
NOTES RELATING TO THE FLORA OF BHUTAN: XXXIII. UMBELLIFERAE, I

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Ten new species of Umbelliferae are described from Bhutan, Nepal and Sikkim: *Cnidium atropurpureum* M.F. Watson, *Cortiella lamondiana* Fullarton & M.F. Watson, *Heracleum bhutanicum* M.F. Watson, *H. woodii* M.F. Watson, *Keraymonia pinnatifolia* M.F. Watson, *Schulzia bhutanica* M.F. Watson, *Sinocarum longii* M.F. Watson, *S. minus* M.F. Watson, *S. pulchellum* M.F. Watson and *S. woodii* M.F. Watson. Two new combinations are made: *Cortiella cortioides* (C. Norman) M.F. Watson and *Meeboldia digitata* (Kljuykov) M.F. Watson.

Keywords. *Cnidium*, *Cortiella*, *Heracleum*, Himalaya, *Keraymonia*, *Meeboldia*, new combinations, new species, *Schulzia*, Sikkim, *Sinocarum*.

INTRODUCTION

Umbelliferae are generally regarded as one of the more difficult families to identify and classify: although the vast majority of the species are readily recognizable as umbellifers, many look superficially very similar. To make matters worse, specimens are frequently gathered in flower when the all-important fruit characters are at best only partially evident. The Sino-Himalaya (W Himalaya to SW China) region is rich in Umbelliferae, with several endemic genera (e.g. *Acronema*, *Cortiella*, *Meeboldia*, *Physospermopsis*, *Pleurospermopsis*, *Sinocarum*, *Tongoloa*), and includes centres of diversity in several large, widespread genera (e.g. *Ligusticum*, *Pimpinella*, *Pleurospermum*, *Selinum*). The high-altitude species are particularly difficult taxonomically as the great environmental pressures of harsh climate (wind exposure, low temperatures, high UV light intensity, etc.) and herbivore grazing (particularly by yak) has resulted in convergent evolution between several genera, producing a reduced stature, rosette habit and sessile inflorescences. These species flower in autumn and are not often collected in ripe fruit, and hence this group of squat umbellifers have rather suffered at the hands of taxonomists working on inadequate material.

During the preparation of the account of Umbelliferae for the *Flora of Bhutan* I have been fortunate to have had access to all the available material held at E, BM and K (representing the vast majority of historic material from the area), as well as recent collections from Sikkim and Bhutan held at E. Using this material it has been possible to solve some of the puzzles that previous workers have only alluded to, and to delimit what I believe are good new taxa based on more extensive collections: in the past too many taxa have been described on single, immature collections. The

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excellent herbarium collections of John R.I. Wood merit special mention; during his five years in Bhutan he collected over 160 gatherings of critical umbellifer taxa, supported by meticulous field observations. His collections, photographs and personal input have greatly advanced our knowledge of the family in the E Himalaya.

This is the first of two papers dealing with taxonomic and nomenclatural problems of E Himalayan Umbelliferae. The present paper describes new taxa and presents new combinations arranged alphabetically by genus. The second will chiefly concern typification and include a comprehensive list of specimens seen. The acronyms KEKE, EMAK and ESİK cited in the text refer to three recent expeditions mounted by the Royal Botanic Garden Edinburgh to the E Himalaya: they are respectively the 1989 Kew-Edinburgh Kangchenjunga Expedition, 1991 Edinburgh Makalu Expedition, and the 1992 Edinburgh Expedition to Sikkim and Darjeeling.

CNIDIUM CUSSON

***Cnidium atropurpureum* M.F. Watson, sp. nov. Fig. 1A–D.**

Species fructu cum *Cnidio monnieri* (L.) Cusson optime congruens, sed differt caule non ramoso, paucifolio, foliolis lanceolato-ovatis, serratis et petalis atropurpureis.

Erect biennial or perennial, 35–85cm tall, essentially glabrous with just a minute scabrescence on the leaf margins and main veins, around the nodes and below the umbels; rootstock a short woody taproot. *Stems* solitary, unbranched (excepting the lateral umbel), ribbed, purplish, base clothed in papery leaf remains. *Leaves* almost entirely basal, the 1–2 stem leaves reduced, the uppermost to a sheathing petiole and small blade; *basal leaves* 4–6, 25–40 × 7–18cm (including petiole), distantly 1–2 × pinnate or pinnately lobed, ovate in outline, mid-green above, paler below; *ultimate segments* 1.8–5 × 0.5–3cm, lanceolate-ovate, margin regularly serrate and/or incised; petioles long and slender to 30cm, abruptly and broadly sheathing at base. *sheath* 1.8–4 × 1.3–2.8cm, often purplish. *Umbels* 1–2, compound, the solitary main terminal umbel usually with a much smaller secondary umbel borne on a long slender peduncle from the axil of the uppermost leaf; *primary umbel* 7–16-rayed; *rays* subequal, 1.5–4.5cm, thickening and lengthening in fruit to 5cm or more, ribbed, glabrous or with sparse minute scabrescence on ribs; *bracts* 0–4, 1–1.3cm, linear subulate, sometimes with a larger subtending leaf/leaf-like bract; *umbellules* 7–10mm across, c.20-flowered; *pedicels* 1.5–6mm; *bracteoles* 9–12, to 6mm long, subulate. *Calyx teeth* minute, ovate-triangular, c.0.3mm, persistent in fruit. *Petals* obovate with distinct claw and obtuse apex, c.1.7 × 1.2mm, subequal, glabrous, dark purple with pale midrib above. *Filaments* cream, *anthers* dark purple. *Stylopodium* domed, dark purple; *styles* short, equalling stylopodium, purplish. *Fruit* oblong-ellipsoid, 6–6.5 × 3–3.5mm, dorsal and lateral ribs equally winged; *wings* 0.5–0.75mm broad, somewhat corky; *vittae* small, one per furrow and two on the commissure.

Type: Bhutan, Thimphu district, Talukah [Tataka] Gompa, 3700m, 28 viii 1988. J.R.I. Wood 6609 (holo. E).

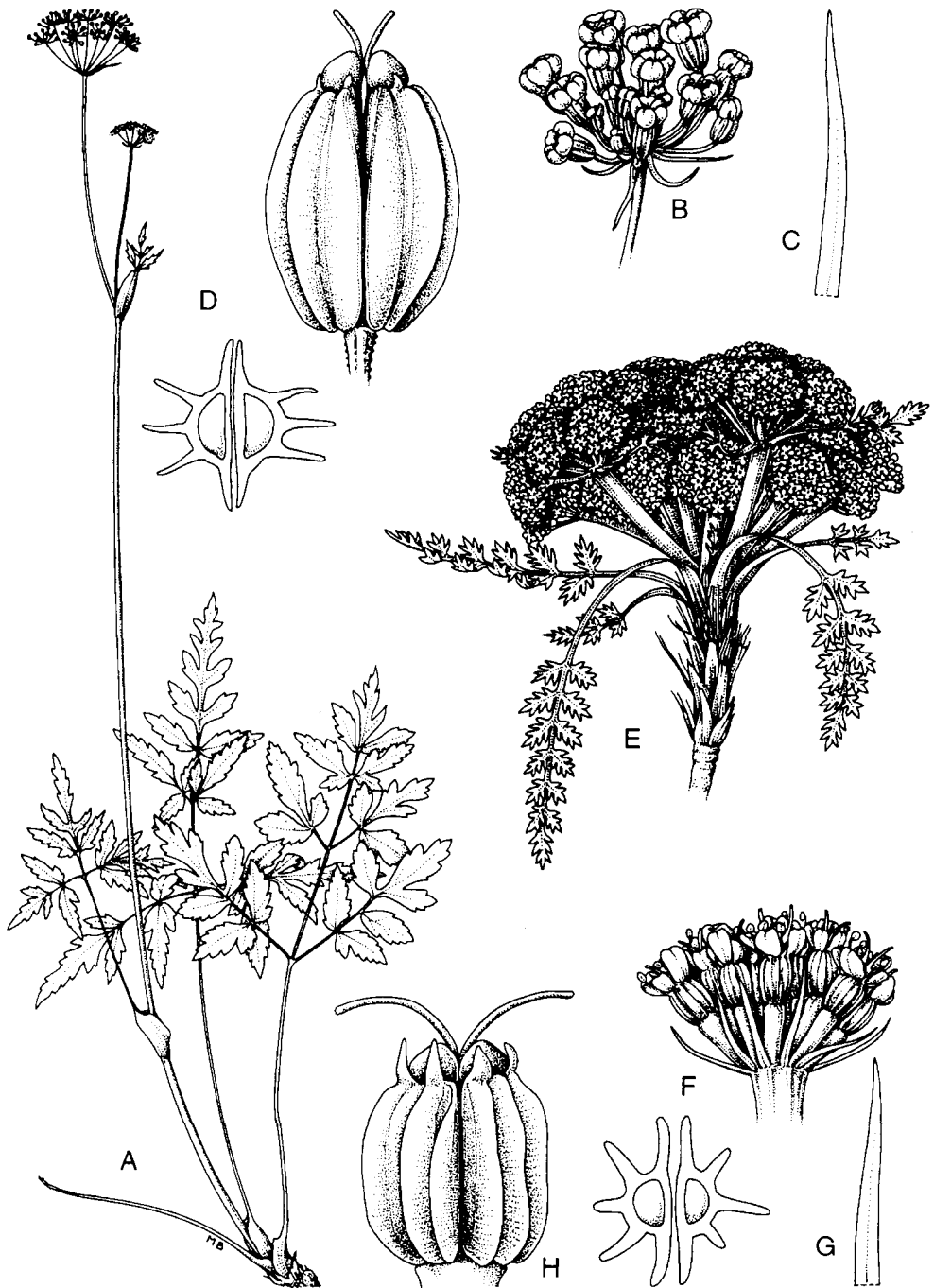


FIG. 1. *Cnidium atropurpureum* M.F. Watson: A, habit, $\times \frac{1}{3}$; B, umbellule, $\times 3$; C, bracteole, $\times 6$; D, fruit, $\times 6$. *Cortiella lamondiana* Fullarton & M.F. Watson: E, habit, $\times 1$; F, umbellule, $\times 3$; G, bracteole, $\times 6$; H, fruit, $\times 10$. A from Wood 7567, B-C from Grierson & Long 2795, D from Wood 6609; E-G from EMAK 538, H from KEKE 506. Drawn by Mary Bates.

Distribution. Endemic to Bhutan. Scrubland, rough hill pasture and open fir (*Abies*) woodland, 3300–3800m. Flowering July–September.

Additional specimens examined. BHUTAN. Ha district: Saka [Sage] La to Ha, 12,000–9000ft, 13 vii 1938, *B.J. Gould* 1052 (K). Thimphu district: ridge E of Phajoding, 3410m, 19 vii 1979, *A.J.C. Grierson & D.G. Long* 2795 (E); near Phajoding Monastery, 3300–3800m, 6 ix 1987, *J.R.I. Wood* 5798 (E); between Talukah [Tataka] Gompa and Taluka La, 3600m, 18 viii 1991, *J.R.I. Wood* 7432 (E); Gidakom [Gida] Valley near Thimphu, 3300m, 28 viii 1992, *J.R.I. Wood* 7567 (E).

This distinctive Bhutanese endemic, named after its striking dark purple flowers, was recognized by Mukherjee & Constance (1993: 136) as '*Tongoloa* sp. 2'.

CORTIELLA C. NORMAN

***Cortiella cortioides* (C. Norman) M.F. Watson, comb. nov.**

Basionym: *Selinum cortioides* C. Norman in *J. Bot.* 75: 95 (1937). Type: Sikkim, Phaloot [Phalut], 13,000ft, *S. Kurz* s.n. (holo. K).

Since Norman's 1937 account of *Cortia depressa* (D. Don) C. Norman, *Cortiella hookeri* (C.B. Clarke) C. Norman and *Selinum cortioides* C. Norman, more good fruiting material of these plants has been collected from the E Himalaya (mainly housed at BM and E). Specimens attributable to *Selinum cortioides* have been observed to display the characteristic abortive wings on the dorsal ribs of the mericarps, but some are variously enlarged into wings extending, in some cases, to half-way up the fruit. When these reduced wings are present the asymmetric pattern of winged to non-winged dorsal ribs is identical to that seen in *Cortiella hookeri*. When erecting the genus *Cortiella*, Norman (1937: 94–95) stated that 'the fruit, with two [outer] dorsal ribs winged on one carpel and only one [middle] winged on the other, is, I believe, unique in Asiatic Umbellifers'. This I also believe to hold good for the genus as known today, and thus *Selinum cortioides* should rightly be housed in *Cortiella*. Farille and Malla (Farille et al., 1985) have further compounded the difficulties in this group by describing new taxa (e.g. *Cortiella cauwetmarciana* [= *C. hookeri*], and *Cortia oreomyrrhiformis* [= *Cortia hookeri*]) on single collections of immature plants.

***Cortiella lamondiana* Fullarton & M.F. Watson, sp. nov. Fig. 1E–H.**

Species haec ab *Cortiella hookeri* C. Norman differt statura humili, radiis pedicellisque crassioribus et calycis dentibus triangulari-ovatis.

An essentially glabrous, high-altitude, dwarf rosette perennial herb to 11cm across. *Stem* much reduced, almost absent to c.1(–3)cm, clothed with dark brown fibrous leaf remains at base. *Leaves* pinnate and deeply pinnatifid, oblong-lanceolate in outline; ultimate leaflets with lanceolate lateral lobes and a trifid terminal lobe, 4–5 × 3–3.5mm; lobes c.1.2mm broad; *petiole* 1.5–4cm, flattened, hardly sheathing at base. *Umbels* compound, primary terminal umbel sessile, secondary lateral umbels shortly

pedunculate (peduncles equalling rays of primary umbel), all flowers appearing to be borne in single domed head maturing from the inside outwards. *Primary umbel* c.20–30-rayed; *rays* to 2cm, conspicuously thickened to 3mm wide; *bracts* several, leaf-like, but with a sheathing base; *umbellules* c.16–20-flowered, c.1cm across; *bracteoles* several, linear, about equal to or exceeding the flowers; *pedicels* to 5mm, conspicuously thickened. *Secondary umbels* similar to the primary but smaller and fewer-flowered. *Calyx teeth* triangular-ovate, c.0.4 × 0.3mm. *Petals* white to purple with a darker purple mid-vein, c.1.5 × 0.9mm, obovate with inflexed tip. *Stylopodium* domed, dark purple; styles long, divergent in fruit to 1.8mm. *Fruit* orbicular-oblong in outline, 2–2.6 × 1.8–2.7mm, lateral and dorsal ribs conspicuously winged; *wings* c.0.9mm broad, wing development on dorsal ribs in mericarp pairs asymmetric: central dorsal rib on one and lateral dorsal ribs on the other less well developed; *vittae* 1 per furrow, 4 on the commissure.

Type: Nepal, Kambachen to Lhonak, 27°44'N 88°01'E, 4200m, 10 ix 1989, KEKE 506 (holo. E).

Distribution. E Nepal. Exposed rock crevices, stable screes, 4200–5900m. Flowering September–October.

Additional specimens examined. NEPAL. Sagarmatha Zone, Solukhumbu district: Tangbochi, Mt Everest Base Camp, 16,000ft, 20 xii 1966, D.H. Nicolson 2906 (US); Khumbu, near Everest Base Camp, 17,500ft, 7 x 1969, J.D.A. Stainton 6584 (BM); Syamjung Khola, 16,500ft, 29 x 1971, L.W. Beer, C.R. Lancaster & D. Morris 10649 (BM); Everest Region, up from Machhermo, 4730m, 14 ix 1982, G. Miehe 1001 (BM). Sankhuwasabha district: Upper Barun Khola, below Peak 3, above Mera, 27°48'N 87°07'E, 4520m, 2 x 1991, EMAK 481 (E); SE ridge of Makalu, above Base Camp, 27°52'N 87°05'E, 5920m, 5 x 1991, EMAK 538 (E).

We take great pleasure in naming this species after Jennifer Lamond who first identified it as a new taxon, and whose work on Umbelliferae at the Royal Botanic Garden Edinburgh over a period of many years has greatly advanced our understanding of the family. From morphological and anatomical studies on *Cortia* and *Cortiella* (Fullarton, 1995), we have found that as well as the distinctive asymmetry of wing development in the fruits, *Cortiella* can be characterized by the following suite of characters: lack of expanded petiole sheath; thickened rays and pedicels; triangular calyx teeth; long styles and lack of bifid carpophore.

HERACLEUM L.

Heracleum bhutanicum M.F. Watson, sp. nov. Fig. 2D–F.

Inter species *Heraclei* notabilis propter caules et folia hirsutos grossos et petala lutea.

Erect to decumbent, branched perennial 35–100cm tall. *Stems* moderately to sparsely covered in coarse whitish patent hairs densest around the nodes. *Leaves* evenly distributed up the stem, 1–2-pinnate, ovate-triangular in outline; ultimate segments ovate-lanceolate to narrowly ovate, 0.4–2.5 × 0.7–6.5cm, margin serrate, apex acute

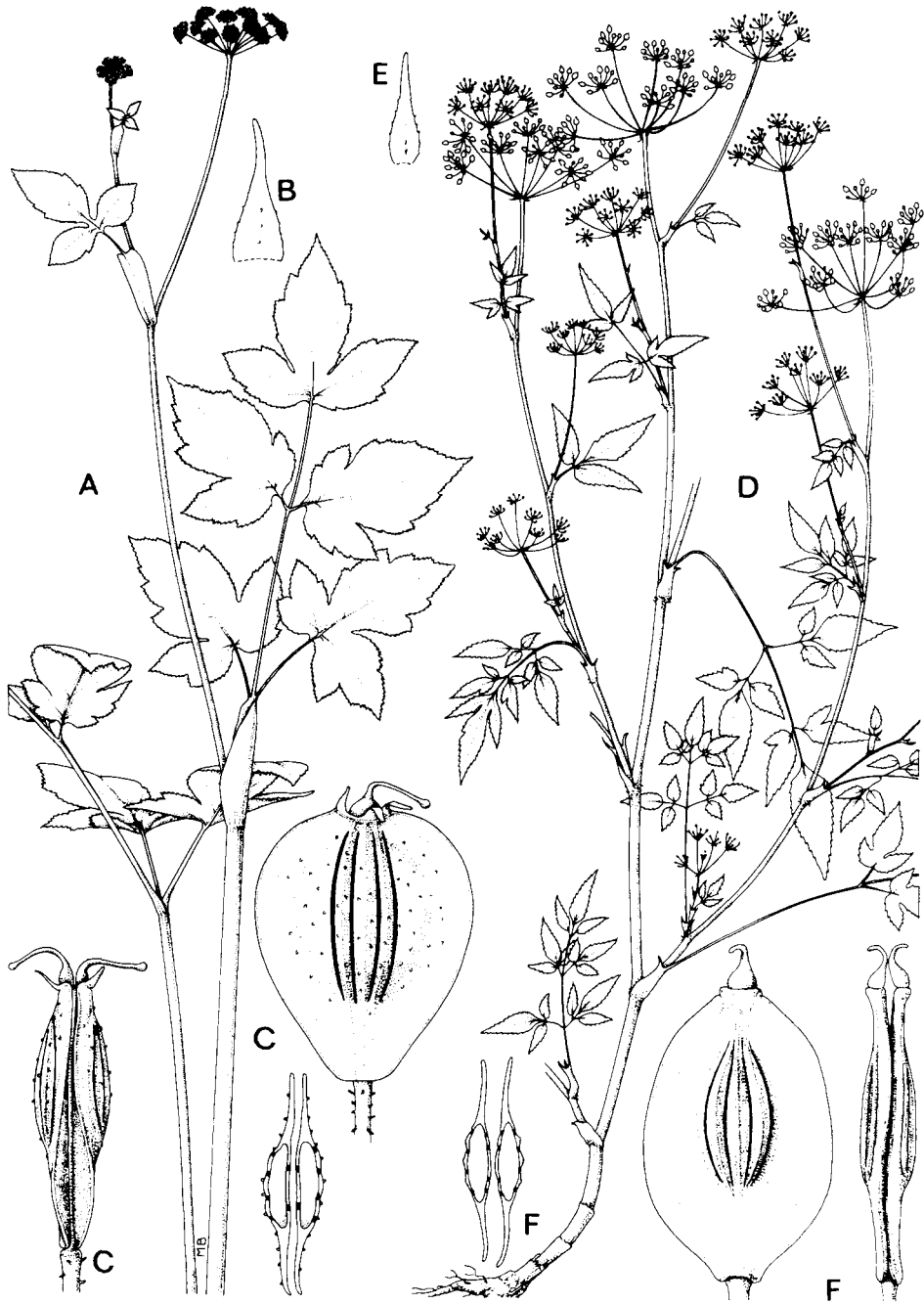


FIG. 2. *Heracleum woodii* M.F. Watson: A, habit, $\times \frac{1}{4}$; B, bracteole, $\times 6$; C, fruit, $\times 4$. *Heracleum bhutanicum* M.F. Watson: D, habit, $\times \frac{1}{3}$; E, bracteole, $\times 6$; F, fruit, $\times 4$. A-C from Rhomoo 854, Stainton 1005 and Wigram 166; D-F from Wood 7158. Drawn by Mary Bates.

to acuminate, base cuneate, moderately to densely covered in coarse hairs; petiole 1.5–11cm, hairy, narrowly sheathing at base, sheath with two lanceolate lobes at apex. *Umbels* compound, terminal and lateral, (6–)8–12-rayed; *rays* to 6cm, unequal, thickening in fruit, with scattered hairs; *umbellules* 12–20-flowered, 6–9mm across; *pedicels* to 13mm in fruit; *bracteoles* 3–4, lanceolate to 5 × 1mm. *Flowers* hermaphrodite or male (in the same umbellule). *Calyx teeth* obsolete. *Petals* c.1 × 0.7mm, yellow, obovate with inflexed acuminate apex. *Styles* short. *Fruit* rounded to broadly elliptic, strongly dorsally compressed, 5–10 × 5–8mm, *wing* 1.5–2mm broad; *vittae* 4 on outer surface, 2–4 on the commissure (sometimes obscured).

Type: Bhutan, Chukka district, between Awaka and Taktichu, 1500m, 8 ix 1989, *J.R.I. Wood* 7158 (holo. E [Sheet II], iso. E [Sheet I]).

Distribution. Endemic to Bhutan. On disturbed open cliff-banks in moist broad-leaved forest, 1000–1600m. Flowering July–October.

Additional specimens examined. BHUTAN. [Chukka district], Mirichoma [Marichong], 3500ft, 3 vii 1914, *R.E. Cooper* 1086a (E); Chukka district, c.8km S of Chukka, 1400m, 12 x 1988, *J.R.I. Wood* 6811 (E).

This low-altitude, hairy *Heracleum* species is known only from Chukka district in SW Bhutan.

***Heracleum woodii* M.F. Watson, sp. nov. Fig. 2A–C.**

Basionym: *Heracleum nepalense* D. Don var. *bivittatum* C.B. Clarke p.p. in Hook.f., Fl. Brit. India 2: 714 (1879); non *Heracleum bivittatum* Boissieu. Type: Sikkim, Jongri [Dzongri], 12,000ft, 15 x 1875, *C.B. Clarke* 25837 (lecto. selected here, K).

Species haec ab *Heracleo nepalensi* D. Don differt statura humili, umbella secundaria umbellam terminaliem non superans, radiis paucioribus, petalis luteo-viridibus et stylis longioribus.

Robust biennial or perennial herb 0.5–1m high, moderately pubescent. *Stems* 8–13cm thick at base, often suffused purple. *Leaves* rather few, often 1–2 basal and 1–2 cauline, internodes long. *Lowest leaves* pinnate with 5 ternately lobed or divided pinnae, to 50 × 25cm, oblong-ovate in outline, petiole to 11cm, slender, slightly winged at base. *Upper leaves* to 30 × 30cm biternate, triangular-ovate in outline; leaflets ovate, rounded, shallow to deeply lobed, c.5–10 × 3–6cm; petioles broadly winged to auriculate, often purple. *Central primary umbel* 3–6cm in flower (to 10cm in fruit), 11–26-rayed, held above a solitary secondary umbel in the axil of the uppermost leaf; *rays* to 6cm and sturdy in fruit, fruiting head compact, with erect often concave rays; *umbellules* (12–)16–25-flowered; *pedicels* to 13mm in fruit; *bracteoles* 3–4, lanceolate to 5 × 1mm. *Calyx teeth* linear-lanceolate, acute, to 1mm long, unequal. *Petals* to 2 × 1.75mm, greenish yellow or brownish yellow, rarely whitish. *Styles* long, (1.2–)1.7–3(–4)mm erect in maturing fruit. *Fruit* elliptic to broadly elliptic-obovate, strongly dorsally compressed, 6.5–10 × 6.5–8mm, *wing* 2–2.5mm broad; *vittae* 4 on outer surface, 2 on inner surface (sometimes obscured).

Type: Bhutan, Thimphu district, Dongshola [Dungtsho La], 4300m, 19 viii 1990, *J.R.I. Wood 7315* (holo. E).

Distribution. E Himalaya; Nepal, Sikkim and Bhutan. Fir (*Abies*) forest and rocky slopes above treeline, scrubby alpine turf, grassy banks, 3000–4200m. Flowering August–September.

Additional specimens examined. BHUTAN. Thimphu district: Phajoding, 3900m, 6 ix 1987, *J.R.I. Wood 5821* (E); Hangsu [Hongtsho], 3000m, 14 viii 1988, *J.R.I. Wood 6533* (E); Phajoding, 3900m, 27 viii 1989, *J.R.I. Wood 7138* (E); Talukah [Tataka] Gompa, 3600m, 12 viii 1990, *J.R.I. Wood 7305* (E); near Saga La, 4200m, 20 viii 1991, *J.R.I. Wood 7444* (E); Saga La to Dongshola, 4200m, 29 viii 1992, *J.R.I. Wood 7572* (E).

SIKKIM. Jongri [Dzongri], 12,000ft, 15 x 1875, *C.B. Clarke 25837* (K) [lecto. *Heracleum nepalense* D. Don var. *bivittatum* C.B. Clarke]; Jongri, 12,000ft, 15 x 1875, *C.B. Clarke 25967* (K); Jongri, 12,000ft, 15 x 1875, *C.B. Clarke 26082c* (K); Jongri, 13,000ft, 15 x 1875, *C.B. Clarke 26120* (K); Yampung, 14,000ft, 12 viii 1913, *Rhomoo 854* (E); Kangling, 14,000ft, 1913, *Ribu & Rhomoo 6538* (E); Thangshing, 4000m, 28 vi 1983, *Alpine Garden Society Expedition to Sikkim (AGSES) 195* (K).

NEPAL. Michet, 1927, *C. Wigram 166* (E); Yapchet, 1927, *C. Wigram 167* (E).

From John Wood's careful field observations and herbarium collections it has been possible to clarify the delimitation of *Heracleum nepalense* D. Don var. *bivittatum* C.B. Clarke from typical *H. nepalense*, and Clarke's 'very doubtful' taxon is here considered a good species in its own right. Unfortunately the epithet *bivittatum* is already occupied at the specific rank by the very different *Heracleum bivittatum* Boissieu (1903: 855) from China. Furthermore, as Clarke did not fully recognize this taxon (many specimens at K are annotated by him as just *H. nepalense*, and some specimens of *H. nepalense* he misidentified as var. *bivittatum*), I have described this taxon as a new species, sinking Clarke's var. *bivittatum* p.p. into synonymy. I take pleasure in naming this plant after John Wood, whose accurate field observations, numerous herbarium collections and photographs have made it possible to elucidate the species limits in this species complex.

KERAYMONIA FARILLE

Keraymonia pinnatifolia M.F. Watson, *sp. nov.* Fig. 3A–C.

Fructu *Keraymoniae cortiformi* Cauwet-Marc & Malla similis, sed differt foliis pinnatis.

Dwarf, almost stemless perennial to 9cm tall from a vertical woody taproot c.8mm thick; crown clothed by dark purple-brown remains of leaf sheaths; plant mainly glabrous, leaf and bracteole margins pubescent. *Leaves* pinnate, oblong in outline, 3–4 × 1–1.2cm; *leaflets* in 5–7 pairs, ovate to lanceolate, 4–8 × 0.75–7mm, usually 3-toothed at apex, sessile on rachis; *petiole* broadly sheathing at base. *Umbels* compound; the primary umbel sessile on the crown, 3- to 7-rayed; *rays* 2.5–8cm, rather stout, 1–1.3mm thick (secondary lateral umbels absent or few, pedunculate but rays very short and umbellules reduced); *umbellules* 1.2–1.8cm across, c.30- to

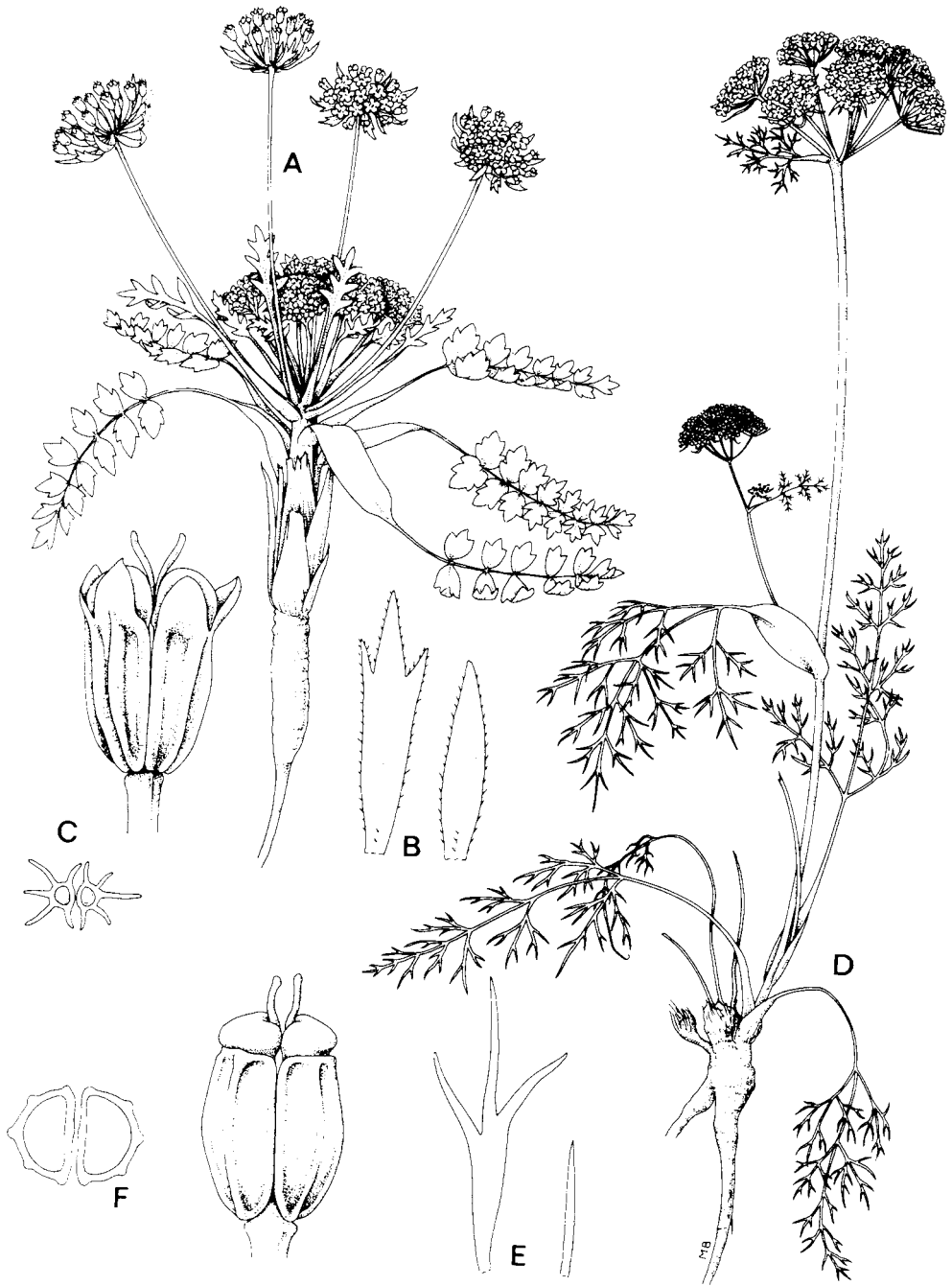


FIG. 3. *Keraymonia pimatifolia* M.F. Watson: A, habit, $\times 1$; B, bracteole, $\times 4$; C, immature fruit, $\times 10$. *Schulzia bhutanica* M.F. Watson: D, habit, $\times \frac{2}{3}$; E, bracteole, $\times 6$; F, fruit, $\times 12$. A–C from Cooper 4533; D–F from Sinclair & Long 5469, Wood 7183 and Wood 7335. Drawn by Mary Bates.

40-flowered; *bracteoles* numerous, c.12–15, obovate to oblanceolate, 7–9 × 1.5–3.5mm, equalling flowers, often 3-toothed at apex; *pedicels* 3–5mm. *Flowers* hermaphrodite. *Calyx teeth* ovate acute, to 0.75mm, unequal, purple-black. *Petals* white, obovate, c.1.5 × 1.2mm, clawed at base, apex with inflexed tip. *Stylopodium* domed, dark purple-black; *styles* short, c.0.2mm after flowering. Developing *mericarps* with 5 prominent ridges, mature fruit unknown.

Type: Bhutan, Tashigang district, Preng La, 13,000ft, 22 viii 1915, R.E. Cooper 4533 (holo. E, iso. BM).

Distribution. Endemic to Bhutan. Alpine turf, 4000m. Flowering August.

This species is reminiscent of *Chamaesium novem-jugum* (C.B. Clarke) C. Norman, but differs most notably in the pubescent margins of the leaves and bracteoles and conspicuous calyx teeth. It cannot be placed within the genus *Chamaesium* as the domed, unflanged stylopodium and 5-ridged mericarps are very different from the flattened, flanged stylopodium and 10-ridged mericarps characteristic of the latter. Pending further collections, this Bhutanese endemic (known only from the type collection) is placed in the nearby genus *Keraymonia* where flower and fruit characters match well. The specific epithet records the distinctive leaf shape until now not known in the genus.

MEEBOLDIA H. WOLFF

Wolff (1924) described *Meeboldia* as a new monotypic genus of Himalayan Umbelliferae based on *Meeboldia selinoides* H. Wolff. The holotype is stated to be 'Meebold No. 3402, Naini valley [Northwest Himalaya], 6500' s.m. with mature fruit in October', and apparently was distributed under the name *Selini tenuifolii*. Meebold's original herbarium is housed in the general collections at Wroclaw (WRSL), with Indian duplicates sent to B, CAL, E, G, H, K, S and SING (Vegeter, 1976: 521). Unfortunately all the Umbelliferae in the Wroclaw herbarium were destroyed by enemy action during World War II, and enquiries to the above herbaria (all except CAL have replied) have failed to locate a duplicate. Meebold's specimens of gathering 3402, and hence all Wolff's syntype material, must therefore be considered lost, a conclusion previously reached by Constance (pers. comm.).

However, Wolff's detailed description matches exactly the distinctive characters of *Ptychotis achilleifolia* DC. and while working at the Natural History Museum, London, Norman annotated the Wallich Sheets of *Ptychotis achilleifolia* DC. 568 and s.n. 1820 at BM as 'compared with type of *Meeboldia selinoides*', but did not record where he saw this type. Constance (pers. comm.) was similarly unable to locate the type (*Meebold* 3402), and recombined *Ptychotis achilleifolia* DC. into *Meeboldia achilleifolia* (DC.) P.K. Mukherjee & Constance (1991: 44), without mentioning the fate of Wolff's *M. selinoides* (nor later in Mukherjee & Constance, 1993: 116–7).

From my own investigations I have found two new threads of evidence. Firstly there is a specimen of *Pimpinella achilleifolia* (DC.) C.B. Clarke at Kew (Kumaon, Strachey & Winterbottom s.n., K) that Wolff annotated with 'Haec planta recte ad genus *Pimpinellam* non pertinet; cf *Meeboldiam*' (annotation dated 4 ix 1928). Secondly the sheet at the BM with the Wallich collection 568 bears not only Norman's note as stated above but also a small capsule containing 7 mericarps and labelled 'Meebold 3402'. Norman must have had the Meebold specimen on loan before World War II and taken this fragment. I believe that these fruits are all that remains of the type material for *Meeboldia selinoides*, and on examination they do indeed match the *Ptychotis achilleifolia* specimen to which they are attached, and the two should be considered synonymous. Thus in accepting the recombination within *Meeboldia*, the specific epithet *achilleifolia* has priority over *selinoides* and the following synonymy results:

Meeboldia achilleifolia (DC.) P.K. Mukherjee & Constance in Edinb. J. Bot. 48: 44 (1981).

Basionym: *Ptychotis achilleifolia* DC., Prodr. 4: 109 (1830). Type: Nepal, *Athemantha achilleifolia* Wall., Napalia 1821, Wall. Cat. 568.1 (lecto. selected here, G-DC, n.v.; isolecto. E, K-W).

Syn.: *Pimpinella achilleifolia* (DC.) C.B. Clarke in Hook.f., Fl. Brit. India 2: 684 (1879).

Meeboldia selinoides H. Wolff., Repert. Spec. Nov. Regni Veg. 19: 313 (1924). Type: India, Meebold No. 3402, Naini valley [Northwest Himalaya], 6500' s.m. October (holo. WRSL [presumed destroyed]; klepto. BM [attached to Wall. Cat. 568]).

Vicatia achilleifolia (DC.) P.K. Mukh. ex P.K. Mukh. in Bull. Bot. Surv. India 24(1-4): 43 (1982).

Tongoloa achilleifolia (DC.) Pimenov & Kljuykov, Repert. Spec. Nov. Regni Veg. 102: 383 (1991).

Although *Meeboldia achilleifolia* has been recorded in the literature as occurring in Bhutan, all specimens seen have proved to be misidentified. *Meeboldia* is easily confused with *Vicatia*, but readily distinguished by the linear-lanceolate calyx teeth of the former and the obsolete calyx teeth of the latter. Furthermore, as Constance (pers. comm.) and Pu Fa-ding (1992: 22) have suggested that *Sinodielsia* H. Wolff (1925: 278) should be treated as synonymous with *Meeboldia*, the following combination needs to be made:

Meeboldia digitata (Kljuykov) M.F. Watson, **comb. nov.**

Basionym: *Sinodielsia digitata* Kljuykov in Feddes Repert. 97: 756 (1986).

Type: Bhutan, Chungkar [Deothang district: Keri Gompa], 27°03'N 91°27'E, 6500ft, on damp places, 13 xi 1938, F. Ludlow, G. Sherriff & G. Taylor 7263 (holo. BM).

This Bhutanese endemic is readily distinguished from *Meeboldia achilleifolia* by the much finer (0.3–0.5mm compared with c.1mm) ultimate segments of the leaves, and fewer rays to the umbels (5–7 compared with 7–16).

SCHULZIA C.P.J. SPRENGEL

The generic name *Schulzia* has frequently been spelled '*Schultzia*' in the literature. In Sprengel's original publication (1813: 30), he clearly states that the genus is named in honour of 'Jo Henr. Schulzii', and thus the correct spelling should be *Schulzia*.

***Schulzia bhutanica* M.F. Watson, sp. nov. Fig. 3D–F.**

Schulziae dissectae (C.B. Clarke) C. Norman affinis sed planta minus pubescens et folia majora segmenti longioribus.

Slender single-stemmed biennial or perennial glabrous herb, stems 5–22cm sparingly branched from short thickened taproot. *Leaves* mainly basal, ovate in outline, 3–8 × 2–5cm, 2–3-pinnate with long filiform segments, the ultimate segments (5–)7–17 × 0.5mm; *petioles* filiform, 1–9cm, moderately to broadly sheathing at base, base widest in uppermost leaves. *Umbels* 2–5cm across, 6–10-rayed; *rays* 0.4–2cm; *bracts* 0–1, 1–2.5cm, leaf-like, early falling; *umbellules* densely flowered, 5–10mm across; *pedicels* 2–4mm; *bracteoles* several, linear to trifid, as long as or slightly longer than the flowers. *Calyx teeth* obsolete. *Petals* white, obovate to obovate-oblong, c.1 × 0.5mm, apex obtuse. *Stylopodium* dark purple, flat-domed. *Fruits* oblong-ovoid, slightly compressed laterally; *mericarps* subterete distinctly constricted below the stylopodium, ridges prominent but scarcely winged when mature, c.2 × 0.9mm; *vittae* obscure.

Type: Bhutan, Thimphu district, between Phajoding [Pajoding] and Dongshola [Dungtsho La], 4000–4200m, 24 ix 1989, *J.R.I. Wood* 7183 (holo. E).

Distribution. Endemic to Bhutan. Moist to wet habitats; rocky areas in grassland, underhangs, stone walls, 3850–4200m. Flowering September–October.

Additional specimens examined. BHUTAN. Upper Mo Chu district: valley SE of Lingshi, 27°55'N 89°28'E, 3860m, 2 x 1984, *I.W.J. Sinclair & D.G. Long* 5469 (E). Thimphu district: Daga La, 4100m, 18 ix 1991, *J.R.I. Wood* 7335 (E); between Tulakah La and Genekha [Guljekha], 4000m, 21 ix 1991, *J.R.I. Wood* 7460 (E).

This Bhutanese endemic, although very similar in flower and fruit structure to *S. dissecta*, is usually much less puberulent, and has larger leaves with longer ultimate segments; it prefers damper habitats and flowers somewhat later.

SINOCARUM H. WOLFF EX R.H. SHAN & F.T. PU

***Sinocarum longii* M.F. Watson, sp. nov. Fig. 4A–C.**

Species haec ab *Sinocarum pulchello* C. Norman ex M.F. Watson differt caulibus ad basim ramosissimis et radiis inaequalissimis.

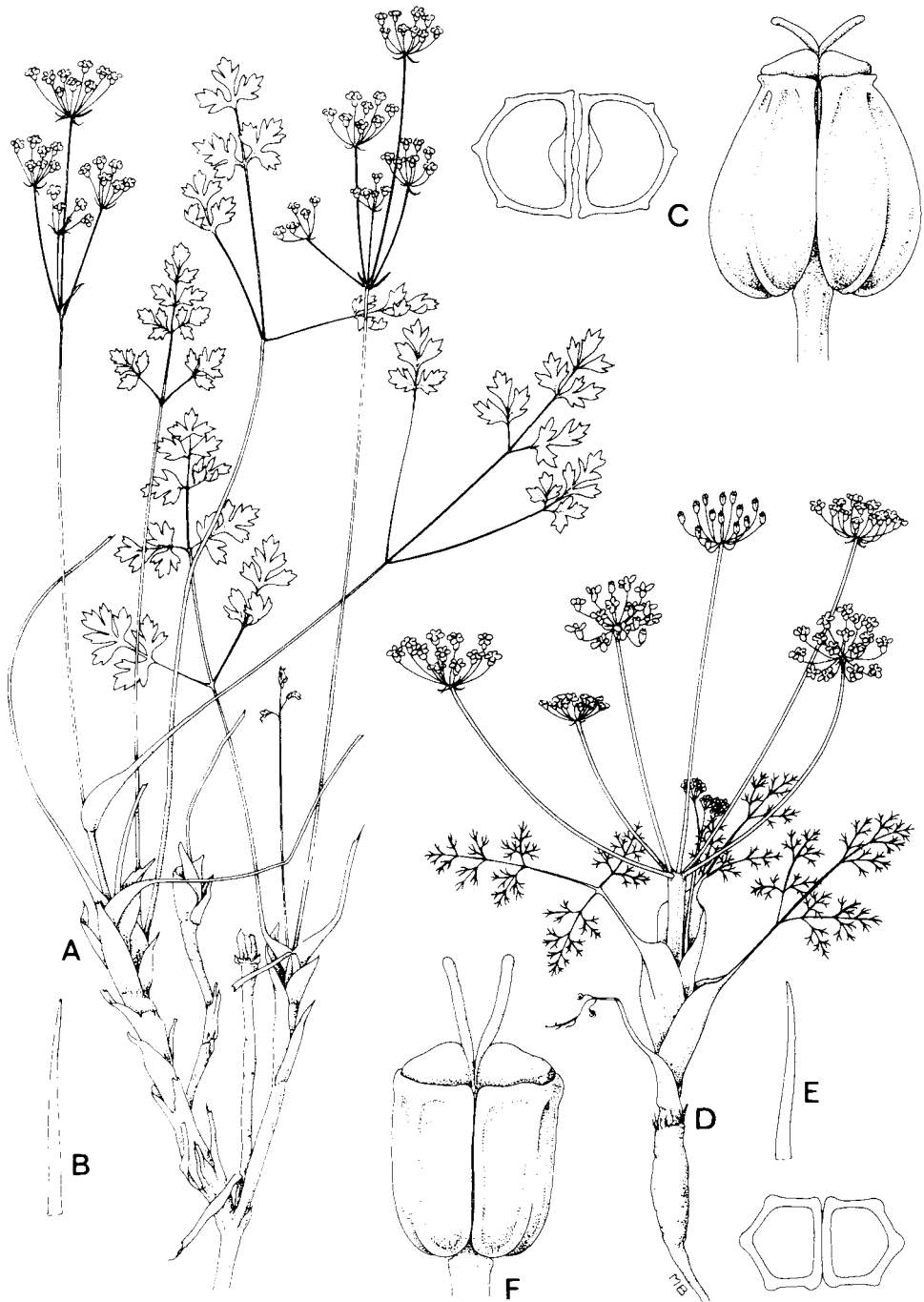


FIG. 4. *Sinocarum longii* M.F. Watson: A, habit, $\times 1$; B, bracteole, $\times 10$; C, fruit, $\times 10$. *Sinocarum woodii* M.F. Watson: D, habit, $\times 1$; E, bracteole, $\times 16$; F, fruit, $\times 16$. A-C from *ESIK* 665; D-F from *Wood* 7440. Drawn by Mary Bates.

Tap-rooted perennial to 27cm high, much branched from base, sometimes forming clumps; rhizome short and vertical to 2×0.5 cm, clothed in petiole base remains. *Leaves* mainly basal, biternate or bipinnate, $10\text{--}24 \times 2\text{--}4.5$ cm (including petiole); *leaflets* elliptic-ovate, to $1.2 \times 1(-1.5)$ cm, deeply divided to pinnatifid, usually 3-lobed at apex; *ultimate segments* oblong acute, $2\text{--}5 \times 1.2\text{--}3$ mm; petioles long and slender, to 9cm, with sheathing base to 15×8 mm. *Umbels* compound, 1.5–3cm across, 3–6-rayed, held above the leaves on long stout peduncles 10–24cm long; *rays* stout, very unequal, 0.5–4.5cm long, rather erect in flower, spreading in fruit; bracts 0–1, linear-lanceolate, 2–7mm, usually falling after flowering; *umbellules* 4–6mm across, 6–8-flowered; *bracteoles* 1–3(–5), linear, 1–1.5mm. *Calyx teeth* minute triangular to obsolete. *Petals* elliptic-ovate, c. 1.2×1 mm purple-black, apex obtuse-acute. *Stylopodium* flattened, dark-purple, styles erect in fruit. *Fruits* c. 2.5×2 mm, ovoid-oblong, purplish; *mericarps* thinly 5-ribbed; *vittae* indistinct.

Type: Bhutan, Thimphu district, between Phajoding and Dongsho La, 4000–4500m, 19 viii 1990, *J.R.I. Wood* 7313 (holo. E).

Distribution. Sikkim and Bhutan. Moist pasture or boggy moorland, around boulders and in rock crevices, 3900–4500m. Flowering July–August.

Additional specimens examined. BHUTAN. Thimphu district: between Phajoding and the lakes, 3900m, 22 ix 1987, *J.R.I. Wood* 5855 (E); Dakey Phungtso [Darkey Pang Tso], 4300m, 4 viii 1991, *J.R.I. Wood* 7396 (E); near Dongsho La (NW side), 4300m, 26 viii 1991, *J.R.I. Wood* 7448 (E).

SIKKIM. Dzongri to the Prek Chhu, 3700m, 18 vii 1992, *ESIK* 460 (E); Samiti Lake, 4420m, 23 vii 1992, *ESIK* 665 (E).

I have pleasure in naming this distinctive species after David G. Long, whose co-editorship and leadership of the *Flora of Bhutan*, and extensive field collections, have contributed so much to the understanding of the E Himalayan flora.

***Sinocarum minus* M.F. Watson, sp. nov. Fig. 5E–H.**

Species haec ab *Sinocarum woodii* M.F. Watson differt statura humilissima, multicauli et radiis brevissimis.

Diminutive multi-stemmed perennial herb with slender stems to 1–3cm high from a short cylindrical vertical rhizome, $c.3 \times 15$ mm, or taproot. *Leaves* basal and cauline, 1–2-ternate, to 3×1 cm (including petiole); *leaflets* ovate, to 4×4 mm, deeply ternately lobed to pinnatifid, segments 3-lobed at apex, ultimate segments oblong-elliptic acute; *petioles* slender, to 2.5cm long, with broad sheathing bases $c.4 \times 3$ mm. *Umbels* compound, held just above the leaves, 5–15mm across, 4–6-rayed; *rays* 1.5–5mm long, somewhat unequal; *bracts* 1–2, linear, 1–2mm long; *umbellules* 4–5-flowered, 3–6mm across; *pedicels* 0.5–2mm; *bracteoles* 0–3, linear, to 1.5mm. *Calyx teeth* obsolete. *Petals* dark purple or white flushed purple, ovate acute c. 0.75×0.5 mm. *Stylopodium* domed, dark purple; styles reflexed. *Mature fruit* not known.

Type: Nepal, Arun Valley, Barun Khola, N of Num, 12,500ft, 7 vi 1956, *J.D.A. Stainton* 547 (holo. BM, iso. E).

Distribution. E Nepal to Bhutan. Amongst rocks and boulders in short alpine turf, 3800m. Flowering June.

Additional specimen examined. BHUTAN. Shingbe (Me La), 12,500ft, 21 vi 1949, *F. Ludlow, G. Sherriff & J.H. Hicks* 20384 (BM).

***Sinocarum pulchellum* C. Norman ex M.F. Watson, sp. nov. Fig. 5A–D.**

Sinocarum sikkimensi (P.K. Mukh.) P.K. Mukh. & Constance rhizomata globoso affinis, sed petioli basibus late vaginatis et fructibus globoso-ovoideis differt.

Short erect slender-stemmed glabrous herb 4–24cm tall from a globose bulb-like rhizome 4–15mm thick, clothed in fibrous roots. *Leaves* 1–4, mainly basal, ovate in outline, 2.5–10 × 1.5–6cm, bipinnate; leaflets ovate to 14 × 11mm, usually 3-lobed into oblong-elliptic acute segments 0.75–1.5mm broad, pale below; *petioles* with characteristic broad sheathing bases 0.8–2.3 × 0.8–1.4cm. *Umbels* compound, 2.5–4cm across, 5–12-rayed; *rays* 0.5–2cm, slightly unequal, slender, becoming erect in fruit; *bracts* (0–)2–3 linear, 1–4mm, early falling; *umbellules* 6–8mm across, 8–10(–12)-flowered; *pedicels* 1–2.5mm; *bracteoles* 1–5 linear-subulate 0.5–2.2mm. *Stamens* dark purple. *Calyx* teeth obsolete. *Petals* obovate, to 2 × 1.5mm, white, apex rounded-obtuse. *Stylopodium* domed, dark purple; styles recurved in fruit. *Fruit* globose–ovoid, c.1.5 × 1.75mm; *mericarps* thinly 3–5-ribbed; *vittae* indistinct.

Type: Nepal, Dara, 13–14,000ft, 1930, *Lall Dhwoj* 617a (holo. BM, iso. E [in part]).

Distribution. E Himalaya (Nepal to Bhutan). Marshy meadows, streamsides, mossy banks, 3650–4200m. Flowering July–August.

Additional specimens examined. BHUTAN. E side of Donga La, 12,300ft, 12 viii 1949, *F. Ludlow, G. Sherriff & J.H. Hicks* 21014 (BM).

SIKKIM. Phedang below Dzongri, 3750m, 26 vii 1992, *ESIK* 723 (E); Kapup, Jelep La Road, 13,000ft, 7 x 1942, *F. Ludlow & G. Sherriff* 10019 (BM).

NEPAL. Without precise locality, 1927, *C. Wigram* 95 (E); S of Pangsing-Bhanjyang on Tiru Danda ridge, 28°07'N 85°09'E, 3700m, 24 viii 1974, *J.H. de Haas* 2531 (BM); Sankhuwasabha district, Ridge between Kuama and Shipton La, 27°39'N 87°13'E, 3650m, 26 ix 1991, *EMAK* 303 (E).

Although this species was recognized as a novelty by C. Norman (on a note attached to the holotype cited above) and Mukherjee & Constance (1993: 132, as '*Sinocarum* sp. 1'), it has not formally been published. Norman realized that Lall Dhwoj's gathering No. 617 was a mixed collection of two species, separating and renumbering the BM material. The duplicate at E is also a mixture of two species: *S. normanianum* (Cauwet & Farille) Farille [annotated 1, 3; distinguished by larger leaflets and triangular calyx teeth] and *S. pulchellum* [annotated 2].

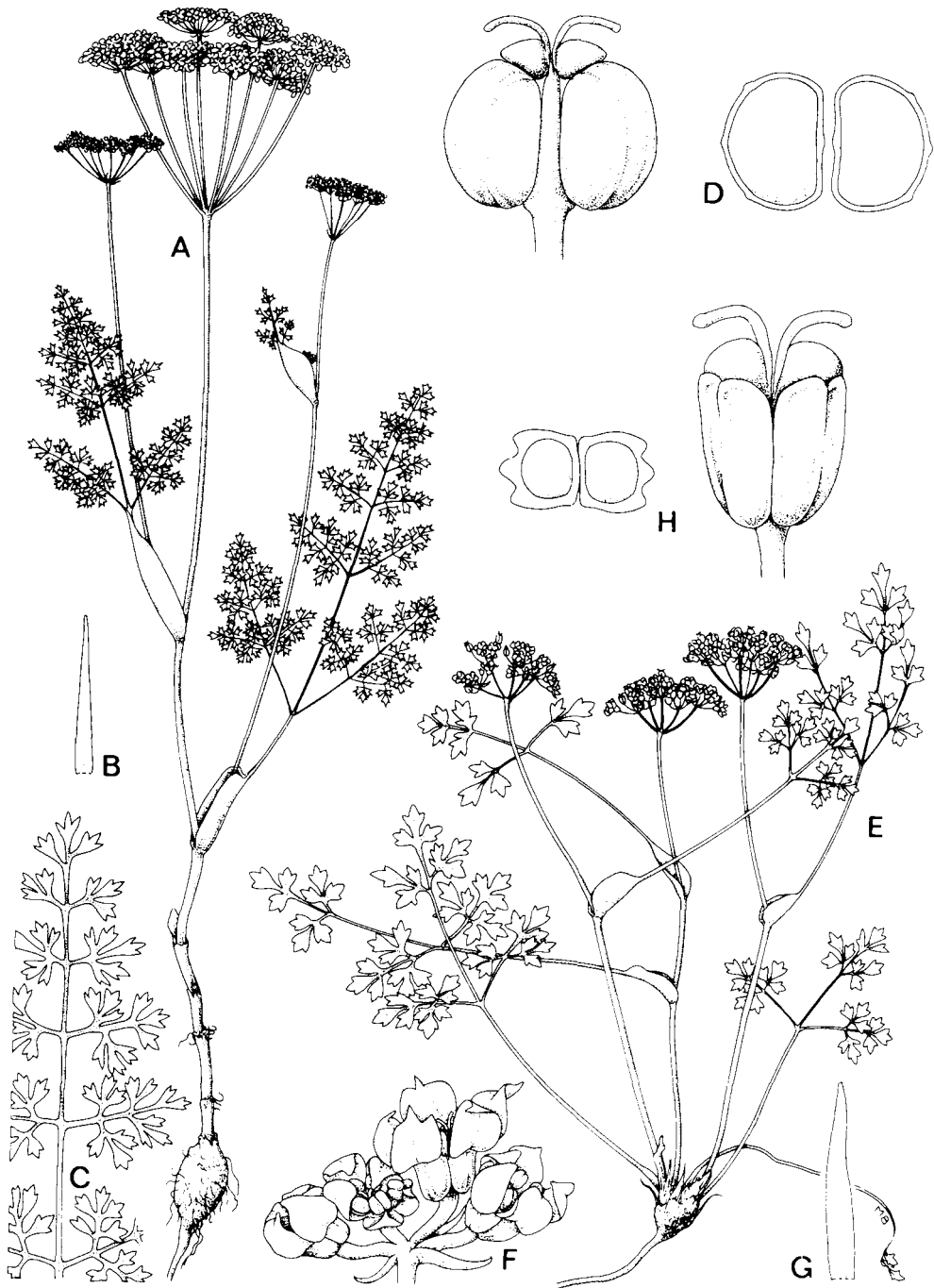


FIG. 5. *Sinocarum pulchellum* M.F. Watson: A, habit, $\times \frac{2}{3}$; B, bracteole, $\times 18$; C, part of leaf, $\times 2$; D, fruit, $\times 18$. *Sinocarum minus* M.F. Watson: E, habit, $\times 2.5$; F, umbellule, $\times 10$; G, bracteole, $\times 18$; H, immature fruit, $\times 24$. A–D from *EMAK* 303 and *Ludlow, Sherriff & Hicks* 21014; D–F from *Ludlow, Sherriff & Hicks* 20384. Drawn by Mary Bates.

***Sinocarum woodii* M.F. Watson, sp. nov. Fig. 4D–F.**

Species haec ab *Sinocarum pulchello* C. Norman ex M.F. Watson differt rhizomate cylindrico verticali radice palari et habitu humili et fructibus oblongis.

Short, single-stemmed, high-altitude, glabrous perennial herb 2.5–6cm high and 6–12cm across; stem 0.5–2cm long; rhizome cylindrical 3–7mm thick, to 3cm long producing a woody taproot. *Leaves* 2–5, mainly basal, ovate in outline to 4 × 2.5cm (including the petiole), very finely and openly divided, 2–3 × pinnate; *leaflets* pinnatifid into linear-acute segments 0.2–0.5mm broad; *petioles* with conspicuous wide auriculate sheathing bases 1–2 × 0.5–1cm. *Umbels* compound, the primary umbel solitary and terminal, often almost sessile on crown, 5–8-rayed; secondary lateral umbels 0–1, smaller and with fewer rays and pedicels; *rays* 2–6cm long, widely spreading and unequal, often down-curved in fruit; *bracts* absent; *umbellules* 8–12mm across, (7–)12–15-flowered; *bracteoles* 4–6, linear-lanceolate, 1–6mm long; *pedicels* 1.5–6mm long, somewhat unequal. *Calyx teeth* obsolete. *Petals* obovate, rounded to acute, to 2.4 × 1.3mm, unequal with the larger petals on the outside, white. *Stamens* dark purple. *Stylopodium* conical-domed, dark purple; styles erect to spreading in fruit. *Fruit* oblong, c.2 × 1.5mm; *mericarps* 3–5-ribbed; *vittae* indistinct.

Type: Bhutan, Thimphu district, near Nya Tsho, Saga La, 4400m, 25 viii 1991, J.R.I. Wood 7440 (holo. E).

Distribution. E Himalaya (E Nepal to Bhutan). Short alpine turf and amongst rocks, 4000–4600m. Flowering August–October.

Additional specimens examined. NEPAL. Yalung, 4112m, 23 ix 1978, D. Binns, R. Mason & G. Wright 50 (E).

SIKKIM. Reshinangi, 13,000ft, 26 x 1910, *Ribu & Rhomoo* 4524 (E); Tosa [Torsa], 14,000ft, 2 viii 1910, W.W. Smith 4042 (E); Kaukola, 15,000ft, 21 viii 1849, J.D. Hooker s.n. (K); Yeumting [Yumthang], 14,000ft, 6 ix 1849, J.D. Hooker s.n. (K).

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