

STUDIES IN THE BORAGINACEAE, XXVIII.
NEW OR OTHERWISE INTERESTING SPECIES FROM
AMERICA AND ASIA

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Cordia (§ *Varronia*) *lauta*, sp. nov.

Frutex 1.5–2 m. altus; ramulis 5–7 mm. crassis antrorse fulvo-strigosis (pilis ca. 1 mm. longis); foliis ellipticis evidenter venosis 8–12 cm. longis 5–7 cm. latis medium versus vel paulo infra medium latissimis utroque angulatis, margine evidenter irregulariterque serratis, supra fulvescentibus abundanter strigosis (pilis rectis 0.5–1 mm. longis e basibus disciformibus ca. 0.2 mm. diametro erumpentibus), subtus pallidioribus juventate plus minusve tomentulosis (pilis curvatis vel subtortuosis albis vel griseis gracilibus plerumque ca. 0.5 mm. longis); petiolis crassis 5–10 mm. longis fulvo-strigosis; pedunculo perelongate 10–30 cm. longo 3–4 mm. crasso terminali vel internodali; inflorescentia capitata ante anthesin 3–3.5 mm. diametro; calyce in alabastro obovoideo 12–16 mm. longo apicem versus 7–8 mm. crasso supra medium strigoso sessili, lobis triangularibus 4–4.5 mm. longis basi 3–4.5 mm. latis acutis fere ad apicem appendiculis liberis crassiusculis ad 1.5 mm. longis donatis; corolla conspicua alba infundibuliformi 6.0–7.8 cm. longa glaberrima 6–7-mera, limbo 4–5 cm. diametro; lobis ad 20 mm. latis ad 5 mm. longis rotundis vel subtruncatis, tubo ad 3 cm. longo nervis validis 12 vel 14 donato basi imo ca. 5 mm. crasso 1.5–2 cm. supra basim ca. 3 mm. crasso deinde sursum ampliato; staminibus 6–7 inclusis; antheris 4 mm. longis ad 1 mm. latis paulo infra medium affixis basi 1.5–7 mm. profunde lobatis apice emarginatis, supra medium connectivo lato encrassato donatis; filamentis 30–35 mm. longis filiformibus 3–3.5 mm. supra basim corollae affixis, ca. 1–5 mm. infra basim sinuum limbi corollae attingentibus; pollinis sphaericis ca. 160 μ prominenter abundanterque papillatis et minute punctulatis oribus circularibus 3 donatis; stylo 75–80 mm. longo e corolla breviter exserto, apice ca. 2.5 mm. profunde lobatis, lobis ca. 1 mm. profunde lobulatis; stigmatibus 4 capitatis terminatis; fructu ignoto.

MEXICO: Plan de Barrancas, Jalisco, steep rocky volcanic slopes, 2500–3500 ft. alt., shrub 1.5–2 m. tall, with white flowers, July 17, 1951, *H. S. Gentry & C. L. Gilly 10878* (TYPE, Arn. Arb.).

A species notable for its robust habit, coarse, very elongate peduncles, large calyces, and very large corollas. The corollas are certainly the largest known in the section *Varronia* and, furthermore, are larger than those of any other American member of the genus *Cordia*. The pollen is notable for its large size and its verrucose surface. Relationships of the species are uncertain. It must be classified with those *Varronias* having distinctly

capitate, terminal or extra-axillary inflorescences and simple, non-stellate indument. It has, however, no evident relationship with any of the members of that assemblage either north or south of the Equator. The species is one of the most distinct members of its genus that has been discovered in America during the past quarter century.

Cordia salvifolia Juss. ex Poir. Encyc. 7: 46 (1806).

Cordia Buchii Urban, Symb. Ant. 1: 475 (1900).

The type of *Cordia salvifolia* is in folder no. 6476 of the Jussieu Herbarium at Paris. A recent examination of the specimen reveals it to be a sterile branch of the endemic species of the island of Hispaniola which Urban described under the name *Cordia Buchii*. It does not represent the shrub of the Lesser Antilles which has been accepted as "*Cordia salvifolia*" for over a century. The label associated with Jussieu's type bears only the following data: "*Cordia salvifolia* J., donne par M. Dupuis".

Cordia (§ *Varronia*) *nesophila*, sp. nov.

Frutex 1–3 m. altus; ramis hornotinis 2–4 mm. crassis strigosis (pilis rigidis 0.1–0.4 mm. longis); foliis lanceolatis vel elliptico-lanceolatis 5–12 cm. longis 2–5 cm. latis, apice acutis, basi acutis vel plus minusve rotundis in petiolum 8–12 mm. longum abrupte contractis, margine dentatis vel dentato-crenatis, in facie superiore scabridis (setis minutis rigidis ascendentibus vel appressis e basi incrassata vel discoidea erumpentibus 0.1–0.5 mm. longis), in facie inferiore pallidioribus (pilis tenuioribus mollibus brevibus curvatis secus nervos gestis); nervis foliorum supra impressis, subtus prominentibus, primariis utroque latere costae 8–14 sub angulo ca. 45° abeuntibus vix vel parvum arcuatis, secundariis et tertiariis areolato-anastomosantibus; inflorescentia laxe ascendenterque dichotoma corymbosa 3–6 cm. lata multiflora 1–5 cm. longe pedunculata in ramis hornotinis terminali; calyce campanulato ca. 3.5 mm. longo, lobis deltoideis ca. 1 mm. longis nullo modo appendiculatis; corolla alba, 5.5 mm. longa tubulosa; lobis ascendentibus rotundis erosis et crispis saepe ca. 2 mm. longis et 2 mm. latis; tubo ad 2 mm. crasso, intus solum secus nervum infra insertionem staminum positum inconspicue villuloso; staminibus inclusis; filamentis 0.2–0.8 mm. longis 1.7–2.8 mm. supra basim corollae affixis; antheris 1–1.5 mm. longis; stylo 2–2.5 longo calyce vix exserto; endocarpio maturitate subgloboso 3–5 mm. longo.

WEST INDIES: St. Lucia, Dauphin, *P. Beard* 1080 (G); Martinique, St. Anne, *Stehlé* 6161 (A); Martinique, *Duss* 287 (G); Guadeloupe, Anse — Bertrand, *Stehlé* 2698 (G), 2689 (G); Marie-Galante, Capesterre, *H. Stehlé* 2678 (TYPE, Gray Herb.); Antigua, *Rose, Fitch & Russell* 3339 (G); Barbuda, near Codrington Village, *Box* 613 (G).

The plant described above is the well known and unmistakable species of the Lesser Antilles which for nearly a century and a half has been

accepted as "*Cordia salvifolia*". The most recent treatment of it is to be found in my account of the "Boraginaceae of the Southern West Indies", Jour. Arn. Arb. 30: 117 (1949). Unhappily, study of the historic specimens at Paris has revealed that the name *C. salvifolia* Juss. ex Poir. Encyc. 7: 46 (1860) applies not to the present species but rather to the very different *Cordia Buchii* Urban (1900), of adjacent southern portions of Haiti and Santo Domingo. Since our plant has no available legitimate name a new one must be proposed.

***Cordia* (§ *Varronia*) *lippioides*, sp. nov.**

Frutex; ramis hornotinis ca. 10 cm. longis ad 2 mm. crassis hispido-villosis (pilis 0.5–1 mm. longis); foliis ovatis vel ellipticis 1–2 cm. longis 8–14 mm. latis, basi abrupte acutis in petiolum ca. 2 mm. longum attenuatis, margine crenatis, supra viridibus areolato-bullatis scabris, subtus pallidis nervosis villosis; inflorescentia in ramis terminali vel laterali et oppositifoliata dense hemispherica vel subglobosa 16–20 mm. diametro 15–20-flora 1–2.5 cm. longe pedunculata; calyce sub anthesi 5.5–9 mm. longo supra medium lobato, in alabastro obovato ad 3 mm. crasso apice appendiculas 5 setaceas 1–2 mm. longas liberis terminato; lobis calycis longe subulateque productis, apice setaceis flexuosis hispidulis (pilis saepe brunneis 0.3–0.8 mm. longis); corolla late tubulosa 6.5 mm. longa apice ca. 5 mm. crassa basi ad 2.5 mm. diametro, intus infra insertionem filamentis villulosa, limbo subintegro; filamentis 2–2.5 mm. longis subulatis ca. 3.5 mm. supra basim corollae affixis; stylo 5.5 mm. longo, lobis spatulatis ca. 1 mm. longis; drupa rubra, endocarpio irregulariter elliptico-ovoideo 6 mm. longo 3 mm. crasso.

PERU: Conay, abajo de Chiquián, dept. Ancash, prov. Bolognesi, monte pluvifolio, 2600 m. alt., May 12, 1950, *Emma Cerrate 565* (TYPE, Gray Herb.).

Most closely related to *C. lantanoides* Spreng. (*Varronia crenata* R. & S.), which it closely resembles in foliage and gross habit. It differs from that species, however, in having not only a very much larger calyx but also one in which the lobes have very prolonged tips which are free and flexuous in the bud.

***Cordia* (§ *Varronia*) *munda*, sp. nov.**

Frutex 12–15 dm. altus; ramis hornotinis 4–10 cm. longis 1–1.5 mm. crassis saepissime simplicibus hispidulo-villulosis (pilis saepe brunneis rectis ascendentibus vel divaricatis 0.5–1 mm. longis); ramis vetustioribus cicatriculas foliorum delapsorum prominulas proferentibus; foliis ovatis vel late lanceolatis 20–45 mm. longis 10–20 mm. latis, apice acutis, basi acutis in petiolum gracilem 2–4 mm. longum contractis, margine crenatodentatis, supra viridibus pilis rigidulis laxe adpressis vestitis, subtus strigosis; nervis utroque latere costae 5–6 sub angulo ca. 45° abeuntibus curvatis; inflorescentia dense capitata saepe ca. 12 mm. diametro in ramis

terminali graciliter 3–8 cm. longeque pedunculata, calyce 6–7 mm. longo campanulato pilis brunneis 0.5–1 mm. longis gesto, lobis acutis triangularibus valvatis 1.7–2.5 mm. longis; corolla alba conspicua infundibuliformi ca. 25 mm. longa, limbo ascendenti 25–30 mm. diametro, lobis rotundis 7–10 mm. longis, tubo 5–6 mm. longo 2.5–3.5 mm. crasso in zona 1–3 mm. supra basim corollae posita sparse villosa; filamentis subulatis 2–2.5 mm. longis 4.5–6.5 mm. supra basim corollae in altitudinibus diversis affixis, antheris 1.3 mm. longis; stylo 4 mm. longo, lobis 1.5 et 1 mm. longis; fructu ignoto.

PERU: abajo de Aiza, entre Catahuasi y Tupe, dept. Lima, prov. Yauyos, monte subxerófilo, fl. blancas, muy vistosas, 2300 m. alt., Jan. 30, 1952, *Emma Cerrate & O. Tovar 1294* (TYPE, Gray Herb.).

A member of the section *Varronia* which has an indument of simple (non-stellate) hairs and a terminal inflorescence that is decidedly capitate. The attractive large white infundibuliform corollas have an evidently lobed limb. The calyx-lobes are triangular and have merely an acute apex. The calyx in the bud, accordingly, is rounded on the summit and is not at all terminally appendaged. The species is probably most closely related to *C. Bridgesii* (Fresen.) Johnston, of Bolivia, from which it differs in the much larger, more deeply lobed corollas, the unappendaged calyx, and the larger leaves.

Cordia (§ *Varronia*) *Vargasii*, sp. nov.

Frutex 15–30 dm. altus; ramis hornotinis 5–25 cm. longis ad 4 mm. crassis velutinis (pilis brunneis 0.5–0.89 mm. longis); ramis annotinis glabratis cicatricis foliorum delapsorum prominentis 1–2 mm. altas proferentibus; foliis ovatis vel ovato-ellipticis paulo asymmetricis 3–10 cm. longis 2.5–5.5 cm. latis, basi obtusis vel rotundis in petiolum 4–6 mm. longum abrupte contractis, apice late acutis, margine evidenter serratis, facie superiore pilis rectis rigidulis 0.4–0.8 mm. longis obsitis, subtus hispidulo-villulosis pallidioribus; nervis primariis foliorum validis aliquando apicem versis furcatis, utroque latere costae 5–7 donatis, nervis secundariis evidentibus numerosis eos primarios conjunctibus; inflorescentia dense capitata 15–23 mm. diametro in ramo hornotino terminali et interdum ex axillis foliorum superiorum rami oriente 2–8 cm. longe pedunculata; calyce anguste campanulato to 5–7 mm. longo apicem versus 4 mm. crasso supra medium pilos brunneos dense proferente in alabastro breviter crasseque apiculato; corolla 5.5–7 mm. longa ut videtur flava tubulosa quam calyce ca. 2 mm. longiore, intus in zona ca. 1 mm. lata infra insertionem staminum posita villosa, basi tubo 1.5–2 mm. crasso, limbo 3–4 mm. crasso, lobis inconspicuis erosis plus minusve rotundis recurvatis ad 1.5 mm. latis et 0.7 mm. longis; filamentis 1.5–2 mm. longis 3–4.5 mm. supra basim corollae affixis; antheris ellipticis ca. 1 mm. longis vix exsertis; stylo aut 2–3 mm. longo et in calyce incluso aut ca. 5 mm. longo et calyce exserto, lobis 0.5–1 mm. longis; fructu ignoto.

PERU (dept. Cuzco): Aobamba, prov. Convención, 1600–1700 m. alt., Nov. 23, 1950, *C. Vargas* 9790 (TYPE, Gray Herb.); Amaibamba, prov. Convención, Dec. 29–30, 1948, *C. Vargas* 7514 (G); Machupicchu, Oct. 1931, *F. L. Herrera* 3227 (G).

This plant has many-flowered, very dense, capitate inflorescences borne on naked peduncles that terminate the leafy stems and sometimes also arise from the upper-most leaf-axils. The leaves are ovate and in form and size are reminiscent of the foliage of *C. spinescens* L. (= *C. ferruginea* Lam.) but differ from it in having petioles which are not decurrent on any subtended peduncle. The closest relationships of *C. Vargasii* appear to be with *C. axillaris* Johnston, of eastern Brazil and the Amazon headwaters of northern Peru (Alto Rio Huallaga, *Klug* 4385). From that species it differs in its ovate (rather than lanceolate) leaves, its less copious indument of shorter hairs, its more elongate, larger calyces, and its prevailing terminal heads of flowers.

Cordia Gharaf (Forsk.) Ehrenb. ex Asch., Sitzung.-Berichte Ges. Naturf. Freunde Berlin 1879: 46 (1879) & Verhandl. Bot. Verein Brandenb. 21²: 69 (1880); Muschler, Manual Fl. Egypt 2: 781 (1912).

Cornus Gharaf Forsk. Fl. Aegypt.-Arab. pg. xcix (1775).

Cornus sanguinea Forsk. Fl. Aegypt.-Arab. 33 (1775), not *Cornus sanguinea* L. (1753).

Cordia sinensis Lam. Tab. Encyc. 1: 423 (1791); Johnston, Journ. Arn. Arb. 32: 11 (1951).

Cordia Rothii R. & S. Syst. 4: 798 (1819).

Cordia subopposita DC. Prodr. 9: 480 (1845).

The identity of *C. sinensis* Lam. (1791) has long remained a mystery and there are numerous guesses recorded in the literature as to what species and genus it might represent. During a recent visit to Paris I took the opportunity to examine the type specimen in Lamarck's herbarium. Much to my surprise I found the plant to be the very distinctive desert shrub, *Cordia Gharaf* (Forsk.) Ehrenb., which occurs in Pakistan and western India and also in the deserts of Arabia and eastern Africa. The eastern form of the species, that found in India and Pakistan, was formerly distinguished as *Cordia Rothii* R. & S. The plant does not grow in China nor is it to be expected there. The geographic data associated with the type of *Cordia sinensis* Lam. are accordingly false and misleading. Sonnerat, the collector of the type, must have found the plant in western India.

The name *Cordia Gharaf* currently appears to be generally accepted as the proper name for the present species. Its claims for acceptance, however, are somewhat questionable. The basionym, *Cornus Gharaf*, was not described by Forskål. It is mentioned six times (on pages xci, xciii, xcv, xcvi, xcvi and xcix) in the prefatory portions of his book concerned with the plants of Yemen and there only as a name in lists of economic plants. It is always a bare name except on pg. xcix where, in a list of medical

plants, it is given as follows: "*CORNUS gharaf*. C. II. 10. In cephalalgia." The symbols (C. II. 10.) refer to Centuria II, species no. 10, or in other words to the main body of Forskål's book in which species are described and given individual treatment. The particular reference is to the account of *Cornus sanguinea* of pg. 33. *Cornus sanguinea* Forsk. and the nomen nudum *Cornus Gharaf* Forsk., are alternate equivalent names for one and the same species. The reference on pg. xcix is evidence of this. Indicative also is the fact that all the economic uses attributed in various lists to *Cornus Gharaf* are all mentioned again in the paragraph in which *Cornus sanguinea* is described and its properties enumerated. Although the binomial *C. Gharaf* is not cited as a synonym in the account of *S. sanguinea*, the vernacular "gharaf" is given as a name applied to the plant at Hodeida, Yemen. It seems likely that the binomial *Cornus Gharaf* was intended as only a temporary appellation, perhaps for use by Forskål during his field work. Although used in his notes, it was one which he subsequently planned to replace with the name *Cornus sanguinea*. In the posthumous editing of his manuscripts by Niebuhr, the preliminary name was not altered, with the result that two names for the species were published.

The two binomials published in Forskål's "Flora Aegyptiaco-Arabica" are the oldest ones applied to the *Cordia* in which we are interested. Of these, *Cornus sanguinea* Forsk. (1775) is a later homonym of *Cornus sanguinea* L. (1753) and must be rejected. Being illegitimate it can not serve as a basionym and the specific epithet is not available for transfer to *Cordia*. Accordingly only *Cornus Gharaf* Forsk. is available as a possible basis for a binomial combination under *Cordia*. As I have indicated, even the validity of this name is open to possible challenge. A case against its acceptance can be made on the grounds that obviously it is a temporary, provisional or alternative name which the author did not intend to retain and would not have published had he lived to edit and publish his own manuscript. Nevertheless the binomial actually is published and on pg. xcix of Forskål's book is associated with a description of a plant printed on pg. 33 of the same volume. The minimum requirements for valid publication of the name *Cornus Gharaf* seem to be fulfilled. This is desirable, for otherwise *Cordia Gharaf* (Forsk.) Asch. would not be the valid correct name for our plant and the obscure, long-confused species with the inappropriate name *Cordia sinensis* Lam. would have to be accepted in its stead.

***Bourreria Rowellii*, sp. nov.**

Arbor ad 4-5 m. alta; foliis oblanceolatis 5-7 cm. longis 16-22 mm. latis nervosis (nervis ramosis utroque lateris costae 5-8) supra medium latioribus deinde deorsum gradatim attenuatis, basi acutis, apice obtusis, facie superiore glabris vel solum secus costam sulcatam sparsissime inconspicuisque villulosis, facie inferiore pallidioribus leviter appressovillulosis (pilulis gracillimis 0.2-0.5 mm. longis), margine anguste revolutis; petiolo gracili 0.3-0.6 mm. longo; inflorescentia terminali laxa

cymosa 3–5 cm. diametro 6–12-flora; calyce 7–8 mm. longo, tube 4–4.5 mm. diametro basi rotundo sessili, lobis triangularibus acutis erectis ca. 3 mm. longis et 2.5 mm. latis, extus griseis minute villulosis, intus albis dense strigosis; corolla alba infundibuliformi ad 17 mm. longa a basi 3 mm. crassa sursum gradatim expansa, limbo 15–18 mm. diametro, lobis ascendentibus rotundis 5–7 mm. diametro extus sparse inconspicueque stipitato-glanduliferis et secus nervum medialem pilos paucos albos adpressos ad 1 mm. longos proferentibus; filamentis attenuatis ca. 8 mm. longis stipitato-glanduliferis nullo modo villulosis ca. 4.5 mm. supra basim corollae affixis apice basim sinuum limbi corollae 1–2 mm. longe superantibus; antheris 3 mm. longis; granulis pollinis 3-colpatis a latere visis transverse ellipticis 65μ latis 50μ altis, desuper visis circularibus vel plus minusve triangularibus 65μ latis; stylo glaberrimo 10–12 mm. longo apice 2–3 mm. profunde bilobato; fructu ignoto.

MEXICO: rocky limestone hillside 1 mile west of Colotlipa, Guerrero, 2700 ft., tree 15 ft. tall with white flowers, June 24, 1953, *Chester M. Rowell, Jr. & H. D. Irby 3545* (TYPE, Arn. Arb.).

An arborescent species with funnellform corollas, ascending corolla-lobes and non-exserted stamens. Its relatively small, oblanceolate leaves are neither pustulate nor hairy on the upper surface. The plant grows in the same region as *Bourreria spathulata* (Miers) Hemsl. The latter is readily distinguished by having widely spreading corolla-lobes, conspicuously protrudent villulose, as well as glanduliferous filaments, and smaller leaves with few evident veins and a short-strigose, usually pustulate upper leaf-face. The closest relation of *B. Rowellii* is probably *B. Hintonii* Johnston of coastal Guerrero. The latter has scabrous upper leaf-surfaces but otherwise the plant is practically glabrous. Its calyx is narrower and the calyx-lobes more slender and its filaments completely glabrous, bearing neither hairs nor stipitate glands.

Tournefortia Romeroi, sp. nov.

Frutex 2 m. altus velutinus; ramis hornotinis fistulosis ad 0.9 mm. crassis dense velutinis (pilis ca. 1 mm. longis abundantissimis); foliis elliptico-lanceolatis 12–25 cm. longis 5–9 cm. latis, apice graciliter longeque attenuatis, basi acutis in petiolum 10–20 mm. longum 2–3 mm. crassum velutinum attenuatis, margine inconspicue minuteque denticulatis, supra sparse velutinis (pilis ca. 0.5 mm. longis erectis solum in aerolis nervorum crebris secus nervos ipsos carentibus); subtus pallidioribus dense velutinis (pilis ca. 1 mm. longis gracillimis solum secus costam et nervos gestis); nervis laminae folii primariis utroque latere costae 12–15 arcuatis, eis secundariis tertiariisque reticulato-anastomosantibus in facie superiore folii areolas minutas 0.5–1.0 mm. latas numerosissimas circumscribentibus; inflorescentia e axillaribus foliorum superiorum orienti pendula 5–7 cm. longe pedunculata dichotoma, ramis duobus simplicibus 5–10 cm. longis vel eis iterum ramosis; calyce sessili, lobis conspicue inaequalibus gracilli-

mis subulatis supra medium non rariter recurvatis basim versus 0.4–0.6 mm. latis, lobo majore 7–8 mm. longo, minore 4–6 mm. longo; corolla pallide viridi 10–12 mm. longa, extus pilulis 0.1–0.2 mm. longis sparse obsita, intus glaberrima, tubo elongato infra medium 0.5–1.0 mm. crasso, apicem versus crassissimo in faucis 2–3 mm. longos 1.5–2.5 mm. crassos expanso, lobis ascendentibus lanceolatis vel oblongis acuminatis 1.8–2 mm. longis 0.8–1.5 mm. latis; antheris oblongis ca. 0.7 mm. longis supra basim affixis; filamentis perbrevisibus 0.1–0.2 mm. longis ca. 1 mm. infra basim loborum corollae insertis; ovario glabro sub anthesi angusto ovoideo ca. 1 mm. longo stylum glabrum 4–6 mm. longum proferenti; stigmatate annulum ca. 0.5 mm. diametro gerenti, apice appendiculam sterilem 0.3–0.5 mm. longam subconicam proferenti; fructu ignoto.

COLOMBIA: La Guayaana (Tumaco), dept. Nariño, shrub 2m. tall, inflorescence pendant, sepals green, corolla pale green, lobes on face pale salmon-color in age, ovary green globose-oblong, June 24, 1951, *R. Romero-Castañeda* 2837 (G); El Diviso, Km. 86 F.C. Tumaco, dept. Nariño, shrub 2 m., inflorescence pendulous; corolla pale green, the lobes pale salmon in age, sepals green, "oreja de macho," July 27, 1952, *R. Romero-Castañeda* 3317 (TYPE, Arn. Arb.).

A very well marked species notable for its velvety indument, the pendulous inflorescence, the very slender and elongate sepals, and the slender elongate corollas. The two collections studied are dark from a very dense velvety indument decidedly brown in color. It is not known if this color is present in the living plant or if it is assumed by the plant in drying.

Associated with this new species from southwestern Colombia, is the name of the collector, Rafael Romero-Castañeda, of the Ministerio de Agriculture, Bogota. Sr. Romero-Castañeda has sent me various lots of Boraginaceae collected during his travels about Colombia. It is fitting that his name should be associated with one of his most attractive discoveries.

Tournefortia microcalyx (R. & P.), comb. nov.

Heliotropium microcalyx R. & P. Fl. Peruv. 2: 3, t. 109b (1799).

Tournefortia obtusiflora Benth. Bot. Voy. Sulphur 140 (1845).

Over 25 years ago, Contr. Gray Herb. 81: 72 (1928), after study of authentic material, I indicated that the species of Ruiz & Pavon was properly classified as a species of *Tournefortia*, but by some mischance the new name required in transferring it to *Tournefortia* was never published. The plant concerned is a readily recognizable one apparently common in a large area in the province of Lima, Peru. Although the source of the type-collection was originally given as "in Peruviae collibus per Huanuci Provinciam", I have collections of the species only from west of the high mountains. It apparently ranges from the Lima area northward on the Pacific slope into southern Ecuador.

Heliotropium Ferreyrae, sp. nov.

Frutex 6–8 dm. altus; ramis numerosis gracillimis 1–2 mm. crassis ascenderet ramosis inconspicue strigulosis (pilis vix abundantibus gracillimis valde adpressis rectis 0.2–0.8 mm. longis); foliis abundantibus non rariter fasciculatis 2–5 cm. longis 1–5 mm. latis, supra medium latioribus deinde deorsum in basim subpetiolatam gradatim longeque attenuatis, apice gradatim attenuatis, supra strigulosis (pilis 0.2–0.5 mm. longis) costa profunde sulcata donatis, subtus pallidis pilis 0.2–1.0 mm. longis vestitis costa prominenti donatis; cymis caulem ramosque terminantibus ebracteatis geminatis ternatisve gracillimis multifloribus 5–25 cm. longis solum ad apicem scorpioideis; floribus numerosis sub anthesi congestis, fructiferis 5–15 mm. distantibus; calyce ad anthesin 2 mm., longo pentifido, lobis inaequalibus anguste lanceolatis tubo corollae subaequilongis; calyce fructifero vix accrescenti 0–1 mm. longe pedicellato; corolla alba 2.3–2.7 mm. longa; tubo corollae subcylindrico 1.5–1.7 mm. longo ca. 1 mm. crasso, extus strigoso, intus secus venas infra lobos corollae positas minute albo-hispidulo alibi glabro; limbo corollae 2–2.2 mm. diametro, lobis recurvatis triangularibus ca. 0.7 mm. longis; sinibus limbi basi truncatis inflexo-plicatis; antheris elongatis haud cohaerentibus subsessilibus 0.8 longis ad 0.2 mm. latis ad 0.8 mm. supra basim corollae basifixis, apice rotundis nec appendiculatas nec pilas evidenter gerentibus; stigmatibus sessilibus elongato sursum angustato ad 0.8 mm. longo basi annulo ad 0.25 mm. diametro donato, apice angusto ad 0.15 mm. crasso saepe obscure emarginato; fructu ca. 1.5 mm. alto ca. 2 mm. lato 4-lobato apice obtuso stigmatem sessilem gerente; nuculis 4 dorso convexis et strigosis, ventre angulatis.

PERU (Prov. Piura): 100 km. south of Piura, shrub 6–8 dm. tall, sandy pampa, 250–300 m. alt., fl. white, May 2, 1949, *Ramón Ferreyra 6044* (TYPE, Arn. Arb.).

A species most closely related to *Heliotropium polyanthellum* Johnston of northern Peru but quickly distinguishable from it by having lines of hairs in the corolla-throat and by having a sessile stigma. In the related species the corolla-throat is glabrous and the stigma is borne on a style 0.2–0.3 mm. long. The proposed species has other characters in its scanty indument, very slender and elongate loosely branched stems, greatly elongating cymes, and small corolla with proportionately shorter tube.

Coldenia Ferreyrae, sp. nov.

Frutex prostratus glanduliferus dichotome ramosus; caulibus 1–5 dm. longis nodosis faciliter disarticulatis, internodiis 1–5 cm. longis 1–4 mm. crassis juventate hispidulis et stipitato-glanduliferis, maturitate cortice chartacea decidua donatis; foliis ad nodos caulium aggregatis; lamina crassiuscula strigosa vel adpresse hispidulo-villulosa et sparse glandulifera.

elliptica 0.8–1.5 cm. longa 3–5 mm. lata utroque acuta, basi in petiolum gracilem villosum glanduliferum 3–5 mm. longum attenuata, supra utrinque lateribus costae sulcatae nervis 2–4 sulcatis donata, subtus costa et nervis latis prominulis donatis, margine revoluta; floribus glomeratis; calyce sessili 5–6 mm. longo, lobis sub anthesi subulatis villuloso-hispidulis et glanduliferis tubum corollae breviter superantibus, tubo calycis fructiferi evidenter 5-costato, costis prominenter suberoso-encrassatis; corolla alba infundibuliformi glaberrima 9–11 mm. longa, tubo cylindrico ca. 4.5 mm. longo et ca. 1 mm. crasso, limbo 5–7 mm. diametro, lobis ascendentibus obovatis ca. 3 mm. longis 2–2.3 mm. latis; filamentis filiformibus 4–7 mm. longis evidenter exsertis, in faucibus 5–6 mm. supra basim corollae insertis, infra insertionem deorsum secus costam invaginatam tubi corollae 2–3 mm. longe decurrentibus (tubo corollae infra basibus decurrentibus filamentorum nullo modo appendiculato); antheris ca. 1.0 mm. longis; pollinis desuper visis ca. 33 μ latis plus minusve trilateralibus, a latere visis quadratis 33 x 41 μ poris 3; stylo filiformi 11–14 mm. longo apicem versus furcato, lobis 0.5–1 mm. longis, stigmatibus minutis; ovulis 4; nuculis saepe 2, 1.3–1.5 mm. longis, dorse alte convexis dense minutissimeque papillatis, ventre planis, margine angulatis sed nullo modo alatis.

PERU: (dept. Arequipa): betw. Nazca and Chala, Km. 545–46, Alt. 200 m., fl. white, Nov. 7, 1947, *R. Ferreyra 2506* (TYPE, Arn. Arb.); vicinity of Camaná, 20–30 m. alt., in sand, fl. white, *Ferreyra 2550* (G); Lomas de Camaná, 180–200 m., sand, fl. white, *Ferreyra 8847* (A); Rio de Lomas, Acaré, 800–900 m. alt., *Weberbauer 5734* (G).

A very well marked species readily distinguished from all other South American congeners by having the lobes of the fruiting calyx conspicuously thickened with corky ribs below the middle. The closest relation of the plant is the habitally similar *Coldenia simulans*, which comes from the same floristic area in coastal southern Peru. This latter species may be distinguished from *C. Ferreyrae* by the lobulate appendages which are well developed inside its corolla-tube, a pair being located about 1 mm. below the attachment of each stamen. These appendages, well developed also in *C. dichotoma*, are absent from the corolla of *C. Ferreyrae*. In all the three species mentioned the inner surface of the corolla-tube is ridged for 1–3 mm. directly below the attachment of each of the stamens. The ridges, although readily mistaken for thickened decurrent bases of the filaments, are actually formed by invagination, each of the ridges on the inside of the tube having a complement in a narrow, elongate depression at the same relative position on the outside of the tube. The vein leading to the stamen passes along the summit of the invaginate ridge but along the ridge the vein is not associated with an appendage. Below the invagination, however, there may be knife-like downwardly elongate appendages close to and paralleling the vein on left and right. In *C. simulans* and *C. dichotoma* the bialate appendage associated with the vein is conspicuously well developed just below the invagination, and is there decidedly lobulate and crisped. In *C. Ferreyrae* the appendages accompanying the veins are

obscure and at best very narrow and sometimes are even absent. Their presence or absence can be determined only by examination of the corolla under very high magnification. They are never enlarged, nor crisped, as is the case in both *C. simulans* and *C. dichotoma*.

The South American species are not separable by marked differences in pollen. The grains from species to species differ only slightly in size and form. In polar profile, though sometimes nearly circular, they tend to be more or less definitely three-sided with the angles broadly rounded. There are three pores. In lateral profile the grains are more or less quadrate in outline and are slightly to very evidently longer than broad. Viewed laterally the polar ends are broadly rounded while the sides are nearly straight and parallel. They measure 30–47 μ in length along the polar axis and 26–33 μ broad at the equator. The smallest average size occurs in *C. dichotoma* (26 x 30 μ) and the largest in *C. grandiflora* (33 x 47 μ). Pollen of the North American species has not been examined. The pollen of the Old World *C. procumbens* L., however, though showing general similarities with the *Coldenia* pollen examined, does differ in a number of notable respects. It has three pores and is also three sided in polar profile, but in lateral view is distinctly elliptic and is very much broader than long, being 25 μ in length along the polar axis and 33 μ broad at the equator. Unlike the pollen of the South American species, that of *C. procumbens* has a surface not practically smooth, but one that appears distinctly granulate.

Coldenia simulans, sp. nov.

Frutex prostratus glanduliferus dichotomus ramosissimus; caulibus 1–5 dm. longis nodosis faciliter disarticulatis, internodis 1–5 cm. longis 1–4 mm. crassis, juventate hispidulis et stipitato-glanduliferis, maturitate cortice chartacea decidua donatis; foliis ad nodos caulis aggregatis; lamina crassiuscula ovato vel lanceo-ovato acuta 7–14 mm. longa 3–5 mm. lata, supra strigosa utrinque lateribus costae nervis 2–3 sulcatis donata, subtus prominenter nervosa villulosa secus costam glandulifera, margine valde revoluta; petiolo 2–4 mm. longo glandulifero; floribus glomeratis; calyce sessili 3–4 mm. longo, lobis lanceolatis acutis villulosis tubo corollae subaequilongis; corolla alba infundibuliformi glabra 4.5–6 mm. longa, lobis ascendentibus obovatis ca. 2 mm. longis et 1 mm. latis, tubo cylindrico ca. 3 mm. longo et 1–1.3 mm. crasso summum ad apicem filamenta proferente infra insertionis filamentorum costis invaginatibus ad 1 mm. longis donato, basibus costarum (i.e. ca. 2 mm. supra basim corollae) appendiculis bialatis lobatis et crispis praedito; filamentis filiformibus inaequalibus 4–5 mm. longis evidentiter exsertis 3–3.5 mm. supra basim corollae insertis; antheris 0.8–1.1 mm. longis; stylo ca. 7 mm. longo, apice ca. 1 mm. profunde lineariter bilobato; nuculis 2–2.3 mm. longis 1.0–1.3 mm. latis plano-convexis.

PERU (dept. Arequipa): El Jagüay, Km. 538, fl. white, Aug. 22, 1948, *Rosa Scolnik 1010* (TYPE, Arn. Arb.); Puerto de Lomas, Oct. 3, 1931, *Father Jaffuel 2137* (G); Puerto de Lomas, *Weberbauer 5730* (G).

Closely related to *Coldenia dichotoma* and perhaps only a very well developed geographic variation differing in its small leaves and less evident conspicuously fewer veins. Whereas *C. dichotoma* has been found at various stations along the Peruvian coast from Lima north to Talara. *C. simulans* is known only from a limited area of coastal southern Peru lying just south of the Ica-Arequipa departmental boundary.

The Peruvian species of *Coldenia* all show a preference for sandy soil. Indeed, most of them are restricted to dunes, especially those near the ocean. Although proper ecological conditions appear to be almost continuously present along the length of the Peruvian coast, only one species of *Coldenia* ranges along more than half of it. *Coldenia parviflora* and *C. grandiflora* are known in Peru only from the interior, from sandy places and dunes near the city of Arequipa. *Coldenia conspicua* and *C. litoralis* are known from Peru only from the south coast, from Mollendo southward. *Coldenia Ferreyrae* and *C. simulans* are known only from a short section of coast between Mollendo and Lima. *Coldenia dichotoma* is known only from the Peruvian coast from Lima northward. The most widely distributed species, occurring along the coast and also well back from the coast, and in southern as well as in northern Peru, is *C. paronychioides*. Of the eight species known from Peru, five are endemic to the country; three (*C. grandiflora*, *C. litoralis*, *C. paronychioides*) extend well southward into Chile; and only *C. paronychioides* reaches into Ecuador. Only two, *C. dichotoma* and *C. paronychioides*, occur about Lima and northward. The six other Peruvian species all reach their northern limit further south. The eight species of *Coldenia* known from Peru may be distinguished by the following key:

- Nutlets distinctly plano-convex, with a high rounded back and a broad flat commissural face; stamens usually evidently exserted from the corolla. Corolla blue; nutlets with knife-like lateral margins, known from the vicinity of Arequipa (1800–2200 m. alt.) and south into northern Chile. *C. grandiflora* Phil.
- Corolla white or very pale bluish; nutlets with angled but not knife-like margins.
 - Fruiting calyx developing prominent corky-thickened ribs; corolla-tube not appendaged a short distance below the attachment of the filaments; plant of coastal southern Peru, 20–900 m. alt. *C. Ferreyrae*, sp. nov.
 - Fruiting calyx without corky-thickened ribs; corolla-tube bearing a pair of crisped lobulate appendages a short distance below the attachment of each filament.
 - Leaves bearing 4 to 6 well developed veins on each side of the midrib; plant of coastal Peru north of Lima, 0–50 m. alt. *C. dichotoma* (R. & P.) Lehm.
 - Leaves bearing only 2 to 3 veins on either side of midrib; plant of coastal southern Peru. *C. simulans*, sp. nov.

Nutlets not conspicuously flattened on the ventral (commisural) side, more or less sphaerical or lance-oblong in form, not distinctly plano-convex; stamens included and equal or nearly so.

Attachment-scar narrow, elongate, longitudinal on the lance-oblong nutlets; corolla very small 2.5–3.5 mm. long; ranging from northern Chile to Ecuador, along the coast and in the interior, 0–2300 m. alt.

..... *C. paronychioides* Phil.

Attachment-scar small, localized on one side of the nearly sphaerical nutlet; corolla larger, over 7 mm. long.

Corolla 11–16 mm. long; calyx 8–13 mm. long, glanduliferous; nutlets 1.2–1.5 mm. in diameter, with a very prominent bony convex commisural surface; coast of southern Peru (Mollendo, Mejia, Cachendo), 0–1000 m. alt.

..... *C. conspicua* Johnston

Corolla 7–9 mm. long; calyx 2.5–5 mm. long, not glanduliferous or only very sparsely so; nutlets 1 mm. or less in diameter, commisure not very prominent.

Leaves lanceolate, largest ones 8–17 mm. long, sharply acute, with 3–5 veins on each side of midrib; region about Arequipa, 2200–3400 m. alt.

..... *C. elongata* Rusby

Leaves ovate or elliptic, largest one 5–10 mm. long, usually obtuse, 2–3 veins on each side of the midrib; coast of southern Peru (Mollendo, Mejia, Tacna) and south into Chile where it is the most common and wide-spread speceis.

..... *C. litoralis* Phil.

***Onosma brachylinum* (Johnston), comb. nov.**

Onosma Waddellii var. *brachylinum* Johnston, Jour. Arn. Arb. 32: 345 (1951).

Plant annual or biennial; stems one to several 1–3 dm. long 1.5–3.5 mm. thick, decumbent to erect, usually ascendingly branched, pungently hispid with spreading hairs 1–3 mm. long; leaves veinless or nearly so, all cauline, numerous, green, usually paler beneath, upper surface in age frequently dotted with discoid hair-bases, hispid with straight stiff erect or ascending hairs 1–3 mm. long; lowest leaves largest and more or less oblanceolate, 3–7 cm. long, 8–13 mm. broad; middle leaves 2–4 cm. long, 4–8 mm. broad, sessile; basal leaves not persisting at flowering time; cymes terminal on the main stem and branches and frequently pedunculate in the upper leaf-axils, frequently forked, at anthesis dense, 1.5–2.5 cm. in diameter, remaining congested even in fruit; calyx 5–8 mm. long, weakly accrescent at maturity, lobes hispid, pedicel 1–3(–5) mm. long; corolla usually pink but sometimes blue or white, 11–13 mm. long, with a short tube ca. 2 mm. thick then expanding into a campanulate throat becoming 5–8 mm. in diameter, outside usually inconspicuously strigulose or hispidulous on and below the lobes, inside glabrous except for the usually villulose annulus; corolla-lobes triangular 1–1.5 mm. long, 2–3 mm. broad, margins revolute; anthers 4.5–6 mm. long, coherent at the base and along the sides to form a tube, affixed ca. 1.5 mm. above the base, included or with only the sterile tip exerted, sterile tip 0.4–0.9 mm. long; filaments 2.5 mm. long, arising 3–4.5 mm. above the corolla-base, decurrent base 2–3 mm. long; annulus very narrow, 0.3 mm. high, villulose lobulate; style

glabrous, commonly exserted 1–2 mm.; nutlets 2–2.5 mm. long olivaceous, somewhat lustrous, sparsely pappillate and obscurely rugulose.

TIBET: Kyimpu, Chayul — Charme road, among shrubs on stony hillside in warm valley, 12,000 ft., corolla mostly bright reddish pink, some colored blue, July 26, 1936, *Ludlow & Sherriff 2440* (BM); Trün, Chayul Chen, on rocky open hillside, dry valley, only one plant seen, corolla pink, 11,500 ft., July 22, 1936, *Ludlow & Sherriff 2418* (BM); Sanga Chöling, Charme, dry stony scrub-covered slopes facing south, not common, plentiful in certain spots, 11,000 ft., Sept. 18, 1935, *Kingdon-Ward 12355* and *12355A* (BM); Kyimdong Dzong, Tsangpo Valley, fl. white, stony screes in rocky gorge, 11,000 ft., July 14, 1935, *Kingdon-Ward 11991* (BM); Kharkhung, 12,500 ft., June 23, 1936, *N. Humphreys 5026* (BM).

This plant was previously known to me only from some collections from the Tibetan valleys north of Mt. Everest. The collections cited above come from regions farther east, from the area north of eastern Bhutan. The species is now known to range along the north side of the Himalaya in southern Tibet between long. 87° and 94° E.

Although probably most closely related to *Onosma Waddellii* Duthie, a species of the dry sands and gravels along the Tsangpo Valley, the present plant is readily distinguished from its relative by its looser, more branching habit, its spreading pungent indument, and its included anthers and short (2–3 mm., not 5–7 mm. long) filaments. It is a plant of stony slopes and hillsides. Its corollas are pink or become blue in age, but never achieve the bright blue which is one of the distinguishing features of *O. Waddellii*.

Maharanga bhutanica, sp. nov.

Planta perennis e radice valida palari 5–10 mm. crassa erumpens; caulibus pluribus 1–2 dm. longis simplicibus ascendentibus 1–2 mm. crassis pilis gracilibus patentibus 2–3 mm. longis rigidulis abundante donatis; foliis firmissculis costa et nervis evidenter donatis adpresse hispidis (pilis rectis abundantibus 2–4 mm. longis) et praesertim in facie inferiore minute inconspicueque strigosis (pilulis 0.1–0.5 mm. longis), maturitate facie superiore basis pallidas discoideas pilorum notatis; foliis basalibus persistentibus 5–9 cm. longis 1–2 cm. latis utroque acutis; nervis utrinque lateribus costae 3–4 validis assurgentibus in facie superiore sulcatis in facie inferiore prominulis; foliis caulinis parvis lanceolatis 1–3 cm. longis 4–8 mm. latis inferioribus quam superioribus aliquandam majoribus vel plus minusve equalibus; cymis terminalibus densis sub anthesi 2–3 cm. diametro; calyce hispido sub anthesi 4–5 mm. longo fere ad medium lobato, lobis triangularibus acutis; corolla caerulea 9–11 mm. longa, base imma 1.5 mm. crassa, medium versus 4–5 mm. crassa, ore 1–2.5 mm. diametro, extus strigulosis (pilulis 0.1–0.3 mm. longis retrorsis antrorsisque) a fundo sinum usque ad medium tubi 5-sulcata, infra medium tubi costis 5 inflatis et areolis 3 planis ellipticis apice haud invaginis ornato, intus solum in annulo fere ad 1 mm. alto villulosa alibi glabra; antheris 4–

4.5 mm. longis basi coherentibus inclusis 1 mm. supra basim affixis, apicibus sterilibus denticulatis ca. 0.8 mm. longis, basibus 4–5 mm. infra sinus corollae positus; filamentis 2–2.5 mm. longis, sursum gradatim attenuatis 3.5–4 mm. supra basim corollae affixis; stylo glabro; nuculis ignotis.

BHUTAN: Chungkar, common on cliff-ledges, 7000 ft. alt., corolla blue, pink when first opening, June 6, 1947, *F. Ludlow, G. Sherriff & H. H. Elliot 12598* (TYPE, Brit. Mus.).

This species is a coarse perennial and has the gross habit of *Maharanga emodi* (Wall.) DC. It works out to the latter species in my key to plants of this relationship, Jour. Arn. Arb. 32: 206 (1951). The Bhutan plant differs from *M. emodi* in being much more abundantly hairy and in having elongate corollas, reduced cauline leaves, and conspicuously veined, more persistent basal leaves. In *M. emodi* the cauline are gradually larger upward along the stem, with the lowest imperfectly developed and those below the cyme largest and best developed. In *M. bhutanica* the cauline leaves are all about equally developed with the lowermost only very slightly larger than the uppermost. The proposed new species is known only from relatively low altitudes in Bhutan, whereas *M. emodi* occurs between 10,000 and 15,000 ft. alt. and ranges from Bhutan to Kumaon.

***Maharanga emodi* (Wall.) DC., var. *stelligera*, var. nov.**

A var. typica differt foliis basalibus in utrinque lateris et foliis caulinis in facie inferiore pilis stellatis abundantibus gestis; pilis majoribus 3–6 mm. longis e centro disciformi pallidi erumpentibus, basi pilulos ca. 1 mm. longos pluros radiate dispositos disco pallido marginem versus erumpentes circumdatis.

BHUTAN: Tang Chen, Ritang, corolla blue-violet to purple-blue, lobes bright red or reddish blue, on cliff ledges and on steep open slopes among stones, 12,000 ft., *F. Ludlow & G. Sherriff 3234* (TYPE, Brit. Mus.; ISOTYPE Arn. Arb.).

In this plant the basal leaves are pallid with an appressed villose-hispid indument composed solely of stellate hair-clusters. The cauline leaves, however, are green and their sparse indument contains stellate hair-clusters only on their lower surface. Hair clusters of a similar sort occur in two other species of *Maharanga*, *M. egregia* Johnston and *M. Wallichiana* DC.

***Craniospermum echioides* (Schrenk) Bunge, Heliocarya 10 (1871).**

Diploloma echioides Schrenk, Bull. phys.-math. Acad. Petersb. 2: 195 (1844).
Craniospermum mongolicum Johnston, Jour. Arn. Arb. 33: 74 (1952).

DZUNGARIA: Ala-tua, 1840, *A. Schrenk* (Paris, ISOTYPE of *D. echioides*).
MONGOLIA: Daying Gol, *Chaney 195* (G, TYPE of *C. mongolicum*).

I have examined the authentic specimens of *Craniospermum echioides*, from the herbarium of Bunge, now preserved at Paris. It is without any doubt conspecific with the type of *C. mongolicum*. The plant involved

appears to be extremely rare and at present is known only from the two localities cited. These two stations both lie near lat. 45° N. but are separated from west to east by over 1500 kilometers.

Brand, Pflanzenr. Heft 97: 103 (1931), apparently saw no material of *C. echioides*, for he lists the species as a synonym of the very different *C. subvillosum* Lehm. Actually the species is not very closely related to the other species of *Craniospermum* and, if it is not eventually separated from them to form the monotypic genus *Diploloma*, it should be segregated within in *Craniospermum* to form the section *Diploloma*, as Popov, Fl. URSS 19: 535 (1953), has recently done.

The pollen of *C. echioides* is sphaerical and 33–39 μ in diameter. It bears three broad granular elliptic areas, usually more or less protrudent, equally spaced about the equator. I am unable to distinguish it by size or form from the pollen of other members of the genus. The pollen from the type specimen of *C. mongolicum* is mostly imperfect and not characteristic. It is smaller (at most 25 μ in diameter) than in other collections but otherwise similar.

Hackelia Stewartii, sp. nov.

Planta herbacea perennis 6–10 dm. alta; caulibus erectis fistulosis basim versus ad 8 mm. crassis, apicem versus ramulos paucos ascendentes florigeros 5–20 cm. longos gerentibus; foliis caulinis lanceolatis; lamina 6–18 cm. longa 2 — 8 cm. lata, basi acuta vel plus minusve obtusa in petiolum 5–35 mm. longum contracta, apice graciliter attenuata, facie inferiore pallidior villulosa pilulis mollibus 0.1–0.5 mm. longis vix abundantibus vestita, facie superiore viridi scabrella pilulis gracilibus inconspicuis adpressis 0.1–0.6 mm. longis obsita; nervis lateralibus laminae evidentibus, eis in tertia parte inferiore costae orientibus conspicue longissimis fere ad apicem folii attingentibus; cymis solitariis vel geminatis in caulibus et ramulis terminalibus 7–15 cm. longis ebracteatis vel basim versus bracteas saepe solitariis foliatis 1–4 mm. longas gerentibus; calyce pallido dense villuloso, lobis acutis ad anthesin cuneato-lanceolatis 1.5–2.5 mm. longis 0.6–1.0 mm. latis, in statu fructifero plus minusve ovatis ad 3.5 mm. longis et 2 mm. latis; corolla pallide azurea 10–14 mm. diametro, tubo 1.5–2 mm. longo, lobis rotundis patentibus ad 4 mm. diametro; appendiculis faucium exsertis oblongis 1–1.3 mm. longis 0.8–1 mm. latis marginibus lateralibus villosis; nuculis marginatis dorso non rariter inconspicue hispidulis; corpore nuculae 4.5–5 mm. longo 2–3 mm. lato, margine saepe alato, ala 0.3–2 mm. lata appendiculas uniseriatis subulatas glochidiatas 1–3 mm. longas armatos; gynobasi 2.5–3 mm. longa basi ca. 2 mm. crassa; stylo elongato 2–2.5 mm. longo maturitate saepe exserto.

KASHMIR: Rajdhiangan Pass, fl. pale blue, July 19, 1940, *R. R. Stewart 19526* (TYPE, Gray Herb.); trip to Gurais, May–June, 1929, *R. R. Stewart 12955* (G); Sonamarg, 11,000 ft., fl. light blue, July 18, 1928, *R. R. Stewart 12959* (G); Killanmarg, 10,000 ft., Aug. 1926, *R. R. Stewart 8604A* (G); Pahlgam, 10,000

ft., Aug. 8, 1927, *R. R. Stewart 12956* (G); mountains opposite Pahlgam, 11,000 ft., fl. pale blue, Aug. 28, 1945, *R. R. Stewart 21816* (G); Zur Nar above Arie, Liddar Valley, fl. large and dark, usually sky blue, half inch in diameter, Aug. 3, 1945, *R. R. Stewart 21563* (G); 6 mi. south of Karagbal, fir forest, 8000 ft., plant 3 ft. tall, fl. sky blue, Aug. 1, 1936, *W. Koelz 9239* (G).

A readily recognizable species which appears to be most closely related to *Hackelia uncinata*, the most widely distributed member of the genus in the western Himalaya. In gross habit it is intermediate between that of *H. uncinata* and *H. macrophylla*. Both of these latter species range in same general area as that in which *H. Stewartii* is found. The proposed species may be distinguished from the other Himalayan species of the genus by the following key:

- Upper leaf-face more or less lustrous, glabrous or nearly so; corolla 10–15 mm. in diameter, white or white with a blue or purple spot between the bases of the lobes; nutlets bearing glochidiate appendages on the dorsal surface as well as on the margin; Kashmir and adjacent Punjab.
 *Hackelia macrophylla* (Brand) Johnston.
- Upper leaf-face with abundant minute appressed hairs, not lustrous; corolla pale to dark blue; nutlets not bearing glochidiate appendages on the dorsum, bearing them only on the margin.
 Style elongate, 2–2.5 mm. long; corolla large, 10–14 mm. in diameter, pale blue, faucal appendages longer than broad, 1–1.3 mm. long, ca. 0.8 mm. broad; stem leaves large, broadly lanceolate, 6–18 cm. long, 2–8 cm. broad, lower ones not cordate; Kashmir. *Hackelia Stewartii*, sp. nov.
- Style short, 0.2–0.8 mm. long; corolla usually less than 10 mm. in diameter, faucal appendages usually broader than long, 0.3–0.8 mm. long and 0.6–0.9 mm. broad; stem leaves usually ovate, commonly 6–9 cm. long and 2.5–5 cm. broad.
 Calyx usually densely appressed hairy; lowest leaves well developed, usually cordate; cymes becoming loose in fruit; Kashmir to Nepal.
 *Hackelia uncinata* (Benth.) Fischer.
- Calyx and especially the lobes, sparingly strigose or nearly glabrous; lowest leaves small, not cordate; cymes relatively few flowered and dense; Sikkim to Yunnan. *Hackelia brachytuba* (Diels) Johnson.

Mertensia Meyeriana Macbride, *Contr. Gray Herb.* 48: 52 (1916);
 Popov, *Fl. URSS.* 19: 249 (1953).

Mertensia Popovii Rubtz. *Fl. URSS.* 19: 247 and 706 (1953).

The label associated with the type collection of *Mertensia Meyeriana* has the following data "On Chinese territory near Saisansk, so. Siberia, May 20, 1911, *F. N. Meyer* no. 727". When the species was published the geographic data were misread and were given incorrectly as "Zairansk, western Mongolia". A study of the itinerary of Meyer reveals that on May 20, 1911, he was near the Kazakh-Dzungaria boundary, southeast of Lake Zaisan, at about lat. 47° 30' N and long. 85° 00' E., probably at the west end of the Saur Mts. "Saisansk" is an old spelling for the town in East Kazakhstan appearing on recent maps as Zaisan or Zaysan. It is

clear, therefore, that the type of *M. Meyeriana* comes from the region designated in the Flora URSS as the "Dzungaro-Tarbagatai" floristic area, the very area in which *Mertensia Popovii* is endemic. The latter species is said to range, "In montibus Tarbagatai et Saur, satis frequens". Its lengthy description in the Fl. URSS applies perfectly to the type of *M. Meyeriana*.

***Mertensia nemorosa* (DC.), comb. nov.**

Lithospermum ovalifolium Decne. in Jacquemont, Voy. Inde Bot. 121, t. 124 (1844). — In humidis nemorum ad Ouri [Uri on Jhelum River], May 4, 1831, Jacquemont.

Eritrichium nemorosum A. DC. Prodr. 10: 123 (1846). — Based on *Lithospermum ovalifolium* Decne (1844), not *Eritrichium ovalifolium* DC. (1846).

A Kashmir plant most closely related to *M. racemosa* (Royle) Clarke of Kumaon, Bashahr and Kulu. It differs conspicuously in its blue-purple, rather than white corollas, and its coarser habit. Unlike *M. racemosa* its lower leaves are not subcordate at the base and the herbage usually darkens and becomes more or less chocolate-brown in drying.

The binomial *Mertensia ovalifolia* Brand, Pflanzenr. Heft 97: 199 (1931), was coined by Brand and applied to two very different plants: *Eritrichium ovalifolium* DC. Prodr. 10: 123 (1846), which is a species of *Trigonotis*, and *Eritrichium nemorosum* DC. op. cit., our present species of *Mertensia*. In both applications Brand indicated that his binomial was a "nom. nov.". In Index Kewensis, Suppl. 9, *Mertensia ovalifolia* Brand is taken up as based upon *Eritrichium ovalifolium* A. DC. This decision associates the name with the species of *Trigonotis* and makes it unavailable for our *Mertensia*.

The name "*Mertensia moltkioides*" has been applied to the present plant. Indeed, Coventry, Wild Fl. Kashmir 31: 91, t. 46 (1930), has an excellent colored illustration of it under that name. *Mertensia moltkioides* Clarke, however, is based entirely upon the plant in Royle's Illustrations, which is described as *Myosotis moltkioides* (on pg. 305) but illustrated, on Plate 73, as *Anchusa moltkioides*. Royle's plant, from Pir Panjal Pass, must be reexamined. I believe it will be found to represent not the present species, but rather, *Mertensia primuloides* (Decne.) Clarke.

***Mertensia exserta*, nom. nov.**

Craniosperm parviflorum Decne. in Jacquemont, Voy. Inde Bot. 126, t. 130 (1844). — Type from the northwest extension of the Pir Panjal Range, from the south side of the pass [i.e. Aliabad or Haji Pir pass] traversed by the road from Punch north to Uri on the Jhelum River, about long. 74° and lat. 34°, collected May 3, 1831 by Jacquemont. Not *Mertensia parviflora* G. Don (1837).

Moltkia parviflora (Decne.) Clarke, Fl. Brit. India 4: 174 (1883).

Although it has elongate, much exerted stamens associated with a very reduced corolla, this plant otherwise agrees well with the species representing *Mertensia* in the western Himalayas. Authors, upon the basis of superficial resemblances, have classified this plant in the genera *Craniospermum* and *Moltkia*, but actually it has no immediate relationships with either genus. It is aberrant in *Mertensia* in having elongate, much exerted stamens associated with a reduced corolla, but in all other respects (and especially so in distribution, habit, fruit, and pollen) it shows definite relations with the Himalayan representatives of that genus. It obviously should be classified with the latter plants. I find it surprising that the species has not been transferred to *Mertensia* years ago.

***Mertensia Trollii* (Melch.) comb. nov.**

Moltkia Trollii Melch. Notizbl. Bot. Gard. Berlin 15: 115 (1940). — TYPE from Tragbal Pass, Kashmir, *C. Troll* 7028.

Mertensia Coventryana S. Clay, The Present-Day Rock Garden, pp. xx and 379, t. 27a (1937). — a provisional name for a cultivated plant; unaccompanied by technical description or Latin diagnosis. The published photograph, plate 27a, was made by B. O. Coventry at Banihal, Kashmir, 9000 ft. alt., May 17, 1929, and is to be associated with the herbarium-specimen, *Coventry 1448*, bearing the same data, which is now preserved at the British Museum.

This species is related to *Mertensia exserta* (= *Moltkia parviflora* Clarke) and confused with it in most herbaria. Both species have stamens conspicuously exerted from the corolla. *Mertensia Trollii* differs from its more common relative in having much larger corollas that have well developed lobes and five invaginate hemispheric appendages in the throat. The corolla lobes of *M. Trollii* are oblong or elliptic and 2–2.5 mm. long. Those of *M. exserta* are more or less triangular and usually 1–1.5 mm. long.



Johnston, I. M. 1956. "Studies in the Boraginaceae, XXVIII. New or Otherwise Interesting Species from America and Asia." *Journal of the Arnold Arboretum* 37(3), 288–306. <https://doi.org/10.5962/p.324652>.

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