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ACONITUM OF THE HIMALAYA

New species and extensions in distribution

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In a previous paper (Fletcher & Lauener in Notes R.B.G. Edinb. 20, 181–206: 1949) an attempt was made to clear up some of the confusion in the taxonomy and nomenclature of certain Chinese species of *Aconitum*.

The very rich material resulting from various fairly recent expeditions to the Himalayan regions has demanded a further study of the genus. Several new species are described and the extensions in the known distribution of existing species is discussed. Although I am loth to describe new species in so large a genus, often from a single gathering, yet both Chinese and Indian *Aconitums* are so well represented in the Edinburgh Herbarium, that careful comparison with these has led me to the belief that a high percentage of these collections are new taxa.

In his paper on the Saxifrages of the Himalaya (Bull. Brit. Mus. (Nat. Hist.) 2 (4): 1958) Dr. Harry Smith pointed out that many of his new species had only been collected once. Similarly, of the 23 new species here described, 12 are based on only one collection. Whether more extensive collecting in these areas would point to extreme localisation of the species or greater variation in a lesser number of species, is still an open question.

In a recent paper on the “*Aconitum* of Honshu, Shikoko and Kyushu” (Science Reports, Osaka University, 9: 1960), Tamura and Namba state that many species created by Nakai “seem to be included in one species. The individuals forming one colony are often separated as several different species”. I can but hope that I am not laying myself open to similar criticism. The same authors say that “*Aconita* of Japan, especially of middle Honshu, are the most difficult group taxonomically. They are extremely variable, and there are no criteria by which the species are clearly defined”. This statement might be equally justifiable if applied to many of the Himalayan species.

Since all the new species described in this paper fall into Subgenus *Tuberaconitum* Rap., Sect. *Napellus* DC. amplif. Hand.-Mazz., it is not

feasible to key them without including all the other Chinese and Indian species in that section. As such a key is beyond the scope of this present paper, a tentative grouping of the new species is employed, with the new taxa (apart from *A. assamicum* and *A. szechenyianum* var. *glabrum*) arranged in groups or complexes, each centring on a previously recorded, and, for the most part, well known species. This seems to me more satisfactory than pursuing a merely alphabetical arrangement of the new taxa.

ACKNOWLEDGEMENTS

I am greatly indebted to the Keeper of Botany in the British Museum and to the Director at Uppsala for permitting me to retain specimens on loan for a long period. I am very grateful also to the Regius Keeper, Dr. H. R. Fletcher, for his generous help and guidance throughout this work, particularly in respect of the Latin diagnoses. My thanks are also due to Miss Rosemary Smith for her drawings of the leaves, sepals and petals.

GROUPING OF NEW TAXA

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|---|--|
| 1. SESSILIFLORUM COMPLEX | <i>A. tsangpoense</i> sp. nov. |
| <i>A. richardsonianum</i> sp. nov. | <i>A. kongboense</i> sp. nov. |
| <i>A. pseudosessiliflorum</i> sp. nov. | 6. STYLOSUM COMPLEX |
| <i>A. hicksii</i> sp. nov. | <i>A. stylosum</i> var. <i>doshongense</i> var. nov. |
| <i>A. bracteolatum</i> sp. nov. | <i>A. elliotii</i> sp. nov. |
| 2. BRACHYPODUM COMPLEX | <i>A. longipedicellatum</i> sp. nov. |
| <i>A. parabrachypodum</i> sp. nov. | <i>A. tsariense</i> sp. nov. |
| 3. PULCHELLUM COMPLEX | <i>A. brevilibum</i> sp. nov. |
| <i>A. pulchellum</i> var. <i>hispidum</i> var. nov. | <i>A. viridiflorum</i> sp. nov. |
| <i>A. sherriffii</i> sp. nov. | 7. LACINIATUM COMPLEX |
| <i>A. longipetiolatum</i> sp. nov. | <i>A. laciniatum</i> (Brühl) Stapf |
| <i>A. naviculare</i> (Brühl) Stapf | <i>A. spicatum</i> (Brühl) Stapf |
| <i>A. creagromorphum</i> sp. nov. | <i>A. nepalense</i> sp. nov. |
| 4. POLYANTHUM COMPLEX | <i>A. dhwojii</i> sp. nov. |
| <i>A. parapolyanthum</i> sp. nov. | 8. HETEROPHYLLOIDES COMPLEX |
| <i>A. prominens</i> sp. nov. | <i>A. heterophylloides</i> (Brühl) Stapf |
| <i>A. lhasaense</i> sp. nov. | <i>A. bhedingense</i> sp. nov. |
| <i>A. rongchuense</i> sp. nov. | 9. OROCHRYSEUM COMPLEX |
| 5. SIKANGENSE COMPLEX | <i>A. orochryseum</i> Stapf |
| <i>A. sikangense</i> Hand.-Mazz. | <i>A. assamicum</i> sp. nov. |

MISCELLANEOUS NOTES AND RECORDS

- A. bulbilliferum* Hand.-Mazz.
A. stapfianum Hand.-Mazz.
A. bisma (Ham.) Rap.
A. novoluridum Munz
A. wallichianum nom. nov.
A. szechenyianum Gayer var. *glabrum* var. nov.

THE SESSILIFLORUM COMPLEX

A. sessiliflorum (Fin. & Gagnep.) Hand.-Mazz. is a Western Chinese species characterised mainly by the sessile flowers in which the hooded sepal is hardly beaked and by the very divided leaves with petioles shorter than the lamina.

***Aconitum richardsonianum* Lauener, sp. nov. (Figs. 1, A; 2, A)**

Proximum *A. sessilifloro* (Fin. & Gagnep.) Hand.-Mazz. a quo inflorescentia patenter hirsuta casside naviculari differt.

Tubera anguste cylindrica, ad 10 cm. longa, 1 cm. crassa. *Caulis* erectus, foliatus, ad 100 cm. altus. *Folia* glabra; basilia non visa; caulina ambitu orbicularia, cordata, 8–10 cm. longa et lata, usque ad basin 5-secta, segmentis extimis alte bipartitis, partibus lobatis, segmentis interioribus profunde tripartitis, partibus paucipinnatis, lobis omnibus ovatis vel oblongis integris acutis vel apiculatis; petioli superiores laminis subaequantibus vel brevioribus. *Inflorescentia* ad 60 cm. longa, paniculata, laxiuscula ubique dense patule-hirsuta, ramis infimis ad 15 cm. longis paucifloris;

bracteae inferiores folia referentes, superiores ovatae vel lanceolatae integrae vel trilobatae; pedicelli 3–30 mm. longi apice in discum 3–4 mm. latum dilatati. *Sepala* purpurea extus aureo-hirsuta; cassis navicularis, 2 cm. alta, 1.5 cm. lata, ad 1.8 cm. ad apicem rostri brevis metiens; sepala lateralalia ex ungue brevi late oblique obovata, 1.5 cm. longa, 1 cm. lata, intus leviter aureo-hirsuta; sepala inferiora oblique ovata vel elliptica, 8 mm. longa, 4–5 mm. lata, leviter deflexa. *Petala* glabra, unguibus tenuibus ad medium valde inclinat, calcaribus subglobosis recurvis, laminis emarginatis inflexis. *Stamina* 7–8 mm. longa, glabra, inferne alata, dentata vel edentata, ultra medium filiformia. *Ovaria* 5, dense hirsuta, sub anthesi 3 mm. longa in stylos 2 mm. longos attenuata. Folliculi seminaque ignota.

TIBET. Vicinity of Lhasa, 3960–4270 m., pale blue, Aug. 1939, *H. E. Richardson* 330 (holo. BM); hills N. of Lhasa, 3960 m., 16 Aug. 1943, *Ludlow & Sherriff* 9864 (BM, E).

From *A. sessiliflorum* (Fin. & Gagnep.) Hand.-Mazz., of Szechuan and Sikang, this plant readily can be separated by the indumentum. The inflorescence axis, pedicels, sepals and carpels are all covered with long copious pale golden spreading hairs, whereas in *A. sessiliflorum* these structures are covered with short white appressed hairs. Moreover, the inflorescence in *A. richardsonicum* is far more branched than in *A. sessiliflorum*, the pedicels and bracts are longer, and the hooded sepal is navicular in shape and not galeate. The shape of the leaves and the structure of the petals is much the same in both species.

***Aconitum pseudosessiliflorum* Lauener, sp. nov. (Figs. 1, B; 2, B)**

Proximum *A. sessilifloro* (Fin. et Gagn.) Hand.-Mazz. a quo pedicellis longioribus, foliorum segmentis latioribus minus partitis differt.

Tubera imperfecta, cylindrica vel dauciformia, ad 8 cm. longa, 1.2 cm. crassa, apice squamis fuscis lanceolatis obsita. *Caulis* erectus, foliatus, ad 70 cm. altus, cum inflorescentia minute et crispule pubescens vel glaber. *Folia* inferiora longe petiolata, glabra, ambitu orbicularia cordata, ad 5 cm. longa et lata ad 3 mm. supra basin subaequaliter 3–5-partita, segmentis mediis ad medium tripartitis, partibus iterum tri-vel paucipartitis, segmentis lateralibus inaequaliter 2-partitis, lobis ultimis ovatis, petiolis tenuibus ad 12 cm. longis; folia superiora petiolata vel subsessilia, paniculae ramos vel flores subtendentia. *Inflorescentia* 20–40 cm. longa, paniculata, laxa, ramis infimis pauci-vel multifloris; bracteae omnes praeter summas folia minora referentes; bracteolae lanceolatae vel lineares; pedicelli ad 4 cm. longi, apice in discum 2 mm. latum dilatati. *Sepala* coerulea vel atrovioacea, extra glabra vel leviter pubescentia; cassis oblique navicularis, 1.5–2 cm. alta, 0.5–0.8 cm. lata, 1.5–2 cm. ad basi ad apicem rostri metiens, fronte leviter declivis, rostro conspicuo tenui; sepala lateralalia ex ungue brevi lato oblique obovata, circ. 1 cm. longa et lata intus leviter hirsuta; sepala inferiora oblique ovata vel oblonga 1 cm. longa, intus pubescentia. *Petala* glabra, 1.5 cm. longa, unguibus apice valde inclinat, calcaribus apice globosis recurvis, laminis emarginatis inflexis. *Stamina* 8 mm. longa, glabra vel sparse pilosa, usque ad medium alata, superne filiformia, edentata. *Carpella* 5, leviter pubescentia, sub anthesi 3 mm. longa in stylos brevissimos attenuata. *Folliculi* seminaque ignota.

TIBET. Reting, 60 miles N. of Lhasa, 4270 m., along banks of stream, flowers blue, 30 July 1944, *Ludlow & Sherriff* 11085 (holo. BM, iso. E); hills N. of Lhasa, 4880 m., open hillsides, flowers greenish purple, 30 June 1942, *Ludlow & Sherriff* 8770 (BM); Kongbo, Lochen, Lochen La, 4570 m., on dry ground under bushes, dark purple flower with green calyx, 6 Aug. 1947, *Ludlow, Sherriff & Elliot* 15569 (BM, E); Kongbo, Pasum La, Drukla Chu, lat. 30°28' N., long. 93°22' E., 3810 m., by the side of large boulders in wet situations, 22 Aug. 1938, *Ludlow, Sherriff & Taylor* 6883 (BM); Upper Yigrong Valley, 3960–4270 m., alpine and subalpine region, in clumps, 19 Aug. 1935, *F. Kingdon Ward* 12225 (BM).

This is another plant from the vicinity of Lhasa which, like *A. richardsonianum*, finds its nearest affinity in the Szechuan and Sikang *A. sessiliflorum* but has longer pedicels and less divided leaves. *A. pseudosessiliflorum* is akin also to *A. bracteolatum*. The differences between these two species are recorded under *A. bracteolatum* which is described later in this paper.

***Aconitum hicksii* Lauener, sp. nov. (Figs. 1, D; 2, C)**

Proximum *A. sessilifloro* (Fin. & Gagnep.) Hand.-Mazz. a quo inflor-
escentia patenter hirsuta, pedicellis longioribus, floribus minoribus differt.

Tubera imperfecta, 8 cm. longa 1 cm. crassa. *Caulis* erectus, foliatus, ad 90 cm. altus, plus minusve glabrescens. *Folia* glabra, ambitu orbicularia, leviter cordata, 6–8 cm. longa et lata, ad basin 5-secta, segmentis ovatis, cuneatis, interioribus profunde tripartitis, partibus paucipinnatis, segmentis extimis fere ad basin bipartitis, partibus paucilobatis, lobis omnibus integris, acutis vel obtusis; petioli infimi laminis aequilongi vel longiores, ceteri brevissimi. *Infloréscentia* ad 30 cm. longa, paniculata, laxiuscula, ubique dense patule aureo-hirsuta, ramis infimis paucifloris; bracteae inferiores folia referentes, superiores ovatae integrae vel trilobatae; bracteolae late ovatae vel suborbiculares; pedicelli sub anthesi fere erecti, 0.5–3 cm. longi, robusti, apice in discum 3 mm. latum dilatati. *Sepala* extra leviter aureo-hirsuta; cassis galeata, ascendens ad 2 cm. alta, ad 1 cm. lata, ad 1.5 cm. ad apicem rostri brevis metiens; sepala lateralia ex ungue brevi late oblique obovata, 1.3 cm. longa et lata, intus aureo-hirsuta; sepala inferiora ovata, ad 12 mm. longa, 5 mm. lata, deflexa. *Petala* glabra, cassidi aequilonga, unguibus ad medium valde inclinatis, calcaribus oblongis recurvis, laminis emarginatis inflexis. *Stamina* 5 mm. longa, glabra, usque ad medium alata, superne filiformia. *Carpella* 5, aureo-hirsuta, sub anthesi 3 mm. longa in stylos 2 mm. longos attenuata. *Folliculi* seminaque ignota.

BHUTAN. Pangotang, Tsampa, 4270 m., on open hillsides, up to 2½–3 ft., magnificent spikes of clear blue-violet flowers, 9 Sept. 1949, *Ludlow, Sherriff & Hicks* 19710 (holo. BM, iso. E); Marlung, Tsampa, 4570 m., under overhanging cliffs, at present up to 1½ ft., flowers blue-violet, 7 July 1949, *Ludlow, Sherriff & Hicks* 19379 (BM, E); Passu Sepu, Mangde Chu, 4270 m., growing amongst rocks, perianth reddish purple, 4 Sept. 1949, *Ludlow, Sherriff & Hicks* 17224 (BM, E).

TIBET. Dongkar Dzong, Tibetan plateau region, 4115 m., open bare hillsides, deep grape-purple, 16 Aug. 1934, *Ludlow & Sherriff* 827 (BM, E).

The general facies of *A. sessiliflorum* and *A. hicksii*, the cutting of the leaves, the shape of the hooded sepal and the structure of the petals are

remarkably alike. The petal of *A. hicksii*, however, is more recurved and is smaller, as in fact, is the whole flower. Moreover, whereas the inflorescence axis, the very short pedicels, the sepals and carpels of the Sikang plant are covered with a minute white crisp pubescence, these structures in *A. hicksii* are covered with a copious golden spreading indumentum.

A. hicksii can be distinguished from *A. richardsonianum* by its much denser inflorescence and galeate, not navicular, hooded sepal.

NOTE:—After this was written, a paper by Tamura (Acta Phytotax. Geobot. 19, 73: 1962) was received in which two new species of *Aconitum* are described. One of them, *A. nakaoi* Tamura from Bhutan, seems to be near *A. hicksii* and both these species are related to *A. sessiliflorum*.

A. hicksii appears to be a much taller plant with larger leaves and flowers. Its inflorescence is paniculate whereas that of *A. nakaoi* is described as "terminalis corymbosa interdum ramosa subpaniculata". The stamens are glabrous in *A. hicksii* and pilose in *A. nakaoi*.

Whilst I do not think that these two taxa are conspecific, *A. nakaoi* will of course be the correct name if this should be the case.

***Aconitum bracteolatum* Lauener, sp. nov. (Figs. 1, c; 2, d)**

Proximum *A. hicksii* Lauener, a quo foliis segmentis multo angustioribus floribus minoribus differt.

Tubera ignota. *Caulis* erectus, foliatus, superne cum inflorescentia minutissime albo-crispo-pubescens. *Folia* glabra, ambitu orbicularia, ad 12 mm. diametro, ad basin 5-secta, segmentis profunde lobatis, lobis profunde lobulatis, lobulis linearibus, integris acutis; petioli infime laminis aequilongi vel longiores, ceteri brevissimi. *Inflorescentia* paniculata, ad 35 cm. longa ramis infimis ad 10 cm. longis; bracteae inferiores folia referentes, superiores ovatae integrae; bracteolatae late ovatae vel suborbiculares, pedicelli 1-1.5 cm. longi. *Sepala* extra fere glabra; cassis galeata, ad 1.5 cm. alta et lata, ad 1.2 cm. ad apicem rostri brevis metiens; sepala lateralialia ex ungue brevi oblique obovata, 1 cm. longa et lata; sepala inferiora ovata ad 8 mm. longa, 3-4 mm. lata, valde deflexa. *Petala* glabra, cassidi aequilonga, unguibus ad medium valde inclinatis, calcaribus recurvis, laminis emarginatis inflexis. *Stamina* glabra usque ad medium alata, superne filiformia. *Carpella* 5, crispo-pilosa, sub anthesi 3 mm. longa in stylos 2 mm. longos attenuata. *Folliculi* seminaque ignota. TIBET. Lhakang, 3960 m., open hillside, flowers purple, 1 Sept. 1933, Ludlow & Sherriff 509 (holo. BM, iso. E).

In the shape of the uppermost bracts and of all the bracteoles and in the structure of the flowers, this species clearly is allied to *A. hicksii*. The leaf segments are much narrower, however, and the flowers are smaller. Moreover, the inflorescence is covered with a minute white crisp pubescence and not with the golden spreading tomentum of the other species.

Whilst *A. bracteolatum* is furnished with the same kind of indumentum as *A. pseudosessiliflorum*, the hooded sepal of the former has a short beak whilst that of the latter species is much longer. Furthermore, the leaves of *A. bracteolatum* are more deeply lacinate and the upper bracts are always entire.

2. THE BRACHYPODUM COMPLEX

A. brachypodum from Tibet and W. China is closely related to *A. sessiliflorum* of the previous group but can be distinguished by its beaked hooded sepal and by the long yellowish hairs on the carpels. In *A. sessiliflorum* the carpels are covered with short white appressed hairs.

Aconitum parabrachypodum Lauener, sp. nov. (Figs. 1, E; 2, E)

Proximum *A. brachypodo* Diels a quo herba multo minus robusto, floribus minoribus paucioribus, petalis hispidis nec plus minusve glabris differt.

Tubera cylindrica 2-3 cm. longa. *Caulis* erectus vel prostratus, simplex vel apice ramosus, 20-60 cm. altus, superne crispule albo-pubescentis, inferne mox glabratus. *Folia* infima, saepe sub anthesi emortua; lamina ambitu late cordato-orbicularia, utrinque glabra vel puberula, 1.5-2 cm. lata et longa, fere ad basin 3-partita segmentis rhomboideo-cuneatis lateralibus duplo latioribus 2-partitis, ad $\frac{1}{2}$ paucilobatis lobulis ovatis vel ovato-lanceolatis; folia superiora similiter partita sed lobulis anguste oblongis; petiolo folii inferioris 3-7 cm. longo, superioris 0.5-1.5 cm. longo. *Inflorescentia* uniflora, vel racemum laxum 3-florum referens, vel paniculata 8-10 cm. longa; axis primariis et pedicelli crispule albo-pubescentis; pedicelli 2-3 cm. longi, apice in discum 3 mm. latum dilatati; bractee foliaceae vel folia minora referentes. *Sepala* coeruleo-violacea extra puberula; summum galeiforme, erectum, 1.8-2 cm. altum, 2 cm. a basi ad apicem rostri metiens, circ. 1 cm. latum; sepala lateralalia vix unguiculata, subrotundata, 1.3-1.5 cm. lata et longa; inferiora elliptica, 1 cm. longa, circ. 0.5 cm. lata, obtusa, deflexa. *Petala* hispida 2.3-2.5 cm. longa, unguibus apice valde inclinatis, calcaribus recurvis, laminis apice emarginatis inflexis. *Stamina* circ. 8 mm. longa, inferne alata, ultra medium filiformia, pilosa. *Carpella* 3-5, aureo et dense pilosa. *Folliculi* 1.5 cm. longi, paralleli, aureo-pilosi. *Semina* ignota.

BHUTAN. Pang La, 3810 m., open rocky hillside, deep blue violet, 21 Sept. 1949, *Ludlow, Sherriff & Hicks* 21460 (BM, E); Pangotang, Tsampa, 4270 m., below cliffs, on open hillside, up to 2½ feet, perianth blue violet, 9 Sept. 1949, *Ludlow, Sherriff & Hicks* 19708 (BM, E); Shingbe, Me La, 4115 m., stony hillsides, 23 Sept. 1949, *Ludlow, Sherriff & Hicks* 21213 (BM); 3960 m., amongst rocks, flowers deep blue, 23 Aug. 1949, *Ludlow, Sherriff & Hicks* 21079 (BM, E); Phage La, Mangde Chu, 4270 m., in amongst boulder scree, perianth palish purple, sometimes with a reddish tinge, 26 Aug. 1949, *Ludlow, Sherriff & Hicks* 17203 (BM, E); Amlung-nang, Dhur Chu, 4115 m., among *Rhododendrons* on open banks, up to 3 feet, does not stand upright, but bending over, flowers intense rich blue violet, little seen, 4 Oct. 1949, *Ludlow, Sherriff & Hicks* 19813 (BM, E).

TIBET. Cho La, 4270 m., 20 Aug. 1934, *Ludlow & Sherriff* 861 (BM, E); Natu La (near Sikkim-Tibet Frontier) 4115 m., in *Rhododendron* shrubbery in the alpine zone, sometimes prostrate and creeping, handsome, 1 Oct. 1950, *Ludlow & Sherriff* 21505 (BM, E).

ASSAM. Orka La, 3900-4200 m., on boulder screes, 28 Sept. 1938, *F. Kingdon Ward* 14306 (holo. BM); Ze La, 4270 m., on boulder strewn alpine slopes, 22 Aug. 1938, *F. Kingdon Ward* 14141 (BM).

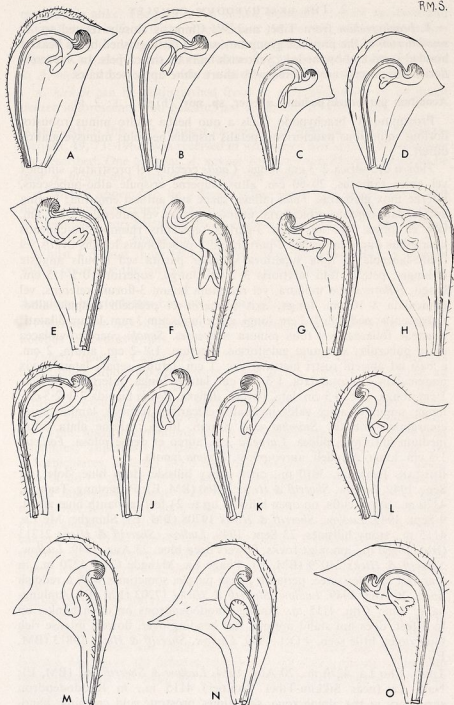


FIG. 1. Sepals and petals of A. *Aconitum richardsonianum*; B. *A. pseudosessiliflorum*; C. *A. bracteolatum*; D. *A. hicksii*; E. *A. parabrachypodum*; F. *A. sherriffii*; G. *A. longipetiolatum*; H. *A. creagromorphum*; I. *A. parapolyanthum*; J. *A. prominens*; K. *A. lhasaense*, L. *A. rongchuense*, M. *A. tsangpoense*, N. *A. kongboense*, O. *A. assamicum*.

All $\times 2$.



FIG. 2. Leaves of A. *Aconitum richardsonianum*, B. *A. pseudosessiliflorum*, C. *A. hicksii*, D. *A. bracteolatum*, E. *A. parabrachypodum*, F. *A. sherriffii*, G. *A. longipetiolatum*, H. *A. creagromorphum*, I. *A. parapolyanthum*, J. *A. prominens*, K. *A. lhasaense*, L. *A. rongchuense*. All $\times \frac{1}{2}$.

A. parabrachypodum is a less robust plant than *A. brachypodum* and has fewer and smaller flowers. The leaves, which are also less numerous, have longer petioles and are therefore less crowded about the axis.

3. THE PULCHELLUM COMPLEX

Aconitum pulchellum Hand.-Mazz. in Anz. Akad. Wiss. Wien, Math.-Nat. Kl., **62**, 219 (1925).

var. *pulchellum*

SIKKIM. Jongri, 4200 m., 1913, *Ribu & Rhomoo* 6569 (E).

BHUTAN. Phage La, Mangde Chu, 4200 m., stony grassy alpine pastures, perianth violet purple, 26 Aug. 1949, *Ludlow, Sherriff & Hicks* 17204 (BM, E).

TIBET. Mira La, Puchu, 4500 m., lat. 20°30' N., long. 94°10' E., 13 Aug. 1938, *Ludlow, Sherriff & Taylor* 6048 (BM, E).

Previously known from Yunnan, Sikang, S.E. Tibet and Upper Burma (Fletcher & Lauener in Notes R.B.G. Edinb. **20**, 197, 204:1949).

In the Edinburgh herbarium the Sikkim plant had at one time been identified as *A. hookeri* Stapf. Certainly its general facies is extraordinarily like that of *A. hookeri* which has been gathered in Sikkim on many occasions; but the indumentum of the two is quite different, short golden adpressed hairs in *A. pulchellum* instead of the long white spreading hairs of *A. hookeri*. The petals too are very distinct.

In 1933, on the Salween-Tsangpo divide, Kingdon Ward gathered his 10738 which obviously is very closely allied to *A. pulchellum*, having the same habit, the same indumentum, the same shape of petals and sepals. But whereas the petals and stamens of *A. pulchellum* are always quite glabrous, in *Kingdon Ward* 10738 they are remarkably hispid. The Kingdon Ward plant can be regarded as a variant of *A. pulchellum*.

A. pulchellum var. *hispidum* Lauener, var. nov.

A typo petalis staminibusque hispidis differt.

TIBET. Salween-Tsangpo divide, N.E. of Shugden Gumpa, 4500 m., amongst tussocks of dwarf Rhododendrons on turf slopes, flowers violet, 12 Aug. 1933, *F. Kingdon Ward* 10738 (holo. BM).

A. pulchellum var. *burmanicum* with glabrous carpels, was described in Notes R.B.G. Edinb. **20**, 197 (1949). Thus, *A. pulchellum* is a quite widespread and plastic species varying mainly in the hairiness or otherwise of the petals, carpels and stamens.

Aconitum sherriffii Lauener, sp. nov. (Figs. 1 F; 2, F)

Proximum *A. pulchello* Hand.-Mazz. a quo pedicellis aureo-crispo-pubescentibus, floribus maioribus, petalis staminibusque hispidis, carpellis glabris differt.

Tubera imperfecta, 2 cm. longa, 8 mm. lata, dauciformia. *Caulis* erectus, simplex, ad 30 cm. altus, superne crispule aureo-pubescent, inferne mox glabratus. *Folia* longe petiolata, utrinque glabra vel supra parcesime pubescentia; lamina ambitu late cordato-ovata vel orbicularia, 4-6 cm. lata et longa, ad 5 mm. supra basin 3-partita, segmentis rhomboideo-cuneatis lateralibus duplo latoribus 2-3-partitis, ad $\frac{1}{2}$ paucilobatis

lobis lanceolatis acutis vel apiculatis 3-4 mm. latis, subtus nervis valde prominulis; petioli laminis multo usque plus triplo longiores. *Inflorescentiae* 1-2 florae; pedicelli 3-5 cm. longi, apice in discum 4 mm. latum dilatati, aureo-crispo-pubescentes; bractee foliis similes; bracteolae lanceolatae ad 1 cm. longi. *Sepala* intense purpurea, extra puberula; summum galeatum, a basi ad apicem 2.5-3 cm. altum; sepala lateralalia vix unguiculata subrotundata, 2-2.5 cm. longa; sepala inferiora late ovata vel elliptica, 2 cm. longa 1-1.5 cm. lata, apice obtusa vel rotundata. *Petala* hispida, circ. 2.5 cm. longa, unguibus tenuibus valde inclinatiss, calcaribus reflexis, laminis apice emarginatis recurvatis. *Filamenta* ad 8 mm. longa, usque ad medium late alata dentata vel edentata, superne filiformia, dense aureo-pilosa. *Carpella* 3, glabra, 5 mm. longa. *Folliculi* seminaeque ignota.

BHUTAN. Pang La, 4420 m., rocky hillside, 14 Aug. 1933, Ludlow & Sherriff 462 (holo. BM, iso. E).

A very beautiful and distinct plant, related to *A. pulchellum* Hand.-Mazz. of Upper Burma, Sikkim, Bhutan, S.E. Tibet, Yunnan and Sikang but readily separable by floral details. The flowers may be twice the size of those of *A. pulchellum*. Both petals and stamens are strongly hispid whereas these structures are glabrous in *A. pulchellum*. The carpels of *A. pulchellum* var. *pulchellum* and var. *hispidum* are golden pilose whereas those of *A. sherriffii* are quite glabrous. *A. pulchellum* var. *burmanicum* also has glabrous carpels but agrees with *A. pulchellum* in flower size and in having glabrous petals and stamens.

***Aconitum longipetiolatum* Lauener, sp. nov. (Figs. 1, G; 2, G)**

Species affinis *A. pulchello* Hand.-Mazz. sed inflorescentiis minute pubescentibus, staminibus petalisque hispidis, pilis carpellarum minutis sericeisque, bracteis majoribus foliatis siccis distincta.

Tubera 2.5-3 cm. longa ad 1 cm. crassa, ovata vel dauciformia. *Caulis* erectus, simplex, ad 60 cm. altus, superne pilis recurvis minute pubescens, inferne glabratus. *Folia* longe petiolata, utrinque glabra; lamina ambitu cordato-orbicularia, 4-8 cm. longa et lata, fere ad basin 3-partita segmentis rhomboideo-cuneatis lateralibus duplo latioribus 2-3-partitis, ad $\frac{1}{2}$ paucilobatis lobis lanceolatis acutis vel apiculatis 4-7 mm. latis; petioli laminis multo usque plus triplo longiores. *Inflorescentia* uniflora vel racemum laxum ad 16 cm. longum; axis pedicellisque indumento eodem ac caulis; pedicelli ad 4.5 cm. longi, apice in discum 3-4 mm. latum dilatati; bractee plus minusve sessiles foliis similes, minute pubescentes; bracteolae ad 1 cm. longae late ovatae trifidae. *Sepala* coeruleo-violacea minute puberula; cassis ascendens, navicularis, circ. 2 cm. alta, obtuse rostrata, curvatura superiore fere semicirculari inferiore concava; sepala lateralalia vix unguiculata, late atque suboblique obovata, 17 mm. longa, 8 mm. lata; inferiora oblonga vel elliptica, 10-12 mm. longa, 5 mm. lata, obtusa, deflexa. *Petala* hispida, 2 cm. longa, unguibus tenuibus apice sensim sed valde inclinatiss, calcaribus reflexis, laminis apice emarginatis inflexis. *Stamina* 8-10 mm. longa, inferne alata edentata, ultra medium filiformia, pilosa. *Carpella* 5-7, dense et brevissime sericea vel crispule pilosa. *Folliculi* seminaeque ignota.

TIBET. Tsari, Sur La, 4720 m., open rocky hillsides, beside dwarf Juniper,

15 Aug. 1936, *Ludlow & Sherriff* 2049 (holo. BM); Tsari, Bimbi La, 3960 m., on rocky steep bank, among fir trees, 6 Sept. 1936, *Ludlow & Sherriff* 2551 (BM); Tsari, Chickchar, 23 Aug. 1936, *Ludlow & Sherriff* 2491A (BM).

This distinct species obviously is closely allied to *A. pulchellum* now known to occur in Yunnan, Sikang, S.E. Tibet, Upper Burma, Sikkim and Bhutan. From *A. pulchellum* var. *pulchellum*, however, it is readily separated by its grosser habit, the whole plant, including the tubers, being much bigger; by the larger more foliaceous bracts, the minute white reflexed pubescence of the inflorescence, the hispid petals and stamens and the short white velvety indumentum of the carpels. There is also some relationship to the Bhutan *A. sherriffii*; the general facies of the two plants is the same and both have hispid petals, very similar in structure, and stamens. The flowers of *A. longipetiolatum*, however, are much smaller than those of *A. sherriffii* the carpels of which are quite glabrous.

Aconitum naviculare (Brühl) Stapf in Ann. Roy. Bot. Gard. Calc. 10 (2), 154 (1905).

This species previously has been recorded only from the high alpine zone of Chumbi and north Sikkim. The following collections show it to be by no means a rare plant in Bhutan, and in Tibet in the hills around Lhasa.

BHUTAN. Me La, N.E. Bhutan, 4115, m., on open hillsides, corolla blue violet, 23 Aug. 1949, *Ludlow, Sherriff & Hicks* 21424 (BM, E); Passu Sepu, Mande Chu, 4420 m., amongst shrubbery, perianth greenish white veined purple, red purple at the margin of all segments, 4 Sept. 1949, *Ludlow, Sherriff & Hicks* 17226 (BM, E); Tolegang, Tsampa, 4420-4570 m., in open scree, on cliff ledges and on very steep grassy banks, perianth deep blue violet striated darker, 10 Sept. 1949, *Ludlow, Sherriff & Hicks* 19727 (BM, E); Kuma Thang, 3960 m., on rocks and on grassy hill slopes, perianth pale violet, 15 Oct. 1949, *Ludlow, Sherriff & Hicks* 17475 (BM, E).

TIBET. Hills south of Lhasa, 4720 m., alpine pastures, 6' high, flowers lilac purple with dark purple veins, 21 Aug. 1942, *Ludlow & Sherriff* 9029 (BM, E); hills north of Lhasa, 4570 m., among *Potentilla fruticosa* and other shrubs on grassy hillsides, flowers purple, 10 Sept. 1943, *Ludlow & Sherriff* 9928 (BM, E).

***Aconitum creagromorphum* Lauener, sp. nov. (Figs. 1, H; 2, H)**

Proximum *A. naviculari* (Brühl) Stapf a quo pilis inflorescentiae longioribus patentioribus, bracteolis creagromorphis differt.

Tubera ignota. *Caulis* e basi saepe tenui et breviter prostrata ascendens vel erectus, 3-10 cm. altus, simplex, superne albo-hirsutus, inferne pubescens vel mox glabrescens. *Folia* basi vel supra partem prostratam caulis rosulata vel subrosulata, cordato-orbicularia vel cordato-reniformia, 1.5-3.5 cm. longa et lata, ad medium vel quartem inferum 3-5-partita, partibus obovatis plus minusve trifidis lobulis rotundatis vel apiculatis vel intermedium partibus grosse laciniato-dentatis, supra pubescentia, subtus glabra vel ad nervos parvisime pubescens; petioli 2-8 cm. longi. *Flores* 1-3 racemosi. *Bracteae* sessiles foliis similes. *Pedicelli* stricti erecti,

2-7 cm. longi, albido-hirsuti, apice in discum ad 2 mm. latum dilatati. *Bracteolae* creagromorphae, 8-12 mm. longae. *Sepala* colore rubida (ex Ludlow "maroon") longe pilosa; cassis ascendens, plus minusve navicularis, a basi ad apicem 2 cm. alta, 1 cm. lata, in rostrum progressa, sepala lateralia unguiculata, late oblique obovato-rotundata, ad 2 cm. longa, 1.5 cm. lata; sepala inferiora elliptica vel obovata, 10-13 mm. longa, 5-7 mm. lata, subdeflexa. *Petala* glabra, 15-18 mm. longa, unguibus tenuibus apice valde inclinat, calcaribus obtusis non deflexis, laminis apice emarginatis inflexis. *Stamina* circ. 5 mm. longa, inferne alata edentata, ultra medium filiformia parce albo-pilosa. *Carpella* 5, dense pilosa, 3-4 mm. longa, in stylos tenues 2 mm. longos contracta. *Folliculi* seminaque ignota.

TIBET. Kongbo, Lang La, 4570 m., in alpine zone growing on turf, 18 Oct. 1947, Ludlow, Sherriff & Elliot 13334 (holo. BM, iso. E).

This is a most charming plant closely allied to *A. naviculare* which it strongly resembles in foliage and floral characters. The bracteoles, shaped like a 3-pronged table fork (from which the specific name is derived) and occurring at the apex of the pedicel, are quite diagnostic however. There is no match for these structures in *A. naviculare* nor in other species of this alliance, *A. hookeri* Stapf, *A. handelianum* Comber, *A. pulchellum* Hand.-Mazz., *A. rotundifolium* Kar. & Kir., *A. spiripetalum* Hand.-Mazz., *A. tanguticum* (Maxim.) Stapf and *A. violaceum* Jacq.

4. THE POLYANTHUM COMPLEX

A. polyanthum (Fin. & Gagnep.) Hand.-Mazz. is so far known only to occur in the Western Chinese province of Sikang. It was described originally as a variety of *A. napellus* from several gatherings of Soulié, of which Soulié 231 has been examined at Edinburgh.

***Aconitum parapolyanthum* Lauener, sp. nov. (Figs. 1, 1; 2, 1)**

Proximum *A. polyantho* (Fin. & Gagnep.) Hand.-Mazz. a quo caulibus foliisque dense patenter pilosis, sepalis utrinque pilosis, petalis ovarisque hispidis differt.

Tubera ignota. *Caulis* erectus cum inflorescentia dense patenter pilosus. *Folia* pilosa, ambitu cordato-orbicularia, ad 8 cm. lata et longa, fere ad basin 5-secta, segmentis interioribus profunde tripartitis, segmentis extimis fere ad basin bipartitis, partibus paucilobulatis, lobulis omnibus linearibus acutis; petioli superiores ad 5 cm. longi, pilosi. *Inflorescentia* ad 30 cm. longa paniculata, ramis infimis paucifloris; bracteae omnes praeter summas folia referentes; bracteolae lineari-lanceolatae; pedicelli fere erecti, ad 2 cm. longi, apice in discum 2 mm. latum dilatati, pilosi. *Sepala* utrinque pilosa; cassis navicularis, recta, 1.5 cm. alta, 0.5 cm. lata, 2 cm. a basi ad apicem rostri brevis metiens; sepala lateralia ex ungue late oblique obovata, 1.5 cm. longa, 1 cm. lata; sepala inferiora oblonga vel ovato-oblonga, 1 cm. longa, ad 0.5 cm. lata deflexa. *Petala* hispida, cassidi aequilonga, eminentia, unguibus recurvatis ad limbum leviter geniculatis, calcaribus crassiusculis recurvatis, laminis inflexis emarginatis. *Stamina* 8-10 mm. longa, glabra, usque ad medium alata, superne filiformia. *Carpella* 5, hispida, sub anthesi 5 mm. longa. *Folliculi* seminaque ignota.

BHUTAN. Between the Me La and the Cho La, 3650 m., stony ground, among small shrubs, perianth pale blue-violet, 25 Aug. 1949, Ludlow, Sherriff & Hicks 21432 (holo. BM, iso. E).

A. polyanthum (Fin. & Gagnep.) Hand.-Mazz., *A. parapolyanthum* Lauener and *A. prominens* Lauener obviously are three very closely allied species which are somewhat isolated from each other geographically. In general facies they are all extremely similar and all are characterised by petals protruding from a shallow navicular hooded sepal. The Sikang *A. polyanthum* stands apart from the others in its crisply pubescent covering of the stems and especially of the inflorescence axis; the stems and inflorescence of the other two species are covered with long stiff patent golden hairs which in *A. parapolyanthum* are very dense. Though the general structure of the flowers is remarkably alike in all three yet there are significant differences; the sepals in the Bhutan plant are conspicuously pilose both within and without; those of *A. polyanthum* have hairs only on the margin whilst those of the Tibetan plant are completely glabrous or almost so; *A. prominens* has glabrous petals which in the other two species are hispid; on the other hand the carpels of *A. parapolyanthum* are quite markedly hispid but are glabrous in the other two species.

***Aconitum prominens* Lauener, sp. nov. (Figs. 1, J; 2, J)**

Proximum *A. polyantho* (Fin. & Gagnep.) Hand.-Mazz. a quo caulibus patenter pilosis nec crispo-pubescentibus, petalis glabris leviter geniculatis differt.

Tubera imperfecta, circ. 5 cm. longa, 0.8 cm. crassa, dauciformia. *Caulis* erectus, ad 60 cm. altus, cum inflorescentia tenuiter et patenter pilosus, foliatus. *Folia* ambitu cordato-orbicularia, ad 10 cm. lata et longa, ad basin 5-secta, segmentis ovatis, cuneatis, interioribus profunde tripartitis partibus paucipinnatis, segmentis extimis fere ad basin bipartitis partibus paucilobulatis, lobulis omnibus linearibus integris acutis, supra parce puberula, subtus glabra; petioli infimi laminis longiores, ceteri laminis aequilongi vel multo breviores. *Inflorescentia* ad 35 cm. longa, paniculata, ramis infimis paucifloris; bracteae omnes praeter summas folia referentes; bracteolae lineari-lanceolatae; pedicelli sub anthesi fere erecti, inferiores ad 3 cm. longi, superiores 1 cm. longi, apice in discum 2 mm. latum dilatati. *Sepala* atro-coerulea, extra glabra; cassis navicularis, recta, 1.5 cm. alta, ad 0.5 cm. lata, 1.5–2 cm. a basi ad apicem rostri brevis metiens; sepala lateralia ex ungue brevi late oblique obovata, circ. 1.5 cm. longa, 1.2 cm. lata, intus glabra vel sparce pubescentia, ciliata; sepala inferiora oblonga, 1 cm. longa 0.3 cm. lata, deflexa. *Petala* glabra, cassidi aequilonga, eminentia, unguibus recurvatis ad limbum leviter geniculatis, calcaribus crassiusculis recurvatis, laminis emarginatis inflexis. *Stamina* 10 mm. longa, glabra, usque ad medium alata, superne filiformia, edentata. *Carpella* 3, glabra, sub anthesi 5 mm. longa in stylos brevissimos attenuata. *Folliculi* seminaeque ignota.

TIBET. Kongbo, Nambu La, 4420 m., on moist ground, 12 July 1947, Ludlow, Sherriff & Elliot 15408 (holo. BM, iso. E).

With its navicular, very shallow hooded sepal, so shallow that the petals instead of conniving under the hood are frequently markedly

protruding, this is a most distinct species. The shape of the hooded sepal and the shape and protruding habit of the petals are characters shared by *A. polyanthum*, restricted apparently to the neighbourhood of Tongolo and Tatsienlu in Sikang and thus geographically remote from *A. prominens*, and by *A. parapolyanthum* from N.E. Bhutan.

***Aconitum lhasaense* Lauener, sp. nov.** (Figs. 1, κ ; 2, κ)

Proximum *A. polyantho* (Fin. et Gagnep.) Hand.-Mazz., a quo casside galeata longe rostrata, sepalis extra crispo-pubescentibus nec hispidis differt.

Tubera imperfecta, cylindrica vel dauciformia. *Caulis* erectus, foliatus, ad 100 cm. altus, superne cum inflorescentia crispule pubescens. *Folia* ambitu cordato-ovata vel orbicularia, utrinque fere glabra, ad basin 5-secta, segmentis profunde 2-3-partitis, partibus omnibus lobulatis lobulis oblongis vel lanceolatis acutis; petioli foliorum inferiorum laminis duplo longiores, superiores his sensim breviores. *Inflorescentia* ad 30 cm. longa; bracteae inferiores folia referentes, superiores lanceolatae et lineares; pedicelli 1-3 cm. longi apice in discum ad 2 mm. latum dilatati. *Sepala* pallido-violacea, extra crispo-pubescentia; summum galeatum ad 1.8 cm. altum, ad 1.5 cm. latum, ad 1.8 cm. a basi ad apicem rostri metiens, rostro 3-4 mm. longo; sepala lateralia late et oblique obovata, unguiculata, ciliata, 1.5 cm. longa, 1 cm. lata, intus hispida; sepala inferiora oblonga vel lanceolata ad 1.5 cm. longa, 3-4 mm. lata, deflexa. *Petala* leviter hispida, ad 1.8 cm. longa, unguibus apice inclinatis; calcaribus apice globosis recurvis, laminis inflexis emarginatis. *Stamina* 8 mm. longa, glabra, inferne alata, ultra medium filiformia. *Carpella* 5, glabra vel apice parce pilosa, 3-4 mm. longa. *Folliculi* seminaeque ignota.

TIBET. Hills South of Lhasa, 4270 m., 19 Aug. 1943, Ludlow & Sherriff 9880 (holo. BM, iso. E); Reting, 60 miles North of Lhasa, 4115 m., on open hillside, 7 Aug. 1944, Ludlow & Sherriff 11109 (BM, E).

A. lhasaense differs from *A. polyanthum* in the galeate, long-beaked hooded sepal and the crisp-pubescent sepals. It bears a close superficial resemblance to *A. rongchuense*, both having similar leaves and galeate hooded sepals although the beak of *A. rongchuense* is somewhat longer. The indumentum on the inflorescence, stem and sepals, however, is crisp pubescent in *A. lhasaense* and pilose in *A. rongchuense*.

***Aconitum rongchuense* Lauener, sp. nov.** (Figs. 1, L; 2, L)

Proximum *A. polyantho* (Fin. & Gagnep.) Hand.-Mazz., a quo caulibus pedicellisque patenter pilosis nec crispo-pubescentibus, pedicellis longioribus, casside longe rostrata galeata differt.

Tubera ignota. *Caulis* erectus superne cum inflorescentia patenter pilosa. *Folia* ambitu cordato-ovata vel orbicularia, utrinque parce pilosa, ad basin 5-secta, segmentis 2-3-partitis, partibus omnibus lobulatis lobulis ovatis vel oblongis acutis vel obtusis. *Inflorescentia* ad 35 cm. longa; bracteae inferiores folia referentes quam pedicelli longiores, superiores, lanceolatae pinnatifidae; pedicelli 1-3 cm. longi, apice in discum ad 2 mm. latum dilatati. *Sepala* utrinque leviter pilosa; summum galeatum ad 1.8 cm. altum, ad 1.5 cm. latum, 1.5 cm. a basi ad apicem rostri metiens,

rostrum 5 mm. longo; sepalia lateralalia late et oblique obovata, unguiculata, c. 1.5 cm. lata et longa; sepalia inferiore oblonga vel lanceolata 1-1.2 cm. longa, deflexa. *Petala* glabra vel parce pilosa, circ. 1.8 cm. longa, unguibus apice leviter inclinatis, calcaribus apice globosis recurvis, laminis inflexis emarginatis. *Stamina* 8 mm. longa, glabra, inferne alata, ultra medium filiformia. *Carpella* 3, apice pilosa; styli 1-3 mm. longi. *Folliculi* seminaeque ignota.

TIBET. Rong Chu, 4115 m., 20 Aug. 1934, Ludlow & Sherriff 862 (holo. BM, iso. E).

5. THE SIKANGENSE COMPLEX

Aconitum sikangense Hand.-Mazz. in Acta Hort. Gotoburg. 13, 105 (1939). TIBET. Tsangpo Valley, Tse, lat. 29°30' N., long. 94°30' E., 3810 m., among rhododendrons on edge of *Abies* forest, 1½ ft. high, perianth violet or purplish violet, anthers black purple, little seen, 4 Aug. 1938, Ludlow & Sherriff 6007 (BM).

A. sikangense was collected by Dr. Harry Smith in the Taofu and Tachienlu districts of Sikang in 1934 and has not been recorded elsewhere. Therefore, as might be expected from a plant so geographically distinct, the gathering from S.E. Tibet is by no means typical of the Sikang plant which is a species of some 100 cm. tall with leaves 3-5 partite almost to the base and long acuminate terminal segments. The leaves of the Ludlow and Sherriff specimen are rather more deeply cut and the leaf segments narrower; the inflorescence is fewer flowered and rather more lax. Structurally the flowers show no significant differences. It may be that future gatherings of the Tsangpo Valley plant will make it necessary to describe it as a new species.

Aconitum tsangpoense Lauener, sp. nov. (Figs. 1, M; 4, A)

Proximum *A. sikangensi* Hand.-Mazz. a quo floribus sordido-albis nec coeruleis caulibus pedicellisque crispo-pubescentibus nec patule velutinis differt.

Tubera ignota. *Caulis* erectus, 90-150 cm. altus, superne dense foliatus et crispo-pubescent, inferne glabrescent. *Folia* infima ignota, superiora ambitu cordato-ovata, 6-10 cm. lata et longa, ad 5 mm. supra basin 3- vel 5-partita, partibus interioribus alte tripartitis, partibus exterioribus profunde inaequaliter bipartitis, partibus paucilobulatis, lobulis oblongis vel ovatis, apice rotundatis vel apiculatis, supra in nervis parcesime pubescentia, subtus nervis valde prominulis; petioli superiores 2-4 cm. longi. *Racemus* densus, 12-15 cm. longus; bractae infimae folia referentes, quam pedicelli longiores, ceterae cum bracteolae lanceolatae; pedicelli 1-2 cm. longi, crispo-pubescentes, erecto-patentes, apice in discum ad 2 mm. latum dilatati. *Sepala* sordido-alba, extra minute crispo-pubescentes, intus pilosa; summum galeatum, 1.7-2 cm. altum, 1 cm. latum, 1.5 cm. a basi ad apicem rostri metiens, rostro 3-5 mm. longo apice paulo deflexo; sepalia lateralalia ex ungue brevi late oblique obovata, ad 1.5 cm. longa, 1.2 cm. lata; inferiora oblonga 1 cm. longa ad 0.5 cm. lata, deflexa. *Petala* hispida, ad 1.5 cm. longa, unguibus leviter inclinatis, calcaribus apice vix globosis recurvis, laminis emarginatis inflexis. *Stamina* 8 mm. longa, glabra, inferne alata edentata ultra medium

filiformia. *Carpella* 3-5, glabra vel parce pubescentia, 5 mm. longa in stylis 2 mm. longos attenuata. *Folliculi* seminaque ignota.

TIBET. Tsangpo Valley, Nye, 3650-3960 m., common in alpine pastures amongst shrubs and in open yak meadows, height 3-5 ft., flowers dirty white, 3 Sept. 1935, *F. Kingdon Ward* 12301 (holo. BM).

Clearly closely allied to *A. sikangense* Hand.-Mazz. known from the Kangting (Tachienlu) and Taofu (Dawo) districts of Sikang as well as from the Tsangpo Valley of S.E. Tibet, but differing chiefly in the colour of the flowers and in the indumentum. *A. tsangpoense* obviously is of the same kinship as *A. kongboense* Lauener for the colour of the flowers and the structure of the various floral parts are essentially the same. From *A. kongboense*, however, *A. tsangpoense* differs in its short compact racemose inflorescence which is very different from the long pyramidal inflorescence with long basal branches of the other species.

***Aconitum kongboense* Lauener, sp. nov. (Figs. 1, N; 4, B)**

Proximum *A. sikangense* Hand.-Mazz. a quo caulibus pedicellisque crispo-pubescentibus nec patule velutinis, inflorescentiis longioribus, floribus albis purpureo-tinctis nec coeruleis differt.

Tubera (imperfecta) 8 cm. longa, 1.5 cm. crassa, cylindrica. *Caulis* erectus, robustus, ad 180 cm. altus, superne cum inflorescentia crispule-pubescent, simplex vel ascendenti-ramosus. *Folia* ambitu cordato-ovata, plus minusve pentagona, ad 15 cm. longa et lata, fere ad basin 3- vel 5-partita, partibus lateralibus profunde inaequaliter bipartitis, omnibus plus minusve rhombeis, profunde laciniatis laciniis dentato-lacinulatis lacinulis oblongis vel lanceolatis obtusis vel acutis, utrinque glabra vel subtus in nervis prominulis parce pubescentia; petioli infimi laminis aequilongi, plurimi autem multo breviores. *Racemus* ad 40 cm. longus, multiflorus, ramis additis, paniculatus; pedicelli 1-4 cm. longi, apice in discum ad 3 mm. latum dilatati; bractee infimae folia referentes, quam pedicelli longiores, ceterae lanceolatae vel subulatae. *Sepala* alba, purpureo-tincta, extra pilosa vel glabra intus hirsuta; summum galeatum, 2-2.5 cm. altum, 1-1.5 cm. latum, 1.5-2 cm. a basi ad apicem rostri metiens, rostro circ. 0.5 cm. longo; sepala lateralia late et oblique obovata, 1.5 cm. longa et lata; sepala inferiora elliptica vel lanceolata, obtusa, 1.3-1.5 cm. longa, deflexa. *Petala* parce hispida, circ. 1.8 cm. longa, unguibus apice leviter inclinis, calcaribus apice globosis valde recurvis, laminis emarginatis inflexis. *Stamina* 8 mm. longa, glabra, inferne alata edentata, ultra medium filiformia. *Carpella* 3-4, glabra vel parce albo-pubescentia; styli 3 mm. longi. *Folliculi* seminaque ignota.

TIBET. Kongbo, Tongshong, Gyamda Chu, lat. 29°52' N., long. 93°48' E., 3050 m., on grassy banks and amongst open scrub, 14 Aug. 1938, *Ludlow, Sherriff & Taylor* 6831 (holo. BM, iso. E); Kongbo, Gyara, 3510 m., on dry ground, 22 July 1947, *Ludlow, Sherriff & Elliot* 15509 (BM, E); Kongbo, Je, Pasum Laka, 3650 m., in *Picea* forest, 15 July 1947, *Ludlow, Sherriff & Elliot* 14138 (BM); Kongbo, Miling, Tsangpo Valley, lat. 29°15' N., long. 94°00' N., 3050 m., on the edge of scrub forest, 3-6 ft. high, perianth white, faintly suffused blue violet, 3 July 1938, *Ludlow, Sherriff & Taylor* 5727 (BM).

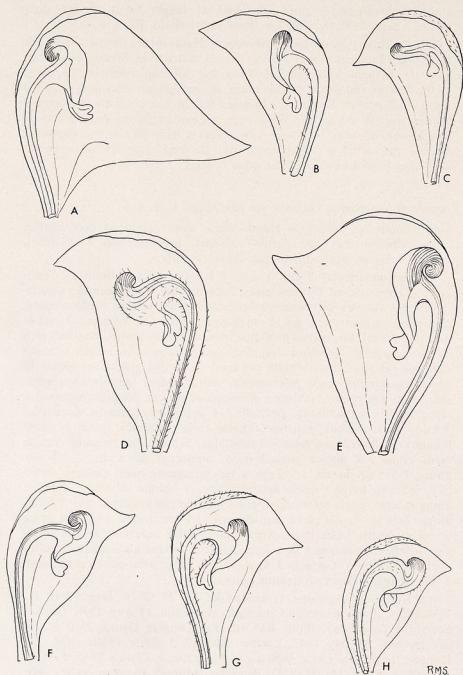


FIG. 3. Sepals and petals of A. *Aconitum dhwojii*; B. *A. nepalense*; C. *A. bhedingense*; D. *A. brevilimbium*; E. *A. elliotii*; F. *A. tsariense*; G. *A. viridiflorum*; H. *A. longipedicellatum*. All $\times 2$.



FIG. 4. Leaves of A. *Aconitum tsangpoense*; B. *A. kongboense*; C. *A. assamicum*; D. *A. elliotii*; E. *A. tsariense*; F. *A. longipedicellatum*; G. *A. brevilimbium*; H. *A. viridiflorum*; I. *A. dhwojii*; J. *A. nepalense*; K. *A. bhedingense*. All $\times \frac{1}{2}$.

6. THE STYLOSUM COMPLEX

A. stylosum Stapf var. *stylosum* from Yunnan and S.E. Tibet is a stout plant with large leafy bracts. It has blue or purplish violet flowers and therein differs from its near ally *A. souliei* which has smaller yellow flowers and shorter lateral sepals.

Aconitum stylosum Stapf var. *doshongense* Lauener, var. nov.

Proximum *A. styloso* Stapf a quo petalis ovariisque glabris nec pilosis differt.

TIBET. Kongbo, Doshong La, Tsangpo Valley, lat. 29°29' N., long. 94°59' E., 4115 m., 16 July 1938, *Ludlow, Sherriff & Taylor* 5274 (holo. BM, iso. E).

Aconitum elliotii Lauener, sp. nov. (Figs. 3, E; 4, D)

Proximum *A. taronensi* (Hand.-Mazz.) Fletcher & Lauener, a quo floribus maioribus, pedicellis longioribus, inflorescentiis brevioribus lateralibusque, ovariis glabris nec pilosis differt.

Tubera ignota. *Caulis* erectus, foliatus, superne patule hirsutus. *Folia* numerosa, basalia ignota; petioli 1.5–4 cm. longi, glabrati; laminae utrinque glabrae, ambitu late ovatae, basi cordatae, ad 12 cm. longae et latae, ad 1 cm. supra basin tripartitae, segmento intermedio rhomboideo-cuneato vel sublanceolato, 3-lobo lobis alte crenato-serratis crenis latiusculis apiculatis, segmentis lateralibus oblique ovatis inaequaliter bilobis, ceterum intermedio similibus; folia summa minora et minus divisa. *Inflorescentiae* paniculatae, laxae, ad 30 cm. longae, ubique patule aureo-pilosae; bracteae inferiores in folia abeuntes, superiores ovatae vel lanceolatae, utrinque dentibus 1–2 magnis triangularibus instructae; bracteolae lanceolato-lineares vel lineares; pedicelli ad 6 cm. longi, apice in discum pilosum ad 4 mm. latum dilatati. *Sepala* purpurea, albo-tincta, glabra; summum galeatum, 2.5–3 cm. altum, 1.5–2 cm. latum, 2.5–3 cm. a basi ad apicem rostri metiens; sepala lateralialia plus minusve rotundata, 2 cm. longa, intus aureo-hirsuta; sepala inferiora elliptica oblongo-elliptica vel lanceolata, 1.5 cm. longa, intus hirsuta, deflexa. *Petala* glabra, circ. 2 cm. longa, unguibus apice leviter inclinatis, calcaribus apice globosis valde recurvis, laminis emarginatis inflexis. *Stamina* circ. 1 cm. longa, glabra, parte alata 7 mm. longa, dentata, subito contracta. *Carpella* 5, glabra, sub anthesi 7 mm. longa. *Fructus* ignotus.

TIBET. Kongbo, Doshong La, 3350 m., open glades in Conifer woodland, calyx purple, greenish white at base internally, 15 Aug. 1947, *Ludlow, Sherriff & Elliot* 14346 (holo. BM, iso. E).

A. elliotii is a very beautiful plant most closely allied to *A. taronense* (Hand.-Mazz.) Fletcher & Lauener. This latter species, showing kinship with *A. stylosum* Stapf, is apparently known only from Taron, between the Salwin and Irrawaddy Rivers. The two plants show marked resemblances to each other in such characters as indumentum and the shape of the leaves, sepals and petals. But the inflorescence of *A. elliotii* is shorter and broader, the flowers larger, the carpels glabrous and the plant as a whole much more handsome than *A. taronense*.

***Aconitum longipedicellatum* Lauener, sp. nov. (Figs. 3, H; 4, F)**

Proximum *A. styloso* Stapf a quo caulibus pubescentibus nec pilosis, petalis hispidis, pedicellis tenuioribus erectioribusque differt.

Tubera ignota. *Caulis* erectus, foliatus, ad 80 cm. altus, inferne demum glabratus, superne pilis recurvis minute pubescens. *Folia* basalia intermediae longe petiolata, superiora paniculae ramos vel flores subtendentia multo brevius petiolata vel sessilia; laminae glabrae, ambitu late cordato-ovatae, usque ad 10 cm. longae et latae, ad 5-7 mm. supra basin 3-partitae, segmento intermedio rhomboideo basi cuneato, 3 partito, segmentis lateralibus profunde inaequaliter 2-partitis, omnibus grosse dentatis, dentibus ovatis acutis vel apiculatis; petioli ad 25 cm. longi. *Inflorescentia* erecta ad 40 cm. longa, laxiuscula, paniculata, pubescentia, foliata, ramis infimis 3-4 floris; bracteae omnes praeter summas folia referentes; bracteolae pedicellorum inferiorum foliosae, superiorum minutae lanceolatae; pedicelli 3-9 cm. longi, graciles, arcuati, apice in discum 3 mm. latum dilatati. *Sepala* caeruleo-violacea, extra puberula; cassis sub-galeata, margine inferiore concavo, 1.5-2 cm. alta, 1 cm. lata, 1.3-2 cm. a basi ad apicem rostri brevis metiens; sepala lateralalia oblique obovata exunguiculata 1.5 cm. lata et longa; sepala inferiora ovato-lanceolata vel elliptica, obtusa, 1-1.5 cm. longa, 0.5 cm. lata, descendunt. *Petala* hispida, cassidi aequilonga, apice valde curvato-inclinata, laminis leviter emarginatis vel integris inflexis in calcaria recurvata gibbosa producta. *Stamina* 8-10 mm. longa, hispida, dentata vel edentata, inferne alata, ultra medium filiformia. *Ovaria* 5, sericeo-pilosa, 6 mm. longa, in stylos 1.5 mm. longos producta. *Folliculi* seminaeque ignota.

TIBET. Chosan, Tsari, alt. 4270 m., amongst shrub on steep hillside, perianth and filaments blue violet, 21 Aug. 1936, Ludlow & Sherriff 2100 (holo. BM, iso. E).

With its long lax inflorescence and slender arching pedicels, *A. longipedicellatum* is a very distinct and striking species.

***Aconitum tsariense* Lauener, sp. nov. (Figs. 3, F; 4, E)**

Proximum *A. styloso* Stapf a quo petalis carpellisque glabris, casside naviculare differt.

Tubera dauciformia vel cylindrica, 3-4 cm. longa, 1-1.5 cm. crassa, squamis parvis ovatis obsita. *Caulis* erectus, ad 90 cm. altus, patenter aureo-pilosus. *Folia* infima sub anthesi emortua, intermedia ambitu late cordato-ovata vel cordato-orbicularia, usque ad 8 cm. diametro, ad 2/3 3-partita, segmento intermedio rhomboideo basi late cuneato 3-partito, segmentis lateralibus inaequaliter 2-partitis, omnibus profunde laciniatis laciniis dentato-lacinulatis lacinulis vel dentibus acutis vel apiculatis, utrinque praesertim ad nervos parce strigillosa, subtus nervis prominulis; petioli intermedii ad 5 cm. longi; folia superiora paniculae ramos vel flores subtendentia, multo brevis petiolata. *Inflorescentia* erecta 10-30 cm. longa, paniculata, laxiuscula, aureo-pilosa, foliata, ramis infimis 2-4-floris; bracteae omnes praeter summas folia referentes; bracteolae pedicellorum inferiorum foliosae ovatae laciniato-dentatae, superiorum lineares; pedicelli 1-5 cm. longi leviter pilosi, apice in discum glabrum 3 mm. latum dilatati. *Sepala* caeruleo-violacea vel alba et purpureo-tincta, extra

glabra; summum naviculare, 2 cm. altum, ad 1 cm. latum, 2-2.5 cm. a basi ad apicem rostri brevis acuti metiens; sepala lateralia ex ungue brevi lato oblique orbicularia, 1.7-2 cm. lata et longa; sepala inferiora oblique oblonga vel obovata, 1.7 cm. longa, 0.5 cm. lata, intus leviter hirsuta. *Petala* glabra, circ. 1.8-2 cm. longa, unguibus valde inclinat, calcaribus apice globosis recurvis, laminis inflexis emarginatis. *Stamina* 1 cm. longa, glabra, parte alata 5-6 mm. longa, bidentata, superne filiformia. *Carpella* 3-5, glabra, in stylos 3 mm. longos attenuata. *Folliculi* seminaeque ignota. TIBET. Chickchar, Tsari, 4420 m., on open stony grassy hillside, perianth rich blue violet, 23 Aug. 1936, Ludlow & Sherriff 2491 (holo. BM); Takar La, W. Tsari, 4270 m., height 2-3 feet, perianth white, faintly tinged purple, 15 Aug. 1936, Ludlow & Sherriff 2076 (BM, E); Kongbo, Deyang La, 4115 m., grassy stony slopes, 8 Aug. 1947, Ludlow, Sherriff & Elliot 14261 (BM, E).

A. tsariense is another species closely allied to *A. stylosum* Stapf, differing not only in the glabrous petals and carpels but also in the navicular hooded sepal. The glabrous petals and carpels, the structure of the petals and the shape of the leaves relate it also to *A. elliotii*, but the leaves of *A. tsariense*, are smaller, slightly hairy, and carried on longer petioles and its flowers are smaller.

***Aconitum brevilibum* Lauener, sp. nov. (Figs. 3, D; 4, G)**

Proximum *A. styloso* Stapf a quo inflorescentiis longioribus angustioribus crispo-pubescentibus nec aureo-pilosis, staminibus hispidis differt.

Tubera imperfecta, cylindrica, 6 cm. longa, 1.5 cm. crassa. *Caulis* erectus, foliatus, ad 150 cm. altus, praesertim superne cum inflorescentia dense et minutissime aureo-crispo-pubescent. *Folia* basalia longe petiolata, superiora flores subtendentia multo brevius petiolata vel subsessilia, ambitu late ovata vel orbicularia, circ. 8 cm. longa, 8-10 cm. lata, basi cordata, subtus in nervis parcissime crispo-pilosula, ad 1 cm. supra basin 3-partita, segmento intermedio ad 5.5 cm. longo, ad 4.5 cm. lato, basi cuneato, 3-partito, segmentis lateralibus profunde inaequaliter 2-partitis, omnibus grosse laciniatis, laciniis ovatis vel oblongis, obtusis vel rotundatis vel apiculatis, subtus nervis prominulis; petioli infimi ad 18 cm. longi, ceteri brevissimi, pubescentes demum glabrati. *Inflorescentia* erecta ad 55 cm. longa, laxiuscula, foliata; bracteae omnes praeter summas folia referentes; bracteolae pedicellorum inferiorum foliosae, superiorum minutae lanceolatae; pedicelli ad 15 cm. longi, erecti vel erecto-patentes, in discum 3-4 mm. latum dilatati. *Sepala* coeruleo-violacea vel atro-rubra extra puberula; cassis galeata, 2 cm. alta, 2 cm. a basi ad apicem rostri brevis metiens, 1 cm. lata; sepala lateralia oblique obovata, unguiculata, 2 cm. longa, 1 cm. lata, intus pilosa; sepala inferiora late ovata vel elliptica, 1.5 cm. longa, 0.8 cm. lata, exungiculata, obtusa, intus pilosa, margine ciliata. *Petala* valde hispida, cassidi aequilonga, unguibus apice valde inclinat, calcaribus apice globosis recurvis, laminis brevibus leviter emarginatis inflexis. *Stamina* ad 1 cm. longa, hispida, parte alata 5-6 mm. longa, dentata, superne filiformia. *Ovaria* 3, breviter sericeo-pilosa, ad 5 mm. longa, in stylos brevissimos attenuata. *Folliculi* seminaeque ignota.

TIBET. Kongbo, Kucha La, near Paka, 4270 m., lat. N. 29°15', long. E.

94° 25', common on open stony hillsides, 25 July 1938, *Ludlow, Sherriff & Taylor* 5937 (holo. BM, iso. E); Tsanang La, near Paka, 3300 m., lat. N. 29° 15', long. E. 94° 15', in clearings in *Abies* forest, 16 July 1938, *Ludlow, Sherriff & Taylor* 5842 (BM).

A. brevilibum is clearly an ally of *A. stylosum* of Yunnan and S.E. Tibet but the two can be readily distinguished by characters of the indumentum; in the former it is very short and adpressed whereas in the latter it is long and outspreading. There are other significant differences. The inflorescence in *A. brevilibum* is narrow; that of *A. stylosum* much longer and broader, more lax and more branched. In *A. brevilibum* the stamens are hispid and the carpels minutely adpressed-pubescent; in *A. stylosum* the stamens are glabrous and the carpels golden-pilose. Though the petals in both species are hispid those of *A. brevilibum*, with their short limb (hence the specific name), are quite distinct. In foliage characters the two species are remarkably alike.

***Aconitum viridiflorum* Lauener, sp. nov. (Figs. 3, G; 4, H)**

Proximum *A. piepunensi* Hand.-Mazz. a quo inflorescentiis crispo-pubescentibus nec aureo-pilosis, magis ramosis differt.

Tubera imperfecta, cylindrica, ad 6 cm. longa, 1.5 cm. crassa, apice squamis ovatis obsita. *Caulis* erectus, robustus, imperfectus, praesertim superne cum inflorescentia minutissime crispo-pilosus. *Folia* basalia intermediaeque ignota, superiora paniculae ramos subtendentia; petioli superiores ad 12 cm. longi; laminae, glabrae praeter margines et nervos supra parce minuteque pubescentes, ambitu cordato-orbiculares vel cordato ovatae, ad 3-5 mm. supra basin 3-partitae, segmento intermedio ad 10 cm. longo, ad 7 cm. lato, basi cuneato, profunde 3-partito, segmentis lateralibus ad 1.5 cm. supra basin 2-partitis, omnibus profunde laciniatis laciniis dentato-lacinulatis lacinulis vel dentibus apiculatis. *Inflorescentia* imperfecta, paniculata, ramis ad 35 cm. longis; bracteae omnes praeter summas folia referentes; bracteolae foliosae vel minutae lanceolatae; pedicelli 1-6 cm. longi fere erecti vel erecto-patentes, apice in discum 2 mm. latum dilatati. *Flores* virido-albi obscure purpurei suffusi, extra crispule pubescentes; cassis navicularis usque galeata, margine inferiore leviter concavo, 1.5-1.8 cm. alta, 1.5 cm. a basi ad apicem rostri brevis metiens, 0.7-1 cm. lata; sepala lateralia oblique obovata, unguiculata 1.5 cm. longa, 1.2 cm. lata, intus pilosa ciliata; sepala inferiora oblique elliptica vel oblonga 10-12 mm. longa, 3-5 mm. lata paulo descendentia. *Petala* hispida, cassidi breviora vel aequilonga, unguibus apice valde inclinat, calcaribus apice globosis recurvis, laminis brevibus leviter emarginatis inflexis. *Stamina* 8-10 mm. longa, glabra, inferne alata edentata ultra medium filiformia. *Ovaria* 5 breviter pilosa ad 5 mm. longa in stylos tenues 2 mm. longos contracta. *Folliculi* seminaeque ignota.

TIBET. Kongbo, Nam La, alt. 4420 m., on cliffs, greenish white faintly tinged mauve, 4 Sept. 1947, *Ludlow, Sherriff & Elliot* 14487 (holo. BM); Gyandro, Chayul Charme, 4270 m., on open stony ground, 5 or 6 ft. tall, palest mauve tinged green, 26 July 1936, *Ludlow & Sherriff* 2433 (BM, E).

Aconitum viridiflorum is a very distinct species by reason of the branched inflorescence. Apart from its relationship to the Yunnan and Sikang *A. piepunense* Hand.-Mazz., there is also kinship with *A. brevilibum*

Lauener, also found in the Kongbo district of S.E. Tibet. Both have the same pale golden crisp pubescence. Structurally the flowers of the two are the same though those of *A. viridiflorum* are smaller, more pubescent without and of a different colour "greenish white faintly tinged mauve" and not blue violet. The leaves of *A. viridiflorum* are more deeply cut and the segments proportionately narrower. In fact the cutting of the leaves more closely approaches *A. longipedicellatum* Lauener which, however, has much narrower lower sepals, more slender graceful pedicels and a sparser indumentum.

7. THE LACINIATUM COMPLEX

Aconitum laciniatum (Brühl) Stapf in Ann. Roy. Bot. Gard. Calc. 10 (2), 168 (1905).

BHUTAN. Central Bhutan, Rinchen Chu, 4570 m., perianth pale milky blue, hood tinged dull red, 14 July 1937, *Ludlow & Sherriff* 3448 (BM, E); Chelai La, Ha, 3810 m., fairly common in fir forest, perianth deep purple, 13 Aug. 1949, *Ludlow, Sherriff & Hicks* 19609 (BM, E); East Bhutan, Pang La, 3650 m., amongst other herbs on grassy hillside, flowers deep purple, 9 July 1949, *Ludlow, Sherriff & Hicks* 20864 (BM, E).

NEPAL. Shebal Joong, 5640 m., 5 Sept. 1927, *Wigram* 110 (E); Pach Pokhri, 3960–4720 m., 1927, *Wigram* 92 (E); *sine loc.* 1928, *Lall Dhwoj* 33 (*pro parte*-E); Chilime Kharka, 4115 m., scree, rich blue, July 1949, *Polunin* 1156 (BM); across Gangja La and down Palchock Danda, 4570 m., 10–17 Sept. 1949, *Polunin* 1975 (BM).

The above gatherings represent extensions in the range of this species which has been frequently collected in the subalpine and alpine Himalaya of Sikkim and adjoining Tibet.

Aconitum spicatum (Brühl) Stapf in Ann. Roy. Bot. Gard. Calc. 10 (2), 165 (1905).

BHUTAN. Me La, 4420 m., 24 Aug. 1934, *Ludlow & Sherriff* 884 (BM, E); Tranga, Upper Pho Chu, 4270 m., amongst boulders, up to 6 ft. high, perianth white veined violet, 17 Sept. 1949, *Ludlow, Sherriff & Hicks* 17262 (BM); Leji, Upper Pho Chu, 3810 m., amongst rocks and boulders on the edges of fields, and on cliffs, grows to a height of 6 feet, perianth mauve, 24 Sept. 1949, *Ludlow, Sherriff & Hicks* 17279 (BM); Barshong, Thimbu Chu, 3510 m., in fruit, 15 Oct. 1949, *Ludlow, Sherriff & Hicks* 17522 (BM); Pangotang, Tsampa, 3810 m., on open clearings in fir forests, common, up to 4½ ft. high, perianth blue violet, faintly striated darker, 13 Sept. 1949, *Ludlow, Sherriff & Hicks* 19736 (BM, E).

NEPAL. *sine loc.*, 1928, *Lall Dhwoj* 33 (*pro parte*-E); 1929, *Lall Dhwoj* 224 (E); Soomsong Khang, 3650–3960 m., flowers blue, *Lall Dhwoj* 409 (E).

A fairly common plant in the alpine zone of the Himalaya of Sikkim and Chumbi, this species is now known to occur in Bhutan and Nepal.

Aconitum nepalense Lauener, *sp. nov.* (Figs. 3, B; 4, J)

Proximum *A. spicato* (Brühl) Stapf a quo caulibus inflorescentisque brevioribus, pedicellis plus minusve crispo-pubescentibus nec patenter hirsutis differt.

Tubera cylindrica, vel dauciformia ad 10 cm. longa, 1 cm. crassa.

Caulis erectus, foliatus, ad 35 cm. altus. *Folia* ambitu orbicularia, ad 8 cm. lata et longa, 5–10 mm. supra basin 3-secta, segmentis 2–3-partitis, partibus omnibus profunde lobulatis, lobulis ovatis vel oblongis acutis; supra parcissime pubescentia vel glabra, petioli ad 10 cm. longi. *Inflorescentia* ad 10 cm. longa, compacta, pauciflora; bracteae inferiores folia referentes, superiores ovatae vel oblongae integrae vel lobatae; pedicelli 10–15 mm. longi, apice in discum 5 mm. latum dilatati. *Sepala* caerulea; cassis 2–2.5 cm. alta, 1–1.2 cm. lata, curvatura superiore fere semicirculari inferiore perconcava; sepala lateralalia late atque suboblique obovata, circiter 2 cm. longa, inferiora oblonga, ad 15 cm. longa, 5–7 mm. lata, paulo descendencia. *Petala* hispida, unguibus ad medium inclinatis, calcaribus subglobosis recurvis, laminis emarginatis inflexis. *Stamina* 8–10 mm. longa, glabra, inferne alata, ultra medium filiformia. *Ovaria* dense hirsuta 5 mm. longa. *Folliculi* seminaque ignota.

NEPAL. Chuwar, 6400 m., flowers blue, 14 Aug. 1932, K. N. Sharma E. 422 (holo. BM); Gosignkund, 5180 m., flowers bluish, 24 June 1931, K. N. Sharma E. 94 (BM); Chilime Kharka, 3960 m., grassland, deep blue, July 1949, O. Polunin 1225 (BM).

I was at first inclined to regard these collections as representing a dwarf, few-flowered, high elevation form of *A. spicatum* (Brühl) Stapf which does extend from Sikkim, Chumbi and Bhutan into Nepal. Typical *A. spicatum*, however, has the stem and inflorescence covered with a heavy outspreading indumentum and the leaf segments much more sharply and deeply toothed.

***Aconitum dhwojii* Lauener, sp. nov. (Figs. 3, A; 4, 1)**

Proximum *A. laciniato* (Brühl) Stapf a quo inflorescentiis aureo-pilosis nec crispo-pubescentibus, sepalis et petalis genitalisque glabris differt.

Tubera imperfecta, 4 cm. longa, ad 1.2 cm. crassa, cylindrica. *Caulis* ad 50 cm. altus, superne aureo-tomentellus, inferne mox glabrescens, simplex. *Folia* ambitu cordato-orbicularia vel cordato-ovata, ad 3 mm. supra basin 3-partita, segmento intermedio 5–7 cm. longo et 2–4 cm. lato, basi late cuneato, lateralibus 4–6 cm. longis profunde inaequaliter 2-partitis, omnibus profunde laciniatis laciniis dentato-lacinulatis lacinulis vel dentibus apiculatis, utrinque praesertim ad nervos parce curvulo-strigillosa, subtus nervis valde prominulis; petioli 1–4 cm. longi pilosi. *Inflorescentia* aureo-pilosa, racemum laxum ad 10 cm. longum referens; pedicelli ad 4 cm. longi, apice in discum ad 5 mm. latum dilatati; bracteae omnes praeter summas folia minora referentes, quam pedicelli longiores. *Sepala* caeruleo-violacea? glabra; summum galeatum, circ. 2.5 cm. altum, 3 cm. a basi ad apicem rostri brevis obtusi metiens, 1.5 cm. latum; lateralalia ex ungue brevi lato oblique orbicularia, circ. 2.3 cm. longa et lata; inferiora late elliptica, circ. 2 cm. longa, 1 cm. lata, subdeflexa. *Petala* glabra unguibus tenuibus 2 cm. longis, laminis emarginatis, calcaribus recurvis. *Stamina* circ. 10 mm. longa, glabra, inferne alata dentata vel edentata ultra medium filiformia. *Ovaria* 5, glabra, 4 mm. longa, in stylis tenues 3 mm. longos contracta. *Folliculi* immaturi? 1 cm. longi glabri.

NEPAL. Khorlak, 4570–4880 m., 1929, Lall Dhwoj 29 (holo. BM, iso. E).

Readily distinguished from *A. laciniatum* and *A. spicatum* by the larger

flowers with glabrous sepals, petals and genitalia. *A. dhwojii* is related also to *A. nepalense* from which it differs not only in the larger flowers and glabrous carpels but in the more lax inflorescence, longer pedicels and shorter follicles.

8. THE HETEROPHYLLOIDES COMPLEX

Aconitum heterophylloides (Brühl) Stapf in Ann. Roy. Bot. Gard. Calc. 10 (2), 171 (1905).

BHUTAN. Saga La, Upper Mangde Chu, 4420 m., amidst shrubs in boulder strewn ravines, perianth greenish white, the hood with a brownish purple tinge, 15 July 1949, *Ludlow, Sherriff & Hicks* 16852 (BM, E); Thampe La, 4570 m., amongst rhododendron bushes, perianth whitish with a certain amount of purple on the hood, and on the edges of the lateral segments, 14 Aug. 1949, *Ludlow, Sherriff & Hicks* 17135 (BM, E); Ju La, Dhur Chu, 4420 m., on open rocky hillside, among *Meconopsis paniculata*, rhododendrons etc., perianth white, 20 July 1949, *Ludlow, Sherriff & Hicks* 19468 (BM, E); Donga La, 3780 m., open places near rhododendron forest, flowers white, marked with green and purple, 12 Aug. 1949, *Ludlow, Sherriff & Hicks* 21013 (BM, E).

A. heterophylloides for long has been known to occur in the alpine Himalaya of Sikkim and, if one regards *A. leucanthum* (Brühl) Stapf as nothing more than a less robust form, in the adjoining parts of Tibet as well. Not surprisingly, therefore, it is also present in Bhutan where it was gathered on several occasions in 1949 by Ludlow, Sherriff and Hicks.

Aconitum bhedingense Lauener, sp. nov. (Figs. 3, c; 4, κ)

Proximum *A. heterophylloides* (Brühl) Stapf a quo caulibus pedicellisque patenter pilosis nec crispo-pubescentibus, staminibus petalisque glabris differt.

Tubera imperfecta, 5 cm. longa, ad 1.5 cm. crassa, dauciformia. *Caulis* erectus, 25–40 cm. altus, superne albo-pilosus, inferne mox glabrescens. *Folia* basalia ignota; cetera ambitu cordato-ovata, ad 1 cm. supra basin 3-partita, segmento intermedio ad 4 cm. longo, 2–3 cm. lato, basi cuneato, lateralibus 2.5–3 cm. longis inaequaliter 2-partitis, omnibus profunde laciniatis, laciniis dentato-lacinulatis, utrinque glabra vel subtus ad nervos parvisime pubescens; petioli 3–6 cm. longi plus minusve glabri. *Racemus* laxus erectus 8–13 cm. longus; axis primarius albo-pilosus; bractee infimae foliaceae, ceterae folia minora referentes, quam pedicelli multo breviores; pedicelli 2–4 cm. longi, albo-pilosi, apice in discum ad 2 mm. latum dilatati. *Sepala* caerulea albo-pilosa; summum galeatum, erectum, brevirostratum, 1.5–2 cm. altum, 1.3–1.6 cm. a basi ad apicem rostri metiens, circ. 8 mm. latum; sepala lateralia ex ungue brevi oblique obovata, 1.5 cm. longa, circ. 1 cm. lata; sepala inferiora oblonga vel elliptica, obtusa, 8–10 mm. longa, 4–5 mm. lata, subdeflexa. *Petala* glabra, 1.7–2 cm. longa, unguibus apice sensim sed valde inclinis, calcaribus leviter recurvis, laminis apice emarginatis inflexis. *Stamina* 7–8 mm. longa, glabra, inferne alata edentata, ultra medium filiformia. *Carpella* 5, aureo- et sericeo-pilosa; stylis 2–3 mm. longis. *Folliculi* ignoti.

NEPAL. Bheding, 3650–3960 m., flowers blue, root bark purple, 1930, *Lall Dhwoj* 325 (holo. E, iso. BM).

The affinity of *A. bhedingense* with the Sikkim and Bhutan *A. heterophylloides* and the Sikkim and Tibetan *A. leucanthum* (if indeed these two be really distinct) is quite evident. At the same time there should be no cause for confusion. *A. heterophylloides* is covered with an adpressed indumentum, whereas the indumentum of *A. bhedingense* is spreading and is confined to the sepals, carpels, pedicels and the upper part of the inflorescence axis; the leaves are almost completely glabrous and thus unlike those of *A. heterophylloides*. Stamens and petals, very hispidulous in *A. heterophylloides*, are quite glabrous in *A. bhedingense*. The Sikkim plants in the past have been confused with the Nepal *A. ferox* Wall. and unquestionably there is close relationship between this species and *A. bhedingense*. The shape of the petals is the same and both have glabrous stamens, and carpels covered with spreading silky golden hairs. The only significant difference in the structure of the petals lies in the fact that the petal limb of *A. ferox* is usually entire, lanceolate and acute whereas that of *A. bhedingense* is shorter, markedly obovate and slightly emarginate. Foliage characters are a ready means of separation, the 3-partite leaves of *A. bhedingense* being very distinct from the 5-pedatipartite leaves of *A. ferox*.

9. THE OROCHRYSEUM COMPLEX

Aconitum orochryseum Stapf in Kew Bull. 1922, 149, (1922).

NEPAL. Pach Pokhri, 3960–4720 m., flowers whitish yellow, Wigram 90 (E); Tangba, 4270–4570 m., flowers pale yellow, Lall Dhwoj 228 (E); *sine loc.*, Lall Dhwoj 4, 37, 38 (E); Chilime Kharka, 4900 m., forest edge, flowers yellow, but a little greenish, July 1949, Polunin 1203 (BM, E).

BHUTAN. Tolegang, Tsampa, 4115–4270 m., in juniper scrub on steep hillsides, perianth almost white, slightly tinged yellow and blue, 10 Sept. 1949, Ludlow, Sherriff & Hicks 19719 (BM, E); Thampe La, 4720 m., in boulder scree, perianth pale lemon yellow, 13 Aug. 1949, Ludlow, Sherriff & Hicks 17122 (BM, E).

This usually yellow flowered species was collected by A. F. R. Wollaston on Mount Everest in 1921 at 21,000 ft. altitude. The type (Wollaston 16) is in the Kew Herbarium and apparently has been the only known representation of the species in herbaria. In Edinburgh, however, there are several collections made in Nepal by Lall Dhwoj between 1927 and 1930 which have been variously named *A. palmatum* D. Don, *A. sp. aff. palmatum* D. Don and *A. leucanthum* (Brühl) Stapf but which are certainly *A. orochryseum*. More recent gatherings from Bhutan, taken by Ludlow, Sherriff and Hicks and previously unnamed are also referable to *A. orochryseum*. All these collections allow a more accurate and detailed picture of this species than that afforded by Stapf's description and the, in some ways, fragmentary type.

The Wollaston gathering lacks tubers; the Lall Dhwoj collections show that these are short and stout and ovoid up to 2 cm. long and 1 cm. thick. The plant may be as tall as 100 cm. The inflorescence is not always short and referable to a 3-flowered raceme as in the type but may be a loose many flowered raceme up to 20 cm. long with the flowers varying in colour from pale lemon yellow to "whitish yellow" to almost white slightly tinged with yellow and blue. The beak of the hooded sepal usually is rather short; only in the type gathering is it several millimetres long.

The petals and stamens are always golden pilose, the stamens remarkably so, but the carpels may have a dense golden adpressed tomentum as in the type or they may be perfectly glabrous. Mature follicles are 2-2.5 cm. long and parallel though slightly recurving outwards at the apex. The seeds are about 2 mm. long, winged along the raphe and have numerous undulate transverse lamellae running out towards the back.

***Aconitum assamicum* Lauener, sp. nov. (Figs. 1, o; 4, c)**

Proximum *A. orochryseo* Stapf, a quo pilis inflorescentiae carpellarumque longioribus patulisque, petalis minoribus paene glabris differt.

Tubera ignota. *Caulis* erectus simplex ad 60 cm. altus, praesertim superne cum inflorescentia dense aureo-hirsutus, inferne albo-pubescent. *Folia* basalia ignota; caulina utrinque aureo-pubescentia, petiolata, petiolo folii inferioris ad 5 cm. longo, superioris ad 1 cm. longo; lamina ambitu late reniformis vel late cordato-ovata, 4-8 cm. longa, 6-12 cm. lata, ad 5 mm. supra basin 3-partita, divisionibus ambitu ovatis grosse laciniato-dentatis, laciniis dentato-lacinulatis. *Inflorescentiae* ad 15 cm. longae, paniculatae, laxae ubique dense patule aureo-pilosae, ramis inferioribus 2.5-3 cm. longis; bractae inferiores in folia abeuntes, superiores lanceolatae utrinque dentibus 1-2 magnis triangularibus instructae; pedicelli 1-1.5 cm. longi, apice in discum ad 2 mm. latum dilatati. *Sepala* gilva, longi pilosa; summum galeatum, a basi ad apicem 1.5-1.8 cm. altum, 2 cm. a basi ad apicem rostri brevis metiens, 0.8-1 cm. latum; lateralia ex ungue brevi lato oblique subrotundata, circ. 1.5 cm. lata et longa; inferiora oblonga, subdeflexa, circa 1 cm. longa, 0.4 cm. lata. *Petala* circ. 1.5 cm. longa, unguibus tenuibus plus minusve glabris apice sensim sed valde inclinat, calcaribus leviter recurvis, laminis apice emarginatis ciliatis inflexis. *Stamina* 8 mm. longa, inferne alata edentata, ultra medium filiformia, aureo-pilosa. *Carpella* 3, dense aureo-pilosa, 4-5 mm. longa, in stylos tenues 3 mm. longos contracta. *Folliculi* immaturi 10-12 mm. longi, pilosi.

ASSAM. Orka La, 3960-4270 m., amongst scrub and Juniper trees on open boulder slopes, flowers cream, 29 Sept. 1938, *F. Kingdon Ward* 14309 (holo. BM).

Although a close ally of *A. orochryseum* Stapf from Nepal and Bhutan, it is readily distinguished by the long spreading indumentum on the inflorescence axis, the pedicels, sepals and carpels, the indumentum of *A. orochryseum* consisting of very short golden adpressed hairs. The petals, much smaller in *A. assamicum*, are structurally the same in both species, though almost glabrous in the Assam species and densely pilose in the other.

MISCELLANEOUS NOTES AND RECORDS

Aconitum bulbiferum Hand.-Mazz. in Anz. Akad. Wiss. Wien, Math.-Nat. Kl. 62, 220 (1925) et Symb. Sin. 7, 296, tab. VIII, fig. 1 (1931); Fletcher & Lauener in Notes R.B.G. Edinb. 20, 199 (1949).

TIBET. Migyitun, Tsari, 2890 m., perianth rich very deep wine purple, filaments the same, anthers a little paler, 26 Aug. 1936, *Ludlow & Sherriff* 2510 (BM, E); Migyitun, Tsari Chu, lat. 28°40' N., long. 93°38' E., 3050 m., 23 Oct. 1938, *Ludlow, Sherriff & Taylor* 6628 (BM, E).

BHUTAN. Dhur Valley near Bumthang, 3350 m., amongst boulders in conifer forest, perianth dark purplish black, 22 July 1949, *Ludlow, Sherriff & Hicks* 16924 (BM); Pangotang, Tsampa, 3960 m., up to 4'6" high, perianth shiny—the very deepest purple red, almost black, only one seen in flower, on bank in open fir forest, 13 Sept. 1949, *Ludlow, Sherriff & Hicks* 19737 (BM); Waitan, Tsampa, 3960 m., steep hillside, among shrub and juniper, perianth dark shiny purplish red, small bulbils in the axils of each leaf all the way up the stem, 19 Sept. 1949, *Ludlow, Sherriff & Hicks* 19752 (BM, E).

This climbing species has hitherto been represented in herbaria probably by only the one gathering made by Dr. Handel-Mazzetti in Szechuan in 1914 (H.-M. 5202). It is now known to occur in Bhutan and in South Tibet albeit in somewhat variable form. The Szechuan plant is grey pilosulose on the stems, petioles and the veins on the lower leaf surface. The Bhutan and S. Tibet plants on the other hand have these structures, especially the stems and petioles, covered with much longer patent hairs, or occasionally these structures are glabrous. Structurally the flowers are the same though the colour may vary from palest mauve to so deep a purplish-red as to be almost black.

Aconitum stapfianum Hand.-Mazz. Symb. Sin. 7, 294, t. 5, fig. 11, 12 (1931); Fletcher & Lauener in Notes R.B.G. Edinb. 20, 204 (1949).

TIBET. Kongbo, Temo La, 3650–3960 m., twiner, flowers glossy violet, 15 Sept. 1924, *F. Kingdon Ward* 6189 (K, BM, E); Kongbo, Nam La, 4115 m., sprawling over shrubs, calyx reddish purple, 31 Aug. 1947, *Ludlow, Sherriff & Elliot* 14470 (BM, E).

Previously recorded only from the Likiang Snow Range of N.W. Yunnan this climbing species is now known to occur in the Kongbo Province of S.E. Tibet.

Aconitum bisma (Ham.) Rap. in Nov. Kozl. 7, 164 (1907) p.p.;

Fletcher & Lauener in Notes R.B.G. Edinb. 20, 197, pl. CCLXVI, fig. 1 (1949).

CENTRAL BHUTAN. Tang Chu, 2750 m., perianth deepest velvety reddish purple, 8 Aug. 1937, *Ludlow & Sherriff* 3543 (BM, E).

WEST BHUTAN: bordering Sikkim. Chelai La, Ha, 3650 m., in fir forest, pale blue, anthers black, 21 Aug. 1949, *Ludlow, Sherriff & Hicks* 19623 (BM).

As *A. bisma* has for long been known in the Alpine Himalaya of Nepal, Sikkim and the adjoining part of South Tibet, its presence in Bhutan is but to be expected. Throughout its range it varies considerably in flower colour from almost white through various shades of blue to deep reddish purple.

Aconitum novoluridum Munz in Gentes Herbarum 6, 472 (1945).

BHUTAN. Me La, 4270–4570 m., 24 Aug. 1934, *Ludlow & Sherriff* 881 (BM, E); Shingbe (Me La), 3810 m., rocky soil in open valley, amongst other tall herbs, flowers blue-purple, 23 Aug. 1949, *Ludlow, Sherriff & Hicks* 21076 (BM, E); near Phage La, Mangde Chu, 4420 m., on cliffs, flowers red-brown, 27 Aug. 1949, *Ludlow, Sherriff & Hicks* 17209 (BM, E).

TIBET. Kongbo, Nyima La, 4420 m., lat. 29°37' N., long. 94°47' E., amongst huge boulders in Rhododendron scrub, perianth segments short blunt spur chocolate, filaments green at expanded base, dark purple above, anthers dark purple, carpels dark green, stigma lighter, 4 July 1938, *Ludlow, Sherriff & Taylor* 5111 (BM, E); Kongbo, Nyima La, 3810 m., in conifer forest, perianth dark purplish red, paler at base, 27 Aug. 1947 *Ludlow, Sherriff & Elliot* 14460 (BM, E); Tsangpo Valley, Tsela Dzong, 3650 m., lat. 29°20' N., long. 94°20' E., on rocky steep slopes on edge of *Abies* forest, 4-6½ ft., perianth dull pale purplish wine colour, almost white at base and tinged brown at tips of segments, 29 July 1938, *Ludlow, Sherriff & Taylor* 5990 (BM, E); Kulu Phu Chu, near Paka, 3960 m., lat. 29°15' N., long. 94°25' E., forming big clumps 3 ft. high in open rocky hillsides, perianth velvety dull brownish wine red, anthers dark blue violet, 29 July 1938, *Ludlow, Sherriff & Taylor* 5994 (BM, E).

This species was for long known as *A. luridum* Hook. f. & Thoms., which name, as Munz has pointed out, is not tenable as applied to Indian plants because of Salisbury's earlier use of it for a plant near to *A. variegatum* Linn. (see Rapaics, Nov. Kozl. VI, 152: 1907). *A. novoluridum* has previously been recorded from Nepal, Sikkim and Chumbi. *Ludlow, Sherriff, Taylor and Elliot* have not unexpectedly extended its distribution into N.E. Bhutan and S.E. Tibet.

***Aconitum wallichianum* Lauener, nom. nov.**

A. dissectum D. Don Prodr. Fl. Nep. 197 (1825); Wall. Cat. 4724 (1831), non Tausch ex Reichb. (1823) non Watt (1902).

"*A. napellus* Linn."; Hook. f. & Thoms. Fl. Ind. 1, 57 (1855) quoad Wall. 4724.

A. napellus Linn. var. *rigidum* Hook. f. Fl. Br. Ind. 1, 29 (1875) quoad Wall. 4724.

NEPAL. *Sine loc.*, flowers yellowish blue, 1927, *Sir Clive Wigram* 119 (E); 1927, *Sir Clive Wigram* 179 (E); Bheding, 3650-3960 m., flowers greenish yellow, 1930, *Lall Dhwoj* 266 (E); Brangechen Kharka, shady stream side, yellow, Aug. 1949, *O. Polunin* 1722 (BM).

SIKKIM. Shaitan Pokri, 3810 m., on sandy spit along lake shore, 2 ft., rambling habit, 3 Sept. 1913, *R. E. Cooper* 767 (E).

A. dissectum D. Don is a later homonym of *A. dissectum* Tausch ex Reichb. and thus cannot be used.

The figure accompanying the article by Stein (*Gartenflora* 35, 227: 1886) is of *A. ferox*, which Stein erroneously sank under *A. dissectum* D. Don.

***Aconitum szechenyianum* Gayer var. *glabrum* Lauener, var. nov.**

A typo caulis, inflorescentiis sepalisque glabris nec pilosis differt.

TIBET. Shinden Gompa, Nagong, 3960-4270 m., in meadows and alpine pastures, wherever cattle or ponies feed, grows 3 feet high, flowers a dull glossy purple 19 Aug. 1933, *F. Kingdon Ward* 10768 (holo. BM).