NOTES RELATING TO THE FLORA OF BHUTAN: XLI. *COMPOSITAE* (*ASTERACEAE*)

A. J. C. GRIERSON* & L. S. SPRINGATE†

The following new species, subspecies and combinations are proposed for plants occurring in the *Flora of Bhutan* area: *Anaphalis cooperi* Grierson & Springate, *Artemisia bhutanica* Grierson & Springate, *Ixeridium beauverdianum* (H.Lév.) Springate, *Ligularia lancifera* (J.R.Drumm.) Grierson, *L. latiligulata* (R.D.Good) Springate, *Parasenecio chenopodifolius* (DC.) Grierson, *Saussurea donkiah* C.B.Clarke ex Springate, *S. pinnatiphylla* Grierson & Springate, *Tanacetum tatsienense* var. *tanacetopsis* (W.W.Sm.) Grierson and *Youngia silhetensis* subsp. *bhutanica* Grierson & Springate. A description of *Ligularia latiligulata* is provided. A lectotype is designated for *Saussurea obscura* Lipsch.

Keywords. *Anaphalis*, *Artemisia*, *Ixeridium*, *Ligularia*, new species, *Parasenecio*, *Saussurea*, Sino-Himalayan Region, *Tanacetum*, *Youngia*.

INTRODUCTION

This paper is based on a manuscript prepared by Andrew Grierson in the late 1980s, wherein the jointly authored new taxa were first identified. The comments on these taxa were compiled after his death by the second author, when the circumscriptions of *Artemisia bhutanica* and *Youngia silhetensis* var. *bhutanica* were revised and the notes on further species incorporated. In all cases where a transfer between genera is proposed, the circumscription accepted for that genus is compatible with that outlined by Bremer (1994). Only the relationship of one long-overlooked species, *Ligularia lancifera*, is significantly reassessed at this level, though the status of *Ligularia latiligulata* and *Ixeridium beauverdianum* is reassessed at specific level.

For the following descriptions, involucre diameters were measured near the base of relaxed capitula, and disc corollas were measured with the tube at maximum development and the lobes or teeth held erect.

Anaphalis DC. (Gnaphalieae)

Anaphalis cooperi Grierson & Springate, **sp. nov. Fig. 1a–c.**

Frutex ab omnibus speciebus himalensibus generis *Anaphalidis* caulibus lignosis erectis longaevis recedens. Surculi floriferi similes caulibus totis floriferis *A. pannosae* Hand.-Mazz. sed alis decursivis foliorum inferiorum longioribus, pubibus glandulosis phyllariorum amplioribus, phyllariis mediis interioribusque elanatis differunt.

* Deceased, formerly of the Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh EH3 5LR, UK.
† Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh EH3 5LR, UK.

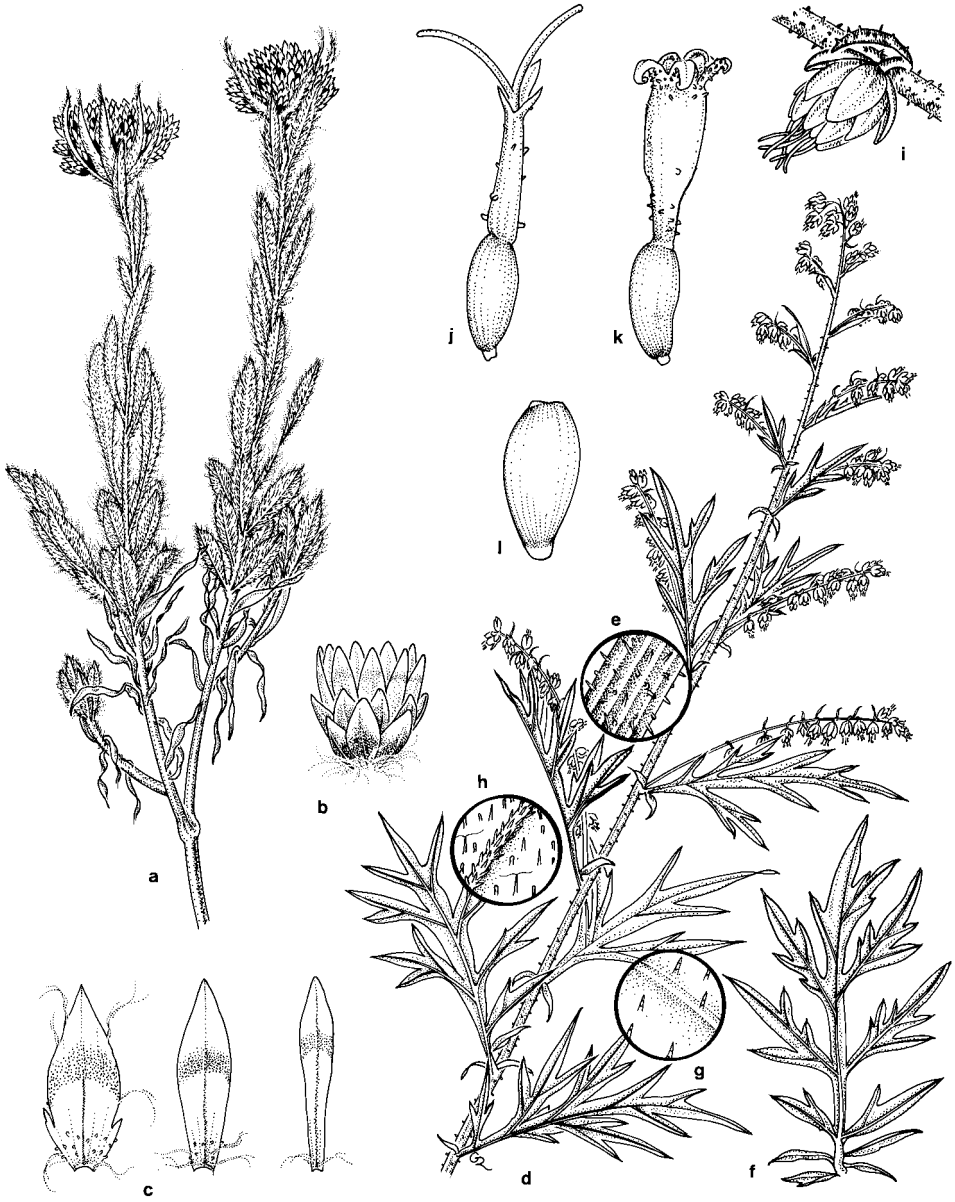

FIG. 1. *Anaphalis cooperi* Grierson & Springate: a, top of stem with flowering shoots (×⅔); b, capitulum (×2); c, 3 phyllaries (×3). *Artemisia bhutanica* Grierson & Springate: d, upper part of flowering stem (×⅔); e, upper stem detail (×4); f, leaf, (×1); g, leaf detail above (×15); h, leaf detail beneath (×15); i, capitulum (×6); j, female flower (×15); k, bisexual flower (×15); l, achene (×18). a–c from *Cooper* 1955 (E, BM); d, e, g–k from *Sinclair & Long* 5101 (E); f, l from *Cooper* 2387 (E). Drawn by Glenn Rodrigues.

Type: Bhutan, Timpu, Parshong [Thimphu district, Barshong], 12,500ft, 27 vii 1914, *Cooper* 1955 (holo. E, iso. BM).

Rounded shrub to 50cm or more, loosely whitish lanate throughout (brownish yellow when pressed); stems erect, upper part much-branched, loosely covered with dead leaves and bearing many short sterile shoots, few flowering shoots and sometimes elongate sterile shoots, lanate in first year, subsequently glabrous, eventually bark becoming fibrous. *Leaves* sessile, often with glandular secretions beneath wool, usually only midrib apparent when pressed. Outer leaves of sterile shoots short, obovate to oblong, inner or upper leaves narrowly oblanceolate, sessile, to 50×9mm, subacute with short apiculus, attenuate to base. *Flowering shoots* 7–18cm long (–24cm in fruit), erect, eventually bearing conspicuous vegetative buds in lowest leaf axils; lower leaves oblanceolate to narrowly oblong, $20–50 \times 4–6.5(–8)$mm, subacute with blunt apiculus, attenuate below and narrowly decurrent on stem; upper leaves often shorter, narrowly oblong to lanceolate, acute to long-acuminate with scarious tip, rounded at base. *Capitula* (4–)7–23 in a compact, eventually subglobose corymb. *Involucre* 5–6-seriate, c.8mm diam.; 0–3 irregular bracts present, transitional to and longer than outer phyllaries. *Lamina of phyllaries* white with purplish zone at base, stereome brownish when pressed; all phyllaries sparsely glandular-stipitate on back on and around stereome, where outer phyllaries also lanate. *Outer phyllaries* ovate, $6–10 \times 2.3–4$mm, acute or less often obtuse; middle phyllaries elliptic, folded but scarcely contracted above stereome, to 11.5×4mm, obtuse or less often subacute; innermost phyllaries reduced. *Receptacle* alveolate, margins of alveolae protruding c.0.2mm. *Flowers* predominantly female or almost entirely bisexual (functionally male), corolla lobes glandular-stipitate. Female corollas c.5.5mm long, pappus c.6.3mm long. Bisexual corollas c.6.5mm long, ?scarcely dilated above, pappus c.7mm long (corollas and achenes in both capitulum types too poorly preserved or immature to describe in detail or to confirm as fertile; flowers probably opening in August).

Additional specimens. BHUTAN. [Upper Pho Chu district], head of western branch of Pho Chu, 13,500ft, on pebbly shores of a glacier lake, 21 vi 1949, *Ludlow, Sherriff & Hicks* 16606 (E, BM); [Upper Bumthang Chu district], Tsampa, Kantanang, 13,000ft, on cliff ledges, 3 vi 1949, *Ludlow, Sherriff & Hicks* 19045 (E, BM); Upper Mo Chu district, ridge above Laya, 28°07′N, 89°44′E, 4480m, grassy ledges on exposed ridge, 21 ix 1984, *Sinclair & Long* 5226 (E).

Most Himalayan species of *Anaphalis* can reasonably be accommodated in the series adopted by Ling *et al.* (1979) for Chinese species, but the relationships of *A. cooperi* are less obvious. It develops a permanently increasing framework of vegetative shoots without any die-back, although the flowering shoots scarcely differ from whole stems of herbaceous species of *Anaphalis* and die back almost to the base. Apart from its habit, *A. cooperi* shows a combination of characters most often found in the more-or-less herbaceous series *Pannosae* Y.Ling and *Xylorhizae* Y.Ling. It most resembles *A. pannosa* Hand.-Mazz. from SE Tibet and NW Yunnan, but differs by its more strongly decurrent lower cauline leaves, more numerous and more widely distributed glandular hairs on the phyllaries and non-lanate middle and inner phyllaries, as well

as by its habit, since *Anaphalis pannosa* produces short branches at soil level to form a dense tuft. The relationship of *Anaphalis cooperi* to series *Suffruticosae* Y.Ling with weak, slender, often decumbent, woody stems seems more remote. It has no affinity with series *Contortae* Y.Ling and *Virgatae* Y.Ling, scarcely separable series which include several subshrubs with conspicuous but short-lived woody stems, nor any affinity with the woodier species of series *Sinicae* Y.Ling, nor with the remaining shrubby species of southern India and Sri Lanka.

Artemisia L. (Anthemideae)

Artemisia bhutanica Grierson & Springate, **sp. nov.** (Sect. *Viscidipubes* Y.R.Ling). **Fig. 1d–l.**

Ab *A. myriantha* Wall. ex Bess. var. *myriantha* foliis pilos sparsiores et majores undique gerentibus, in pagina inferiore foliorum et pagina dorsali phyllariorum pilis araneosis paucioribus vel nullis, floribus foeminis c.12–17 differt.

Type: Bhutan, Upper Mo Chu district: Laya (28°07′N, 89°44′E), 3840m, open grassy slope amongst cultivation, rank-smelling herb, flowers brownish green, 18 ix 1984, *Sinclair & Long* 5101 (holo. E).

Perennial herb from short stout horizontal stock, at least 60cm tall, probably often much taller, bearing pale short-stipitate glands intermixed with longer stiff dark-reddish multiseptate hairs; stems erect, hispidulous. *Mid-cauline leaves* 2-pinnatisect, ovate in outline, subsessile, 7–9 × 4–7cm, bearing 3–4(–5) pairs of primary segments and 2–4 stipuliform lobes at base; primary segments with 1–3 pairs of lanceolate, sharply acuminate, usually entire secondary segments. *Lower inflorescence leaves* 1–2-pinnatisect, 3.5–7.5 × 2.5–5.5cm. *Cauline leaves* thinly covered with coarse septate hairs above, more densely covered beneath with small glandular-capitate hairs, some larger obviously septate hairs and sometimes some tomentose hairs (base obviously septate, bifid above with filiform spreading branches); leaves of basal offsets bearing stiffer ± spreading eglandular hairs interspersed with some short capitate ones. *Primary inflorescence branches* spreading, 3–20cm long, simple or sometimes bearing short lateral spurs with 2–3 capitula towards base, rarely with a third order of branching. *Involucre* ovoid-campanulate, 1.8–2.5mm diam.; phyllaries ovate to narrowly obovate, glabrous or bearing short-stipitate glands, cilia and sometimes few araneous hairs; outermost 2–2.5mm long; inner 2.7–3.4mm long. *Female flowers* c.12–17; corolla narrowly conic, 1.4–2mm long, sparsely subsessile-glandular, with short teeth at apex (0.1–0.3mm long). *Bisexual flowers* fertile, c.12–18; corolla narrowly tubular-campanulate, 2.1–2.6mm long, subsessile glandular, mostly on tube and teeth; style branches strongly recurved. *Achenes* ellipsoid-obovoid, c.1.2mm long, finely striate, mucilaginous. *Flowering* September–October

Additional specimens: BHUTAN. Timpu, Simtoka, [Thimphu district, Simtokha], 9000ft, 13 x 1914, *Cooper* 2387 (E, BM); [Thimphu district], Dotinang [Dotena], 2610m, 27 x 1971, *Bedi* 1080 (K).

The species is described from three collections from a relatively small area of north-west Bhutan. At first sight these differ considerably. The type lacks tomentose hairs beneath the cauline leaves and has an open narrowly pyramidal inflorescence of spreading branches bearing most capitula singly except for some spurs with two or three capitula towards the base of the lower branches. *Bedi* 1080 is the only complete specimen, a short plant with small shrivelled cauline leaves with most tomentose hair beneath and inflorescence similar to the type. *Cooper* 2387 consists of parts of large inflorescences with scarcely any tomentose hairs beneath the leaves and long, apparently fastigiate primary branches, in one case with subsidiary branches bearing congested third order branchlets towards the base with up to five capitula. However, the branches seem to have been folded together during collection and probably naturally assumed the same attitude as the other examples. These collections were readily referred to a small section of *Artemisia*, sect. *Viscidipubes*, where each collection was found to have more characters in common with the other two than with any species so far described. They are referred to a single new species here.

Predominance of secretory hairs beneath the lamina of the cauline leaves and paucity or complete absence of tomentose hair are very uncommon in sect. *Viscidipubes*; in combination with viscid and glandular hairs on the stems, it has previously been described only from *A. mattfeldii* Pamp. var. *etomentosa* Hand.-Mazz. (Handel-Mazzetti, 1938; Ling, 1991; Jiang & Ling, 1996). As described by these authors and Pampanini (1936), *A. mattfeldii* differs by its much smaller ultimate, often third order, leaf segments and predominance of bisexual flowers. Isoparatypes of var. *etomentosa* (Gansu, *Ching* 923, E) also differ by their slender, squamate stolons and capitula c.4mm across with c.19–27 female and c.27–50 bisexual flowers. The species is confined to SW China and Tibet; var. *mattfeldii* has a scattered distribution in Tibet, not inconsistent with occurrence within Bhutan, but var. *etomentosa* is only is distributed well to the north-east (Ling, 1985). It seems quite distinct from *A. bhutanica*.

Artemisia myriantha Wall. ex Bess. is a widespread polymorphic species sympatric with *A. bhutanica.* It differs by the finer but much denser vestiture with subsessile glands on both faces of its leaves. The tomentose hairs beneath the leaves are sparse (var. *myriantha*) to dense (var. *pleiocephala* (Pamp.) Y.R.Ling) but never as infrequent as on *A. bhutanica*, all phyllaries are partly araneous, the capitula are usually smaller, the female flowers are fewer, the bisexual flowers are either fewer or clearly outnumber the female ones and the style branches are spreading, not recurved.

Cooper 2387 has been determined *in sched.* as *A. vexans* Pamp., but that species has leaves obviously tomentose beneath, hair on all phyllaries and many fewer, larger capitula with 30–40(–50) bisexual flowers (Ling, 1991). It is confined to Sichuan and some scattered locations in Tibet (Ling, 1985).

A population of uncertain status but quite similar to *A. bhutanica* occurs in north-west Yunnan (Zhongdian: Na Pa Hai, 3550m, cleared *Picea* forest, 28 ix 1990, *CLD* 396 (E) & *CLD* 398 (E)). *CLD 398* differs only in that the innermost phyllaries are

more reduced, ovate-lanceolate, acute and all other phyllaries are ovate to oblong-elliptic, broadest at or below the middle. *CLD* 396 differs noticeably by its numerous more compact capitula with more female flowers (up to 20), but agrees in most other characters, so I take it to be the same taxon.

Ixeridium (A.Gray) Tzvelev (Lactuceae)

Ixeridium beauverdianum (H.Lév.) Springate, **comb. nov.**
Basionym: *Lactuca beauverdiana* H.Lév., Repert. Spec. Nov. Regni Veg. 8: 450 (1910).
Type: 'Kouy-Tchéou: Kai-Tchéou' [China: Guizhou, Kaikou], vi 1908, *Cavalerie* 3707 (holo. E, iso. E).
Syn.: *Lactuca makinoana* Kitam., Compos. Nov. Jap.: 26 (1931).
Ixeris makinoana (Kitam.) Kitam., Bot. Mag. (Tokyo) 49: 284 (1935).
Ixeridium makinoanum (Kitam.) Pak & Kawano, Mem. Fac. Sci. Kyoto Univ. (Ser. Biol.) 15: 47 (1992).
Misapplied names: *Lactuca gracilis* sensu Hook.f., Fl. Brit. Ind. 3: 410 (1881) p.p., non DC.
Ixeris gracilis sensu Lauener, Notes Roy. Bot. Gard. Edinburgh 34: 391 (1976) p.p. non (DC.) Stebb.
Ixeridium gracile sensu Shih, Fl. Rei. Pop. Sin. 80: 257 (1999) p.p. non (DC.) Shih.

Further synonyms and another misapplication are listed by Pak & Kawano (1992).

Ligularia Cass. (Senecioneae)

Ligularia lancifera (J.R.Drumm.) Grierson, **comb. nov.**
Basionym: *Senecio lancifer* J.R.Drumm., Kew Bull. 1911: 270 (1911). Lectotype (chosen here): Tibet, Saogong, 20vii 1907, *H.M. Stewart* s.n. (K).

Ligularia latiligulata (R.D.Good) Springate, **stat. nov. Fig. 2a–f**.
Basionym: *Cremanthodium hookeri* C.B.Clarke fm *latiligulatum* R.D.Good, Linn. Soc. Journ., Bot. 68: 280 (1929). Lectotype (chosen here): East Himalaya: Kapook [India: Sikkim, Kupup], 13000ft, 1 viii 1912, *Rohmoo* 31 (E: labelled specimen, iso. BM).
Syn. *L. hookeri* (C.B.Clarke) Hand.-Mazz. fm *latiligulata* (R.D.Good) R.Mathur in Rao *et al.*, Fl. Ind. Enum. Aster. 53 (1988).

Perennial herb 180–600mm; stems erect, glabrescent to pubescent throughout with crisped, multiseptate hairs, sometimes with araneous tips, usually surrounded by fibrous leaf remains at base. *Basal leaves* reniform or cordate; blade 20–100 × 25–110mm, obtuse, shallowly to deeply cordate at base, regularly and sharply dentate, glabrous to sparsely short-puberulous above, subglabrous to puberulous

FIG. 2. *Ligularia latiligulata* (R.D.Good) Springate: a, habit (×½); b, capitulum (×2); c, 2 phyllaries (×2); d, ray flower (×2); e, disc flower (×2); f, disc achene (×2). *Saussurea donkiah* C.B.Clarke ex Springate: g, habit (×1); h, outer, middle and inner phyllaries (×2); i, flower (×2). a–f from *Cooper* 31 (E); g–i from *Hooker* s.n. (holotype). Drawn by Christina Oliver.

beneath with the hairs longer and araneous; petioles 70–160mm (–300mm, probably only when etiolated). *Lowest 1 (–3) cauline leaves* similar to basal leaves in size and shape, though petiole usually shorter with only base of sheath clasping stem. *Bracts* usually 1–2 on upper c.⅔ of stem, ±oblong, mainly derived from petiole sheaths, some with a small triangular leaf blade-like apex, sometimes more developed and resembling a much reduced leaf with little-dilated sheath. *Inflorescence* erect, racemose, with hairs of same type as stems and thickest on apex of peduncle and base of involucre, sometimes extending onto phyllaries below; capitula 1–4(–6), opening in basipetal sequence, with apical capitulum largest and earliest. *Involucres* (5–)7–12mm diam., base often bearing 1–2 linear to lanceolate bracts usually ± as long as phyllaries; phyllaries oblong-elliptic, 9–15 × 3–6.5mm, acute to acuminate, velutinous at very apex, inner ones with very broad scarious margin. *Corollas* yellow. *Ray flowers* (9–)11–12(–16); corolla tube 3–5mm, limb obdeltoid to oblong-elliptic, 8.5–15 × 4.5–8mm, length less than 3 × width, 3-(4-)toothed at apex, teeth usually very deeply and irregularly cut though sometimes obsolete. *Disc flowers* numerous; corolla tube 1.8–3mm; throat narrowly infundibular, teeth suberect, 1–1.5mm, combined length 5.3–6.7mm, more than 2 × length of tube. *Achenes* oblong, 4mm, glabrous; pappus 6.5–8mm, white. *Flowering* July–September.

Additional specimens. NEPAL. East: *Beer* 25474 (BM); *Minaki et al.* 9020811 (E); *Stainton* 971 (BM, E).

INDIA. Sikkim: *Cave* s.n., Boktu, 1 ix 1919 (E); *Cooper* 482 (E), 576 (E), 603 (E), 834 (BM, E); *Elwes* s.n. (K); *EENS* 278 (E); *Hooker* '*Ligularia* 8' p.p.: Yeumtong, 7 ix 1849 (K), Lachen 16 vii 1849 (K), without locality (K); *Hooker* '*Ligularia* 15' p.p.: without locality (K); *Ludlow & Sherriff* 10098 (BM); *Rohmoo* 34 (E, K). West Bengal, Darjeeling District: *Kanai et al.* 726653 (BM) = *TI* 881272 p.p. (E), 726654 (BM) = *TI* 881272 p.p. (E); *Clarke* 25575 (BM), 25581 (K).

CHINA. Tibet: *Cooper* 719 (E).

BHUTAN. *Cooper* 3221 (BM, E); *Ludlow, Sherriff & Hicks* 17085 (BM, E), 20979 (E), 20981 (BM, E), 21315 (BM, E), 21482 (BM); *Sinclair & Long* 5193 (E).

Living material. NEPAL. East: *EMAK* 402 (grown under RBGE 19920132); *KEKE* 751 (RBGE 19892367).

Distribution. E Nepal, Sikkim, NE Darjeeling, Chumbi, C & N Bhutan east to Upper Kuru Chu district.

This taxon was originally described as a form of *Ligularia hookeri* (under *Cremanthodium h.*) and there has been some confusion *in sched.* and by Good (1929) with *L. retusa* DC. [*Cremanthodium retusum* (DC.) R.D.Good], *Cremanthodium thomsonii* C.B.Clarke and *C. reniforme* (DC.) Benth. In the characters of its leaves, bracts and raceme, including the capitula opening in basipetal sequence, it has greatest similarity to *L. hookeri*. However, the shorter, wider, often irregularly toothed ray corolla limbs obviously differ and the two taxa have seldom been confused. The involucres are also wider, prone to deform into a hemispheric outline and noticeably darker when pressed and the disc corollas are quite different (*L. hookeri* having a long tube, broader, campanulate limb and recurved teeth). In all these characters,

L. latiligulata instead resembles *L. retusa* and many species of *Cremanthodium* Benth. Separate species status therefore seems appropriate for it. Placement in *Ligularia* along with *L. retusa* will leave the reniform-leaved, palmately veined group of *Cremanthodium* composed entirely of 1-capitulate species.

Distinguishing vigorous specimens of *L. ligulata* from *L retusa* has caused most problems of identification. Specimens with a cymose inflorescence bearing the earliest and largest capitulum at the centre can be readily identified as *L. retusa*. Later capitula overtop the central one. The plants are very turgid, but seem to have relatively little supporting structure and press badly, the leaf sheaths becoming very loose and perforations sometimes developing between the leaf veins. There are usually 2–3 cauline leaves (including a sub-basal one), all with a reniform blade and separate, large, dilated sheath, the uppermost leaf often subtending the main (lowest) branch of the inflorescence with bracts only occurring at nodes higher up. Racemose specimens with basipetal opening of capitula are less turgid and have more stem nodes, the upper ones with small, undivided, almost entirely leaf sheath-derived bracts. They agree with *L. latiligulata* in these characters and seem best referred to that taxon. Specimens with one or two capitula can also be separated by these characters; a few coarse ones then prove to be *L. retusa.*

Cremanthodium thomsonii and *C. reniforme* both vary considerably, but can usually be distinguished from 1-capitulate specimens of *L. latiligulatum* by the longer limb of their ray corollas. *Cremanthodium thomsonii*, at least in the forms that occur within the range of *L. latiligulatum*, also bears no leaves on its stem, only 1–2 small bracts. The stems of *C. reniforme* may bear leaves in the lower part, but any persistent petioles at their base remain entire and smooth, resembling stalks of straw, rather than breaking up into fibres as in *L. latiligulata*.

Parasenecio W.W.Sm. & Small (Senecioneae)

Parasenecio chenopodifolius (DC.) Grierson, **comb. nov.**
Basionym: *Senecio chenopodifolius* DC., Prodr. 6: 364 (1838). Syntypes: [Nepal] Gossain Than, *Wallich*, Num. List 3175A (G n.v., isosyn. E, K); [NW India] Emodus Kamaonensis, *Blinkworth*, Wall. Num. List 3175B (G n.v., isosyn. K-W: details from published list, no reference to Blinkworth at K-W fide second referee).
Syn.: *Cacalia chenopodifolia* (DC.) Kitam. ex Koyama, Mem. Fac. Sci. Kyoto Univ. Ser. Biol. 2: 170 (1969).

Koyamacalia chenopodifolia (DC.) H.Rob. & Brettell, Phytologia 27: 271 (1973).

Parasenecio chenopodifolius (DC.) Y.L.Chen, Fl. Rei. Pop. Sin. 77 (1): 29 (1999), non rite publ.

Saussurea DC. (Cardueae)

Saussurea donkiah C.B.Clarke ex Springate, **sp. nov. Fig. 2g–i.**
S. leontodontoidi (DC.) Schultz Bip. var. *leontodontoidi* formisque acaulibus *S. erios-*

temonis Wall. ex C.B.Clarke similis, sed foliis subtus ubique sparse et laxe arachnoideis differt. Ab illa etiam setis exterioribus pappi plumosis persistentibus recedit.
Type: India, Sikkim, *Hooker* s.n. (holo. K, labelled specimen on mixed sheet of collections from Donkiah Pass, 17,000–18,000ft, 9 ix 1849 and Kinchin Jhow, 17,000ft, 14 ix 1849; duplicates of either/both collections: E, MANCH).

Loosely to densely tufted plants from short rhizomes crowned with marcescent leaf-bases or from slender stolons with appressed scale-leaves; stems usually absent, less often present, up to 10mm long and leafy. *Basal leaves* deeply pinnatisect, narrowly oblong-elliptic or oblanceolate in outline, 35–c.110 × 8–22mm; lateral segments usually 8–10(–13) pairs, occasionally alternating with large teeth, ovate-triangular to obovate in outline, up to 10 × 10mm, with oblique mucronulate apex and undulate margin with 0–7 broad mucronulate teeth, covered above usually sparsely with multiseptate, araneous-tipped hairs and sometimes with subsessile glands, thinly to moderately lanate below with some larger multiseptate hairs on veins and sometimes subsessile glands, successive outer segments usually overlapping when pressed flat. *Capitula* solitary. *Involucre* campanulate, 8–16mm diam.; phyllaries imbricate, c.5-seriate, simple, apparently purplish above and violet at margins, apiculate, ciliate or rarely subentire, puberulous to lanate above inside, glabrous to puberulous, thinly pilose or lanate above outside, sometimes with some glandular hairs; outer phyllaries ovate with tapered appendage to lanceolate, 13–14.5 × 3.5–5.5mm, reflexed at middle, sometimes the very outermost much enlarged; inner phyllaries linear-lanceolate, 16–18 × 2–2.5mm, reflexed above; innermost sometimes c.1.5mm wide and not reflexed. *Receptacle* densely setose, bristles c.6–9mm, persistent. *Corolla* dark mauve, purple or deep purple, tube 7.5–10mm long, throat 2.7–4mm long, lobes 3.7–4.5mm long, with few small capitate hairs at base outside. Anthers including tails 7–9.5mm long; tails lanate, 2–3mm long, eventually partly exserted. *Achenes* not seen fully developed, apparently oblanceolate, smooth, with fine longitudinal ribs and prominent corona of many narrow scales; pappus double, plumose, inner pappus elements connate at base, 11.5–13mm, outer pappus complete, free of inner pappus, 8–11mm.

Additional specimens. NEPAL. East: Upper West Ombula Chu valley, above Thudam, 27°50′N, 87°39′E, 15,000–16,000ft, 15 viii 1971, collected for G.F. Smith, no. 155 (BM); Tamur valley, Mewa Khola, Topke Gola, on open slopes, 14,500ft, 11 viii 1956, *Stainton* 1325 (E, BM); *ibid.*, on a rock scree, c.12,500ft, 22 x 1971, *Beer, Lancaster & Morris* 10611 (BM); near Pang Pema, above Lhonak, 27°47′N, 88°05′E, alpine meadow, 4900m, *KEKE* 569 (E).

INDIA, SIKKIM. South of Mt Pandim, Chemathang, on lateral moraine, ix 1983, *Macpherson* 118 (E).

CHINA, TIBET, CHUMBI or BHUTAN. [Upper Mo Chu district.] Phile La [Lingshi La], in turf, 15,000ft, *Cooper* 1734 (E).

Although Clarke realized this species was distinct, subsequent workers have referred all specimens to *S. leontodontoides* (DC.) Schultz Bip. var. *leontodontoides*, *S. pachyneura* Franch. or *S. polystichoides* Hook.f., all species which it resembles in habit and in possessing a continuous covering of interwoven hair beneath the leaves.

However, in those species the hair is shorter and denser, forming a tomentum and the outer pappus is either absent or much shorter than the inner pappus and very incomplete or setose. *Saussurea donkiah* seems more closely related to *S. eriostemon* Wall. ex C.B.Clarke s.l. (incl. *S. nepalensis* Spreng. and *S. chapmannii* C.E.C.Fisch.). I have treated the latter as one very heterogeneous taxon, comprising a number of elements which seem to overlap too much in their combinations of characters to be reliably proposed as distinct taxa. The indumentum beneath the leaves of *S. eriostemon* usually consists of few to very many crisped multiseptate hairs clustered along the veins. In some individuals most of these hairs develop araneous tips and occasionally a sparse covering of araneous hair between the veins is found, rather similar to that of *S. donkiah*, as in a group from East Nepal and Sikkim, represented by *KEKE* 753 (E), Thangu, ix 1903, *Prain* s.n. (E) and *Stainton* 1141 (BM, E). However, these plants have long stems and broadly oblanceolate lyrate-pinnatifid upper cauline leaves with about five pairs of lobes. A group from East Nepal and Sikkim with short or no stems and araneous hair covering the underside of the leaves in some individuals and confined to the veins in others is represented by *Beer, Lancaster & Morris* 9543 (BM), Yampung, 1 ix 1919, *Cave* s.n. (E), Nepal, *Dobremez* 1652 & 1674 (both BM), *EMAK* 622 (E), *Ohashi et al.* 775002 (E) and *Ribu & Rhomoo* 6578 (E). These differ from *S. donkiah* by their more obconic and proportionately longer involucres with inner phyllaries 17–25mm long and subglabrous or scabridulous above outside, and, in the three examples with developing fruit, by their elongate slender achenes 6–10mm long.

The type of *Saussurea donkiah* is mounted with eleven other specimens that Hooker retained in his own herbarium when his Indian collections were distributed. All the specimens are *S. donkiah.* The sheet bears two of Hooker's field labels for different localities and dates. The specimens seem to me to be mounted at random, as in many similar cases, and it is no longer possible to distinguish the constituents of each collection nor to relate any individual specimen to a particular field label.

Saussurea obscura Lipsch., Nov. Syst. Pl. Vasc. 8: 250 (1971) as avowed substitute for *S. inconspicua* Lipsch., Nov. Syst. Pl. Vasc. 1968: 219 non Hand.-Mazz. (1939). Lectotype (designated here by L.S.S.): [India], Sikkim, *Hooker* s.n. (K: specimen labelled '4' on mixed sheet of collections from Samdong, 16,000ft, 14 ix 1849 and Yeumtong, 12,000ft, 2 ix 1849; probable isolecto. BM).

Lipschitz typified *Saussurea inconspicua* by five specimens mounted with three others on a sheet originally retained in Hooker's own herbarium. The sheet bears field labels for two distinct localities at different dates. As noted above under *S. donkiah*, in such circumstances the constituents of either collection can no longer be distinguished, nor can any specimen be associated with a specific field label. Lipschitz considered the specimens numbered 1–3 represented *S. nimborum* W.W. Smith and specimens 4–8 comprised his new species. However, I regard specimen no. 8 as another example of the same form of *S. nimborum* as specimens 1–3. Specimen 4

includes a dissected capitulum seen by Lipschitz and the only examples of achenes developed enough to be described as rugose and muricate. It therefore seems a better choice for lectotype than specimen 8.

With the exclusion of the latter, specimens 4–7, together with two apparent duplicates at BM, form a more homogeneous group, similar to *S. nimborum* in many characters, but differing by those related to size, particularly leaf shape, and quite possibly by the achenes, which were better developed in the lectotype than in any example of *S. nimborum* at E, K or BM. Achenes of the latter did not show any seed development and either had been completely flattened in the press or were longitudinally ribbed, with incipient tubercules between the ribs in one case. I do not believe definite comparison can be made between achenes of different species at this stage of development. Nevertheless, Lipschitz' species is provisionally maintained (as *S. obscura*), since I have not examined the sole paratype collection (*Smith* 2442, CAL) nor seen any further specimens that could link the two taxa.

Saussurea pinnatiphylla Grierson & Springate, **sp. nov. Fig. 3a–d.**
S. eriostemoni et *S. pachyneurae* similis sed phyllariis pinnatifidis et foliis plerumque interrupte pinnatis, foliolis dentibusque alternantibus disjunctis differt. Ab illa etiam foliis infra tomentosis, ab hac setis exterioribus pappi plumosis persistentibus recedit. Type: Bhutan: Tongsa district, Rinchen Chu, Takseha, 4730m, alpine grassy pastures, involucres green, florets purple, 19 viii 1949, *Ludlow, Sherriff & Hicks* 17172 (holo. E; iso. E, BM).

Acaulous or subacaulous herb. *Leaves* 12–15, interruptedly pinnate, elliptic in outline, 70–145 × 25–35mm; principal leaflets 5–10 pairs, ovate to obovate or oblong in outline, 7–15 × 5–12mm, bearing c.7–9 coarse, irregular, mucronulate teeth, green above and very sparsely crisped-puberulous with small multiseptate hairs with mostly obsolete araneous tips, whitish tomentose beneath; alternating minor lobes usually 1- or 3-toothed, up to 3 × 3mm, absent from some leaves; leaflets towards leaf apex sometimes joined by a narrow strip of lamina; rachis purplish, crisped-puberulous. *Capitulum* solitary. *Involucre* 15–20mm diam., 4–5-seriate; outer phyllaries c.19–25 × 4–8mm, with oblong-lanceolate, coriaceous, entire base sparsely puberulous on the back and foliaceous, pinnately lobed, reflexed limb puberulous on back and sparsely so on face, segments up to 8 pairs, linear from a triangular base, spreading or directed forwards, up to 4mm long; inner phyllaries c.25–28 × 2–4mm with longer, narrower base and shorter limb and lateral segments. *Receptacle bristles* numerous, linear, 3mm long. *Corolla* glabrous outside, tube 13–14mm long, throat urceolate, 3.5mm long, lobes linear-lanceolate, 4.5–5mm long. Anthers including tails 9mm long; tails lanate, 2.8mm long, eventually partly exserted. Achenes (immature) oblong, 3–4mm long, ± ribbed, rugulose; pappus brownish, of 2 plumose series, the inner 15mm long, the outer 8–9mm long. *Flowering* August.

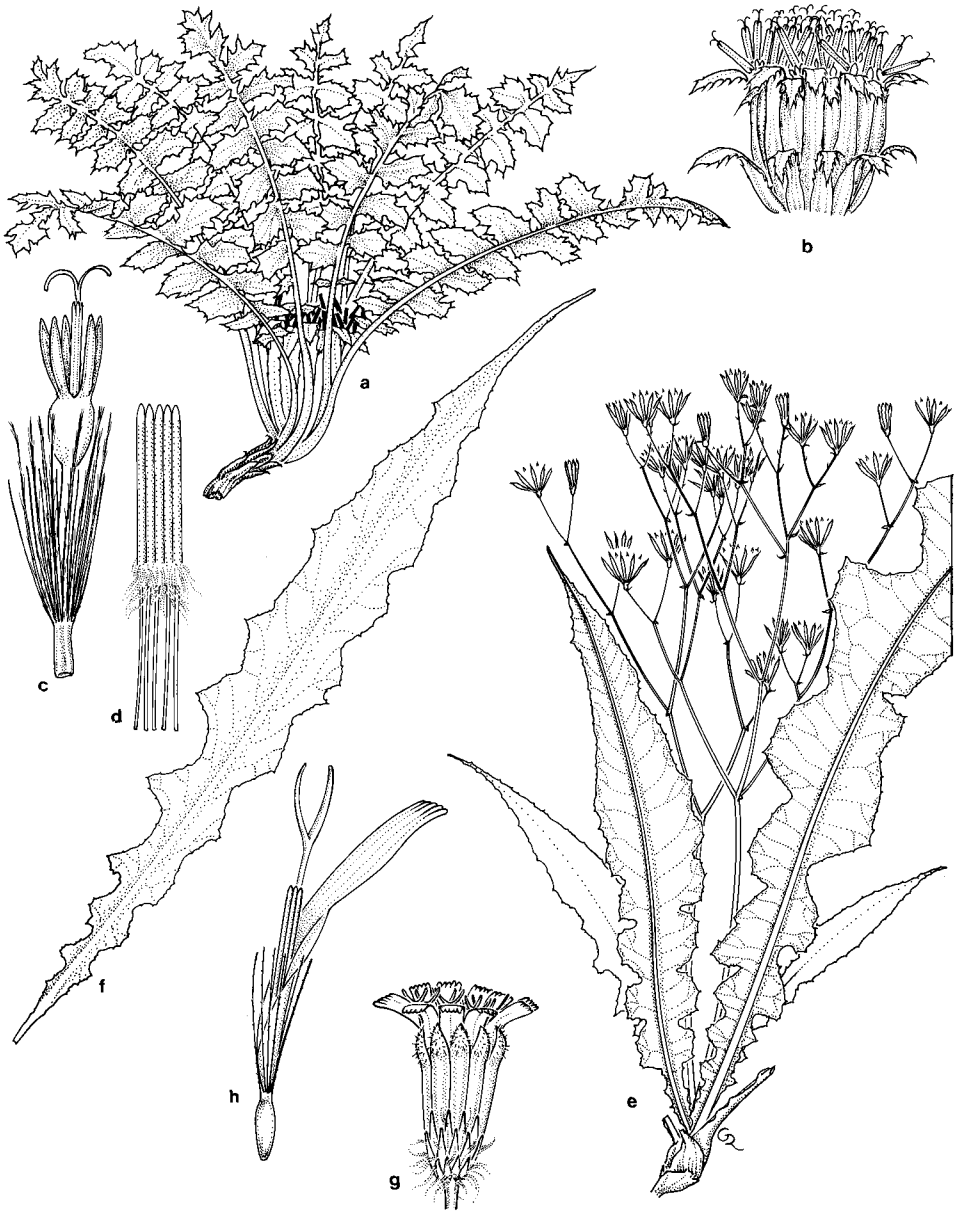

FIG. 3. *Saussurea pinnatiphylla* Grierson & Springate: a, flowering plant (×⅔); b, capitulum (×1); c, flower (×2); d, dissected ring of stamens (×3). *Youngia silhetensis* (C.B.Clarke) Babc. & Stebb. subsp. *bhutanica* Grierson & Springate: e, habit (×⅔); f, leaf, (×⅔); g, capitulum (×3); h, flower (×4). a–d from *Ludlow, Sherriff & Hicks* 17172 (E, BM); e, g, h from *Wood* 6268 (E); f from *Searight* 88 (E: sheet 'A'). Drawn by Glenn Rodrigues.

The type collection consists of four separate rosettes borne on a stout rhizome or tap root with no signs of connection or branching. A stem 25mm long, completely sheathed by the bases of all leaves, has developed on one specimen.

S*aussurea pinnatiphylla* differs from all other acaulous/subacaulous Himalayan species by the complete separation of most of its leaf segments and by its pinnately lobed phyllaries. In the other Himalayan species the leaf segments are connected at least by a very narrow herbaceous strip and the phyllaries are all simple apart from the outermost ones of *S. eriostemon* Wall. ex C.B.Clarke, which are sometimes apically 3–5-toothed. The new species shows most superficial resemblance to *S. eriostemon*, *S. pachyneura* Franch. and perhaps *S. colpodes* Y.L.Chen & S.Y.Liang, but the first also differs by its leaf undersurface being subglabrous to crisped pilose on the veins or rarely sparsely araneous and *S. pachyneura* differs by the exceptionally long hairs (mostly 2–4mm) on the bristles of its inner pappus and by the scabrid outer pappus elements.

Tanacetum L. (Anthemideae)

Tanacetum tatsienense (Bureau & Franch.) K.Bremer & Humphries var. **tanacetopsis** (W.W.Sm.) Grierson, **comb. nov.**
Basionym: *Chrysanthemum jugorum* W.W.Sm. var. *tanacetopsis* W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 10: 173 (1918). Type: China, Yunnan, Kari Pass, Mekong-Yangtze divide, lat. 27°40′N, 13–14,000ft, vii 1914, *Forrest* 12897 (E).
Syn.: *C. tatsienense* Bureau & Franch. var. *tanacetopsis* (W.W.Sm.) Marq. & Shaw, J. Linn. Soc., Bot. 68: 190 (1929).

Youngia Cass. (Lactuceae)

Youngia silhetensis (DC.) Babc. & Stebb. subsp. **bhutanica** Grierson & Springate, **subsp. nov. Fig. 3e–h.**
Formis khasianis magnifoliis polycephalis subspeciei typicae similis sed foliis sessilibus et plerumque undulato-dentatis usque lobulatis, raro subintegris et inflorescentis humilioribus differt.
Type: Bhutan, South: Samdrup Jongkhar District [Deothang district], between Narfang and Wamrung, 1600m, on open cliff faces in some frequency, rosette herb, flower heads yellow, 1 v 1988, *Wood* 6268 (holo. E, iso. E).

Perennial herb, 15–25cm, from short stout rootstock. *Leaves* oblanceolate, sessile, 8.5–25 × 2–4.5cm, acuminate, attenuate at base, remotely denticulate and usually weakly undulate to coarsely dentate, often cut into broad triangular lobes in lower half, ± glabrous above, sparsely pubescent on veins and more densely so on midrib beneath, densely brown araneous at base. *Flowering stems* leafless, branched above, rarely with 1 branch from axil of reduced leaf near base, usually several together forming a single ± corymbose inflorescence of up to 150 capitula, the largest stem on each rosette bearing 15–60 capitula. *Involucre* 2–3mm diam., biseriate; outer

phyllaries ovate, 0.7–4 × 0.5–0.7mm, inner phyllaries 10–13, linear-lanceolate, 6–7.2 × 0.8–1.1mm. *Flowers* 15–19. *Corollas* yellow, glabrous; tube 2.8–5mm long; ligule 7.5–9.5mm long. *Achenes* (immature) linear-lanceolate, 4mm long, puberulous near apex, ribs ± alternately broad and narrow; pappus brittle, yellowish, barbellate, 5mm long.

Additional specimens: [BHUTAN. South/Central: Samchi, Phuntsholing or Ha district] Torsa [river], 3,000–4,000ft, iv 1905, *Searight* 88 (E).

Subspecies *bhutanica* differs considerably in habit from the type of *Y. silhetensis*, but the capitula, flowers and fruit are very similar, including the pappus characters noted by Clarke (1876) and subsequent authors as being more typical of *Hieracium* than *Youngia*. Apart from the two collections of subsp. *bhutanica* cited above, I have only seen one collection of *Y. silhetensis* attributed to Himalaya (although others have been recorded from Kameng District of Arunachal Pradesh by Biswas (1940, under *Crepis*) and Panigrahi and Kar (1966, under *Crepis*)). This was from Griffith's herbarium ('Sikkim', s. lect., E.I.C. distribution no. 3368, K) and bears subentire leaves to 30 × 4cm, as long as the longest flowering stem, which seem to have once borne up to 30 capitula or more. It resembles subsp. *bhutanica* more closely than any other specimen seen, but differs by leaves that taper to a very narrowly winged petiole, 5–6cm long, and bear coarser hairs on their undersurface. However, it shows more similarity to several collections from Meghalaya by Griffith, Hooker and Thomson and Clarke and its distribution number was also used for a collection from Burma. In consequence, its origin has been disputed by Clarke (1876) and later writers. The Meghalayan specimens differ from subsp. *bhutanica* by their subentire petiolate leaves no more than two-thirds as long as the inflorescence and by the smaller number of capitula (up to c.25) on each flowering stem in their narrower inflorescences. They are provisionally referred to subsp. *silhetensis* here. The origin and status of the 'Sikkim' collection from Griffith's herbarium remains uncertain. The remaining specimens seen of *Y. silhetensis* have much smaller leaves and fewer capitula than the Meghalayan plants and resemble the type of the species.

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