

Some new Asiatic Primulaceae.

BY

WILLIAM WRIGHT SMITH AND GEORGE FORREST.

With Plate CCXXIII.

In naming the species of *Primula* and *Omphalogramma* collected by George Forrest during his explorations on the Burmese-Yunnan frontier during the years 1924-5 several new members of these genera have been found and are here described. Further material was secured of certain imperfectly known but described species, and of these a supplementary account is given. The species referred to are as follows:—

- Primula Agleniana*, Balf. f. et Forrest (Nivalis), p. 247.
- P. candidissima*, W. W. Sm. et Forrest (Petiolaris), p. 250.
- P. euosma*, Craib, var. *purpurea*, W. W. Sm. (Petiolaris), p. 250.
- P. hylobia*, W. W. Sm. (Petiolaris), p. 251.
- P. Klaveriana*, Forrest (Petiolaris), p. 252.
- P. pudibunda*, W. W. Sm. (Sikkimensis), p. 253.
- P. serratifolia*, Franch. var. *roseo-tincta*, Forrest (Candelabra), p. 254.
- P. serratifolia*, Franch. var. *unicolor*, Forrest (Candelabra), p. 255.
- P. sonchifolia*, Franch. var. *atrocoerulea*, Forrest (Petiolaris), p. 255.
- Omphalogramma Coxii*, Balf. f., p. 257.
- O. Farreri*, Balf. f., p. 255.

Primula Agleniana, Balf. f. et Forrest in Notes R. B. G. Edin. xiii (1920) 3.

A very brief description was given to this magnificent species by the authors who intended to publish a supplementary account in a later publication. This, however, Sir Isaac Balfour did not live to complete. Since 1920 considerable additional material has been collected by Forrest and by Farrer. The accounts given by these collectors of its appearance in the field makes it a matter of great regret that so far this *Primula* has not been introduced into cultivation. It belongs to the large group of the Nivalids, the majority of which are difficult subjects for the cultivator. Seeds have been secured on several occasions but no plant has been brought to flowering stage.* Another *Primula* which has been a rival to this in the estimation of those who

* This is no longer true. *P. Agleniana* has flowered well in Cornwall in the summer of 1927, and there is a prospect of establishing it in cultivation. I have seen but one plant of *P. sonchifolia* in flower in cultivation. It flowered but weakly and I doubt if there is now a living plant of this species in any garden. W.W.S.

have seen it in nature is *P. sonchifolia*, and it has proved similarly difficult.

Better developed specimens than the type (Forrest No. 18875) are now available, and also fruit. These make possible the following notes which include details regarding distribution.

There is an abundance of red fleshy scales at flowering time, giving a bulbous appearance to the base of the plant. *P. Agleniana* recalls in its general habit and robust growth *P. muliensis*, Hand.-Mzt. (syn. *P. Coryana*, Balf. f. et Forrest), from which it is readily distinguished by its coarsely dentate, almost lacerate leaves. These in robust specimens may attain 60 cm. in length. The lamina gradually narrows into a winged petiole, not sharply marked off, which may be shorter than the lamina, equal to it or occasionally somewhat longer. The margin is much more cut than is usual for a Nivalid. The scape reaches 120 cm. in height but is usually 60-80 cm.; the bracts are linear with a broadish base; the pedicels more or less pendent in flower are erect and somewhat rigid in fruit and may then reach 6 cm. in length; the number of flowers is usually 3-4 but may be 6-7. The calyx is broadly tubular, 12-15 mm. long, 8 mm. broad at apex in the dried state, with lobes 5-6 mm. long, 2-3 mm. broad, ovate-oblong to oblong, rounded or very blunt at the apex, traversed by a pattern of purplish veins. The broad corolla-tube equals the calyx more or less, sometimes slightly exserted or included; the expanded limb sometimes exceeds 4 cm. in diameter; the rounded lobes are 1.5 cm. broad and reach about half-way to the mouth of the tube. There is a fleshy annulus. In the short-styled flower the stamens are inserted 3 mm. below the mouth of the tube and the non-apiculate anthers 3 mm. long are very slightly exserted; in the long-styled flower the stamens are inserted at the middle of the tube. The ovary is ovoid about 3 mm. in length; the style of the short-styled flower is 2 mm. long, in the long-styled 9 mm.; the stigma is large and capitate. The fruit is that of the Nivalid section. It measures some 12 mm. in length and almost 1 cm. broad at time of dehiscence, equalling or slightly exceeding the calyx lobes, splitting into five valves. The seeds are numerous, brownish-black, somewhat glistening, with a sponge-like papillose testa and about 1 mm. in diameter.

The distribution is also extended as it occurs in Yunnan and Burma as well as in Tibet.

"S.E. TIBET:—Tsarong province; Salween-Kiu-chiang divide. Lat. 28° 40' N. Plant of 9-12 inches. Flowers creamy-yellow, orange at base, fragrant. On moist stony meadows. July 1919." G. Forrest. No. 18875. Type.

"N.W. YUNNAN:—Moist open grassy situations in scrub on Mekong-Salween divide. Alt. 11-13,000 ft. Lat. 27° 28' N. Erect plant of

9-18 inches. Flowers pale creamy-yellow, pendulous fragrant corolla, thick fleshy calyx, pedicels and stem covered with a whitish-yellow meal, leaves not so, doubly serrated, lanceolate, obtuse, from 4-10 inches long by $\frac{3}{4}$ -1 $\frac{1}{4}$ broad. July-August 1905." G. Forrest. No. 479.

"N.W. YUNNAN :—Mekong-Salween divide. Lat. 27° 35' N. Long. 98° 55' E. Alt. 12-13,000 ft. Plant of 10-14 inches. Flowers fragrant, soft primrose-yellow, *not* drying green. Open moist situations on lush meadows. June 1921." G. Forrest. No. 19824.

"S.E. TIBET :—Salween-Kiu-chiang divide. Lat. 28° 24' N. Long. 98° 24' E. Alt. 14-15,000 ft. Plant of 12-16 inches. Flowers fragrant, pale primrose-yellow, *not* drying green. On open moist meadows and shady pasture by streams. July 1921." G. Forrest. No. 20077.

The same in fruit. Sept. 1921. No. 20337; Oct. 1922. Nos. 22840, 22849; July 1924. (Flower) No. 25566; Oct. 1924. (Fruit) No. 25804.

"N. BURMA :—Chawchi and Shing Hong Passes. Alt. 13,000 ft. I know no rival to this in the race except *P. sonchifolia* in a solidier style. Flowers externally pure ivory white, occasionally flushed very faintly with rose antique or with a touch of rose or apricot on the tube as it emerges from the maroon-crimson calyx lobes; internally with the dimmest suffusion of yellow and with the musty scent of *P. optata*. This awe-inspiring beautiful species occurs abundantly in some of the highest glades, in enormous red masses of 'pseudo-bulbs,' coming up like clumps of any Rheum and in style absolutely suggesting the *Sonchifolia* group, till the flower transfers it to *Sikkimensis*. July 9th, 1920." R. Farrer. No. 1712.

"N. BURMA :—Moku-ji Pass. Alt. 12,000 ft. A second series of No. 1712, at home and in full character all over the high meadowy slopes on the Chinese side of the pass. It hardly ventures at all on to the western wall of the range and never in abundance or typical development. At its best the crimson stock is fatter than even in *P. Farreriana* and the double flower-head copiously furnished. The leaf too has a thin white veneer of farina on the reverse. The upper part of the scape also has powder, extending about an inch below the powdered inflorescence and there abruptly ceasing. But as the scape develops this powdered portion elongates with it and the line of cleavage fades. The powder itself seems fragrant, as plants in bud are scented. Aug. 4th, 1920." R. Farrer. No. 1776.

A white variety was described in Notes R. B. G. Edin. xiv (1923) 32. The species was named in honour of Sir Francis Aglen, K.B.E., Inspector-General of the Chinese Maritime Customs, Peking.

Primula candidissima, W. W. Sm. et G. Forrest, sp. nov.

Species affinis *P. euosmae*, Craib sectionis *Petiolaris*; foliis longiuscule petiolatis, bracteis latioribus albidis, calycis glabrioris lobis brevibus erectis eciliolatis, floribus albis inter alia ab illa specie distinguitur.

Herba humilis, scaposa, rhizomate satis elongato, radicibus fibrosis numerosis; squamae basales ad anthesin desunt. Folia sublaxa, ambitu elliptica vel anguste obovata, apice rotundata, basi in petiolum subaequilongum anguste alatum haud discretum attenuata; lamina ad 6 cm. longa, ad 3 cm. lata, in sicco tenuiter membranacea, viridis subtus pallidior, utraque pagina glandulis minutis farini-potentibus sparsim munita, nervis lateralibus utrinque 6-8, margine valde irregulariter dentata, nunc fere lobatula; petiolus ad 4 cm. longus. Pedunculi 1-2, plerumque 8-10 cm. alti, 3-7-flori, minute puberuli; bractee lanceolatae, acuminatae, 4-6 cm. longae, minute ciliolatae, albido-virides; pedicelli circ. 1 cm. longi pilis minutis farini-potentibus induti. Calyx pallido-viridis, campanulatus, subglaber, 6-7 mm. longus, lobis subtriangularibus, subobtusis vel saltem haud acuminatis, erectis glabris vel fere glabris circ. 2 mm. longis. Corollae glabrae albae floris longistyli tubus annulatus, circ. 1 cm. longus, limbo in sicco 1.5-1.7 cm. lato; lobi 8-9 mm. longi, 6-7 mm. lati, late obovati, alte bilobulati, lobulis integris vel obscure denticulatis. Antherae 2 mm. longae, brevissime apiculatae, calycem superantes; filamenta brevissima ad medium tubum inserta. Ovarium circ. 1.5 mm. altum, stylo 7 mm. longo vix ad os corollinum pertinente. Fructus deest.

"WEST CHINA:—Mid West Yunnan, on the ranges north of Yungchang-fu. Lat. 25° 20' N. Long. 99° 20' E. Alt. 9-10,000 ft. Plant of 3-7 inches. Flowers fragrant, pure white. On banks in damp shady thickets. April 1924." G. Forrest. No. 25466.

The nearest ally of *P. candidissima* would appear to be *P. euosma*, Craib. It differs from that species in the markedly petiolate leaves of thinner texture and very irregularly dentate, in the broader whitish-green bracts, in the subglabrous calyx with very short erect non-acuminate and non-patent lobes and in the white flowers. There is a white variety of *P. euosma* but except in its colour it is no nearer *P. candidissima* than the typical *P. euosma*. The habitat of the new species is 70 miles eastwards from the nearest locality for *P. euosma* and on a different divide.

Primula euosma, Craib var. **puralba**, W. W. Sm., var. nov.

A typo floribus albis, corollae lobis bene crosso-denticulatis variat.

"N.E. UPPER BURMA:—On the western flank of the N'Maikha-Salween divide. Lat. 26° 20' N. Long. 98° 48' E. Alt. 11,000 ft. Plant of 2-4 inches. Flowers fragrant, pure white. On moist pasture by streams and in willow thickets. April 1925." G. Forrest. No. 26519.

The original specimen of typical *P. euosma* from the Shweli-Salween divide has the flowers of a soft purplish-rose with eye greenish yellow. In subsequent collections it may have deep-blue flowers. Farrer (No. 923 from the Chimili region) reports its flowers as scentless, of soft clear water-blue with a paler margin, not infrequently varying to pure white.

Primula hylobia, W. W. Sm. Sp. nov.

Species sectionis *Petiolaris* ex affinitate *P. Davidi*, Franch. ; planta valde distincta in grege *Davidi*, in vicinatem *P. leptophyllae*, Craib et *P. fagosa*, Craib ponenda ; folia ut in *P. fagosa* fere epetiolata, textura submembranacea in sicco sed multo crassiora quam ea *P. leptophyllae*.

Planta circ. 24 cm. alta, rhizomate crasso lignoso radices numerosas emittens ; squamae basales plus minusve oblongae, 1.5–2.5 cm. longae, in sicco membranaceae, stramineae, pilis minutis farini-potentibus conspersae. Folia anguste obovata, apice rotundata, basi cuneata, plerumque 14–18 cm. longa, 6–7 cm. lata, in sicco submembranacea, supra pilis minutis farini-potentibus conspersa, pilis septatis deficientibus, subtus pallidiora, pilis farini-potentibus notata, ad costam nervosque pilis longioribus septatis bene munita, costa supra straminea, nervis lateralibus utrinque vulgo 12–16, supra infraque aequaliter subconspicuis, nervulis rete subobscuro formantibus, margine irregulariter crenata apice excepto, in petiolum alatum vix discretum nunc fere nullum nunc ad 2.5 cm. longum sensim contracta, parte alata saepe taraxacoideo-dentata. Pedunculi solitarii folia paulo excedentes, umbellam simplicem 6–11-floram gerentes, infra glabri, supra sub umbella pilis farini-potentibus muniti ; bracteae subvirides, e basi lata lineari-lanceolatae, acuminatae, subrigidae, circ. 5 mm. longae ; pedicelli 2–2.5 cm. longi, erecti, rigidi, pilis capitatis farini-potentibus dense praediti, ut calyx totus. Calyx 7–8 mm. longus, 5 mm. latus, cupularis, fere ad medium lobatus, lobis circ. 3 mm. longis triangularibus acuminatis. Corollae coeruleae floris longistylis tubus circ. 1 cm. longus, in sicco albidus, lobi 6–7 mm. longi et lati, anguste obcordati, apice retusi. Stamina ad medium tubum posita. Ovarium submaturum globosum circ. 4 mm. diametro ; stylus ad os corollinum pertinens, stigmate capitato ; semina fusca angulata foveolata.

WEST CHINA :—Yunnan. "Ista species floribus coerulei coloris, lecta ex silvis Pien-oua (Yun-pe) ; die 23 Aprilis, 1920." Simeon Ten. No. 387.

This is a very distinct species of the group *Davidi* in the series *Petiolaris*. There are probably many species of this series still to be collected in Yunnan for as they flower very early in the year and high

in the mountains they are not often secured by collectors in a state fit for identification. The present specimens are just passing into fruit.

Primula Klaveriana, Forrest. Sp. nov.

Species sectionis *Petiolaris* et affinis *P. leptophyllae*, Craib a qua foliis rigidioribus vix membranaceis longioribus, petiolo multo breviorae saepe vix distinguendo, nervatione multo magis conspicua removitur.

Rhizoma crassum lignosum radices crassas fibrosas numerosas emittens; squamae basales interdum deciduae oblongae membranaceae circ. 1 cm. longae. Folia obovata vel oblongo-obovata, apice rotundata, saepe late sed haud alte retusa, basi cuneatim attenuata, usque ad 18 cm. longa, ad 9 cm. lata, chartacea vel membranaceo-chartacea, sicco supra fusco-viridia, infra pallide viridia, matura pagina superiore pilis minutis farini-potentibus ad basim costae parcissime praedita, infra ad costam pilis longioribus transverse septatis dense instructa, aliter pilis brevibus farini-potentibus conspersa, nervis lateralibus utrinque 12-16 patulis vel subpatulis rectis in hydathodos recurvos excurrentibus supra conspicuis (nervulis transversis inter se parallelibus pagina utraque conspicuis), margine saepe crenulata, subsessilia vel petiolo alato ad 5 cm. longo suffulta. Pedunculi plerumque solitarii, circ. 11 cm. alti, infructescentes ad 20 cm., saepissime foliis subaequales, pilosi, 2-3-flori; bracteae circ. 6 mm. longae, puberulae, ad basim latae, apice acutae, margine saepe irregulariter pauci-dentatae; pedicelli sat robusti circ. 1 cm. longi, pilosi. Calyx pallido-viridis, extra puberulus, 1-1.2 cm. longus, ad medium lobatus, lobis basi 2 mm. latis apice acutis 3-5-nerviis. Corollae coeruleae in sicco 2.2 cm. longae glabrae tubus basi albidus 1 cm. superans, limbus in sicco explanatus circ. 2.2 cm. latus, lobi obovati integri. Stamina in flore longistylis infra os corollinum circ. 3 mm. inserta; filamenta antheris paulo breviora. Stylus paulo exsertus. Capsula globosa calyce maturo omnino inclusa.

"N.E. UPPER BURMA:—On hills west of Tzi-tzo-ti. Lat. 25° 58' N. Long. 98° 29' E. Alt. 8,000 ft. Plant of six inches. Flowers blue, fragrant. On the margins of shady thickets. April 1925." G. Forrest. No. 26534.

"WEST CHINA:—Shweli-Salween divide, Yunnan. Lat. 25° 40' N. Alt. 11,000 ft. Plant of 6-8 inches. In fruit. On shady moist rocks in ravines. May 1919." G. Forrest. No. 18056.

"Mekong-Salween divide, Yunnan. Lat. 26° 30' N. Alt. 10,000 ft. Plant of 9-13 inches. In fruit. Open stony slopes and on the margins of scrub in side valleys. July 1919." G. Forrest. No. 18191.

The following in fruit with very much larger leaves and with the remains of 5-6 flowers in the umbel is probably the same:—

"N.E. UPPER BURMA:—On the western flank of the N'Maikha-Salween divide. Lat. $26^{\circ} 20'$ N. Long. $98^{\circ} 48'$ E. Alt. 11,000 ft. Plant of 12 inches. In fruit. In shady thickets by streams. May 1925." G. Forrest. No. 26590.

This species undoubtedly belongs to the Davidi group of the Petiolaris section but has no very close ally. It comes intermediate between *P. leptophylla*, Craib on the one hand and *P. coerulea*, Forrest and its allies on the other. See Key to the group in Notes R. B. G. Edin. xi (1919) 179. There is unfortunately only one flower available which has not been dissected. The floral details in consequence are not given in full.

Primula pudibunda, W. W. Smith in Rec. Bot. Surv. Ind. vi (1913) 38.

P. sikkimensis, Hook. var. *cinerea*, Watt MSS. in Herb. Kew et Herb. Edin.

"N.W. YUNNAN:—Mekong-Yangtze divide, east of A-Wa. Lat. $27^{\circ} 35'$ N. Long. $99^{\circ} 18'$ E. Alt. 13,000 ft. Plant of 9-12 inches, flowers soft yellow. In open moist pasture by streams. July 1924." G. Forrest. No. 25547.

"WEST SZECHUAN:—Near Tachienlu." Pratt. No. 253.

The typical *P. sikkimensis*, Hook. appears to extend throughout Sikkim and Bhutan into the alpine areas of Yunnan and Szechuan. At any rate specimens from Bhutan and from Yunnan are indistinguishable from the Sikkim plant. But drier and more alpine situations in these areas have yielded varieties or subspecies which differ in some degree from the typical plant. Thus *P. pudibunda* in Sikkim and *P. pseudo-sikkimensis*, Forrest, in Yunnan would be examples, the first a more alpine plant with slender leaves and much smaller corolla, the second a dwarf but vigorous representative from the limestone of the Lichiang range. But typical *P. sikkimensis* does not appear to penetrate into the central area—Tibet—where it is replaced by allied species, generally with well-defined petioles and cordate base to the lamina as in *P. microdonta*, Franch., *P. Florindae*, Ward, and *P. Waltoni*, Watt, which last has purplish flowers. But in alpine states of the yellow Tibetan representatives, the well-marked differences in leaf become obscured and the resulting forms approach closely to *P. pudibunda*. See also Notes R. B. G. Edin. xv (1926) 86-87.

Primula serratifolia, Franch.

This species was described in 1885 by Franchet in Bull. Soc. Bot. France xxxii, p. 267, where the corolla is stated to be yellow—*corolla flava*—and in comparing it on the same page with *P. obtusifolia* he confirms his statement by adding "et les fleurs sont jaunes." Later in Bull. Soc. Bot. France xxxiii (1886) p. 68, in discussing

P. serratifolia and its allies he places it along with *P. japonica* and says that these two have the flowers purplish or violet. This appears to be an error on Franchet's part. But Pax in *Pflanzenreich* (Primulaceae) p. 126 takes Franchet's last statement as a correction of the original description and re-iterates the affinity with *P. japonica*. When Forrest found the plant again on the Tali Range in 1905 he described it as *P. biserrata* in Notes R. B. G. Edin. iv (1908) p. 230 as his plant obviously did not agree with the description given of *P. serratifolia* in Pax's Monograph. There is no doubt whatever that the type plant of *P. serratifolia* (Delavay No. 111) is the same species as that described under *P. biserrata* which came from the same locality. The plant has since 1905 been collected on many occasions and in areas far removed from the original locality. It is found on the Lichiang Range in abundance; on the Mekong-Salween divide and on ranges to the west of that divide in Lat. 28° N. it is also common; also much further south on the Burma frontier in Lat. 26° N. the typical plant is to be seen.

In the original description of the species one striking character seems to have been overlooked, possibly not noticed by Delavay or his collectors and only slightly in evidence when the flowers are dried. The flowers have two colours, as each petal has a distinct bar of deep orange-yellow running from the mouth of the tube to the tip of the lobe, a feature commented on in all of Forrest's field notes on the typical plant as collected by him. It is a constant feature in the plants now in cultivation. It is interesting to note that in photographs this orange bar comes out black, while the pale yellow of the rest of the corolla appears of a very light tint. See Plate No. CCXXIII.

The species is, however, not consistent in colouring throughout its area, but deviations are rare—only two variations being known, both of which occur on the ranges of the Burma frontier in Lat. 26° 40' N. In one variation the corolla is of a pale soft yellow without the orange bar; in the other the ground colour is pale yellow without bar and heavily suffused purplish-rose so markedly in bud that the flowers appear to be purple. In full bloom the tincturing is confined to the upper half of the limb of the corolla.

var. *roseo-tincta*, Forrest.

"N.E. UPPER BURMA:—On the western flank of N'Maikha-Salween divide, north of the Chimi-li. Lat. 26° 35' N. Long. 98° 48' E. Alt. 11-12,000 ft. Plant of 9-18 inches. Flowers pale yellow, more or less flushed purple-rose, especially on margins, fragrant. On open stony slopes and on ledges of cliffs. July 1925." G. Forrest. No. 821.

26In fruit. Oct. 1925. G. Forrest. No. 27298.

var. **unicolor**, Forrest.

"N.E. UPPER BURMA:—Western flank of the N'Maikha-Salween divide, north of the Chimi-li. Lat. $26^{\circ} 40'$ N. Long. $98^{\circ} 48'$ E. Alt. 12,000 ft. Plant of 9-16 inches. Flowers fragrant, pure pale yellow. On moist stony slopes and ledges of cliffs. June 1925." G. Forrest. No. 268II.

In fruit. Oct. 1925. G. Forrest. No. 273II.

Primula sonchifolia, Franch. var. **atrocoerulea**, Forrest, var. nov.

Planta praestans floribus pulchre atrocoeruleis conspicua.

"N.W. YUNNAN:—Salween-Kiu-Chiang divide. Lat. 27° N. Long. $98^{\circ} 35'$ E. Alt. 12-13,000 ft. Plant of 5-8 inches. Flowers fragrant, intense indigo-blue. Moist shady situations on meadows in the shelter of scrub. May-June 1924." G. Forrest. No. 25652.

In fruit, same locality and altitude. Oct. 1924. G. Forrest. No. 25810.

Omphalogramma Farreri, Balf. f. in Notes R.B.G. Edin. xiii (1920) 23.

We append the original notes of Farrer on the two numbers quoted in the original description:—

"N.E. BURMA:—Hpawshi Bum. Alt. 12,300 ft. In the light dwarf high alpine scrub. Foliage even more violoid than in *O. Viola-grandis*. The original diagnosis [i.e., of *Delavayi* with which Farrer identified it] does not do justice to this feature, though I cannot otherwise separate the plant from *O. Delavayi* as I should like. June 24th 1919." R. Farrer. No. 1053.

"Hpimaw and Chimili Alps. Alt. 12,600-12,800 ft. Among high-alpine brushwood and even in higher alpine hayfields and forming wonderful masses in alpine marshes and rill-sides. Flowers dark purple. Leaves violoid. (Cf. No. 1187, a very ugly and quite distinct twin.) June 24th 1919." R. Farrer. No. 1169.

Further material from the area is available. This serves to lessen the gap between the Burma plant and typical *O. Delavayi*. The most striking feature in the original types are the deeply cordate leaves to which Farrer has drawn particular attention. The plant is in cultivation in Edinburgh and this character is very noticeable. The fairly ample specimens of *O. Delavayi* in the Edinburgh herbarium do not show so decidedly cordate-reniform leaves. But the more recently collected specimens do not always emphasize this foliar distinction. Forrest in his early expeditions collected typical plants of *O. Delavayi* in the Tali Range and no other locality is known for the species than that region. He has in 1924-5 collected several gatherings of *O. Farreri* from the Burmese-Yunnan frontier where Farrer got the original plants. Having thus collected both he gives it as his opinion that the two, though closely related, are yet distinct. Some of the differences

may be due to climatic conditions as the Tali Range is drier and colder than the frontier range. The following points may be of service in distinguishing the two:—

- (1) The sheathing basal scales are much more in evidence in *O. Delavayi*, as noted also by Farrer.
- (2) The flowers of *O. Delavayi* are most often precocious; it is only seldom that the young leaves appear with the flower; in *O. Farreri* the leaves are generally coetaneous.
- (3) The leaves of *O. Farreri* are usually orbicular, often broader than long, with a very pronounced cordate base. As Farrer says, the appearance is violoid.
- (4) The incisions in the corolla lobes of *O. Delavayi* are usually more regular.

Geographically they are separated by 150 miles of longitude and by two large intervening ranges—the Salween-Mekong divide and the Mekong-Tali divide. This intermediate area has been partially explored without yielding any evidence of either plant.

The following are all referable to *O. Farreri*:—

"N.E. BURMA:—Valley of the Chawng-maw-hka. Lat. $26^{\circ} 10'$ N. Long. $98^{\circ} 30'$ E. Alt. 10–12,000 ft. Flowers deep rich violet. Growing in damp moss, rooted in rich black soil on steep slopes covered with dwarf bamboo, between shale cliffs. Also on bamboo shaded grassy slopes or amongst dwarf Rhododendrons in the open, beneath the Imaw Bum ridge, E. flank, at 12,000 ft. 6th June 1919. Seeds ripe Aug.–Sept." F. K. Ward. No. 3186.

"N.E. UPPER BURMA:—On the western flank of the Chimi-li, N'Maikha-Salween divide. Lat. $26^{\circ} 23'$ N. Long. $98^{\circ} 48'$ E. Alt. 12,000 ft. Plant of 3–10 inches. Flowers deep ruddy purple, tube-base yellowish. On open moist stony alpine meadows, June 1924." G. Forrest. No. 24651.

"N.E. UPPER BURMA:—On the western flank of the N'Maikha-Salween divide. Lat. $26^{\circ} 24'$ N. Long. $98^{\circ} 48'$ E. Alt. 13,000 ft. Plant of 4–6 inches. Flowers deep rose-purple, tube yellowish. On peaty stony meadows and amongst dwarf alpine scrub. June 1925." G. Forrest. No. 26860.

"N.E. UPPER BURMA:—On the western flank of the N'Maikha-Salween divide. Lat. $26^{\circ} 20'$ N. Long. $98^{\circ} 48'$ E. Alt. 13,000 ft. Plant of 12–14 inches. In immature fruit. On open alpine meadows and amongst dwarf scrub. July 1925." G. Forrest. No. 27014.

"N.E. UPPER BURMA:—Duplicate of No. 26860 in fruit. Oct. 1925." G. Forrest. No. 27280.

"N.E. UPPER BURMA:—Duplicate of No. 27014 in fruit. Oct. 1925." G. Forrest. No. 27294.

Omphalogramma Coxii, Balf. f. in Notes R.B.G. Edin. xiii (1920) 23.

This species was described from material collected by Farrer and Cox under No. 1187 in August 1919. The original note on the plant written by Farrer on his field-ticket runs thus:—

"*Omphalogramma* sp. I believe this to be a quite distinct species which has, by confusion, brought a bad reputation on the beautiful F. 1053* (*O. Delavayi*—though by no means can I make out on it a scape 'squamis fuscis . . . involutus'). The two species have, however, no very obvious distinction (except in flower). But F. 1187 always has the leaves longer than broad as in the type of *Viola hirta*, while those of F. 1053 are always rotundate, as broad or broader than their length and remarkably like those of type *Viola odorata*. Apart from floral differences F. 1187 blooms a full month later than F. 1053, which is a foot high in pod, while its successor is emitting its ugly vinous-magenta little flowers, huddled in their scale leaves. F. 1053 ranges in marshes and copses and open alps from 11,500–12,800 ft., while F. 1187 is constant to undergrowth and marsh and woodland, at 11,500 ft. Chimili Alps. August 3rd 1919. Field No. 1187."

The material under this No. 1187 is very scanty and the description given in the first diagnosis is of the shortest. Further specimens were collected in the following year by Farrer, and in 1924–5 several gatherings were made by Forrest. It is therefore now possible to make out more clearly the character and position of *O. Coxii*.

It differs from *O. Farreri*, its nearest ally, in the leaves being oblong and not rotundate and especially in the small flower in which the corolla-lobes are remarkably short in comparison with the other species of the genus. The flower has a squat unprepossessing appearance, contrasting strongly with those of *O. Farreri* and *O. Delavayi*. From the abundant material of the genus now available we know that the variation in the corolla may be considerable in certain species—there are marked differences in size, in breadth of the tube, in the length of the lobes and in the character of their serration. Moreover much apparent deviation from the typical condition is due to the changes which occur in the development of the flower-bud to complete anthesis. There was therefore the possibility that the original somewhat meagre specimens represented only an undeveloped state of the corolla. Two very complete collections of the flowers of the species by Forrest are quite in harmony with the original and show exactly the same features. They are as follows:—

"N.E. UPPER BURMA:—Western flank of the N'Maikha-Salween divide. Lat. 26° 35' N. Long. 98° 48' E. Plant of 3–6 inches. Flowers deep purple-rose, tube-base yellow. On moist stony meadows amongst alpine scrub. July 1925." G. Forrest. Nos. 26920, 27009.

The same in fruit October 1925. No. 27310 (= 26920); No. 27287 (= 27009).

* This is *O. Farreri*, Balf. f.

Also in young fruit :—

"Western flank of the Chimi-li, N'Maikha-Salween divide. Lat. 26° 23' N. Long. 98° 48' E. Plant of 14-16 inches. On open pasture on the margins of scrub. Sept. 1924." G. Forrest. No. 25002.

In 1920 Farrer made collections of several species of *Omphalogramma* at or near the Chawchi Pass. This material did not include *O. Farreri*. But he endeavoured to distinguish three which appeared to him as different from one another, and he attempted also to correlate them with the fruiting stages later in the season. It is better to refer to these in sequence under his numbers.

Farrer 1699 :—This, if interpreted aright, he identifies with what he found in the previous year under No. 1187. "This is again what I call the false *Delavayi*. It does not quite like the same situations as No. 1673 but abounds in very large clumps and drifts in open sweeps and stretches of damp or wet slopes or flats of the high alpine region, where its flowers are sometimes of so brilliant an amethyst-red as to be quite effective. The flower develops greatly in size as the scape in length. 12-13,000 ft. Chawchi Pass. July 5th 1920."

Of the six flowers one is quite that of *O. Coxii*, the others are larger with better developed lobes. Farrer was no doubt right in regarding them as representing the *O. Coxii* of the previous year. The same number in fruit collected in September is referable to *O. minus*, Hand.-Mzt. Its small leaves and small capsule are quite distinctive.

Farrer 1697 :—Collected on the Chawchi Pass on July 5th at 12,000 ft. This is *O. minus*, Hand.-Mzt. Farrer was inclined to consider it a hybrid between 1673 and 1699.

Farrer 1673 :—Collected on the Chawchi Pass on July 2nd at 12,000 ft. Farrer did not identify this with either *O. Farreri* or with *O. Coxii*. He suggested kinship with *O. Engleri* but afterwards withdrew that suggestion on account of the petiolate and auriculate leaf. It comes nearest *O. Coxii*, however, except in the much better developed flower. What Farrer collected in fruit in September under the same number is not distinguishable from *O. Coxii* at that stage. It may perhaps be best left as akin to *O. Coxii* until further material is available. But the record has been cited at some length as evidence that a keen collector like Farrer observed these *Omphalogrammas* with considerable care and saw that some three or four species were concerned. Leaving out the readily distinguished *O. minus* there would appear to be at least three closely allied species of this *Delavayi* affinity—*O. Delavayi* from the Tali Range and *O. Farreri* and *O. Coxii* from the Burmese-Chinese frontier. Forrest who has collected all three both in flower and in fruit regards them as quite distinct although of very near kinship.



Primula serratifolia, Franch.