

New Primulaceae from Southern Tibet

BY

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An account is given here of the species of *Primula* and of *Omphalogramma* collected by Messrs. Ludlow and Sherriff while on tour in 1936 for biological purposes in South and South-East Tibet. The expedition was under the auspices of the British Museum, and I am indebted to the Keeper of Botany of that Museum for the opportunity of examining the material. The new species are described below. In addition, use has been made of the extensive field-notes of the collectors, and these have been quoted in full where they concern the less-known species. The area explored is to some extent intermediate between the Himalaya and the Chinese Alps, and the flora, as has been shown by Kingdon Ward in his Tibetan expeditions, has a marked affinity with the floras of both regions. The data secured by the present collectors are a valuable contribution to our knowledge of plant distribution, particularly as regards the genus *Primula*.

AMETHYSTINA.

P. Dickieana Watt in Journ. Linn. Soc. xx (1882), 9.

Found by Hooker in Sikkim in 1848 but not described until 1881. Now recorded from several localities in Sikkim but known to extend into Bhutan, through South Tibet to Yunnan and the extreme north of Burma. Very variable in colour—purple, violet, yellow, white. (*P. Pantlingii* King is only a variety with 1-2 flowers in the umbel.) The plant appears to be well distributed in South and S.E. Tibet, as is indicated by the following numbers of the collectors: Nos. 1537, 1654, 1878, 1922, 2174, 2178, 2385, 2498, 2568, 2635, 2673, 2888. Alt. 11,500-16,000 ft.

Primula odontica W. W. Sm. Spec. nov.

Species arcte affinis *P. amethystinae* Franch. atque *P. Valentinianae* Hand.-Mzt. a quibus foliis plerumque lanceolatis, margine dentibus magnis patentibus ornatis, textura tenuiter papyraceis inter alia recedit.

Planta subrobusta, rhizomate crasso, radicibus multis carnosulis, basi [Notes, R.B.G., Edin., No. XCIV, October 1937.]

squamis 3-6 cm. longis ovatis vel lanceolatis cartilagineis una cum emarcidis sub anthesin bene circumdata. Folia vulgo 5-7 cm. longa, 1.5-2.5 cm. lata, plerumque lanceolata vel nunc oblanceolata vel ambitu elliptica, apice acuta vel subacuminata, basi in petiolum alatum vix discretum sensim angustata, margine grosse et subremote dentata, nunc irregulariter, dentibus plus minusve angulo recto patentibus, in sicco tenuiter papyracea pellucida, glabra, efarinosa, minute punctulata, laete viridia, subtus pallidiora, costa conspicua, nervatione tenui obscura. Scapus 9-12 cm. altus, subatratatus, ubique minute pilosulus (nec abest suspicio farinae), umbellam florum vulgo 5-10 nutantium gerens, bracteis linearibus circ. 1 cm. longis, pedicellis 1-2 cm. longis similiter pilosulis. Calyx circ. 7 mm. longus, cupularis, atroruber, minute pilosulus, in lobos lanceolatos vel subtriangulares ad medium vel ad tertiam partem divisus. Corolla in sicco complanata 1.5-1.7 cm. longa et lata, campanulata e tubo brevissimo sensim ampliata, rubro-purpurea, ubique minute pilosula, lobis 6 mm. longis obovatis apice rotundatis integris vel subintegris. Stamina in flore longistylis 2 mm. a basi tubi inserta, filamentis vix 1 mm. longis. Ovarium globosum, 2 mm. diametro, stylo 6 mm. longo. Fructus calycem subaequans apice valvis dehiscens.

"SOUTHERN TIBET.—Chickchar, Tsari. Alt. 14,500-15,500 ft. A most beautiful primula, of a deep rich claret colour, with up to ten flowers on one stem. Some show quite a bright yellow orange eye at the base. Filaments white, anthers pale golden yellow. Calyx dull greenish red. Farina not noticeable. Very fragrant. Common on steep grassy slopes where avalanches habitually come down in the spring. 13th June 1936." Ludlow and Sherriff, No. 2153. Type in Herb. Brit. Mus.

"SOUTHERN TIBET.—Takar La, W. Tsari. Alt. 14,500 ft. Flowers over. Capsules, calyx and scape dull reddish purple. On open grassy hillside. 15th August 1936." Ludlow and Sherriff, No. 2068. (Also No. 2484 in fruit, 23rd August, from same locality as 2153.)

This differs from *P. Valentiniana* Hand.-Mzt. in its more robust habit, in the shape, consistency, and toothing of the leaves, and in the many-flowered scape. It is also an ally of *P. amethystina* Franch., diverging from it in its well-marked leaf-characters.

P. Valentiniana Hand.-Mzt. in Sonderabd. aus Anzeig. Akad. Wien, Nos. 26-27 (1922), 5.

"S.E. TIBET.—Singo Samba, Lo Chu Valley, near Molo. Alt. 13,500-14,000 ft. Flowers deep rich velvety crimson, almost black around tube. Open hillsides with north face and on edge of lake. 29th June 1936." Ludlow and Sherriff, No. 1885.

Recorded from the province of Tsarong, Eastern Tibet, from N.W. Yunnan, from the extreme north of Burma, and from the Doshong La, Southern Tibet.

BELLA.

Primula barbatula W. W. Sm. Spec. nov.

Species affinis *P. pusillae* Wall. et *P. bellae* Franch. a quibus foliis glabris efarinosis, floribus multo minoribus solitariis ad oculum purpureo-barbatulis inter alia facile distinguitur.

Planta perpusilla caespitosa stolones breves emittens. Folia 4-5 mm. longa, spatulata, glabra, efarinosa; lamina tantum 1.5 mm. longa, apice ambitu rotundata, in dimidio apicali 3-7-dentata (pro magnitudine grossius), textura carnosula, nervatione obscura, in petiolum longiorem alatum tenuiter chartaceum sensim angustata. Flos solitarius plantam reliquam magnitudine aequans; pedunculus 4-5 mm. altus, ad apicem bractea unica lineari instructus; pedicellus vix 1 mm. superans. Calyx 2 mm. longus, cupularis, glaber, efarinosus, in lobos anguste triangulares subacutos erectos fere ad medium fissus. Corolla in sicco complanata circ. 6 mm. longa, 6-8 mm. lata, pallido-purpurea, ad fauces pilis purpureis dense farcta, tubo calycem paululo superante atropurpureo, lobis anguste obcordatis circ. 3 mm. longis alte emarginatis. Stamina in flore brevistylo ex ore corollae paululo exserta sed pilis aggregatis insuper oclusa. Ovarium immaturum globosum; stylus in flore brevistylo tantum 1 mm. longus, ad medium tubum attingens.

"SOUTHERN TIBET.—Kashong La, Chayul Chu. Alt. 15,000 ft. Corolla very slightly pinkish purple turning to deep purple in the centre tuft of hairs. Tube deep velvety purple. Calyx dull, very dark red green. No farina. On open stony hillside and on cliff ledges; damp situation. 13th July 1936." Ludlow and Sherrieff, No. 2350. Type in Herb. Brit. Mus.

The small section *Bella* has consisted so far of two species, *P. pusilla* Wall. from the Himalaya and *P. bella* Franch. and its sub-species, chiefly from the mountains of Western China and Eastern Tibet. *P. barbatula* has the characteristic pompon of hairs in the corolla throat, but differs widely from both its allies in the characters of its foliage. This pompon filling the throat is really formed in a ring and would appear to be a development of the annulus.

CANDELABRA.

P. prenantha Balf. f. et W. W. Sm. in Notes, R.B.G. Edin. ix (1916), 191.

In the collection the only representative of a section which finds its full expression in the western provinces of China. Found in Sikkim as long ago as 1888 but not described until 1916. Recorded also from Bhutan, Southern and S.E. Tibet, and from Tsarong, Eastern Tibet. Nos. 1658, 2126, 2396, 2516, 2732.

CAPITATA.

P. capitata Hook. in Bot. Mag. (1850), t. 4550. No. 2441.

P. crispata Balf. f. et W. W. Sm. in Notes, R.B.G. Edin. ix (1916), 162. No. 2048.

CORTUSOIDES.

P. Normaniana Ward in Ann. of Bot. xliv (1930), 123.

"S.E. TIBET.—Lo La, Pachakshiri. Alt. 11,500 ft. Flowers pale purplish pink, white eye. In forest by side of a stony path. 3rd July 1936." No. 1903.

DENTICULATA.

P. atrodentata W. W. Sm. in Rec. Bot. Surv. India, iv (1911), 217.

Widely distributed. Alt. 9,000–15,000 ft. Variable in colour—purple, violet, lilac to white. Sometimes nearly efarinose, but again with ample white or more rarely yellowish meal. Nos. 1278, 1290, 1313, 1562, 1641, 1698, 1902, 1990, 2537, 2722, 2880.

P. denticulata Sm. in Exot. Bot. ii (1805), 109.

Nos. 1176, 1299.

DRYADIFOLIA.

P. Jonarduni W. W. Sm. in Rec. Bot. Surv. India, iv (1911), 269.

Nos. 1805, 2181, 2570, 2679.

FARINOSAE.

P. Clutterbuckii Ward in Ann. of Bot. xlv (1930), 122.

"SOUTHERN TIBET.—Kashong La, Chayul Chu. Alt. 15,000 ft. Corolla slightly purplish pink, eye white to slightly yellow. Under surface of leaves white with farina, upper surface, scape and calyx also mealy. In sheltered crevices in cliffs. South of Main Range. Flowers mostly over. 14th July 1936." No. 2359. Found previously only by Kingdon Ward in the Delei Valley.

P. Genestieriana Hand.-Mzt. in Anz. Akad. Wiss. Wien, lix (1922), 250.

"S.E. TIBET.—Lo La, Pachakshiri. Alt. 13,000 ft. Flowers dark lilac. No eye. Moist earth. 3rd July 1936." No. 1901.

"SOUTHERN TIBET.—Kashong La, Chayul Chu. Alt. 15,000 ft. Corolla purple, very deep velvety purple in the centre. Calyx dull greenish red. On open wet grassy hillsides. 14th July 1936." No. 2374.

P. glabra Klatt in Linnaea, xxxvii (1871-3), 500.

Widely distributed in Nepal, Sikkim, Bhutan, and Southern Tibet. Nos. 1592, 1642, 2070, 2186, 2497, 2577.

P. pumilio Maxim. in Bull. Acad. St. Pét. xxvii (1881), 498.

"SOUTHERN TIBET.—Tsona. Alt. 14,500 ft. Slightly purplish pink, orange eye. Growing on open close-cropped grassy plateau where snow has just melted, singly and in little clumps. 12th April 1936." No. 1314. Known from Kansu and Southern Tibet.

P. tibetica Watt in Journ. Linn. Soc. xx (1882), 6, t. xia. Nos. 1551, 1819, 2258, 2602.

P. yargongensis Petitm. in Bull. Herb. Boiss, sér. II, viii (1908), 366.

Nos. 1662, 1709, 1783, 1918, 2122, 2473.

MINUTISSIMAE.

P. muscoides Hook. f. ex Watt in Journ. Linn. Soc. xx (1882), 15.

"SOUTHERN TIBET.—Taktsang, Tsari. Alt. 15,000 ft. Corolla and tube white. A little farina on calyx and on under surfaces of leaves. Calyx green. Growing in small clumps on open rocky hillside in moss, above tree zone. Scarce. 22nd June 1936." No. 2194.

"Drichung La, near Charme. Alt. 15,500 ft. Corolla cream white. Calyx and corolla with a little farina. Growing in small clumps on open shale scree. 7th July 1936." No. 2311.

"Kashong La, Chayul Chu. Alt. 15,000 ft. Corolla violet, eye hairy and white. Tube white. Growing in little clumps on open scree. This Primula was all coloured where this specimen was collected. 19th July 1936." No. 2399. (Varies in colour from type.)

"Drölma La. Alt. 16,000 ft. Flower over. Among stunted grass on open hillside. 8th September 1936." No. 2567.

This Sikkim plant has been recorded from Tibet previously by Kingdon Ward.

P. petrocharis Pax et K. Hoffm. in Fedde, Repert. xvii (1921), 95.

"SOUTHERN TIBET.—Chösam, Tsari Chu. Alt. 14,000 ft. Pink, eye pale orange yellow to lemon. In clumps covering the grassy bare hill-sides. 16th May 1936." No. 1599. Also in fruit. 14th August 1936. No. 2044.

"Sanga Chöling. Alt. 12,000-13,500 ft. Corolla pale blue violet with a large green eye. Common on open banks or among scrub jungle, south face. Back of leaves white with farina, which is also on scape, pedicels, and calyx. 29th June 1936." No. 2257.

First found in 1914 in Szechuan by Limpricht, afterwards in Bhutan by Cooper and in Tibet by Kingdon Ward.

P. rhodochroa W. W. Sm. in Notes, R.B.G. Edin. xv (1926), 75.

"SOUTHERN TIBET.—Mipa, Tsari. Alt. 15,000 ft. Corolla slightly purplish pink with a pale orange lemon eye. A good deal of farina on leaves both sides, stem and calyx. Calyx large, slightly purplish green. Fragrant in spite of its size. Only seen on a few huge rocks in the valley bed, growing in moss or in rock crevices, south face. I could not find this *Primula* elsewhere. 16th June 1936." No. 2137. Also 19th June 1936. No. 2177.

"Kashong La, Chayul Chu. Alt. 15,000 ft. Corolla pure white, lemon green eye. Back of leaves white with meal. Scape and calyx mealy. On open rock faces. 14th July 1936." No. 2371.

"Migyitun, Tsari. Alt. 14,000 ft. Flower over. A very few ripe capsules collected. In moss on rocks. 2nd September 1936." No. 2539.

Previously collected in Tibet by Kingdon Ward and only known from there.

Primula subularia W. W. Sm. Spec. nov.

Species affinis *P. minutissimae* Jacq. et *P. tenuilobae* Pax a quibus foliis subuliformibus integris inter alia facile cognoscitur.

Planta perpusilla, cum flore circ. 2 cm. alta, caespitosa, radicibus fibrosis multis munita. Folia ad 1 cm. longa, vix 1 mm. lata, subulata, rosulam graminiformem exhibentia, apice acuta, basi vix angustata itaque haud petiolata, textura firma, costa obscura, venis ceteris deficientibus. Flos in quaque plantula solitarius, erectus, pedicello 3 mm. longo in foliis immerso suffultus. Calyx circ. 3 mm. longus, anguste cupularis, viridis, in lobos oblongos obtusos hydathodis terminatos ad medium fissus. Corolla in sicco complanata 10–13 mm. longa, circ. 8 mm. lata, extra sub lente minute puberula, roseo-purpurea; tubus anguste cylindricus, 8 mm. longus, supra paululo ampliatus; limbus in lobos circ. 4 mm. longos vix patentes anguste obcordatos alte emarginatos venulis purpureis pererratos fere ad fauces divisus. Stamina infra medium tubum posita, antheris a basi tubi 2.5 mm. remotis atque calycis apicem subaequantibus. Ovarium immaturum globosum; stylus calyce paulo brevior.

"S.E. TIBET.—Lo La, Pachakshiri. Alt. 14,500 ft. Flowers purplish pink. Hab. in tufts on wet peaty soil. 14th July 1936." Ludlow and Sherriff, No. 1912. Type in Herb. Brit. Mus.

This small species recalls *P. tenuiloba* (Hook. f.) Pax in habit and in the shape of the corolla but has quite different leaves. The corolla-lobes, so far as can be judged from dried material, tend to be somewhat erect and not definitely reflexed, so that they appear to form a continuous line with the tube.

P. tenuiloba (Hook. f.) Pax in Engl. Bot. Jahrb. x (1889), 204.

"SOUTHERN TIBET.—Drölma La, Tsari. Alt. 16,000 ft. Corolla blue violet, all except the eye, which is white. Tube white with five

narrow purple streaks or wholly purple. Calyx green. No farina visible. Growing on bare steep rocky scree. 18th June 1936." No. 2172.

"Kashong La, Chayul Chu. Alt. 14,000-15,000 ft. Corolla blue violet with a whitish hairy eye. No farina. On steep open grassy hillside or on cliff ledges with a little soil. 13th July 1936." No. 2354.

Recorded from Nepal, Sikkim, Bhutan, and Tibet.

MUSCARIOIDES.

P. bellidifolia King in Hook. f. Fl. Brit. Ind. iii (1882), 486. Nos. 1556, 1801, 2780.

P. hyacinthina W. W. Sm. in Notes, R.B.G. Edin. xix (1936), 170.

"SOUTHERN TIBET.—Shagam La, Tsari. Alt. 15,000-16,000 ft. Corolla powdery pale blue tinged violet. Tube blue violet. Back of leaves white with meal, which is also on stem and calyx. Calyx dull green purple. Mostly under overhanging cliffs or at foot of cliffs, south face. 20th June 1936." No. 2185.

"Le La, Chayul Charme. Alt. 12,500-16,000 ft. Corolla and tube pale blue violet. Under surface of leaves white with farina, which is also plentiful on scape and calyx. Very fragrant. All over the open stony hillside and among dwarf Rhododendron and Juniper. 4th July 1936." No. 2294.

Also at Chakar, Rong Chu. In fruit. 20th November 1936. No. 2901.

Found once before—by Kingdon Ward.

NIVALES.

Primula Elizabethae Ludlow Mss. Descript. W. W. Sm. Spec. nov.

Species valde affinis *P. Aglenianae* Balf. f. et Forrest atque praesertim ejus speciei varietati *atrocroceae* Ward; habitu minore, foliis distincte petiolatis basi subcordatis vel rotundatis efarinosis inter alia recedit.

Planta sub anthesin squamis imbricatis 2-3 cm. longis chartaceis rubris in modum *P. Aglenianae* cincta. Folia tempore florendi ex squamis satis exserta; lamina 2.5-3.5 cm. longa, circ. 1.5 cm. lata, ambitu subcordiformis vel nunc ovata vel sublanceolata, apice subacuta, basi subcordata vel rotundata vel nunc angustata, a petiolo discreta nec decurrens, margine crebre denticulata, glabra, efarinosa, supra atroviridis, infra pallida et aspectu quasi pergamentacea, nervatione obscura; petiolus primo laminam aequans vel paulo superans, tandem in speciminibus fructiferis ad 8-10 cm. elongatus, laminis eodem tempore vix augmentatis. Scapus circ. 12 cm. altus, flores 1-3 gerens, vulgo uniflorus; bracteae 1-2, lineares, 3-8 mm. longae, glabrae, efarinosae;

pedicelli circ. 1 cm. longi, robusti. Calyx 8-9 mm. longus, circ. 5 mm. latus, cupularis, viridis, efarinosus, in lobos subquadratos apice rotundatos vix ad medium divisus. Corolla pro planta magna, in sicco complanata 3-3.5 cm. longa, ad 3.5 cm. lata, in modum *P. Aglenianae* late campanulata, flava, extra efarinosa, intus ad fauces macula fere 1 cm. lata sulfureo-farinosa praedita; tubus e calyce longe exsertus supra ampliatus; lobi suborbiculares, 13-14 mm. diametro, integri, venulis multis pulchre pererrati. Stamina in flore longistylis ad medium tubum posita, antheris calycis ad apicem attingentibus. Ovarium primo globosum, maturitate paululo elongatum sed vix calycem superans. Semina eis *P. Aglenianae* et *P. muliensis* subsimilia. Nomen specificum in honorem matris a collectore datum.

"S.E. TIBET.—Singo Samba, Lo Chu Valley, near Molo. Alt. 13,500-14,000 ft. Flowers primrose yellow with a pale (yet well-marked) sulphur farinaceous eye. Calyx green. Bulbous base of stem reddish brown. Open earthy hill slopes. A truly magnificent primula. Flowers huge, 1-3 on a peduncle. 29th June 1936." Ludlow and Sherriff, No. 1886. Type in Herb. Brit. Mus.

"SOUTHERN TIBET.—Lo La. Alt. 13,500 ft. On open earthy hillside. Flower over. 12th October 1936." Ludlow and Sherriff, No. 2667. The same in fruit.

The beautiful species is closely allied to *P. Agleniana* Balf. f. et Forrest and to *P. muliensis* Hand.-Mzt. In the shape of the corolla these three species recall *P. sikkimensis* Hook., but in most other respects they favour the section *Nivales*, where they show kinship with *P. calliantha* Franch.

P. macrophylla D. Don in Prodr. Fl. Nepal. (1825), 80.

Nos. 1287, 1561, 1712, 1743, 1777, 1843, 1844, 1917, 2538, 2560, 2573, 2576, 2590, 2599, 2651, 2680, 2692, 2701, 2719, 2790, 2909. This variable Himalayan *Primula* is common in the area.

Var. ***macrocarpa*** (Watt).

Nos. 1769, 1778, 2112, 2375, 2561, 2730, 2782, 2787.

P. szechuanica Pax in Engl. Pflanzenr. Primul. (1905), 106, var.

"S.E. TIBET.—Near Pamchi, Lilung Valley. Alt. 13,500 ft. Flowers greenish yellow, tube purple, calyx dull green. Amongst grass under shrubs. 21st June 1936." No. 1848.

"SOUTHERN TIBET.—Takar La, W. Tsari. Alt. 14,000 ft. Corolla a pale yellow green, rather more yellow than green. Tube purple. Calyx dull dark red green. The most fragrant *Primula* I have ever seen. The tube is seen only in some specimens owing to the long calyx and the claws being reflexed back on to it. The back of many leaves is distinctly purple, though most are green. On river banks and hillsides, always partly under dwarf Juniper or other screens. 28th June 1936." No. 2242. Also Nos. 1589, 2682.

This differs from the typical Szechuan plant in the purple corolla-tube ; Kingdon Ward noted the same difference.

OBCONICA.

P. filipes Watt in Journ. Linn. Soc. xx (1882), 5.

"EASTERN BHUTAN.—Waterfall below Takhtoo, Gamri Chu. Alt. 6,500 ft. Almost white to pale pink. Flowers now nearly over. In shady position growing in moss on dry cracks of rock and under rocks. 16th March 1936." No. 1189.

"EASTERN BHUTAN.—Kheri Gompa, Chungkar. Alt. 7,000 ft. Corolla pale mauve, greenish yellow eye. This is just beginning to come into flower now. On steep hillside, north face, under trees and shrubs. 23rd November 1936." No. 2877.

OBTUSIFOLIA.

P. Caveana W. W. Sm. in Rec. Bot. Surv. India, iv (1911), 218, vel aff.

Nos. 2536, 2791. Both in fruit.

P. consocia W. W. Sm. in Notes, R.B.G. Edin. xix (1936), 167.

"SOUTHERN TIBET.—Bimbi La, Tsari. Alt. 15,500 ft. Lilac with a very small green-yellow eye. A great deal of meal on the leaves, both surfaces, scape, pedicels, and calyx. Very fragrant indeed. A beautiful Primula growing in damp cracks in rocks, often overhanging, mostly on south face. 3rd June 1936." No. 1768. Also Nos. 2162, 2783.

"Trakan La, Char Chu. Alt. 16,000–16,500 ft. Flower over, only two seen, lilac with lemon eye. Back of leaves white with meal, as are scape and calyx. In rock clefts. 11th August 1936." No. 2016.

"Le La, Chayul Charme. Alt. 15,500 ft. Corolla purplish pink, with a pale lemon orange eye. Very fragrant. Back of leaves white with farina. Calyx dull purple green. Growing in cracks of rock open to sun and rain. 4th July 1936." No. 2284. Also 2572.

P. Jaffreyana King in Journ. Asiat. Soc. Bengal, lv (1886), 228.

"SOUTHERN TIBET.—Bimbi La, Kyim Dong Chu, Tsari. Alt. 14,000 ft. Flowers dark lilac with a yellow eye. On south-facing slopes in dry situations, growing on cliff faces and also in thin dry rhododendron jungle. 13th June 1936." No. 1807.

"Sanga Chöling. Alt. 12,000–13,500 ft. Corolla pale blue violet, with a large green eye. Common on open banks and amongst scrub jungle, south face. Back of leaves white with farina, which is also on scape, pedicels, and calyx. 29th June 1936." No. 2257. Also in

fruit at Chayul Charme. 1st October 1936. No. 2717. And at Sumbatse, Kyim Dong Chu. 20th October 1936. No. 2779.

Found apparently only once before by Walton in 1904. Has affinity with *P. pulchella* Franch. and *P. pulchelloides* Ward.

PETIOLARES.

P. Boothii Craib in Notes, R.B.G. Edin. vi (1917), 249.

"SOUTHERN TIBET.—Lepo, Nyam Jang Chu. Alt. 10,000 ft. Pink with orange green eye. Some flowers with farina on under surface and some leaves also with a little farina. Growing in big patches a foot or two across, beside most waterfalls here, in moss on rocks. 8th April 1936." No. 1292.

"Pangchen (at the Chörten), Nyam Jang Chu. Alt. 6,500 ft. Purplish pink, orange yellow eye, with white outside the orange. No farina seen on these plants, which were nearly over. Growing on moss on wet rocks at the side of a waterfall. 27th March 1936." No. 1243.

Also in Bhutan. Nos. 1188, 1216, 2861, 2862.

Primula chamaedoron W. W. Sm. Spec. nov.

Species arcte affinis *P. chamaethaumati* W. W. Sm. a qua pedunculo satis evoluto medio 2-3-bracteato, pedicellis haud elongatis nec gracilibus, flore vulgo solitario differt; proxima autem est *P. chionota* W. W. Sm. quae floribus flavidis gaudet.

Rhizoma breve satis crassum radicibus longis multis carnosulis. Folia exteriora squamiformia, oblonga vel ovata, ad anthesin carnosula rubida, interiora cum floribus nascentia vel paulo serius, eo tempore 1-2 cm. longa, 5-10 mm. lata, elliptica vel oblonga, apice obtusa vel rotundata, basi in petiolum nunc late alatum 1-2 cm. longum subabrupte contracta, margine crenato-denticulata, textura chartacea, glabra, ut videtur efarinosa. Flores pro planta magni, sub anthesin plantam reliquam aequantes, plerumque solitarii vel nunc binati, pedunculo ad 1.5 cm. evoluto glabro suffulti, pedicellis ad 1.5 cm. longis, bracteis 2-3 linearibus 8-15 mm. longis. Calyx cupularis carnosus rubro-viridis 8-9 mm. longus in lobos ovatos vel ovato-lanceolatos obtusos integros ad medium fissus. Corolla violacea, flavo-oculata, in sicco ad 3 cm. longa, ad 3.75 cm. lata; tubus circ. 1.5 cm. longus, cylindricus supra medium sensim dilatatus, ore annulatus; lobi obovati, alte emarginati venulis purpureis pererrati. Stamina in medio tubo posita ab ore remota. Ovarium globosum stylo brevi haud ad apicem calycis attingente. Fructus deest.

"SOUTHERN TIBET.—Kashong La, Chayul Chu. Alt. 14,000-15,000 ft. Corolla and tube violet, eye bright orange yellow. Flowers measured 1½-1¾ inches across. Nearly all over. No farina. Calyx reddish green. On steep grassy wet slopes. 14th July 1936." Ludlow and Sherriff, No. 2373. Type in Herb. Brit. Mus.

P. chamaethauma W. W. Sm. in Notes, R.B.G. Edin. xv (1927), 300.

"S.E. Tibet.—Pö La, near Kyim Dzong. Alt. 15,500 ft. Flowers deep violet with a conspicuous yellow eye. Calyx green. By sides of running stream. 19th July 1936." No. 1924.

Collected once before—by Kingdon Ward.

Primula hilaris W. W. Sm. Spec. nov.

Species valde affinis *P. strumosae* Balf. f. et Cooper sed foliis longe petiolatis, lamina breviter elliptica crenato-denticulata, floribus multo majoribus divergit.

Planta satis robusta, rhizomate crasso, radicibus carnosis, basi squamis 3-7 cm. longis anguste oblongis in sicco membranaceis nunc subfoliaceis sensim in folia abeuntibus bene circumdata. Folia petiolo elongato vulgo 6-8 cm. longo 5-10 mm. lato multum complanato membranaceo praedita; lamina vulgo circ. 6 cm. longa, 3-3.5 cm. lata, plus minusve late elliptica vel nunc suborbicularis, apice rotundata, basi subcordata vel rotundata vel nunc latissime cuneata, margine regulariter crenato-denticulata, textura in sicco firme papyracea, supra viridis glabra, infra dense flavido-farinosa, costa latiuscula conspicua, nervis farina haud occultis. Scapus circ. 10 cm. longus, folia paulo superans, robustus supra sparse farinosus umbellam 3-6-floram gerens, bracteis ad 1.5 cm. longis basi lato linearibus farinosis, pedicellis 1.5-2.5 cm. longis bene farinosis. Calyx 7-9 mm. longus, cupularis, farina indutus, in lobos ovatos vel triangulari-ovatos obtusos ad medium divisus, ei *P. strumosae* subsimilis. Corolla circ. 3 cm. longa, ad limbum 3.5-4 cm. lata, late infundibularis annulata, pallido-flava, ore aurantiaco-flava, pubescentia minuta farinipotente conspersa; tubus (complanatus) 4-5 mm. latus supra ad 7 mm. sensim ampliatus; lobi late obovati vel suborbiculares, breviter emarginati atque nunc erosuli. In flore brevistylo stamina 4 mm. ab ore inserta; stylus calycem subaequans. In flore longistylo antherarum apices calycem aequantes; stylus 3 mm. ultra stamina projectus. Ovarium globosum.

"SOUTHERN TIBET.—Kashong La, Chayul Chu. Alt. 14,000-15,500 ft. Corolla pale yellow, with bright large orange-yellow eye. Flowers measure up to 1½ inches across. Tube same as corolla. Calyx green. Back of leaves and calyx very mealy. Scape and pedicels show a little meal also. Common among rocks and cliffs and on open steep rocky hillside. 14th July 1936." Ludlow and Sherriff, No. 2370. Type in Herb. Brit. Mus.

Primula jucunda W. W. Sm. Spec. nov.

Species affinis *P. strumosae* Balf. f. et Cooper atque *P. hilari* W. W. Sm.; ab hac floribus multo minoribus, calycis segmentis linearibus vel lineari-lanceolatis acuminatis haud patentibus inter alia differt;

ab illa laminis basi rotundatis vel subcordatis, calycis segmentis angustis recedit.

Planta habitu *P. hilaris* W. W. Sm., rhizomate satis crasso, radicibus carnosus, basi sub anthesin squamis 3-4 cm. longis ovatis carnosulis dense albido- vel flavido-farinosis nunc sensim in folia abeuntibus arcte cincta. Folia petiolo laminam subaequante late alato membranaceo munita; lamina 4-4.5 cm. longa, 2-3 cm. lata, late elliptica, apice rotundata, basi subcordata vel rotundata, margine regulariter crenato-denticulata, in sicco papyracea, supra glabra, infra dense albido- vel flavido-farinosa, costa latiuscula efarinosa, nervis farina haud occultis. Scapus ad 10 cm. longus, folia superans, apice bene farinosus, umbellam compactam 5-7-floram gerens, bracteis circ. 1 cm. longis linearibus vel lineari-lanceolatis, pedicellis tantum 5 mm. longis dense farinosis. Calyx ad 1 cm. longus, subcylindricus, farina indutus, in lobos lineari-lanceolatos acutos nunc acuminatos haud patentes ad duas partes fissus. Corolla circ. 2.5 cm. longa, ad limbum 2 cm. lata, infundibularis, aurantiaco-flava, pubescentia minuta farinipotente conspersa; tubus circ. 1.5 cm. longus; lobi anguste obovati breviter emarginati. In flore brevistylis stamina ad fauces pertinentia; stylus calyce paulo brevior. In flore longistylis stamina ad medium tubum inserta; stylus fere ad os attingens. Ovarium globosum.

"SOUTHERN TIBET.—Migyitun, Tsari Chu. Alt. 11,000 ft. Golden yellow, deeper orange yellow in centre. Back of leaves covered with meal, the short outer leaves covered both sides. Meal also on scape and calyx. Fragrant. Open grassy meadows. 29th May 1936." Ludlow and Sherrieff, No. 1732. Type in Herb. Brit. Mus.

"SOUTHERN TIBET.—Mipa, Tsari. Alt. 16,000 ft. Corolla pale golden yellow, eye golden yellow. Calyx dull green. Fragrant. Farina thick on back of leaves, also a little on scape and calyx. On open wet hillside. 18th June 1936." Ludlow and Sherrieff, No. 2175.

Certainly closely akin to *P. hilaris* W. W. Sm. but differing in the densely farinose basal scales, in the more compact inflorescence and more slender scape, in the bracts exceeding the pedicels, in the much smaller flowers, and in the linear lobes of the larger calyx. In the type the farina is white. In No. 2175, a smaller plant from a higher elevation, the meal is somewhat yellow.

Var. *ponticula* W. W. Sm. Var. nov.

Varietas haec a typo laminis in petiolum decurrentibus nec basi subcordatis recedit; itaque primo intuitu ad *P. strumosam* Balf. f. et Cooper transire videtur sed foliis margine crenatis, segmentis calycis omnino diversis distinguitur.

"SOUTHERN TIBET.—Bimbi La, Tsari. Alt. 14,500 ft. Corolla yellow, deeper in the centre. Back of leaves, scape and calyx mealy. Among open scrub forest, near the top of Abies forest. 5th June 1936." Ludlow and Sherrieff, No. 1780. Type in Herb. Brit. Mus.

Primula laeta W. W. Sm. Spec. nov.

Species ex affinitate *P. Roylei* Balf. f. et W. W. Sm. atque *P. Griffithii* Pax ; foliis subtus dense flavido-farinosis, floribus saturate atropurpureis distinguitur.

Planta satis robusta, rhizomate brevi crasso, radicibus carnosis, basi squamis 3-5 cm. longis oblongis acuminatis in sicco rubidis membranaceis nunc sensim in folia abeuntibus cincta. Folia in petiolum laminam subaequantem vel paulo superantem late alatum nunc membranaceum gradatim angustata ; lamina vulgo sub anthesin 6-9 cm. longa, 2-3 cm. lata, late oblanceolata vel elliptica, apice rotundata vel obtusa nunc apiculata, basi late cuneata, margine subregulariter denticulata, textura in sicco papyracea, supra viridis glabra, infra dense flavido-farinosa, costa latiuscula efarinosa, nervis farina haud occultis. Scapus 12-14 cm. longus, folia superans, plus minusve farinosus sub umbella dense, flores 5-8 gerens, bracteis circ. 1.5 cm. longis linearibus, pedicellis 2-3 cm. longis farina bene conspersis. Calyx circ. 7 mm. longus, cupularis, farina indutus, in lobos ovatos vel ovato-lanceolatos subacutos ad medium fissus. Corolla in sicco complanata fere 3 cm. longa, 3 cm. lata, late infundibularis, annulata, saturate purpurea, farina conspersa ; tubus 1.4 cm. longus, dimidio superiore sensim ampliatus ; lobi obovati integri vel breviter emarginati. Stamina in flore longistylis ad medium tubum inserta ; stylus ad fauces pertinens. Ovarium globosum.

"S.E. TIBET.—Lo La, Pachakshiri. Alt. 14,500 ft. Flowers darkest damson. Habitat—open rocky hillsides. 14th July 1936." Ludlow and Sherriff, No. 1910. Type in Herb. Brit. Mus.

P. Roylei, Balf. f. et W. W. Sm. in Notes, R.B.G. Edin. ix (1916), 198.

Nos. 1396, 1569, 1694.

Var. alba.

"SOUTHERN TIBET.—Bimbi La, Tsari. Alt. 11,500 ft. White, very faintly tinged purple on margins. Eye orange yellow, as in tube. A disagreeable smell. Very common in open glades in forest and above tree zone. White forms of this have been very rarely seen. 2nd June 1936." No. 1754.

P. strumosa Balf. f. et Cooper in Notes, R.B.G. Edin. ix (1916), 201.

"SOUTHERN TIBET.—Pö La, Nyam Jang Chu. Alt. 12,000 ft. Primrose yellow, orange yellow eye. Just coming out, as the snow melts. Leaves and flowers farinose. Open grassy meadows and under scrub jungle. 10th April 1936." No. 1300.

Primula tsariensis W. W. Sm. Spec. nov.

Species affinis *P. Griffithii* (Watt) Pax a qua habitu minore, foliis

margine crenatis, calycis lobis acutatis approximatis saepe imbricatis inter alia recedit.

Planta habitu *P. Griffithii* sed minor, rhizomate satis crasso, radicibus carnosus, basi sub anthesin squamis 2-3 cm. longis ovatis vel oblongis in sicco membranaceis rubidis arcte cincta. Folia tempore florendi saepe semi-evoluta, petiolo primum squamis occulto serius 2.5-3 cm. longo paulo alato glabro suffulta; lamina vulgo 2.5-4 cm. longa, 1.5-2 cm. lata, elliptica vel ovato-lanceolata, apice rotundata vel obtusa, basi subcordata vel rotundata vel nunc late cuneata, margine subregulariter crenata, in sicco tenuiter papyracea, supra atroviridis glabra, infra laete viridis primo intuitu efarinosa sed sub lente glandulis farinipotentibus bene munita, costa latiuscula, nervis nervulisque conspicuis. Scapus 9-12 cm. longus, folia superans, ad apicem farinosus, umbellam 2-5-floram gerens, bracteis ad 1.2 cm. longis basi lato linearibus pedicellos farinosos superantibus vel nunc subaequantibus. Calyx 8-10 mm. longus, subcylindricus, farina conspersus, atroviridis, in lobos forma irregulares vulgo lanceolatos plus minusve acutos nunc ovatos obtusos saepe approximatos atque etiam imbricatos ad medium fissus. Corolla circ. 2 cm. longa, ad limbum in sicco 2-2.5 cm. lata, late infundibularis, coeruleo-purpurea, extra obscure farina conspersa, intra sub annulo conspicuo dense farinosa; tubus late cylindricus, brevis, calycem paulo superans; lobi late obovati, alte emarginati. In flore brevistylo stamina supra medium tubum inserta, antheris vix ad annulum attingentibus; stylus dimidium calycis aequans. In flore longistylo stamina ad medium tubum pertinentia; stylus ad fauces haud attingit. Ovarium globosum. Fructus ei *P. Griffithii* subsimilis.

"SOUTHERN TIBET.—Migyitun, Tsari Chu. Alt. 12,500 ft. Rich blue purple, yellow eye. Grows on open hillsides on wet slopes. Usually seen in clumps with about 15-25 flowers, forming a most beautiful sight. 26th June 1936." Ludlow and Sherriff, No. 1711. Type in Herb. Brit. Mus. Also same locality. Alt. 11,500 ft. 24th June 1936. No. 1693.

"SOUTHERN TIBET.—Takar La, W. Tsari. Alt. 14,500 ft. Flower over. Calyx purplish red. On open grassy hillside. 15th August 1936." Ludlow and Sherriff, No. 2067. In fruit. Also No. 2081.

"Podzö Sumdo, Tsari Chu. Alt. 11,000 ft. Rich bright purple, golden yellow eye. No farina on plant or flower. Open hillside beside snow. 22nd June 1936." Ludlow and Sherriff, No. 1650.

"Tama La, Tsari. Alt. 15,000 ft. Corolla deepest velvety royal purple. Eye orange yellow. Calyx reddish brown, very common on open grassy hillside. 21st June 1936." Ludlow and Sherriff, No. 2191.

"Chickchar, Tsari. Alt. 14,000-15,500 ft. Corolla rich blue purple, yellow eye. A few of these Primulas are still in flower, others have thrown their seed. On open grassy hillside. 23rd August 1936." Ludlow and Sherriff, No. 2478. Also No. 2483.

"Yarap, valley west of Chickchar, Tsari. Alt. 14,000 ft. Blue

purple, orange yellow eye. No farina on leaves, stem or flowers. Abundant. Growing on a bare hillside beside snow and mixed up with 1614 (*P. vernicosa*). 20th June 1936." Ludlow and Sherriff, No. 1621. Also No. 1625. (Leaves half-developed.)

"Taktsang, Tsari. Alt. 14,000-15,000 ft. A very bright pink purple, much deeper in the centre and in the tube. Calyx dull red green; upper scape and pedicels the same. Covering the open hillside above the tree zone. 22nd June 1936." Ludlow and Sherriff, No. 2195. (Differs from the type in colour of corolla.)

"SOUTHERN TIBET.—Tse Gar. Alt. 13,000-14,000 ft. Flowers deep violet with orange eye. Scattered on alpine turf slopes, often under *Rhododendron* bushes. 7th July 1935." F. K. Ward, No. 11932. (Previously referred to *P. Griffithii*.)

The members of the Subsection *Roylei* share with other *Petiolaridis* great variability in the shape and size of the leaves, in the degree of farina, in the size and lobing of calyx, etc. The specimens collected by Captain Sherriff, and here given the name of *P. tsariensis*, present several distinctions from any specimens I have seen of *P. Griffithii* Pax and *P. Tanneri* King from Sikkim and Bhutan. They are all reasonably consistent with one another, and as a species come nearest to *P. Griffithii*. They are reported as being without farina but under a lens traces of meal are readily visible. The species differs from its ally in its normally smaller habit, in the crenation of its leaves, in the rounded leaf-apex, in the longer and narrower calyx-lobes which are approximate and even imbricate at times, and in the much shorter corolla-tube which is but little exerted from the calyx.

Var. **porrecta** W. W. Sm. Var. nov.

Varietas haec habitu multo robustiore, lamina ad 8 cm. longa, petiolo ad 10 cm., scapo ad 33 cm. elongato, inflorescentia multiflora a typo divergit.

"SOUTHERN TIBET.—Taktsang, Tsari. Alt. 13,000-14,000 ft. Corolla pale purple or violet purple, darker in the centre with pale lemon yellow eye and inside the tube. Calyx dull green, bracts green. Farina not seen on plant. Up to 15 flowers on one stem. Common here, where I have seen it for the first time, in thick *Abies* forest growing in thick moss. 22nd June 1936." Ludlow and Sherriff, No. 2196. Type in Herb. Brit. Mus.

In spite of the marked difference in size, there is no doubt that the var. *porrecta* is referable to *P. tsariensis*. Captain Sherriff informs me that the plant was found in particularly favourable conditions for growth and that he could not regard it as specifically distinct from the typical dwarf plant.

P. vernicosa Ward in Notes, R.B.G. Edin. ix (1916), 203.

"SOUTHERN TIBET.—Yarap, Chickchar Chu, Tsari. Alt. 14,000 ft.

Pure white. One specimen seen coloured pale lavender. Plants singly with two to four flowers. Open stony hillside, coming up as snow clears off, some even in the snow. No farina on plant or flower. 19th May 1936." No. 1614.

Var. *violacea* W. W. Sm. Var. nov.

A typo floribus violaceis, pedunculo fructifero multo minus evoluto (? semper) recedit.

" Migyitun, Tsari Chu, S. Tibet. Alt. 12,000 ft. Pale blue violet, eye white with a tinge of yellow. Collected near the Pang La, where all these Primulas are coloured and no white ones were seen. On open hillside. 30th May 1936." Ludlow and Sherriff, No. 1734. Type in Herb. Brit. Mus.

" Same locality and date. Alt. 13,000 ft. This Primula was all in fruit up the valley this specimen was taken. It seems to have a very short flowering season. On open hillside among rocks." Ludlow and Sherriff, No. 1742.

Primula vernicosa, collected in West China and Eastern Tibet by Ward, Forrest and others, is always reported as having white flowers. The above coloured variety is very similar in habit and in foliage to the type, has the same peculiar calyx, but in fruit (which, however, is young) lacks the marked elongation of the peduncle which is characteristic of the typical plant.

P. Whitei W. W. Sm. in Rec. Bot. Surv. India, iv (1911), 268.

" EASTERN BHUTAN.—Sakden. Alt. 10,000 ft. Delft blue, green eye with white ring outside the green. Growing in moss, mostly in shade. Very plentiful, usually in small clumps. 13th March 1936." No. 1215.

" SOUTHERN TIBET.—Lepo, Nyam Jang Chu. Alt. 11,000 ft. Delft blue, green yellow eye, with white outside the green. A little farina only on the stock leaves and on young leaves. Growing in patches up to a foot across, making a grand sight. Damp mossy ground in partial shade. 7th April 1936." No. 1291.

" Lung, Chayul Chu. Alt. 9,200 ft. Flowers over, only a few withered flowers collected. Corolla appears to be deep blue purple. A little farina on the stems of some specimens. Growing in wet moss, always beside a stream. 28th April 1936." No. 1379.

" Also at 9,000–12,000 ft. Delft blue. Collected at 12,000 ft., where the Primula was still in full bloom. 29th April 1936." No. 1388.

" Sanguti, Tsari Chu. Alt. 13,000 ft. Pale powder blue, white eye with a greenish yellow centre. A most lovely sight. Very common in masses under Juniper and Rhododendron forest. 19th May 1936." No. 1605.

Also in fruit at Bimbi La. 12th September 1936. No. 2582. And at Gamri Chu, Eastern Bhutan. 16th November 1936. No. 2864.

ROTUNDIFOLIA.

P. rotundifolia Wall. in Roxb. Fl. Ind. ii (1824), 18.

"SOUTHERN TIBET.—Kashong La, Chayul Chu. Alt. 14,000–15,000 ft. Corolla lilac. Eye pale lemon green. Under surface of leaves white with meal, as also calyx. Scape and pedicels slightly mealy. A beautiful scent. Growing only under overhanging rocks. Soil usually pretty damp, but sun and rain do not reach the flowers. 13th July 1936." No. 2349. Also in fruit at Chukar, Rong Chu. 20th November 1936. No. 2902.

P. sp. aff. Gambeliana Watt.

Specimens are all in fruit. Taktsang, Tsari. Alt. 13,500 ft. 13th September 1936. No. 2574. Bimbi La. No. 2580. Milakatong La, Shao-Tawang. No. 2829.

SIKKIMENSIS.

P. alpicola Stapf in Bot. Mag. (1929), t. 9276.

"SOUTHERN TIBET.—Natrampa, Chayul Chu. Alt. 10,000 ft. Pale lemon yellow, very fragrant. Farina on calyx and inside of corolla. Beside a waterfall, south face. Transition zone. 26th April 1936." No. 1348.

A dwarf form of the species.

"Migyitun, Tsari Chu. Alt. 11,000 ft. Pale lemon yellow. Very little farina on calyx, pedicels, and upper stem. None on leaves. Fragrant. On banks of stony streams. 24th May 1936." No. 1689.

"Bimbi La, Tsari. Lat. 13,500 ft. Pale yellow. Calyx pale yellowish brown. Bracts of open specimens and scape quite a bright brown-red. In open stony ground beside stream. 11th June 1936." No. 2120.

"Tomtsang, Tsari. Alt. 13,000 ft. Pale yellow. Bracts, pedicels, and calyx pale green. Petioles red. Scape red at base, turning to green. Fragrant. On grassy cliff ledges and open steep hillside. 23rd June 1936." No. 2199.

In fruit. Nos. 2583, 2676, 2686, 2688.

Var. alba W. W. Sm.

"S.E. TIBET.—Kyim Dong Dzong. Alt. 12,500 ft. Flowers white. Sweet-scented. Marshy ground on banks of streams. 13th June 1936." No. 1833.

Found at the same place and elevation as No. 1831, with reddish amber flowers, and as No. 1832 possibly referable to *P. vinosa* Stapf.

"Migyitun, Tsari. Alt. 10,000 ft. Corolla almost white, faintly yellowish cream. Only one seen this colour. On open wet meadows. 10th June 1936." No. 2106.

Var. *violacea* Stapf.

"SOUTHERN TIBET.—Migyitun, Tsari Chu. Alt. 11,500 ft. Corolla varying from pale powder purplish pink to a purplish claret, white mealy centre. Calyx green to mealy brown. Very fragrant. Farina on upper stem and calyx, none on leaves. Growing on banks of rocky streams. 24th May 1936." No. 1685.

"Podzö Sumdo, Tsari. Alt. 11,000–12,500 ft. Rich purple wine-red, yellowish meal in centre inside. Meal on scape, pedicels, and calyx. On open grassy meadows. 12th June 1936." No. 2128.

Var. ?

"S.E. TIBET.—Kyim Dong Dzong. Alt. 12,500 ft. Flowers reddish amber. Marshy ground on river banks. 18th June 1936." No. 1831.

P. Florindae Ward in Notes, R.B.G. Edin. xv (1926), 84.

"SOUTHERN TIBET.—Migyitun, Tsari. Alt. 9,500 ft. Corolla yellow, mealy yellow inside. A little farina on stem and calyx. Very fragrant. Scape to 2 ft. high. Growing in boggy grassy meadows in the open. 23rd May 1936." No. 1663. Probably the same in fruit. Nos. 2657, 2658, 2660, 2677.

P. Hopeana Balf. f. et Cooper in Trans. Bot. Soc. Edin. xxvii (1917), 236.

"SOUTHERN TIBET.—Takar La, W. Tsari. Alt. 14,000 ft. Corolla creamy white. Calyx dull dark green. On open marshy meadows. 15th August 1936." No. 2075.

"Chickchar, Tsari. Alt. 14,000–15,000 ft. Cream white, mealy in the centre. Calyx very dark dull green. Bracts dull reddish green. Very fragrant. On open, very steep, grassy hillside, among other Primulas. 13th June 1936." No. 2141. Also No. 2490. Also No. 1686 with corolla white but with the slightest tinge of lavender.

Primula ioessa W. W. Sm. Spec. nov.

E grege *P. sikkimensis* Hook. ; affinis *P. Hopeanae* Balf. f. et Cooper atque *P. vinosae* Stapf ; a priore floribus majoribus violaceis nec albis, corollae tubo e calyce longe exserta differt ; ab altera haud satis definita floribus violaceis nec purpureo-rubris inter alia signa minora divergit.

Quoad habitum plantae nanae *P. sikkimensis* subsimilis. Folia numerosa vulgo (petiolo incluso) 9–10 cm. longa, 1.5–2 cm. lata, oblanceolata, apice rotundata, basi in petiolum 2–3 cm. longum plus minusve alatum cuneatim angustata, margine serrato-denticulata, in sicco tenuiter papyracea, utrinque glabra efarinosa. Scapus 20–22 cm. altus, subrobustus, apice sparsim farinosus, umbellam 5–8-floram gerens, bracteis 1–1.5 cm. longis linearibus, pedicellis 3–6 cm. longis gracilibus farinosis. Calyx 6–7 mm. longus, cupularis, 5-costatus, nigrescens, glandulis farinipotentibus notatus, in lobos triangulares acutos vix ad medium fissus. Corolla in sicco complanata circ. 2.5 cm.

longa et lata, infundibularis, violacea; tubus e calyce longe exsertus, parte cylindrica calycem duplo superante, supra ampliatus; lobi late obcordati emarginati. In flore brevistylis stamina ad apicem partis tubi cylindricae inserta; stylus 2 mm. longus calyce multo brevior. In flore longistylis stamina a basi tubi 3 mm. inserta; stylus e parte tubi cylindrica paululo exsertus. Capsula ex reliquiis breviter cylindrica calycem subaequans.

"SOUTHERN TIBET.—Migyitun, Tsari. Alt. 12,500 ft. Corolla a beautiful shade of pinkish mauve, with a whitish mealy eye. Tube bright wine purple. Calyx velvety brown green. Scape and pedicels reddish green. Deliciously fragrant. On open rocky steep hillside. 27th August 1936." Ludlow and Sherriff, No. 2514. Type in Herb. Brit. Mus. Also the same in fruit. 22nd October 1936. No. 2794.

Equivalent or almost so are the following:—

"S.E. TIBET.—Singo Samba, Lo La Chu, near Molo. Alt. 12,500 ft. Flowers pale violet. No eye. Drooping with bent pedicels. Very attractive. Calyx darkest green, almost black. On rocks and fallen logs, growing amongst moss. 26th June 1936." Ludlow and Sherriff, No. 1868. Also in fruit. 13th October 1936. No. 2672. (Calyx larger, corolla smaller and less exserted.)

"SOUTHERN TIBET.—Tama La, Tsari. Corolla (open) violet, buds deep lilac. Tube deep lilac. Scape dull red. Calyx velvety black. Fragrant. A little farina on upper scape and inside corolla. Leaves willow green, young ones tinged purple. On shale scree—open hillsides. 20th June 1936." Ludlow and Sherriff, No. 2189. Also in fruit. 11th September 1936. No. 2571. (Same as No. 1868.)

"SOUTHERN TIBET.—Bimbi La, Tsari. Alt. 14,000 ft. Pale madder pink, inside almost white with meal. Very fragrant. Back of leaves slightly mealy, as are upper end of scape and calyx. In damp open grassy meadows. 7th June 1936." Ludlow and Sherriff, No. 1791. (Flowers not fully developed but near those of No. 1868.)

The species of the section *Sikkimensis* occurring in the Himalaya and in the western provinces of China do not appear to vary unduly in their characters. It seems to be quite otherwise with those found in Tibet. This has been shown very conclusively in the collections of Captain Kingdon Ward. I have had considerable difficulty in assessing the position of *P. ioessa*. Its foliage characters separate it readily from the polychrome *P. alpicola* Stapf and there can be no confusion with *P. florindae* Ward. It is not the robust *P. waltoni* Watt from Lhasa, nor is it the small-flowered *P. prionotes* Balf. f. et Watt. There remain *P. hopeana* Balf. f. et Cooper and *P. vinosa* Stapf. The typical *P. hopeana* can be described as a dwarf alpine white *P. sikkimensis* with small flowers. But size of flower in this section is a very variable factor, as is also the degree of exsertion of the corolla from the calyx. *P. vinosa* is unfortunately not fully characterised. It is founded on Ward No. 6094 and on Bot. Mag. tab. 9210, for the elucidation of which see tab.

9276. If the originals of Ward and the cultivated plant figured are the same, as they may well be, then in cultivation the decurrent leaves of the originals become non-decurrent, and the long-exserted tube becomes shortly exserted. But this is just what some of these Sikkimensis *Primulas* will do. Consequently, I am inclined to put these three—*P. Hopeana*, *P. vinosa*, and *P. ioessa*—as very closely allied and on the same grade. Their foliage characters are reasonably in unison and so is the type of inflorescence—allowing again some degree of variation, as one simply must in this section unless the units are to be unprofitably multiplied. We may well have here a parallel to *P. alpicola*, where yellow, white, and violet strains come true in cultivation though intermediates can be made by hybridisation. Further observations are needed in the field before the facts can be properly elucidated. It is also possible that plants of *P. ioessa* will be available in gardens from seeds collected in 1936. The problem is, however, more complicated than that of *P. alpicola* with its distinct foliage. Dwarf plants of *P. sikkimensis* approximate in everything except colour of flower to the trio mentioned. As Stapf very appositely pointed out under Bot. Mag. tab. 9276, morphologically these dwarfs form a very uniform type, although genetically they are distinct. As an alternative we may yet have to give *P. sikkimensis* the same licence as *P. alpicola* and permit it to be polychrome as it pleases.

I should add that Captain Sherriff brought back several coloured photographs of *P. ioessa*, and these, colour apart, favour the separation of the plant from the two allies indicated.

P. pudibunda W. W. Sm. in Rec. Bot. Surv. India, vi (1913), 38. Nos. 1578, 2030.

P. sikkimensis Hook. in Bot. Mag. (1851), t. 4597. Nos. 1582, 1714, 1758, 1966, 2065, 2077, 2119, 2241, 2585, 2685.

Var. **subpinnatifida** W. W. Sm. in Notes, R.B.G. Edin. xix (1936), 173. Nos. 2240, 2382, 2566, 2587.

P. vinosa Stapf in Bot. Mag. (1928), t. 9210 and (1929), sub-t. 9276, vel aff.

"S.E. TIBET.—Kyim Dong Dzong. Alt. 12,500 ft. Flowers bright reddish purple. Marshy ground on banks of streams. 18th June 1936." No. 1832.

SOLDANELLOIDES.

P. Cawdoriana Ward in Notes, R.B.G. Edin. xv (1926), 87.

"SOUTHERN TIBET.—Migyitun, Tsari Chu. Alt. 11,500 ft. Flower not seen. Growing on rock, damp faces. 26th May 1936." No. 1708.

"S.E. TIBET.—Pö La, Kyim Dzong. Alt. 14,000 ft. Flower violet

blue, white at base. On rocks and also on grassy hill slopes. 19th July 1936." No. 1928.

"SOUTHERN TIBET.—Takar La, W. Tsari. 15th August 1936." No. 2072.

"Bimbi La, Tsari. Alt. 13,500 ft. Basal half of corolla white, changing to a fine bright shade of blue violet. The flower is barely out yet. Large calyx deep dull purple. Farina not seen on leaves but is evident on flowers and calyx. Always growing on cliff ledges, usually where there is a little grass and the soil is damp but not wet. 11th June 1936." No. 2113. Also Chickchar. 13th June 1936. No. 2154. Also Mipa. Alt. 16,000 ft. 18th June 1936. No. 2173. Also Nos. 2224, 2305, 2681, 2795.

Previously collected only by Kingdon Ward.

P. sp. aff. *Cawdoriana* Ward.

"SOUTHERN TIBET.—Migyitun, Tsari. Alt. 13,500 ft. Flower not yet fully open but one or two which are half open are heavily covered with meal and are a deep blue violet. Large green stigma. No farina seen on leaves but on upper scape, calyx, and flower. Calyx green to purplish green. On mossy rocks above *Abies* zone. 11th June 1936." No. 2118. Also in fruit. Nos. 2499, 2796.

These numbers are not typical *P. Cawdoriana* and may represent an allied species. The material is not adequate for determination.

***P. eburnea* Balf. f. et Cooper in Notes, R.B.G. Edin. ix (1916), 166.**

"SOUTHERN TIBET.—Chykar, Rong Chu. Alt. 14,000 ft. Under rocks on steep south face. In fruit. 20th November 1936." No. 2899.

***P. flabellifera* W. W. Sm. in Notes, R.B.G. Edin. xix (1936), 169.**

"SOUTHERN TIBET.—Migyitun, Tsari Chu. Alt. 13,000 ft. Rich very deep blue violet. Calyx usually very deep purple green. Growing in little tufts in moss and soil on damp steep cliffs. 30th May 1936." No. 1737.

"Tama La. Alt. 15,000–16,000 ft. Corolla deep blue violet. Eye more purple. Tube deep velvety wine red. Calyx velvety black. No farina visible. In moss on cliff faces on damp soil. Common. 20th June 1936." No. 2184.

Found only once before—by Kingdon Ward.

OMPHALOGRAMMA.

***Omphalogramma brachysiphon* W. W. Sm. Spec. nov.**

Inter species generis hujus descriptas corollae tubo brevissimo facile distinguenda.

Inter congeneres planta modesta 8–12 cm. alta, basi squamis circumdata, rhizomate crasso, radicibus carnosis. Folia sub anthesin semi-

evoluta, inferiora subsquamiformia et in squamas transeuntia, superiora petiolo lato membranaceo praedita; lamina (immutata) 2-2.5 cm. longa, 8-10 mm. lata, oblonga vel lanceolata vel oblanceolata, apice acutata, basi in petiolum angustata nec cordata, carnosula, integra, glabra, punctulata, costa subconspicua, nervatione obscura. Scapus ubique pilosus, sub flore dense rufo-pilosus. Calyx 4-5 mm. longus fere ad imum in lobos anguste triangulares acutos fissus, sparsim pilosus, ex collectore kermesino-ruber. Corollae in sicco circ. 2 cm. longae et latae campanulatae saturate violaceae tubus tantum 8 mm. longus, late cylindricus citoque insuper ampliatus, extra et ad margines loborum sparsim pilosulus, lobi circ. 12 mm. longi, 5 mm. lati, plus minusve elliptici, apice ambitu rotundati, 5-7-eroso-dentati. Stamina 6 ad medium tubum inserta, filamentis 1 mm. longis, antheris 3 mm. longis ad fauces attingentibus. Ovarium subglobosum, circ. 4 mm. diametro, stylo 4 mm. longo glabro stamina subaequante. Fructus deest.

"S.E. TIBET.—Singo Samba, La Chu Valley, near Molo. Alt. 13,500-14,000 ft. Flowers deep violet, tube and eye dark purplish black. Calyx and flower stalk crimson red. Hab. in open damp soil. 29th June 1936." Ludlow and Sherriff, No. 1887. Type in Herb. Brit. Mus.

One of the smaller species of the genus and noteworthy for the short corolla-tube.

Omphalogramma minus Hand.-Mzt. in Anz. Akad. Wiss. Wien, lix (1922), 248.

"S.E. TIBET.—Lo La, Singo Sambo, Lo Chu Valley, near Molo. Alt. 13,500 ft. Flowers imperial purple with greenish yellow eye. Tube darker purple, almost black. Calyx reddish green. Apex of flower-stalk with numerous red hairs. In dry earthy situations in the open. 1st July 1936." No. 1891. Also in fruit. 12th December. Nos. 2668, 2669.