

**NOTES RELATING TO THE FLORA OF BHUTAN:  
XXXII. BORAGINACEAE, II.**

**New taxa, combinations and lectotypifications in subfamily  
Boraginoideae**

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One new genus (*Setulocarya* R.R. Mill & D.G. Long, belonging to tribe Eritrichieae and allied to *Microcaryum* I.M. Johnst.: Himachal Pradesh, Nepal, Sikkim) and four new species (*Hackelia bhutanica* R.R. Mill and *H. obtusifolia* R.R. Mill, both from Bhutan and Sikkim, *Lasiocaryum ludlowii* R.R. Mill from Bhutan, Nepal and Tibet, and *Trigonotis clarkei* R.R. Mill from Darjeeling) are described. The new combinations *Setulocarya diffusa* (Brand) R.R. Mill & D.G. Long and *Onosma emodi* Wall. var. *stelligera* (I.M. Johnst.) R.R. Mill are made. *Tournefortia hookeri* C.B. Clarke is lectotypified and the typification of *Microula pustulosa* (C.B. Clarke) Duthie is clarified.

*Keywords.* *Hackelia*, *Lasiocaryum*, *Microula*, new combinations, new genus, new species, *Onosma*, *Setulocarya*, *Tournefortia*, *Trigonotis*.

INTRODUCTION

This is the second of three papers which together deal with new taxa and other matters pertaining to the account of Boraginaceae for *Flora of Bhutan*. (For the first, which described *Onosma griersonii*, see Mill, 1994). The third paper (Mill, 1996) will deal with the genus *Ehretia*. The genus *Hackelia* is being revised throughout the Sino-Himalayan region and will form the subject of a fourth paper independent of the *Notes relating to the Flora of Bhutan* series, but two new taxa of that genus are validated here in order that the names can be used in *Flora of Bhutan*.

**SETULOCARYA, A NEW GENUS FROM HIMACHAL PRADESH,  
NEPAL AND SIKKIM**

***Setulocarya* R.R. Mill & D.G. Long, gen. nov.**

*Lasiocaryi* I.M. Johnst. speciebus affinis sed nuculis ad gynobasem cicatrice triangulari in parte tertia inferiore lateris ventralis affixis, latere exteriori nucularum pilis rigidis suberecto-patentibus differt. A genere *Microcaryo* I.M. Johnst. habitu caulescenti (haud acaulescenti), inflorescentia diffusa non subumbellata, lobis corollae suberectis non patentibus, antheris in medio tubi corollae (non eius ad summum) affixis, nuculis glabris facile distinguitur.

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Low annual herbs of disturbed alpine habitats. *Stems* diffuse, slender, erect to decumbent or subprostrate. *Leaves* almost all cauline, subsessile; lowest ones obovate, others elliptic to lanceolate-elliptic, sparsely hispid with relatively  $\pm$  long setules on veins and margin. *Inflorescence* of diffuse, terminal, raceme-like scorpioid cymes; lower pedicels arising from leaf axils, others ebracteate. *Calyx* divided almost to base, lobes narrowly oblong to narrowly lanceolate-elliptic, patent-hairy on midrib and margins. *Corolla* very small, whitish with blue lobes, tubular-campanulate; tube relatively long, lobes very small. *Throat scales* minute, semilunar. *Anthers* ovoid, minute, apparently sessile, at middle of corolla tube. *Style* shorter than calyx. *Nutlets* small, ovoid, attached to gynobase by a triangular scar occupying lower  $\frac{1}{3}$  only of ventral surface, setulose on outer (dorsal) surface. Monotypic.

Typus generis: *Setulocarya diffusa* (Brand) R.R. Mill & D.G. Long (*vide infra*).

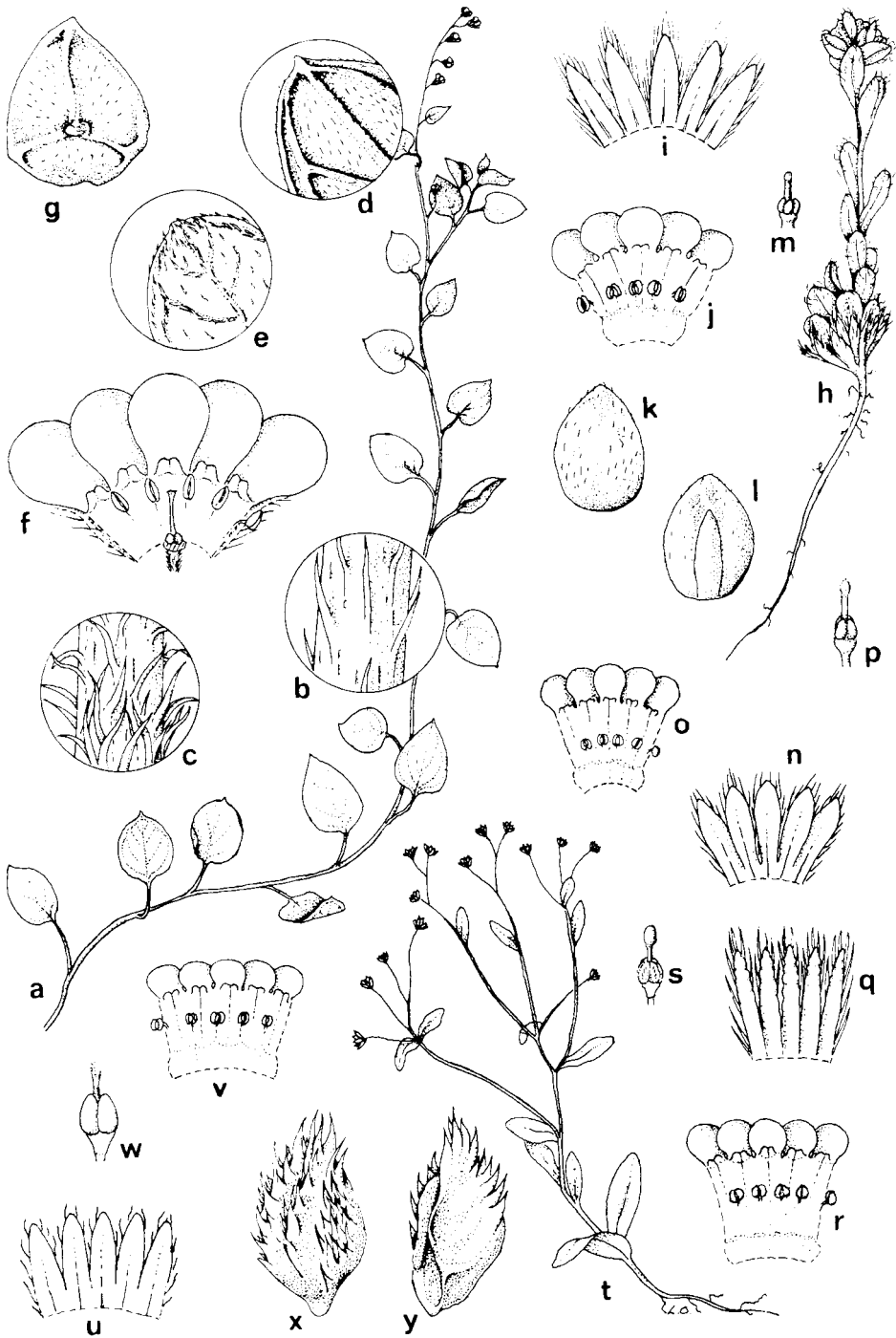
*Etymology.* Alluding to the setulose nutlets, formed by analogy with other generic names in Boraginaceae, e.g. *Actinocarya* Benth., *Nephrocarya* Candargy, *Pectocarya* DC. ex Meisn.; name originally suggested by D.G. Long and the late A.J.C. Grierson (unpublished note).

**Setulocarya diffusa** (Brand) R.R. Mill & D.G. Long, **comb. nov.** Fig. 1t–y.

Syn.: *Microcaryum diffusum* Brand in Repert. Spec. Nov. Regni Veg. 22: 101 (31 Dec. 1925), basionym; Brand in Engl., Pflanzenr. 97 (IV.252): 202 (1931); *Lasiocaryum diffusum* (Brand) I.M. Johnst. in J. Arnold Arbor. 21: 51 (1940). Lectotype (designated by S.P. Banerjee & A. Bhattacharjee, Bull. Bot. Soc. Bengal 39: 36 & 38, 1985): [India, Himachal Pradesh], Kumaon, Rilam [sic: recte Ralam] Valley, 13,000–15,000ft, [24 viii 1884], J.F. Duthie 3196 (lecto. DD, n.v.; isolecto. BM, CAL, n.v., K).

Low, diffuse, somewhat loosely caespitose, sparsely hispid annual herb. *Stems* 1.5–9cm tall, 0.3–0.6mm thick, erect-ascending or lowermost ones subprostrate or decumbent, diffusely branched above, reddish-purple, sparsely hispid; hairs  $\pm$  appressed, antrorse, c.0.4–0.7mm. *Leaves*  $\pm$  all cauline, 4–6 per stem (but stems appearing 'leafy'), subsessile (lowermost sometimes with indistinct petiole not more than 1mm), lower ones obovate, middle and upper elliptic to lanceolate-elliptic, 3–6.5(–10)  $\times$  1.1–2.5(–4)mm, obtuse or subacute, base shortly attenuate or cuneate; upper surface sparsely crispate-hispid on veins and margin (hairs long and weak, 0.5–0.6mm on veins but longer (to 1.2mm) on margin, from tuberculate bases).

FIG. 1. a–g, *Trigonotis clarkei*: a, habit,  $\times \frac{1}{4}$ ; b, stem indumentum,  $\times 50$ ; c, stem indumentum of *T. ovalifolia*,  $\times c.50$ ; d, leaf indumentum,  $\times c.5$ ; e, leaf indumentum of *T. ovalifolia*,  $\times 2.4$ ; f, corolla,  $\times 6$ ; g, nutlet,  $\times 18$ . h–m, *Lasiocaryum ludlowii*: h, habit,  $\times 1.5$ ; i, calyx,  $\times 9$ ; j, corolla,  $\times 9$ ; k, nutlet (dorsal view),  $\times 9$ ; l, nutlet (ventral view),  $\times 9$ ; m, style and gynobase,  $\times 9$ . n–p, *L. munroi*: n, calyx,  $\times 9$ ; o, corolla,  $\times 9$ ; p, style,  $\times 9$ . q–s, *L. densiflorum*: q, calyx,  $\times 9$ ; r, corolla,  $\times 9$ ; s, style,  $\times 9$ . t–y, *Setulocarya diffusa*: t, habit,  $\times 1.5$ ; u, calyx,  $\times 9$ ; v, corolla,  $\times 9$ ; w, style and gynobase,  $\times 9$ ; x, nutlet (dorsal view),  $\times 18$ ; y, nutlet (ventral view),  $\times 18$ .



lamina otherwise  $\pm$  glabrous; lower surface with setules 0.7–1mm on midrib and also scattered on lamina surface; setules on both surfaces  $\pm$  straight. *Inflorescence* elongating rapidly after anthesis; flowers up to 12 per cyme. *Pedicels* 1–2mm in flower, rapidly elongating and up to 9.5mm in fruit. *Calyx lobes* c.1.5–1.8  $\times$  0.3–0.35mm in flower, slightly enlarging (but scarcely widening) in fruit and c.2.5mm, narrowly oblong to narrowly lanceolate-elliptic, obtuse, with weak spreading hairs on margin and in a line along midrib. *Corolla* white with pale blue tips to lobes, tubular-campanulate, 2mm; tube relatively long (subequalling calyx), 1.6–1.7mm; limb c.1mm diam., its lobes orbicular, 0.3–0.35  $\times$  c.0.35mm, semi-elliptic, obtuse. *Throat scales* situated at top of corolla tube, semi-lunar, c.0.1  $\times$  0.3mm, shallowly emarginate. *Stamens* inserted in middle of corolla tube; anthers  $\pm$  sessile, ovoid, c.0.2  $\times$  0.1mm; pollen whitish. *Style* c.0.3mm; gynobase narrowly ovoid. *Nutlets* ovoid, c.1–1.5  $\times$  0.7mm; attachment scar c.0.2  $\times$  0.1mm; ventral surface flattened, with a prominent, pale, median ridge extending to apex from the cicatrice; dorsal surface strongly convex, rugose with a few strong rather oblique longitudinal ridges, covered with erecto-patent, rigid setules 0.3–0.45mm.

*Distribution and ecology.* India (Himachal Pradesh and Sikkim), Nepal, China (Xizang: Chumbi valley bordering Sikkim). Disturbed alpine habitats (waste places by streams, around herdsman's huts etc.); 3500–c.4500m. Flowering late July–mid September.

*Additional specimens examined.* INDIA. Himachal Pradesh: Kumaun, near the Ralam glacier, 14,000ft, 28 viii 1884, *Duthie* 3197 (BM, syntype); Ralam, 11,500ft, *Strachey & Winterbottom* Boragineae ignotae 1 (BM, K).

NEPAL. 5 miles NE of Maharigaon, flowers white, growing on sandy flat by streamside, 14,000ft, 24 vii 1952, *Polunin, Sykes & Williams* 294 (BM, E, originally named *Lasiocaryum munroi* (C.B. Clarke) I.M. Johnst.); Lamzung Himal, among boulders, corolla white, 14,500ft, 13 vii 1954, *Stainton, Sykes & Williams* 6468 (BM); Tukucha, Kali Gandaki, around herdsman's hut, corolla bluish white, 12,500ft, 21 vii 1954, *Stainton, Sykes & Williams* 1903 (E).

SIKKIM. North district: Nurguil, 3800m, *W. W. Smith* 4185 (WRS�, n.v., syntype; CAL, n.v., isosyntype); near Thangshang, waste areas on top of river-bank, corolla white flushed pale blue with yellow eye, 4000m, 24 vii 1992, *ESIK* 694 leg. *H. J. Noltie* (E).

CHUMBI/SIKKIM. Gyong, 13,000ft, 12 ix 1912, *Rohmoo Lepcha* 188 (E).

Brand (1925) originally classified this plant in the genus *Microcaryum* I.M. Johnst., which, in a rather confused treatment, he regarded as comprising four species: *M. pygmaeum* (C.B. Clarke) I.M. Johnst., *M. turkestanicum* (Franch.) Brand, *M. diffusum* Brand and *M. duthieanum* Brand, all of which except *M. turkestanicum* were said to be Himalayan endemics. His later account of the genus (Brand, 1931) showed no changes in his circumscription of *Microcaryum*.

*M. turkestanicum* has since been treated by Johnston (1940: 51) and Popov (1953: 498) as a species of *Eritrichium* Schrad. ex Gaudin whilst *M. duthieanum* is a synonym of *Lasiocaryum densiflorum* (Duthie) I.M. Johnst. Johnston (*loc. cit.*) also removed *M. diffusum* to *Lasiocaryum*, leaving *Microcaryum* as a monospecific genus comprising solely *M. pygmaeum*.

Johnston (1940: 51), on transferring *Microcaryum diffusum* Brand to *Lasiocaryum*, noted the similarity in habit between *M. diffusum* and *L. munroi*, but also observed indumentum differences and a striking dissimilarity in nutlet attachment. In *Lasiocaryum* (except *L. diffusum*), the nutlets are attached by a broad, elongate ventral opening in the pericarp. In *L. diffusum*, this is closed except near the base, the attachment area thus being much smaller and triangular instead of oblong or elliptic.

Banerjee & Bhattacharjee (1985) followed Johnston's concept and treated *Microcaryum diffusum* as a species of *Lasiocaryum*, allying it to *L. munroi* even though they correctly observed the difference in nutlet attachment described above.

*Setulocarya*, *Lasiocaryum* and *Microcaryum* are clearly allied, but the differences between *Setulocarya* and *Lasiocaryum* are as great as those which separate *Lasiocaryum* from *Microcaryum*. However, in flower, *S. diffusa* has often been confused with *Lasiocaryum*, especially with *L. munroi*. In fact, the two species have occasionally been found growing together and one or two specimens seen are composed of mixed gatherings. The similarities in floral characters are doubtless the result of adaptation to the same type of specialized habitat. The genera have, however, diverged in fruit characters, not only in morphology but also apparently in maturation time. Almost all specimens seen of *Setulocarya*, as well as having flowers, have at least a few mature fruits at the base of the inflorescence; however, *Lasiocaryum* has normally been collected either in flower or in fruit, but not with both flowers and mature fruits at the same time. This suggests that the fruits of *Lasiocaryum* take longer to mature than those of *Setulocarya*. Characters which can be used to separate flowering specimens of *Lasiocaryum* from *Setulocarya* are: the more erect habit, usually of a single stem which has numerous (usually more than 6) rather patent leaves and which is branched at the top; the longer, arcuate (not  $\pm$  straight) setiform hairs on the leaves; the orbicular, rather than semi-elliptic, corolla lobes; and the more distinct corolla scales.

#### NEW SPECIES AND A NEW COMBINATION IN *HACKELIA*, *LASIOCARYUM*, *ONOSMA* AND *TRIGONOTIS*

***Hackelia bhutanica* R.R. Mill, sp. nov. Fig. 2a-i.**

*H. uncinatae* (Benth.) C.E.C. Fisch. similis sed pagina inferiore foliorum pilis perpaucis (venis exceptis) differt.

*Caules* erecti vel ascendentes, 22–75cm, inferne leviter pilosi usque subglabri, superne breviter adpresse-strigosi. *Folia radicalia*  $\pm$  longe petiolata (petiolo 3.5–21cm longo), lamina ovata, apice acuto vel acuminato, basi leniter cordato; folia caulina radicalibus similia sed magis breviora petiolata superioribus subsessilibus, lamina 25–100  $\times$  10–60mm, semper acuminata; pagina superior foliorum breviter et sparsim pilosa pilis longiusculis (plerumque 0.5–1mm longis) et saepe lutescenti tinctis; pagina inferior glabra venis exceptis. *Lobi calycis* ovati, 1.5–2.5mm, plerumque  $\pm$  acuti, sparse pilosi, parte receptaculari extus densissime breviter strigosa. *Corolla*

subcampanulata, 3–5mm longa et 5–8(–9)mm diametro; tubus albidus c.2mm longus calyem subaequans lobosque corollae paulo brevior; lobi pallide caerulei raro albi (1.5–)2–3.5mm longi patentes obtusi. *Fornices* subquadrati, c.0.5 × 0.6–0.8mm apice emarginato. *Stylus* c.1.5mm longus calyem subaequans vel paulo brevior. *Nuculae* homomorphae, 2–3mm (appendiculis exclusis); appendiculae marginales 1.5–3mm longae, glochidiatae. *Habitat* in montosis et locis apertis in sylvis *Tsugae* ad altitudines 2440–3200(–4260)m. *Floret* Maio serotino usque Augusto novo.

Type: Bhutan, wooded valley above Lami Gompa, Byaka, Bumtang Chu, by stream in shady ravine, erect herb, flowers blue or pinkish, 3050m, 12 vi 1979, *Grierson & Long* 1827 (holo. E, iso. K).

By far the most widespread of the three species of *Hackelia* known from Bhutan, *H. bhutanica* occurs in Thimphu, Punakha, Tongsa, Bumthang and Sakden districts of central Bhutan and Upper Kulong district of N Bhutan, as well as in Sikkim, Darjeeling and E and C Nepal. A total of 33 separate gatherings have been examined. It frequents hillsides and open places in *Tsuga* forest, mainly between 2440 and 3200m but occasionally ascending to 4260m. It thus tends to prefer slightly lower altitudes, and more shaded, forested habitats, than *H. obtusifolia* (described below), although there is a small degree of altitudinal overlap.

***Hackelia obtusifolia* R.R. Mill, sp. nov. Fig. 2j–o.**

*H. bhutanicae* R.R. Mill (vide supra) similis sed folii apice obtuso plerumque ± mucronato numquam distincte acuminato, caulibus plerumque decumbentes usque ascendentes, saepe brevioribus (4–45cm), pagina superiore foliorum pilis plerumque albis, corolla rotata, tubo raro plus quam 1mm longo et lobos calycis distincte brevioris, fornicibus transverse oblongis multo minus altioribus, stylo 0.3–0.8mm longo lobos calycis plerumque multo brevioris recedit.

Herba perennis saepe caespitosa caulibus numerosis. *Caules* decumbentes, ascendentes vel suberecti 4–45cm alti pilis retrorsis vel subpatentim-retrorsis tenuiter setiformibus albohyalinis (raro lutescentibus) obtecti. *Folia radicalia* 20–80 × 10–40mm, caulina mediana 22–55(–85) × 8–24(–42)mm, omnia elliptica ovato-elliptica vel (radicalia minima) late ovato-elliptica usque suborbicularia, integerrima, apice obtuso vel subobtusio mucrone minimo (numquam acuminato), basi obtuso usque breviter cuneato-attenuata, superne sparse usque modice breviter pilosa, pilis albo-vel argenteohyalinis; petiolus 25–160mm pilosus usque subglaber pilis retrorsis vel patentibus. *Inflorescentiae* 5–12-florae terminales primo compactae demum (post anthesin) breviter elongatae. *Pedicelli* ad anthesin 3.5–7mm, dense subadpressim canescenti-pubescentes. *Bracteae et bracteolae* nullae. *Calyx* 1.5–2.5(–4)mm, parte basali ('receptaculari') dense albescenti-vel luteoli-albescenti-pilosa; lobi atrovirides interdum brunneo tincti, ovati, subacuti vel obtusi, parce pubescentes pilis solum ad costam in partibus inferioribus  $\frac{2}{3}$  distributis (apicem marginesque versus glabri). *Corolla* in alabastro rosea, ad anthesin pallide usque intense caerulea (raro alba) tubo albedo, ± rotata, 4–5.5(–7)mm longa, 6–9mm diametro tubo brevissimo

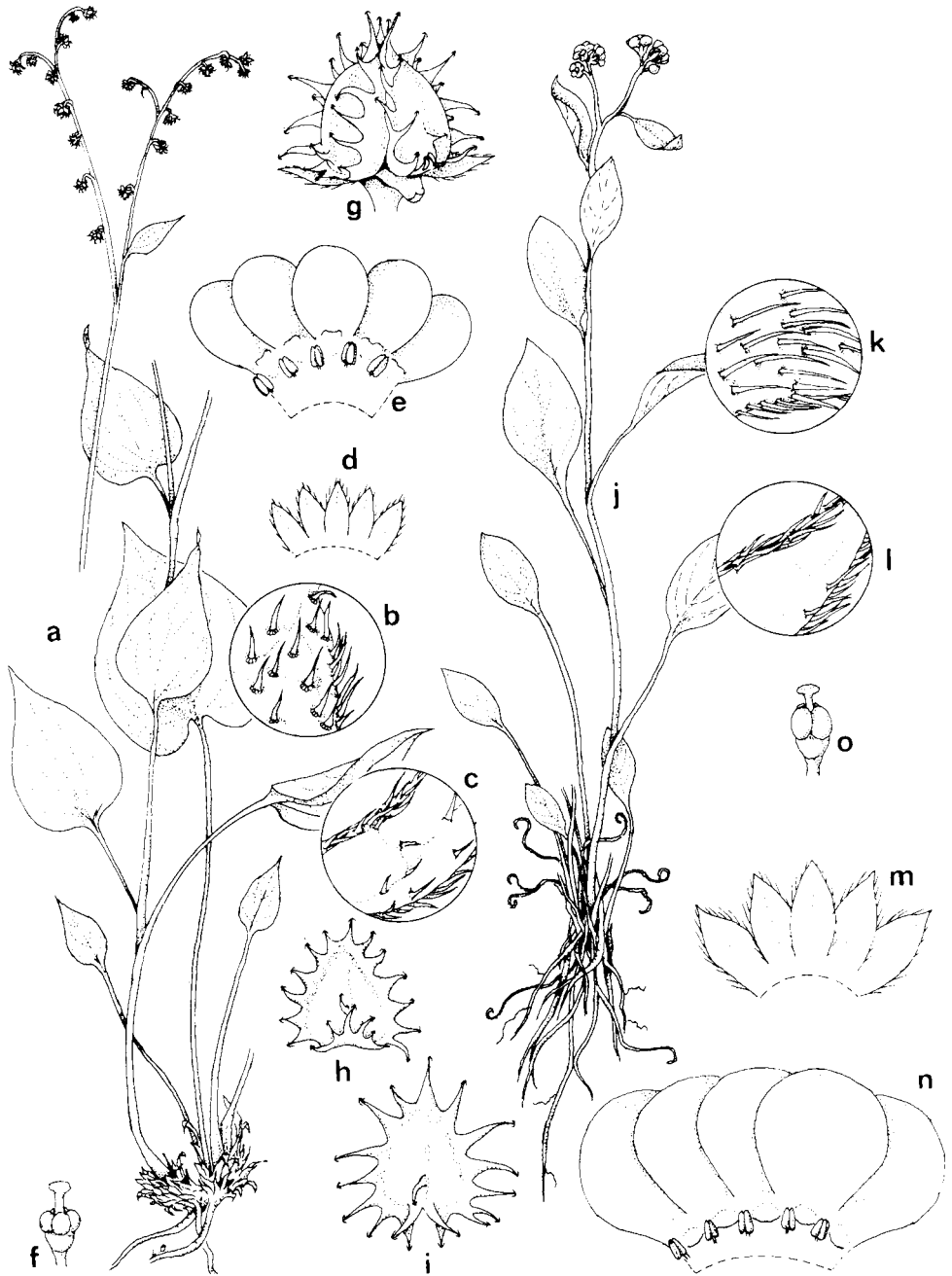


FIG. 2. a-i. *Hackelia bhutanica*: a, habit,  $\times \frac{1}{4}$ ; b, leaf indumentum (upper surface),  $\times 7$ ; c, leaf indumentum (lower surface),  $\times 8$ ; d, calyx,  $\times 6$ ; e, corolla and stamens,  $\times 6$ ; f, style and young nutlets,  $\times 6$ ; g, group of nutlets,  $\times 6$ ; h, nutlet (dorsal view),  $\times 6$ ; i, nutlet (ventral view),  $\times 6$ . j-o. *Hackelia obtusifolia*: j, habit,  $\times \frac{1}{4}$ ; k, leaf indumentum (upper surface),  $\times 10$ ; l, leaf indumentum (lower surface),  $\times c.17$ ; m, calyx,  $\times 6$ ; n, corolla and stamens,  $\times 6$ ; o, style and young nutlets,  $\times 6$ .

plerumque vix 1mm longo excedenti lobis 2.5–3mm longis. *Fornices* lutei transverse oblongo-quadrati latiores quam alti (c.0.3 × 0.8mm) minutissime pubescentes apice levissime emarginati. *Stamina* in tubo corollae inclusa antherarum apicibus bases fornicium vix excedentibus; filamenta brevissima; antherae pallide lutescentes vel albescentes anguste oblongo-ellipsoideae c.0.7 × 0.25mm. *Stylus* 0.3–0.8mm calyce plerumque multo brevior. *Nuculae* ignotae. *Habitat* in glareosis et declivitatibus humidis saepe turfosis ad altitudines (2750–)3600–4300m. *Floret* Jun–Jul.

Type: Bhutan, Dungshinggang (Black Mountain), growing in masses on rocky hillside, corolla bright saxe blue, yellow eye, 14,000ft, 23 vi 1937, F. Ludlow & G. Sherriff 3302 (holo. BM, iso. E).

This second new species of *Hackelia* from Bhutan and Sikkim prefers to grow at higher altitudes than is typical of *H. bhutanica*; only two specimens have been collected below 3600m. It has been recorded from Punakha and Bumthang districts of C Bhutan, Upper Kulong district of N Bhutan, Sikkim (several collections from Changu), and extreme E Nepal (a single collection from the Arun valley). Although known at present from 13 different gatherings made between June and early July, none are in fruit and consequently further collection of this species, later in the season, is desirable to complete the description. *Bowes Lyon* 15097 (BM) from Bhutan (Penge La, 4146m) is unusual in having the uppermost cauline leaves shortly acuminate and may represent a transitional form between *H. obtusifolia* and *H. bhutanica*; all other specimens seen have all the leaves, even the uppermost, obtuse and usually shortly mucronate.

Both these new species of *Hackelia* are allied to *H. uncinata* (Benth.) C.E.C. Fisch. The latter is a widespread Himalayan species, commonest in the western Himalaya but extending sporadically at least as far east as Upper Bumthang Chu district of Bhutan. *H. uncinata* appears to be divisible into local variants of taxonomic significance but, pending completion of a revision of the *Hackelia* species of the E Himalayas and China, no infraspecific epithet is here proposed for the form of it that occurs in Bhutan. However, both of the new species here described were in fact previously confused, even by Johnston himself, not with *H. uncinata* but with *H. brachytuba* (Diels) I.M. Johnst. (*Paracaryum brachytubum* Diels), a species occurring in China (Yunnan) and extreme NE Myanmar (adjacent to the Yunnan border). Both differ from that species by their much smaller corollas with shorter tubes ('*brachytuba*' is an inappropriate epithet for the Chinese species, which has one of the longest tubes of all the Sino-Himalayan *Hackelias*; Diels may have had in mind some of the long-tubed species of *Paracaryum* from Turkey, e.g. *P. corymbiforme* (DC. & A.DC.) Boiss., when he originally described *P. brachytubum*). *H. obtusifolia* additionally differs from *H. brachytuba* by the obtuse leaves. More detailed discussion of all these taxa will appear later in a revision of all the Sino-Himalayan *Hackelias*, which will also include English descriptions of these two new *Hackelia* species together with full lists of all specimens seen for each species. The names validated



here are published in advance of the appearance of that revision, in order that they may be used in the *Flora of Bhutan*.

***Lasiocaryum ludlowii* R.R. Mill, sp. nov. Fig. 1h-m.**

Affinis *L. densifloro* (Duthie) I.M. Johnst. sed caulibus (3-)6-7(-11) cm altis, singulis vel rariore usque 3(-4), in parte vegetativa simplicibus vel raro ramo singulo, foliis caulinis 6-8 mm longis sessilibus vel paulo amplexicaulibus ad caulem arctiuscule erecto-patentibus, cymis terminalibus per caulem plerumque 3-4, pedicellis c. 1 mm longis, lobis calycis circa 1.5 mm longis, corolla minuta 2-2.5 mm longa tubo calycem manifeste excedenti limbo circa 2 mm diametro lobis circa 0.5 × 0.5 mm, fornicibus non alte trapeziformibus usque fere lunatis circa 0.1 × 0.3 mm cum prominentiis lateralibus patentibus et apice distincte sed late vadoseque emarginato differt. *L. trichocarpum* (Hand.-Mazz.) I.M. Johnst., species sinensis, a species nova limbo corollae duplo latiore lobis 2- vel 3-plo longioribus, foliis secus caulem minus numerosis (usque 8, non 9-12) latioribus paulo longioribusque recedit.

Small, erect, probably annual herb. *Stems* 2.5-11 cm, 1-3(-4) per plant, reddish-tinged, slender (0.3-1 mm thick), densely subappressed-villous with antrorse silvery-white setules 0.6-0.8 mm and some longer erecto-patent or subpatent setules to 1.2 mm. *Leaves* 8-13 per stem, sessile; internodes (4-)6-17 mm; lamina of lower leaves somewhat spatulate, of middle and upper ones elliptic or ovate-elliptic, 4-10 × 2.2-3.5 mm, base cuneate or shortly attenuate, margin entire, apex obtuse or subacute; upper surface bright green with sparse, long arcuate setules; lower surface slightly paler and greyer with similar arcuate setules. *Cymes* 3-7 per stem, 4-10-flowered, axillary from uppermost leaves; peduncles 4-18 mm, elongating rapidly after anthesis. *Pedicels* 0.5-1.5 mm, bracteate; bracts ovate or ovate-elliptic, 3-4 × 1.2-2 mm. *Calyx lobes* linear-lanceolate, 1.2-1.6 × 0.15-0.2 mm (-0.3 mm in fruit), hispid-setulose. *Corolla* tubular-campanulate, 2.3-3.2 mm; tube whitish with brownish veins, subequalling calyx lobes; limb c. 2 mm diam.; lobes bright blue, suborbicular, spreading, 0.6 × 0.6 mm, obtuse. *Throat scales* low-trapeziform, 0.1 × 0.45 mm including slender lateral projections c. 0.1 mm at base, apex shallowly emarginate. *Anthers* sessile in middle of corolla tube, ellipsoid, c. 0.3 × 0.15 mm, their apices well below the scale bases. *Style* 0.8-1.2 mm (depending on age), c. 2/3 × calyx; stigma capitate. *Nutlets* (described from *Stainton, Sykes & Williams* 7289) ovoid but compressed ventrally, 1-1.1 × 0.6-0.7 mm, with attachment scar along length of ventral face, sparsely and minutely appressed-pubescent on dorsal face (hairs c. 0.05 mm).

Type: Bhutan, Upper Pho Chu district, Gafoo La, 15,500 ft, 6 vii 1949, calyx dark greenish, corolla pale blue with pale yellow eye, in scree, *F. Ludlow, G. Sherriff & J.H. Hicks* 16747 (holo. E) — flowering specimen.

*Distribution and ecology.* Nepal, Bhutan, China (Xizang). Scree and open grassy slopes, 4270-4725 m. Flowering July-August; fruiting August.

*Additional specimens examined.* NEPAL. West Region, Gandaki Zone, Pokhara district:

Samargaon (N of Tukucha), 15,000ft, open grass slopes, corolla blue, edge of leaf hairy, 16 viii 1954, *Stainton, Sykes & Williams* 7289 (E) — flowering specimen with a few mature nutlets.

CHINA (XIZANG). Hills N of Lhasa, 14,000ft, flowers pale blue, on open grassy slopes, 16 viii 1943, *Ludlow & Sherriff* 9869 (E) — flowering specimen.

This new species is named after Frank Ludlow, who gathered not only the type, from northern Bhutan, but also the earliest-collected specimen, from Tibet. These two specimens, in which all plants on the sheets consist of a single  $\pm$  unbranched stem, were previously named as *L. densiflorum* (Duthie) I.M. Johnst. while the specimen from Nepal, which has up to 3(–4) suberect stems per plant, had been identified as *L. munroi*. The differences from *L. densiflorum* (Fig. 1q–s) are given in the Latin diagnosis: the most clear-cut are the shorter calyx lobes (c.1.5mm instead of 2–2.5mm), short but distinct pedicels c.1mm (not flowers subsessile), corolla limb only 2mm diam. (not 2.5–4mm diam.) with lobes about half the size (0.5  $\times$  0.5mm, not 1  $\times$  1mm), and the throat scales half as high (only 0.1mm, not 0.2mm). *L. munroi* (Fig. 1n–p) differs from the new species by its branched habit with numerous stems; most flowers with pedicels 0.5–3mm long but the lowest pedicel of each inflorescence up to twice as long (not all c.1mm); and throat scales subquadrate, about as broad as high (not crescent-shaped and broader than long). *L. trichocarpum* (Hand.-Mazz.) I.M. Johnst., from China (NW Yunnan to SW Sichuan), is variable in stature and in density and length of indumentum but always has fewer leaves per stem (not more than 8) and corollas about twice the diameter (c.4mm, not 2mm) compared to *L. ludlowii*. The distribution of the new species seems rather scattered, but this is doubtless due to under-collection of these easily overlooked little plants.

***Onosma emodi* Wall. var. *stelligera* (I.M. Johnst.) R.R. Mill, **comb. nov.****

Syn.: *Maharanga emodi* (Wall.) A.DC. var. *stelligera* I.M. Johnst. in *J. Arnold Arbor.* 37: 302 (1956).

The necessity of this new combination was overlooked by Grierson & Long (1978: 145).

***Trigonotis clarkei* R.R. Mill, **sp. nov.** Fig. 1a–g.**

*T. ovalifoliae* (Wall.) C.B. Clarke affinis sed caulibus strigosis (non villosis, sine pilis patentibus), foliis omnibus (supremis inclusis) petiolatis, petiolis foliorum inferiorum plerumque 10–27mm longis, superiorum 1–3mm, pagina superiore foliorum densiuscule et subtiliter strigosa (pilis  $\pm$  aequalibus, 0.2–0.3mm), inferiore sparsiore strigosa; venis infra manifeste elevatis; pedicellis longioribus (floriferis 8–10mm, non 2–3mm, fructiferis usque 12mm longis, non 2.5–3mm); nuculis brunneis usque nigris, acutissime trigonis (haud tetragonis), paulo minoribus (1.5  $\times$  1.2mm, non 2  $\times$  1.5mm), dense pubescentibus pilis longiusculis differt.

Weak perennial herb. *Stems* erect from decumbent base, 10–40cm, unbranched (except in inflorescence), strigose; hairs pale whitish-brown, all adpressed or some erecto-patent but none horizontally spreading. *Basal leaves* few, smaller than but

similar to cauline leaves. *Cauline leaves* numerous, all including uppermost petiolate (petioles of lower leaves usually 10–27mm, of upper ones 1–3mm), subequal; lamina ovate-elliptic to suborbicular, 10–30 × 7–20mm, obtuse with short acute mucro 0.2–0.7mm; upper surface rather densely but weakly strigose (hairs subequal, 0.2–0.3mm, orientated at an angle of c.45° to the midrib), lower surface less densely strigose (hairs on both lamina surface and midrib unequal); veins conspicuously raised on lower surface of lamina. *Inflorescence* racemose, short, few-flowered, simple, terminal (sometimes also with a shorter lateral raceme but never a forked terminal raceme); flowers axillary, 1–several; pedicels at most 8–10mm in flower, in fruit to 12mm. *Calyx lobes* 1.5–2mm in flower, ovate, acute, increasing to 2.5–3mm in fruit. *Corolla* blue(?), 3.5–4mm; limb 4.5–7mm diam. *Throat scales* subquadrate, emarginate. *Style* slender, 2.5–3mm after anthesis. *Nutlets* 1.5 × 1.2mm, very sharply trigonous with prominent edges, densely pubescent with rather long hairs; stipe ± lacking.

Type: India, West Bengal, Darjeeling district, Singalelah [Singalila], Darjeeling, 11,000ft, 8 x 1870, 'seeds trigonous with an acute entire margin and microscopically pilose faces', C.B. Clarke 12718 (holo. K) [the quoted annotation is in Clarke's handwriting].

*Distribution and ecology.* N India (W Bengal, Darjeeling district); 1700–3350m.

*Additional specimens examined.* DARJEELING. Singalila, 10,000ft, 7 x 1870, Clarke 13362 (K); Choongthang, 5600ft, v 1885, Pantling s.n. (Clarke 46458) (K).

This new species is obviously allied to *T. ovalifolia* (Wall.) C.B. Clarke; indeed, the holotype and one of the paratypes (Clarke 13362) are mounted on the same sheet as an example of *Wallich* 927, type of *T. ovalifolia*. However, it differs from *T. ovalifolia* in its grey-strigose stems (not villous with spreading brownish hairs); all leaves petiolate (in *T. ovalifolia* the upper ones are sessile), with the veins more prominently raised beneath; pedicels considerably longer in both flowering and fruiting stages; and nutlets sharply trigonal (not tetrahedral), pubescent with markedly longer hairs than in *T. ovalifolia*. At present it is known only from three collections from two localities in Darjeeling (Singalila and Chunthang) but it may also occur in adjacent E Nepal. Further material, especially in flower, is desirable to complete the description. The flower colour is assumed to be blue (since all other Himalayan species of *Trigonotis* have blue flowers) but this requires confirmation.

#### NOTES ON TYPIFICATIONS

***Microula pustulosa*** (C.B. Clarke) Duthie in Kew Bull. 1912: 39 (1912, as '*pustulata*'). Syn.: *Eritrichium pustulosum* C.B. Clarke in Hook.f., Fl. Brit. India 4: 164 (1883) — '*Eritrichium* sp. n. 14, *Herb. Ind. Or. H. f. & T.*'. Type locality: 'Alpine Sikkim; Lachen, alt. 13–15000ft.'. Lectotype (designated here): Lachen, 13–14,000ft, 17 vii [18]49, fl. pale blue, *Hooker & Thomson* s.n. (K).

There are two sheets in the type cover at K: 'Lachen, 13–14000ft, July 17/[18]49, fl. pale blue' and 'Tungu, 14–15000ft, July [18]49'. The Lachen sheet bears a Kew 'Type Specimen' label. The Tungu specimen was determined (in sched.) by Grierson and Long in 1978 as the *holotype* of *Eritrichium pustulosum*, with a note that the specimen in the capsule was probably a *Lasiocaryum*; indeed, the capsule does contain material of *L. munroi*. However, Grierson & Long were wrong in designating the Tungu plant as holotype. Although Clarke presumably saw both sheets of '*Eritrichium* sp. n. 14', he cited only the Lachen specimen. Both specimens can be regarded as 'syntypes' of that numbered, but not named, taxon, but the Lachen specimen (with the K type label) should be regarded as the type. As Clarke neither explicitly cited the Lachen specimen as holotype nor explicitly excluded the Tungu specimen from his circumscription of the species, the Lachen specimen is here selected as lectotype of the name rather than regarded as the holotype.

***Tournefortia hookeri*** C.B. Clarke in Hook.f., Fl. Brit. India 4: 147 (1883). Lectotype (designated here): [India, Sikkim], 'Lower Hills Sikkim Himal.', *J.D. Hooker* (K; labelled '*T. heyneana* Wall. Sikk.', on lower part of a sheet whose upper quarter bears a different specimen annotated var. *subtropica*.)

Clarke recognized two taxa within his new species *T. hookeri*: the typical one, and var. *subtropica* C.B. Clarke, *loc. cit.* The latter was described on the basis of a specimen from 'Sikkim: by the great Rungait, *J.D.H.*'. This is easily typified by the specimen presently in the type cover at K, collected by J. D. Hooker in April 1850 and labelled 'Gt Rt'.

The typical form of the species was cited from 'Sikkim: alt. 2–5000ft, frequent: *J.D.H., &c.*'. The specimen at present in the type cover is labelled '*T. Heyneana* W[allich]', with a redetermination as *T. hookeri* in Clarke's writing, but is completely unlocalized and does not have any indication of who collected it. It *may* have been collected by Hooker, but there is no evidence to suggest it (the 'Herbarium Hookerianum 1867' rubber stamp simply refers to the Kew Herbarium). It is, however, marked 'Type?' in what looks like Sir David Prain's writing.

Several other specimens would also have been available to Clarke in drawing up his description: Darjeeling: Rungbe, 5000ft, 31 v 1870, *Clarke* 11790A (K) and 11790F (BM); 'Sikkim' [probably Darjeeling], iii 1871, *Clarke* 16774 (K); 'Sikkim terai' [likewise, probably Darjeeling], *Clarke* s.n. (K); Sikkim, *Griffith* H.E.I.C. 5928 (K); Darjeeling, Choonabuttee, 12 vi 1870, *Clarke* 12024 A (K), 12024 G (BM) and 12024 H (BM). Only *Griffith* H.E.I.C. 5928 and *Clarke* 11790 and 12024 bear fruits. The rusty pubescence in the inflorescence, noted by Clarke, is most evident on the *Griffith* sheet and on the one presently in the type cover, less so in *Clarke* 11790.

There is one further sheet at K, on which are mounted what appear to be two separate specimens. The top quarter of this sheet bears an inflorescence branch and upper leaves of var. *subtropica* C.B. Clarke (recognizable by its large flowers c.8mm);

this collection is annotated var. *subtropica* by Clarke but is otherwise unlabelled. The lower part of the sheet bears a branch, including inflorescence, of *T. hookeri* var. *hookeri*, with small corollas c.5mm. Like the one presently in the type cover, this specimen is labelled '*T. heyneana* Wall. Sikk' in pencil by Hooker; it also has one of Hooker's blue field labels, 'Lower Hills Sikkim Himal.' It has been redetermined as *T. hookeri* C.B. Clarke in Clarke's handwriting. Because of the obvious connection between this specimen and both Hooker and Clarke, and because at present no other authentic Hooker gatherings of this species have been traced, this lower specimen is here designated lectotype of *T. hookeri* var. *hookeri*.

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