

FLOWERING PLANTS AND FERNS OF NORTH GARHWAL, UTTAR PRADESH, INDIA

(An account based on collections made during 1957-59)

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ABSTRACT

The paper gives an account of the recent collection of flowering plants and ferns from the Garhwal Himalayas, made by the author during the years 1957 to 1959 in which nearly 1500 gatherings were made which on study yielded 738 species. The area covered by this study lies between 30° and 31° N., and 79° and 80° E., and includes the Alaknanda, Arwa, Bhyundar, KHIRAUN, Mandakini and Nandakini river valleys and their neighbouring glacial beds, mountain slopes and meadows ranging in altitude between 2000 and 4500 metres. *Cypripedium elegans* Reichb. f., a rare terrestrial orchid was collected for the first time in Western Himalayas.

The Garhwal Himalayas in the State of Uttar Pradesh, India have been described as including some of the noblest and most beautiful mountains of the world. This sector of the Himalayas lying between 30° and 31° N., and 79° and 80° E., forms the western portion of the Kumaon division and consists for the most part of massive mountains associated with a number of rivers and mountain torrents. Some of the highest peaks in India, namely, Nanda Devi and Kamet, along with a number of other well known peaks of more than 6000 metres elevation above sea-level, Trisul, Dunagiri, Mana, Badrinath, Kedarnath and Nilakanta are found here. The river, Alaknanda, which has its origin in the region of confluence of the glacial beds of Satopanth and Bhagat Kharak, is joined by the Saraswathi near Mana village, beyond the holy Shrine of Badrinath, and in its further southward course is joined by a number of rivers among which may be mentioned, Bhyundhar, Dhauli, Birehi, Nandakini, Pindar, Mandakini and finally, at Devaprayag, on the border of Tehri-Garhwal, by the Bhagirathi whenceforth it is named Ganga. Granites, gneisses and other crystalline rocks form the main constituents of these mountain ranges. The forests lie mainly in the valleys up to an altitude of 3000 metres above which extensive meadows occur in some places which are covered in the summer and autumn months by a profusion of flowers of alpine and sub-alpine species.

BOTANICAL HISTORY

The Kumaon division has all along attracted the attention of botanical collectors ever since 1796, when Thomas Hardwicke, the first European to collect plants in the area, did so while on a political mission to the Ruler of Garhwal in Srinagar in the Alaknanda Valley (Burkill, 1953). During the early years of the nineteenth century, William Moorcroft, crossed over the Niti Pass into the Manasarowar area and brought back, for the first time, a collection of plants from places so far in the interior in the Himalayas. The most comprehensive

collections from the area, however, have been those of Strachey and Winterbottom which were made between 1846 and 1849 within the province of Kumaon and in the adjoining parts of Garhwal and Tibet, *i.e.*, the portion of west Himalaya lying between Nepal frontier on the east and the Bhagirathi river on the west. The original herbarium of Strachey and Winterbottom included nearly 2000 species and was distributed in sets to various museums in 1852-3 along with a provisionally named catalogue. This original catalogue was reprinted and first published in 1882. It was revised by Duthie in 1906, who included in it, the results of previous botanical explorations in the area from time of Wallich, Royle, Falconer, Blinkworth, T. Thomson and others and also the subsequent collections of Duthie himself who during the years 1884-6 made extensive tours through British Garhwal to North Kumaon and to Nepal. Osmaston (1927) published a forest flora for Kumaon in which more than 800 species, mostly shrubs and trees, have been described.

In recent years, Holdsworth and Smythe, who were members of the British Kamet Expedition of 1931, on their return journey, collected plants in the Bhyundar valley and were so impressed with the scenic grandeur and the wealth of flora of the valley, that they named it the "Valley of Flowers". A list of plants collected during the expedition is included in 'Kamet conquered' (1932). Smythe returned to the valley in 1937 for collecting seeds and bulbs for the Royal Botanic Garden, Edinburgh. He collected more than 250 species, a list of which is given in his delightful book, "Valley of Flowers" (1938). Ghildyal (1957) made two visits to the valley and has listed 289 species collected in various parts of Garhwal, including the Valley of Flowers.

ITINERARY OF PRESENT COLLECTIONS

This paper gives an account of the collection tours undertaken by the author during the years 1957-59 on behalf of the Botanical Survey of India.

The first tour was undertaken during June-July, 1957, and among the places visited were the Rishiganga Valley at the foot of Mount Nilakanta on its eastern face, the lower slopes of Nar and Narayan Parbats on either side of the holy shrine of Badrinath, the Mana and Vasudhara valleys beyond Badrinath and the Bhyundar Valley. In addition collections were also made while trekking from Pipal Koti to Badrinath, a distance of nearly 60 km. At altitudes above 3000 metres, snow was just melting at the time of visit and already a large number of temperate and alpine herbs like species of *Anemone*, *Androsace*, *Corydalis*, *Epilobium*, *Lloydia*, *Nomocharis*, *Pedicularis*, *Potentilla*, *Primula*, *Thymus* and others had come into bloom and were adorning the hill slopes with their rich variety of colour.

The second tour in the area was undertaken during September 1958 and this time, the Mandakini Valley was explored. The river Mandakini has its origin from the glaciers beyond the holy shrine of Kedarnath and flows down a distance of more than 80 km. before meeting the Alkananda with which it confluences at Rudraprayag. Collections were made all along, while trekking, from Rudraprayag to Kedarnath Temple (alt. 3500 m.) and to the foot of glaciers beyond. Species of *Cyananthus*, *Elsholtzia*, *Inula*, *Polygonum*, *Saussurea* and *Swertia* are prominent among the autumn flowering herbs and shrubs.

The Nandakini river originates from the Trisul basin and flows in a westward direction till it meets the Alaknanda at Nandprayag. The Nandakini Valley and its higher reaches where the picturesque meadows of Bajmora and Bishtola are found at altitudes of nearly 4000 metres, were visited during the Summer of 1959. The route for this trek was from Birehi along the Pipalkoti Road to the large lake of Gohna, formed during the closing years of nineteenth century as a result of a huge landslide and from there to Ramni. Extensive forests occur in the Ramni-Kanol-Wan (along the Rupkund route) belt. Collections were made, particularly, in the forests around Kanol and Sutol and in the *Abies-Picea-Quercus semecarpifolia* forests near Buhna. The picturesque alpine grassy slopes of Bajmora and Bishtola yielded many colourful alpine herbs. The rare, *Cypripedium elegans*, a lady's slipper Orchid with a pair of opposite leaves was collected for the first time in Western Himalaya (Fig. 1).

During the month of October, 1959, a mountaineering-cum-scientific expedition was organised by the Indian Air Force to Garhwal Himalayas with the aim of climbing the Chaukamba (Badrinath) and Nilakanta peaks and to make scientific observations in the valleys at the foot of these peaks. At the request of Air Commodore (now Air-Vice-Marshal) S. N. Goyal, leader of the expedition, the author was deputed to accompany the expedition and to conduct botanical exploration in the river valleys up to an altitude of 4500 metres. During the stay with the expedition, the following places were explored, Khiraun Valley, Rishiganga Valley and the Bhagat Kharak-Satopanth glacial bed, situated respectively, to the south-east, east and

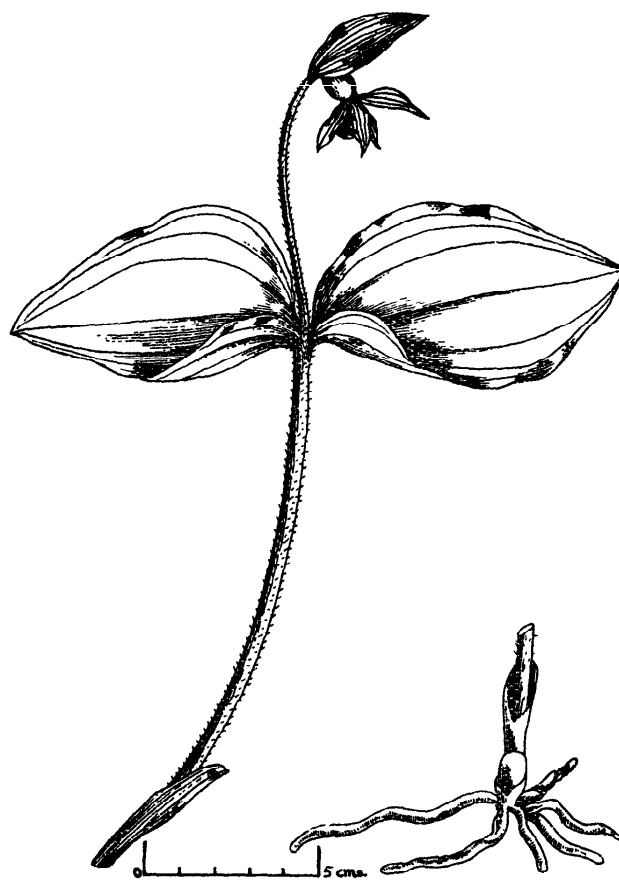


FIG. 1. *Cypripedium elegans* Reichb. f.

north of Nilakanta, the hills of Nar Parbat range behind Mana village and the Arwa-Saraswathi basin around Ghastoli. The last named place is at an altitude of nearly 4000 metres and presents a bleak appearance with the hill slopes all round practically bereft of vegetation. Alpine herbs, some of them extremely reduced in size, among them species of *Elsholtzia*, *Primula* and *Ranunculus*, were met with in the valley. Among the plants of interest collected during this expedition were, *Psilotum nudum*, a rare occurrence at an altitude of nearly 2000 metres, *Streptolirion cordifolium*, a climbing member of the Commelinaceae, very infrequently collected in the past from this area, the medicinal *Nardostachys jatamansii* of the Valerianaceae, *Gentiana stipitata*, an attractive late flowering Gentian and many *Primulas*, *Swertias*, the cushion and mat forming high altitude species of *Androsace*, *Arenaria*, *Polygonum*, *Salix* and *Saxifraga*.

The accompanying table (Table 1) gives the itineraries of the four collection tours and includes the names of places of collection mentioned in the systematic enumeration.

From the above collection tours 738 species of flowering plants and ferns were obtained which are enumerated in this paper. Table 2 gives a summary of the collections made. In the detailed enumeration the following procedure has been adopted. To facilitate

TABLE 1

Itinerary of collections. (The localities from which collections were made are included.)

ITINERARY 1 June-July 1957	ITINERARY 2 Sept.-Oct. 1958	ITINERARY 3 June 1959	ITINERARY 4 October 1959
June 24. Pipalkoti 25. Gulabkoti 26. Jeshimath 27. Vishnuprayag 28. Badrinath 29. Mana-Vasudhara 30. Narayan Parbat July 1-2. Rishiganga Valley 3. Badrinath 4-5. Hanumanchatti Pandukeshwar 6-7. Bhyundhar Forest & Valley	September 18. Soragarh Agastyamuni 19-20. Chandrapuri Batwalchari 21-22. Narayankoti Phata 23. Trijuginarayan 24. Gauri Kund 25. Rambara 26-28. Kedarnath, Kedarnath glacial valley 29-30. Gauri Kund October 1-2. Phata Narayankoti 3. Kalimath 4-5. Ukhimath Dewariya Tal	June 7. Birehi and Birehi river bank 8-9. Gohna lake 10-12. Ramni 13-14. Sutol 15. Buhna 16. Bishtola Alp. 17. Bajmora Alp. 18-19. Kanol 20. Shetale 21-22. Ghat 22-24. Nand Prayag --	With the IAF Expedition. October 3. Joshimath 4. Pandukeshwar 5-6. Mana 7. Vasudhara 8-9. Nar Parbat 10-11. Satopanth glacial bed 12. Badrinath 13-14. Rishiganga Valley 15-16. Ghastoli Arwa-Saraswathi basin 17-19. Vasudhara 20-22. Badrinath Narayan Parbat Rishiganga V. 23-24. Mana 25-26. Hanumanchatti, Khiraun Valley 27. Pandukeshwar Joshimath

TABLE 2

	Families	Genera	Species
Dicotyledons	88	344	562
Monocotyledons	15	93	128
Gymnosperms	4	5	6
Ferns and Fern Allies	11	25	42

easy reference, the order of families, genera and species of flowering plants is the same as in Hooker's *Flora of British India* (1872-97). Every effort has been made to bring the nomenclature up to date. Wherever the currently valid name of a taxon differs from that found in the *Flora of British India*, the former is given first with proper reference followed by the name in the *Flora of British India*. Taxa which have not had any nomenclature change are listed as they are named in the *Flora of British India* and no references are given. It is seen that as many as 154 species among the flowering plants in this list have undergone nomenclatural

changes since the time of publication of the *Flora of British India*. In the case of Ferns, the classification of Copeland (1947) has been followed and the nomenclature brought up to date.

All the specimens included in this list are preserved in the Herbarium of the Northern Circle, Botanical Survey of India and the Central National Herbarium, Calcutta, under the Collector's name (M. A. Rau) and the respective field collection numbers. Brief mention is also made of the habit, colour of the flower, locality of occurrence, altitude, month and year of collection of each species in the list.

LIST OF PLANTS COLLECTED DURING 1957-59

ANGIOSPERMS

Dicotyledons

RANUNCULACEAE

Clematis montana Buch.-Ham.

Large climber, in fruit. Ramni, Buhna. 2000-3000 m. M. A. Rau 10147, 10293. June 1958.

Clematis grata Wall.

Woody climber. White fragrant flowers. Hairy achenes. Batwalachari, Ukhimath, Pandukeshwar. 1000-2000 m. *M. A. Rau* 6395, 8767, 10423. Sept. 1958, Oct. 1959.

C. connata DC.

Climber. Cream white bell-shaped flowers. In fruit. Rambara. 2800 m. *M. A. Rau* 8634. Sept. 1958.

C. buchaniana DC. Syst. 1: 140. 1818.

C. buchananaiana Hook. f. & Thoms. var. *rugosa* as in Fl. Brit. India 1: 6. 1872.

Woody climber, with coarse pinnate leaves and cream white flowers. Pandukeshwar. 2000 m. *M. A. Rau* 10422. Oct. 1959.

Anemone rupicola Camb.

Herb. Large white flowers, 4-5 cms. across. Badrinath, Kanol. 2500-3500 m. *M. A. Rau* 2844, 10307. June 1958 & 1959.

A. vitifolia Buch.-Ham. ex DC.

Large herb. White flowers. Phata, Gaurikund. 1800-2500 m. *M. A. Rau* 8511, 8719. Sept. 1958.

A. obtusiloba D. Don

Tufted herb. White or pale blue flowers. Common. Bishtola. 3600 m. *M. A. Rau* 10229. June 1959.

A. rivularis Buch.-Ham. ex DC.

Herb. Large white flowers, purplish underneath. Pandukeshwar, Ramni. 2000 m. *M. A. Rau* 2819, 10082. June 1958 & 1959.

A. narcissifolia Linn. var. *polyanthes* Finet et Gagn. in Bull. Soc. Fr. 51: 75. 1904.

A. polyanthes D. Don Fl. Brit. India 1: 9. 1872.
Large hairy herb growing in clumps on rocks. Flowers white. Buhna, Bishtola. 3000-3500. *M. A. Rau* 10248. June 1959.

Thalictrum elegans Wall. ex Royle

Erect herb with small leaflets. In fruit. Rishiganga Valley. 3600 m. *M. A. Rau* 10548. Oct. 1959.

T. cultratum Wall. ssp. *platycarpum* (Hook. f. & Thoms.) Brühl in Ann. R. bot. Gardn. Calcutta 5: 72. 1896.

T. platycarpum Hook. f. & Thoms. Fl. Brit. India 1: 11. 1872.

Large spreading herb with greenish flowers. Filaments of stamens purplish. With fruits. Kedarnath, Buhna. 3000 m. *M. A. Rau* 8656, 10277. Sept. 1958, June 1959.

T. reniforme Wall.

Large herb on rocks. Leaflets up to 8-10 cms. Hanu-manhatti. 2500 m. *M. A. Rau* 10633. Oct. 1959.

T. javanicum Blume

Herb. Small white flowers. Narayankoti. 1200 m. *M. A. Rau* 6449. Sept. 1958.

T. foliolosum DC.

Herb. With fruits. Phata. 1500 m. *M. A. Rau* 6496. Sept. 1958.

Ranunculus pulchellus Mey.

Small herb with radical leaves only. Solitary yellow flowers. Arwa-Saraswathi basin at Ghastoli. 4000 m. *M. A. Rau* 10566. Oct. 1959.

R. hyperboreus Rottb.

Slender delicate herb. Small yellow flowers. Badrinath. 3000 m. *M. A. Rau* 2886. June 1957.

R. hirtellus Royle

Common buttercup of hill slopes. Yellow flowers. Buhna, Bishtola, Ghastoli. 3000-4000 m. *M. A. Rau* 10232, 10562. June 1959, Oct. 1959.

Caltha palustris Linn.

Herb with cordate leaves. Yellow flowers. Ganghare. 3300 m. *M. A. Rau* 3009. July 1957.

Aquilegia pubiflora Wall. ex Royle Illus. Bot. Him. 1: 55. 1834.

A. vulgaris ssp. *pubiflora* Hook. f. & Thoms. Fl. Br. India 1: 24. 1872.

Large herb. Flowers dark purple. Bajmora. 3300 m. *M. A. Rau* 10273. June 1959.

Delphinium denudatum Wall. ex Hook. f. & Thoms.

Leaves divided to the base. Flowers blue. Pandukeshwar, Kanol. 2300-2600 m. *M. A. Rau* 2810, 2953, 10312. June 1957 & 1959.

D. vestitum Wall. ex Royle

Hairy herb. Dull purple flowers. Kedarnath. 3300 m. *M. A. Rau* 8650. Sept. 1958.

Aconitum atrox (Brühl) Mukerjee in Bull. bot. Surv. India 3: 101. 1961.

A. balfourii Stapf. (under *A. ferox* Wall. in Fl. Brit. India 1: 28. 1872).

Large herb. Stem erect more than a meter. Carpels 5, tomentose. With fruits. Root reputed locally as poisonous. Nar Parbat, Rishiganga Valley. 4000 m. *M. A. Rau* 10511, 10543. Oct. 1959.

A. sp.

Stout erect herb with ripe follicles. Roots considered poisonous. Kedarnath glacial valley. 4000 m. *M. A. Rau* 8695. Sept. 1958.

A. heterophyllum Wall. ex Royle

Large herb. Locally known as Atees. Root valued as febrifuge and tonic. Kedarnath, Rishiganga Valley. 3500 m. *M. A. Rau* 8700, 10549. Sept. 1958, Oct. 1959.

Actaea spicata Linn.

Perennial herb. Flowers white. Fruits black when ripe. Badrinath, Buhna, Kanol. 2500-3500 m. *M. A. Rau* 2946, 10074, 10241. June 1957 & 1959.

Paeonia emodii Wall. ex Royle

Large herb. With fruits. Ramni forest. 2500 m. *M. A. Rau* 10099. June 1959.

SCHISANDRACEAE (MAGNOLIACEAE BH)

Schisandra grandiflora Hook. f. & Thoms.

Big climber in Rhododendron-Oak forest. Flowers white, unisexual, fragrant. Fruit of fleshy, red carpels. Rambara, Sutol. 2500. *M. A. Rau* 8722, 10212. Sept. 1958, June 1959.

MENISPERMACEAE

Stephania glabra (Roxb.) Miers in Contrib. Bot. 3: 217. 1871; *S. rotunda* Lour. Fl. Brit. India 1: 103. 1872.

Climber with male and female flowers. Flowers greenish yellow. With fruits. Hanumanchatti, Soragarh, Nandprayag. 1000-2000 m. *M. A. Rau* 2982, 6349, 10393. June 1957 & 1959, Sept. 1958.

S. gracilentia Miers in Contrib. Bot. 3: 219. 1871.

Flowers purplish. Kanol, Pandukeshwar. 2300 m. *M. A. Rau* 10327, 10450. June 1959, Oct. 1959.

Cissampelos pareira Linn.

Common twiner. Pipalkoti. 1300 m. *M. A. Rau* 2731. June 1957.

LARDIZABALACEAE (BERBERIDACEAE BH)

Holboellia latifolia Wall.

Climbing shrub. Leaflets 7-9, narrow (under var. *angustifolia* in Fl. Brit. India 1: 108. 1872). Pandukeshwar, Kanol. 2300 m. *M. A. Rau* 2998, 10360. June 1957 & 1959.

BERBERIDACEAE

Berberis aristata DC.

Shrub. Yellow flowers and blue berries. Pandukeshwar, Ramni. 2300 m. *M. A. Rau* 2828, 10093. June 1957 & 1959.

B. lycium Royle

A shrub with violet berries. Edible. Pandukeshwar, Gohna. 1500-2300 m. *M. A. Rau* 2828a, 10010. June 1957 & 1959.

B. asiatica Roxb.

Shrub with black berries. Joshimath. 2000 m. *M. A. Rau* 2785. June 1957.

B. jaeschkeana C. K. Schneider in Bull. Herb. Boiss. Ser. 2. 5: 399. 1905.

Shrub with yellow flowers and oval red berries. Mana, Kedarnath glacial valley. 3000-4000 m. *M. A. Rau* 8661, 10467, 10515. Sept. 1958, Oct. 1959.

PAPAVERACEAE

Meconopsis aculeata Royle

The Himalayan Blue-Poppy. With fruits. Buhna. 3000 m. *M. A. Rau* 10274. June 1959.

FUMARIACEAE

Dicentra macrocapnos Prain in J. As. Soc. Bengal 6: 12. 1896.

D. scandens Fl. Brit. India 1: 121. 1872. non Walp. A twining herb. Flowers yellow. Phata. 1800 m. *M. A. Rau* 6489. Sept. 1958.

Corydalis cashmeriana Royle, Illus. 1: 69. 1834.

C. cachemiriana Royle: Fl. Brit. India 1: 123. 1872. Slender erect herb. Pale blue flowers. Growing amidst clumps of an alpine grass. Bishtola, Bajmora. 3500-4000 m. *M. A. Rau* 10261, 10224. June 1958.

C. cornuta Royle

Branched herb. Purple tipped yellow flowers. Gaurikund, Trijuginarayan, Badrinath. 2000-3000 m. *M. A. Rau* 8546, 8583, 8614, 10432. Sept. 1958, Oct. 1959.

C. ramosa Wall. ex Hook. f. & Thoms.

Herb attached to rocks in streams. Flowers yellow. Kedarnath, Rishiganga Valley. 3500-4000 m. *M. A. Rau* 2911, 8675, 10550. June 1957, Sept. 1958, Oct. 1959.

CRUCIFERAE

Barbarea vulgaris R. Br.

Erect branched herb. Yellow flowers. Herb has distinct aroma. Kedarnath glacial valley. 4000 m. *M. A. Rau* 8680. Sept. 1958.

Arabis pterosperma Edgew. in Trans. Linn. Soc. 20: 83. 1846.

A. alpina Fl. Brit. India 1: 135. 1872, non Linn. Erect herb. Flowers pale purple. Badrinath. 3000 m. *M. A. Rau* 2838. June 1957.

A. amplexicaulis Edgew.

Erect herb. White flowers in lax racemes. On stone walls, Badrinath. 3000 m. *M. A. Rau* 2839. June 1957.

A. sp.

Stiff erect herb on rocks. Purplish flowers. Badrinath. 3000 m. *M. A. Rau* 2798, 2852, 2977. June 1957.

Cardamine macrophylla Willd.

Large herb. White flowered racemes. Rishiganga Valley. 3500 m. *M. A. Rau* 2925. June 1957.

Cardamine inayatii O. E. Schulz in Notizb. Bot. Gart. Mus. Berlin 9: 1069. 1927.

Small white flowered herb. On hill slopes. Bajmora. 3500 m. *M. A. Rau* 10268. June 1959.

Arabidopsis thaliana (Linn.) Heynh. in Holl. et Heynh. Fl. Sachs. 1: 538. 1842.

Sisymbrium thalianum Gay et Monn. Fl. Brit. India 1: 148. 1872.

Erect herb growing in clumps. Flowers white. Ghas-toli. 4000 m. *M. A. Rau* 10569, 10573. Oct. 1959.

Descurainia sophia (Linn.) Webb ex Prantl in Pflanzenfam. 3(2): 192. 1890.

Sisymbrium sophia Linn. Fl. Brit. India 1: 150. 1872. Herb. Pale yellow flowers. On stone walls; Badrinath. 3000 m. *M. A. Rau* 2945. June 1957.

Arcyosperma primulifolium (Thomson) O. E. Schulz in Pflanzenreich 86: 182. 1924.

Eutrema primulaefolium Hook. f. & Thoms. Fl. Brit. India 1: 152. 1872.

Stemless herb. Spathulate radical leaves. Fruits. Bajmora. 3500 m. *M. A. Rau* 10262. June 1959.

Erysimum hieracifolium Linn.

Erect herb. Flowers orange-yellow. Badrinath, Kanol, Vasudhara. 2500-3500 m. *M. A. Rau* 2864, 10300, 10577. June 1957 & 1959, Oct. 1959.

Capsella bursa-pastoris (Linn.) Medic. Pflanzeng. 85, 1792.

C. bursa-pastoris Moench. Fl. Brit. Ind. 1: 159. 1872. Common weed in all areas visited up to 4000 m. *M. A. Rau* 2848, 2888, 10054, 10197, 10243. June 1957 & 1959.

CAPPARIDACEAE

Capparis spinosa Linn.

Shrub. Purple-white flowers. Pipalkoti-Joshimath road. 1500 m. *M. A. Rau* 2750. June 1957.

VIOLACEAE

Viola biflora Linn.

Flowers yellow. Badrinath, Sutol, Buhna. 3000 m. *M. A. Rau* 2845, 2891, 10178. June 1958 & 1959.

V. serpens Wall.

Flowers white to violet. Badrinath. 3000 m. *M. A. Rau* 2893, 2931. June 1957.

FLACOURTIACEAE (BIXINEAE BH)

Flacourtia jangomas (Lour.) Rauesch. Nomencl. Bot. ed. 3. 290. 1797.

F. cataphracta Roxb. Fl. Brit. India 1: 193. 1872. Small tree. With fruits. Pandukeshwar. 2000 m. *M. A. Rau* 2811. June 1957.

F. indica (Burm. f.) Merr. Interpr. Rumph. Herb. Amb. 377. 1917.

F. ramontchii L'Herit. Fl. Brit. India 1: 193. 1872.

Thorny shrub. Small yellow flowers. Locally known as Khudma, fruits edible. Useful in fevers. Joshimath. 1800 m. *M. A. Rau* 2782. June 1957.

POLYGALACEAE

Polygala tatarinowii Regel in Bull. Soc. nat. Mosc. 34: 523. 1861.

P. triphylla Buch.-Ham. Fl. Brit. India 1: 201. 1872. Small herb. Pink flowers in close racemes. Triguginarayan. 2500 m. *M. A. Rau* 8516. Sept. 1958.

P. furcata Royle Illus. Bot. Him. t. 19, B. 1834.

P. triphylla Buch.-Ham. var. *glaucescens* Wall. (Fl. Brit. India 1: 201. 1872).

Flowers yellow. Agastyamuni. 600 m. *M. A. Rau* 6348. Sept. 1958.

P. crotalarioides Buch.-Ham.

Small herb. Purple flowers. Joshimath, Gaurikund. Ramni. 2000 m. *M. A. Rau* 2786, 8553, 10155. June 1957, Sept. 1958, June 1959.

P. abyssinica R. Br.

Erect slender herb. Lax racemes of purple flowers. Pipalkoti, Ramni. 1500-2000 m. *M. A. Rau* 2723, 10156. June 1957 & 1959.

P. persicariaefolia DC.

Herb with purple flowers. Agastyamuni. 600 m. *M. A. Rau* 6307. Sept. 1958.

CARYOPHYLLACEAE

Gypsophila cerastioides D. Don

Hairy herb. Purple-streaked white flowers. Vasudhara. 3500 m. *M. A. Rau* 2869. June 1957.

Silene cucubalus Wibel in Rohrb. Monogr. Silene 84. 1868.

S. inflata Smith (Fl. Br. India 1: 218. 1874).

Large herb. Pale purple flowers. Calyx inflated. Gangharea, Kedarnath, Khiraun Valley. 2500-3500 m. *M. A. Rau* 2950, 8658, 10631. July 1957, Sept. 1958, Oct. 1959.

S. persica Boiss. Sub. sp. *moorcroftiana* (Rohrb.) Chaudhuri in Notes R. Bot. Gardn. Edin. 22: 267. 1957.

S. moorcroftiana Wall. (Fl. Brit. India 1: 219. 1874).

Herb on rocks. Slender pale reddish flowers. Badrinath. 3000 m. *M. A. Rau* 10434. Oct. 1959.

S. falconeriana Royle

Stout herb. Dull white flowers. Gaurikund. 2000 m. *M. A. Rau* 8571. Sept. 1958.

Lychnis indica Benth.

Large herb. Petals with fimbriate blade. Gaurikund. 2000 m. *M. A. Rau* 8717. Sept. 1958.

L. nutans Benth.

Herb. Green purple-veined flowers. Bajmora. 3600 m. *M. A. Rau* 10275. June 1959.

L. pilosa Edgew.

Hairy herb in rock crevices. Leaves hairy, thick. Fruits with hairy calyx. Mana-Ghastoli Road. 3300 m. *M. A. Rau* 10481, 10570. Oct. 1959.

Stellaria paniculata Edgew.

Herb. White flowers. Phata. 1600 m. *M. A. Rau* 6499. Sept. 1958.

S. semivestita Edgew.

Herb with narrow linear leaves. White flowers. Phata. 1500 m. *M. A. Rau* 6463. Sept. 1958.

S. latifolia Benth.

Trailing herb. White flowers. Bajmora. 3500 m. *M. A. Rau* 10265. June 1959.

S. patens D. Don Prodr. Fl. Nep. 215. 1825.

S. longissima Wall. (Fl. Brit. India 1: 232. 1872).

Slender spreading herb. White flowers. Common on rocks and grassy slopes. Badrinath. 3000 m. *M. A. Rau* 2817, 2980. June 1957.

S. decumbens Edgew.

Tufted herb with shining leaves and white flowers. Common at high altitudes forming spreading mats. Kedarnath glacial valley, Vasudhara. 3500-4000 m. *M. A. Rau* 8691, 10476. Sept. 1958, Oct. 1959.

Arenaria festucoides Benth.

Densely tufted rigid herb forming mats on rocks. With fruits. Vasudhara, Ghastoli. 3500-4000 m. *M. A. Rau* 2873, 10491, 10530. June 1957, Oct. 1959.

Sagina procumbens Linn.

Small herb with narrow leaves and white flowers. Badrinath, Vasudhara. 3000-3500 m. *M. A. Rau* 2947, 10477. June 1957, Oct. 1959.

Drymaria cordata Willd.

Trailing herb. Small white flowers. Agastyamuni. 600 m. *M. A. Rau* 6303. Sept. 1958.

TAMARICACEAE

Myricaria germanica Desv.

A low shrub forming rigid bushes along river bank. Sterile. Satopanth glacial bed. 3500 m. *M. A. Rau* 10519. Oct. 1959.

HYPERICACEAE

Hypericum cernuum Roxb.

Shrub with yellow flowers. Pandukeshwar, Ramni. 2000-2500 m. *M. A. Rau* 2753, 2988, 2993, 10102. June 1957 & 1959.

H. dyerii (Wall.) Rehder in J. Arn. Arb. 20: 422. 1939.

H. lysimachioides Wall. (Fl. Brit. India 1: 254. 1874). Shrub. Yellow flowers. Pandukeshwar, Phata. 1500-2000 m. *M. A. Rau* 2999, 3002, 8527. June 1957, Sept. 1958.

H. patulum Thunb.

Shrub. Yellow. flowers. Pandukeshwar. 2000 m. *M. A. Rau* 3024. July 1957.

H. elodeoides Choisy

Herb. Sepals with profuse marginal glands. Petals yellow. Phata, Pandukeshwar. 1500-2000 m. *M. A. Rau* 8545, 10573, 10635. Sept. 1958, Oct. 1959.

MALVACEAE

Malva verticillata Linn.

Hairy herb. Small purplish flowers. Bhyundar, Badrinath. On stone walls and along roadside. 3000 m. *M. A. Rau* 3020, 10433. July 1957, Oct. 1959.

Sida cordifolia Linn.

Greyish pubescent herb. Orange yellow flowers. Kalimath. 1000 m. *M. A. Rau* 8764. Sept. 1958.

Urena lobata Linn.

Undershrub. Pale pink flowers. Echinete fruits. Agastyamuni. 600 m. *M. A. Rau* 6333. Sept. 1958.

Hibiscus cannabinus Linn.

Large herb with showy flowers. Cultivated. Agastyamuni. 600 m. *M. A. Rau* 6366. Sept. 1958.

Kydia calycina Roxb.

Large tree. With white-flowered panicles. Batwalchari. 1000 m. *M. A. Rau* 6419. Sept. 1958.

STERCULIACEAE

Sterculia villosa Roxb.

Stunted tree with large rusty-tomentose foliicles. Along Birehi river bank. 1300 m. *M. A. Rau* 10018. June 1959.

TILIACEAE

Grewia optiva J. R. Drummond, nomen nov. in Litt.

G. oppositifolia Roxb. (Fl. Brit. India 1: 384. 1874). Tree. Yellow flowers and 4-lobed fruits. Pipalkoti, Nandprayag. 1000-1500 m. *M. A. Rau* 2744, 10385. June 1957 & 1959.

Grewia elastica Royle Illus. Bot. Him. 1839.

G. asiatica Mast. var. *vestita* Wall. (Fl. Brit. India 1: 387. 1874).

Shrub. Flowers small purplish. Along Birehi river bank. 1000 m. *M. A. Rau* 10014. June 1959.

Triumfetta rhomboidea Jacq. Fl. Brit. India 1: 395. 1874.

Common herb. Fruits with hooked spines. Batwalchari. 800 m. *M. A. Rau* 6413. Sept. 1958.

GERANIACEAE

Geranium wallichianum Sw.

Herb. Purple flowers, 3-4 cms. dia. Common. Badrinath. 2500-3000 m. *M. A. Rau* 2951. June 1957.

G. nepalense Sw.

Herb with white to pale purple flowers, 1 cm. dia. Badrinath, Gaurikund. On grassy slopes. Common. 2500-3000 m. *M. A. Rau* 2955, 8523, 8604. June 1957. Sept. 1958.

G. robertianum Linn.

Large herb. Flowers small, purple with red streaks. On grassy slopes and rocks. Hanumanchatti. 2500 m. *M. A. Rau* 2985, 10452. June 1957 & 1959.

BALSAMINACEAE (GERANIACEAE BH)

Impatiens roylei Walp.

A large balsam with pale purple flowers. Common. Badrinath, Khiraun Valley. 2500-3000 m. *M. A. Rau* 2766, 2952, 10613. June 1957, Oct. 1959.

I. gigantea Edgew. in Trans. Linn. Soc. 20: 38. 1846.

I. sulcata Wall. in Fl. Brit. India 1: 469, 1875.

Stout fleshy herb. Pale rose flowers. Vasudhara. 3500 m. *M. A. Rau* 10464. Oct. 1959.

I. scabrida DC.

White flowers, spur yellow. Ghat. Pandukeshwar. 1300-2000 m. *M. A. Rau* 2766, 10379. June 1957 & 1959.

I. bicornuta Wall.

Herb. Reddish spurred flowers in terminal clusters. Badrinath. 3000 m. *M. A. Rau* 2958. June 1957.

I. racemosa DC.

Herb with small yellow flowers. Phata. 1500 m. *M. A. Rau* 8590. Sept. 1958.

RUTACEAE

Zanthoxylum alatum Roxb.

Shrub or small tree, strongly smelling of pepper with gland dotted fruits. Locally known as Pahari-masala. Common. Birehi, Ghat. 1300 m. *M. A. Rau* 10020, 10408. June 1959.

Fagara oxyphylla (Edgew.) Reeder & S. Y. Cheo in J. Arn. Arb. 32: 69. 1951.

Zanthoxylum oxyphyllum Edgew. (Fl. Brit. India 1: 494. 1875).

Prickly shrub. With fruits. Phata, Gohna. 1500 m. *M. A. Rau* 8561, 10089. Sept. 1958. June 1959.

Skimmia laureola Sieb. & Zucc.

Aromatic shrub. Flowers greenish white. Fruits ovoid, red. Common. Khiraun Valley. 2300 m. *M. A. Rau* 10612. Oct. 1959.

MELIACEAE

Toona serrata (Royle) M. Roem. Syn. Hesper. 139. 1846.

Cedrela serrata Royle Illus. Bot. Him. t. 25. 1839. under *C. toona* Roxb. (Fl. Brit. India 1: 568. 1875).

Tall tree. Small rose-coloured flowers in panicles. Pandukeshwar. 2000 m. *M. A. Rau* 3003. July 1957.

CELASTRACEAE

Euonymus fimbriata Wall.

Straggling shrub with crosswise flattened fruits. Gangharea forest. 2500 m. *M. A. Rau* 3019. July 1957.

E. echinata Wall.

Shrub with echinate fruits. Ramni forest. 2500 m. *M. A. Rau* 10108. June 1959.

E. hamiltoniana Wall.

Shrub with four-lobed fruits. Pandukeshwar. 2000 m. *M. A. Rau* 2992. July 1957.

RHAMNACEAE

Berchemia edgeworthii Lawson.

Shrub. Small white flowers. Gohna. 1600 m. *M. A. Rau* 10063. June 1959.

Rhamnus virgatus Roxb. Fl. Ind. 1: 604.

R. dahuricus Pall. (Fl. Brit. India 1: 639. 1875).

Tree with green ovoid fruits. Buhna forest, Kanol. 2500-3000 m. *M. A. Rau* 10221, 10322. June 1959.

R. purpureus Edgew.

Small tree with fruits. Batwalchari. 800 m. *M. A. Rau* 6420. Sept. 1958.

R. triqueter Wall. ex Roxb.

Stunted tree. Small greenish flowers in axillary panicles. Pipalkoti, Ghat. 1000-1300 m. *M. A. Rau* 2763, 1037, 10411. June 1957 & 1959.

VITACEAE (AMPELIDACEAE BH)

Vitis lanata Roxb.

Climber with rough hairy cordate leaves and fruits. Birehi river bank. 1500 m. *M. A. Rau* 10029. June 1959.

var. *rugosa* Laws. Leaves clothed with brown tomentum. Joshimath, Sutol. 1500-2500 m. *M. A. Rau* 2752, 10176. June 1957 & 1959.

Parthenocissus semicordata (Wall.) Planch. in DC. Mon. Phan. 5: 451. 1887.

Vitis semicordata Wall. under
V. himalayana Brand. in Fl. Brit. India 1: 656. 1875.
Big climber in forest. With fruits. Narayankoti, Pipalkoti, Sutol. 1500-2500 m. *M. A. Rau* 2739, 6455, 10218. June 1957 & 1959, Sept. 1958.

Tetrastigma obtectum (Wall.) Planch. ex Franch. in Bull. Soc. Bot. Fr. 33: 458. 1886.

Vitis obtecta Wall. (Fl. Br. India 1: 657. 1875).
Climber with 5-foliolate leaves and globose fruits. Gulabkoti, Gohna. 1500 m. *M. A. Rau* 2765, 10105. June 1957 & 1959.

T. serrulatum (Roxb.) Planch. in DC. Mon. Phan. 5: 432. 1887.

Vitis capreolata D. Don (Fl. Brit. India 1: 659. 1875).

Climber with 5-foliolate leaves. Red spherical fruits. Shtalc. 1600 m. *M. A. Rau* 10341. June 1959.

Leea aspera Edgew.

Large herb. With fruits. Phata. 1500 m. *M. A. Rau* 8513. Sept. 1958.

ACERACEAE (SAPINDACEAE BH)

Acer caesium Wall. ex Brandis

Big tree. With fruits. Ramni forest. 2500 m. *M. A. Rau* 10138. June 1959.

A. villosum Wall.

Tree with fruits. Pandukeshwar. 2000 m. *M. A. Rau* 2995. June 1957.

HIPPOCASTANACEAE (SAPINDACEAE BH)

Aesculus indica Colebr.

Big tree with pyramidal panicles of mauve flowers. Ramni forest. 2500 m. *M. A. Rau* 10139. June 1959.

STAPHYLEACEAE (SAPINDACEAE BH)

Staphylea emodii Wall. ex Brandis

Shrub with inflated capsules. Pandukeshwar, Gaurikund. 2000 m. *M. A. Rau* 3000, 8735. July 1957, Sept. 1958.

SABIACEAE

Sabia campanulata Wall.

Climbing shrub. Blue 2-lobed fruits. Ramni forest. 2500 m. *M. A. Rau* 10073. June 1959.

ANACARDIACEAE

Rhus wallichii Hook. f.

Small tree. Dull white flowers in large panicles. With corrosive juice. Birehi, Gulabkoti. 1300 m. *M. A. Rau* 2741, 10012. June 1957 & 1959.

Pistacia integerrima Stew.

Tree. Large panicles of red spherical fruits. Nandprayag. 1000 m. *M. A. Rau* 10404. June 1959.

Lannea coromandelica (Houtt.) Merrill in J. Arn. Arb. 19: 353. 1938.

Odina wodier Roxb. (Fl. Brit. India 2: 29. 1876).

Tree with oval fruits. Birehi. 1200 m. *M. A. Rau* 10007. June 1959.

CORIARIACEAE

Coriaria nepalensis Wall.

Shrub with arched branches and black wrinkled fruits. Gohna, Sutol. 1500-2500 m. *M. A. Rau* 10017, 10220. June 1959.

LEGUMINOSAE

Piptanthus nepalensis D. Don

Large shrub with flattened legumes. An endemic species of temperate Himalayas. Hanumanchatti, Rambara. 2600 m. *M. A. Rau* 2974, 8643.

Crotalaria sessiliflora Linn.

Herb with inflated pods enclosed in hairy calyx. Gaurikund, Phata. 1500 m. *M. A. Rau* 8744. Sept 1958.

C. sericea Retz.

Large herb with flower buds only. Batwalchari. 800 m. *M. A. Rau* 6435. Sept. 1958.

Trifolium repens Linn.

Trailing herb. White globose heads. Buhna. 3000 m. *M. A. Rau* 10199. June 1959.

Parochetus communis Buch.-Ham.

Creeping herb. Flowers blue, in moist places. Pandukeshwar. 2000 m. *M. A. Rau* 2800. June 1957.

Trigonella emodii Benth.

Creeping herb. Small yellow flowers. Common. Mana, Badrinath. 3000 m. *M. A. Rau* 2835, 2865, 10532. June 1957, Oct. 1959.

Lotus corniculatus Linn.

Trailing herb with yellow flowers. Specimens from this locality show solitary flowers. Rambara. 2800 m. *M. A. Rau* 8623. Sept. 1958.

Indigofera heterantha Wall. ex Brandis in Forest Fl. N. W. & C. India 135. 1874.

I. gerardiana Wall. (Fl. Brit. India. 2: 100. 1876) and its variety *heterantha* (Wall. ex Brandis) Baker.

Shrub. Flowers reddish purple. Fruits in Oct. Pandukeshwar. 2000 m. *M. A. Rau* 2719, 2736, 2970, 10598. June 1957, Oct. 1959.

Indigofera hebeptala Benth. ex Baker

Shrub with reddish flowers. Pandukeshwar. 2000 m. *M. A. Rau* 2987. June 1957.

Guldenstaedtia himalaica Baker

Silky herb with bluish flowers. Forms close patches on grassy slopes. Badrinath. 3000 m. *M. A. Rau* 2843. June 1957.

Astragalus strictus Grah.

Prostrate herb on rocks. Flowers bluish. Rishiganga Valley. 3500 m. *M. A. Rau* 2920. June 1957.

A. himalayanus Klotzsch

Creeping herb with violet flowers. Vasudhara. 3500 m. *M. A. Rau* 10531. Oct. 1959.

A. chlorostachys Lindl.

Shrub with oblong turgid pods. Rambara-Kedarnath. 3000 m. *M. A. Rau* 8652. Sept. 1958.

A. rhizanthus Royle

Tufted herb with yellow flowers at the crown of rootstock. Hanumanchatti. 2300 m. *M. A. Rau* 2959. June 1957.

Lespedeza eriocarpa DC.

Shrub. Purple flowers and beaked pods. Gaurikund. 1800 m. *M. A. Rau* 8757. Sept. 1958.

Zornia diphylla Pers.

Spreading herb. Jointed pods with bristles. Agastyamuni. 600 m. *M. A. Rau* 6355. Sept. 1958.

Smithia ciliata Royle

Annual herb with pale violet flowers. Phata. 1500 m. *M. A. Rau* 6479. Sept. 1958.

Uraria lagopus DC.

Undershrub. Coiled jointed pods. Phata-Trijuginarayan. 2000 m. *M. A. Rau* 8525. Sept. 1958.

Desmodium podocarpum DC.

Herb with pale purple flowers. 2-jointed pods. Phata. 1500 m. *M. A. Rau* 8501. Sept. 1958.

D. floribundum G. Don

Undershrub. With pods. Gaurikund-Phata. 1500 m. *M. A. Rau* 8752. Sept. 1958.

D. tiliaefolium G. Don

Shrub, common in forests and on hill slopes. Flowers purple. Joshimath, Gaurikund, Kanol. 2000-2500 m. *M. A. Rau* 2791, 8716, 10315, 10601. June 1957, Sept. 1958, Oct. 1959.

D. diffusum DC.

Hairy herb. Flowers bluish in long racemes. Batwalchari. 800 m. *M. A. Rau* 6408. Sept. 1958.

D. concinnum DC.

Shrub with bluish flowers. Bracts prominent. Batwalchari. 800 m. *M. A. Rau* 6408. Sept. 1958.

D. polycarpum DC.

Small shrub with blue flowers. Pods, 5-8 jointed. Agastyamuni. 600 m. *M. A. Rau* 6326, 6337. Sept. 1958.

D. parvifolium DC.

Trailing herb with jointed pods. Agastyamuni. 600 m. *M. A. Rau* 6344. Sept. 1958.

D. motorium (Houtt.) Merrill in J. Arn. Arb. 19: 345. 1938.

D. gyrans DC. (Fl. Brit. India 2: 174. 1876).

The "Telegraph Plant". Flowers white. Agastyamuni. 600 m. *M. A. Rau* 6338, 6438. Sept. 1958.

Vicia hirsuta (Linn.) S. F. Gray

Purplish herb. With pods. Kanol 2000 m. *M. A. Rau* 10323. June 1959.

V. pallida Turcz.

Twinner with violet flowers. Pandukeshwar. 2000 m. *M. A. Rau* 10597. Oct. 1959.

Shuteria vestita Wt. & Arn.

Climber with dense racemes. Compares with the var. *densiflora*. Nandprayag. 1000 m. *M. A. Rau* 10398. June 1959.

Erythrina arborescens Roxb.

A low tree common in forest. Flowers brown-red. Phata. 1500 m. *M. A. Rau* 6492. Sept. 1958.

Phaseolus radiatus Linn.

Trailing herb with hairy, flattened pods. Chandrapuri. 700 m. *M. A. Rau* 6375. Sept. 1958.

Vigna capensis Walp. Linnaea 13: 533. 1839.

V. vexillata Benth. (Fl. Brit. India 2: 210. 1876).

Climber with large pale purple flowers. Phata-Trijuginarayan. 1500 m. *M. A. Rau* 8526. Sept. 1958.

Atylosia mollis Benth.

Trailing herb. Flowers large, yellow. Chandrapuri. 600 m. *M. A. Rau* 6390. Sept. 1958.

Dalbergia lanceolaria Linn.

Tree. Flattened pods. Vishnuprayag. 1500 m. *M. A. Rau* 2790. June 1957.

D. hircina Benth.

Small tree. With fruits. Birehi river bank. 1300 m. *M. A. Rau* 10026. June 1959.

Cassia pumila Lamk.

Prostrate woody perennial. Flowers yellow. Chandrapuri. 700 m. *M. A. Rau*. Sept. 1958.

ROSACEAE

Prunus cornuta (Royle) Steudel, Nomencl. Bot. ed. 2, 2: 403. 1841.

P. padus Hook. f. in Fl. Brit. India 2: 315. 1878 non Linn.

Small tree. Flowers white. Ovaries often become malformed and fusiform on account of insect attack. Hanumanchatti-Badrinath. 2300-3000 m. *M. A. Rau* 2830, 2894. June 1957.

Prinsepia utilis Royle

Spinous shrub. Flowers white, drupes dark purple. Khiraun Valley. 2000 m. *M. A. Rau* 10595. Oct. 1959.

Sorbaria tomentosa (Lindl.) Rehder. in J. Arn. Arb. 19: 74. 1938.

Spiraea sorbifolia as in Fl. Brit. India 2: 324. 1878 non Linn.

Tall shrub. Large panicles of white flowers. Joshimath, Gohna, Ramni. 1500-2000 m. *M. A. Rau* 2771, 10041, 10145. June 1957 & 1959.

Aruncus silvester Kostel ex Maxim. in Acta Horti. Petrop. 6:169. 1879.

Spiraea aruncus Linn. (Fl. Brit. India 2:323. 1878).

Large herb with panicles of white flowers. Buhna. 3000 m. *M. A. Rau* 10202. June 1959.

Spiraea bella Sims

Shrub with pink flowers. In forest. Gangharea and Buhna forests. 3000 m. *M. A. Rau* 3010, 10195. July 1957, June 1959.

S. canescens D. Don

Shrub with stout arching branches. Corymbs of white flowers. Pandukeshwar, Rambara, Kanol. 2000-2500 m. *M. A. Rau* 2803, 8602, 10320. June 1957, Sept. 1958. June 1959.

S. vacciniifolia D. Don

Shrub. Leaves small, greyish underneath. White flowers in close corymbs. Gulabkoti, Birehi. 1500 m. *M. A. Rau* 2734, 10011, 10013. June 1957 & 1959.

Rubus nutans Wall. ex Hook.

Creeping shrub on rocks with stiff brown hairs. Flowers white, fruits dark red. Hanumanchatti, Ramni, Gaurikund. 2000-2500 m. *M. A. Rau* 2829, 8589, 10171. June 1957 & 1959, Sept. 1958.

R. pedunculatus D. Don Prodr. Fl. Nep. 234. 1825.

R. niveus Wall. (Fl. Brit. India 2: 335. 1878).
Rambling shrub, armed with curved prickles. Purple flowers. Fruits globose, yellow. Gaurikund, Buhna.

2000-3000 m. *M. A. Rau*. 8729, 10280. Sept. 1958, June 1959.

R. niveus Thunb., Diss. de Rub. 9. 1813.

R. lasiocarpus Sm. var. *pauciflorus* Hook. f. (Fl. Brit. India 2: 339. 1878).

Large rambling shrub. Armed. Fruits brownish. Birehi. 1500 m. *M. A. Rau* 10024. June 1959.

Geum urbanum L.

Erect herb. Yellow flowers. Gangharea. 3000 m. *M. A. Rau s. n.* July 1957.

Duchesnea indica Focke in Pflanzenfam. 3, 3: 33. 1888.

Fragaria indica Andr. (Fl. Brit. India 2: 343. 1878).

Creeping herb. Yellow flowers. Fruits in spid. Soragarh. 800 m. *M. A. Rau* 6306. Sept. 1958.

Sibbaldia parviflora Willd. in Ges. Naturf. Fr. New Schr. ii 125. 1799.

Potentilla sibbaldii Franch. (Fl. Brit. India 2: 348. 1878).

Prostrate herb. Yellow flowers. Vasudhara, Mana-Ghastoli. 3500 m. *M. A. Rau* 2871, 10554. June 1957, Oct. 1959.

Potentilla arbuscula D. Don Fl. Nepal. 256. 1825.

This plant is generally known as *P. fruticosa* Linn. According to Fletcher (Notes R. Bot. Gardn. Edinb. 20: 207. Jan. 1950), the Linnaean species does not occur in the Himalaya and its place is taken by *P. arbuscula* D. Don. Hairy shrub with thick leaves. On rocks. Flowers yellow. Hanumanchatti, Rambara. 2500 m. *M. A. Rau* 2832, 2986, 8627. June 1957, Sept. 1959.

P. ambigua Camb.

Prostrate silky herb. Flowers yellow, solitary in axils. Mana, Buhna. 3000 m. *M. A. Rau* 2851, 10179. June 1957 & 1959.

P. fulgens Wall. in Lehm. Rev. Pot. 54. 1854.

Herb. Leaflets silky-white underneath. Yellow flowers. Gaurikund. 1800 m. *M. A. Rau* 8576. Sept. 1958.

P. leschenaultiana Ser.

Large herb with numerous flowering stems. Flowers pale yellow. Khiraun Valley. 2000 m. *M. A. Rau* 10629. Oct. 1959.

P. fragarioides Linn.

Hairy herb. Small yellow flowers. Batwalchari, Buhna. 1000-3000 m. *M. A. Rau* 6394, 10183. Sept. 1958, June 1959.

P. microphylla D. Don

Dwarf herb on grassy slopes with filiform leaves and small yellow flowers. Bishtola Alp. 3800 m. *M. A. Rau* 10226. June 1959.

Potentilla nepalensis Hook.

Herb. Leaves 5-foliolate. Flowers crimson red. Ukhimath, Trijuginarayan. 1500-2500 m. *M. A. Rau* 8549, 8770. Sept.-Oct. 1959.

P. argyrophylla Wall. in Lehm. Rev. Potentill. 1854.

Herb with silky-white hairs. Flowers yellow. Fruits. Mana-Ghastoli. 3500 m. *M. A. Rau* 10558, 10574. Oct. 1959.

P. atrosanguinea Lodd. Bot. Cab. 8:t 786. 1824.

Under *P. argyrophylla* Wall. in Fl. Brit. India 2: 357. 1878.

Similar in habit to above but with dark crimson flowers. Common on grassy slopes. Badrinath, Buhna. 3000-3500 m. *M. A. Rau* 2854, 2862, 10258, 10526. June 1957 & 1959.

P. kleiniana Wight

Herb with yellow flowers. Joshimath. 1800 m. *M. A. Rau* 2762. June 1957.

Agrimonia pilosa Ledeb. var. **nepalensis** (D. Don) Nakai in Tokyo Bot. Mag. 47: 247. 1933.

A. eupatoria Hook. f. (in Fl. Brit. India 2: 361. 1878) non Linn.

Erect herb. Flowers yellow. Batwalchari. 1000 m. *M. A. Rau* 6393. Sept. 1958.

Rosa anserinaefolia Boiss.

Large prickly shrub. Flowers white. Badrinath. 3000 m. *M. A. Rau* 2781a. June 1957.

R. macrophylla Lindl.

Prickly shrub. Bright rose-red flowers. Common throughout Garhwal up to 3500 m. *M. A. Rau* 2781, 8649, 10106, 10217, 10245, 10588. June 1957 & 1959, Sept. 1958, Oct. 1959.

R. sericea Lindl.

Shrub. Flowers large, white. Ramni, Buhna. 2000-3000 m. *M. A. Rau* 10126, 10216, 10237. June 1959.

Pyrus pashia Buch.-Ham.

Small tree with spherical fruits. Gohna. 1500 m. *M. A. Rau* 10061. June 1959.

P. lanata D. Don

Medium-sized tree (upto 20 m.). Leaves lobed, rough textured. With red spherical fruits. Buhna forest. 3000 m. *M. A. Rau* 10222. June 1959.

Sorbus aucuparia Linn. Sp. Pl. 477, 1753.

Pyrus aucuparia Gaertn. (Fl. Brit. India 2: 375. 1878).

Small tree. Fruits white, spherical. Kedarnath. 3000 m. *M. A. Rau* 8726. Sept. 1958.

S. foliolosa (Wall.) Spach, Hist. Veg. Phan. 2: 96. 1824.

Pyrus foliolosa Wall. (Fl. Brit. India 2: 376. 1878). Small tree, similar to above but with red brown tomentum. Flowers white. Bishtola. 3500 m. *M. A. Rau* 10252. June 1959.

Pyracantha crenulata (D. Don) Roemer, Fram. Nat. Reg. Veg. Syn. 3: 220. 1847.

Crataegus crenulata Roxb. (Fl. Brit. India 2: 384. 1878).

Spinescent shrub with red fruits. Gulabkoti, Birehi. 1000-1500 m. *M. A. Rau* 2749, 6352, 10036. June 1957 & 1959, Sept. 1958.

Cotoneaster affinis Lindl. var. **bacillaris** (Lindl.) Schneider in Ill. Handb. Laubh. 1: 757. 1906.

C. bacillaris Wall. (Fl. Brit. India 2: 384. 1873). Shrub. With fruits. Khiraun Valley. 2000 m. *M. A. Rau* 10608. Oct. 1959.

C. acuminata Lindl.

Shrub with white fragrant flowers. Kanol. 2500 m. *M. A. Rau* 10321. June 1959.

C. microphylla Wall. ex Lindl.

Rigid shrub on rocks. Abundant around Ramni. Flowers white, fruits red. Kedarnath, Ramni, Badrinath. 2500 to 4000 m. *M. A. Rau* 8670, 8711, 10112, 10576. Sept. 1958, June 1959, Oct. 1959.

C. disticha Lange in Bot. Tidsskr. 13: 19. 1882.

C. rotundifolia Hook. f. p.p. (Fl. Brit. India 2: 386. 1878).

Shrub. Fruits red. Near Rock bridge, Mana. 3200 m. *M. A. Rau* 2863. June 1957.

SAXIFRAGACEAE

Saxifraga diversifolia Wall. var. **parnassifolia** (D. Don) Engl. Monogr. Gatt. Sax. 125. 1872.

S. diversifolia Wall. (Fl. Brit. India 2: 393. 1878). Erect herb. Yellow flowers. Common. Kedarnath, Nar Parbat. 3000-4000 m. *M. A. Rau* 8580, 8665, 10508, Sept. 1958, Oct. 1959.

S. pallida Wall.

S. micrantha Edgew. (C. B. Clarke in Fl. Brit. India 2: 394. 1878).

C. B. Clarke (loc. cit.) had already stated that his species would perhaps, be merged in *S. pallida* when more material accumulated and this has now been done by Engler & Irmscher in Pflanzenreich 67: 46-47. 1916. Small herb near water fall. Flowers white. Buhna-Bajmora. 3500 m. *M. A. Rau* 10267. June 1959.

S. brunoniana Wall. ex Sternberg

Herb with basal rosette of leaves and long surculi. Flowers yellow. Badrinath, Buhna. 3000-3500 m. *M. A. Rau* 2966, 10292. June 1957 & 1959.

Bergenia stracheyii (Hook. f. & Thoms.) Engl. in Pflanzenfam. 3, 2a: 50. 1890.

Saxifraga stracheyii Hook. f. & Thoms. (Fl. Brit. India 2: 398. 1878).

Stout herb with thick fleshy leaves which change colour to red during autumn. Abundant near glacial bed amidst boulders. Locally known as 'Silphadu', leaves are used for making brew. Satopanth, Bhagath Kharak glacial bed. 3500 m. *M. A. Rau* 10529. Oct. 1959.

Chrysosplenium tenellum Hook. f. & Thoms.

Trailing herb in moist places. With fruits. Buhna. 3000 m. *M. A. Rau* 10270. June 1959.

Parnassia nubicola Wall. ex Royle

Herb on grassy slopes. Flowers white. Rambara, Hanumanchatti. 2500-3000 m. *M. A. Rau* 8615, 10440. Sept. 1958, Oct. 1959. A dwarf form of this occurs on Nar Parbat at 4000 m. *M. A. Rau* 10498. Oct. 1959.

Deutzia corymbosa R. Br.

Shrub. Bark peels off in flakes. Flowers white. Hanumanchatti, Buhna. 2500-3000 m. *M. A. Rau* 2972, 10272. June 1957 & 1959.

D. staminea R. Br.

Shrub. With fruits. Cangharea, Vasudhara. 3000 m. *M. A. Rau* 3021, 10578. July 1957, Oct. 1959.

Philadelphus tomentosus Wall. ex Royle Illus. Bot. Him. 1: 216. 1835.

P. coronarius Linn. var. *tomentosus* Maxim. (Fl. Brit. India 2: 407. 1878).

Shrub. Flowers white. *M. A. Rau* 2976. June 1957.

Itea nutans Royle

Shrub, hanging from rocks with pendant elongate racemes of white flowers. Birehi-Gohna. 1500 m. *M. A. Rau* 10038. June 1959.

Ribes alpestre Wall. ex Decne in Jacq. Voy. Bot. t. 75. 1844.

R. grossularia C. B. Clarke in Fl. Brit. India 2: 410. 1878 non Linn.

Large armed shrub with fruits. Mana. 3500 m. *M. A. Rau* 2856. June 1957.

R. glaciale Wall.

Small tree. With fruits. Buhna. 3000 m. *M. A. Rau* 10207, 10249. June 1959.

R. himalense Decne in Jacq. Voy. Bot. t. 67. 1844.

R. rubrum C. B. Clarke in Fl. Brit. India 2: 411. 1878 non Linn.

Tree. Hanging inflorescences of yellow flowers. Buhna. 3000 m. *M. A. Rau* 10246. June 1959.

CRASSULACEAE

Tillaea pentandra Royle ex Edgew.

Small herb on rocks. Flowers minute in axils. Pandukeshwar, Narayankoti. 1500-2000 m. *M. A. Rau* 2794, 6459. June 1957, Sept. 1958.

Crassula indica Decne

Succulent herb. Panicles of dull reddish flowers. Gaurikund, Hanumanchatti. 2000-2500 m. *M. A. Rau* 8534, 10429, 10439, 10604. Sept. 1958, Oct. 1959.

Sedum quadrifidum Pallas.

Moraine species with long tap root, short shoots and reddish leaves. Satopanth glacial bed. 3500 m. *M. A. Rau* 10539. Oct. 1959.

S. crassipes Wall. ex Hook. f. & Thoms. in J. Linn. Soc. 2: 99. 1858.

S. asiaticum C. B. Clarke in Fl. Brit. India 2: 419. 1878 non DC.

Succulent herb growing in close clumps on rocks. Flowers reddish. Kedarnath glacial valley. 4000 m. *M. A. Rau* 8687. Sept. 1958.

S. linearifolium Royle

Succulent herb on rocks. Flowers white, red tipped. Rambara, Badrinath. 3000 m. *M. A. Rau* 8600, 8626, 10346. Sept. 1958, Oct. 1959. var. *sinuatum* Hamet. in Acta Horti Goth. 2: 394. 1926.

S. trifidum Wall. (Fl. Brit. India 2: 420. 1878).

Herb on tree bark. Flowers white. Gaurikund, Rambara, Buhna. 2500-3500 m. *M. A. Rau* 8582, 8630, 10266. Sept. 1958, June 1959.

S. rosulatum Edgew.

Herb on rocks with rosulate leaves. Flowers white. Ramni. 2500 m. *M. A. Rau* 10143. June 1959.

S. adenotrichum Wall. ex Saunders.

In rock crevices. Flowers dull purple. Mana. 3200 m. *M. A. Rau* 2858. June 1957.

S. ewersii Ledeb.

Succulent herb on rocks. Thick oval leaves and dense cymes of purple flowers. An attractive herb. Mana, Badrinath. 3000-3500 m. *M. A. Rau* 10443, 10479, 10483. Oct. 1959.

S. multicaule Wall. ex Lindl.

Herb. Flowers yellow. Pandukeshwar, Kedarnath, Vasudhara. 2000-3000 m. *M. A. Rau* 6485, 8529, 8676, 10454, 10475. Sept. 1958, Oct. 1959.

MELASTOMACEAE

Osbeckia stellata Wall. ex D. Don

Small shrub. Ovoid woolly fruits. Phata. 1500 m. *M. A. Rau* 6468. Sept. 1958.

Sonerila tenera Royle

Small herb. Pale purple flowers. On rocks amidst ferns and mosses. Soragarh. 800 m. *M. A. Rau* 6347. Sept. 1958.

LYTHRACEAE

Ammannia senegalensis Lamk.

Erect herb. Flowers purplish. Agastyamuni. 700 m. *M. A. Rau* 6356. Sept. 1958.

PUNICACEAE (LYTHRACEAE BH)

Punica granatum Linn.

The Pomegranate. Wild? With flowers. Nandprayag. 1000 m. *M. A. Rau* 10413. June 1959.

ONAGRACEAE

Chamaenerion latifolium (Linn.) Sweet in Hort. Brit. Ed. 2: 198.

Epilobium latifolium Linn. (Fl. Brit. India 2: 583. 1879).

Herb on hill slopes and along water margins. Attractive dark purple flowers. Kedarnath glacial valley. 4000 m. *M. A. Rau* 8677. Sept. 1958.

Epilobium roseum Schreb.

Herb with small pink flowers. Common. Badrinath, Gaurikund. 2000-3000 m. *M. A. Rau* 8568, 8605, 10448. Sept. 1958, Oct. 1959.

E. palustre Linn.

Herb near water margins. Small pale pink flowers. Khiraun Valley, Rambara. 2500-3000 m. *M. A. Rau* 8616, 10623. Sept. 1958, Oct. 1959.

E. origanifolium Lamk.

Dwarf herb. With fruits. Vasudhara. 3500 m. *M. A. Rau* 10473. Oct. 1959.

Circaea imaicola (Äsch. et Magn.) Hand.-Maz. in Symb. Sin. 603. 1933.

Circaea alpina Clarke in Fl. Brit. India 2: 589. 1879 non Linn.

Small herb with white flowers. On a log of wood amidst mosses. Rambara. 2800 m. *M. A. Rau* 8610. Sept. 1958.

HYDROCARYACEAE (ONAGRACEAE BH)

Trapa sp.

In Dewariya Lake at 2500 m. With fruits. This is probably one of the forms of *T. natans* Linn., which according to some taxonomists includes several species. *M. A. Rau* 8773. Oct. 1958.

CUCURBITACEAE

Trichosanthes bracteata Voigt. Cat. Hort. Calc. 58. 1845.

T. palmata Roxb. (Fl. Brit. India 2: 606. 1879).

Climber. White flowers with frilled petals. Pipalkoti, Birehi. 1300 m. *M. A. Rau* 2737, 10032. June 1957 & 1959.

T. sp.

Climber. With red ovoid fruits. Trijuginarayan. 2000 m. *M. A. Rau* 8566. Sept. 1958.

Luffa acutangula Roxb.

Climber with white female flowers. Hanumanchatti. 2500 m. *M. A. Rau* 2984. June 1957.

Gomphogyne cissiformis Griff.

Twiner with top shaped fruits. Hanumanchatti. 2500 m. *M. A. Rau* 10438. Oct. 1959.

Bryonopsis laciniosa (Linn.) Naud. Ann. Sc. Nat. 4. Ser 12: 141. 1859.

Bryonia laciniosa Linn. (Fl. Brit. India 2: 622. 1879).

Climber with yellow flowers. Fruits globose, smooth. Soragarh. 800 m. *M. A. Rau* 6343. Sept. 1958.

BEGONIACEAE

Begonia picta Sm.

Soft herb on rocks. Pale rose-white flowers. Soragarh. 800 m. *M. A. Rau* 6301. Sept. 1958.

UMBELLIFERAE

Centella asiatica (Linn.) Urban in Mart. Fl. Bras. 11: 287. 1879.

Hydrocotyle asiatica Linn. (Fl. Brit. India 2: 669. 1879).

Trailing herb. With fruits. Chandrapuri. 700 m. *M. A. Rau* 6372. Sept. 1958.

Trachydium roylei Lindl.

Small herb in moist places. Flowers pale purple. Badrinath. 3000 m. *M. A. Rau* 2904. June 1957.

Bupleurum candollei Wall. ex DC.

Herb. With fruits. Hanumanchatti, Khiraun Valley. 2500 m. *M. A. Rau* 2967, 10607. June 1957, Oct. 1958.

B. falcatum Linn.

Herb. Flowers yellow. Ramni. 2500 m. *M. A. Rau* 10159. June 1959.

B. longicaule Wall. ex DC.

Branched herb. With fruits. Hanumanchatti, Nar Parbat. 2500-4000 m. *M. A. Rau* 2812, 10509. June 1957, Oct. 1959.

Carum carvi Linn.

A cultivated herb. Badrinath. 3000 m. *M. A. Rau* 2941. June 1959.

Pimpinella acuminata Clarke

Large herb. With fruits. Pandukeshwar. 2000 m. *M. A. Rau* 10456. Oct. 1959.

P. diversifolia DC.

Tall herb. Umbels of small white flowers. Pipalkoti. 1300 m. *M. A. Rau* 2745. June 1957.

Chaerophyllum villosum Wall. ex DC.

Large herb. Flowers white. Ramni, Khiraun Valley. 2500 m. *M. A. Rau* 10128, 10614. June 1959, Oct. 1959.

C. reflexum Lindl.

Herb. Leaves finely divided. White flowers. Sutol-Buhna. 2500 m. *M. A. Rau* 10200 m. June 1959.

Selinum tenuifolium Wall. ex DC.

Tall herb. Flat oval fruits in large umbels. Kedarnath. 3500 m. *M. A. Rau* 8639, 8681. Sept. 1958.

S. vaginatum Clarke

A tall herb. Bracteoles prominent. With fruits. Nar Parbat slopes. 4000 m. *M. A. Rau* 10505. Oct. 1959.

Heracleum candicans Wall. ex DC.

Large herb. Flowers white. Fruits. Ramni, Kanol. 2500 m. *M. A. Rau* 10097, 10355. June 1959.

ARALIACEAE

Hedera nepalensis Koch. Hort. Dendr. 284. 1853.

H. helix as in Fl. Brit. India 2: 739. 1879. non Linn. Climber. Very common in forest. Phata. 1500 m. *M. A. Rau* 6467. Sept. 1958.

CORNACEAE

Cornus macrophylla Wall.

Tree. Fruits in panicles. Gohna, Kanol. 1500-2000 m. *M. A. Rau* 10059, 10351. June 1959.

Dendrobenthamia capitata (Wall.) Hutchinson in Fam. Fl. Plants 1: 328. 1956.

Benthamidia capitata (Wall.) Hara in J. Arn. Arb. 29: 115. 1948.

Cornus capitata Wall. (Fl. Brit. India 2: 745. 1879).

Small tree. Bracts yellowish, prominent around hemispherical heads. Gohna. 1500 m. *M. A. Rau* 10042. June 1959.

CAPRIFOLIACEAE

Viburnum cotinifolium D. Don

Shrub with dense corymbs of flattened fruits. Common. Hanumanchatti, Ghat, Vasudhara. 1500-3500 m. *M. A. Rau* 2957, 10064, 10503. June 1957 & 1959, Oct. 1959.

V. mullaha Buch.-Ham. ex Don Prodr. Fl. Nep. 141. 1825.

V. stellulatum Wall. (Fl. Brit. India 3: 4. 1880).

Shrub with spreading corymbs of globose red fruits. Trijuginarayan, Ramni, Kanol. 2000-3000 m. *M. A. Rau* 8556, 8608, 10144, 10342. Sept. 1958, June 1959.

V. foetens Decne

Large shrub, leafless at time of flowering. Flowers pale pink in clusters. Fruits. Badrinath, Ramni forest. 2500-3000 m. *M. A. Rau* 2944, 10137. June 1957 & 1959.

Lonicera myrtillus var. *depressa* Rehder in Sargent, Trees & Shrubs. 1: 87. 1903.

L. parvifolia Hook. f. & Thoms. non Edgew. (Fl. Brit. India 3: 13. 1880).

Shrub with small white flowers in pairs. Fruits red. Mana, Kedarnath. Buhna. 3000-4000 m. *M. A. Rau* 2853, 8698, 10247, 10487, 10587. June 1957, Sept. 1958, June & Oct. 1959.

L. obovata Royle ex Hook. f. & Thoms.

Shrub. Fruits sky-blue. Kedarnath glacial valley. 4000 m. *M. A. Rau* 8699. Sept. 1958.

L. quinquelocularis Hardw.

Shrub. Flowers yellow. Kanol. 2500 m. *M. A. Rau* 10339. June 1959.

Leycesteria formosa Wall.

Shrub with ovoid red fruits in clusters. In Rhododendron-Oak forest. Rambara. 2800 m. *M. A. Rau* 8613. Sept. 1958.

RUBIACEAE

Uncaria pilosa Roxb.

Straggling tree on hill slope. With globose heads. Nandprayag. 1000 m. *M. A. Rau* 10388. June 1959.

Hymenodictyon flaccidum Wall.

Tree. White flowers in dense racemes. Nandprayag. 1000 m. *M. A. Rau* 10386. June 1959.

Oldenlandia coccinea Royle

Slender erect herb. Flowers pink. Trijuginarayan. 2500 m. *M. A. Rau* 8515. Sept. 1958.

Ophiorhiza fasciculata D. Don

Herb in moist places. Flowers white. Batwalchhari, Narayankoti. 1000-1500 m. *M. A. Rau* 6377, 6447. Sept. 1958.

Randia tetrasperma Roxb.

Shrub. Flowers greenish-white. Vishnuprayag. 1500 m. *M. A. Rau* 2783. June 1957.

Pavetta indica Linn.

Small tree. With fruits. Narayankoti. 1000 m. *M. A. Rau* 6439. Sept. 1958.

Pavetta tomentosa Roxb. ex Sm. in Rees Cyclop. 26. 1813.

P. indica Linn. var. *tomentosa* Roxb. (Fl. Brit. India 3: 150. 1880).

Tree. Panicles of white flowers. Nandprayag. 1000 m. *M. A. Rau* 10388.

Leptodermis lanceolata Wall.

Shrub. Flowers pale pink or white. Joshimath, Narayankoti. 1500 m. *M. A. Rau* 2776, 6404, 6428. June 1957. Sept. 1958.

L. kumaoenensis Parker in Indian For. 48: 576. 1922.

Woody straggling shrub, often hanging from rocks. Flowers white to purple. Badrinath, Ramni, Kanol. 2500-3000 m. *M. A. Rau* 2834, 10133, 10309, 10316. June 1957 & 1959.

Borreria hispida (Linn.) Schum. in Pflanzenfam. 4, 4: 144. 1891.

Spermacoce hispida Linn. (Fl. Brit. India 3: 200. 1881).

Procumbent hairy herb. Flowers small, white. Sora-garh. 800 m. *M. A. Rau* 6351. Sept. 1958.

Rubia cordifolia Linn. var. *munjista* Miquel in Ann. Mus. Lugd.-Bat. 3: 111. 1867.

R. cordifolia in Fl. Brit. India 3: 202. 1891 non Linn. Climbing herb. Flowers minute. Pandukeshwar. 2000 m. *M. A. Rau* 3025. July 1957.

Galium rotundifolium Linn.

Herb with minute flowers. Pandukeshwar, Narayan-koti. 1500-2000 m. *M. A. Rau* 2792, 6437. June 1957, Sept. 1958.

G. asperuloides Edgew. in Trans. Linn. Soc. 20: 61. 1846.

G. triflorum in Fl. Brit. India 3: 205. 1891 non Michx. Herb. Small white flowers. Common. Badrinath, Mana, Ramni. 2500-3000 m. *M. A. Rau* 2859, 2938, 2973, 3012, 10123. June 1957 & 1959.

G. vestitum D. Don

Perennial herb. With flowers. Ramni-Sutol. 2500 m. *M. A. Rau* 10172. June 1959.

G. mollugo Linn. Subsp. *asperifolium* (Wall.) Kitamura in Fauna & Fl. Nepal Him. 1: 230. 1955.

G. asperifolium Wall. in Roxb. Fl. Ind., ed. Carey & Wall. 1: 381. 1820 under *G. mollugo* Linn. (Fl. Brit. India 3: 207. 1881).

Rambling stiff herb. Flowers white. Batwalchari. 1000 m. *M. A. Rau* 6389. Sept. 1958.

G. acutum Edgew.

Herb with close set leaves. Turns black on drying. Flowers yellow. Vasudhara, Kedarnath. 3000 m. *M. A. Rau* 2872, 8647, 19461, 10490. June 1957, Sept. 1958, Oct. 1959.

VALERIANANCEAE

Nardostachys jatamansii DC.

Erect herb. Yellowish flowers. The Himalayan spike-nard, well known as a medicinal plant. Nar Parbat, Bishtola. 3500-4000 m. *M. A. Rau* 10290, 10507. June 1959, Oct. 1959.

Valeriana jatamansii Jones in As. Res. 2: 405. 416. 1790.

V. wallichii DC. (Fl. Brit. India 3: 213. 1891)

Herb. Rootstock aromatic. Flowers white, flowers early in spring and summer. Ramni, Kanol. 2500 m. *M. A. Rau* 10078, 10304. June 1959.

V. hardwickii Wall.

Large herb. Spreading dichotomously branched corymbs of white flowers. Common. Flowers during autumn months. Rambara, Kedarnath, Pandukeshwar, Badrinath. 2500-3000 m. *M. A. Rau* 8607, 8718, 10437, 10605. Sept. 1957, Oct. 1958.

DIPSACACEAE

Morina longifolia Wall. ex DC.

Tall spiny herb. Pale purple flowers in whorls at nodes. Fruits. Badrinath, Kedarnath, Buhna. 3000 m. *M. A. Rau* 2962, 8653, 10291. June 1957, Sept. 1958, June 1959.

Dipsacus mitis D. Don Prodr. Fl. Nep. 161. 1825.

D. inermis Wall. var. β (Fl. Brit. India 3: 217. 1891).

Tall herb. Terminal head of white flowers. Trijuginarayan, Pandukeshwar. 2000 m. *M. A. Rau* 8530, 10444. Sept. 1958, Oct. 1959.

COMPOSITAE

Solidago virga-aurea Linn.

Perennial herb. Small yellow heads. Trijuginarayan. 2500 m. *M. A. Rau* 8535. Sept. 1958.

Dichrocephala integrifolia (D. Don) O. Kuntze, Rev Gen. 333. 1891.

D. latifolia DC.

Erect herb. Heads violet. Trijuginarayan. 2500 m. *M. A. Rau* 8558. Sept. 1958.

Myriactis wallichii Less.

Large herb. Yellow-centred white heads. Narayan-koti, Phata. 1500 m. *M. A. Rau* 6387, 8509. Sept. 1958.

Aster asperulus Nees

Herb. Large purple heads. Trijuginarayan-Gaurikund. 2500 m. *M. A. Rau* 8573. Sept. 1958.

Erigeron alpinus Linn.

Erect herb. Pale purple heads. 1 cm. dia. Badrinath. 3000 m. *M. A. Rau* 2978. June 1957.

Erigeron multiradiatus Benth.

Erect hairy herb. Large purplish heads 4-5 cms. dia. Badrinath. 3000 m. *M. A. Rau* 10590. Oct. 1959.

Conyza stricta Willd.

Branched herb. Numerous small heads. Soragarh, Phata. 600-1500 m. *M. A. Rau* 6341, 8748. Sept. 1958.

Laggera alata Schultz-Bip.

Tall herb with winged stem. Purplish heads. Batalchari. 1000 m. *M. A. Rau* 6417. Sept. 1958.

Anaphalis nepalensis (Spreng.) Hand.-Maz. in Symb. Sin. 1099. 1936.

A. nubigena DC. (Fl. Brit. India 3: 280. 1881) and its varieties.

Woolly herbs, abundant at high altitudes. Several intergrading forms occur leading to difficulties in specific delimitations. Kedarnath, Buhna, Ghastoli, Satopanth. 3000-4500 m. *M. A. Rau* 2896, 8662, 8689, 10182, 10488, 10520, 10521, 10522, 10564. June 1957, Sept. 1958, June 1959, Oct. 1959.

A. triplinervis Clarke

Large herb with prominently 3-nerved leaves, white underneath. Heads white. Trijuginarayan, Gaurikund. 2000-2500 m. *M. A. Rau* 8582, 8601. Sept. 1958.

A. margaritacea Benth. & Hook. f. Gen. Pl. 2: 303. 1873. Sub sp. *angustior* Kitamura in Mem. Coll. Sci. Kyoto Imp. Univ. 13: 243. 1937.

A. cinnamonea Clarke (Fl. Brit. India 3: 281. 1881). Stout herb with greyish wool. Numerous heads. Trijuginarayan, Khiraun Valley. 2500 m. *M. A. Rau* 8555, 10611. Sept. 1958, Oct. 1959.

A. busua (Buch.-Ham.) Hand.-Maz., Symb. Sin. 1104. 1936.

A. araneosa DC. (Fl. Brit. India 3: 283. 1881). Hairy herb with many small heads. Khiraun Valley. 2500 m. *M. A. Rau* 10540, 10625. Oct. 1959.

A. contorta Hook. f.

Herb. Very common on alpine slopes. With narrow wrinkled leaves and small heads. Mana-Ghastoli. 3000-4000 m. *M. A. Rau* 10471, 10492, 10541, 10552. Oct. 1959.

A. virgata Thoms.

Erect grey herb. Aromatic. Badrinath. 3000 m. *M. A. Rau* 2855, 2897. June 1957.

Gnaphalium affine D. Don Prodr. Fl. Nep. 173. 1825.

G. luteo-album (Fl. Brit. India 3: 288. 1881) non Linn. Erect woolly herb. Yellow heads. Pipalkoti, Kanol. 1300-2000 m. *M. A. Rau* 2732, 10314. June 1957 & 1959.

G. hypoleucum DC.

Herb. Yellow heads. Soragarh, Khiraun Valley. 600-2000 m. *M. A. Rau* 6316, 6317, 10619. Sept. 1958, Oct. 1959.

Inula grandiflora Willd.

Herb. Near water margin. Heads large, yellow. Rambara. 2800 m. *M. A. Rau* 8609. Sept. 1958.

I. cappa DC.

Shrub. Leaves thick, leathery. Orange-yellow to reddish heads in corymbs. Pandukeshwar, Narayankoti, Ramni. 1500-2500 m. *M. A. Rau* 2981, 6465, 10198, 10528. June 1957, Sept. 1958, June and Oct. 1959.

I. cuspidata Clarke

Large shrub with conspicuous yellow heads. Gaurikund, Pandukeshwar. 2000 m. *M. A. Rau* 8753, 10420. Sept. 1958, Oct. 1959.

Siegesbeckia orientalis Linn.

Pubescent herb. Small yellow heads. Gulabkoti, Agastyamuni. 600-1300 m. *M. A. Rau* 2761, 6350, 6410. June 1957, Sept. 1958.

Bidens biternata (Lour.) Merr. & Sherff.

B. pilosa as in Fl. Brit. India 3: 309. 1881. non Linn. Erect herb with dark stiff elongated heads. Soragarh. 600 m. *M. A. Rau* 6323. Sept. 1958.

Tanacetum nubigenum Wall.

Woolly highly aromatic herb with small yellow heads. Satopanth, Rishiganga Valley. 3500-4000 m. *M. A. Rau* 10538, 10546. Oct. 1959.

Artemisia parviflora Roxb.

Large perennial herb. With heads. Batwalchari. 1000 m. *M. A. Rau* 6411. Sept. 1958.

A. maritima Linn.

Greyish herb, highly aromatic. Reddish heads. Vasudhara. 3500 m. *M. A. Rau* 2883, 10469. June 1957, Oct. 1959.

A. nilagirica Pampanini in Nuovo Giron. Bot. Ital. 33: 452. 1926.

A. vulgaris as in Fl. Brit. India 3: 325. 1881. non Linn.

Large herb almost a shrub. Aromatic. Clustered heads. Gaurikund, Mana. 2000-3000 m. *M. A. Rau* 8727, 8740, 10478. Sept. 1958, Oct. 1959.

A. vestita Wall.

Large herb with ash-grey finely dissected leaves. Aromatic. Small heads. Gaurikund. 2000 m. *M. A. Rau* 8751. Sept. 1958.

Gynura cusimbua (D. Don) S. Moore in J. Bot. 1: 212. 1912.

G. angulosa DC. (Fl. Brit. India 3: 334. 1881).

Large herb with stem clasping leaves. Orange-yellow heads. On rock edge near Phata. 1500 m. *M. A. Rau* 8754. Sept. 1958.

Senecio graciliflorus DC.

Large herb. Yellow heads. Khiraun Valley. 2500 m. *M. A. Rau* 10632. Oct. 1959.

S. chrysanthemoides DC.

Common herb. Bright yellow heads. Khiraun Valley. 2500 m. *M. A. Rau* 10547, 10626. Oct. 1959.

S. alatus Wall. ex DC.

Herb with large radical leaves. Yellow heads in panicle. In shade in forest. Rambara forest. 3000 m. *M. A. Rau* 8736. Sept. 1958.

S. kunthianus Wall. ex DC.

Erect herb. Leaves ash-grey underneath. Heads yellow, involucre black. Mana-Ghastoli. 3000-4000 m. *M. A. Rau* 10568. Oct. 1959.

S. rufinervis DC.

Almost a shrub. Leaves ash-white underneath. Heads in fruit. Khiraun Valley. 2500 m. *M. A. Rau* 10596. Oct. 1959.

Ligularia amplexicaulis (Wall.) DC. Prodr. 6: 314. 1838.

Senecio amplexicaulis Wall. (Fl. Brit. India 3: 348. 1881).

Robust herb with large toothed leaves. Racemes of heads; in fruit. On way to Kedarnath. 3000 m. *M. A. Rau* 8640. Sept. 1958.

Echinops cornigerus DC.

Spinescent herb. Large globose heads, 6-8 cms. dia. Rambara. 3000 m. *M. A. Rau* 8734. Sept. 1958.

Carduus nutans Linn.

Tall thistle. Purple-red heads. Mana. 3200 m. *M. A. Rau* 10557. Oct. 1959.

Cirsium involucreatum DC. Prodr. 6: 639. 1838.

Cnicus involucreatus DC. (Fl. Brit. India 3: 362. 1881).

Tall stout thistle. Large purple heads. Hanumanchatti, Khiraun Valley. 2500 m. *M. A. Rau* 2991a, 10641. June 1957, Oct. 1959.

C. wallichii DC. Prodr. 6: 643. 1838.

Cnicus wallichii DC. (Fl. Brit. India 3: 363. 1881).

Tall thistle. Purple heads. In dry river bed. Birehi, Hanumanchatti. 1600-2000 m. *M. A. Rau* 2991, 10030. June 1957 & 1959.

Saussurea obvallata Wall. ex Clarke

Herb near snowline. Dark purple heads enclosed in large membranous bracts. Locally known as Brahma-Kamal offered to the Deity at the holy shrines of Kedarnath and Trijuginarayan. Kedarnath glacial valley. 4000 m. *M. A. Rau s.n.* Sept. 1958.

S. candicans Clarke

Greyish herb. Purple heads. On rocky ground along Birehi stream. 1500 m. *M. A. Rau* 10035. June 1959.

S. albescens Hook. f. & Thoms.

Tall herb with stem-clasping upper leaves. Pale purple heads. Rambara. 3000 m. *M. A. Rau* 8732. Sept. 1958.

S. lappa Clarke

The 'Kuth' of commerce. Plantations near Buhna. 3500 m. *M. A. Rau* 10209. June 1959.

Serratula pallida DC.

Tall herb. Solitary purple head on long scape. Ramni. 2500 m. *M. A. Rau* 10110. June 1959.

Leucomeris spectabilis D. Don

Shrub. Leaves white-tomentose underneath. Heads numerous, white. Birehi. 1200 m. *M. A. Rau* 10023. June 1959.

Gerbera lanuginosa Benth.

Greyish woolly herb. Pale purple heads. Birehi. 1500 m. *M. A. Rau* 10037. June 1959.

Taraxacum officinale Wigg.

The Dandelion. Milky herb widely distributed over the entire range 2 to 4500 m. and highly variable in size and form. Needs critical taxonomic analysis. *M. A. Rau* 2879, 10310. June 1957 & 1959.

Lactuca longifolia DC.

Herb. Heads blue. Phata-Trijuginarayan. 1500 m. *M. A. Rau* 8522. Sept. 1958.

L. hastata DC.

Tall herb. Heads in fruit. Gaurikund, Rambara. 2000 to 3000 m. *M. A. Rau* 8570, 8629. Sept. 1958.

L. macrorhiza Hook. f.

Large herb with lyrate-lobed leaves, usually hanging from rocks. Heads pale purple. Gaurikund, Vasudhara. 2000-4000 m. *M. A. Rau* 8569, 10589. Sept. 1958, Oct. 1959.

L. brunoniana (Wall.) Clarke in Comp. India 266. 1876. *Prenanthes brunoniana* Wall. (Fl. Brit. India 3: 411. 1881).

Herb. Pinnatifid leaves, auricled at base. Heads pale purple of few flowers. Rambara. 2500 m. *M. A. Rau* 8606. Sept. 1958.

L. violaefolia Clarke in Comp. India 269. 1876.

Prenanthes violaefolia Decne. (Fl. Brit. India 3: 412. 1881).

Small herb with few bluish heads. Mana, Vasudhara. 3000-3500 m. *M. A. Rau* 10499, 10527. Oct. 1959.

Lactuca sikkimensis (Hook. f.) Stebbins in Indian For. Rec., n.s. Bot. 1: 239. 1939.

Prenanthes sikkimensis Hook. f. (Fl. Brit. India 3: 412. 1881).

Milky herb with purple heads. Pandukeshwar. 2000 m. *M. A. Rau* 10421, 10600. Oct. 1959.

Dubyaea hispida (D. Don) DC. Prodr. 7: 247. 1838.

Lactuca dubyaea Clarke (Fl. Brit. India 3: 409. 1881).

Large herb with nodding heads clothed with black glandular hairs. Ligules yellow. Kedarnath. 3500 m. *M. A. Rau* 8668. Sept. 1958.

Launea secunda Clarke

Branched erect herb. Heads yellow. Pipalkoti. 1300 m. *M. A. Rau* 2721. June 1957.

Tragopogon gracilis D. Don

Milky herb with grass-like leaves. Yellow heads. Gulabkoti. 1500 m. *M. A. Rau* 2722. June 1957.

CAMPANULACEAE

Lobelia pyramidalis Wall.

Tall herb. Pale purple flowers. Rambara. 2800 m. *M. A. Rau* 8714. Sept. 1958.

Codonopsis viridis Wall.

Twining herb. Large bell-shaped purple flowers. Trijuginarayan. 2500 m. *M. A. Rau* 8550. Sept. 1958.

Cyananthus lobatus Wall. ex Benth.

Small herb on alpine slopes. Flowers dark blue. Calyx with black, spreading hairs. Kedarnath, Nar Parbat. 3500-4500 m. *M. A. Rau* 8663, 10495. Sept. 1958, Oct. 1959.

C. linifolius Wall. ex Hook. f. & Thoms.

Small herb similar in habit to previous species but with narrow, oblong, entire leaves. Nar Parbat. 4000 m. *M. A. Rau* 10459, 10496. Oct. 1959.

Campanula colorata Wall.

Hairy herb. Greyish calyx and purple corolla. Common throughout. 1500-2000 m. *M. A. Rau* 2948, 8544, 8625, 10115, 10466. June 1957, Sept. 1958, June 1959, Oct. 1959.

C. argyrotricha Wall. ex DC.

Greyish herb with white, purple-streaked flowers. On rocks near Rock-Bridge, Mana. 3200 m. *M. A. Rau* 10480. Oct. 1959.

C. cashmeriana Royle

Herb. Flowers purple-blue. Rambara. 2800 m. *M. A. Rau* 8644. Sept. 1958.

ERICACEAE

Gaultheria nummularioides D. Don

Prostrate, spreading shrub. With fruits. Trijuginarayan. 2500 m. *M. A. Rau* 8557. Sept. 1958.

G. trichophylla Royle

Prostrate shrub with wiry stem. Fruits globose red or sky blue. Kedarnath, Nar Parbat. 3500-4500 m. *M. A. Rau* 8666, 8667, 10512. Sept. 1958, Oct. 1959.

Cassiope fastigiata D. Don

Shrub forming rigid dense tufts on alpine slopes. Flowers white-rose. Rishiganga, Ghastoli. 3500-4000 m. *M. A. Rau* 2922, 10537. June 1957, Oct. 1959.

Lyonia ovalifolia (Wall.) Drude in Pflanzenfam. 4, 1: 44. 1889.

Pieris ovalifolia D. Don (Fl. Brit. India 3: 460. 1882).

Tree, common associate of *Rhododendron arboreum* Sm. Racemes of white flowers. Pandukeshwar, Ramni. 2000 m. *M. A. Rau* 2784, 2823, 10107, 10111. June 1957 & 1959.

Rhododendron campanulatum D. Don

Large shrub. Flowers white to pale purple. Bhyundar valley, Buhna. 3000-3500 m. *M. A. Rau* 3012, 10184. July 1957, June 1959.

R. lepidotum Wall. ex D. Don

Small shrub with gland dotted leaves and purple flowers. Forms gregarious patches on hill slopes. Fruits in October. Badrinath, Buhna. 3000-3500 m. *M. A. Rau* 2836, 10127, 10238, 10542. June 1957, 1959, Oct. 1959.

R. anthopogon D. Don

Aromatic shrub, locally known as 'Dhoop'. Flowers cream-white. Satopanth glacial bed, Kedarnath glacial valley. 3500-4500 m. *M. A. Rau* 8712, 10510, 10525. Sept. 1958, Oct. 1959.

MONOTROPACEAE

Monotropa uniflora Linn.

Leafless white herb with single nodding flower. Saprophytic. In forest humus near Ukhimath. Very scarce. 1500 m. *M. A. Rau* 8777. Oct. 1959.

Hypopithys lanuginosa Nutt.

Yellowish herb with nodding racemes of yellow flowers. Amidst fallen Oak-Rhododendron leaves in forest near Kanol. 2800 m. *M. A. Rau* 10303. June 1959.

PRIMULACEAE

Primula denticulata Sm.

Erect herb, very variable in habit. Heads of white to pale purple flowers. Common throughout the area. 2000-4000 m. *M. A. Rau* 2861, 2917, 2924, 10192, 10551, 10561. June 1957 & 1959, Oct. 1959.

Primula munroi Lindl. in Bot. Reg. t. 15. 1833.
P. involucrata Wall. ex Duby (Fl. Brit. India 3: 488. 1882).

Slender herb. Flowers white. Rishiganga Valley. 3500 m. *M. A. Rau* 2908, 2915. June 1957.

P. nivalis Pall., var. *macrophylla* (D. Don) Pax in Pflanzenreich 22: 103. 1905.

Under *P. stuartii* Wall. var. *purpurea* Hook. f. in Fl. Brit. India 3: 490. 1882.

Herb with large dark purple flowers. Rishiganga Valley. 3500 m. *M. A. Rau* 2918. 1957.

P. edgeworthii (Hook. f.) Pax in Pflanzenreich 22: 41. 1905.

P. petiolaris Wall. var. *edgeworthii* Hook. f. (Fl. Brit. India 3: 493. 1882.

Herb. Leaves rosulate. Flowers lilac, solitary on scapes. Buhna. 3000 m. *M. A. Rau* 10240. June 1959.

P. minutissima Jacq.

Small herb. Minute rosettes. Flowers solitary, blue. Arwa-Saraswathi Bed, Ghastoli. 4000 m. *M. A. Rau* s.n. Oct. 1961.

P. floribunda Wall.

A yellow-flowered primrose of lower altitudes in the Himalayas. Ghat. 1200 m. *M. A. Rau* 10391. June 1959.

Androsace rotundifolia Hardw.

Herb, hairy. Flowers white or pink. Corresponds to variety *incisa* Pax. Joshimath, Ghat. 1500-2000 m. *M. A. Rau* 2757, 3027, 10384. June 1957 & 1959.

A. sarmentosa Wall.

Herb. Flowers pale purple. Vasudhara, Rishiganga, Kedarnath. 3000 m. *M. A. Rau* 2875, 2932, 8731. June 1957, Sept. 1958 (Fruits).

A. lanuginosa Wall.

Greyish hairy herb. Flowers lilac. Pandukeshwar, Ramni. 2000-2500 m. *M. A. Rau* 2805, 10080. June 1957 & 1959.

A. globifera Duby.

Cushion forming herb at high altitudes. Flowers pale rose. Fruits in Oct. Rishiganga, Nar Parbat slopes. 3500-4000 m. *M. A. Rau* 2921, 10503. June 1957, Oct. 1959.

Lysimachia pyramidalis Wall.

Erect herb. Flowers white. Gohna, Ramni. 2000-2500 m. *M. A. Rau* 10005, 10077. June 1959.

L. prolifera Klatt.

Small soft herb in grassy meadows. Flowers pale purple. Buhna. 3000 m. *M. A. Rau* 10298. June 1959.

L. alternifolia Wall. ex Roxb.

Small herb on rocks. Flowers yellow. Nandprayag. 1000 m. *M. A. Rau* 10390. June 1959.

L. japonica Thunb.

Small hairy herb on rocks. Flowers yellow. Kanol-Shetale. 2000 m. *M. A. Rau* 10334. June 1959.

MYRSINACEAE

Maesa indica (Roxb.) Wall.

Small tree. Panicles of fruits. Ukhimath, Batwalchhari. 1000 m. *M. A. Rau* 6382, 8766. Sept. 1958.

SYMPLOCACEAE (STYRACACEAE BH)

Symplocos chinensis (Lour.) Druce in Rep. Bot. Exch. Cl. Brit. Is. 65. 1917.

S. crataegoides Buch.-Ham. (Fl. Brit. India 3: 572. 1882).

Tree. With fruits. Locally known as 'Loodh'. Gohna-Shetale. 2000 m. *M. A. Rau* 10066, 10365. June 1959.

S. ferruginea Roxb.

Tree. With fruits, black when ripe. Phata, Kalimath forest. 1500 m. *M. A. Rau* 6470, 8762, 8763. Sept.-Oct. 1959.

OLEACEAE

Jasminum humile Linn.

Shrub. Flowers yellow. Gulabkoti. 1500 m. *M. A. Rau* 2743. June 1957.

J. officinale Linn.

Shrub. Flowers white, fragrant. Fruits ovoid. Rambara, Kanol. 2500 m. *M. A. Rau* 8637, 10329. Sept. 1958, Oct. 1959.

Syringa emodii Wall. ex G. Don

Large shrub in Rhododendron forests. Panicles of white, fragrant flowers. Gangharee, Rambara, Buhna. 3000 m. *M. A. Rau* 3008, 8635, 10181, 10361. July 1957, Sept. 1958, June 1959.

Osmanthus fragrans Lour.

Small tree. Yellow flowers in axillary fascicles. Ukhimath. 1300 m. *M. A. Rau* 8768. Oct. 1958.

Olea cuspidata Wall. ex DC.

Tree. With fruits. Vishnuprayag. 1500 m. *M. A. Rau* 2778. June 1957.

APOCYNACEAE

Chonemorpha macrophylla G. Don

Shrub. Large white flowers. Chandrapuri. 800 m. *M. A. Rau* 6373. Sept. 1958.

Trachelospermum lucidum (D. Don) K. Schum. in Pflanzenfam. 4, 2: 173. 1895.

T. fragrans Hook. f. (Fl. Brit. India 3: 667. 1882).
 Climbing shrub. White flowers in panicles. Joshimath. 1800 m. *M. A. Rau* 2780. June 1957.

ASCLEPIADACEAE

Cryptolepis buchananii Roem. & Sch.

Twiner with greenish yellow flowers. Birehi, Nand-prayag. 1300 m. *M. A. Rau* 10009, 10389. June 1959.

Periploca calophylla Falc.

Climber. Narrow cylindrical follicles. Batwalchari. 1000 m. *M. A. Rau* 6432. Sept. 1958.

Cynanchum vincetoxicum Pers.

Large erect herb. Flowers greenish yellow. Follicles. Badrinath, Mana. 3000 m. *M. A. Rau* 2821, 2930, 10468. June 1957, Oct. 1959.

Marsdenia roylei Wight

Climber with orange-yellow flowers. Joshimath, Gohna. 1600 m. *M. A. Rau* 2774, 10043. June 1957 & 1959.

Tylophora govani Decne

Erect herb in Blue Pine forest. Flowers dark purple. Kanol-Shetale. 2000 m. *M. A. Rau* 10354.

Hoya longifolia Wall.

Climbing shrub spreading on rocks. With fruits. Vishnuprayag. 1500 m. *M. A. Rau* 2788, 10638. June 1957, Oct. 1959.

GENTIANACEAE

Canscora decussata Roem. & Sch.

Erect herb with winged stem and winged calyx. Small white flowers. Soragarh. 600 m. *M. A. Rau* 6368. Sept. 1958.

Gentiana carinata Griseb.

Herb in moist places. Light blue flowers. Gohna. 1500 m. *M. A. Rau* 10047. June 1959.

G. stipitata Edgew. in Trans. Linn. Soc. 20: 84. 1846.

G. cachemirica Clarke (Fl. Brit. India 4: 115. 1883). Small herb. Flowers proportionately large, blue, purple-backed. On alpine slopes. Nar Parbat. 4000 m. *M. A. Rau* 10472, 10544. Oct. 1959.

Gentianella tenella (Rottb.) H. Smith in Uppsala Univ. Arsskr. Nr. 7. 259. 1945.

Gentiana tenella Fries. (Fl. Brit. India 4: 109. 1883). Small herb with blue flowers. Nar Parbat slopes. 3600 m. *M. A. Rau* 10497. Oct. 1959.

Pleurogyne carinthiaca Griseb.

Herb. Flowers blue. Rishiganga Valley. 3500 m. *M. A. Rau* 10545. Oct. 1959.

Swertia purpurascens Wall. ex D. Don

Erect herb. Flowers purple. Rambara, Nar Parbat. 2800-3500 m. *M. A. Rau* 8620, 8655, 10502. Sept. 1958, Oct. 1959.

S. alternifolia Royle

Large herb with alternate leaves. In fruit. Kedarnath glacial valley. 3500-4000 m. *M. A. Rau* 8669, 8707. Sept. 1958.

Halenia elliptica D. Don

Erect herb. Flowers with spurred petals. Near Badrinath. 3000 m. *M. A. Rau* 10442. Oct. 1959.

BORAGINACEAE

Cynoglossum zeylanicum (Wall.) Thunb. ex Lehm. in Neue Schrift. Natur. Ges. Halle, 3, 2: 20. 1817.

C. furcatum Wall. (Fl. Brit. India 4: 155. 1883). Herb, flowers white, blue-centred. Fruits. Pipalkoti, Soragarh. 600-1200 m. *M. A. Rau* 2726, 6304. June 1957, Sept. 1958.

C. micranthum Desf.

Hairy herb. Flowers blue. Gulabkoti, Khiraun Valley. 1500-2000 m. *M. A. Rau* 2760, 10628. June 1957, Oct. 1959.

C. wallichii G. Don

Large herb with blue flowers. In cultivated fields near Kanol. 2500 m. *M. A. Rau* 10356. June 1959.

Lindelofia spectabilis Lehm.

Erect herb. Flowers dark blue. Kedarnath. 3500 m. *M. A. Rau* 8686. Sept. 1958.

Hackelia glochidiata (A. DC.) Brand in Pflanzenreich 97: 120. 1931.

Paracaryum glochidiatum Benth. (Fl. Brit. India 4: 161. 1883).

Herb. Flowers blue, yellow-centred. Bhyundar forest, Kedarnath, Buhna. 3000-3500 m. *M. A. Rau* 3006, 8678, 10208. June 1957 & 1959, Sept. 1958.

Myosotis sylvatica Hoffm.

A small hairy herb with yellow-centred sky-blue flowers. Vasudhara. 3500 m. *M. A. Rau* 2874. June 1957.

CONVOLVULACEAE

Ipomoea hispida (Vahl) Roem. & Sch. Syst. 4: 238. 1819.

I. eriocarpa R. Br. (Fl. Brit. India 4: 204. 1883).

Twining, trailing herb. Flowers rose. Chandrapuri 800 m. *M. A. Rau* 6361. Sept. 1958.

Porana racemosa Roxb.

Twiner. Flowers white. Phata. 1500 m. *M. A. Rau* 8538. Sept. 1958.

Cuscuta reflexa Roxb.

Twining parasite. With flowers and fruits. Pandukeshwar. 2000 m. *M. A. Rau* 10427. Oct. 1959.

SOLANACEAE

Solanum nigrum Linn.

Herb. With white flowers and fruits. Near Gaurikund. 1600 m. *M. A. Rau* 8749. Sept. 1958.

S. verbascifolium Linn.

Hairy shrub. White flowered panicles. Ghat-Nand-prayag. 1200 m. *M. A. Rau* 10410. June 1959.

S. surattense Burm. f., Fl. Ind. 57. 1768.

S. xanthocarpum Schrad. & Wendl. (Fl. Brit. India 4: 236. 1883).

Prickly bush. Flowers white. Fruits globose, yellow. Pipalkoti Phata. 1000-1500 m. *M. A. Rau* 2725, 2728, 8750. June 1957, Sept. 1958.

Physalis minima Linn.

Herb. Flowers yellow. Fruits. Agastyamuni. 800 m. *M. A. Rau* 6360, 6407. Sept. 1958.

Nicandra physaloides Gaertn.

Large herb. With fruits. Joshimath. 1800 m. *M. A. Rau* 2768. June 1957.

Datura stramonium Linn.

Near Bhyundar village. 2500 m. *M. A. Rau* 3032. July 1957.

Hyoscyamus niger Linn.

Large herb. Dull purple-streaked flowers. Badrinath. 3000 m. *M. A. Rau* 2842. June 1957.

SCROPHULARIACEAE

Verbascum thapsus Linn.

Tall, tomentose herb. Flowers yellow. Badrinath. 3000 m. *M. A. Rau* 2899, 10482. June 1957, Oct. 1959.

Scrophularia edgeworthii Benth.

Large perennial herb. Flowers green. Badrinath, Vasudhara. 3000-3500 m. *M. A. Rau* 2824, 10446, 10493. June 1957, Oct. 1959.

S. himalensis Royle

Herb. Flowers green. Fruits. Phata. 1500 m. *M. A. Rau* 8760. Sept. 1958.

Mimulus strictus Benth. Scroph. Ind. 28. 1835.

M. gracilis in Fl. Brit. India 4: 258. 1884 non R. Br.
Herb with white flowers. Nandprayag. 1000 m. *M. A. Rau* 10400. June 1957.

Mazus japonicus (Thunb.) Kuntze Rev. Gen. Plant. 462. 1891.

M. rugosus Lour. (Fl. Brit. India 4: 259. 1884).
Herb on hill slopes. Common. Flowers white, orange spotted. Near Hanumanchatti. 2400 m. *M. A. Rau* 2967. June 1957.

Lindenbergia grandiflora Benth.

Herb. Flowers yellow. Agastyamuni. 800 m. *M. A. Rau* 6358. Sept. 1958.

L. macrostachya Benth.

Perennial herb. Flowers yellow. On rocky soil near Birehi stream. 1300 m. *M. A. Rau* 10034. June 1959.

L. indica (Linn.) Kuntze in Rev. Gen. Plant. 462. 1891.

L. urticaefolia Lehm. (Fl. Brit. India 4: 262. 1884).
Herb. Flowers yellow. Agastyamuni. 800 m. *M. A. Rau* 6365. Sept. 1958.

Torenia cordifolia Roxb.

Herb. Flowers blue. Common. Soragarh. 800 m. *M. A. Rau* 6302. Sept. 1958.

Lindernia nummulariaefolia Wettst. in Pflanzenfam. 4, 3b: 73. 1891.

Vandellia nummulariaefolia D. Don (Fl. Brit. India 4: 282. 1884).

Small herb on rocks amidst mosses. Batwalchari. 1000 m. *M. A. Rau* 6433. Sept. 1958.

Bonnaya brachiata Link & Otto.

Herb. Flowers white. Fruits. Chandrapuri. 800 m. *M. A. Rau* 6369. Sept. 1958.

Hemiphragma heterophyllum Wall.

Trailing prostrate herb. Fruits red. Trijuginarayan, Bajmora. 2500-3500 m. *M. A. Rau* 8560, 10263. Sept. 1958, June 1959.

Picrorhiza kurrooa Benth.

Spreading herb with perennial rootstock. Leaves turn black on drying. Flowers light blue with long filaments. Locally known as 'Karui', the bitter rootstock is reputed to be medicinal. Buhna, Nar Parbat. 3000-4500 m. *M. A. Rau* 10271, 10506. June 1957, Oct. 1959 (Frs.).

Wulfenia amherstiana Benth.

Herb in moist places. Flowers blue in one-sided spikes. Kedarnath, Ramni, Kanol. 2500-3000 m. *M. A. Rau* 8725, 10072, 10306. Sept. 1958, June 1959.

Veronica cana Wall.

Hairy herb. Pale blue flowers. Buhna-Bishtola. 3500-4000 m. *M. A. Rau* 10230. June 1959.

Buchnera hispida Buch.-Ham.

Erect hairy herb. Stem purplish. Flowers blue. Batwalchari. 1000 m. *M. A. Rau* 6415. Sept. 1958.

Striga asiatica (Linn.) Kuntze in Rev. Gen. Plant. 466. 1891.

S. lutea Lour. (Fl. Brit. India 4: 299. 1884).
Slender herb. Flowers yellow. Phata. 1500 m. *M. A. Rau* 8514. Sept. 1958.

***Pedicularis pectinata* Wall. ex Benth.**

Tall herb. Fruits. Kedarnath. 3500 m. *M. A. Rau* 8693, 8697. Sept. 1958.

***P. gracilis* Wall. ex Benth.**

Herb. Flowers purple. Fruits. Trijuginarayan, Kedarnath. 2500-3000 m. *M. A. Rau* 8548, 8654. Sept. 1958.

***P. porrecta* Wall. ex Benth.**

Small herb. In fruit. Nar Parbat slopes. 4000 m. *M. A. Rau* 10513. Oct. 1959.

***P. punctata* Decne in Jacquem. Voy. Bot. 117. 1844.**

P. siphonantha D. Don (Fl. Brit. India 4: 313. 1884).
Herb alongside stream. Flowers bright purple-red. Rishiganga, Bishtola. 3500 m. *M. A. Rau* 2923, 2956, 10235. June 1957 & 1959.

***P. bifida* (Buch.-Ham.) Pennell, Scroph. West Himal. 144. 1943.**

P. carnosa Wall. (Fl. Brit. India 4: 313. 1884).
Herb with pale rose flowers. Ukhimath, Gaurikund. 1500-2000 m. *M. A. Rau* 8581, 8720, 8771. Sept. & Oct. 1958.

OROBANCHACEAE

***Aeginetia indica* Linn.**

In moist places. Soragarh. 600 m. *M. A. Rau* 6308. Sept. 1958.

***Orobanche epithymum* DC.**

Parasite on *Thymus*. Flowers dark purple. Kedarnath, Vasudhara. 3500 m. *M. A. Rau* 8709, 10463. Sept. 1958, Oct. 1959.

***Boschniakia himalaica* Hook. f. & Thoms.**

Parasite on roots of *Rhododendron*. Flowers dull purple. Bhyundar forest, Kanol. 2500-3000 m. *M. A. Rau* 8709, 10463. July 1957, June 1959.

LENTIBULARIACEAE

***Utricularia striatula* Sm. Rees Cycl. 37, 1817.**

U. orbiculata Wall. (Fl. Brit. India 4: 334. 1884).
On moist rocks near dripping water. Flowers white-violet. Narayankoti. 1300 m. *M. A. Rau* 6452.

U. sp.

Very small herb along with above. Flowers yellow. Spur sharply bent. Narayankoti. 1300 m. *M. A. Rau* 6457.

***Pinguicula alpina* Linn.**

The 'butter wort'. On hill slopes. Flowers white, spurred. Rishiganga Valley. 3500 m. *M. A. Rau* 2910. June 1957.

GESNERIACEAE

***Aeschynanthus ramosissima* Blume**

Epiphytic on *Mallotus philippensis*. Flowers red. Batwalchhari. 1200 m. *M. A. Rau* 6441. Sept. 1958.

***Didymocarpus subalternans* Wall. ex DC.**

Herb. Leaves hairy, thick. Fruits curved. Phata-Trijuginarayan. 2000 m. *M. A. Rau* 8542. Sept. 1958.

***Corallo-discus lanuginosus* (Wall. ex DC.) B. L. Burt in Gard. Chron. 212. 1947.**

Diddissandra lanuginosa Clarke (Fl. Brit. India 4: 355. 1884).

Herb on rocks with woolly leaves. With fruits. Narayankoti, Joshimath. 1300-1800 m. *M. A. Rau* 6458, 10639. Sept. 1958, Oct. 1959.

***Chirita bifolia* D. Don**

Small herb in moist places. Phata. 1800 m. *M. A. Rau* 8510. Sept. 1958.

***C. pumila* D. Don**

Herb on rocks. Fruits. Phata. 1800 m. *M. A. Rau* 8541. Sept. 1958.

***Platystemma violoides* Wall.**

Slender herb on rocks in shade. Flowers violet. Gaurikund-Rambara. 2000 m. *M. A. Rau* 8596. Sept. 1958.

***Rhynchoglossum obliquum* Blume**

Herb in moist places. Flowers blue in spikes. Narayankoti. 1200 m. *M. A. Rau* 6453. Sept. 1958.

BIGNONIACEAE

***Incarvillea arguta* (Royle) Royle, Illus. Bot. Him. 296. 1836; Burt & Grierson in Notes R. Bot. Gard. Edin. 21: 155. 1953.**

Amphicome arguta Lindl. (Fl. Brit. India 4: 385. 1884).

Herb. Pinnate leaf, 5 leaflets. Flower pink. Gulabkoti. 1500 m. *M. A. Rau* 2748. June 1957.

ACANTHACEAE

***Goldfussia dalhousiana* Nees in DC., Prodr. 11: 174. 1847.**

Strobilanthes dalhousiana (Nees) Clarke (Fl. Brit. India 4: 460. 1884).

Shrub. Flowers blue. Common. Hanumanchatti. 2500 m. *M. A. Rau* 2831. June 1957.

***Pteracanthus alatus* (Wall. ex Nees) Bremekamp in Verh. Nederl. Adad. Wetenschapp. 46, 1: 199. 1944.**

Strobilanthes alatus Nees (Fl. Brit. India 4: 464. 1884).

Shrub. Flowers curved, blue. Gaurikund, Buhna. 2500-3000 m. *M. A. Rau* 8738, 10308. Sept. 1958 & 1959.

Barleria cristata Linn.

Undershrub. Flowers purplish. Agastyamuni. 800 m. *M. A. Rau* 6340. Sept. 1958.

Justicia simplex D. Don

Herb. Flowers white, purple streaked. Chandrapuri. 800 m. *M. A. Rau* 6403. Sept. 1958.

VERBENACEAE

Verbena officinalis Linn.

Large herb. Flowers light purple in paniced spikes. Gohna. 1500 m. *M. A. Rau* 10055. June 1959.

Callicarpa macrophylla Vahl

Shrub. Flowers purple. Nandprayag. 1000 m. *M. A. Rau* 10397. June 1959.

Premna barbata Wall. ex Schauer.

Small tree. In flower buds. Pandukeshwar. 2000 m. *M. A. Rau* 2804. June 1957.

Clerodendrum serratum Spreng.

Small roadside shrub. Flowers purple. Pipalkoti, Batwalchhari. 1300 m. *M. A. Rau* 2718, 6402. June 1957, Sept. 1958.

Caryopteris wallichiana Schauer.

Shrub. Small blue flowers in thyrsoïd cymes. Birehi river bank. 1200 m. *M. A. Rau* 10006, June 1959.

C. grata Benth.

Shrub on rocks. Red globose fruits. Gohna. 1500 m. *M. A. Rau* 10058. June 1959.

LABIATAE

Plectranthus striatus Benth.

Includes *P. gerardianus* Benth. also (Fl. Brit. India 4: 616. 1885).

Herb. Panicles of white flowers. Phata, Gaurikund. 1500-2000 m. *M. A. Rau* 6482, 8505, 8739. Sept. 1958.

P. coetsa Buch.-Ham. ex D. Don

Large herb. Flowers light purple. Pandukeshwar. 2000 m. *M. A. Rau* 10431. Oct. 1959.

P. rugosus Wall.

Shrub. Flowers white, pink spotted. Hanumanchatti. 2500 m. *M. A. Rau* 2954. June 1957.

Coleus forskohlii Briq. in Pflanzenfam. 4, 3a: 359. 1897.

C. barbatus Benth. (Fl. Brit. India 4: 625. 1885).

Herb. Leaves aromatic. Flowers light purple. Narayankoti. 1500 m. *M. A. Rau* 8765. Sept. 1958.

Anisochilus carnosus Wall.

Herb. inodorous. Flowers pale purple. Agastyamuni. 800 m. *M. A. Rau* 6362. Sept. 1958.

Elsholtzia flava Benth.

Tall herb. Flowers yellow. Phata-Trijuginarayan. 2000 m. *M. A. Rau* 8540. Sept. 1958.

E. fruticosa (D. Don) Rehder in Sargent, Pl. Wils. 3: 381. 1916.

E. polystachya Benth. (Fl. Brit. India 4: 643. 1895).

Shrub. Spikes of white flowers. Rambara, Pandukeshwar. 2000-2500 m. *M. A. Rau* 8636, 10426. Sept. 1958, Oct. 1959.

E. incisa Benth.

Herb. Flowers light purple. Trijuginarayan. 2500 m. *M. A. Rau* 8574. Sept. 1958.

E. strobilifera Benth.

Herb with cylindrical spikes. Some of the high altitude specimens are hardly 4 cms. high. Flowers dark purple. Vasudhara, Nar Parbat. 3500-4000 m. *M. A. Rau* 2840, 10474. June 1957, Oct. 1959.

E. cristata Willd.

Aromatic herb. Flowers white. Soragarh. 600 m. *M. A. Rau* 6353. Sept. 1958.

Origanum vulgare Linn.

Erect herb. Aromatic. Flowers white in close spikes. Badrinath, Agastyamuni, Mana. 1000-3000 m. *M. A. Rau* 3031, 6329, 10425, 10556. Sept. 1958, Oct. 1959.

Thymus serpyllum Linn.

Aromatic spreading herb. Abundant on hill slopes. Flowers purple. The Thyme. Badrinath, Mana. 3000-3500 m. *M. A. Rau* 2876, 10514. June 1957, Oct. 1959.

Micromeria biflora Benth.

Aromatic herb. Flowers mauve. On rocks in dry situations. Phata-Trijuginarayan. 2500 m. *M. A. Rau* 6364, 8517. Sept. 1958.

Clinopodium vulgare Linn. Sp. Pl. 587. 1753.

Calamintha clinopodium Benth. (Fl. Brit. India 4: 650. 1885).

Erect herb. Flowers purple. Badrinath. 3000 m. *M. A. Rau* 2949. June 1957.

Salvia nubicola Sweet, Brit. Flower Gardn. 2: 140. 1825-27.

The plant described as *S. glutinosa* in Fl. Brit. India 4: 653. 1885 is *S. nubicola* Sw., according to I. C. Hedge (Notes R. Bot. Gardn. Edinb. 23: 205-208. 1961) since *S. glutinosa* Linn. does not extend to the Himalayas.

Large herb. Flowers dull brownish yellow. Khiraun Valley. 2500 m. *M. A. Rau* 10634. Oct. 1959.

Salvia hians Royle ex Benth.

Herb. Aromatic. Flowers purple-blue. Calyx sticky. Rambara-Kedarnath. 3000-3500 m. *M. A. Rau* 8645, 8659. Sept. 1958.

Nepeta eriostachya Benth.

Erect herb. Flowers blue. Badrinath, Khiraun Valley. 2500-3000 m. *M. A. Rau* 10445, 10610. Oct. 1959.

N. discolor Royle ex Benth.

Stem spreading, erect branches. Flowers purple-blue. Herb aromatic. Vasudhara. 3500 m. *M. A. Rau* 10486. Oct. 1959.

N. govaniana Benth.

Erect aromatic herb. Flowers yellow. Rambara-Kedarnath. 3000-3500 m. *M. A. Rau* 8642. Sept. 1958.

Scutellaria grossa Wall.

Aromatic. Erect herb. Flowers blue-purple. Gohna, Sutol. 2000-2500 m. *M. A. Rau* 10071, 10163. June 1959.

Prunella vulgaris Linn.

Herb on grassy slopes. Flowers blue-purple. Hanumanchatti, Khiraun Valley. 2500 m. *M. A. Rau* 2979, 10624. July 1957, Oct. 1959.

Craniotome versicolor Benth.

Erect herb. Flowers small, rose coloured. Batwalchari. 1300 m. *M. A. Rau* 6386. Sept. 1958.

Colquhounia coccinea Wall.

Shrub. Flowers orange-yellow. Joshimath-Pandukeshwar. 2000 m. *M. A. Rau* 2754, 2779. June 1957.

Stachys sericea Wall.

Aromatic. Erect herb. Flowers pale purple. Rambara. 2800 m. *M. A. Rau* 8646. Sept. 1958.

S. melissaefolia Benth.

Herb. Pale purple. Khiraun Valley. 2500 m. *M. A. Rau* 10620. Oct. 1959.

Leonurus cardiaca Linn.

Herb. Flowers white. Khiraun Valley. 2500 m. *M. A. Rau* 10630. Oct. 1959.

Lamium amplexicaule Linn.

Large herb. Flowers purple. Badrinath. 3000 m. *M. A. Rau* 2943. July 1957.

L. album Linn.

Large herb. Flowers white. Hanumanchatti, Ramni forest. 2500 m. *M. A. Rau* 2997, 10134. July 1957, June 1959.

Leucas lanata Benth.

Herb along roadside. Flowers white. Pipalkoti, Batwalchari. 1200 m. *M. A. Rau* 2720, 6391. June 1957, Sept. 1958.

Teucrium royleanum Wall. ex Benth.

Herb. Flowers white. Gulabkoti-Joshimath. *M. A. Rau* 2770. June 1957.

T. quadrifarium Buch.-Ham.

Tall herb. Aromatic. Flowers pink, bracts, prominent, purplish. Batwalchari. 1000 m. *M. A. Rau* 6378. Sept. 1958.

Ajuga parviflora Benth.

Hairy greyish herb on rocks. Flowers purple. Vasudhara. 3500 m. *M. A. Rau* 2868. June 1957.

PLANTAGINACEAE

Plantago major Linn.

Herb with spikes up to 0.5 m. in length. Gohna. 1500 m. *M. A. Rau* 10048. June 1959.

P. asiatica Linn. Sp. Pl. 113. 1753.

Under *P. major* Linn. in Fl. Brit. India 4: 705. 1885. Herb with spikes in fruit. Locally known as 'Dabluja'. Birehi, Kanol. 1500-2500 m. *M. A. Rau* 10004, 10368. June 1959.

P. depressa Willd. Enum. Pl. Hort. Berol. Suppl. 8. 1813.

P. tibetica Hook. f. & Thoms. (Fl. Brit. India 4: 706. 1885).

Prostrate herb. Spike 2-3 cms. Badrinath, Mana. 3000-3500 m. *M. A. Rau* 2847, 10571. June 1957, Oct. 1959.

AMARANTHACEAE

Amaranthus gangeticus Linn.

Herb. Spikes, spinescent bracteate. Vishnuprayag. 1500 m. *M. A. Rau* 2789. June 1957.

Cyathula tomentosa Moq.

Undershrub. Globose inflorescences. Joshimath, Batwalchari. 1200-1800 m. *M. A. Rau* 2756, 6376. June 1957, Sept. 1958.

C. capitata Moq.

Herb. Globose heads of white flowers. Trijuginarayan. 2500 m. *M. A. Rau* 8563. Sept. 1958.

CHENOPODIACEAE

Chenopodium botrys Linn.

Aromatic purplish herb. Small reddish flowers. Vasudhara. 3500 m. *M. A. Rau* 10460. Oct. 1959.

POLYGONACEAE

Polygonum recumbens Royle ex Bab.

Trailing herb. Flowers small, reddish. Hanumanchatti, Gaurikund. 2500 m. *M. A. Rau* 8564, 8598, 10594. Sept. 1958, Oct. 1959.

Polygonum viviparum Linn.

Small herb in moist situations. Flowers pink, lower flowers and spike replaced by bulbils. Rishiganga Valley, Bishtola Alp. 3500-4000 m. *M. A. Rau* 2912, 2927, 2937, 10225. June 1957 & 1959.

P. macrophyllum D. Don, Prodr. Fl. Nep. 70, 1825.

P. sphaerostachyum Meissn. (Fl. Brit. India 5: 32, 1886).

Herb along water margin. Cylindrical close spikes of bright red flowers. Kanol. 2800 m. *M. A. Rau* 10299. June 1959.

P. amplexicaule D. Don

Herb. Leaves amplexicaul. Flowers white or red. Gaurikund, Khiraun Valley. 2500 m. *M. A. Rau* 8599, 8603, 1067. Sept. 1958, Oct. 1959.

P. affine D. Don

Prostrate spreading woody rootstock. Flowers reddish in spikes. Satopanth glacial bed. 4000 m. *M. A. Rau* 10524. Oct. 1959.

P. vacciniifolium Wall. ex Meissn.

Rootstock woody, twisted and forming rigid mats on alpine slopes. Flowers rose-red. Kedarnath glacial valley, Vasudhara, Nar Parbat. 3500-4000 m. *M. A. Rau* 8674, 10465, 10504. Sept. 1958, Oct. 1959.

P. nepalense Meissn., Monogr. 84, 1826.

P. alatum Buch.-Ham. var. *nepalense* Hook. f. (Fl. Brit. India 5: 40, 1886).

Procumbent herb along river bed. Flowers pink. Chandrapuri, Rambara, Pandukeshwar. 1000-2000 m. *M. A. Rau* 6370, 8664, 10447. Sept. 1958, Oct. 1959.

P. sphaerocephalum Wall. ex Meissn.

Herb on moist slopes. Flowers white. Ramni forest. 2500 m. *M. A. Rau* 10121. June 1959.

P. sinuatum Royle ex Meissn.

Trailing herb. Leaves runcinate. Flowers rose coloured. Pandukeshwar. 2000 m. *M. A. Rau* 2816. June 1957.

P. capitatum Buch.-Ham.

Herb on rocks. Rose-purple coloured heads. Common. Joshimath-Badrinath. 2000-3000 m. *M. A. Rau* 3028. July 1957.

P. chinense Linn.

Rambling shrub. Fruits ripening black. Pandukeshwar-Badrinath. 2000-3000 m. *M. A. Rau* 2813, 10449. June 1957, Oct. 1959.

P. polystachyum Wall. ex Meissn.

Shrub with large panicles of white flowers. Very common along roadside and in valleys. On way to Kedarnath and Badrinath. 2000-3000 m. *M. A. Rau* 8633, 10618. Sept. 1958, Oct. 1959.

P. convolvulus Linn.

Twining herb. With fruits. Phata, Pandukeshwar. 1500-2000 m. *M. A. Rau* 6483, 10424. Sept. 1958, Oct. 1959.

Fagopyrum cymosum Meissn.

Herb locally known as 'Kanali'. Cultivated, near villages. Flowers white. Joshimath, Narayankoti, Ramni, Mana. 1500-3000 m. *M. A. Rau* 2769, 6464, 10166, 10500. June 1957, Sept. 1958, June & Oct. 1959.

Rheum moorcroftianum Royle

Large herb. Flowers red. Buhna. 3000 m. *M. A. Rau* 10258. June 1959.

Oxyria digyna Hill.

Herb on rocks, walls, etc. Flowers and fruits reddish. Badrinath, Kedarnath, Buhna. 3000-3500 m. *M. A. Rau* 2841, 2887, 8660, 10276, 10494. June 1957, Sept. 1958, June & Oct. 1959.

Rumex nepalensis Spreng.

Large herb. With fruits. Rambara. 2800 m. *M. A. Rau* 8621. Sept. 1958.

PIPERACEAE

Peperomia reflexa A. Dietr.

Herb. On tree barks. Common. Pandukeshwar, Batwalchari. 1000-2000 m. *M. A. Rau* 6424, 6471, 10455. Sept. 1958, Oct. 1959.

LAURACEAE

Litsaea lanuginosa Nees

Tree. With fruits. Batwalchari, Ukhimath, Gohna. 1000-2000 m. *M. A. Rau* 6440, 8769, 10100. Sept. 1958, June 1959.

L. umbrosa Nees

Tree. With fruits. Locally known as 'Bailal', oil is expressed from fruits. Hanumanchatti, Trijuginarayan, Kanol-Shetale. 2500 m. *M. A. Rau* 2822, 8532, 10364. June 1957 & 1959. Sept. 1958.

THYMELEACEAE

Daphne papyracea Decne

Small shrub. Flowers white. Pandukeshwar. 2000 m. *M. A. Rau* 10435. Oct. 1959.

Wickstroemia canescens Meissn.

Shrub. Flowers yellow. Kanol-Shetale. 2000 m. *M. A. Rau* 10362. June 1959.

ELAEAGNACEAE

Elaeagnus conferta Roxb. Hort. Beng. 11, 1814.

E. latifolia in Fl. Brit. India 5: 203, 1886 non Linn.

Shrub, ash grey leaves. Small greyish fruits. Locally known as 'Guyanla'. Shetale. 2000 m. *M. A. Rau* 10338. June 1959.

- Hippophae rhamnoides** Serv. subsp. *salicifolia* (D. Don)
 Serv. in Beih. Bot. Centralbl. 25, 2: 18. 1909.
H. salicifolia D. Don (Fl. Brit. India 5: 203. 1886).
 Shrub with yellowish fruits. Rambara. 2800 m. *M. A. Rau* 8617. Sept. 1958.

LORANTHACEAE

- Scurrula pulverulenta** (Wall.) G. Don, Gen. Syst. 3: 421. 1834.
Loranthus pulverulentus Wall. (Fl. Brit. India 5: 211. 1886).
 Greyish hairy flowers, filaments red. Gaurikund. 2000 m. *M. A. Rau* 6480. Sept. 1958.
- S. elata** (Edgew.) Danser in Bull. Jard. Bot. Buitenz. Ser. III. 10: 349. 1929.
Loranthus elatus Edgew. (Fl. Brit. India 5: 212. 1886).
 Parasitic on *Litsaea umbrosa* Nees. Flowers reddish. Hanumanchatti, Kanol. 2500 m. *M. A. Rau* 2827, 2983, 10371. June 1957 & 1959.
- Taxillus vestitus** (Wall.) Danser, loc. cit., 354. 1929.
Loranthus vestitus Wall. (Fl. Brit. India 5: 212. 1886).
 Leaves rough, brown tomentose underneath. Ramni-Sutol. 2000 m. *M. A. Rau* 10174. June 1959.
- Viscum album** Linn.
 Parasitic on *Pyrus pashia* Buch.-Ham. Vishnuprayag. 1500 m. *M. A. Rau* 2787. June 1957.
- Korthalsella opuntia** (Thunb.) Merr. Danser in Bull. Jard. Bot. Buitenz. Ser. III. 11: 453. 1931.
Viscum japonicum Thunb. Small tufted parasite on *Litsaea umbrosa* Nees, a newly recorded host for the parasite (See also Vaid, J. Bomb. nat. Hist. Soc. 58: 549. 1961). Kanol-Shetale. 2000 m. *M. A. Rau* 10366. June 1959.

SANTALACEAE

- Osyris wightiana** Wall. ex Wight Icones t. 1853. 1852.
O. arborea Wall. (Fl. Brit. India 5: 233. 1886).
 Shrub hanging from rock. Flowers greenish. Batwal-chari. 1000 m. *M. A. Rau* 6384. Sept. 1958.

BALANOPHORACEAE

- Balanophora** sp.
 A reddish root parasite in *Rhododendron* forest. The specimen had only an immature inflorescence and specific determination was not possible. Rambara. 3000 m. *M. A. Rau* 8619. Sept. 1958.

EUPHORBIACEAE

- Euphorbia hypericifolia** Linn.
 Small herb. Cyathia green. Soragarh. 600 m. *M. A. Rau* 6314. Sept. 1958.

- E. pilosa** Linn.
 Large herb with yellow involucre leaves around cyathia. Badrinath, Gaurikund, Ramni forest. 2000-3000 m. *M. A. Rau* 2801, 6486, 10087. June 1957 & 1959, Sept. 1958.

E. pilulifera Linn.

- A weed along roadside. Soragarh. 600 m. *M. A. Rau* 6339. Sept. 1958.

Andrachne cordifolia Muell. Arg.

- Large shrub. Flowers greenish. Pandukeshwar, Gaurikund, Kanol. 2000-2500 m. *M. A. Rau* 2806, 8565, 10344, 10602. June 1957, Sept. 1958, June & Oct. 1959.

Phyllanthus parvifolius Buch.-Ham.

- Perennial herb. Phata, Pipalkoti. 1300 m. *M. A. Rau* 2733, 8504. June 1957, Sept. 1958.

P. urinaria Linn. Sp. Pl. 982. 1753.

- Prostrate spreading herb. Fruits. Batwalchari 1000 m. *M. A. Rau* 6398. Sept. 1958.

Glochidion velutinum Wight

- Small tree. Fruit lobed, seeds red. Narayankoti. 1500 m. *M. A. Rau* 6469. Sept. 1958.

Acalypha ciliata Forsk.

- Herb with spikes of greenish flowers. Soragarh, Phata. 800-1300 m. *M. A. Rau* 6345, 8508. Sept. 1958.

Trewia nudiflora Linn.

- Tree with male inflorescences. Near Phata. 1200 m. *M. A. Rau* 6478, 6481. Sept. 1958.

Mallotus philippensis Muell. Arg.

- Tree with male inflorescences. Soragarh. 800 m. *M. A. Rau* 6342. Sept. 1958.

Sapium insigne Benth.

- Tree. Branches easily breaking. Laticiferous. With fruits. Along Birehi river bank. 1200-1500 m. *M. A. Rau* 10008. June 1959.

Excoecaria acerifolia F. Didr.

- Shrub with male spikes and three-lobed fruits. Joshimath, Birehi. 1200-1800 m. *M. A. Rau* 2738, 2773, 10015. June 1957 & 1959.

BUXACEAE

- Buxus wallichiana** Baill. Monogr. Buxus. 63. 1859.
B. sempervirens Linn. in part (Fl. Brit. India 5: 267. 1887).
 Tree. With fruits. Trijuginarayan, Ramni forest. 2500 m. *M. A. Rau* 8551, 10135. Sept. 1958, June 1959.

Sarcococca saligna (D. Don) Mueller Arg. in DC. Prodr. 16, 1: 11. 1869.

- S. pruniformis* Lindl. (Fl. Brit. India 5: 266. 1887).
 Shrub. Flowers greenish yellow. Fruits black. Joshi-

math, Gohna. 1500-2000 m. *M. A. Rau* 2775, 10090, 10592. June 1957 & 1959, Oct., 1959.

URTICACEAE

Ficus clavata Wall. ex Miq.

Small tree. With receptacles. Nandprayag. 1000 m. *M. A. Rau* 10387. June 1959.

F. foveolata Wall. in Miquel, Ann. Mus. Bot. Lugd. Bat. 3: 294. 1867.

Climber. With receptacles. Gulabkoti, Narayankoti, Sutol. 1500-2000 m. *M. A. Rau* 2740, 3022, 8755. 10175. June 1957 & 1959, Sept. 1958.

Urtica dioica Linn.

Common nettle with large free stipules. Badrinath, Mana. 3000 m. *M. A. Rau* 2857, 2942. June 1957.

Girardinia heterophylla Decne

Large leaved nettle. Phata. 1500 m. *M. A. Rau* 6473. Sept. 1958.

Pilea umbrosa Wedd.

Erect soft herb. White mealy inflorescences in axils. Phata, Buhna forest. 2000-3000 m. *M. A. Rau* 6474, 10203. Sept. 1958, June 1959.

P. scripta Wedd.

Large herb. Leaves prominently 3-nerved. Flowers minute in axillary panicles. Badrinath, Shetale, 2000-3000 m. *M. A. Rau* 3026, 10349, 10378. June 1957 & 1959.

Lecanthus wightii Wedd.

Herb in moist places and near water margin. Peduncled discs, reddish, 2-3 cms. dia. Phata, Rambara. 1500-3000 m. *M. A. Rau* 6476, 6484, 8622. Sept. 1958.

Elatostema sessile Forster.

Herb near water margin. Oblique leaves. Sessile heads. Phata, Ramni forest. 1500-2000 m. *M. A. Rau* 8507, 10079. Sept. 1958, June 1959.

E. surculosum Wight

Small soft herb on moist rocks, growing with mosses. Phata, Gaurikund, Ramni. 1500-2500 m. *M. A. Rau* 8533, 8597, 10150. Sept. 1958, June 1959.

Boehmeria rugulosa Wedd.

Small tree. Rough hairy leaves. Spikes of male flowers. Batwalchari. 1000 m. *M. A. Rau* 6423. Sept. 1958.

B. platyphylla D. Don

Shrubby herb. With large leaves and very long spikes. Common. Soragarh, Phata, Shetale. 600-2000 m. *M. A. Rau* 6309, 6490, 8586, 10377. Sept. 1958, June 1959.

Gonostegia hirta Miq. in Ann. Mus. Bot. Lugd. Bat. 4: 303. (1868-69).

Pouzolzia hirta Hassk. (Fl. Brit. India 5: 586. 1888). Slender trailing herb. Gulabkoti, Soragarh. 800-1800 m. *M. A. Rau* 2767, 6325. June 1957. Sept. 1958.

Oreocnide frutescens Miq. in Ann. Mus. Bot. Lugd. Bat. 3: 131. 1867.

Villebrunea frutescens Blume (Fl. Brit. India 5: 590. 1888).

Small tree. Leaves ash-white underneath. Batwalchari. 1000 m. *M. A. Rau* 6422. Sept. 1958.

Debregeasia hypoleuca Wedd.

Small tree. Fruits edible. Gulabkoti, Gohna. 1500 m. *M. A. Rau* 2751, 10031. June 1957 & 1959.

Maoutia puya Wedd.

Herb with minute white flowers in axillary cymose clusters. Soragarh. 600 m. *M. A. Rau* 6321. Sept. 1958.

Parietaria debilis Forster.

Diffuse herb with soft white stem. Very small white flowers. Vasudhara. 3500 m. *M. A. Rau* 10462. Oct. 1959.

JUGLANDACEAE

Juglans regia Linn.

Tree with fruits. The walnut. Joshimath-Badrinath. 2000-3000 m. *M. A. Rau* 2820, 2996. June 1957.

Engelhardtia colebrookiana Lindl.

Tree. Fruits with persistent bract, pericarp with thick felt of hairs. Gulabkoti. 1500 m. *M. A. Rau* 2735. June 1957.

MYRICACEAE

Myrica nagi Thunb.

Small tree, locally known as 'Kaphal', with gland dotted leaves. Catkin-like spikes in axils. Gaurikund. 2000 m. *M. A. Rau* 8745. Sept. 1958.

BETULACEAE (CUPULIFERAE BH)

Betula utilis D. Don

The Birch or 'Bhoja-pattra', Tree, stunted and snow-swept at high altitude with male spikes. Bishtola, Sato-panth. 3500-4000 m. *M. A. Rau* 10250. June 1959.

Alnus nepalensis D. Don

Tree with male and fruiting spikes. Trijuginarayan. 2500 m. *M. A. Rau* 8547. Sept. 1958.

Corylus colurna Linn.

Small tree. With fruits. Sutol-Buhna forest. 3000 m. *M. A. Rau* 10219. June 1959.

Carpinus viminea Lindl.

Small tree with fruits. Kanol-Shetale forest. 2500 m. *M. A. Rau* 3033, 10331. June 1957 & 1959.

FAGACEAE (CUPULIFERAE BH)

Quercus semecarpifolia Sm.

'Kharsu' Oak reaching an altitude of 3500 m. On the way to Bishtola Alp. with male spikes. *M. A. Rau* 10251. June 1959.

Q. incana Roxb.

Common associate of *Rhododendron arboreum* in forest. Gaurikund. 2000 m. with acorns. *M. A. Rau* 8746. Sept. 1958.

Q. glauca Thunb.

Tree. With acorns. Phata. 1500 m. *M. A. Rau* 6491. Sept. 1958.

SALICACEAE

Salix elegans Wall. ex Anderss.

Large shrub with spikes of dehiscent fruits. Badrinath, Buhna, Satopanth base. 3000-3500 m. *M. A. Rau* 2975, 10210, 10536. June 1957, June & Oct. 1959.

S. daphnoides Villars.

Tree with female catkins. Pandukeshwar. 2000 m. *M. A. Rau* 2825. June 1957.

S. flabellaris Anderss.

Procumbent, rigid shrub in glacial bed. With fruits. Kedarnath, Satopanth. 3000-4000 m. *M. A. Rau* 8673, 10535. Sept. 1958, Oct. 1959.

S. lindleyana Wall. ex Anderss.

Stunted shrub, reddish spikes. Buhna-Bajmora. 3800 m. *M. A. Rau* 10279. June 1959.

Populus ciliata Wall. ex Royle

Tree with fruits. Birehi-Gohna. 1500 m. *M. A. Rau* 10040. June 1959.

MONOCOTYLEDONS

HYDROCHARITACEAE

Vallisneria spiralis Linn.

With male spathes. In Gohna Lake. 1500 m. *M. A. Rau* 10049. June 1959.

ORCHIDACEAE

Oberonia pachyrachis Reichb. f.

Succulent leaved herb on tree trunks. Spike with cylindric fleshy rachis, minute flowers depressed in it. Batwalchhari. 1000 m. *M. A. Rau* 6425. Sept. 1958,

Malaxis acuminata D. Don in Prodr. 20. 1825.

Microstylis wallichii Lindl. (Fl. Brit. India 5: 686. 1888).

Small orchid on rocks. Lip, greenish shield-like. Shetale. 2000 m. *M. A. Rau* 10337. June 1959.

M. muscifera (Lindl.) O. Kuntze in Rev. Gen. Pl. 2: 673. 1891.

Microstylis muscifera Ridley (Fl. Brit. India 5: 689. 1889).

Small orchid with fleshy oblong leaves and club-shaped spike. Flowers very small, greenish yellow. Bajmora Alp. 3500 m. *M. A. Rau* 10287. June 1959.

Oreorchis foliosa Lindl.

Terrestrial, in forest undergrowth. Pale reddish flowers. Bhyundar forest. Buhna. 3000 m. *M. A. Rau* 3005, 10305. July 1957, June 1959.

Dendrobium alpestre Royle

Small orchid on rocks. Flowers white, lip spotted with red. Phata. 1500 m. *M. A. Rau* 8528. Sept. 1958.

Eria convallarioides Lindl.

Epiphytic on *Litsaea* sp. With fruits. Narayankoti, Joshimath. 1500-1800 m. *M. A. Rau* 6448, 10637. Sept. 1958, Oct. 1959.

E. alba Lindl.

Epiphytic, growing in clumps on an Oak. Flowers white, lip yellow. Near Peri village between Ramni and Sutol. 2000 m. *M. A. Rau* 10161. June 1959.

Phajus albus Lour.

Densely tufted orchid on steep rock surface. Flowers large, fragrant, white. Ghat-Nandprayag. 1300 m. *M. A. Rau* 10406. June 1959.

Pholidota articulata Lindl.

Epiphytic orchid. Jointed yellowish stem. With fruits. Batwalchhari. 1000 m. *M. A. Rau* 6434. Sept. 1958.

Calanthe tricarinata Lindl.

Terrestrial. Large erect herb. Flowers white-yellow brown. Lip without spur. Hanumanchatti, Ramni forest, Sutol. 2500 m. *M. A. Rau* 2960, 10149, 10180. June 1957 & 1959.

Cymbidium giganteum Wall. ex Lindl.

A large epiphytic orchid. With flowers buds. Narayankoti 1500 m. *M. A. Rau* 6472. Sept. 1958.

Luisia teretifolia Gaud.

Epiphytic on *Mallotus philippensis*. Also on rocks. With fruits. Batwalchhari, Nandprayag. 1000 m. *M. A. Rau* 6427, 10399. Sept. 1958, June 1959.

Rhynchostylis retusa Blume

Epiphytic. Hanging spikes of rose-purple flowers. Nandprayag. 1000 m. *M. A. Rau* 10396. June 1959.

Aerides multiflorum Roxb.

Epiphytic. With fruits. Batwalchari. 1000 m. *M. A. Rau* 6431. Sept. 1958.

Spiranthes sinensis (Pers.) Ames, Orch. 2: 53. 1908.

S. australis Lindl. (Fl. Brit. India 6: 102. 1890).
Terrestrial. Flowers rose-red. Fruits. Nandprayag, Pandukeshwar. 1000-2000 m. *M. A. Rau* 10395, 10441. June & Oct. 1959.

Pogonia flabelliformis Lindl.

Terrestrial. Flowers mauve with purple streaks. Birehi river bank. 1200 m. *M. A. Rau* 10027. June 1959.

Gastrodia orobanchoides Benth.

Terrestrial, parasitic. Flower buds only. In forest undergrowth. Kanol. 2000 m. *M. A. Rau* 10370. June 1959.

Cephalanthera ensifolia Rich.

Terrestrial. Flowers white. In forest undergrowth. Bhyundar forest. 3000 m. *M. A. Rau* 3016. July 1957.

Epipactis latifolia Swartz

Terrestrial. With flower buds only. Buhna. 3000 m. *M. A. Rau* 10288. June 1959.

E. royleana Lindl.

Terrestrial. With fruits. In forest undergrowth. Ramni. 2500 m. *M. A. Rau* 10098. June 1959.

Orchis latifolia Linn.

Terrestrial. Flowers purple. Badrinath, Buhna. 3000 m. *M. A. Rau* 2934, 2961, 10215. June 1957 & 1959.

O. spathulata Reichb. f.

Terrestrial, solitary leaf, purple flowers. Badrinath. 3000 m. *M. A. Rau* 2969. June 1957.

Herminium angustifolium Benth.

Terrestrial. Spikes nearly 25 cms. long. Phata-Tri-jugarayan. 2000 m. *M. A. Rau* 6500. Sept. 1958.

Habenaria pectinata D. Don

Terrestrial. Flowers greenish. Fruits. Gaurikund. 2000 m. *M. A. Rau* 8577. Sept. 1958.

H. aitchisonii Reichb. f.

Terrestrial. In forest. With fruits. Ukhimath forest. 1500 m. *M. A. Rau* 8772. Oct. 1958.

Satyrium nepalense D. Don

On rocks with *Sedum* sp. Small purple flowers. Kedarnath-Gaurikund. 2500 m. *M. A. Rau* 8721. Sept. 1958.

Cypripedium elegans Reichb. f.

Terrestrial. Herb with pair of opposite leaves and solitary greenish purple-lined flower. Very rare. New

record for Western Himalaya. Buhna-Bajmora. 3500 m. *M. A. Rau* 10286. June 1959.

C. himalaicum Rolfe ex Hemsl. in Jour. Linn. Soc. 29: 319. 1892.

Terrestrial. Solitary, terminal 3-lobed fruit. Kedarnath glacial valley. 3800 m. *M. A. Rau* 8703. Sept. 1958.

ZINGIBERACEAE (SCITAMINEAE BH)

Roscoeia alpina Royle

Small herb on grassy slopes and in rock crevices. Flowers lilac to purple. Hanumanchatti, Ramni, Kanol. *M. A. Rau* 2971, 10116, 10302. June 1957 & 1959.

Curcuma angustifolia Roxb.

Tuberous herb. Bracts rose. Flowers yellow. Ghat. 1300 m. *M. A. Rau* 10374. June 1959.

Costus speciosus Smith.

Stout leafy stem. Capsules red. Soragarh. 600 m. *M. A. Rau* 6328. Sept. 1958.

HAEMODORACEAE

The following genera included under Haemodoraceae in Flora of British India are now brought under Liliaceae in Engler and Prantl's Pflanzenfamilien, 15a: 376-378. 1930.

Aletris pauciflora (Klotzsch) Hand.-Maz. Symb. Sin. 1220. 1936.

A. nepalensis Hook. f. (Fl. Brit. India 6: 261. 1892).
Small herb on moist rocks. Flowers white. Rishiganga valley. 3500 m. *M. A. Rau* 2909, 2926. June 1957.

Mondo wallichianus (Kunth) Bailey in Gentes Herb. 2, 1: 22. 1929.

Ophiopogon wallichianus Hook. f. (Fl. Brit. India 6: 268. 1892).

Epiphytic on tree trunk. Scape with greenish flowers. Ghat-Shetale. 1500-2000 m. *M. A. Rau* 10332, 10375. June 1959.

M. intermedium (D. Don) Bailey in Gentes Herb. 21: 20. 1929.

Ophiopogon intermedium D. Don (Fl. Brit. India 6: 269. 1892).

Herb on rocks, hill slopes. Common. Flowers white to pale purple. Very variable with intergrading forms. Pandukeshwar, Gohna, Ramni, Kanol, Khiraun Valley. 2000-2500 m. *M. A. Rau* 3024, 10057, 10083, 10094, 10118, 10152, 10301, 10606. June 1957, June & Oct. 1959.

IRIDACEAE

Iris ensata Thunb.

Herb on grassy slopes. Leaves narrow. Flowers deep purple. Ramni-Sutol. 2500 m. *M. A. Rau* 10151. June 1959.

***Iris kumaonensis* Wall. ex D. Don**

On grassy slopes and meadows. Common. Flowers purple. Badrinath. 3000 m. *M. A. Rau* 2877. June 1959.

***Belamcanda chinensis* Leman.**

Large herb. With fruits. Perhaps cultivated. Phata. 1500 m. *M. A. Rau* 6493. Sept. 1958.

AMARYLLIDACEAE

***Hypoxis aurea* Lour.**

Herb. Flower yellow. On grassy slopes around Ramni. 2600 m. *M. A. Rau* 10154. June 1959.

***Agave cantala* Roxb.**

Planted. With greenish yellow flowers. Chandrapuri. 1000 m. *M. A. Rau* 6374. Sept. 1958.

DIOSCOREACEAE

***Dioscorea deltoidea* Wall. ex Kunth.**

Climber in forest. With male-flowered spikes and fruiting axes. Pandukeshwar, Ramni, Kanol. 2000-2500 m. *M. A. Rau* 2808, 10101, 10330. June 1957 & 1959.

***D. sativa* Linn.**

Climbing. With fruits. Soragarh, Nandprayag. 600-1000 m. *M. A. Rau* 6318, 6319, 10404. Sept. 1958, June 1959.

***D. belophylla* Voigt. Hort. Suburb. Calc. 653. 1805.**

With male spikes. Batwalchhari. 1000 m. *M. A. Rau* 6445. Sept. 1958.

***D. melanophyma* Prain & Burkill in J. Asiat. Soc. Beng. n.s. 4: 452. 1908.**

Twining around a large *Pteris*. Leaves 5-foliolate. Phata. 1500 m. *M. A. Rau* 6487, 8737. Sept. 1958.

LILIACEAE

***Smilax glaucophylla* Klotzsch in Reise Pr. Wold. Bot. 45. t. 91. 1862.**

S. parvifolia Wall. (Fl. Brit. India 6: 304. 1892). Climber. With fruits. Shetale. 2000 m. *M. A. Rau* 10345. June 1959.

***S. elegans* Wall. ex Kunth**

Climber with red flowers. Joshimath. 1800 m. *M. A. Rau* 2777. June 1957.

***S. aspera* Linn.**

Climber. Fruits red in umbels. Phata, Ramni. 1500-2500 m. *M. A. Rau* 6466, 8759, 10114. Sept. 1958, June 1959.

***Asparagus filicinus* Buch.-Ham.**

In forest. Flowers white. Fruits. Hanumanchatti, Ramni. 2500 m. *M. A. Rau* 3028, 10113, 10131, 10132. June 1957 & 1959.

***A. racemosus* Willd.**

With fruits. Nandprayag. 1000 m. *M. A. Rau* 10407. June 1959.

***A. curillus* Buch.-Ham.**

With fruits. Narayankoti. 1300 m. *M. A. Rau* 6475. Sept. 1958.

***Polygonatum multiflorum* Allioni**

Large herb. Leaves alternate. With fruits. Ramni. 2500 m. *M. A. Rau* 10109. June 1959.

***P. verticillatum* Allioni**

Common herb with whorls of leaves. Flowers white. Fruits red. Hanumanchatti, Rambara, Kedarnath, Sutol, Buhna. 2500-3500 m. *M. A. Rau* 2964, 8631, 8705, 10191, 10193, 10214, 10215. June 1957, Sept. 1958, June 1959.

Var. *graciel* Baker

Flowers purplish, in pairs in axils. Vasudhara. 3500 m. *M. A. Rau* 2881. June 1957.

***P. cirrhifolium* Royle**

Leaves narrow with circinnate tips. Flowers white. Joshimath, Ramni. 2000-2500 m. *M. A. Rau* 2755, 10028, 10160. June 1957 & 1959.

***Smilacina pallida* Royle**

Herb in forest undergrowth. Flowers purple. Ramni, Buhna. 2500-3000 m. *M. A. Rau* 10136, 10185. June 1959.

***Theropogon pallidus* Maxim.**

Herb growing in clumps on rocks, tree trunks etc. Flowers white. Fruits. Pandukeshwar, Gaurikund, Shetale. 2000 m. *M. A. Rau* 3023, 8741, 10359, July 1957, Sept. 1958, June 1959.

***Allium stracheyii* Baker**

Bulbous herb on rocks. Flowers white, purple blotched. Locally known as 'Pharan'. Near Badrinath. 2800 m. *M. A. Rau* 10451. Oct. 1959.

***Lilium polyphyllum* D. Don**

Tall herb. Dull yellow, purple dotted flowers. Shetale. 2000 m. *M. A. Rau* 10343. June 1959.

***Nomocharis oxypetala* (Royle) Balf. f. in Trans. Bot. Soc. Edinb. 27: 293. 1918.**

Fritillaria oxypetala Royle (Fl. Brit. India 6: 352. 1892).

Herb amidst grasses. Flower, solitary, terminal, nodding, cream yellow. Badrinath. 3000 m. *M. A. Rau* 2837. June 1957.

***N. nana* (Klotzsch) E. H. Wilson in Lilies East Asia. 13. 1925.**

Flower purple-blue. Buhna-Bishtola. 3500 m. *M. A. Rau* 10239. June 1959.

Fritillaria roylei Hook.

Herb. Fruit 3-lobed, lobes flattened. Kedarnath-glacial valley. 3600 m. *M. A. Rau* 8688. Sept. 1958.

Lloydia serotina Reichb.

Herb. Flowers white, purple streaked. Narayan Parbat. 3000 m. *M. A. Rau* 2890. June, 1957.

Gagea lutea Schultz. f.

Small herb. Flowers yellow. Rishiganga valley. 3500 m. *M. A. Rau* 2919. June 1957.

Disporum cantoniensis Merr. in Philip. Jour. Sci. 25: 229. 1919.

D. pullum Salisb. (Fl. Brit. India 6: 360. 1892).

Robust herb. Fruits, globose, black when ripe. Rambhara, Kanol, Ramni. 2000-2800 m. *M. A. Rau* 8562, 10096, 10350. Sept. 1958, Oct. 1959.

Clintonia alpina Kunth.

Herb in forest undergrowth. Flowers white-mauve in short racemes. Buhna-Bishtola. 3000-3500 m. *M. A. Rau* 10244. June 1959.

Trillium govanianum Wall. ex Royle

Herb growing in shade. Flower terminal, dark purple. Vasudhara, Buhna. 3000-3500 m. *M. A. Rau* 2867, 10278. June 1957 & 1959.

Paris polyphylla Sm.

In thick forest undergrowth. With fruit. Locally known as 'Kāli-muni'. Said to be poisonous to cattle and sheep. Ramni. 2500 m. *M. A. Rau* 10076, 10140. June 1959.

PONTEDERIACEAE

Monochoria hastata (Linn.) Solms in A. DC. Mon. Phan. 4: 523. 1883.

M. hastaeifolia Presl. (Fl. Brit. India 6: 362. 1892).

Aquatic herb with violet-blue. Fruits. Agastyamuni. 800 m. *M. A. Rau* 6367. Sept. 1958.

COMMELINACEAE

Commelina paludosa Blume, Enum. Pl. Java 1, 2. 1880.

C. obliqua Buch.-Ham. (Fl. Brit. India 6: 372. 1892).

Flowers large, sky blue. Batwalchari. 1000 m. *M. A. Rau* 6444. Sept. 1958.

Murdannia divergens (Clarke) Brückn. in Pflanzenfam. 15a: 173. 1930.

Aneilema divergens Clarke (Fl. Brit. India 6: 376. 1892).

Herb. With fruits on scape. Narayankoti. 1500 m. *M. A. Rau* 8758. Sept. 1958.

M. spirata (Linn.) Brückn. in Pflanzenfam. 15a: 173. 1930.

Aneilema spiratum R. Br. (Fl. Brit. India 6: 377. 1892).

Small herb. Violet-blue flowers. Batwalchari. 1000 m. *M. A. Rau* 6454. Sept. 1958.

Streptolirion cordifolium (Griff.) Kuntze in Rev. Gen. 722. 1891.

S. volubile Edgew. (Fl. Brit. India 6: 389. 1892).

Climbing herb. Flowers white. Rare. Pandukeshwar-Joshimath. 2000 m. *M. A. Rau* 10640. Oct. 1959.

JUNCACEAE

Juncus glaucus Ehrh.

Growing along with a sedge. Gulabkoti. 1500 m. *M. A. Rau* 2758. June 1957.

J. leucomelas Royle

Near water margin. Rishiganga valley. 3500 m. *M. A. Rau* 2906. June 1957.

J. himalensis Klotzsch

On rocks in glacial bed, Kedarnath. 4000 m. *M. A. Rau* 8704. Sept. 1958.

Luzula multiflora (Retz.) Lej. in Fl. Spa. 1: 192.

On alpine slopes. With brownish spikes. Bishtola and Bajmora Alps. 3800 m. *M. A. Rau* 10257, 10296. June 1959.

ARACEAE

Arisaema intermedium Blume

Herb in forest undergrowth. Leaf solitary, trifoliate, leaflets elliptic, spathe purple lined. Ramni forest. 2500 m. *M. A. Rau* 10084. June 1959.

Ramni forest. 2500 m. *M. A. Rau* 10084. June 1959.

A. costatum (Wall.) Mart. ex Schott. in Melet. Bot. 17. 1832 (see Chatterjee, D., Bull. bot. soc. Bengal 8: 123. 1954).

A. wallichianum Hook. f. (Fl. Brit. India 6: 500. 1893) in part.

Large herb, similar in habit to above, leaflets rhombic. Spathe with brown and white stripes. Gangharea. 3000 m. *M. A. Rau* 3004. July 1957.

A. tortuosum Schott.

Very common throughout. Spadix with cylindrical, long appendage. Fruits red. Joshimath, Gaurikund, Ramni. 2000-2500 m. *M. A. Rau* 2772, 2793, 8742, 10085. June 1957, Sept. 1958 (Frs.), June 1959.

A. flavum Schott.

Spathe yellowish, short, spadix included. Gulabkoti, Shetale, Mana. 1500-300 m. *M. A. Rau* 2746, 10336, 10485. June 1957, Sept. 1958, Oct. 1959.

Arisaema concinnum Schott.

Spathe attenuated into a tail. Appendage of Spadix short, club shaped. In Ramni forest. 2500 m. *M. A. Rau* 10086. June 1959.

A. jacquemontii Blume

Spathe green striped with white. Hanumanchatti. 2500 m. *M. A. Rau* 2826. June 1957.

Remusatia vivipara Schott.

Tuberous herb. Leaf large, peltate. In shade in forest. With bulbils. Batwalchari. 1000 m. *M. A. Rau* 6430. Sept. 1958.

Gonatanthus pumilus (D. Don) Engl. & Krause in Pflanzenreich 71: 19. 1920.

G. sarmentosus Klotzsch (Fl. Brit. India 6: 522. 1893).

Bulbous herb. With Spathe. In thick forest on moist slopes. Gohna-Ramni. 2500 m. *M. A. Rau* 10075, 10168. June 1959.

NAIADACEAE

Potamogeton perfoliatus Linn.

Aquatic. In Gohna Lake. 1500 m. *M. A. Rau* 10051. June 1959.

P. pectinatus Linn.

Aquatic. Leaves filiform forming tangled masses. Gohna Lake. 1500 m. *M. A. Rau* 10050, 10069. June 1959.

CYPERACEAE

Cyperus niveus Retz.

On grassy slopes near Ghat. 1300 m. *M. A. Rau* 10380. June 1959.

Eleocharis palustris R. Br.

Near a stream in Rishiganga Valley. 3500 m. *M. A. Rau* 2902. June 1957.

Fimbristylis junciformis Kunth.

With short brownish spikes. Ghat-Nandprayag. 1000 m. *M. A. Rau* 10409. June 1959.

Eriophorum comosum Wall. ex Nees

Abundant on rocky slopes. Soragarh. 800 m. *M. A. Rau* 6310. Sept. 1958.

Kobresia hookerii Boeck.

Slender stems growing in clumps. Buhna-Bishtola. 3500 m. *M. A. Rau* 10294. June 1959.

K. trinervis Boeck.

Alpine sedge with prominent leaf sheaths. Bishtola. 3500 m. *M. A. Rau* 10236. June 1959.

Carex filicina Nees

Phata. 1500 m. *M. A. Rau* 8506. Sept. 1958.

C. alpina Sw.

On alpine slopes. With blackish spikes. Bajmora. 3500 m. *M. A. Rau* 10295. June 1959.

C. setigera D. Don

Along margin of a stream. Brown spikes. Rishiganga valley. 3500 m. *M. A. Rau* 2902b, 2905, 2914. June 1957.

GRAMINEAE

The genera and species listed here are arranged in the alphabetical order and the nomenclature is brought up to date with reference to N. L. Bor's 'The Grasses of Burma, Ceylon, India and Pakistan' (1960).

Agrostis canina Linn., Sp. Pl. ed. 1: 62. 1753.

Ghastoli. 4000 m. *M. A. Rau* 10560. Oct. 1959.

Apluda mutica Linn., Sp. Pl. ed. 1, 82. 1753.

Under *A. varia* Hack. in Fl. Brit. India 7: 150. 1896. Gaurikund. 2000 m. *M. A. Rau* 8567. Sept. 1958.

Arthraxon lancifolius (Trin.) Hochst., in Flora 39: 188. 1856.

A. microphyllus Hochst. (Fl. Brit. India 7: 147. 1896).

On rocks near a hill stream. With spikes. Narayankoti. 1500 m. *M. A. Rau* 6462. Sept. 1958.

Arundinella setosa Trin., Gram. Panic. 63. 1826.

Tall grass. Spikelets brown. Awned. Batwalchari. 1000 m. *M. A. Rau* 6396. Sept. 1958.

Avena fatua Linn. Sp. Pl. ed. 1: 80. 1753.

Sutol. 2500 m. *M. A. Rau* 10173. June 1959.

Brachiaria ramosa (Linn.) Stapf in Prain, Fl. Trop. Afr. 9: 542. 1919.

Panicum ramosum Linn. (Fl. Brit. India 7: 36. 1896). Agastyamuni. 800 m. *M. A. Rau* 6357. Sept. 1958.

Calamagrostis pseudophragmites (Half. f.) Koeler, Descr. Gram. 106. 1802.

Var. *pseudophragmites*

C. littorea P. Beauv. (Fl. Brit. India 7: 261. 1896).

Tall grass with brownish spikes. Kedarnath glacial valley. 3500 m. *M. A. Rau* 8685. Sept. 1958.

Chrysopogon fulvus (Spreng.) Chiov., Fl. Somalia 1: 327. 1929.

Andropogon monticola Schult. (Fl. Brit. India 7: 192. 1896).

With awned purplish spikelets. Soragarh, Batwalchari. 600-1000 m. *M. A. Rau* 6327, 6414. Sept. 1958.

- Coix lacryma-jobi** Linn., Sp. Pl. ed 1, 972. 1753.
 Var. *lacryma-jobi*.
 In fields near Narayankoti. 1300 m. *M. A. Rau* 6456. Sept. 1958.
- Cymbopogon distans** (Nees) Wats. in Atkins., Gaz. N. W. Prov. India. 392. 1882.
Andropogon distans Nees ex Steud. (Fl. Brit. India 7: 207. 1896).
 On rocky soil. Pipalkoti, Gaurikund. 1500-2000 m. *M. A. Rau* 2724, 8743. June 1957, Sept. 1958.
- Dactylis glomerata** Linn., Sp. Pl. ed. 1, 71. 1753.
 Ramni, Kanol. 2500 m. *M. A. Rau* 10129, 10313. June 1959.
- Eragrostis tenella** (Linn.) P. Beauv. ex Roem. et Schult., Syst. Veg. 2: 576. 1817.
E. amabilis Wight et Arn. (Fl. Brit. India 7: 317. 1896).
 Spikelets purplish. Batwalchari. 1000 m. *M. A. Rau* 6397. Sept. 1958.
- E. nigra** Nees ex Steud., Syn. Pl. Glum. 1: 267. 1854.
 In Ramni forest. 2500 m. *M. A. Rau* 10142. June 1959.
- Eremopoa persica** (Trin.) Roshev., in Kumarov. Fl. U. S. S. R. 2: 430. 1934.
Poa persica Trin. (Fl. Brit. India 7: 337. 1896).
 Rishiganga valley. On alpine slopes. 3500 m. *M. A. Rau* 2935. June 1957.
- Erianthus ravennae** (Linn.) P. Beauv., Ess. Agrost. 14. 1812.
 Tall grass with large panicles. Pipalkoti. 1300 m. *M. A. Rau* 2742, June 1957.
- E. rufipilus** (Steud.) Griseb. in Nachr. Ges. Wiss. Gottingen, 93. 1868.
E. fulvus Nees ex Steud. & ex Hack. (Fl. Brit. India 7: 123. 1896).
 Very common. Tall grass with silky, purple inflorescences. Phata. 1500 m. *M. A. Rau* 8747. Oct. 1959.
- Eulalia hirtifolia** (Hack.) A. Camus in Ann. Soc. Linn. Lyon, n. s. 68: 202. 1922.
Pollinia hirtifolia Hack. (Fl. Brit. India 7: 111. 1896).
 Gaurikund. 2000 m. *M. A. Rau* 8592. Sept. 1958.
- Eulaliopsis binata** (Retz.) C. E. Hubbard in Hook., Ic. Pl. Sub tab. 3262. 1935.
Ischaemum angustifolium (Trin.) Hack. (Fl. Brit. India 7: 129. 1896).
 Gulabkoti. 1500 m. *M. A. Rau* 2759. June 1957.
- Heteropogon melanocarpus** (Ell.) Benth. in J. Linn. Soc. Bot. 19: 71. 1881.
Andropogon melanocarpus Ell. (Fl. Brit. India 7: 200. 1896).
 A tall, stout grass. Batwalchari. 1000 m. *M. A. Rau* 6400. Sept. 1958.
- Muhlenbergia huegelii** Trin. in Mem. Acad. Sci. Petersb. Ser. 6, 6(2): 293. 1841.
M. viridissima Nees ex Steud. (Fl. Brit. India 7: 259. 1896).
 Garukund. 2000 m. *M. A. Rau* 8579. Sept. 1958.
- Neyraudia arundinacea** (Linn.) Henr. in Meded. Herb. Leid. no. 58, 8. 1929. in obs.
N. madagascariensis Hook. f. (Fl. Brit. India 7: 305. 1896).
 Tall grass 2 m. high, along roadside. Pipalkoti. 1300 m. *M. A. Rau* 2729. June 1959.
- Oplismenus compositus** (Linn.) P. Beauv., Ess. Agrost. 54: 168, 169. 1812.
 Gaurikund. 2000 m. *M. A. Rau* 8578. Sept. 1958.
- Oryzopsis munroi** Stapf ex Hook. f., Fl. Brit. India 7: 234. 1896.
 Grass near water margin. Badrinath. 3000 m. *M. A. Rau* 2936. June 1957.
- Pennisetum orientale** L. C. Rich. in Pers., Syn. Pl. 1: 72. 1805.
 Tall grass with purplish cylindrical spikes. Batwalchari. 1000 m. *M. A. Rau* 6416. Sept. 1958.
- Poa alpina** Linn.
 Grass of high altitudes and alpine slopes. Vasudhara Valley, Bishtola Alp. 3500-4000 m. *M. A. Rau* 10227, 10517. June & Oct. 1959.
- P. annua** Linn. Sp. Pl. ed. 1: 68. 1753.
 In moist places. Hanumanchatti, Ramni Hill top. 2500-3000 m. *M. A. Rau* 2818, 10146. June 1957 & 1959.
- P. nepalensis** Wall. ex Duthie, Grasses of N. W. India, 40. 1883.
P. annua Linn. var. *nepalensis* Griseb. (Fl. Brit. India 7: 346. 1896).
 Badrinath. 3000 m. *M. A. Rau* 2889. June 1957.
- Pogonatherum paniceum** (Lamk.) Hack. in Allg. Bot. Z. 12: 178. 1906.
P. saccharoideum P. Beauv. (Fl. Brit. India 7: 141. 1896).
 Phata. 1500 m. *M. A. Rau* 8536. Sept. 1958.
- Rotboellia exaltata** Linn. f., Nov. Gram. Gen. 40. 1779. t. 1, et in Suppl. Pl. 114. 1781.
 Soragarh. 600 m. *M. A. Rau* 6324. Sept. 1958.
- Setaria glauca** (Linn.) P. Beauv., Ess. Agrost. 51: 169, 178. 1812.
 Khiraun Valley. 2000 m. *M. A. Rau* 10603. Oct. 1959.
- S. viridis** (Linn.) P. Beauv., loc. cit., 171, 178.
 Purplish grass on rocks. Mana. 3000 m. *M. A. Rau* 10586. Oct. 1959.

Sporobolus piliferus (Trin.) Kunth, Enum. Pl. 1: 211. 1833.

Hanumanchatti. 2500 m. *M. A. Rau* 10453. Oct. 1959.

Stipa sp.

Tufted perennial grass, abundant on hill slopes up to 4500 m. Vasudhara, Mana. 3500-4500 m. *M. A. Rau* 10501, 10516. Oct. 1959.

GYMNOSPERMS

EPHEDRACEAE

Ephedra gerardiana Wall. ex Stapf in Denkschr. Math.-Nat. Kl. Akad. Wiss. Wien 56, 2: 75. 1889.

E. vulgaris Brandis non Rich. (Fl. Brit. India 5: 640. 1888).

Rigid shrub on rocks. With male and female flowers, female red when ripe. Medicinal. Kedarnath glacial valley, Vasudhara. 3500-4000 m. *M. A. Rau* 8684, 10484, 10582. Sept. 1958, Oct. 1959.

CUPRESSACEAE

Cupressus torulosa D. Don

Large tree with female cones. Buhna. 1500 m. *M. A. Rau* 10068. June 1959.

Juniperus communis Linn.

Stunted shrub. Blue globose cones. Satopanth. 3600 m. *M. A. Rau* 10518. Oct. 1959.

J. wallichiana Brandis in Forest Fl. India 537. 1874.

J. pseudosabina in Fl. Brit. India 5: 646. 1888 non Fisch. & Mey. Aromatic shrub locally known as Dhoop. Used for fuel. With cones.

Vasudhara, Kedarnath. 3500 m. *M. A. Rau* 2870, 8708. June 1957, Sept. 1958.

TAXACEAE

Taxus baccata Linn.

According to some authors the Himalayan plant is considered to be *T. wallichiana* Zucc., but Dallimore and Jackson doubt this being specifically distinct from the Linnaean species. Shrub with seed in a reddish cup.

Rambara. 3000 m. *M. A. Rau* 8632. Sept. 1958.

PINACEAE

Abies pindrow (Royle) Spach. Hist. Phaner. 11: 423. 1842.

A. webbiana Lindl. var. *pindrow* in Fl. Brit. India 5: 655. 1888.

Tree in forest. With cones, female cones purple-blue, erect. Kanol, Buhna. 2500-3000 m. *M. A. Rau* 10425. June 1959.

PTERIDOPHYTES

PSILOTACEAE

Psilotum nudum (Linn.) Griseb.

P. triquetrum Sw.

With sporangia. On a steep rock near Vishnuprayag. 1800 m. New distributional record (see also Vaid in Indian For. 86: 92. 1960). *M. A. Rau* 10430. Oct. 1959.

LYCOPODIACEAE

Lycopodium setaceum D. Don

Epiphytic on tree trunk and on rocks. With sporangia in axils. Phata, Ukhimath forest. 1500 m. *M. A. Rau* 6494, 8776. Sept.-Oct. 1958.

SELAGINELLACEAE

Selaginella adunca A. Br.

S. yemensis Spr.

Gohna. 1500 m. *M. A. Rau* 10044. June 1959.

S. involvens (Sw.) Spr.

S. caulescens Spr.

Chandrapuri-Batwalchari. 1000 m. *M. A. Rau* 6385. Sept. 1958.

S. semicordata Spr.

Batwalchari. 1000 m. *M. A. Rau* 6409. Sept. 1958.

EQUISETACEAE

Equisetum debile Roxb.

On rocks near Shetale. 2000 m. *M. A. Rau* 10372. June 1959.

E. diffusum D. Don

Gohna. 1500 m. *M. A. Rau* 10070. June 1959.

E. sp.

With strobili. Near a stream on way to Kalimath. 1300 m. *M. A. Rau* 8761. Oct. 1958.

E. sp.

Weak, very much branched herb in wheat fields. Sterile. Mana. 3000 m. *M. A. Rau* 10534. Oct. 1959.

OPHIOGLOSSACEAE

Botrychium lunaria (Linn.) Sw.

With sporangia. On alpine slope in Rishiganga Valley. 3500 m. *M. A. Rau* 2929. June 1957.

B. ternatum Sw.

With sporangia. In forest on way to Dewariya Tal from Ukhimath. 1500 m. *M. A. Rau* 8775. Oct. 1958.

OSMUNDACEAE

Osmunda claytoniana Linn.

Large fern on alpine slopes. With sporangial pinnae. Rishiganga Valley. 3500 m. *M. A. Rau* 2898. June 1959.

SCHIZEACEAE

Lygodium japonicum (Thunb.) Sw.

Large twining fern. With Sori. Soragarh. 600 m. *M. A. Rau* 6346. Sept. 1958.

PTERIDACEAE

Pteris cretica Linn.

With sori. Near Shetale. 2000 m. *M. A. Rau* 10340. June 1959.

Aleuritopteris farinosa (Forsk.) Fée.

Cheilanthes farinosa (Forsk.) Kaulf.

The silver fern. With Sori. Soragarh. 600 m. *M. A. Rau* 6312. Sept. 1958.

Onychium contiguum (Wall.) Hope

O. japonicum var. *multisecta* F. Henderson ex Clarke.

With Sori. Pandukeshwar, on rocks near Rambara. 2000-3000 m. *M. A. Rau* 2796, 8624. June 1957, Sept. 1958.

O. japonicum (Thunb.) O. Kze.

With Sori. Abundant. Khiraun Valley. 2500 m. *M. A. Rau* 10627. Oct. 1959.

Gymnopteris vestita (Wall.) C. Chr.

Syngamme vestita Wall.

With Sori. In dry situations. Phata. 1500 m. *M. A. Rau* 8518. Sept. 1958.

Adiantum candatum Linn.

With Sori. In shade. Soragarh. 800 m. *M. A. Rau* 6330. Sept. 1958.

A. venustum Linn.

Small pinnules. With Sori. On rocks. Ramni, Gaurikund, Khiraun Valley. 2000-2500 m. *M. A. Rau* 8587, 10095, 10622. Sept. 1958, June & Oct. 1959.

ASPIDACEAE

Polystichum acanthophyllum Franchet

Leaves thick, dark green. With Sori. Pandukeshwar, Khiraun Valley. 2500 m. *M. A. Rau* 2807, 10615. June 1957, Oct. 1959.

P. squarrosum (D. Don) Fée.

Aspidium aculeatum Sw. var. *rufobarbatum* Wall.

In Buhna forest. 3000 m. *M. A. Rau* 10223. June 1959.

Phanerophlebia caryotideia (Wall.) Copeland

Cyrtomium caryotideum (Wall.) Presl.

With Sori. In forest. Ramni, Kanol. 2500 m. *M. A. Rau* 10103, 10346. June 1959.

Dryopteris crenata (Forsk) O. Kze.

Nephrodium odoratum Baker

With Sori. Soragarh. 800 m. *M. A. Rau* 6313, 6335. Sept. 1958.

D. xylodes (O. Kze.) C. Chr.

Nephrodium prolixum Baker var. *tylodes* O. Kze.

With Sori. Batwalchhari. 1000 m. *M. A. Rau* 6443. Sept. 1958.

Tectaria macrodonta (Fée) C. Chr.

Nephrodium cicutarium Baker

In rock crevices. With Sori. Soragarh, Batwalchhari. 600-1000 m. *M. A. Rau* 6311, 6383. Sept. 1958.

Cystopteris fragilis Bernh.

With Sori. Gaurikund. 2000 m. *M. A. Rau* 8585. Sept. 1958.

ASPLENIACEAE

Asplenium alternans Wall.

With Sori. Common. Pandukeshwar, Batwalchhari, Shetale. 1000-2000 m. *M. A. Rau* 2797, 6380, 10347. June 1957, Sept. 1958, June 1959.

A. dalhousiae Hook.

Cetarach dalhousiae (Hook.) C. Chr.

Pandukeshwar. 2000 m. *M. A. Rau* 2797 b. June 1957.

A. fontanum Bernh.

In rock crevices. With Sori. Badrinath. 3000 m. *M. A. Rau* 2937. June 1957.

A. laciniatum D. Don

A. planicaule Wall.

Epiphytic and on rocks. With Sori. Phata, Ukhimath forest. 1500 m. *M. A. Rau* 6498, 8774, Sept.-Oct. 1958.

A. septentrionale Hoffm.

In rock crevices. With Sori. Mana. 3000 m. *M. A. Rau* 10584. Oct. 1959.

A. varians Hook. & Grev.

Small fern in rock crevices. With Sori. Kanol-Shetale. 2300 m. *M. A. Rau* 10348. June 1959.

A. viride Hudson

In rock crevices. With Sori. Pandukeshwar, Mana. 2000-3000 m. *M. A. Rau* 2795, 10580. June 1957, Oct. 1958.

POLYPODIACEAE

Polypodium amoenum Wall.

Epiphyte. With Sori. Narayankoti. 1500 m. *M. A. Rau* 6460. Sept. 1958.

Pleopeltis thunbergiana Kaulf.

Polypodium lineare Thunb.

According to Copeland, *Lepisorus* cannot be maintained as a separate genus but other authors like Ching and Holttum recognise this genus in which case this taxon is to be named *Lepisorus nudus* (Hook.) Ching.

Epiphytic on tree trunks and on rocks. With Sori. Batwalchari. 1000 m. *M. A. Rau* 6429. Sept. 1958.

Pyrrosia flocculosa (D. Don) Ching

Polypodium flocculosum D. Don

Epiphytic fern with thick, leathery leaves, linear elliptic as long as 40-50 cms. Under surface brown with Sori. Soragarh. 600 m. *M. A. Rau* 6305. Sept. 1958.

Microsorium membranaceum (D. Don) Ching

Polypodium membranaceum D. Don

Epiphyte with thin linear leaves. 30-40 cms. long. With Sori. Batwalchari. 1000 m. *M. A. Rau* 6379. Sept. 1958.

Crypsinus ebenipes (Hook.) Copeland

Polypodium ebenipes Hook.

On rocks. With Sori. Joshimath, Nandprayag. 1000-1600 m. *M. A. Rau* 2764, 10394. June 1957 & 1959.

C. malacodon (Hook.) Copeland

Polypodium malacodon Hook.

In rock crevices. With Sori. Bishtola Alo. 3500 m. *M. A. Rau* 10231. June 1959.

Arthromeris wallichiana (Spr.) Ching

Polypodium juglandifolium D. Don

Large fern on rocks. With Sori. Trijuginarayan,

Pandukeshwar. 2300 m. *M. A. Rau* 8531, 10599. Sept. 1958, Oct. 1959.

Loxogramme involuta (D. Don) Presl.

Gymnogramme involuta Hook.

Epiphytic on tree branches. With Sori. Phata, Shetale. 1500-2000 m. *M. A. Rau* 6495, 8519, 10376. Sept. 1958, June 1959.

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