GERANIUM SPECIES FROM MOUNT VICTORIA, BURMA

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ABSTRACT. Three species of *Geranium* were collected by F. Kingdon-Ward on Mount Victoria, Burma, in 1956. One is here described as a new species, *G. wardii* P. F. Yeo, related to *G. polyanthes* Edgew. & Hook f. and to several previously mis-classified Chinese species. The second is a member of the *G. wlassovianum* Link group but cannot yet be more exactly placed. The third, which is in cultivation, is *G. yunnanense* Franch., whose floral characters have not previously been fully evident; it is suggested that its closest relative is *G. refractum* Edgew. & Hook. f.

On his last expedition, which was to Mount Victoria, Burma, in 1956 (anon., 1959), Frank Kingdon-Ward collected specimens of three different *Geranium* species. Mount Victoria is in south-west Burma, and forms the last high point on the mountain range which extends south from the high mountains of Yunnan and Sikiang along the Indo-Burmese frontier, and includes the Naga, Lushai and Chin Hills. It thus occupies an isolated position which is distantly linked by high ground with the floristically better known south-west Chinese mountains. The *Geranium* material, comprising one species known also from SW China and two which have more or less distinct affinities with plants of that area, show the expected phytogeographical relationships. The Botany Department of the British Museum (Natural History) has kindly lent the specimens and presented duplicates to the Cambridge Botanic Garden.

Geranium wardii P. F. Yeo, **sp. nov.**, *G. umbelliformi* Franch. et *G. strigoso* Franch. non Burm. f. (? *G. strictipedi* R. Knuth) affinis sed ab hoc inflorescentia laxissima et pedunculis pedicellisque longioribus, ab illo lobis foliorum non rhomboideis, recedit.

Radix ignota. *Caulis* prostrato-ascendens, usque ad c. 30 cm longus, glanduloso-puberulus, supra unilateraliter retro-pubescens et pilis longis hyalinis nigro-capitatis (? vivo rubro-capitatis) sparsim instructus. *Folia basalia* ignota. *Folia caulina* inferiora opposita, leviter inaequalia; stipulae ovatae, pilosae, c. 3 mm longae; petioli quam lamina 2–3½-plo longiores, indumento illi caulis simili; lamina ambitu reniformis, usque ad 4 cm longa et 5 cm lata, usque ad ½–⅔ palmato-7–9-partita, lobis cuneatis, apice subtruncatis usque ad ⅕–¼ palmato-trilobularis, lobulis apice rotundato-2–3-dentatis, dentibus calloso-mucronatis; folia superiora brevius petiolata, interdum alterna, 7-lobata, stipulis interdum connatis. *Laminae foliorum* pilis magnis hyalinis omnino glanduloso-strigosis, supra in venis puberulae, infra glanduloso-puberulae. *Pedunculi* biflori robusti, foliis duplo longiores, usque ad 10 (etiam ad 12) cm longi, ad nodos versus basim plantae primo emissi et inflorescentiam laxissimam ita efformantes; pedicelli 1·5–4 cm longi, pilis glandulosis copiose obtecti, fructu refracti et versus apicem ascendentes.

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Sepala sub anthesi 8 mm, sub fructu 10 mm, longa, mucronibus 0·5–1 mm longis inclusis, primum divergentia, post anthesin appressa, ultimo patentia, glanduloso-puberula et pilis magnis hyalinis in venis ciliata. *Petala* c. 10–13 mm longa, obovata, apice rotundata, superficie basi barbato, supra purpurea, infra kermesina (teste cl. lectoris). *Staminum filamenta* c. 4–5 mm longa, ? purpurea, basi dilatata et longe pilosa; antherae c. 1·5 mm longae. *Stylus* subnullus; stigmata primo 1·5 mm longa, tandem 2·5 mm longa. *Rostrum* ex apice mericarpium usque ad basem stigmatum 16–17 mm longum, totum dense et patente vel subpatente eglanduloso-pilosum. *Mericarpia* c. 5 mm longa, apice acuta, flavo-brunnea, reticulata (basis exceptis), rugis dense albo-pilosis; mericarpia et elateres maturitate abjecti. *Semina* ignota.
West Central Burma. Mount Victoria: common on turf slopes, mostly in young fruit, 2560 m, 26 x 1956, *Kingdon-Ward* 22760 (holo. BM!; iso. CGG!).

The closest relatives of this plant have previously been placed in different sections, namely *Polyantha* and *Palustria*. The species concerned were listed by Knuth (1912) as follows:
Sect. 4 POLYANTHA R. Knuth (spp. 124–126): 124, *G. polyanthes* Edgew. & Hook. f., occurring from Kumaon to Sikkim and NW Yunnan; 125, *G. umbelliforme* Franch., above Hokin in Yunnan; 126, *G. moupinense* Franch., at Mupin on the boundary between Szechuan and Sikiang.
Sect. 23 PALUSTRIA R. Knuth (spp. 189–209): 202, *G. hispidissimum* (Franch.) R. Knuth (*G. strigosum* var. *hispidissimum* Franch.) on Mount Hee-Chan-Men, Yunnan; 203, *G. platylobum* (Franch.) R. Knuth (*G. strigosum* var. *platylobum* Franch.), above Tapin-tze, Yunnan; 204, *G. strigosum* Franch., non Burm. f. (nom. illegit.), above Houang-Kia-Pin; this was later expanded to include, in addition to var. *strigosum* (called var. *gracile* Franch.), the vars. *hispidissimum* Franch. and *platylobum* Franch. (both raised to specific rank by Knuth as indicated above) and var. *grandiflorum* Franch., on Mount Hee-Chan-Men, Yunnan; 204a, *G. strictipes* R. Knuth, on the eastern flank of the Lichiang Range, Yunnan; 205, *G. pogonanthum* Franch., on Mount Fang-Yang-Tchang, Yunnan.

The primary reason for associating these taxa and *KW* 22760 with one another is the fruit, though the general affinity is apparent in other characters. The fruit is not known for all species, but it is known in *G. polyanthes* (which is abundantly represented in herbaria), in an un-numbered Delavay specimen at Kew, collected on the Col de Yen-Tze-Han, Yunnan, and sent out from Paris under the name *G. strigosum*, in *Ducloux* 224 from Yunnan-fu (K), in *Forrest* 6113, from Lichiang Valley, as *G. strictipes* (BM), and in *KW* 22760. There is some published description of the fruit for *G. strictipes* and *G. moupinense* and of the 'seed' (perhaps really of the fruit) for *G. strigosum*. The common characters of the fruit are the somewhat compressed section and beaked profile of the mericarp, the elevated and often pubescent ribs or reticulations of the mericarp, and the dispersal of the seeds within the mericarps which are freed from the caducous awns leaving behind the furrowed axis of the rostrum (for an account of the occurrence in the genus *Geranium* of this type of dispersal, termed 'carpel projection', see Yeo, 1973). I have established with certainty the existence of this type of fruit among specimens from SW China in the three gatherings mentioned above. However, these specimens and all the material representing Knuth's species 202–

204a at the Kew Herbarium (not a complete set of all the material cited in publications), undoubtedly form a closely related group, and it would be highly surprising to me if the fruit-types proved to be heterogeneous. Accordingly, all the taxa which I have mentioned should be placed in sect. *Polyantha* Knuth. I have my doubts as to whether the Chinese material really represents as many as eight species, but have not undertaken to revise it. (In fact the close affinity of *G. strictipes* with *G. strigosum* was mentioned by Knuth himself, and Handel-Mazzetti in 1933 reduced it to synonymy). However, it becomes evident that our plant differs from all the Chinese plants mentioned, and from *G. polyanthes*, and I have therefore described it as a new species on account of the following characters: indumentum, stem habit, form of stipules, leaf outline, form of inflorescence, length and stoutness of peduncles and pedicels, length of mucro of sepals and rostrum of fruit. As specific characters, those of indumentum and leaf outline are probably the least valuable of those listed.

The field notes for the present plant receive amplification from those of no. 22781, which indicate that the lower sides of the petals of 22760 are pilose, with a "plush effect". In fact these surfaces have only very sparse minute glandular hairs such as are found on other parts of the plant; apart from this there is a slight grainy appearance caused apparently by embossment of individual cells which under a lens might conceivably be mistaken for puberulence. The petals of *G. polyanthes* are exactly the same.

G. wardii is distinguishable from its nearest allies by its combination of *polyanthes*-like leaves, extremely lax inflorescence, very short sepaline apiculi and rather short rostrum.

Kingdon-Ward was apparently never commemorated in his lifetime by having a *Geranium* named after him, and I therefore now take pleasure in remedying the omission.

G. aff. wlassovianum Link

West Central Burma. Mount Victoria: prostrate with ascending or almost erect stems and pinkish purple flowers. Not so hairy as 22760 and without the pilose reverse to the petals, giving the plush effect. On turf slopes, common, 2510–2740 m, 28 x 1956 *Kingdon-Ward* 22781 (BM!; CGG!)

The plant seems to belong to a group centred on *G. wlassovianum* Link which Knuth (1912) placed in his Sect. 23, *Palustria*. This group includes (apart from Japanese species) *G. franchetii* Knuth, *G. yunnanense* Franch., *G. maximowiczii* Regel & Maack, *G. rosthornii* Knuth and *G. bockii* Knuth. Later, Knuth (1923 1930) recognised among the specimens he had cited as *G. wlassovianum* in his monograph a further six species. I have looked for specimens similar to *KW* 22781 at Kew (K) and the British Museum (BM). Not all the species of the group concerned are represented there and of those that are, most are represented by only one or two examples. Consequently it is not at present possible for me to come to any definite conclusions about the exact affinities of our plant, and I have not ventured to describe it as a new species. According to the published descriptions, it seems to be nearest of all to *G. rosthornii* Knuth, described from Nanchuan in Szechuan, which I have not seen. Of the species of which I have seen specimens, *KW* 22781 is somewhat similar to *G. franchetii* Knuth and *G. strigellum* Knuth, as

represented by type material at Kew, and it rather strongly resembles *G. henryi* Knuth (type collection, non-fruiting, from Hupeh: *Henry* 6752, BM) in general habit, colouring, appearance of stipules and extent of lobing of leaves. However, it differs from this as follows: stem without spreading hairs on the lowest internode; stipules shorter and blunter (though likewise pluri-dentate); leaf-divisions broader, subtruncate, with shorter and broader teeth; floral parts all appreciably smaller; petals without an abnormally extensive beard (present in the specimen of *G. henryi* though not mentioned in the original description); style obsolete; ovary densely hairy.

G. wlassovianum is more obviously distinct from *KW* 22781 in its coarsely and irregularly dentate (instead of rather evenly crenate), short-petioled leaves but, like *G. henryi*, it also differs from it in several less conspicuous characters.

G. yunnanense Franch., Pl. Delav. 114 (1889). Fig. 1.
West Central Burma. Mount Victoria: common along the ridge in partial shade, open spaces, petals reflexed like a Martagon lily's, the nodding pink flowers also suggest a miniature *Nomocharis* at first sight, habit of the other two species with ascending stems, c. 2890 m, 28 x 1956, *Kingdon-Ward* 22796 (BM!; CGG!; cult. material at CGG!, K!).

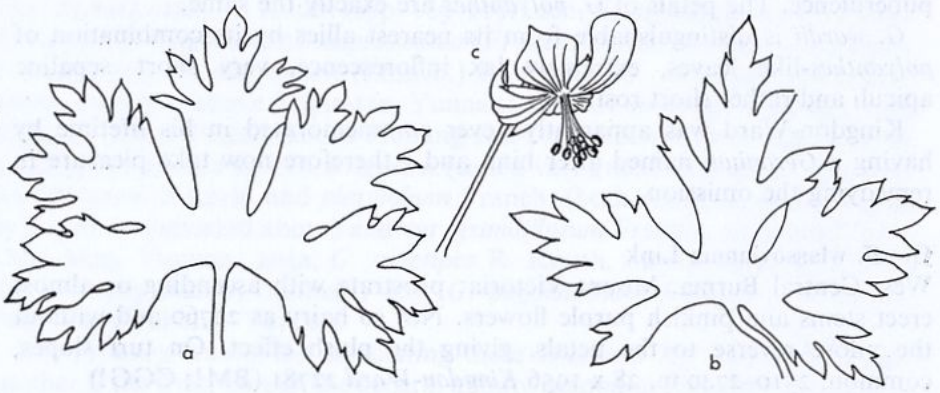

FIG. 1. *Geranium yunnanense* Franch. (*KW* 22796): a, basal leaf from plant cultivated at Cambridge, 1971; b, cauline leaf from original specimen in CGG; c, flower in the first (male) stage of anthesis, from plant cultivated at Cambridge, 1972.

Described from Mount Tsang Chan in Yunnan at 4000 m alt.; reported from Lidjiang (Lichiang) and between Bödö and Alo se in Dschungdien by Handel-Mazzetti (1933), and collected from N Burma, Myitkyina near Hphawte, on the Yunnan frontier, 16 viii 1938 *Naw Mu Pa* 17440 (K!).

This plant is widespread in cultivation. It first reached me early in 1971 from Mr D. McClintock, of Bracken Hill, Platt, Kent, who had it from Mr A. G. Kenneth of Stronachullin, Ardrishaig, Argyllshire. Mr Kenneth had raised seed under the numbers *KW* 22781 and 22796 and was not sure which this was (only one form had survived). On receiving a transcript of the field notes of all three geraniums from the British Museum through the kindness of Mr L. H. J. Williams, I was able to conclude that it was in fact no. 22796. In June 1971 I saw it at the Royal Horticultural Society's Garden at Wisley,

Surrey, where it was ascribed simply to Kingdon-Ward without number, and at the Royal Botanic Gardens, Kew, correctly named and numbered. In 1973 an enquiry from Mr Graham Thomas led to my receiving a plant from the Royal Botanic Garden, Edinburgh. This was collected on Kingdon-Ward's same expedition by U Maung Gale in November 1956 under the number 5897 and obtained by the Royal Botanic Garden from the Forestry Department, University of Oxford.

This plant was apparently first named in 1961 when Mr P. W. H. Conn, of Calderstones Park, Liverpool, submitted it to the Kew Herbarium under the numbers 22796 and 22781, where it was named *G. yunnanense*. The latter number is an error, possibly caused by incorrect labelling of the original distribution, as the same situation occurred among Mr Kenneth's plants.

Syntype material of *G. yunnanense* at Kew differs from Knuth's (1912) description in that the petals are pink, not purple, and the leaves are divided as far as $\frac{2}{3}$ of their radius, rather than merely to "beyond the middle". Further, Knuth describes the stems as erect, which is not at all evident from the specimen, and the petals as erect which seems meaningless in the context. In fact, the petal posture, being apparently unique, might be expected to be included in any description, but it normally becomes disguised in pressing and was probably unknown previously. When allowance is made for all these points it becomes evident that our plant differs from the type only in its rather more deeply divided leaves with longer and narrower teeth. The cultivated material varies as to the presence or absence of glandular hairs on the pedicels and calyx. A description of the Kingdon-Ward plant follows.

Rhizome abbreviated, branched, massive. *Radical leaves* with the lamina c. 6 cm wide, 5-lobate as far as c. $\frac{4}{5}$ of the radius, the lobes cuneate, palmato-pinnately lobulated in the distal third, the lobules deeply and acutely toothed, upper surface lightly marbled, sparsely strigose, the veins densely strigose beneath; stipules triangular-lanceolate, up to c. 2·5 cm long. *Stems* usually in a whorl of three, at first erect, soon forking and becoming spreading, bearing peduncles as low as the first dichotomy. *Cauline leaves* petiolate, the lower with petioles c. 3 times as long as the lamina, lamina similar to that of the basal leaves, reduced upwards. *Inflorescence* very diffuse; peduncles retrorsely appressed-hirsute, the lower c. 8–13 cm long, the upper sometimes more or less suppressed; pedicels c. 1·5–3 cm long, retrorsely appressed-hirsute and sometimes with spreading glandular hairs in addition, more or less divaricate and bent just below the flower at anthesis so that the flower faces vertically downwards, after anthesis reflexed from the attachment to the peduncle, erect in ripe fruit. *Sepals* c. 10–12·5 mm long, including mucro c. 1·5–2 mm long, pilose, sometimes with glandular hairs at the base, green with intensely purple base inside, erecto-patent at anthesis, loosely appressed afterwards. *Petals* 16–19 mm long, 8·5–9 mm wide, cuneate-obovate, widely diverging from the base, recurved and ascending between the sepals distally, not contiguous, light rose pink with elevated translucent colourless veins converging to form a pale base to the petal, claw very densely bearded at either edge, with less dense hairs extending across the surface both adaxially and abaxially. *Filaments* 11 mm long, slender, evenly tapered from base to apex, rose pink at base, otherwise pinkish purple, densely clothed with fine white setae in the basal half, anthers c. 2. mm long, blackish, pollen yellow,

style and ovary c. 9·5 mm long, style antrorsely short-setose near the base, pinkish purple, stigmatic branches c. 2·5–3 mm long, purplish; rostrum from top of ovary to base of stigmatic branches 21–23 mm, very shortly spreading-hairy and with scattered long glandular hairs; mericarps c. 4·3 mm long, pubescent, persistent, ejecting the seeds, open side partly filled by long white bristles seated on the basal boss, seeds c. 3 mm long, microscopically rugulose.

In cultivation flowering from late July to September.

As already mentioned the petals do not show their true posture in dried specimens in which they tend to spread out widely with one or two of them folded back above the middle. If the true posture of the flower and petals had been known to Knuth he would certainly not have placed *G. yunnanense* where he did, in section *Palustria* Knuth, but in section *Reflexa* Knuth.

This section is in fact heterogeneous, for the European species (*G. phaeum*, *reflexum* and *aristatum*) have fruits which break up like those of *Erodium*, each awn (elater) becoming coiled and detached with the mericarp which retains the seed inside it (Tokarski, 1972), while the Chinese members of the group have fruits like *G. pratense*, the awns curling back explosively with the mericarps attached, and ejecting the seeds in the process. *G. yunnanense* shows strong resemblances to *G. refractum* Edgew. & Hook. f. which, however, has the sepals about 15 mm long, the stamens dilated and overlapping at the base and with only a few hairs there, and the beard of the petals divided into two lateral tufts with a glabrous area in between. Its petals vary from white to pale lilac (collectors' notes on specimens in BM), and appear to be straight above the reflexed base. Also closely related to *G. refractum* are *G. refractoides* Pax & Hoffm., with sepals only 8 mm long, and petals only a little longer, and only 4 mm wide, *G. batangense* Pax & Hoffm., (which from the description hardly seems to differ from *G. yunnanense*) and *G. calanthum* Hand.-Mazz., also with small sepals and petals and with the filaments glabrous and slightly dilated, but from the description hardly different from *G. refractoides*.

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