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### SOME NEW PEDICULARIS FROM INDIA AND BURMA

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*With one plate*

In a study of the *Pedicularis* of China, made at the Academy of Natural Sciences of Philadelphia during the tenure of a Harrison Fellowship for Research in Botany of the University of Pennsylvania from 1943-46, considerable amount of extra-Chinese material from different herbaria in the U. S. A. and abroad was made available on loan for reference. While a detailed study on Asiatic species of *Pedicularis* other than the Chinese species is not contemplated at present, among the Indian and Burmese specimens, some apparently undescribed species have been noted. These are herein described and presented separately. Little has been done on the *Pedicularis* of the eastern Himalayas since Prain's comprehensive treatment of the Indian species in 1890<sup>1</sup>. Many scores of new species have been discovered during the last fifty years from the neighbouring Chinese regions. Recently Pennell<sup>2</sup> described some 13 new species from the western Himalayas. Undoubtedly more extensive exploration in the eastern Himalayas will also reveal the presence of a large number of hitherto unknown species.

Very little is also known concerning the *Pedicularis* in Upper Burma. Besides casual references to the genus by various authors, the only treatment is by Bonati in 1921<sup>3</sup> when he enumerated the collections made

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1 Prain, D. The species of *Pedicularis* of the Indian Empire and its frontiers. In *Ann. Bot. Gard. Calcutta* 3: 1-196. pl. 1-37, 1 map. 1890.

2 Pennell, F. W. The *Scrophulariaceae* of the western Himalayas. In *Monogr. Acad. Nat. Sci. Phila.* 5: i-vii, 1-163, pl. 1-25. 1943.

3 Bonati, G. New species of the genera *Phtheirospermum* and *Pedicularis*. *Notes Bot. Gard. Edinb.* 13: 103-148. 1921.

by Farrer and Kingdon Ward, both in Upper Burma in the year 1919. He described a number of new species from their collections. In the herbarium of the Chicago Natural History Museum are 13 numbers of *Pedicularis* collected by F. Kingdon Ward in northern Burma in the year 1931, for the "C. Suydem Cutting Sikkim Expedition of Field Museum". Four of the numbers, 9920, 9767, 9858, and 9880 represent four new species as described below. The rest nine numbers include some new records of distribution, and these are here enumerated as follows:

- 9683 *Pedicularis likiangensis* Franchet  
 "Adung Valley. Everywhere in the alpine belt. Alt. 12000-13000 ft. Flowers crimson. Leaves dark purple. June 22, 1931."
- 9685 *Pedicularis cernua* Bonati  
 "Adung Valley. On steep alpine slopes amongst scrub Rhododendron. Alt. 13000-14000 ft. Flowers closely mottled with purple on a white group. June 23, 1931."
- 9699 *Pedicularis Elwesii* Hooker f.  
 "Adung Valley. In meadows on alpine slopes. Alt. 12000-13000 ft. Flowers dark crimson. June 25, 1931."
- 9707 *Pedicularis trichoglossa* Hooker f.  
 "Adung Valley. In the open marshy meadows, abundant. Alt. 12000 ft. Flowers crimson."
- 9740 *Pedicularis lutescens* Franchet var. *brevifolia* Bonati  
 "Adung Valley. In the open alpine meadows. Alt. 12000 ft. Flowers pale yellow, the upper lobes sometimes finely speckled with purple. Leaves woolly. July 2, 1931."
- 9820 *Pedicularis strobilacea* Franchet var.  
 "Adung Valley. Abundant in meadows and on earth chutes. Alt. 12000 ft. Flowers bright crimson. July 18, 1931."
- 9849 *Pedicularis Vialii* Franchet  
 "Adung Valley. A tall plant in the forest, and along the edge of the forest in shaded patches of meadow. Alt. 12000 ft. Flowers purple and white. July 23, 1931."
- 9872 *Pedicularis likiangensis* Franchet  
 "Adung Valley. Common in the meadow, and on alpine grass slopes. Alt. 12000 ft. Flowers crimson, rather dull coloured. July 28, 1931."
- 9908 *Pedicularis rex* C. B. Clarke  
 "Adung Valley. 3-4 ft. high. Amongst low bushes in the meadow. Alt. 12000 ft. Flowers reddish yellow. August 6, 1931."

***Pedicularis myriantha*, sp. nov. (Series *Cernuae*)**

Planta perennis (?), floribus exceptis in sicco valde atra; caule unico, simplici, crasso, glabro, inflorescentia inclusa 20-30 cm. alto, semper 1-nodio; foliis paucis, radicali unico, caulinis 3-4-verticillatis, longe petiolatis, submembraneis, glabris, ovato-oblongis, magnitudine variis, majoribus 10-11 cm. longis, 5-6 cm. latis, petiolis 7-8 cm. longis, minoribus 4-5 cm. longis, 2-2.5 cm. latis, segmentis late oblongo-ovatis, obtusis, pinnatifidis

serrulatisque; inflorescentiis spicatis terminalibus magnis densifloris, circiter 10-12 cm. longis; bracteis superne ovatis, pinnatifidis, inferne lineari-alatis, margine integris ciliatis; calyce longe campanulato, 1.5 mm. longo, membranaceo, sparse ciliato vel glabro, 5-costato, 5-dentato, dento posteriore lineari 4 mm. longo 3 mm. lato, subintegro, dentibus caeteris ovato-oblongis ad 6 mm. longis et 3 mm. latis, superne valde pinnatifidis, inferne constrictis; corolla coccinea, circiter 3 cm. longa: tubo plus minusve erecto, calycem aequante, intus ad basim hirsuto; galea circiter 2 cm. longa, inferne recta, superne leviter curvata, fronte rotundata, apice truncata, margine inferiore ad apicem integra vel obscure 1-dentata, ad medium integra vel obscure gibbosa; labio inferiore 1.2 cm. longo, lobis rotundatis, margine leviter ciliatis, lobo medio parvo, manifeste porrecto; staminibus ad basim tubi insertis; filamentis versus et apicem dense villosis, medium glabis, antheris contiguis; stylo incluso; capsulis ingnotis.

TYPE, in stony pasture at base of cliffs on the western flank of N'-Maikha Salween divide, at an altitude of 3965 meters, collected in flower, July 1925, by G. Forrest, No. 6909; holotype in the United States National Herbarium; isotype in the herbarium of the New York Botanical Garden. Only collection seen. Forrest noted: "Remarkable for rich coloring of flowers, which are of rich light crimson, drying true to shade of live plant".

This species is clearly an ally of *P. cernua* Bonati. It differs from the latter in being a larger plant with only one radical leaf and with larger cauline leaves, larger inflorescences and flowers, and with the galea being either entire or with an obscure tooth on each side of the lower margin. The protuberance on the middle of the lower galea margin so distinctly shown in *P. cernua* is either absent or obscurely present. *P. cernua* was originally placed in the series Lyratae. It differs from other species of the series notably in the habit, especially in the large long-petiolate radical leaves and the fleshy stem. Together with this new species, the two species are here made into a separate series, the Cernuac.

***Pedicularis exigua*, sp. nov. (Series Pseudorostratae)**

Plant nana, 2-3.5 cm. alta; caulibus singulis vel numerosis, adscendentibus, pubescentibus, teretibus, gracilibus; foliis radicalibus vel caulinis, caulinis 1-paribus oppositis, petiolatis (petiolis gracilibus, ad 4 mm. longis),

ovatooblongis, circiter 7 mm. longis et 5 mm. latis, pinnatisectis, segmentis 4-5-jugis, ovatis, subremotis, pinnatifidis; racemis 1-2-floris, floribus breviter pedicellatis, pedicellis vix 1 cm. longis, bracteis foliaceis; calyce oblongo, circiter 4 mm. longo, membranaceo, pubescente, 10-costato, haud reticulato, 5-dentato, dentibus inaequalibus, dente posteriore lanceolato, reliquis oblongis, basi leviter angustioribus, apice subintegris vel serratis; corollae tubo calycem duplo longiore, galeam aequante, parce pubescente, recto; galea erecta, fronte incurva, margine integra, apice in rostrum producta; rostro 6 mm. longo, recto, gracili, plano, apice truncato vel subfisso; labio inferiore 3-lobato, lobis subaequalis, rotundatis, margine ciliatis, lobo medio manifeste porrecto; staminibus apicem tubi insertis, filamentis glabris, antheris oblongis, oculis basi acutis; stylo exserto; capsulis compresso-ovoideis, circiter 8 mm. longis et 3.5 mm. latis, apice suboblique acuminatis, calyce 2/3 inclusis.

TYPE, in Thangu, Sikkim Himalaya, collected in flower and fruit, Sept. 1903, by Dr. Prain; holotype in the Bonati Herbarium, to be deposited in the herbarium of the University of California at Los Angeles; isotype in the herbarium of the Academy of Natural Sciences of Philadelphia. Only collection seen.

The alliance of this species is with *P. schizorrhyncha* Prain. It differs from the latter in being a smaller plant, with broader leaves, in the galea entire along the margins instead of 2-auriculate, in the beak being not lacinate at the apex but entire or slightly 2-fid, and in the staminal filaments being all glabrous.

Limpricht (in Rep. Sp. Nov. 20: 243. 1924) combined Prain's *Pseudo-caespitosae* and *Pseudoasplenifoliae* (in Ann. Bot. Gard. Calcutta 3: 84. 1890) into a single series *Pseudorostratae*. Prain's *Pseudoasplenifoliae* originally contained but a single species, *P. schizorrhyncha* Prain. As the relationships of the two series are very close, Limpricht's combination is here followed.

***Pedicularis nagaensis*, sp. nov.** (Series **Curvipedes**)

"*Pedicularis curvipes*" sensu Prain in Journ. As. Soc. Beng. 58(2): 275. 1890, in Ann. Bot. Gard. Calcutta 3: 151. pl. 35, A. 1890, *p. p.*, *quoad* C. B. Clarke 41334 B; *non* Hook. f.

Planta glaberrima; caulibus elongatis gracilibus, ramosis; foliis suboppositis vel sparsis, membranaceis, glabris, petiolatis (petiolis ad 1.5 cm.

longis, leviter alatis, gracilibus), ovatis, ad 1.8 cm. longis et 1.5 cm. latis, profundè pinnatifidis, lobis 3-4-jugis, oblongis, circiter 7×5 mm., dentatis; floribus axillaribus, longe pedicellatis, pedicellis in floribus 3-4 mm. longis, erectis, saltem fructigeris ad 1.2 cm. longis, recurvis; calyce ovoideo, 6 mm. longo 2.5 mm. lato, glabro, membranaceo, antice fisso, 2-dentato, dentibus 2 mm. longis, basi angustioribus, superne ovato-oblongis, flabellatis, distincte serratis; corolla circiter 1.6 cm. longa: tubo cylindrico, 1 cm. longo, calycem longiore; galea circiter 6 mm. longa, apice in rostrum producta; rostro 5 mm. longo, recto, gracile; labio inferiore 7 mm. longo, 3-lobato, lobis rotundatis, subaequalibus, margine glabris; staminibus?; stylo exserto; capsulis oblongis, suboblique acuminatis, 8 mm. longis, 4 mm. latis, calycibus dimidio longioribus.

TYPE, in Naga Hills, Assam, India, collected in flower and fruit, in 1935, by N. L. Bor, No. 6425; holotype in the herbarium of the Forest Research Institute, Dehra Dun. Only collection seen.

*Pedicularis curvipes* Hook. f. was described from Sikkim Himalaya from fruiting material only. Prain (l. c.) recorded two collections by Clarke for the species, one from Sikkim and the other from Naga Hills, the latter being the basis of his illustrations. He had only a single withered corolla. The plant of Naga Hills differs from that of Sikkim described by J. D. Hooker in the leaves being wider, with the lobes dentate and hardly incised, in the calyx-teeth not merely dentate but are foliaceous and distinctly serrate. I do not feel free to dissect the only flower present, thus the staminal characters can not be revealed.

***Pedicularis petrophila*, sp. nov.** (Series ***Asplenifoliae***).

Plants perennis, nana, vix 7 cm. alta; radicibus singulis vel plurimis, cylindricis, valde crassis; caulibus plurimis, vix 1-2 cm. altis, simplicibus, efoliatis; foliis radicalibus, numerosis, longe petiolatis, petiolis 1-4 cm. longis, gracilibus, glabrescentibus vel parce pubescentibus, laminis ovato-oblongis vel oblongo-lanceolatis, 7-22 mm. longis, 3-6 mm. latis, glabris, apice acutis vel obtusis, basi latis, margine profundè pinnatifidis vel fere pinnatisectis, lobis utrinsecus 5-8-jugis, ovato-oblongis, serratis; inflorescentiis pauca floribus, floribus longe pedicellatis, pedicellis gracilibus, ad 2 cm. longis; calyce cylindrico-campanulato, 5-6 mm. longo, pubescente, parce reticulato, antice leviter fisso, 5-dentato, dentibus inaequalibus, dente posteriore minore, oblongo, serrato, dentibus lateralibus valde latis,

stipitatis, oblique 3-lobatis, lobis serratis, dentibus anterioribus leviter minoribus; corolla purpurea, circiter 2.4 cm. longa: tubo erecto, ad 1.8 cm. longo, externe pubescente, superne leviter dilatato: galea valde falcata, parte verticali circiter 6 mm. longo, parte horizontali circiter 7 mm. longo, apice in rostrum gradatim producto, rostro conico-cylindrico, circiter 5 mm. longo, leviter incurvato; labio inferiore superius subaequante, margine ciliato, lobis subaequalibus, lobo medio leviter porrecto, plus minusve truncato, lobis lateralibus rotundatis; staminibus ad medium tubi insertis, filamentis superne villosis; stylis vix exsertis; capsulis ignotis.

TYPE, "a plant forming tight clumps on the steep alpine slopes, where many dwarf plants form a close carpet on the rock face", at an altitude of 4270 meters, Adung Valley, Burma, near the Tibetan frontier, collected in flowers, July 26, 1931, by F. Kingdon Ward, No. 9858; holotype in the herbarium of the Chicago Natural History Museum. Flowers dull purple. Only collection seen.

A dwarf species related to *P. praeruptorum* Bonati of northwestern Yunnan and Sikang. It differs in the larger flowers, the hairy filaments, and in the calyx being cleft anteriorly and with characteristic laterally broad, obliquely 3-lobed and dentate teeth. From *P. mayana* Hand.-Maz. of northwestern Yunnan, a similarly dwarf plant, it is readily distinguished by the ciliate lower corolla-lip and the hairy filaments, as well as by the calyx characters.

The type sheet bears three specimens, one of them is a dwarf form of *P. likiangensis* Franch. The other two specimens are of this new species but in different stages of development. One of them is a luxuriously blooming specimen with leaves of only 2 cm. in length. The petioles attain to a length of only 1 cm., and the blades have only 5-6 lobes on each side. The flowers, which are numerous, are exserted above the leaves. The other specimen has a few withered flowers of about the same height but the leaves attain to a much greater length and supersede the flowers. These leaves are 6-6.5 cm. long with a much elongated petiole to 4 cm. long and a blade with 5-8 lobes on each side. Evidently the leaves elongate after flowering is over.

***Pedicularis stenophylla*, sp. nov.** (Series **Oxycarpae**)

Planta perennis, 1/3-1/2 m. alta; radicibus plurimis, cylindricis, leviter crassis; caulibus singulis, elatis, simplicibus, glabrescentibus vel parcissime

pubescentibus; foliis radicalibus caulisque, radicalibus multis, longe petiolatis, petiolis gracilibus, 5-10 cm. longis, alatis, glabris vel sparse ciliatis, laminis lanceolatis, 5-13 cm. longis, 1.5-3.5 cm. latis, membranaceis, utrinque ad venis sparse ciliatis, apice acutis, basi longe attenuatis, margine profunde pinnatifidis, lobis ovato-oblongis, utrinsecus 12-20-jugis, circiter 1-1.5 cm. longis, 5-8 mm. latis, plus minusve remotis, apice acutis, basi latis, margine pinnatifidis serratisque; foliis caulinis alternis, radicalibus similaribus at minoribus vel brevioriter petiolatis; inflorescentiis terminalibus, circiter ad 10 cm. longis, multifloris; floribus breviter pedicellatis, inferioribus laxis, superioribus densis, pedicellis ad 2 mm. longis, erectis; bracteis foliaceis, lanceolatis, ad 1.5 cm. longis, 3 mm. latis, breviter petiolatis; calyce cylindrico-campanulate, 7-8 mm. longo, membranaceo, sparse pubescente, superne sparse reticulato, antice fisso, 3-5-dentato, dentibus inaequalibus, dente anteriore minore, lanceolato, serrato, dentibus lateralibus ovatis, pinnatifidis, basi stipitatis, dentibus posterioribus minoribus vel interdum nullis; corolla rubro-purpurea, circiter 1.3 cm. longa, sparse villosa, tubo recto, circiter 8 mm. longo, calyce leviter superante; galea angulari-curvata, torta, parte verticali circiter 5 mm. longa, parte horizontali circiter 5-6 mm. longa, apice in rostrum abrupte producta; rostro gracile, circiter 5 mm. longo, leviter incurvato; labio inferiore superius subaequante, margine ciliato, 3-lobato, lobis subaequalibus, rotundatis; staminibus ad medium tubi insertis, antheris valde oblongis, filamentis anterioribus superne villosis; stylis inclusis vel breviter exsertis; capsulis ignotis.

TYPE, in jungle camp above Hpawte, Mitkyina, Burma, collected in flowers, July 13, 1938, by Naw Mu Pa, No. 17430; holotype in the herbarium of the Forest Research Institute, Dehra Dun. Flowers "red". Paratype, at 3660 meters, Adung Valley, Burma, near the Tibetan frontier, collected in flowers, July 29, 1931, by F. Kingdon Ward, No. 9880; holoparatype in the herbarium of the Chicago Natural History Museum. Flowers "pale pinkish purple".

This species is closely related to *P. Monbeigiana* Bonati, a species of northwestern Yunnan and Sikang. It is, however, a relatively smaller and less robust plant with smaller, much narrower leaves and slightly smaller flowers. Also the pedicels are much shorter, the corolla-tube only slightly longer than the calyx, and the beak more abruptly decurved.

***Pedicularis brachychila*, sp. nov.** (Series **Aloënses**)

Planta annua (?); caule unico, glabro vel parce pubescente; circiter 15 cm. alto, gracile, filiformi, raro apicem versus breviter ramoso; foliis oppositis suboppositis vel sparsis, caulinis longe petiolatis (petiolis gracilibus, ad 2.5 cm. longis), ovatis, supra parce pubescentibus, ad 2.5 cm. longis et 1.5 cm. latis, pinnatisectis, segmentis 5-6-jugis, oblongis, pinnatifidis, ad 7 mm. longis et 5 mm. latis, laciniis ovatis mucronato-serratis; floribus apicem caulis versus axillaribus, pedicellatis, pedicellis 1-2 mm. longis; calycē campanulato, 3.5 mm. longo, 2.5 mm. lato, antice sub-fisso, 5-dentato, dentibus deltoideis integris, margine ciliatis; corolla tenera circiter 1.5 cm. longa: tubo late cylindrico, recto, circiter 7 mm. longo, calycem duplo superante galeam aequante, glabro vel parce pubescente; galea 2 mm. lata, falciformi, fronte rotundata, parce puberula; labio inferiore brevi, 1 cm. longo, antice trilobo, lobis lateralibus ovatis minoribus acuminatis, lobo medio lato concavo acuto ciliato; staminibus supra basim tubi insertis, filamentis anterioribus apicem versus parçissime pilosis, antheris ovoideis, loculis basi acutis; stylo longe exserto; capsulis ignotis.

TYPE, at an altitude of about 3660 meters, in Adung Valley, northern Burma, near the Tibetan frontier, collected in flower, July 1931, by F. Kingdon Ward, No. 9767; holotype in the herbarium of the New York Botanical Garden; isotype in the Chicago Natural History Museum. Only collection seen.

A species closely related to *P. Kingii* Prain of the Sikkim region. It resembles the latter in the general appearance and particularly in the anteriorly cleft calyx. However, it can be distinguished from the latter by its narrower leaves with shorter petioles and smaller segments, its falciform instead of straight galea, its acute instead of rounded middle lobe of the lower corolla-lip, its less attenuate and acuminate anther-cells, and its very long exserted styles.

Two specimens are present on the holotype sheet studied. One of them has the leaves opposite below, subopposite to alternate near the apex of the stem. The other specimen has all the leaves alternate. The two specimens are, however, identical otherwise and are clearly conspecific. The tendency of the leaves be coming subopposite to occasionally alternate has been noticed in other closely related species of the same series.

Prain's series *Fragiles* originally included two species, *P. Kingii* Prain

and *P. fragilis* Prain. These two species are not closely related, and hence *P. Kingii* should be removed from the series. *P. Kingii* as well as this new species are related to the several Chinese species which later authors associated with the series *Fragiles*. These species constitute the series *Alöense*.

***Pedicularis megalochila*, sp. nov. (Series *Megalanthae*)**

Planta perennis, ad 15 cm. alta; radicibus plurimis, cylindricis; caulibus elatis, singulis vel plurimis, simplicibus, parce pubescentibus; foliis radicalibus caulisque, similaribus, petiolatis, radicalibus paucis, petiolis ad 2 cm. longis, gracilibus, laminis oblongo-lanceolatis, ad 4 cm. longis, 1 cm. latis, glabris vel parce pubescentibus, apice obtusis, basi attenuatis, margine profunde pinnatifidis, lobis utrinque 7-10, triangulari-ovatis, serratis, apice acutis and obtusis, basi late dilatatis; floribus axillaribus, laxis, pedicellatis, pedicellis 7-12 mm. longis, erectis; calyce cylindrico, circiter 1.2 cm. longo, pubescente, haud reticulato, antice fisso, 5-dentato, dentibus inaequalibus, dente posteriore minore, omnibus stipitatis, ovatis, pinnatifidis, serratis; corolla lutea (?), circiter 3-3.5 cm. longa: tubo recto, 2-2.5 cm. longo, externe parce pubescente, superius vix dilatato; galea 5-6 mm. longa, plus minusve recta, basim versus leviter torta, apice in rostrum abrupte producta, rostro gracili, 7-8 mm. longo, circinato, apice integro; labio inferiore circiter 1.2 cm. longo, 1.8 cm. lato, margine subtiliter ciliato, lobis inaequalibus, lobo medio minore, oblongo, 3 mm. lato, apice leviter truncato, lobis lateralibus rotundatis, ad 1.2 cm. latis; staminibus ad tubi apicem insertis, filamentis anterioribus villosis; stylis inclusis; capsulis oblong-ovoideo, circiter 1.8 cm. longis 6 mm. latis, leviter compressis, apice oblique acutis.

TYPE, "a small epiphyte low down on a tree overhanging the river", at altitudes of 1830-2135 meters, Adung Valley, Burma, near the Tibetan frontier, collected in flower and fruit, July 7, 1931, by F. Kingdon Ward, No. 9220; holotype in the herbarium of the Chicago Natural History Museum. Only collection seen.

A species related to *P. megalantha* Don but readily distinguished by its smaller stature, much narrower leaves, shorter corolla-tube, non-bilobed beak, etc. The corolla of *P. megalantha* is purple, while though the flowers color of this new species is not indicated on the field label, it is apparently yellow. To *P. Garkeana* Prain of the *Robustae*, this new

species also closely resembles. But it is readily distinguished by the non-bilobed beak and the much smaller middle lobe of the lower corolla-lip.

#### EXPLANATION OF PLATE

- Fig. 1. *Pedicularis myriantha*, sp. nov. Flower x 2, upper portion of calyx, x 6, stamens x 3.  
 Fig. 2. *Pedicularis exigua*, sp. nov. Flower x 2.5, calyx, x 6, stamens x 6.  
 Fig. 3. *Pedicularis nagaensis*, sp. nov. Flower x 2.5, calyx x 4.  
 Fig. 4. *Pedicularis petrophila*, sp. nov. Flower x 2, calyx x 4, stamens x 4.  
 Fig. 5. *Pedicularis stenophylla*, sp. nov. Flower x 2.5, calyx x 4, stamens x 2.  
 Fig. 6. *Pedicularis brachychila*, sp. nov. Flower x 2, calyx x 6, lower lip of corolla x 6, stamens x 6.  
 Fig. 7. *Pedicularis megalochila*, sp. nov. Flower x 2, calyx x 3, stamens x 3.

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Some New pedicularis from India and Burma