

THE ROLE OF CALCUTTA HERBARIUM IN STUDY OF PHYTOGEOGRAPHY AND TAXONOMY OF *ALLIUM* L. IN INDIA

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ABSTRACT

Studies on pioneer collections of *Allium* L., at CAL furnish new data on taxonomy and phytogeography of the genus. Critical examination of exsiccate and type materials reveal validity of two species and reduction of two binomials. Seven new records and additional notes on all 25 species of *Allium* in India was provided in this note along with a key for identification, distributional maps, are also given in this paper.

Allium L., is a genus consisting of ca 450 species, many of which are widely used as vegetables and spices from time immemorial. Garlic, Onion, Leek are widely cultivated. The wild species of *Allium* L., are centered in the western Asia. In India these species are confined to Himalayas with their natural habitat ranging upto 17,500 ft (5330 m) in Tibet.

Allium L., is a bulbous, herbaceous genus with linear leaves and terminal umbel subtended by bracts, separated from the family Liliaceae to form a new family Alliaceae. Taxonomic study of some Indian species of *Allium* L., were undertaken by Baker (1872), Regel (1875), Hook. f. (1892), Airy Shaw (1931), Stearn (1960) and Nasir (1975). These works are based on European herbaria and none of them consulted herbarium CAL except Dr. Stearn who followed Hooker's footsteps in Sikkim Himalaya in the company of Dr. K. P. Biswas and Dr. J. Sengupta during 1936.

Though W. Roxburgh the author of Fl. Indica established a herbarium in Calcutta and N. Wallich catalogued the collections, most of them were distributed to European herbaria. According to these European Botanists it is "the most valuable contribution of its kind to science"

19th century witnessed the activity of botanical explorations in the Himalayas. East India Company recruited Medical Surgeons, Foresters, Military Officers and "used them over when they happened to need a Botanist". Following names may be mentioned of those who explored Western and Eastern Himalayas and Nepal. Western Himalayas Jacquemont (French traveller), J. F. Royle, H. Strachey, R. Strachey, J. E. Winterbottom, T. Thomson, J. H. Lace, F. stoliczka, Dr. G. M. Giles, G. Henderson, C. B. Clarke, J. F. Duthie, F. Younghusband, H. Collett, W. Gatacre, Capt. Harriss, S. M. Toppin, P. W. Mackinnon, H. C. B. Tanner, Baden Powel, Walter Koelz, N. L. Bor, H. F. C. Cleghorn, N. Vicary, R. R. Stewart. For Eastern Himalaya and Khasia W. Griffith J. D. Hooker, G. King and his collectors, W. W. Smith, G. H. Cave, T. Anderson etc. For Nepal, Bhutan-Buchanan Hamilton, N. Wallich, R. E. Cooper, A. K. Bulley etc. In those times China, Tibet, Nepal, Bhutan were forbidden countries, though these are rich in Liliaceae particularly *Allium*. These explorers collected plants from the borders of those countries during their political missions, thereby crossing the Himalayas.

In 20th Century there were also some foreign explorations undertaken in less explored E. Himalaya by Kingdon Ward, Stainton, Sykes, Williams, Polunin from Briain and a team from Japan. These rich collections are mostly deposited in the European herbaria and some duplicates are still at CAL. Since independence botanical explorations are conducted by the Botanical Survey of India.

Examination of the specimens at CAL add new data on the morphology, phenology, ecology and distributional pattern of the species of Indian *Allium*. In earlier publication, most of the species are in lack of capsule and seed characters. Study of these specimens which includes many duplicates of the Types reveals the validity of 2 species and reduction of 2 to synonyms. 7 species have been reported for the first time in the political boundary of India, 5 species have been found to have wider distribution in India, 3 species are found to be endemic and 4 species as endangered in India.

It is observed that wild *Alliums* from W. Asia have been migrated towards north to Russia, China, east to Pakistan, India, Nepal through the mountain path of the Himalayas, then extends to E. China, Japan, Burma etc.

East Asian elements in Khasia hills, Arunachal, Sikkim, Bhutan are actually not E. Asian origin but migrated from the West Asia

through the Himalayas or through mountains of China and Tibet. Close relationship with Chinese *A. pratti* C. H. Wright and European *A. victorialis* L. and similarity with East Asian *A. tuberosum* Rottl. ex Spreng. with W. Himalayan *A. clarkei* Hook. f. and occurrence of *A. tuberosum* in U. P. confirms this.

There are distinction in the morphological characters of eastern Indian and western Himalayan species. Due to more moist situation, in eastern India, bulbs are reduced and fasciculated, thick storage roots develop as may be seen in *A. macranthum* Baker, *A. fasciculatum* Rendle and *A. tuberosum* Rottl. ex Spreng.

The occurrence of *A. hookeri* Thwaites in Khasia hills, Tibet, Bhutan, China and Ceylon is a peculiar phenomenon in plant geography as also seen in *Lilium wallichianum* Schultes. It reveals that the species was migrated to south during the time of glaciation when the places were close together. Subsequently in post glacial period land mass is drifted apart, together with the formation of Gangetic plain and Bay of Bengal, in between resulting discontinuous occurrences of the species.

This account deals with the enumeration list of 25 species of Indian *Allium* which are phytogeographically or taxonomically interesting together with a key to the species 4 maps are enclosed.

KEY TO THE SPECIES

- 1a. Bulbs cylindrical, inconspicuous :
- 1b. Bulbs ovoid or oblong or globose :
- 2a. Umbel big (3.5-9 cm broad). Pedicel long (1-4 cm) :
- 2b. Umbel small (2-2.5 cm broad) or fascicle. Pedicel small (less than 1 cm) or in fascicle upto 3.5 cm long :
- 3a. Flowers cupshaped. Tepals truncate. Ovary with apical swellings *A. macranthum* (18)
- 3b. Flowers campanulate. Tepals not truncate. Ovary without apical swelling :
- 4a. Bulbs membranous or papery, often indistinct *A. hookeri* (13)
- 4b. Bulbs fibrous towards reticulation :
- 5a. Umbel bigger upto 9 cm broad. Flowers 18-30. Perianth as long as or longer than stamens. Pedicels longer (2-2.5 cm) :

- 5b. Umbel smaller, upto 3 cm broad. Flowers few (10-15). Pedicel smaller (1-1.5 cm) *A. clarkei* (7)
- 6a. Leaves 1-2 cm broad. Flowers rose colour. Pedicel 2 cm long *A. gilgiticum* (12)
- 6b. Leaves 4-6 mm broad. Flowers white. Pedicel 2-3 cm long *A. tuberosum* (24)
- 7a. Umbel congested, subglobose :
- 7b. Umbel not congested :
- 8a. Filaments linear without cusp :
- 8b. 3 alternate filaments cuspidate *A. stoliczki* (22)
- 9a. Bulbs big (5-8 × 1-1.5 cm). Flowers not white. Tepals broadly lanceolate :
- 9b. Bulbs small (1-3 × 5-2 cm). Flowers white. Tepals narrowly lanceolate *A. fasciculatum* (9)
- 10a. Bulbs fibrous. Flowers red or purple *A. auriculatum* (1)
- 10b. Bulbs not fibrous. Flowers yellow *A. chrysanthum* (6)
- 11a. Leaves linear. Filaments smaller than perianth :
- 11b. Leaves lanceolate. Filaments longer than perianth *A. victorialis* (25)
- 12a. Filaments connate less than 1/2 the length :
- 12b. Filaments connate more than 1/2 the length *A. fedschenkoanum* (10)
- 13a. Bulbs fibrous or membranous, tend towards fibrous. Stem papiliferous. Flowers bigger (8-10 cm long) *A. mairei* (16)
- 13b. Bulbs reticulate fibrous. Stem glabrous. Flowers smaller (5-7 cm long) *A. oreoprasum* (19)
- 14a. Umbel smaller (1-4 cm broad). Pedicel small (less than 2.5 cm) :
- 14b. Umbel bigger (4-10 cm broad). Pedicel longer (more than 2.5 cm) :
- 15a. Flowers narrowly campanulate *A. jacquemontii* (14)
- 15b. Flowers broadly campanulate or oblong campanulate :
- 16a. Pistil and stamens as long as or smaller than perianth :
- 16b. Pistil and stamens longer than perianth :
- 17a. Internodes present. Alternate stamens with broader base *A. caesioides* (2)
- 17b. Internode absent. Stamens all equal :
- 18a. Tepals narrow ($\pm 5 \times 1$ mm). Stamens free, smaller than perianth. Flowers 25-30 *A. chitralicum* (5)
- 18b. Tepals broad ($\pm 4 \times 2$ mm). Stamens connate below, medium : Flowers numerous *A. farctum* (11)
- 19a. Pedicel longer (.7-1.5 cm) :
- 19b. Pedicel smaller (3-5 mm) :
- 20a. Alternate filaments cuspidate : *A. roylei* (21)
- 20b. Alternate filaments not cuspidate
- 21a. Internodes present. Bulbs fibrous or not. Pedicel 6-15 mm long :
- 21b. Internode absent. Bulbs not fibrous. Pedicel 10 - 15 mm long *A. chinense* (4)
- 22a. Flowers many (40 or more), pink. Leaves broad (.6-1.5 cm) *A. carolinianum* (3)
- 22b. Flowers 20-30, yellow. Leaves narrow (.2-.5 cm) *A. consanguinum* (8)
- 23a. Umbel few flowered. Plants 20-30 cm long *A. stracheyi* (23)
- 23b. Umbel dense flowered. Plants 10-15 cm long *A. phariense* (20)
- 24a. Umbel 6-10 cm diam. Flowers mauve. Pedicel 3-5 cm long *A. macleanii* (17)
- 24b. Umbel 3-5 cm diam. Flowers white. Pedicel 1-2 cm long *A. loratum* (15)

1. *Allium auriculatum* Kunth, Enum. Pl. 4 : 418. 1843 (Type : India Orientalis, Kumaon, *Jacquemont* 1528 P-Photo); Baker in Journ. Bot. 12 : 295. 1874; Regel in Acta Hort. Petrop. 3, 2 : 169. 1875; Hook. f. Fl. Brit. Ind. 6 : 342. 1892.

Previously only known from U.P. but subsequent collections by A. W. Hyde (1874), Walter Koelz (1931), N. L. Bot (1941), Cleghorn (1964), U. C. Bhattacharyya (1973) and Grey, Wilson & Phillips (1973) reveal its wider occurrence in Kashmir, H. P., Punjab in India and also new record in Nepal.

2. *A. caesioides* Wendelb. in Bot. Not. 122 : 29. 1969 (Type : Afghanistan, Badakshan, *Giles* 210 HOLO-K; India, Lahul, *Jaeschke* 122 PARA-WU; India, Keylang, *Bor* 14653 PARA-K; India, Keylang, *Koelz* 5191 PARA-K; India, N. W. Himalaya, Pindi, *Ellis* 1259 PARA-K, CAL duplicate); Rechinger, Fl. Iranica 76 : 24. 1971; Nasir in Nasir and Ali, Fl. W. Pakistan 83 : 16. 1975.

It is an Indian species extends to Afganistan. In India this species was collected from 7 gatherings in 19th century in addition to the types mentioned above. Others are Dr. Brandis (1864), D. Stoliczka (1868), Ellis (1881), Giles (1887) extant at CAL and from one gathering in 20th century J.D. A. Stainton (1976), shows its gradual rarity in this country.

3. *A. carolinianum* DC. in Redoute Liliac. 2 : t. 101. 1804 (Type : Cultivated in Jardin, Paris- fig. seen); Stearn in Bull. Brit. Mus. Nat. Hist. 2 : 173. 1960. *A. blandum* Wall. Pl. As. Rar. 3 : 38. t. 260. 1832; Baker in Journ. Bot. 12 : 295. 1874; Hook. f. Fl. Brit. India. 6 : 340. 1892. *A. thomsonii* Baker in Journ. Bot. 12 : 294. 1874 (Type : W. Tibet, 10-14,000 ft. *T. Thomson* 19K-photo); Regel in Acta Hort. Petrop. 3, 2 : 141. 1875; Hook. f. Fl. Brit. Ind. 6 : 340. 1892.

Specimens available at CAL show wide distribution of this species in H. P., U. P. and

Kashmir in India and extends to Nepal, Bhutan, Tibet, China, Russia in the west and Afghanistan in the west.

Name "Carolinianum" was given by De Candolle with the impression that it had been introduced from Carolina by L. A. G. Bosc, Sereno Watson pointed out (Proc. Amer. Acad. Arts & Sci. 14 : 234, 1879) that the species is not known in America.

4. *A. chinense* G. Don, Monogr. Allium in Mem. Werner Nat. Hist. Soc. 6 : 83. 1832 (Type : Cochinchina, *Lour* BM); Stearn in Bull. Brit. Mus. Nat. Hist. 2 : 1960. *Caloscordum exsertum* Lindl. in Bot. Reg. 33 : E. S. 1847 (Type : Chusan, *Fortune* 102) only description. *A. exsertum* Baker in Journ. Bot. 294. 1874. *A. bakeri* Regel in Acta Hort. Petrop. 3, 2 : 141. 1875; Hook. f. Fl. Brit. India. 6 : 341. 1892.

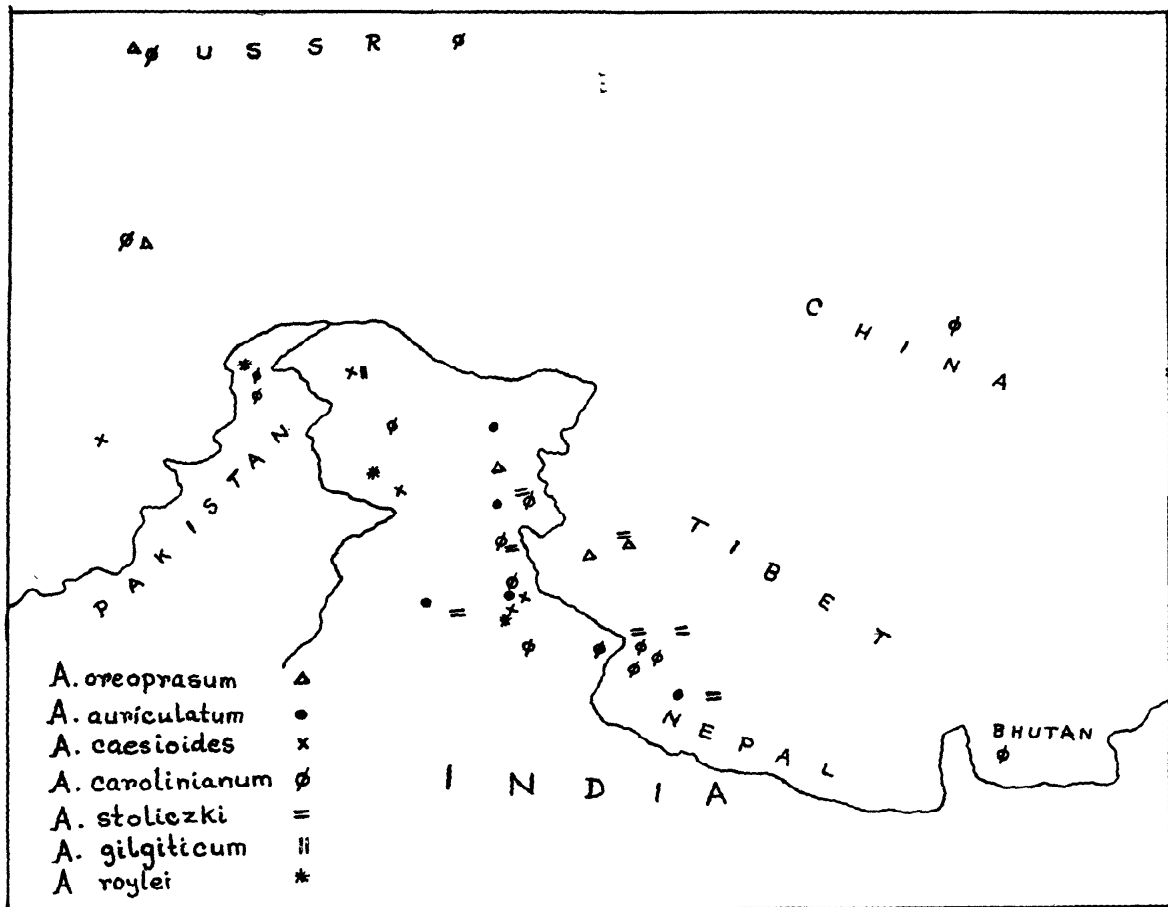
It is culinary onion of importance and widely growing in China and Japan and also cultivated in Khasia hills. P. W. Mackinnon (1897) from U. P. shows its more western occurrence in India.

5. *A. chitralicum* Wang & Tang in Bull. Fan, Mem. Inst. Biol. Bot. Peking 7 : 298. 1937 (Type : Chitral, *Harriss* 16691 a K, CAL duplicate of Type); Nasir in Nasir & Ali, Fl. W. Pakistan 83 : 29, 1973.

According to Wendelbo (1971) the species is endemic in Afghanistan & Pakistan. But one gathering from H. P. by N. C. Nair (1962) shows its extension to India.

6. *A. chrysanthum* Regel in Acta Hort. Petrop. 3, 2 : 91. 1875 (Type : China occidentalis, Kansu, *Przewalski* 256 LE, K-photo!; Kansu, 1872, *Przewalski* s. n. CAL Duplicate (?); Stearn in Bull. Brit. Mus. Nat. Hist. 2 : 175. 1960.

The species was reported from Kansu, China and later from S. E. Tibet (Stearn 1960 on the basis of the collection of Kingdon Ward). Recent examination of unidentified specimens at CAL collected by *Strachey & Winterbottom* (1948) and

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Stoliczka (1865) from Kashmir reveal the occurrence of this species in India. But absence of any recent collection of this species also shows its rarity.

7. *A. clarkei* Hook. f. Fl. Brit. India 6 : 344. 1892 (Type : Kashmir, Skardo, *Clarke* CAL!).

The species is endemic as well as rare in India may be due to the much use of the stem as vegetables. It was only known from Kashmir but recent collection by U. C. Bhattacharyya (1963) from U.P. and O. P. Misra (1970) from Punjab show more area of distribution. The species has been merged with *A. tuberosum* Rottler ex Sprengel by Nasir (1975). But for its smaller head (3-3.5 cm diam.), smaller pedicel (1.5-2 cm) and fewer flowers (10-15) it is kept as distinct species in this treatment.

8. *A. consanguineum* Kunth, Enum. Pl. 4 : 431. 1843 (Type : Ind. Or. *Jacquemont* no. 982 P-Photo!); Baker in Journ. Bot. 12 : 293. 1874; Regel in Acta Hort. Petrop. 3, 2 : 131. 1875; Hook. f. Fl. Brit. India 6 : 340. 1892; Nasir in Nasir & Ali, Fl. W. Pakistan 83 : 9. 1975.

The species is characteristic of W. Himalaya, reported from Kashmir. Subsequently reported from Pakistan. Recent collection from H. P. by N. C. Nair (1964) shows its wider distribution in India.

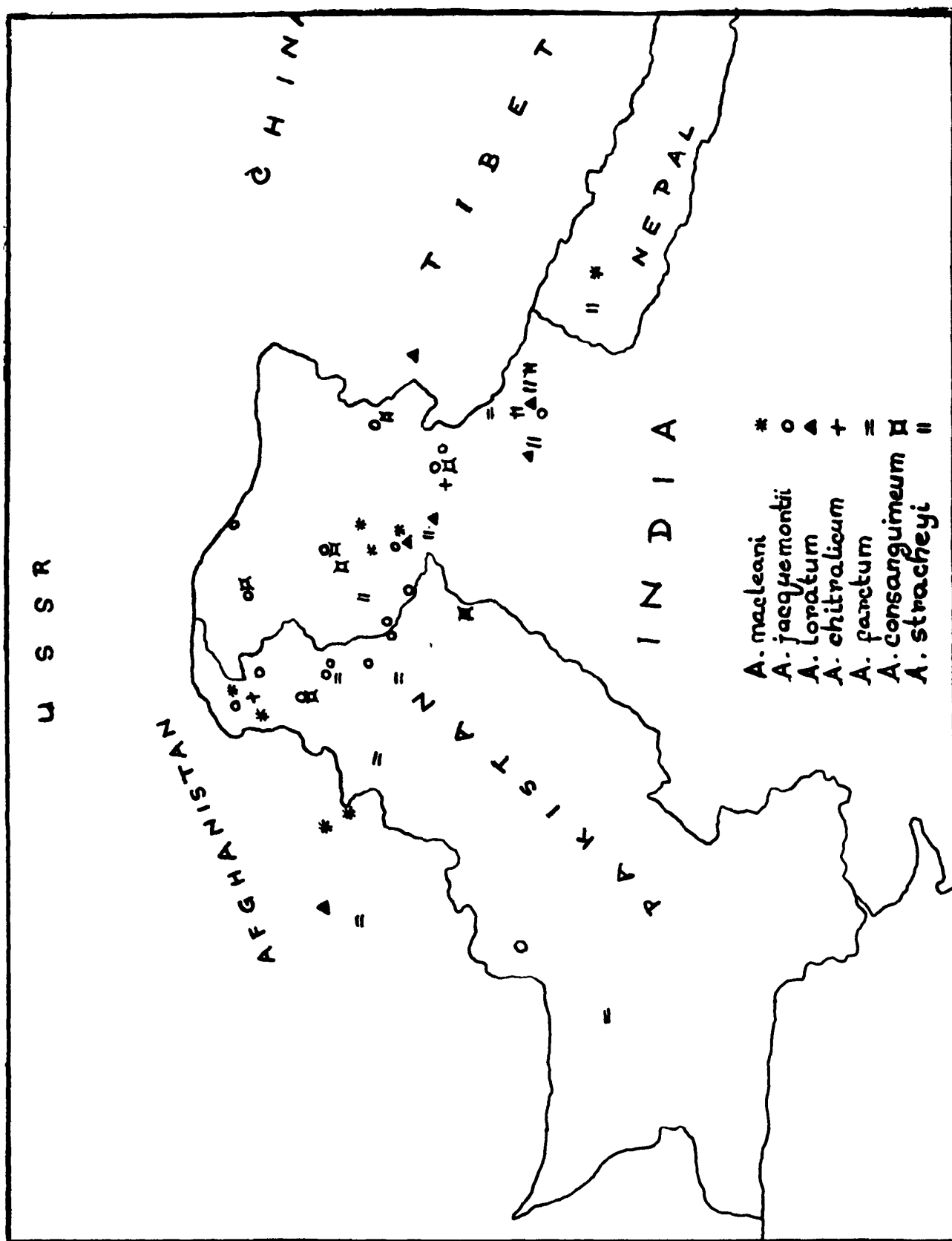
9. *A. fasciculatum* Rendle in Journ. Bot. 44 : 42. 1906 (Type : Tibet, Phari, July, 1879, *Dungboo* Lecto BM; Duplicate CAL!); Stearn in Herbartia 12 : 83. 1947 & Bull. Brit. Mus. Nat. Hist. 2 : 183. 1960. *A. gageanum* W. W. Smith apud Sm. & Cave in Rec. Bot. Surv. India 4 : 247. 1911 (Type : Sikkim, Leonk 4500 m 5.8.1909, *Smith & Cave* 2130 ISO-K, CAL!; Nathula, 5500 m Sept.-Oct. 1909 *Ribu & Rhomo* 2771 PARA-CAL!).

Occurrence in more moist areas in E. Asia (Tibet, Nepal, Bhutan, Sikkim) leads to the reduction of bulbs in this species. Swollen, fleshy roots present, serve as storage organ compensating the bulbs.

10. *A. fedschenkoanum* Regel in Acta Hort. Petrop. 3, 2 : 82. 1875 (Type : Turkestan, *Fedschenko* K LE); Hook. f. Fl. Brit. India 6 : 338. 1892; Nasir in Nasir & Ali, Fl. Pakistan 83 : 11. 1975. *A. semonovi* Regel in Acta Hort. Petrop. 3, 2 : 85. 1875 (Type : Tien Shan, Mt. Alatau, 6 10,000 ft. *Semenow* LE; Himalaya occidentalis 7-12,000 ft. Kashmir, *Falconer* K; Kistwar, *Thomson* K, L, Cal Duplicate of the Type; Interbaltal et Dras, *Henderson* CAL duplicate; Garhwal, *Strachey* & *Winterbottom* K; Hook. f. Fl. Brit. India 6 : 338. 1892.

The original description of *A. semonovi* Regel, *A. fedschenkoanum* Regel and *A. atosanguineum* Schrenk on the basis of specimens collected from W. China, S. Russia and W. Himalayas show little difference in the characters of bulbs, leaves, flowers etc. except filaments $\frac{1}{4}$ in *A. semonovi* and flowers yellowish in *A. fedschenkoanum* and pinkish in *A. atosanguineum*. On examination of the duplicates of Syntypes of *A. semonovi* Regel (*Kistwar*, *T. Thomson* 13 and *interbaltal & Drass, Henderson*) at CAL show flowers \pm 12 mm long (against 16 mm long mentioned in Regel 1875), filaments \pm 5 mm long of which \pm 4 mm connate at base and 3 alternate obscurely cuspidate on either side. So it is observed in the specimens that filaments are $\frac{1}{2}$ $\frac{1}{3}$ of the tepals, not $\frac{1}{4}$ as described by Regel showing similarity with *A. fedschenkoanum* and *A. atosanguineum*. Only difference found is in length of flowers. So *A. semonovi* is merged with *A. fedschenkoanum* having longer yellow colour flowers and *A. semonovi* is merged with *A. fedschenkoanum* having longer yellow colour flowers and *A. atosanguineum* with pink coloured smaller flowers is treated here as a separate species.

11. *A. furctum* Wendelbo in Nytt. Mag. Bot. 14 : 101. 1969 (Type : Pakistan, Kohat to Hangu, *Rechinger* 30991 W); Rechinger, f. Fl. Iran. 76 : 18. 1971; Nasir in Nasir & Ali, Fl. W. Pakistan 83 : 16. 1975.

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The species was originally collected from Pakistan. But recent collection by K. P. Janardhanan (1972) from H. P. is a new distribution record in India.

12. *A. gilgiticum* Wang at Tang in Bull. Fan Mem. Inst. Biol. Peiping, Bot. Ser. 7 : 294. 1937 (Type : Gilgit, 10,000 ft., 26.6.80, Tanner 166-K-Photo!); Nasir in Nasir & Ali, Fl. W. Pakistan. 83 : 29. 1975.

Absence of any collection after the Type indicates its endemic and endangered nature of the species in India.

13. *A. hookeri* Thwaites Enum. Pl. Zeyl. 339, 1864 (Type : Ceylon, Petrotlayalla, 7,000 ft. Thwaites C. P. 3659 K-photo!); Baker in Journ. Bot. 12 : 292. 1874; Hook. f. Fl. Brit. Ind. 6 : 341. 1892; Trimen, Hand Book Fl. Ceylon 4 : 291. 1898; Marquand in Journ. Linn. Soc. Lond. 48 : 226. 1929; Airy Shaw in Notes R. Bot. Gard. Edin. 16 : 138. 1939; Stearn in Bull. Brit. Mus. Nat. Hist. 2(6) : 183. 1960.

The species was reported from Tibet, Bhutan and Meghalaya in India to Yunnan and Szechwan in China and also the type locality Ceylon. Its occurrence in Ceylon is a peculiar phenomenon in Plant geography which is also seen in *Lilium wallichianum*.

14. *A. jacquemontii* Kunth, Enum. Pl. 4 : 399, 1843 (Type : India Orientalis, Mirpur in Montibus Rajaosi, Jacquemont 138 P; K-photo!); Nasir in Nasir & Ali, Fl. W. Pakistan 83 : 20. f. 7 (H-J), 1975. *A. rubellum* Baker in Journ. Bot. 12 : 290. 1874, *Auct non* Bieb.; Hook. f. Fl. Brit. India 6 : 339. 1892.

First described from Mirpur, now it is known to occur in more wider areas in Kashmir, H. P, U.P. in India and extends west wards to Pakistan and Afghanistan.

15. *A. loratum* Baker in Journ. Bot. 12 : 290. 1874 (Type : W. Tibet, Alpine region 10-14,000 ft., T. Thomson K); Hook. f. Fl. Brit. India 6 : 345 1892.

Baker (1874) based his species on Thomson from W. Tibet. The species is now found to extend to H. P. and U. P. in India and westward upto Afghanistan (Aitchison 463).

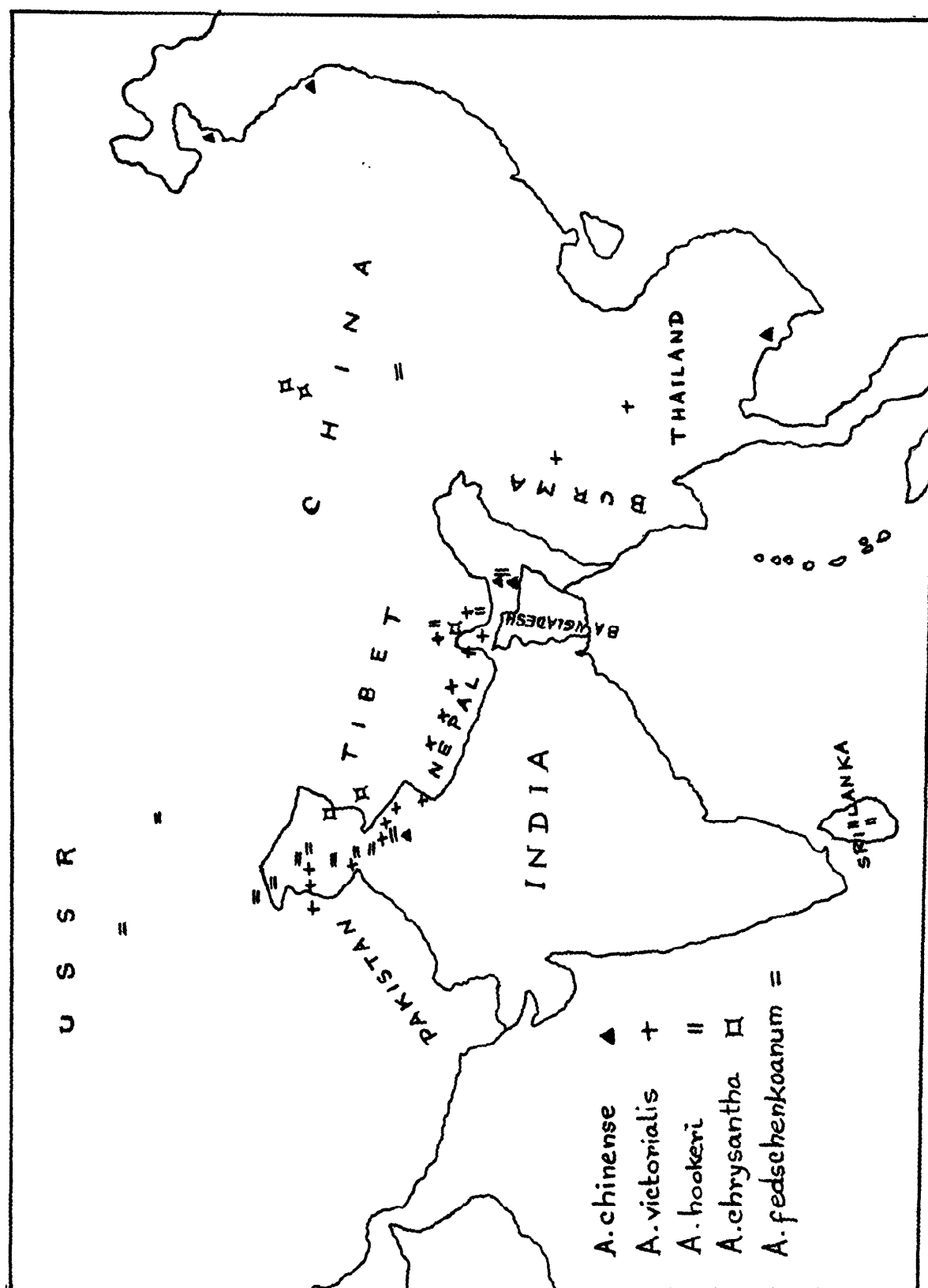
16. *Allium mairei* H. Lev. in Fedd. Rep. Nov. Sp. 7 : 339. 1909 (Type : China Yunnan, 1906, E. E. Maire 452 P); Airy Shaw in Not. R. Bot. Gard. Edinb. 16 : 146. 1931; Stearn in Bull. Brit. Mus. Nat. Hist. 2 : 177. 1960. *A. yunnanense* Diels in Not. R. Bot. Gard. Edinb. 5 : 301. 1912 (Type : Yunnan, Forrest Marquand in Journ. Linn. Soc. Lond. Bot. 48. 226. 1929.

H. Leveille described this species from China. Stearn (1960) reported the occurrence of this species in S. Tibet. Now from the collections of Kingdonward from Arunachal (1950) and Burma (1956) shows its new record in India and Burma.

17. *A. macleanii* Baker in Bot. Mag. 109 (Sr. 3, Vol. 39), t. 6707, 1883 (Type : Cultivated; material from Kabul by Maclean K-plate seen) Wendelp in Rechinger f. Fl. Iranica 76 : 88, 1971; Nasir in Nasir & Ali Fl. Pakistan, 83 : 29. 1975.

T. Thomson's collections of *Allium* from Kistwar, Kashmir (18 & 23) were identified by Baker (1874) and Hook. f. (1892) as *A. atropurpureum*. These sheets at (L, K) together with allied specimens extant at CAL with broad leaves, big heads were carefully examined. It is seen that there are two groups of plants : 1) Smaller heads (3-5 cm diam.) and smaller tepals (3-4 mm long); 2) Bigger heads (6-10 cm diam.) and bigger tepals (5-6 mm long). The first group tallys with the description of *A. loratum* Baker. The second group does not tally with the description of *A. atropurpureum* Waldstein & Kitaibe but tallys with the description and figure of *A. macleanii* Baker on Afghanistan plant. So *A. macleanii* is a new record in India and also Nepal. True *A. atropurpureum* is not growing in this region.

18. *A. macranthum* Baker in Journ. Bot. 12 : 293. 1874 (Type : Sikkim, Lachen, Hooker 9

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K); Hook. f. Fl. Brit. India 6 : 345. 1892; Rendle in Journ. Bot. 44 : 44. 1906; Smith & Cave in Red. Bot. Surv. Ind. 4 : 248. 1911; Stearn in Bull. Brit. Mus. Nat. Hist. Lond. 2 (16) : 186. 1960.

It was first described from Sikkim. Eastward extension of this species to Yunnan and Shensi in China and similarity with N. American species *A. cirnum* Roth and others as mentioned by Stearn (1960) shows possibility of the existence of a land bridge between Asia and W. America.

Fusiform storage roots with inconspicuous bulbs are the manifestation of growing in more moist condition.

19. *Allium oreoprasum* Schrenk in Bull. Scient. Acad. Petersb. 10 : 354, 1842 & Enum. P. Nov. 2 : 6. 1842 (Type : Turkestan, Kuhlas, 10.7. 1841, *Kar et Kir* Enum. Pl. 862. LE); Regel in Act. Hort. petrop. 3, 2 : 180, 1875; Hook. f. Pl. Brit. Ind. 6. 344. 1892. Nasir in Nasir & Ali, Fl. W. Pakistan 83 : 15. 1975, *pro parte*.

This species was described by Schrenk from Turkestan. Regel (1875) reported the occurrence of this species from Zalung Karpo Pas, W. Tibet (Stoliczka LE, CAL!). Though Hook. f. (1892) stated as not seen any British Indian specimen, T. Thomson from Tibet Occ. and Ludlow 551 from Ladakh, tallies with the description of *A. oreoprasum* Schrenk. Collection of this species from Ladakh is a new distributional record in India. Description and figure of this species in Nasir (1975) is different from its protologue.

20. *A. phariense* Rendle in Journ. Bot. 44 : 42, 1906 (Type : S. E. Tibet, Poting-La, two miles north of Phari, 16.8.1878, *Dungboo* HOLO-BM, Duplicate CAL!).

Rendle described the species on the basis of the type extant at BM. Duplicate of this remained in CAL unidentified. It is endemic and endangered in S. E. Tibet, the locality which is very close to Sikkim and Bhutan.

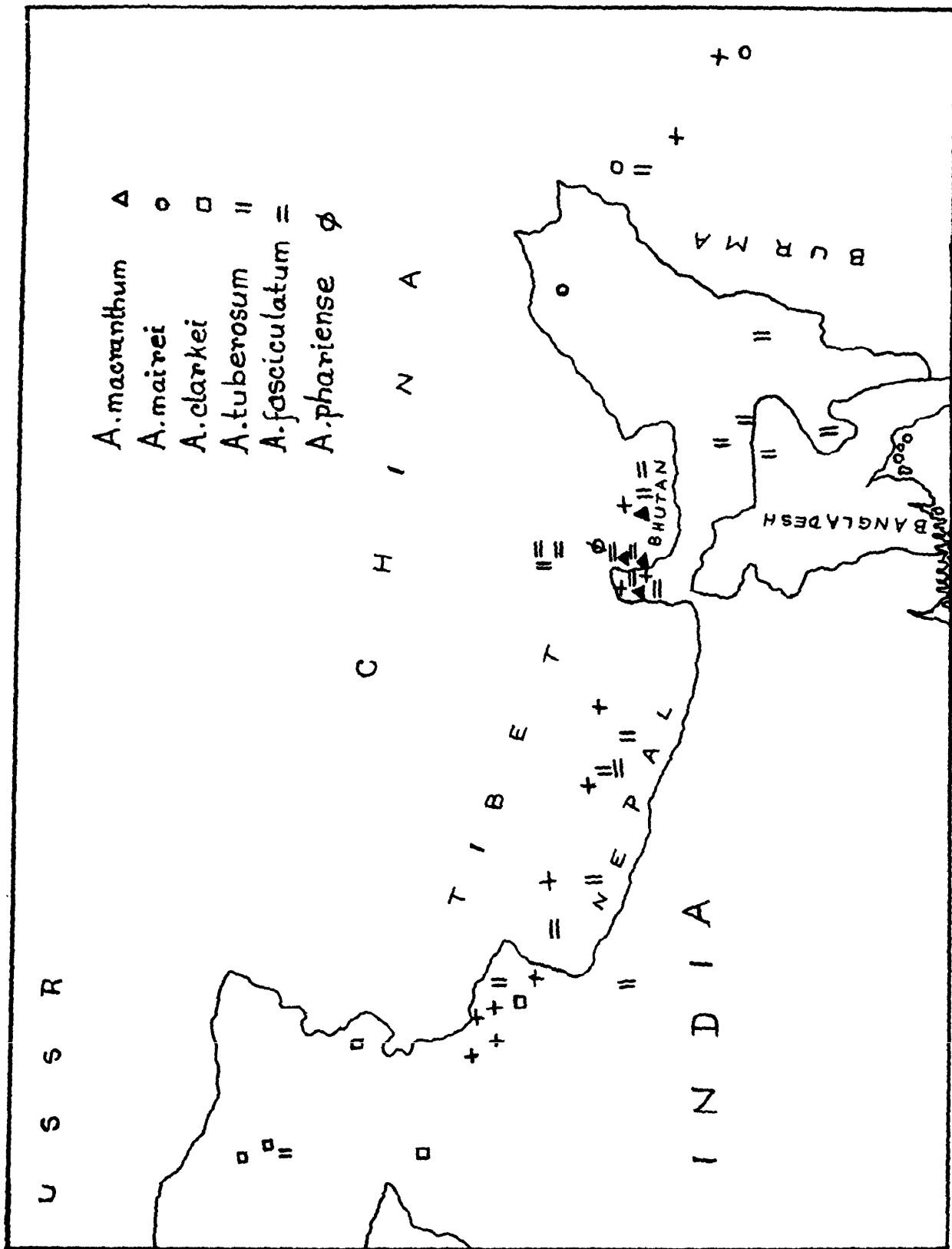
21. *Allium roylei* Stearn. Herbertia, 12 : 75. 1975; Nasir in Nasir & Ali, Pl. W. Pakistan,

83 : 11. f. 2. D-F, 1975. *A. rubens* Baker in Journ. Bot. 12 : 293. 1874, non Schrad (Type : Western Himalaya, Royle K, LE, CAL duplicate of type!, Mussoorie, Edgeworth BM, E, K). *A. lilacinum* Royle ex Regal in Acta Hort. Petrop. 3, 2 : 89. 1875, non Klotzsch (Type : W. Himalaya, Royle K, LE, CAL Duplicate of type!) ; Hook. f. Fl. Brit. India 6 : 339. 1892.

It is an Indian species subsequently known from Pakistan. The collection of this species from 4 gatherings in 19th century and only one by B. P. Uniyal (1989) in 20th century from India shows its gradual rarity.

22. *A. stoliczki* Regel in Acta Hort. Petrop. 3 : 2, 160, 1875 (Type : Ind. Or., Tibet, *Stoliczka s.n.* LE; Karnag, Zalung Karpo Pass, 14-17,000 ft. August 1865, *Stoliczka s.n.* CAL-Duplicate of the Type!); Nasir in Nasir & Ali, Fl. W. Pakistan 83 : 15. 1975, t. 4, D-F. *A. Juroeum* Jacq. ex Baker in Journ. Bot. 12 : 295, 1874, non Smith. (Type : Tibet Alpine region, 12-16,800 ft. Thomson CAL! L! K-Photo-!; Henderson, Strachey & Winterbottom CAL-duplicate of Type!; Simla, Lady Amhrst, Herb Wallich K). *A. jacquemontii* Regel in Acta Hort. Petrop. 3, 2 : 162, 1875 (Type : Ghoyoumal, *Jacquemont* P); Hook. f. Fl. Brit. India 6 : 342, 1892, non Kunth. *A. przewalskianum* Regel in Acta Hort. Petrop. 3, 2 : 164. 1875 (Type : Mongolia, 4.9.1870, *Przewalski* Syn type-photo!); Stern, in Bull. Brit. Mus. Nat. Hist. 2 : 173, 1960.

3 species of Regel *A. stoliczki*, *A. jacquemontii* (non Kunth) and *A. przewalskianum* are conspecific as evidenced from their descriptions and types (CAL). *A. stoliczki* should be the correct name as published prior to the other two species. Regel described *A. stoliczki* on the basis of some incomplete specimens collected from Ind. Or. Tibet by Stoliczka. Though *A. stoliczki* is an Indian species, Hook. f. in Fl. Brit. India (1892) did not mention it, nor merged it

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with any other species. Stearn (1960) did not see Stoliczka specimens. In CAL there are two specimens collected by Stoliczka prior to the publication of Regel (1875) (1) Karnag, 14-17,000 ft. August, 1865 and (2) Karnag, 12-15,000 ft., July, 1865. Both are complete specimens with bulbs, leaves, heads and flowers and tally with the description and must be duplicates of the syntypes.

23. *A. stracheyi* Baker in Journ. Bot. 12 : 293. 1874 (Type : Kumaon, *Strachey & Winterbottom* 5-K photo! 23.8.1848 and 5.10.1848, CAL! Duplicate; Badrinath Edgeworth K); Regel in Acta Hort. Petrop. 2 : 134. 1875; Hook. f. Fl. Brit. India 6 : 340, 1892; Stearn in Bull. Brit. Mus. Nat. Hist. 2 : 174, 1960. *A. longistaminum* Royle, Illustr. 392. name only.

Nasir (1975) merged *A. stracheyi* Baker with *A. consanguineum* Kunth. After examination of Types and other sheets it is decided that due to shorter pedicel (3-6 mm long), narrow leaves (1-2 mm) and smaller habit *A. stracheyi* is a distinct species.

24. *A. tuberosum* Rottl. ex Spreng. in L. Syst. Veg. ed. 16, 2 : 38. 1825 (Type : Malabar, cultivated in Tranquebar garden, *Rottler* K-LIV); Stearn in Herbertia 11 : 239. tt. 264-266, 1946; E. H. Moore in Bailaya 2 : 117 120. 1955; Stearn in Bull. Brit. Mus. Nat. Hist. Lond. 2 : 179. 1960. *A. tuberosum* Roxb. Hort. Bengal. 24. 1814 *nom nud*; Fl. Ind. 2 : 14. 1832, Wall. Cat. 5068 (Type : Garden in Bengal. *Roxburgh* K-WAIL) *A. sylvia* Buch.-Ham. ex D. Don. Prodr. Fl. Nepal 53. 1825. (Type : Nepal, 1802, *Buch.-Ham* LINN.) *A. roxburghii* Kunth, Enum. Fl. 4 : 454, 1843 (Type-Cult. in CAL. *Roxb.*) *Nothoscordum sylvia* (Buch. Ham. ex D. Don) Kunth, Enum Pl. 4 : 462. 1843.

It is an E. Asian plant, cultivated for a long time as vegetable in China and also in E. India. Discussion on the nomenclatural problem of *A. tuberosum* by Stearn (1944) reveals that W.

Roxburgh is the first to give this specific epithet to this taxon in his Hortus Bengalensis (1814 *nom nud*) and Flora India (1832). In Hortus Bengalensis type locality mentioned as "Garden in Bengal" and in Flora India it is mentioned as "cultivated about Calcutta by the Hindus" Other names suggested by the previous authors for this plant from China, Indo-China, Philippines, Nepal etc. are either *nom nud* misidentified. This species was also growing in Tranquebar Botanical Garden in S. India when J. P. Rottler a Danish Missionary, was in-charge of the garden there. He used to send dried specimens to European Botanists. MSS list of Rottler's specimens at Kew herbarium reveals the presence of *A. tuberosum* Roxb. (not Rottler). This suggests that the plants which was growing in Tranquebar and sent to Sprengel by Rottler was obtained from Calcutta Garden and already named by Roxburgh, as there was frequent interchange of specimens and seeds. But due to late publication of Flora Indica (1832) the name *A. tuberosum* epithet was attributed to Rottler ex Sprengel (1825).

25. *A. victorialis* L. Spl. Pl. 295, 1753 (Type : Europe, LINN.); Baker in Journ. Bot. 12 : 121. 291. 1974; Sm. & Cave in Rec. Bot. Surv. Ind. 4 : 247. 1911; Kitamura & Kihara, Fauna & Fl. Nepal Himalayas 1 : 91. 1955. *A. ellipticum* Wall. Numer. List. 177, n. 5069, 1832 *nom nud* (Type : Nepal, Gossainthan, *Wallich* 5069). *A. victorialis* L. var. *angustifolium* Hook. f. Fl. Brit. India 6 : 343. 1892 (Type : Sikkim, Lachen, 16.7.1842, *Hooker f.* K). *A. prattii* C. H. Wright apud Forbes & Hemsl. in Journ. Linn. Soc. Lond. Bot. 36 : 124. 1903 (Type : China, Sikiang, Tatsienly, *A. E. Pratt* 576 K-photo) Stearn in Bull. Brit. Mus. Nat. Hist. 2 : 171. 1960; *A. prattii* C. H. Wright var. *ellipticum* Wang & Tang in Bull. Fan. Mem. Inst. Biol. Bot. Ser. 7 : 297. 1937 (Type : Nepal, Gossainthan, *Wallich* Numer. List. 5069 K).

A. victorialis L. was founded by Linneaus on the basis of European (Spain & Italy) material,

having flat leaves arising from scape, reticulate bulb coat, lanceolate filaments longer than perianth etc. Baker (1874) recognised *A. victorialis* L. as most widely distributed species also occurring in Himalayan region in Kashmir, U. P., Sikkim & Nepal, extending to Japan. But Hook. f. in Fl. Brit. Ind. (1892) differentiated Sikkim, Nepal specimens as a variety (*A. victorialis* L. var. *angustifolia* Hook. f.) having leaves 1.3-3.2 cm broad, flowers pale pink, against broader leaves and white flowers in *A. victorialis* L. var. *victorialis*.

In the meantime Wright (1903) described a new species *A. prattii* on the basis of Chinese specimens having same characters or reticulate bulb, linear leaves (1.20 cm broad) and deeply trilobed ovary. Stearn (1945, 1960) after examining E. Himalayan specimens observed that *A. victorialis* L. var. *angustifolia* Hook. f. is conspecific to *A. prattii* Wright a species distinct from *A. victorialis* for having 2 linear leaves (1.2-3.2 cm broad) and pink flowers against 4 broader leaves and white flowers.

After careful study of a large number of materials collected from Western and Eastern Himalayas, it is observed that there are 2 extreme types of plants, at one end plants are robust bearing 4 leaves and white flowers occurring in W. Himalayas in Pakistan typical *A. victorialis*, the others are smaller plants bearing 2 leaves and

pink flowers in E. Himalayas. These two in two different geographical regions and ecological conditions differ greatly indicating taxonomical distinction. But there are plants having intermediate characters growing in Bhutan, Nepal, U. P. such as 2-3 lanceolate leaves with pink flowers and 2 lanceolate leaves with white flowers and others. It shows that there is gradual change from smaller plants with linear leaves to bigger plants with broader leaves. But the change is so gradual that no distinction is possible. Moreover, very broad leaved purple flowered plant has been collected from Burma and narrow leaved from Kumaon, U.P.

It shows that geographical and ecological isolation is not complete and no distinction at any status is possible. So I feel it desirable to treat these species as synonymous and refrain from making any infra-specific grouping.

Similar unstable variation due to geographical and ecological adaptation has been observed in *Fritillaria cirrhosa* D. Don.

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