lateral veins straight, rather prominent and parallel (if leaves are apiculate and the veins obscure see 2. *H. apiculatum*; if the corolla is very slender, its tube 14-16 mm long, its throat 2 mm wide see 21. *H. quercetorum*) 1. *H. hyssopifolium*
- GG. Leaves elliptical-lanceolate, oblong, rhomboid, oval, or ovate, usually spreading, the lateral veins not markedly straight and parallel.
- H. Corolla tube 6,5-7,5 mm long; calyx tube 3,5-4,5 mm long.
- I. Perennials.
- J. Small wiry prostrate herbs with wiry branches 5-20 cm long; corolla tubes hirtellous within and somewhat annulate near the middle (if plant is glabrous see 13. *H. polygalaeifolium*). 6. *H. diffusum*
- JJ. Stems 25-50 cm tall, stiff, erect; corolla tubes glabrous within or essentially so.
- K. Leaves with conspicuous branching veins, the upper ascendent and acute. 24. *H. oblongifolium*
- KK. Leaf veins hardly conspicuous, the leaves all spreading or drooping, blunt or rounded at the tip. 10. *H. patens*
- II. Annuals; stems 10-30 cm tall, ascendent, not prostrate. 17. *H. acinoides*
- HH. Corolla tube 8-16 mm long; calyx tube 4-6 mm long.
- I. Annuals; leaves 15-25 mm long, rhomboid or rhomboid-elliptical, spreading or ascending; corolla tubes glabrous within, abruptly expanded into the limb. 17. *H. acinoides*

- II. Perennials; leaves 5-15 mm long.
- J. Leaves elliptical to ovate-lanceolate, stiff, glabrous, apiculate; cymules usually 1-flowered; the calyx teeth deltoid-lanceolate, the upper parallel to the lower. 2. *H. apiculatum*
- JJ. Leaves oval to narrowly ovate, the upper sometimes elliptical or linear-elliptical; cymules more than one flowered; the upper calyx teeth not parallel with the lower ones but reflexed to some extent.
- L. Upper calyx teeth joined to the middle.
- M. Upper calyx teeth deltoid, acute; corolla tubes 9 mm long; plants of Durango. 11. *H. jucundum*
- MM. Upper calyx teeth acuminate; corolla tubes 13 mm lg.; plants of Lower California. 22. *H. tenuiflorum*
- LL. Upper calyx teeth essentially free, acuminate.
- M. Corolla tubes 14-16 mm long, hirtellous within toward the base; upper leaves linear-elliptical 20. *H. quercetorum*
- MM. Corolla tubes 10-12 mm long.
- N. Leaves oval to ovate, 5-10 mm long; corolla tubes retrorsely hispidulous within, scarcely annulate. 26. *H. patrinum*
- NN. Leaves narrowly oval or elliptical-oblong, 10-15 mm lg., frequently purple beneath; corolla tubes sharply villos-annulate below the middle. 9. *H. pulcherrimum*

SECTION No. 1.

Woody perennials with ascendent stems much branching at the base; leaves stiff, strict, glabrous or puberulent but gray green, pointed or apiculate, linear-lanceolate to ovate-lanceolate.

1. *H. hyssopifolium* Gray in Proc. Am. Acad. 11: 96. 1876, based upon a specimen collected by Rothrock on Mt. Graham in Arizona; the type is in the Gray Herbarium. — Map 2, H);

A perennial herb, 20—40 cm tall, the root crown bearing the dried stems of previous seasons; stems branching at the base, ascending or sometimes procumbent, stiffish, lightly covered with minute recurved hairs or sometimes entirely glabrous; leaves 10-20 mm long, mostly about 15 mm, not more than one fifth as wide, essentially glabrous, linear-lanceolate and pointed, sessile, entire, strict, commonly ascending, their veins rather prominent and parallel; cymules 1-3-flowered, produced mostly in the upper third of the stem; pedicels as long as, or longer than the calyx; calyx scarcely distended, its tube about four times as long as broad, 5—7 mm long, minutely puberulent, rarely pubescent, the upper teeth acuminate, sharply reflexed, the lower twice as long, the annulus dense and exceeding the tube; corolla tube 8-13 mm long, more or less hirtellous within above the middle, glabrous below.

Mexico: Sonora: San Jose Mts.; Arizona: (Mts.) Santa Rita, Huachuca, Chiricahua, Dragoon, Rincon, Santa Catalina, Pinaleno, Pinal, Mogollon Mts. of Coconino Co., and White Mountains; New Mexico: Mogollon Mts. of Socorro Co., and in the Pinos Altos Mts. Following are representative specimens: Arizona: Santa Rita Mts., 6000-8000 ft., 10. VII. 1881, Pringle 295; Chiricahua Mts., 22. IX. 1931, M. E. Jones 28604; Santa Catalina Mts., 1905, Lemmon 177; Huachuca Mts., IX. 1882, Lemmon 2863; Santa Rita Mts., 7000 ft., 25. VII. 1884, Pringle 2193; New Mexico: Mogollon Mts., 8000 ft., 23. VII. 1903, Metcalfe 318; Mexico: Sierra Madre Occ., 1500-1700 m, 21. IX. 1934, Pennell 19039; Colonia Garcia, 7500 ft., 28. VIII. 1899, Townsend 282.

2. *H. apiculatum* Stewart sp. nov. per specim. in Texas in montibus Guadalupe, com. Culberson, a Moore et Steyermark (no. 3563) lectum constitutum est; typum in herb. Univ. California (Los Angeles) vidi. — (Map 2, S).

Herba perennis suffruticosa caespitosa 10-20 cm alta caulibus e caudice lignoso numerosis ascendentibus retrorse hispidulis; foliorum laminis 5-15 mm longis ellipticis vel ovato-lanceolatis crebris duris integerrimis apiculatis sessilibus utrimque glabris nisi ad venas et margines minute et sparse hispidulis tamen utrimque cinereis; cymulis plerumque 1-floribus rarius trifloribus; pedicellis circiter 2 mm longis; calycum tubo 4-5 mm longo extus glabro, dentibus similibus superioribus tamen quam inferiores dimidia parte brevioribus praesertim inferioribus hispido-ciliatis, annulo denso tubum aequante; corollarum tubo 10-12 mm longo intus pilis crassiusculis sparse hirtello vix tamen annulato.

Texas: cf. locum geogr. supra citatum!

SECTION No. 2.

Annuals, 10—40 cm tall; stems erect, clothed in the upper parts with downward curling hairs; calyx distended, the tube 2,5-

3.0 mm long, the upper teeth shorter, deltoid, and reflexed, the lower teeth subulate and curving; corolla tube 3-5 mm long.

3. *H. hispidum* Pursh, Fl. Am. Sept. 2: 414. 1814, based upon a specimen collected on the "banks of the Missouri"; an authentic specimen communicated by Nuttall to Pursh but probably not the type, since it is a larger plant than that described, is in the Academy of Natural Sciences of Philadelphia; none is at Kew. — (Maps 1, 5, H). — *Cunila hispida* Spreng., Syst. 1: 54. 1828. — *Ziziphora hispida* Roem. & Schult., Syst., Mant. 1: 179. 1817, based upon *H. hispidum*. — *H. hirta* Nutt., Gen. 1: 16. 1818, based upon a specimen collected in "Arkansas"; authentic specimens are in the Gray Herbarium and herbarium of the Royal Botanic Gardens at Kew.

Annual, 10-30 cm tall; stems erect, strict, simple or branching chiefly at the base, heavily clothed in the upper parts with downward curling hairs; leaves spreading, entire, linear-elliptical, rounded at the tip, sessile, green and mainly glabrous, about 2 cm long, hispid-ciliate; cymes 1-6 or more flowered, borne along the entire length of the stems, sometimes crowded and spicate at maturity; pedicels shorter than the calyx; calyx distended, the pouch forming two thirds the length of the tube, the tube 2.5-3 mm long, clothed with long hispid hairs, the veins conspicuous, the lower teeth curved and subulate, longer than the upper, which are somewhat reflexed, broad at the base and pointed; annulus slightly, if at all, exceeding the tube, and somewhat bristly; corolla tube narrowly funnelform, 4-5 mm long, lightly pubescent on the outside, glabrous within.

Alberta: Rosedale; Montana: Bozeman; North Dakota: Medora; South Dakota: Black Hills; Nebraska; Colorado: Colorado Springs, Akron, Golden City; Oklahoma; Texas: Tarrant, Van Zandt, Walker, Erath, Dallas, Navarro, and Galveston Counties; Louisiana; Mississippi; Arkansas; Missouri; Kansas; Iowa; Minnesota; Wisconsin; Illinois; Indiana; Michigan; New York; Connecticut; Vermont; Ontario: Kingston.

4. *H. pulegioides* Pers. Syn. 131. 1807, based upon *Cunila pulegioides* L., loc. cit. — (Maps 1, 2, P). — *Cunila pulegioides* L., Sp. Pl., ed. 2, 30. 1672. — *Melissa pulegioides* L., Sp. Pl., ed. 1, 593. 1753, based upon plants of the Gronovian Herbarium, of which Clayton 514 has been suggested as the standard (Journal of Botany, Jan. 1929, p. 9.); a Kalm plant, present in the Linnean Herbarium at the second enumeration, bears on the reverse side the annotation 'Fl. virgin. 66'. — *Ziziphora pulegioides* Desf. Tabl. ed. 1. 55; ed. II 66. 1815; based on *Cunila pulegioides* L.

Annuals, 10-40 cm tall, mostly about 25 cm; stems erect, branching freely along their entire length, clothed in the upper

parts with curving sometimes uncinata hairs, lower parts usually puberulent or even glabrous; leaves elliptical to oblong, the larger sometimes rhomboid, spreading or drooping, 2-3 cm long, remotely dentate or entire, blunt at the tip, narrowed at the base to a petiole 1-4 mm long, green above, lighter below, essentially glabrous, the veins not conspicuous; cymules 1-6-flowered, borne in the upper parts of the stems; pedicels longer than the calyx tube and covered with spreading hairs; calyx distended, the pouch forming half the length of the tube and lightly hispid-ciliate, the tube 2,5—3 mm long, one-third as wide as long, the lower teeth subulate and curving, the upper teeth shorter, deltoid, free only in the upper third, sharply reflexed; the annulus thin, of stiffish hairs, somewhat exceeding the tube; corolla tube 3-4,5 mm long, funnellform, glabrous within, corolla lips clothed on the outside with a few spreading hairs.

South Dakota: Brookings; Wisconsin; Illinois; Michigan; Indiana; Iowa; Kansas: Miami, Wilson Counties; Missouri; Arkansas; Kentucky; Tennessee; Alabama: Mobile; Georgia: De Kalb, Fannin and Towns Counties; South Carolina; North Carolina; Virginia; West Virginia; Ohio; New Jersey; Maryland; Rhode Island; New York; Massachusetts; New Hampshire; Maine; Vermont; New Brunswick; Nova Scotia; Quebec: Missisquoi Co.; Ontario: Amherstbough, Port Dover, Port Colborne, and Kingston.

SECTION No. 3.

Small perennial herbs; stems prostrate or procumbent at the base; leaves oval, ovate or subrotund, generally entire, 5-10 mm long; calyx noticeably distended, the tube 3-5 mm long, the upper teeth narrowly deltoid, acute, recurving, the lower teeth subulate; corolla tube 3-7,5 mm long.

5. *H. nanum* Briq. in Engler u. Prantl, Die Natürlichhen Pfl. IV, 3a. 294. 1897, based on *H. dentata* var. *nana* Torr., loc. cit. — (Map 2, T, C, M, X). — *H. nana* Greene in Pittonia 3: 339. 1898, based upon the same. — *H. dentata* var. *nana* Torr., Bot. Mex. Bound. 130. 1858, based on a specimen from Fronteras, near El Paso, Texas, May 4, 1852, by Bigelow; the type is in the herbarium of the New York Botanical Garden. — *H. thymoides* Gray, Syn. Fl. N. Am. 2: 368. 1878, (not of Persoon) based on *H. dentata* var. *nana* Torr., loc. cit.

Perennial, 5-35 cm high; stems wiry, freely branching at the base, ascending or procumbent at the base, with spreading or downward curling pubescence, becoming less dense basally; leaves spreading or sometimes drooping, ovate, entire or occasionally minutely denticulate, 5-10 mm long, abruptly acuminate at the apex, rounded to the short-petiolate or sessile base, glabrous to pu-

bescent on the lower surface, the upper surface usually puberulent or glabrous (occasionally basal leaves are present which are larger, purple beneath and glabrous); cymules 1-8-flowered, borne in upper three-fourths of stems, pedicels at least as long as calyx, usually clothed with spreading or sometimes downwardly curved hairs; calyx distended, the inflated part forming more than one half of the tube, the tube 3-5 mm long, usually three times as long as wide, more or less hispid with spreading hairs, the upper teeth sharply reflexed, the lower teeth less than twice as long as the upper ones, the annulus contained within the tube; corolla tube 3-7 mm long, hirtellous within above the middle, glabrous below and nectariferous.

Key to the subspecies.

- A. Calyx tube 1-5 mm long; corolla tube 5-7 mm long; basal leaves present which are purple beneath and green above, more than 1 cm long. *c. macrocalyx*
- AA. Calyx tube 2,5-3 (rarely 4) mm long; large basal leaves usually absent.
- B. Stems forming a close bunch or tuft, 10-15 cm tall, sparingly covered with retrorse pubescence above, glabrous below; leaves about 5 mm long; calyx tube about 3,5 mm; corolla tube 4,5-6,5 mm. *d. californicum*
- BB. Stems loose, 5-35 cm tall with downward curling or spreading pubescence; leaves 5-10 mm long.
- C. Stems 5-15 cm tall, clothed above with spreading hairs equalling the stem diameter or longer; leaves 6-7 mm long; calyx tube 3-3,5 mm long; corolla tube 4-5 mm long. *b. mexicanum*
- CC. Stems 10-35 cm tall, clothed with downward curling pubescence; leaves 5-10 mm long; calyx tube 3-4 mm long; corolla tube 3-6,5 mm long. *a. typicum*

a. Subsp. **typicum** Stewart subsp. nov. per specim. *Torreyanum* constitutum est. — Map. 2, T.

Herba perennis altitudine 10-35 cm caulibus superne pilis recurvis vestitis infime saepe stramineis; foliorum laminis 5-10 mm longis; cymulis 1-6-floribus; calycum tubo 3-4 mm longo; collarum tubo 3-6,5 mm longo.

Southern Arizona, Southwestern New Mexico, Southwestern Texas, to Nuevo Leon, Mexico. Following are representative specimens: New Mexico: Organ Mts., 20.V. 1893, Wooton; Alamogordo, 4350 ft., 7.IV.-24.V.1902, Rehn and Viereck; — Arizona: Santa Rita Mts.; 11.V.1884, Pringle; — Mexico: Coahuila, Monclova, 1880, Palmer 1057; Coahuila, Saltillo, X.VIII.1905, Palmer 164; Coahuila, IX.1898, Palmer 793; Chihuahua, 2.IV.1885, Pringle 246;

without certain locality: 1851-1852, Wright 1516, 1517, 1518, 1718, 1521.

b. Subsp. *mexicanum* Stewart subsp. nov. per specim. in calcareis collinis ad Monterrey, Nuevo Leon a Pringle (no. 10203) lectum constitutum est; typum in herb. Smithson. vidi. — Map 2, X.

Herba perennis 5-15 cm alta caulibus superne pilis extensis hispidis; foliorum laminis 6-7 mm longis; cymulis 3-8-floribus fere ad caulium bases productis etiam spicatis; calycum tubo 3-3,5 mm longo; corollarum tubo 4-5 mm longo.

Mexico: Southeastward from Chisos Mountains to Charcas, San Luis Potosi. Found especially on limestone hills. Following are representative specimens: Mexico, Chihuahua, 1300 m, 1-21. V. 1908, Palmer 215; Nuevo Leon, near Monterrey, 1800 ft., 7. IV. 1906, Pringle 10203; San Luis Potosi, near Charcas, VII. VIII. 1934, Lundell 5046, 5030.

c. Subsp. *macrocalyx* Stewart subsp. nov. per specim. in Arizona ad Higley (Queen's Creek) a Peebles et Harrison (no. 1916) lectum constitutum est; typum in herb. Univ. Calif. (Los Angeles) vidi. — Map 2, M.

Herba perennis 15-35 cm alta caulibus crassioribus pilis decurvis cinereis; foliorum laminis ovatis vel frequenter subrotundis 1 cm longis et ultra; cymulis 3-6-floribus; calycum tubo 4-5 mm longo; corollarum tubo 5-7 mm longo.

Arizona: Yavapai, Maricopa, Pinal and Pima Counties. Following are representative specimens: Arizona: Gila: Christmas P. O., 30. III. 1928, Peebles, Harrison and Kearney 5185; Mt. Ord, Mazatzal Mts., 4300 ft., 11. V. 1935, Peebles and Smith 11544; Maricopa: Queens Creek near Higley, 19. V. 1926, Peebles, Harrison and Kearney 1916; Agua Fria River bottom near Avondale, 9. V. 1926, Harrison 1921.

d. Subsp. *californicum* Stewart subsp. nov. per specim. in Nevada ad Good Springs a Jones lectum constitutum est; typum in herb. Univ. California (Los Angeles) vidi. — Map 2, C.

Herba perennis 10-15 cm alta caulibus gracilibus infime frequenter stramineis, ascendentibus saepius fastigiatis, superne sparse decurvo-pubescentibus infime glabratis; cymulis saepius 1-3-floribus supra caulium medium productis; calycum tubo 3,5-4 mm longo; corollarum tubo 4,5-6,5 mm longo.

California: Clark Mts.; Providence Mts.; Kelso; — Nevada: Good Springs; Potosi Mt., Clark Co.; — Arizona: Toroweap Valley, Mohave Co. Following are representative specimens: California: Bonanza King Mine, Providence Mts., 27. IV. 1932, Ferris and Bacigalupi 8144; same, 30. III. 1920, Munz and Harwood 3519; Kelso, 2000-2500 ft., 2-3. V. 1906, M. E. Jones; Nevada: Good Springs, 1. V. 1905, M. E. Jones.

5a. *H. medium* Epling sp. nov. per specim. in Uruguay ad Soriano a Gallinal lectum constitutum est; typum in herb. Univ. Calif. (Los Angeles) vidi. — (Map 3, D).

Herba perennis ut videtur habitu *H. multiflora* caulibus numerosis ascendentibus superne decurvo-hirtellis; foliorum laminis 4-6 mm longis ellipticis integris punctulatis hispidulis subsessilibus; floribus 3-6 in foliorum axillis praesertim supra caulium medium dispositis pedicellis maturis calyces subaequantibus elatis; calycum tubo 3 mm longo extus minute hispidulo infra medium dimidia parte abrupte saccato, dentibus superioribus deltoideis ad medium et ultra connatis abrupte reflexis quam inferiores dimidia parte brevioribus; corollarum tubo intus ad medium hirtello 3,5-4 mm longo, superne in fauces abrupte dilato.

A species of uncertain quantity and disposition. In habit it resembles *H. multiflorum* to such a degree that some specimens previously referred to that species may properly belong here. In floral habit however it resembles *H. nanum*, the calyx tube being abruptly saccate, the pouch forming more than half the length of the tube. Furthermore, the upper calyx teeth are abruptly reflexed after the habit of that species. In these respects it also resembles *H. polygalaeifolium* but has much smaller flowers.

Uruguay: Soriano: Est. F. C. Juan Jackson; Est. Mongon-Heber, Gallinal (Herb. Rosengurt B 26); — Argentina: Buenos Aires: Rosas "El Toro," Daguerre 314.

6. *H. diffusum* Greene, Pittonia, 3: 338. 1898, based upon a plant obtained near Flagstaff, Arizona, by H. H. Rusby (no. 786); authentic material is in the Gray Herbarium; numerous isotypes have been distributed. — (Map 2, D). — *H. blepharodonta* Greene, Pittonia 3: 339. 1898, based upon a specimen obtained near Flagstaff, Arizona, on August 29, 1884, by M. E. Jones; according to Greene the type is in the U. S. Natl. Herb. but no such specimen was found, however, which bore Greene's annotation; duplicate specimens are in the Gray Herbarium and elsewhere, the first bearing a manuscript number of 404, the others a printed number 4104.

A small prostrate perennial herb with numerous wiry branches 5-20 cm long, mostly simple, puberulent or unevenly hairy with curved and spreading hairs; leaves oval, spreading, prevalingly 3-5 mm long, entire, short-petiolate, either cinereous and villous or green, the veins not prominent; cymes borne in the upper half of the stem, 1-3-flowered; pedicels not longer than calyx; calyx tubular but only slightly gibbous, the tube 3,5-4 mm long, one-fourth as wide as long, sparsely hairy, the upper teeth recurved and about one-third to one-half as long as the lower teeth which are thin and tapering; annulus dense, usually extending beyond the tube of nearly half the length of the upper teeth; corolla tube 6,5-7,5 mm, rarely 1 cm, hirtellous within and somewhat annulate near the middle.

Following are representative specimens: Arizona: Flagstaff, 5.VIII., 29.VIII.1884, M. E. Jones; Flagstaff, VI.1883, Rusby 786.

7. *H. Mandonianum* Wedd., Chlor. And. 2: 148. 1860, based upon a specimen collected by Mandon in Bolivia, province of La Paz in the Cordillera de Sorata; the type is in the herbarium of the Jardin des Plantes, Paris. — (Map 3, A). — *H. breviflora* Griseb. in Lechl., Berb. Am. Austr. 58. 1857 (name). — *H. adscendens* Rusby in Phytologia 1: 74. 1934, based upon a specimen collected in Bolivia on the Tipuani-Ancoma-Sorata trail down to Sorata by Tate (no. 783); the type is in the herbarium of the New York Botanical Garden (identical with *H. Mandonianum* and from the type locality of that species).

A small, more or less prostrate herb, forming small mats, its stems numerous, slender, arising from a woody caudex, shortly puberulent with spreading hairs, leaf-blades 3-5 mm in diameter, rotund-ovate, very obtuse at the apex, truncate-subcordate at the base or sometimes narrowed, their margins entire or obscurely crenate, both surfaces sparingly hirtellous, petioles scarcely 1 mm long; cymules 1-3-flowered, borne in the axils of somewhat diminished leaves; calyx tube 3-3,5 mm long, hispidulous without, the upper teeth about 1 mm long, narrowly deltoid, acute, recurving, the lower 1,5-2 mm long, subulate, the annulus sparse, seated at the base of the lower teeth; corolla tube 3-4,5 mm long, glabrous within; nutlets ovate 0,7-0,8 mm long.

Peru: Azangaro, Agapata, Oroya, Araranca, Pinasniacj; — Bolivia: La Paz, Palca, Illimani, Sorata. Following are representative specimens: Bolivia: Larecaja, Sorata, 3200-3960 m, I-II. 1859, Mandon 514; Sorata, 10 000-13 000 ft., II. 1886, Rusby 1497, 1498; without data, Bang 785; La Paz, 3900 m, 25. III. 1907, Buchtien 1482; — Peru: Azangaro, I. 1854, Lechler 1745; Agapata, VI. 1854, Lechler 1848; La Oroya, 27. V. - 7. VI. 1922, Macbride and Featherstone 980.

SECTION No. 4.

Characterized by *H. floribundum*.

8. *H. floribundum* P. N. Standley sp. nov. per specim. in Mexico prov. Chihuahua ad Rio Mayo a Gentry (no. 1938) lectum constitutum est; typum in herb. Field. Mus. vidi. — (Map 4, F).

Herba perennis altitudine circiter 30 cm caulibus subsimplicibus pilis minutis curvis puberulis; foliorum laminis laxis plerumque circiter 1,5 cm longis ellipticis utrimque obtusiusculis subsessilibus integris utrimque viridibus et fere glabris; cymulis circiter 6-floribus pedunculatis ad caulium apices in paniculas spicatas 3-8 cm longas confertis; pedicellis quam calycum tubus brevioribus; calycum tubo cylindrato nullomodo distento 2,5 mm longo extus pilis minutis curvis puberulis, dentibus vix 1 mm longis subaequalibus

deltoideis supremis ad medium connatis, annulo denso dentes fere subaequante; corollarum tubo 3-4 longo.

Mexico: Chihuahua: Rio Mayo, 6. X. 1935, Gentry 1938.

SECTION No. 5.

Perennials; stems stiff, erect, branching freely along their entire length but mostly in the lower half; leaves oval to oblong; about 1,5 cm in length, laxly spreading, puberulent; calyx slightly distended, the tube 4-5 mm long, the upper teeth not sharply reflexed.

9. *H. pulcherrimum* Wooton and Standley, Contrib. U. S. Natl. Herb. 16: 168. 1913, based on Wooton 241, a specimen collected in the White Mts., Lincoln County, New Mexico; the type is in the U. S. Natl. Herbarium. — (Map 2, P).

Perennial, 15-30 cm tall; stems stiff, erect, branching profusely with ascending branches at the base, or freely along their entire length, hirtellous with short retrorse hairs in the upper parts; leaves narrowly oval or elliptical-oblong, spreading or drooping, 1-1,5 cm long, entire, puberulent, rounded at the tip, tapering to a usually short petiole, green above, often purplish beneath; cymules 1-3-flowered, borne in the upper two-thirds of the stems; pedicels shorter than the calyx and puberulent; calyx hardly distended, its tube 4-5 mm long, one-fourth as wide, lightly covered with short upwardly curling hairs, the upper teeth not sharply reflexed but not parallel with the lower, lower teeth nearly twice as long as the upper, annulus dense and exceeding the tube for one-third the length of the upper teeth; corolla tube 8-10 mm long, sharply villous-annulate below the middle.

New Mexico: western slopes of White and Sacramento Mts. in Lincoln and Otero Counties. Following are representative specimens: New Mexico: White Mts., Lincoln Co., 6500 ft., 21. VII. 1905 - 30. VII. 1897, Wooton; Tularosa Creek, White Mts., Otero Co., 18. VIII. 1899, Wooton 6747; Sacramento Mts., Otero Co., 30-31. VI. 1899, Wooton

10. *H. patens* Jones, Contributions to Western Bot. 12: 70. 1908, based upon a specimen collected by M. E. Jones, in Guayana Canyon, Sierra Madre Mts., Chihuahua; the type is in the herbarium of Pomona College. — (Map 4, P).

Perennial, 30-50 cm high; stems wiry or stiff, erect, but often procumbent at the base, branching freely along the entire length but mostly in the lower half, covered with retrorse pubescence; leaves oblong, variable in length but usually about 1,5 cm, entire or rarely obscurely serrate, laxly spreading, more or less rounded at the tips, narrowed to a short-petiolate base, somewhat puberulent; cymules 1-6-flowered, borne mostly in the upper half of the stems; pedicels not longer than the calyx, clothed with retrorse pubescence; calyx tubular and slightly gibbous, the tube 4-4,5 mm long, about one-fifth as wide as long, puberulent, the upper teeth

reflexed, the lower teeth thin and tapering, about 1,1 mm long, annulus not dense and not exceeding the tube; corolla tube 6,5-7,5 mm long, glabrous within.

Mexico: Chihuahua: Rio Mayo, Canelo, 5000 ft., 2. X. 1935, Gentry 1919; Guayanopa Canyon, 5000 ft., 23. IX. 1903, M. E. Jones; Durango: El Salto (Aserraderos) in rocky woods, 2570-2800 m, 28. VIII. 1934, Pennell 18355; Nayarit: Sierra del Nayarit, Diguét.

SECTION No. 6.

Perennials; stems 10-20 cm tall, loose, wiry, usually ascendant; leaves oval or ovate, 5-15 mm long, entire; calyx distended, the tube 3,5-5 mm long, the upper teeth sharply reflexed, broad, the lower teeth lanceolate-subulate; corolla tube 6-9 mm long.

11. *H. jucundum* Greene, Pitt., 1: 156. 1888, based upon a specimen collected by A. Forrer, from the Sierra Madre, west of Durango; the type is in the herbarium of Notre Dame University; authentic specimens are in the U. S. National Herbarium, the Field Museum, Pomona College Herbarium, New York Botanical Garden Herbarium, the Gray Herbarium, and the herbarium of the University of California (Berkeley). — (Map 4, J).

Perennial herb 10-20 cm tall; stems loose, wiry, mostly simple, ascendant although procumbent or even creeping at the base, retrorse-pubescent in the upper parts; leaves ovate or narrowly ovate, 1-1,5 cm long, one-half as wide as long, spreading or somewhat erect, prevailingy entire, blunt at the apex and rounded to a sessile base, glabrous on both surfaces, the veins apparent but hardly prominent; cymules 1-3-flowered, borne in the upper half of the stems; pedicels shorter than the calyx; calyx tube distended, 4-5 mm long, glabrous or pubescent with only a few hairs curling toward the tip, the upper teeth connate to the middle, deltoid, acute, reflexed, the lower teeth at least twice as long as the upper, narrowly deltoid; annulus dense, barely exceeding the tube; corolla tube 9 mm long, hirtellous within.

Mexico: Durango: Sierra Madre west of Durango, 8100 ft., IX-X. 1881, Forrer 32; without data, Garcia 460.

12. *H. piperitum* Benth., Lab. Gen. et Sp., 730, 1835, based upon *Cunila piperita*, Moc. et Sesse, an herbarium name; the type, sent by Pavon, was seen by Bentham in the Dunant Herbarium; authentic specimens are in the British Museum and in the Madrid and the Boissier herbaria. — (Map 4, I).

Perennial, 5-20 cm tall; stems wiry, loose, ascendant, reclining in the lower parts, branching at the base or in the lower parts, hispid with spreading hairs; leaves spreading, ovate or subrotund, the median about 1 cm long, entire, blunt at the tip, rounded to a sessile or a short-petiolate base, a few hairs borne along the veins on the lower surface, otherwise glabrous and green; cymules 1-3-flowered, borne mostly in the upper half of the stems; pedicels

as long as calyx tube, clothed with dense hispid hairs; calyx distended, the pouch forming half the length of the tube, the tube 3,5-4,5 mm long, about one-third as wide, covered with bristly hairs curving slightly toward the tip, the upper teeth sharply reflexed, nearly as long as broad, not thin and tapering, the lower teeth somewhat longer than the upper, considerably thinner and more tapering, annulus dense, slightly exceeding the tube; corolla tube 6-8 mm long, glabrous within.

Mexico: Mexico: Temascaltepec, Crucero, Agua Blanca, 25.X.1933, Hinton 4925; same, 18.X.1932, Hinton 2095; Montes de la Gavia, in pine woods, 2900 m, Fröderstrom and Hulten 361; Eslava, VIII.1930, Lyonnet 663; Parres, 30.VIII.1910, Orcutt 4439; Cima Station, 9800 ft., 30.VIII.1905, Pringle 13600; Serranja de Ajusco, 10000 ft., 14.VIII.1901, Pringle 7437; Sierra de las Cruces, 21.VIII.1892, Pringle 4201; Hidalgo: Sonoriel and Las Lajas, 5.VIII.1905, Rose 9247; Morelos: Toro, 9800 ft., 5.VIII.1924, Fisher.

13. *H. polygalaefolium* Benth., Lab. Gen. et Sp. 367. 1834 and in DC. Prodr. 12: 246. 1848, based upon a specimen collected by Sellow in the province Rio Grande do Sul, Brazil; the type is in the herbarium of the Royal Botanical Gardens at Kew. — (Map 3, c.)

Low perennial herbs, more or less woody at the base, 10-20 cm tall, their stems ascending or procumbent, branched, minutely puberulent or nearly glabrous, internodes 2-4 mm long; leaf-blades 5-6 mm long, 2-3,5 mm broad, oval or elliptical-oblong, rounded or obtuse at both ends, wholly entire, both surfaces glabrous, punctulate; cymules 1-3-flowered, disposed in the axils of the uppermost leaves, subtended by carinate-lanceolate bracteoles 2-3 mm long; calyx tube 4,5 mm long, glabrous without, the teeth of the upper lip 2 mm long, the lower 3 mm long, all lanceolate subulate, very sharp, pedicels 2 mm long; corolla tube 7,5 mm long.

Distribution: Brazil: Rio Grande do Sul: Sellow; Gaudichaud 570.

SECTION No. 7.

Perennial herbs 10-35 cm tall; stems ascending from a woody base, clothed in varying degree with downward curling hairs; leaves oblong, often deciduous or drooping in the lower half of the stems; calyces distended below the middle but with the teeth connivent, thus tending to close the calyx tube, not reflexed.

14. *H. multiflorum* Benth., Lab. Gen. et Sp. 367. 1834 and in DC. Prodr. 12: 246. 1846, based upon Sellow 1062; the type is in the herbarium of the Botanical Institute, Berlin. — (*H. Gilliesii* Benth., Lab. Gen. et Sp. 367. 1834, based upon a specimen collected by Gillies in Argentina, province of San Luis, near Archiras; the type is in the herbarium of the Royal Botanic Gardens at Kew. — ? *Micromeria bonariensis* Fisch. et

Meyer, Ind. Sem. Hort. Petrop. X. 56. 1845. — ? *Satureia bonariensis* Briq. in Engler u. Prantl, Nat. Pflanzenf. ed 1, IV, 3a, 300. 1897, based on *Micromeria bonariensis* Fisch. et Meyer, loc. cit.

Perennial herbs 10-20 cm tall with numerous stems ascending from a woody caudex, sparingly puberulent with curled hairs; leaf-blades 5-6 mm long, sessile, linear-oblong, sparingly puberulent, punctulate; cymules 1-3-flowered or more, disposed in the axils of the leaves even to the base of the plant, scarcely spicate however; mature calyx tube 3-3,5 mm long, hispidulous, tapering, the upper lip 1-1,5 mm long, its teeth 0,8-1 mm long, the lower teeth 2-2,5 mm long, very acute, all more or less connivent, the annulus clearly seated below the base of the teeth; corolla tube 5-6 mm long, the upper lip 1,5 mm tall, the lower somewhat longer; nutlets ovate, about 1 mm long.

Argentina: Patagonia, Tweedie; — Buenos Aires: Naposta Grande, II-III. 1881, Lorentz 207; Cerro Morro, I. I. 1892, Kuntze; Sierra de la Ventana, XI. 1895, Spegazzini 1663; Sierra de la Ventana, XI. 1904, Dusén; — Entre Rios: Puerto de Brete, 11. II. 1878, Lorentz 1523; — San Luis: Achiras, Gillies; Cerros Largos, 29. IX. 1926, Castellanos; El Funcal, 19. III. 1882, Galander; Santa Barbara, 10. III. 1882, Galander; La Toma, 21. III. 1882, Galander; — Cordoba: Huerta Grande, Punilla, 26. I. 1881, Galander; Laguna de Pocho, 21. II. 1876, Hieronymus 434; 889; 501; 701; Tolumba, Kurtz 6714a; La Cocha (Pampa de Pocho), Castellanos;

Brasil: Rio Grande do Sul: Gaudichaud 572; Minas Geraes: Biribiry near Mocoto, 28. III. 1892, Glaziou 19184.

15. *H. Drummondii* Benth., Lab. Gen. et Sp. 368. 1836, based upon a specimen collected by Berlandier near Monterrey, Nuevo Leon, Mex.; the type is in the herbarium of the Royal Botanic Gardens at Kew. — (Maps 1, 4, D). — *H. ciliata* Nutt. in Journ. Acad. Nat. Sciences of Philadelphia, N. S. 1: 183. 1847, based on a specimen collected near Santa Fé, New Mexico by Gambel; authentic specimens are in the Gray Herbarium and the herbarium of the Royal Botanic Gardens at Kew. — *H. sancta* Small in Bull. N. Y. Bot. Gard. 1: 287. 1896, based on a specimen collected by Thurber at San Antonio, Texas, in April 1853; the type is in the herbarium of the New York Botanical Garden. — *H. serpyllifolia* Small in Bull. N. Y. Bot. Gard. 1: 287. 1896, based on Heller no. 1663, a specimen collected at Kerrville, Kerr Co., Texas, April 25-30, 1894; the type is in the herbarium of the New York Botanical Garden. — *H. longiflora* Rydberg in Bull. Torr. Bot. Club 36: 695. 1909, based on a specimen from cliffs of canyons of Banner Co., Nebraska; the type is Rydberg x296, in the Herbarium of the N. Y. Bot. Gard. — *H. camporum* Rydberg, Flora Rocky Mts. 750. 1917, based on *H. longiflora* Rydb., loc. cit. (not Briq. 1897). — *H. ovata* Nelson in Bull. Torr. Bot. Club 31: 245.

1904, based on Nelson 1374, from Pole Creek, Wyoming; the type is in the herbarium of the University of Wyoming.

Perennial, prevailingly 10-25 cm tall with usually ascending or sometimes procumbent stems arising from usually woody caudices, rather widely branching, more or less pubescent in the upper parts with angular decurved hairs; leaves usually drooping in the lower parts, the lowermost deciduous, usually ascending in the upper parts, the blades commonly 1-2 cm long, shortly petiole, elliptical-oblong, the lowermost often oval or ovate, the upper even linear, all entire and more or less pubescent; cymes 1-6-flowered, produced mostly above the middle of the plant, but frequently nearly to the base; pedicels not longer than the calyx; calyx tubes 5-7 mm long, hispid, strongly distended below the middle, tapering upward into the parallel or convergent teeth which close the orifice, the upper teeth about half the length of the lower; annulus dense, somewhat exceeding the tube; corolla tubes 4-8 mm long, more or less hirtellous within, sometimes even subannulate below the middle.

Hedeoma Drummondii is a species of wide geographic range; nevertheless, throughout most of its range it is remarkably constant in the size and configuration of the flower parts, as well as the general aspect of the plant. Once the peculiar disposition of the calyx teeth is recognized, the species is readily segregated from all other North American species with one exception. This exception is *Hedeoma Reverchoni*.

There are two causes of variability amongst the several hundred herbarium specimens studied. The first is due to the age of the plant. In specimens collected shortly after flowering has commenced, the lower oval and more or less glabrous or puberulent leaves are conspicuous, while the much narrower, more oblong or even linear leaves of the inflorescence have not yet developed. As the plant advances in age the lower leaves usually fall away leaving a specimen of rather different aspect. Late in summer, apparently after summer rains, sprouts may occur at the base of the plant, the leaves of which are densely villous, giving still a third aspect.

The second cause is due presumably to genetic variation. There seems to be a development toward a larger plant with loose, coarse stems, larger, strict and thickish leaves, crowded verticils, larger (and ? redder) flowers and densely hispid calyces. This trend terminates in *H. Reverchoni* which in its recognizable form is restricted to central Texas. Between the extremes there is sufficient basis for specific recognition and yet *H. Reverchoni* impresses one as a derivative of *H. Drummondii* perhaps through chromosome changes since there is no other species with which intermixture seems probable. In any case it is a practical impossibility to segregate these two species even approximately where they come together. *H. Reverchoni* is restricted to a few counties in central

Texas. In these same counties occur occasional intermediate forms which are nevertheless closer to *H. Reverchoni*, while still further west the plants take on a more and more typical aspect. The plants of this intermediate region have served as the basis for Small's proposed species, *H. serpyllifolia*, *H. sancta* and *H. lata*. The first two are *H. Drummondii* in flower characteristics but with the habit more like that of *H. Reverchoni*. The last named is scarcely separable from the plants collected by Reverchon at the type locality of his species and distributed as No. 755. They are not identical with the type. The only plant seen, similar to the type of *H. Reverchoni*, is one collected by Stanfield at San Marcos. Yet, presumably at the same locality, he collected the intermediate form as well.

For purposes of convenience one might determine the Texan plants as follow: the name *H. Reverchoni* might be applied to the plants of central Texas: Grayson, Tarrant, Dallas, Brown, Lampasas, Travis, Blanco, Hays, Kendall and Kerr Counties. *H. serpyllifolia* might be used to designate the intermediate forms in the following counties: Edwards, Bexar, Blanco, Bell, Goliad, Dallas, Calhoun, Refugio, Llano, Kendall, Kerr, Hays, Motley, Gillespie, Medina, Uvalde, Taylor, Travis, Val Verde, Comal, Coryell, Garza, Duval, Nueces, Pecos and Tom Green. Fairly typical *H. Drummondii* occurs in Edwards, Terrell, Pecos, Culberson, Jeff Davis, Hartley, Val Verde, Hays, Baylor and Bexar Counties.

H. ovata A. Nelson is a precocious specimen in which the basal leaves are especially prominent. *H. longiflora* (*H. camporum*) is an anomalous specimen with rather larger flowers. *H. ciliata* is typical of the western forms of *H. Drummondii*.

Montana: Great Falls; Wyoming; Utah: Glendale, Bryce Canyon; Nevada: Highland Range, Charleston Mts.; Arizona: Mohave, Yuma, Coconino, Navajo Indian Reserv., Gila, Santa Cruz, Cochise, and Green Lee Counties, as far west as Peach Springs; New Mexico; Colorado; No. Dakota; So. Dakota; Nebraska; Kansas; Oklahoma; Texas: Edwards, Terrell, Pecos, Culberson, Jeff Davis, Hartley, Val Verde, Hays and Bexar Counties; Mexico: Coahuila: Diaz, Monclova, Saltillo; Nuevo Leon: Monterrey; San Luis Potosi; Tamaulipas: Victoria, Jaumjave; Michoacan: Morelia.

Following are representative specimens: Arizona: Chiricahua Mts., 16. VIII. 1907, Blumer 1701; Grand Canon 7000 ft., 28. VI. 1898, MacDougall 185; Mustang Mts., 11. IX. 1884, Pringle; San Francisco Mts., 1900, Purpus; Camp Grant, 4753 ft., 1874, Rothrock 458; Clifton, 20. IV. 1887, Rusby 340; — New Mexico: Lincoln Co., 31. VII. 1900, Earle and Earle 234; Santa Fe Creek, near Santa Fe, 7500 ft., 17. VI. 1897, Heller and Heller; without data, 1851-52, Wright 1519; — Texas: Blanco, 4. VI. 1917, Palmer 12154; — Mexico: Nuevo Leon: Monterrey, 19. VI. 1934, Pennell 16882; — Coahuila: 40 mi.

south of Saltillo, VII. 1880, Palmer 1057; Chojo Grande 27 mi. S. E. of Saltillo, Palmer 349; — San Luis Potosi: San Miguelito Mts., Shaffner 679.

16. *H. Reverchoni* Gray, Syn. Fl., Suppl., 2: 460. 1888, based on *Hedeoma Drummondii* var. *Reverchoni*, loc. cit. — (Map 1, R). — *H. Drummondii* var. *Reverchoni* Gray. Syn. Fl. 2: 363. 1878, based on a specimen collected by Reverchon in August 1877, from "rocks, Blanket, Brown Co.," Texas; the type is in the Gray Herbarium. — *H. lata* Small, Fl. S. E. U. S. 1040, 1337. 1903, based upon a specimen collected near Dallas, Texas, by Reverchon (Curtiss 2020); the type is in the herbarium of the New York Botanical Garden.

A variable perennial amply distinct in its extreme forms but merging almost indefinitely with *Hedeoma Drummondii*; stems somewhat coarser and rigid, mostly 20-35 cm tall, somewhat woody at the base, branched usually above the middle with widely ascending branches, pubescent in the upper parts with angularly curved hairs; leaves mostly deciduous below the middle of the plant by flowering time, the upper ascendant, rather strict, all 1-2 cm long, generally oblong, frequently oval, even linear-oblong, shortly petiole, all entire, rounded or obtuse at both ends, more or less pubescent; cymules 1-3-flowered, usually produced above the middle of the plant, crowded; calyx tube strongly hispid or setose, distended below the middle, 6.5-9 mm long, narrowed above to the more or less connivent teeth, the upper of which are half as long as the lower and somewhat reflexed and laterally divergent, the annulus dense, slightly exceeding the tube; corolla tube 9-12 mm long, more or less hirtellous within, sometimes even subannulate below the middle.

See a note to the preceding species.

Texas: Grayson, Tarrant, Dallas, Brown, Lampasas, Travis, Blanco, Hays, Kendall, and Kerr Counties. Following are representative specimens: Texas: Rocky prairies near Dallas, VI-IX. 1879, Reverchon; Dallas, VI. 1874, Reverchon 427; Blanco Co., VIII. 1877, Reverchon.

SECTION No. 8.

Characterized by *H. acinoides*.

17. *H. acinoides* Scheele in *Linnaea* 22: 592. 1849, based on a specimen collected by Römer, in the vicinity of New Braunfels, Texas; the type is unknown to the writer. — (Map 2, A).

Annuals, 10-30 cm tall; stems branching throughout but mostly at the base, ascendant, lightly covered with retrorse curled pubescence above, puberulent or glabrous below; leaves rhomboid or rhomboid-elliptical, spreading or ascending, 15-25 mm long, entire or less often obscurely dentate in the upper half, blunt at the tip, narrowed to a petiole about a fifth the length of the blade, glabrous or minutely puberulent; cymules 1-6-flowered or more, borne

in the upper half of the plant and frequently crowded toward the tips; pedicels not longer than calyx; calyx slightly distended, the tube 4-4,5 mm long, about one-fourth as wide, thinly hispidulous, the lower teeth subulate, nearly parallel, and only slightly longer than the upper which are not sharply reflexed, annulus consisting of a few hairs barely exceeding the tube; corolla tube 6-10 mm long, slender and equal to the throat, glabrous within.

Texas: Palo Tinto, Tarrant, San Saba, Kimble, Gillespie, Blanco, Hays, Bell, Kerr, Kendall, Real, Bandera, Uvalde, Medina, Bexar, Comal, Washington, Austin, and Goliad Counties; — Mexico: Nuevo Leon: Sierra Madre above Monterrey, 2 000 ft.

Following are representative specimens: Texas: San Antonio, 17. IV. 1911, Clemens 288; San Antonio, 4. V. 1911, Clemens 289; San Antonio, 19. IV. 1911, Clemens 887; Austin, 18. V. 1872, Hale 444; Kerrville, 19-25. IV. 1894, Heller 1604; Uvalde, 26. IV. 1931, M. E. Jones 28491; Comal Creek, IV. 1845, Lindheimer 379; Upper Guadalupe, 1846, Lindheimer 496; Comanche Spring, IV. 1850, Lindheimer 1080; Boerne, 6. IV. 1917, Palmer 11469; — Mexico: Nuevo Leon: Monterrey, 27. III. 1906, Pringle 10202.

18. *H. tenuipes* Epl. spec. nov. per specim. in Mexico prov. Tamaulipas in Cerro Zamora ad El Milagro a Bartlett (No. 1117) lectum constitutum est; typum in herb. Mus. Field. vidi. — (Map 4, T).

Herba perennis altitudine ad 30 cm caulibus ascendentibus superne decurvo-hirtellis; foliorum laminis linearibus vel anguste ellipticis 8-15 mm longis magnam partem minus quam 3 mm latis saepius extensis in apice acutis in basi breviter petiolatis, marginibus subintegris paginis ambobus sparse hirtellis venis paucis subtus prominulis; cymulis 6-floribus et ultra approximatis; calycum tubo 2,5 mm longo in maturitate paulo aucto lenissime distento, extus sparse hispidulo, dentibus superioribus solum in basi connatis anguste deltoideis acuminatis, pedicellis gracillimis calycem aequantibus vel superantibus; collarum tubo 3 mm longo, intus glabrato.

Mexico: Tamaulipas: Sierra de San Carlos, Cerro Zamora near El Milagro, 25. VIII. 1930, Bartlett 1117.

SECTION No. 9.

Perennials 10-50 cm tall; stems ascending but often procumbent at the base, clothed at least in upper parts with downward curling hairs; leaves dentate, (except for *H. tenuiflorum* and sometimes *H. oblongifolium*), spreading, the veins apparent; calyx gibbous but not strongly so, the pouch forming nearly one-third of the length of the tube, the tube 3,5-6 mm long, the upper teeth reflexed, the lower teeth long and curving, subulate.

19. *H. plicatum* Torr., Bot. of U. S. and Mexican Bound. Survey, part 2, 130. 1858, based on a specimen collected by Bigelow in July, from "dry ravines near the Limpia Mountains," Texas;

the type is in the herbarium of the New York Botanical Garden. — (Map 1, L).

Perennial herb, 10-25 cm tall but commonly less than 15 cm; stems loose, wiry, branching at the base or in the lower third of the plant, ascendant or sometimes procumbent, for the most part densely covered with curled retrorse pubescence in upper parts, less heavily below, less often puberulent throughout; leaf-blades spreading, costate-plicate, mostly 5-10 mm long, rhomboid or ovate, usually not more than twice as long as broad, pointed at the apex, rounded to a short-petiolate base, regularly and sharply apiculate, serrate above the middle, entire near the base, commonly hispidulous along veins beneath, slightly puberulent above, the prominent veins unbranched and elevated; cymules 1-6-flowered, borne in the upper two-thirds of the stems; pedicels not longer than the calyx; calyx distended for half the length of the tube, the tube 4-5 mm long, with short rather stiff but curled hairs, the upper lip 1-1,7 mm long, its teeth narrowly deltoid, united toward the base, slightly longer than their width across the base, the lower teeth 1,5-2 mm long, not more than twice as long as the upper ones, annulus dense but not exceeding the tube; corolla tube 5-7,5 mm (-9 mm) long, hirtellous within especially below the middle.

New Mexico: Queen, Organ Mts., Black River; Texas: Limpia Mts., Chisos Mts. in Brewster Co., Davis Mts., Guadalupe Mts.; Mexico: Chihuahua (southwestern portion); Durango: Sandia Sta. 6500 ft., Zacatecas: Concepcion del Oro. Following are representative specimens: New Mexico: Wright 464, 456; Organ Mts., 29. X. 1904, Wootton 58601; Texas: Madera Canyon, Davis Co., Palmer 34401; Alpine, 19. VI. 1928, Palmer 34435; Davis Mts., 12. VI. 1928, Palmer 34529; — Mexico: Chihuahua: near Chihuahua, X. 1886, Pringle 788; — Durango: Durango, IX. 1896, Palmer 702A; — Zacatecas: Concepcion del Oro, 11. VIII. 1904, Palmer 273.

20. *H. dentatum* Torr. in Bot. of U. S. and Mexican Boundary Survey, part 2, 130. 1858, based upon a specimen collected by Thurber, Sept. 1851, near Santa Cruz, Sonora, Mexico; the type is in the herbarium of the New York Botanical Garden. — (Map 1, U).

Perennial, 20-40 cm tall; stems stiffish and erect or ascending, scarcely fastigiate, freely branching or often simple, pubescent above with spreading but somewhat retrorse hairs; leaves spreading or ascending, mostly 1-1,5 cm long, elliptical or somewhat rhomboid, at least twice as long as broad, mostly short-acuminate at the apex, cuneately narrowed to the short petiole, regularly or irregularly serrate in the upper part, entire near the base, bristly with spreading hairs along the veins beneath, puberulent or glabrous above, veins obvious but usually not elevated, branching; basal ovate leaves and stems densely covered with long curved hairs; cymules 1-6-flowered, borne in the upper part of the stems;

pedicels not longer than calyx; calyx tube 3,5-4,5 mm long, distended, pubescent with curled hairs in lower part, the upper lip 0,5-1 mm long, the lower 1-1,8 mm long; annulus dense and scarcely exceeding the tube; corolla tube 5-8,5 mm long, hairy on the outside, inside heavily clothed with downward pointing hairs.

This species suggests a hybrid form derived from *H. oblongifolium* and *H. plicatum*. Its distribution is limited mainly to the Huachuca and Santa Rita Mountain region in Southern Arizona.

Arizona: Santa Rita, Huachuca, Mule, and Patagonia Mts., Natanes Plateau, Mt. Graham; Mexico: Sonora: Magdalena, Santa Cruz. Following are representative specimens: Arizona: Chiricahua Mts., 15.VIII.1907, Blumer 1700; Rincon Mts., 6500 ft., 15.IX.1909, Blumer 3359; Natanes Plateau, 28.VII.1910, Goodding 703; Huachuca Mts., 26.VIII.1910, Goodding 829; Santa Rita Mts., 8.IX.1884, Pringle; Sonoita Valley, VIII.1874, Rothrock 628; — Mexico: Chihuahua: Colonia García, 7500 ft., 28.VIII.1899, Townsend and Barber 282.

21. *H. quercetorum* Epl. sp. nov. per specim. in Mexico prov. Nuevo Leon in angustiis San Francisco dictis ad Pueblo Galeana a Mueller et Mueller (No. 411) lectum constitutum est; typum in herb. Univ. California (Los Angeles) vidi. — (Map 4, Q).

Herba perennis tenella caulibus paucis e caudice repente erectis vel simplicibus vel in basi sparse ramosis superne pilis retrorsis pubescentibus; foliorum laminis 1-1,5 cm longis sessilibus infimis ovatis glabris subtus purpureis superioribus lineari-ellipticis acutiusculis ascendentibus venis subtus prominulis lateralibus saepius tribus marginibus subintegris paginis ambobus sparse hispidis; cymulis circiter 6-floribus; calycum tubo florente 5 mm longo extus pilis extensis hispidis, lenissime distento, dentibus superioribus acuminatis recurvis fere liberis, inferioribus subulatis 2-2,5 mm longis annulo sat denso; corollarum gracilium tubo 14-16 mm longo gradatim ampliato, intus praesertim ad basim hirtello.

Mexico: Nuevo Leon: Sierra Madre Oriental, San Francisco Canyon, about 15 mi. SW of Galeana, 7500-8000 ft., 16.V.1934, Mueller and Mueller 411.

22. *H. tenuiflorum* Brandege in Zoë 5: 254. 1908, based on a specimen collected by T. S. Brandege at El Rancho Viejo, April 30, 1889, Lower California, Mexico; the type is in the herbarium of the University of California (Berkeley). — (Map 1, T).

Perennial, 30-40 cm tall; stems loose, ascending apparently from a woody caudex, branching at the base, hispid-pilose, hoary; leaves ovate or elliptical, spreading or drooping, about 1 cm long, entire, usually abruptly pointed at the tip, rounded at the base to a short petiole, both surfaces thinly hispidulous, the lower leaves often purple above and green beneath; cymules usually 1-3-flowered, rarely more, borne in the upper half of the stems; pedicels not as long as the calyx, evenly clothed with slightly retrorse pubescence; calyx distended, the pouch occupying one third of the

length of the tube, the tube about five times as long as wide, 6 mm long, hispidulous, the lower teeth half again as long as the upper and the upper broader, connate below the middle, the annulus not conspicuous; corolla tube 13 mm long, slender and even, expanded only in the throat, hirtellous within above the middle.

Distribution: Mexico: Baja California: El Rancho Viejo, 30. IV. 1889, Brandegee.

23. *H. costatum* Gray, Syn. Fl. 2: 363. 1878, based on Ghiesbreght no. 815, from Chiapas, Mexico; the type is in the Gray Herbarium. — (Map 4, C). — *H. costata* Hemsl. in Biol. Centr. Am. Bot. 2: 547. 1881 based on Ghiesbreght 815, from Chiapas, Mexico; the type is in the herbarium of the Royal Botanical Gardens at Kew. — *H. tenella* Hemsl. in Biol. Centr. Am. Bot. 2: 549. 1881, based upon Palmer 1060 from Guajuco, Nuevo Leon; the type is in the herbarium of the Royal Botanical Gardens at Kew. — *H. Pringlei* Briq. in Ann. Conserv. et Jardin Bot. Genève 2: 182. 1898, based upon Pringle 1911, collected in State of Nuevo Leon on wooded slopes of the Sierra Madre near Monterrey; the type is in the Delessert Herbarium. — *H. permixta* Briq. l. c. 2. 1898, based on the same specimen. — *H. pulchella* Greene, Leaflets Bot. Obs. 1: 213. 1906, based on O. B. Metcalfe 1599, from Kingston, New Mexico; the type is in the herbarium of Notre Dame University. — *H. quinquenervata* Bartlett in Proc. Am. Acad. 44: 634. 1908, based on a specimen collected by Pringle (no. 10241); in the Sierra Madre, Monterrey, State of Nuevo Leon; the type is in the Gray Herbarium. — *H. albescentifolia* Bartlett l. c. 44: 633. 1908, based on a specimen collected by Pringle (no. 133) in the Santa Eulalia Mts., Chihuahua; the type is in the Gray Herbarium. — *H. Convisae* A. Nels. in Am. Journ. Bot. 23: 270, 1936, based upon a specimen collected by Mrs. Convis in New Mexico at the Carlsbad Caverns; the type is in the Rocky Mountain Herbarium.

Perennials, 15–30 cm tall; stems ascending but usually procumbent at the base or even trailing, simple or branching, retrorsely pubescent, sometimes hoary or sometimes nearly glabrous; leaves ovate or oval, 1-1,5 cm long, spreading or reflexed, sharply dentate, rarely entire, abruptly acute, rounded or narrowed at the base to a short petiole or sessile, both surfaces more or less pilose with spreading hairs, sometimes hoary or ashy, sometimes green and nearly glabrous, frequently purple beneath; cymules 3-flowered, borne in the upper half of the stems; pedicels no longer than the calyces, clothed with curling hairs; calyx somewhat distended, the tube mostly 4-6 mm long, about one-fifth as wide, clothed with spreading ciliate hairs, the lower teeth 2-3 mm long, the upper lip mostly 1,5-2,5 mm long, somewhat reflexed; annulus slight, consisting of a few bristles which just exceed the tube; corolla tube commonly 11-15 mm long, sometimes as short as 6 mm or as long as 18 mm, hirtellous within.

The species cited in synonymy for *H. costatum* show only irregular variations in the size of flower parts and habit. The configuration of the calyces and corollas, as well as the disposition of the flowers and general aspect of the plants are for the most part quite similar. While the density of hairs may fluctuate, the type of hairs is constant; furthermore the variation in density within the species is often greater than between the proposed species. The distinctions in habit between the proposed species are mainly differences in the amount of branching at the base and in the height.

The type of *H. costatum* is a plant with tufted branches 5-12 cm long; it is definitely hairy with spreading hairs, as much so as *H. albescensifolium* but not pallid; the corolla tubes are 10 mm long. The veins on the lower surfaces of the leaves are rather prominent. *H. Convisae* is more like *H. costatum* than the other segregates. It differs chiefly in the somewhat larger leaves and minutiae of habit. *H. albescensifolium* is a plant about 20 cm tall, pallid and rather densely villous; the leaves are sharply and rather coarsely serrate; the corolla tubes are 8-12 mm long. *H. permixtum* and *H. Pringlei* are both based upon the same number and are identical, as it seems to me. They are also scarcely separable from *H. tenellum*. All are rather diffusely branching and lax plants 20-30 cm tall, predominantly glabrate unless in the upper parts; the leaves tend to be entire or only obscurely serrate; the corollas of *H. Pringlei* and *H. permixtum* are 5.5-6 mm long; those of *H. tenellum* range from 9-13 mm. *H. quinquenervata* is a plant similar in habit to *H. tenellum* and *H. Pringlei*, but intermediate in foliage with these and *H. albescensifolium*; the corolla tubes are 13-15 mm long. *H. pulchellum* of which only a photograph was seen, is evidently similar to *H. Convisae*, but with larger flowers.

New Mexico: White Mts., Sacramento Mts., Guadalupe Mts.; Texas: Marathon, Ft. Stockton; Mexico: Chihuahua: Santa Eulalia Mts.; Coahuila: Burro Mts., Sierra de Parras, Saltillo, Lerios, San Lorenzo; Nuevo Leon: Monterrey, Guajuco, Pablillo, Sierra Madre Oriental; San Luis Potosi: Charcas; Zacatecas; Pastorrilla; Chiapas; Guatemala: Chaerulá (?). Following are representative specimens: New Mexico: Lincoln, 31. VII. 1900, Earle and Earle 235; Sacramento Mts. 8-19. V. 1902, Earle 655; — Mexico: San Luis Potosi; Charcas, VII-VIII. 1934, Lundell 5402; — Nuevo Leon: Monterrey, VII. 1933, Mueller and Mueller 154; Monterrey, 9. IV. 1906, Pringle; San Francisco Canyon, near Galeana, 9. V. 1934, Mueller and Mueller 268; — Coahuila: Saltillo, 16. IV. 1905, Palmer 547; Lerios, 10.-13. VII. 1880, Palmer 1059; — Chihuahua: Santa Eulalia Mts., IV. 1885, Pringle 133; — Durango: Durango, 1896, Palmer 702a.

24. *H. oblongifolium* Heller, *Muhlenbergia*, 1:4. 1900, based upon *H. piperita* var. *oblongifolia*, A. Gray. loc. cit. — (Map 1, O).

— *H. piperita* var. *oblongifolia* A. Gray, Proc. Am. Acad. 8: 366. 1872, based upon Wright 1515, a specimen collected in New Mexico 1851-52; the type is in the herbarium of the New York Botanical Garden. — *H. thymoides* var. *oblongifolia*, A. Gray, Syn. Fl. N. Am. 2: 362. 1878, based upon *H. piperita* var. *oblongifolia*, A. Gray, loc. cit.

Perennial herb, 25-50 cm tall; stems often stoutish, erect, or ascending, freely branched or simple, often glabrous below though usually pubescent, cinereous above with curled or sometimes spreading, stiffish hairs; leaves spreading, mostly 1-1.5 cm long, elliptical or ovate or sometimes linear-elliptical, at least twice as long as broad, mostly short-acuminate at the apex, rounded and narrowed to the sessile base, entire or obscurely serrate, clothed with hairs curling toward the tip, their conspicuous branching veins usually not elevated; cymes 3-6-flowered, borne in the upper two-thirds of the stems, pedicels not longer than calyx; calyx distended, its tube 3.5-4.5 mm long, pubescent with short rather stiff but curled hairs, the lower teeth 1-2.3 mm long, more than twice as long as the upper, annulus dense and scarcely exceeding the tube; corolla tube 5.5-10 mm long, glabrous within, pubescent on the outside.

Arizona: Flagstaff, Prescott, Oracle, Fairview, Globe, Bowie, Ft. Huachuca, Mt. Graham, Pinal Mts., Elder Mts., Santa Rita, Mts., Weaver Mts.; New Mexico: Albuquerque, Pinos Altos, Socorro, El Capitan Mts., Burro Mts., Sandia Mts.; Sonora: Tumichachi; Chihuahua: Sierra Madre Occidental 1500-1700 m, Colonia Garcia. Following are representative specimens: Arizona: Eldon Mt., 7.VII.1891, McDougal 323, 753; Santa Rita Mts., 8.IX.1884, Pringle; Yavapai Co., VII.1883, Rusby 788; — New Mexico: Gray and Lincoln Co., 1900, Earle and Earle 566; without data, Wright 1515; Organ Mts. 4.IX.1897, Wootton 651; — Mexico: Chihuahua: Colonia Juarez 21.IX.1934, Pennell 19039; Colonia Juarez, 12.IX.1903, M. E. Jones; Durango, 1896, Palmer 702.

25. *H. montanum* Brandegee in Univ. of Calif. Publ. Bot., 4: 188. 1913, based on a specimen collected in Coahuila in the Sierra de la Paila by Purpus (no. 4964); the type is in the herbarium of the University of California (Berkeley). — (Map 4, M).

Perennial, 15-20 cm tall; stems strict, stiff, erect, often fastigiate, clothed with short curled hairs, branching freely from the woody caudex and along their entire length; stems intermingled with dead stems of previous years; leaves elliptical, 8 mm long, spreading, only slightly dentate in the upper half, entire in the lower part, pointed at the tip, tapering to a short-petiolate base, canescent on both surfaces with curled pubescence; cymes borne in the upper half of the stems, spicate, usually 1-4-flowered; pedicels less than half the length of the calyx; calyx tube 5.5-6.5 mm long; calyx cylindrical, not distended, hirtellous, the teeth subulate, the lower slightly longer than the upper; the annulus of

silky hairs exceeding the tube for nearly half the length of the upper teeth; corolla tube about 1 cm long, annulate near the middle with rather coarse decurved hairs.

Mexico: Coahuila: Sierra de la Paila, 7000-8000 ft., X. 1910, Purpus 4964.

SECTION No. 10.

Characterized by *H. patrinum*.

26. *H. patrinum* Stewart sp. nov., per specim. in Mexico prov. Zacatecas ad Concepcion del Oro in Sierra Madre Oriental a Pennell (no. 17432) lectum constitutum est; typum in herb. Univ. Calif. (Los Angeles). — (Map 4, A).

Herba perennis fruticulosa 15-35 cm alta caulibus ascendentibus ut videtur frequenter procumbentibus ramulis pilis minutis retrorse hirtellis; foliorum laminis ovalibus vel ovatis 5-10 mm longis plerumque extensis in apice obtusis in basi rotundato-angustatis integris utrimque pilis minutis appresso-hirtellis breviter petiolatis; cymulis 1-3-floribus supra medium productis; pedicellis calycum tubum subaequantibus; calycum tubo nullomodo distento 4-5 mm longo hirtello dentibus superioribus fere ad medium connatis reflexis quam inferiores dimidia parte brevioribus; annulo denso tubum superante dentes dimidia parte aequante; corollarum tubo 8-10 mm longo intus retrorse hirtello.

Mexico: Zacatecas: Concepcion del Oro, 18-19. VII. 1934, Pennell 17432, 17406.

SECTION No. 11.

Characterized by *H. molle*.

27. *H. molle* Torr., Bot. U. S. and Mex. Bound. Surv. 129. 1858, based upon a specimen collected by Bigelow, on cliffs on the Rio Grande near Puerte de Paysano, S. W. Texas; the type is in the herbarium of the New York Botanical Garden. — (Map 2, O). — *Poliomintha mollis*, A. Gray, Proc. Am. Acad. 8: 365. 1872; based on *Hedeoma mollis* Torrey, loc. cit.

Perennial, 20-60 cm tall; cinereous throughout with branching hairs; stems ascendant from a woody caudex, although sometimes procumbent at the base, branching mainly at the base, loose; leaves mostly ascending, oval or ovate, 1-2 cm long, entire, rounded at the tip, narrowed to the sessile base, both surfaces cinereous; cymules 3-6 flowered, and borne in the upper half of the stems; pedicels about one fourth as long as the tube; calyx not distended, the tube 4-5 mm long about one fourth as wide, the teeth only slightly unequal, about 1 mm long and pointed, not convergent, annulus exceeding the tube, and formed at its opening; corolla tube 10-12 mm long, retrorsely hirtellous within and sometimes annulate, apparently nectariferous throughout.

Texas: Chenates region, Nealley; Vieja Mt., X. 1883, Havard; Puerte de Paysano, Valley of the Rio Grande below Donana,

Bigelow et al. 844; Chisos Mts., 9.VIII.1915, Young; Chisos Mts., 5.VIII.1931, Mueller 8146; Chisos Mts., 1933, Cory 7038; 7201.

SECTION No. 12.

Characterized by *H. Palmeri*.

28. *H. Palmeri* Hemsley, *Biology Cent. Am.*, 2: 548. 1881, based on Parry & Palmer, no. 728, a specimen from the region of San Luis Potosi, Mexico; the type is in the herbarium of the Royal Botanic Gardens at Kew. — (Map 4, L). — *H. rotundifolia* Hemsl., loc. cit. 549., based upon a specimen collected in Hidalgo at Zimapam by Coulter (no. 1081); the type is in the herbarium of the Royal Botanic Gardens at Kew.

Perennial, sometimes suffruticose, 30-50 cm tall; stems erect, branching, their internodes usually about 4 cm long, clothed with downward curling hairs, puberulent in lower parts; leaf-blades 1-1.5 cm long, ovate or subrotund, spreading, dark green above, light green below, entire or obscurely serrate, obtuse at the tip, narrowed to a petiole about one-third the length of the blade, rarely sessile, thinly pubescent on both surfaces or even incanous, the lower surface often tomentose; cymules 16-20-flowered, borne in the upper axils of more or less reduced leaves; pedicels half the length of the calyx or less; calyx tubular and not distended, only very slightly bilabiate, the tube 3.5-5 mm long, covered with hairs curling toward the teeth, teeth nearly of equal size and longer than half the length of the calyx tube, annulus dense and exceeding the tube for nearly half the length of the teeth; corolla tube 8-10 mm long, retrorsely hispidulous within but scarcely annulate.

A plant collected from the Sierra Madre Oriental, Nuevo Leon appears to be *Hedeoma Palmeri* but is unusual in its velvety covering of retrorse hairs on both leaf surfaces and on the upper parts of the stems; the calyx teeth are somewhat shorter.

Mexico: Nuevo Leon: Las Canoas, 20. VII. 1935, Mueller 2237; — San Luis Potosi: Alvarez, 5. IX. 1902, Palmer 115; without data, Parry and Palmer 728; without data, Schaffner 343; San Miguelito Mts., 1876, Schaffner 637; Sierra Madre Oriental, 30. VII. 1934, Pennell 17780; — Hidalgo: Zimapam, Coulter 1081.

Species excludendae.

H. arkansana Nuttall in *Trans. Am. Phil. Soc. N. S.* 5: 186, 1837

= *Satureja glabra* Fern.

H. bracteolata Nuttall, *Gen. Am.* 2: add. 1818 = ? *Conradina* sp.

H. caerulescens Benth. in *DC. Prodr.* 12: 245. 1848 = *Satureja caerulescens* Epl.

H. glabra Nuttall, *Gen. Am.* 1: 16. 1818 = *Satureja glabra* Fern.

H. glabrum Pers., *Syn.* 131. 1807 = ? *Satureja glabella* Briq.

- H. Glaziovii* Briq. in Ann. Conserv. et Jard. Bot. Genève 2: 185. 1898 = *Cunila galioides* Benth.
H. gracillima Jones, Contrib. to West. Bot. 15: 150. 1929 = *Satureja Brownei* Briq.
H. Hassleri Briq. in Bull. Herb. Boiss. ser. 2. 7: 611. 1907 = *Cunila spicata* Benth.
H. micrantha Regel in Gartenfl. 357. 1864 = *Mosla ocymoides* Hamilt.
H. napalensis Benth., Lab. Gen. et Sp. 367. 1834 = *Mosla ocymoides* Hamilt.
H. purpurea Kellogg in Proc. Calif. Acad. 5: 52. 1873 = ? *Satureja* sp.
H. serpylloides Torr. in Pac. R. R. Rept. 4: 123. 1856 = *Pogogyne serpylloides* Gray.
H. thymoides Pers., Syn. 2: 131. 1807 = *Thymus Serpyllum* L. fide Benth.

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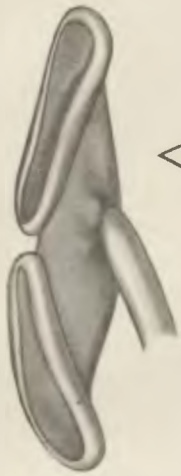
Beiheft LXXX: Preliminary Revision of American <i>Stachys</i>	10 RM.
Beiheft LXXXV: <i>Labiatae</i> austro-americanae I—IV	40 „
Beiheft XCV: The <i>Labiatae</i> of Northern South America	15 „
Beiheft CV: The <i>Labiatae</i> of Peru	12,50 „
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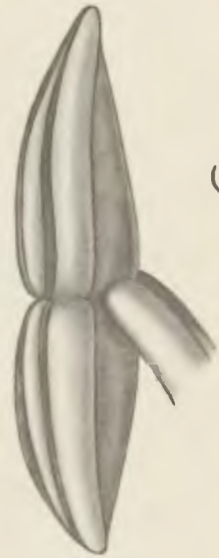
F. Fedde.



A



B^b



C



B^a



D



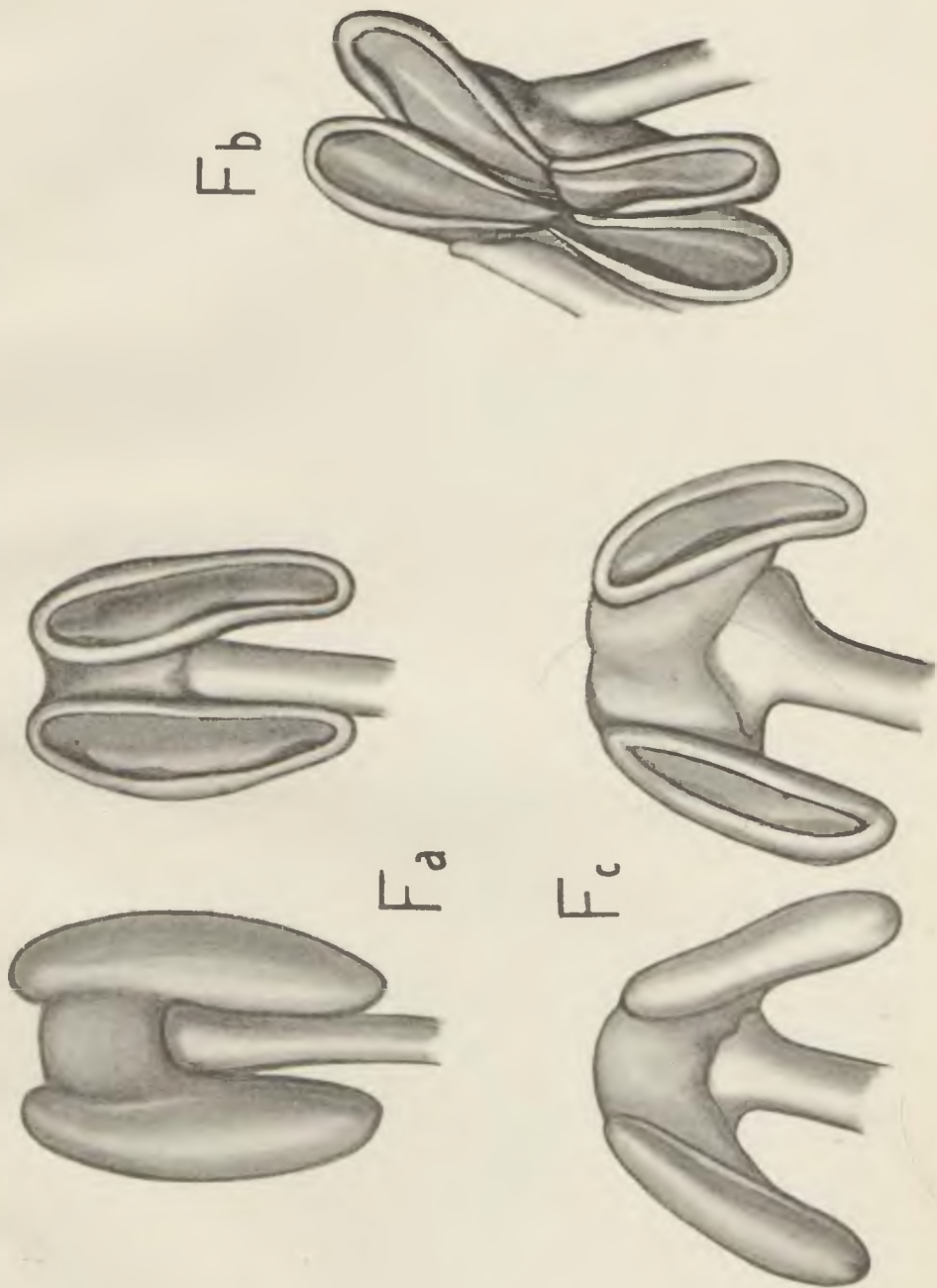
E



G



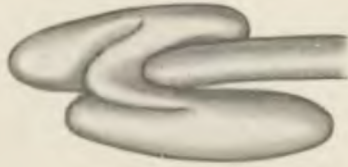
A. *Hedeoma*. general type.
 B. *Zizyphora*. a. *Z. serpyllacea*, b. *Z. parviflora*.
 C. *Rhododon ciliatus*.
 D. *Hesperozygis*. general type.
 E. *Rhabdocaulon*. general type.
 G. *Poliomintha*. general type.



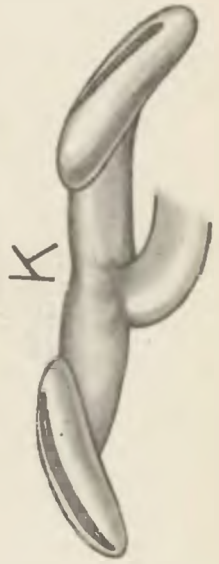
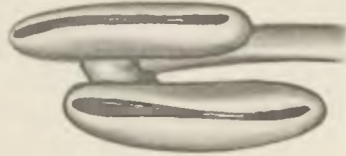
F. *Glechon*: a. *G. thymoides*, *G. spathulata*,
b. *G. Hoehneana*, *G. discolor*,
c. *G. ciliata*, *G. marifolia*.



H



J



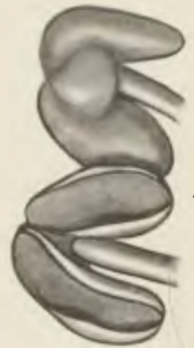
K



La



Lb

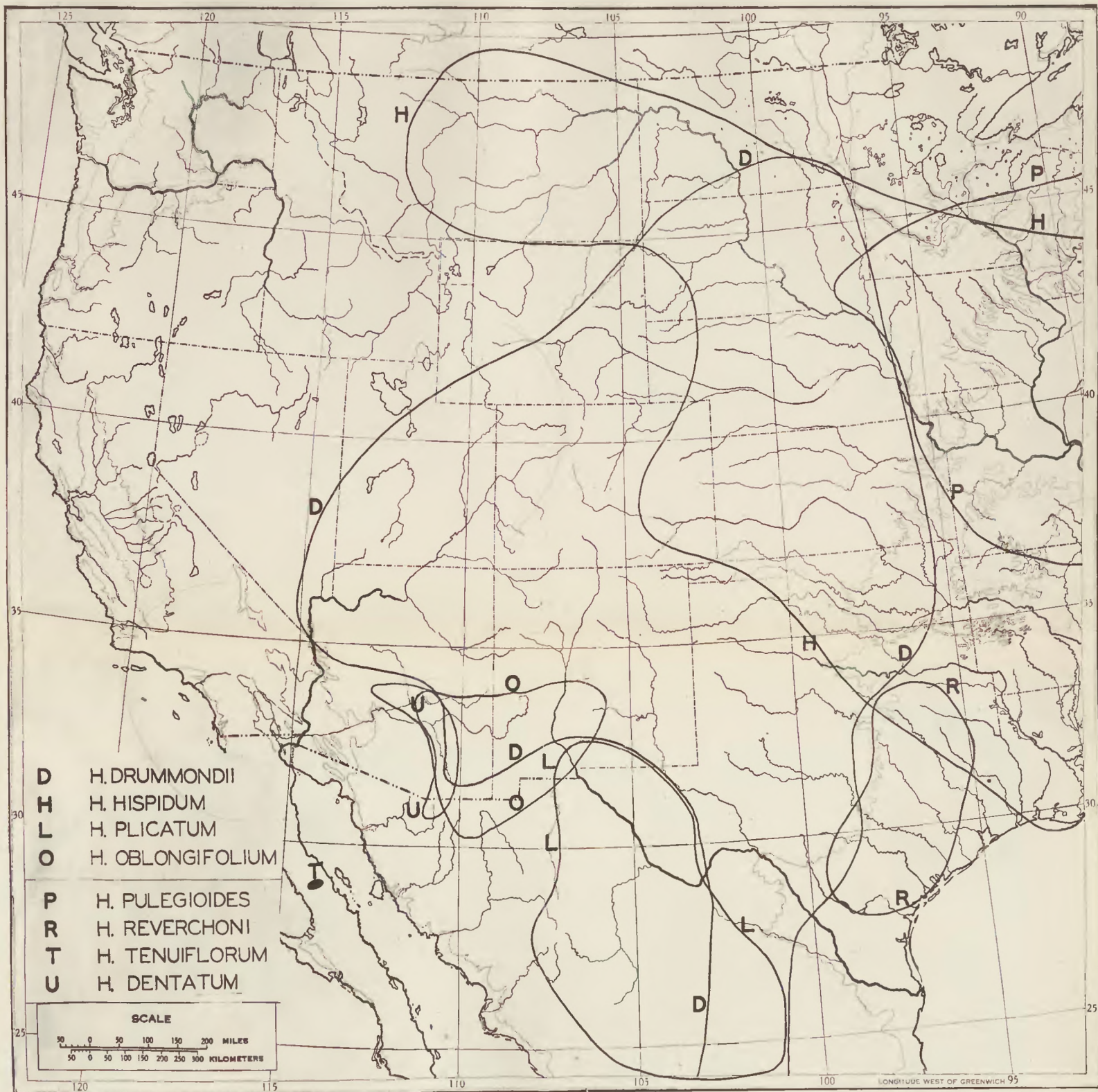


Lc

H. *Friothymus rubiaceus*.
 J. *Stachydeome graveolens*.
 K. *Hochstia*: general type.

L. *Cumula*: a. *C. spicata*, *C. microcephala*, *C. fasciculata*;
 b. *C. spicata*, *C. tenuifolia*, *C. incisa*, *C. angustifolia*;
 c. *C. pycnantha*, *C. lythrifolia*.

GOODE'S SERIES OF BASE MAPS. THE UNITED STATES ON THE CONIC PROJECTION. WEST HALF NO.209 W

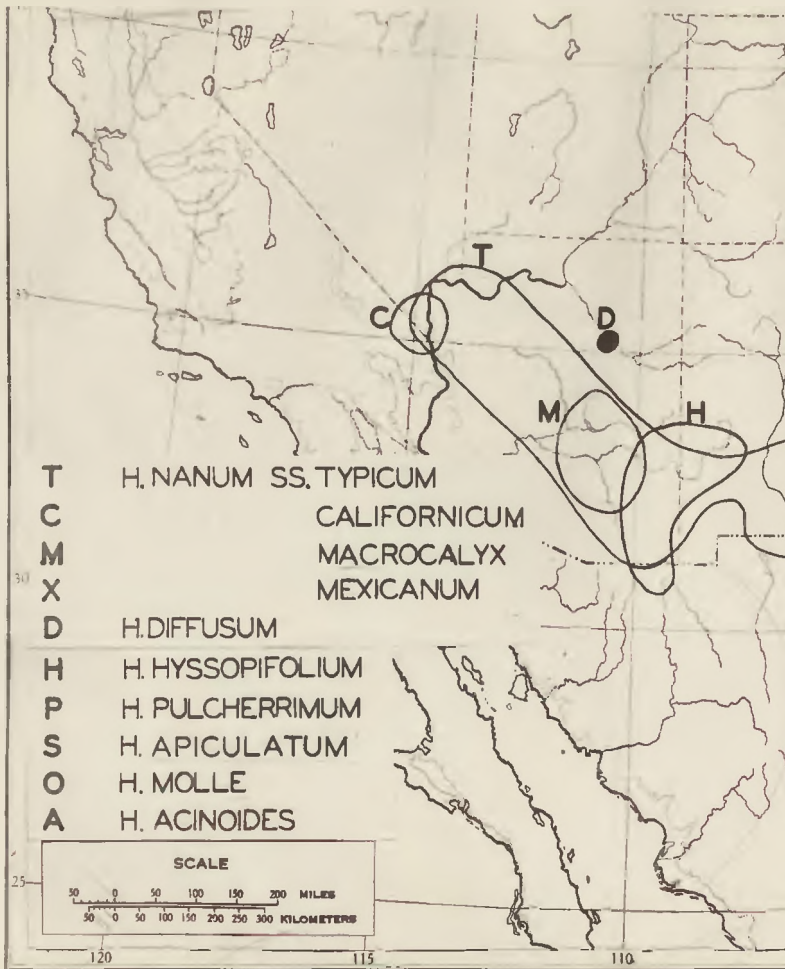


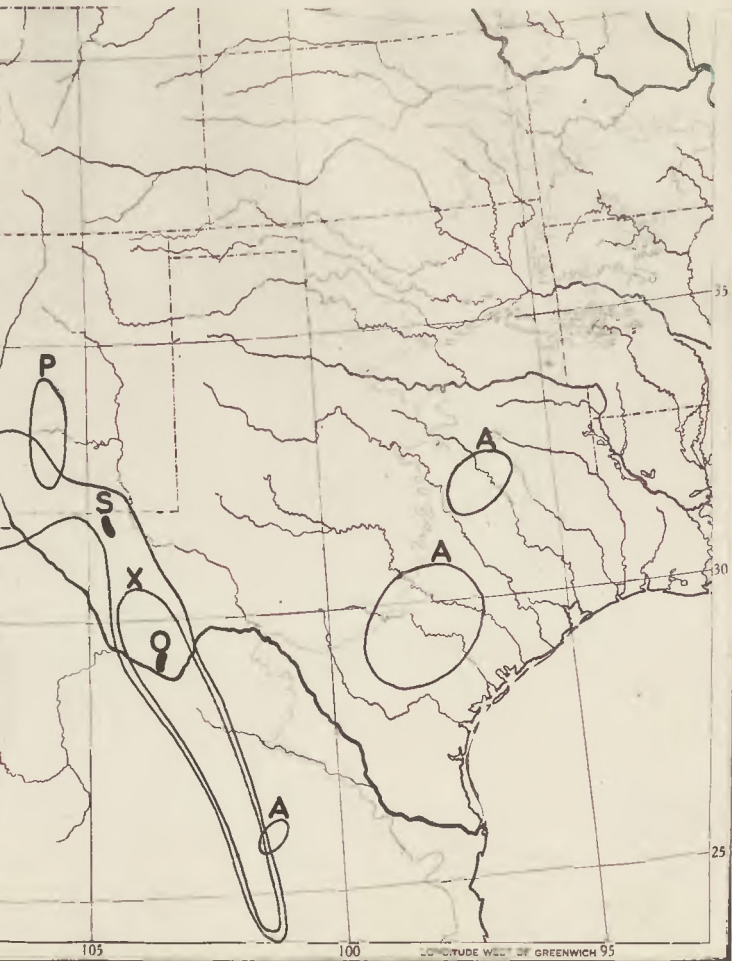
- | | |
|---|------------------|
| D | H. DRUMMONDII |
| H | H. HISPIDUM |
| L | H. PLICATUM |
| O | H. OBLONGIFOLIUM |
| | |
| P | H. PULEGIOIDES |
| R | H. REVERCHONI |
| T | H. TENUIFLORUM |
| U | H. DENTATUM |

SCALE

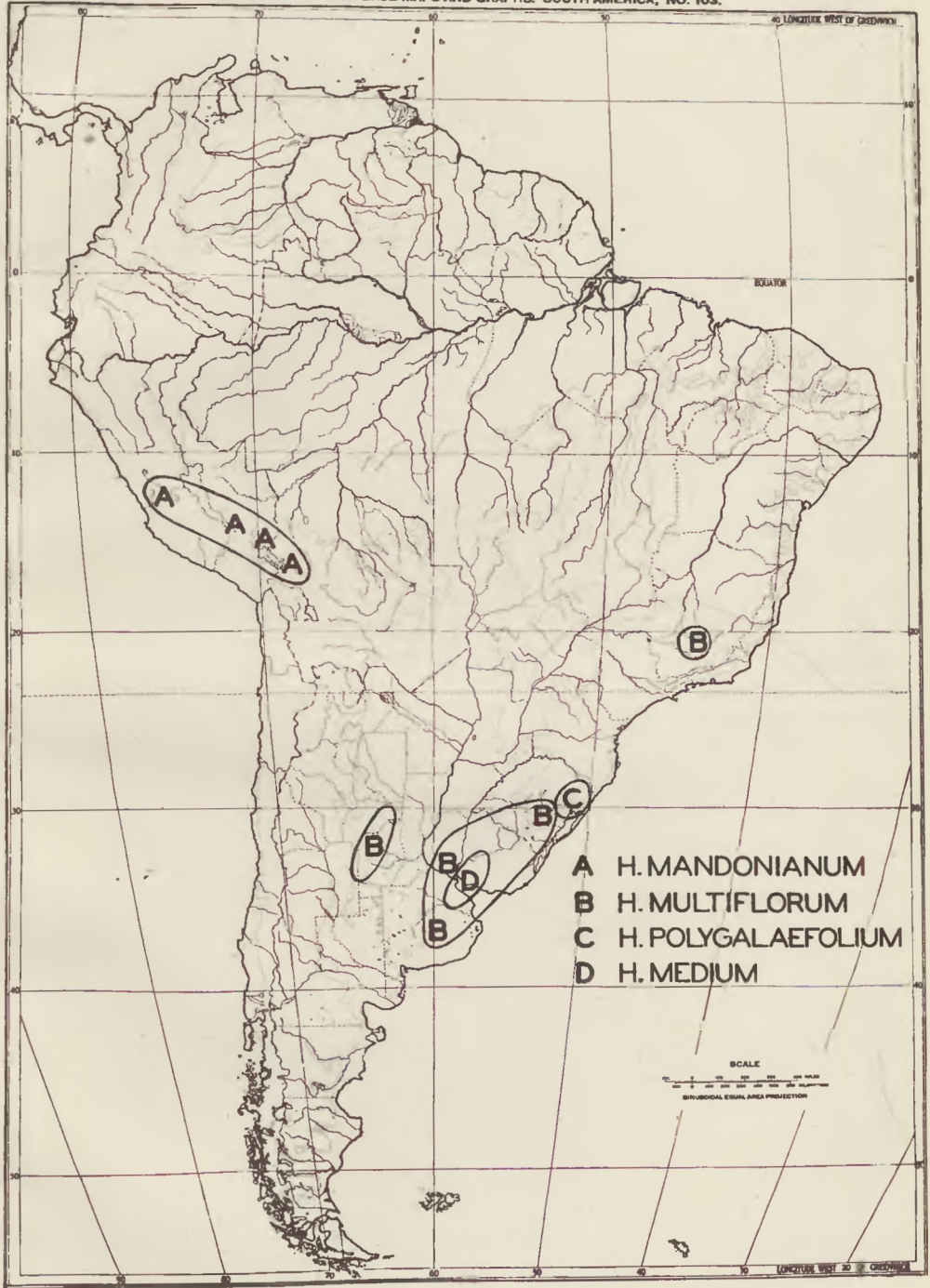
0 50 100 150 200 MILES
 0 50 100 150 200 250 300 KILOMETERS

LONGITUDE WEST OF GREENWICH 95





GOODE'S SERIES OF BASE MAPS AND GRAPHS. SOUTH AMERICA, NO. 103.



- A** H. MANDONIANUM
- B** H. MULTIFLORUM
- C** H. POLYGALAEFOLIUM
- D** H. MEDIUM

SCALE
 0 100 200 300 400 500 600 700 800 900 1000
 BIBBOLD EQUAL AREA PROJECTION





H H. HISPIDUM
P H. PULEGIOIDES

SCALE

50 0 50 100 150 200 MILES
 50 0 50 100 150 200 250 300 KILOMETERS

LONGITUDE WEST OF GREENWICH

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