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**Vol. II (1951-52)**

**No. 1**

**CATALOGUE OF PLANTS  
OF RAWALPINDI DISTRICT**

**BY**

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From

Y. S. Ahmad, Esquire, P.Ft.S.,  
Chief Conservator of Forests, Punjab.

To

The Director,  
Royal Botanic Gardens,  
Kew Surrey, England.

Dated Lahore, the 22nd January, 1953.

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of Plants of Rawalpindi District by  
Dr. R.R. Stewart.

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*Y. S. Ahmad*

Add: Chief Conservator of Forests, Pb.

A.C.K. *SAC*  
21.1.1953

Enclosure.  
Publication.





## THE FLORA OF RAWALPINDI DISTRICT.

Rawalpindi district constitutes the north-west corner of the Punjab (Pakistan). It lies between 33° and 34° N. Latitude and 72° and 74° E. Longitude, and is bounded on the north by Hazara district (N.-W. F. P.) on the east by Poonch province (J. and K.), on the south by Jhelum district (Punjab) and on the west by Attock district (Punjab). In configuration it is a country of broken plains and denuding hills, elevation rising from 1,500' at Gujar Khan to 1,650' at Rawalpindi and 7,500' at Murree above the mean sea level. The plains, which once were flat loess land, are badly ravined and subject to active erosion, partly due to poor consolidation of the soil which is cut deeper and deeper as time passes by rain-fed hill torrents, and partly because of loss of vegetation cover owing to disforestation and overgrazing and consequent sheet washing. Cultivation is confined to flat lands between ravines and is well or rain irrigated. The hills form part of the outer Himalayan Range and include the hill station of Murree. These are densely populated and are being denuded by man and cattle in their endless search for firewood and fodder.

The plains portion lies to the south and west of the district, and contains some ridges which are outliers of the Himalayan foot-hills. Its rainfall is low, the annual average ranging from 25" at its south-west border to 30" at Gujar Khan and 33" at Rawalpindi, and consequently its flora approaches very nearly to that of the arid zone. The prevailing species is dwarf *phuali* (*Acacia modesta*, Wall) with stray *kau* (*Glea—cuspidata*, Wall) and *sanatha* (*Dodonaea viscosa*, Linn) as associates.

The north-eastern corner of the district and its eastern fringe along the Jhelum river are mountainous. The rainfall gradually increases with elevation, but this is counter-acted by heavy grazing and tree cutting. In the foot-hills, therefore the commonest plants are the xerophilous *sanatha* (*Dodonaea—viscosa*, Linn) and *garinda* (*Carissa spinarum*, A. D. C.). Higher up *chir* (*Pinus longifolia*, Roxb) predominates between 2,500' and 5,500' elevation, and is replaced by *bair* or *kail* (*Pinus excelsa*, Wall) above 6,000'.

There was abundance of oaks, elms, bird-cherry, maples and other broad-leaved trees in this region not long ago, but these have almost died out due to heavy lopping for fodder. On the northern slopes of Murree, where annual average rainfall is 60" grows some silver fir. Deodar was planted at Murree (7,000'), Patriata (7,500') and Ghora Gali (5,500') some 50 years ago, and is doing fairly at Patriata.

The richness of flora in any tract corresponds to its annual rainfall; the flora of the district is limited in consequence. Still Dr. Stewart's catalogue of plant collections in the Gordon College herbarium, at Rawalpindi numbers 1,343 species inclusive of annuals, both cultivated and wild, but excluding the Natural Order Gramineae, which has been dealt with separately in Punjab (Pakistan) Forest Record, Volume I, No. 3. He notes that the catalogue includes

a number of plants not actually collected in Rawalpindi district, adding that these were found in the surrounding districts, and very likely grow in Rawalpindi district as well, as there are no barriers which would stop the species from crossing the boundaries.

For collection of plants there are two favourable seasons. the Spring and the Monsoon rains. In the spring there is an ephemeral growth of vegetation in March which dries in April with the onset of hot weather. The rainy season commences from early July, when the hills and plains turn green with the exuberance of vegetation, and lasts till mid-September when rains cease. These are the occasions when specimens of all annuals and perennials of the district are available.

The catalogue is arranged according to the accepted sequence of Natural Orders, Genera and Species. It has no pretensions to be anything else, but it is a valuable compilation and will be of great help to the Systematic Botanist, if any undertakes to compile a Flora of the tract. For facility of reference an alphabetical index prepared in the Silvicultural Research Division under the guidance of the Divisional Forest Officer, is appended.

Earlier publications on the subject are :—

- (i) *Parker, R. N.*—A Forest Flora of the Punjab with Hazara and Delhi—2nd Edition, (1921). It includes trees, shrubs and woody climbers and occasionally perennial herbs, but excludes all annuals wild as well as cultivated.
- (ii) *Stewart, J. L.*—Punjab Plants (1869). This book is out of date and out of print. Considerable changes in the nomenclature of a number of species have been made in the course of the past four score years; still it is a useful book of reference, and is easy to consult due to the appended list of plants arranged according to the alphabetical order of their local names. It is a catalogue of plants arranged according to the Natural Orders, and gives under each plant its utility in the local as well as trade economy of the period.
- (iii) Working Plans of Rawalpindi forests including the forests of Murree and Kahuta tehsils which contain lists of local trees and shrubs with their local names.
- (iv) *Duthies, J. F.*—Flora of the Upper Gangetic plain and the Adjacent Siwalik, and Sub-Himalayan Tracts (1903). A fairly large number of plants are common to Gangetic and Jhelum-Indus basins.

## CATALOGUE OF THE PLANTS OF RAWALPINDI DISTRICT INCLUDING THE MURREE HILLS.

### RANUNOULACEAE CLEMATIS.

*Clematis montana*, Buch-Ham. Common above 6,000', flowering early from April to June. The fruit hangs on all winter.

*Clematis gouriana*, Roxb.—A plant of the foot-hills from 2—4,000'. Nurpur, Saidpur, Chattar Bagh, etc.

*Clematis grata*, Wall.—Very common from 2,000—8,000'; a plant of hedge rows and climbing in small trees.

*Clematis graveolens*, Lindl.—The flowers are yellow instead of white and the plant is often prostrate or on banks and walls. Usually above 3,000'.

*Clematis connata*, D. C.—Fairly common above 4,000'. The yellowish white flowers are funnel shaped and do not open wide.

#### ANEMONE

*Anemone vitifolia* Buch. Ham.—A tall autumn species, white woolly on the lower side of the leaves. Usually found above 4,000'.

*Anemone obtusiloba*, D. Don.—A spring species, usually found above 7,000'. The perianth is white within and bluish without. The Pipe Line, Changla Gali, Dunga Gali.

*Anemone tetrassepala*, Royle.—A tall, white flowered species of early summer at high levels. Changla Gali, Miranjani.

#### THALICTRUM.

*Thalictrum pedunculatum*, Edgew.—A spring species with delicate white flowers. Murree Hills. April-May.

*Thalictrum foetidum*, L. (Syn. *Th. vaginatum*, Royle.) Reported only from Nathia Gali by Deane.

*Thalictrum foliolosum*, D. C.—Changla-Gali and the Pipe Line. A species with small flowers growing in forest humus in July.

*Thalictrum* sp. (?)—A rock species with large leaflets growing at the Motto Bridge on the Pipe Line, half way between Khaira Gate and Dunga-Gali.

#### ADONIS.

*Adonis aestivalis*, L.—An early spring species with straw coloured flowers with a scarlet eye. Usually found as a weed of cultivation in March and April in the plains and up to 5,000'.

#### RANUNCULUS.

*Ranunculus trichophyllus*, Chaix, (*R. aquatilis* var *trichophyllus* Hk.F. and T.) This common small flowered, white water buttercup has been found at Kahuta, Wah, Haripur and Abbottabad.

*Ranunculus falcatus*, L.—This dwarf, early spring species has been collected at various places from 2,000'—7,000'. It is easily recognized by the long beaks to the achenes.

*Ranunculus hirtellus*, Royle. Fairly common from perhaps 6,500' up.

*Ranunculus scleratus*, L.—A common annual weed from early spring to summer in wet places. In shallow water the leaves may be floating.

*Ranunculus diffusus*, D. C.—Only reported by Professor A. Hamid of Lawrence College, Murree.

*Ranunculus laetus*, Wall.—Common above 4,000' and the largest buttercup in the area, perennial with thick rhizome.

*Ranunculus muricatus*, L.—Another common annual weed in wet places, usually at low elevations, but has also been collected in Murree. It may be recognized by the protuberances on the achenes.

*Ranunculus arvensis*, L.—A common weed in grain fields from the plains to 7,000' from February to April.

#### CALLIANTHEMUM.

*Callianthemum pimpinelloides*, Don.—Reported from Nathia Gali by Deane and I have seen specimens collected by Wright on Mokshpuri above 9,000' in April.

#### CALTHA.

*Caltha palustris*, L. var. *alba* Hk. f. and T.—The white marsh marigold grows on Changla Gali in April and has been reported from Nathia Gali also.

#### AQUILEGIA.

*Aquilegia pubiflora*, Wall.—The columbine is fairly common in the Murree Hills above 6,000' from April to July. The flowers are usually bluish but I have collected yellow specimens from Khaira to Dunga Gali. Accordingly to Munz the Murree type is var. *missooriensis* of Royle.

#### DELPHINIUM.

*Delphinium uncinatum*, Hk. f. & T.—The type of this species was collected at Margalla. It grows in dry rocky places from late March to May from 2000'—7,000'.

*Delphinium saniculæfolium*, Bois. —Another spring species growing on low dry hills from the Jhelum to the Indus. It grows in limestone crevices at Margalla and Hasan Abdal. It also grows in Attock district.

*Delphinium ajacis*, L.—Commonly cultivated.

#### ACONITUM.

*Aconitum heterophyllum*, Wall.—Changla Gali, 8,000'—9,000'.

#### ACTAEA.

*Actaea spicata*, L.—Found in forest humus from April to May, Murree, Changla Gali, Dunga Gali, Upper Topa.

#### PAEONIA.

*Paeonia emodi*, Wall.—Grows at Kund and Thandiani in Hazara, flowering in May and June at the edge of forest usually above 7,000'.

#### MENISPERMACEAE.

##### COCCULUS.

*Cocculus laevis*, D.C.—Common in the plains, scrambling over trees; flowering after the rains.

##### CISSAMPELOS.

*Cissampelos pareira*, L.—A cosmopolitan vine growing on cliffs and scrambling over bushes from the plains to 6,000'.

##### TINOSPORA.

*Tinospora cordifolia*, (D.C.)—Miers, *Glò* is a large creeper cultivated because of the rapidity with which it will make a screen of leaves. The flowers are inconspicuous on old wood.



## BERBERIDACEAE.

## BERBERIS.

*Berberis petiolaris*, Wall.—Common above 6,000' in the Murree Hills, growing in shady woods and with comparatively large, elliptical leaves. The inflorescence is a simple raceme.

*Berberis ceratophylla*, G. Don.—(*B. Lycium* Royle).—This is the common barberry of the *Pinus longifolia* zone and is of great importance as a soil binder from 3,000'—7,000'. The blue fruits are collected and sold. *Rasunt*.

*Berberis kunawurensis*, Royle.—This is a dwarf barberry growing in dense patches in exposed places, often on rocks. The fruits are red and the inflorescence paniculate. Khaira Gali, Changla Gali, Mokhshpuri, usually above 7,000'.

## PODOPHYLLUM.

*Podophyllum emodi*, Wall.—The May Apple, *ban kakri*, is common in forests throughout the Murree Hills, flowering as soon as the snow melts; usually above 7,000'.

## BONGARDIA.

*Bongardia margalla*, n. sp.—A rare and interesting plant growing on limestone at Margalla in March with yellow flowers, 1/2 inch in diameter. The corms are deep and hard to extract and there is usually only one compound leaf per corm. The leaves have purple mottlings. The corms are usually more than one inch in diameter.

## HOLBOELLIA.

*Holboellia latifolia*, Wall.—This large vine with glossy, digitate, 3—9 foliolate leaves is found on a cliff on the old cart road between Ghikka Gali and the Murree Bazaar.

## NYMPHAEACEAE.

*Nymphaea nonchali*, Burm. f.—(*N. Lotus* of Fl. Brit. India.)—The leaves are sharply serrate and pubescent beneath. I have only found this at Kontrila, Jhelum district. This is probably the *N. Lotus* var. *pubescens* K Hk. f. and T. reported by Aitchison from Rawalpindi.

*Nymphaea alba*, L.—(*N. candida* Presl.)—Abbottabad (N. Ali).

*Nelumbium nelumbo*, (L.)—Druce, (*N. speciosum*, Wild.). The Lotus grows in the Topi Park, Rawalpindi. The ovules are embedded in a peculiar top shaped thalamus.

## PAPAVERACEAE.

*Papaver hybridum*, L.—A small poppy with brick red flowers and hispid capsules. Very common in grain fields from February to April.

*Papaver pannonicum* Schrenk. ex F. and M.—Locally common in grain fields, dry places in the spring. The fruits are prickly; the flowers are salmon coloured with dark centres.

*Papaver dubium*, L.—var *glabrum* Koch, (*P. laevigatum*, M. Bieb.)—Common in the plains in April and up to 5,000'. The capsules are smooth and the

flowers are salmon colour with black purple spots near the base of the petals. Common in grain fields.

*Papaver somniferum*, L.—The opium poppy with large pale lavender coloured flowers and large smooth pods is occasionally found as an escape.

*Papaver macrostomum*, Boiss and Hust.—(*P. turbinatum*, D.C.)—Petals orange or red with a dark spot at the base. Abbottabad and common in the Kashmir Valley in grain fields in the spring and early summer. This large flowered species can be recognized by the peculiar stigmas with lobed, not overlapping lower margins.

*Papaver rhoeas*, L.—The shirley poppy and its forms are commonly cultivated and may be found self sown.

*Papaver* ? —An undetermined red flowered poppy with smooth capsules and much divided leaves was found in Campbellpur in a field in April 1949.

#### ARGEMONE

*Argemone mexicana*, L.—This noxious weed is adventive from America and is occasionally found in waste places in the plains in April and May. Prickly Poppy.

#### ESCHSCHOLTZIA.

*Eschscholtzia californica*, Cham.—Commonly cultivated in the spring. 'California Poppy'.

#### FUMARIACEAE.

*Hypecoum parviflorum*, K. and K.—A small annual field weed about Peshawar in March and April. Flowers yellow.

*Hypecoum trilobum*, Trautv.—Very near the last, but with larger flowers, the outer petals three lobed and the stigma deeply bi-lobed. A weed of grain fields in the spring in Rawalpindi and Attock districts.

#### CORYDALIS.

*Corydalis stewartii*, Fedde,—*Mamiri*. Found in shady forests at Murree and Changla Gali. In Changla, it is said, the juice is put in the eyes with *surma*. The flowers are small and yellow.

*Corydalis diphylla*, Wall. ex D. Don (*C. rutaefolia*, Sibth.)—An early spring forest flower usually found in the Murree Hills above 6,000'. The flowers are purple.

#### FUMARIA.

*Fumaria indica* (Haussk.) Pugsley.—*Pit papra* is an ubiquitous weed in the plains and lower hills from February to April. Flowers pink. It may be erect or a leaner in tall weeds.

#### CRUCIFERAE.

##### NASTURTIUM.

*Nasturtium officinale*, Br.—Water cress is common in springs or slowly moving water in both plains and hills. The flowers are white.

*Nasturtium palustre* (Leyss.) D.C.—Plant of wet places, erect with yellow flowers and very short pods which are round in cross section. Usually above 4,000'.

*Nasturtium indicum* (L.) D.C.—Tallest and most erect of the 4 nasturtiums. It grows in wet soil in the plains and up to 6,000' with longer curved slender pods.

*Nasturtium montanum* Wall. ex Hk. f and T.—Plants not so tall as in 'indicum' with straight pods almost at right angles to the peduncle. Nurpur at about 2,000'.

#### ARABIDOPSIS.

(A genus included in *Sisymbrium* in the *F. Brit. Ind.*)

*Arabidopsis wallichii* (H. & T.),—Busch—Fairly common in April and May from 2,000'—7,000'. The leaves suggest those of a dandelion and the flowers are white to pale lavender.

*Arabidopsis thaliana*, Heynh.—A tiny white flowered spring ephemeral from the plains to Ladak in Kashmir. There is a basal rosette of almost entire leaves.

*Arabidopsis stricta* (H. and T.), Busch Grows from 5—10,000' with white or pink to pale lavender flowers.

*Arabidopsis campestris*, O. E. Schulz.—My 9,585 from Barian was identified by Schulz.

*Arabidopsis lasiocarpa* (H. and T.), O. E. S.—My 12,598 April 1928 identified by O.E S. also from Barian.

*Arabidopsis mollissima*, O. E. S.—Changla Gali in July.

#### ARABIS.

*Arabis taraxifolia* Anders.—Margalla and Rawalpindi. The leaves are interruptedly pinnatifid.

*Arabis amplexicaulis*, Edgew.—The largest of the genus, usually in forest with pretty white flowers and a basal rosette, perennial from 4,000—8,000'.

*Arabis auriculata*, Lam.—An erect annual, common in Abbottabad in April, also growing in Kashmir Valley.

*Arabis pangiensis*, Watt.—Often growing in forest, near a *amplexicaulis* but the flowers and leaves are smaller.

*Arabis bijuga*, Watt.—Schulz identified one of my Murree specimens from the Murree Hills and one from Trarkhal in Poonch as belonging here but these specimens do not seem to agree with Watt's picture. This genus has not been worked out satisfactorily and type specimens should be consulted.

*Arabis glabra*, (L.), Crantz—Tall, slender, erect, glaucous. The pods are long and erect close to the stem. Abbottabad and probably grows in the Murree Hills. Common in Kashmir.

#### CARDAMINE.

*Cardamine impatiens*, L.—Common in the Murree Hills, usually in forest from 4,000'—9,000' note the auricles at the base of the compound leaves as there are no auricles in *C. flexuosa*. The flowers are small and erect and the pods are nearly erect.

*Cardamine flexuosa*, With subsp *deblis*, O. E. S.—Abbottabad.

*Cardamine hirsuta*, L.—Abbottabad. Much like the last but with 4 stamen instead of 6 and the lower flowers reach above the upper.

## NOTOCERAS.

*Notoceras canariense*, Br.—A spring weed, occasional, Fatch Jang, Hasan Abdal, Attock district and Peshawar.

## ALYSSUM.

*Alyssum desertorum*, Stapf.—(*A. minimum* of Fl. Brit. Ind.)—A spring ruderal, with small yellow flowers growing in dry places in the plains and up to Ladak in Kashmir.

## MALCOLMIA.

*Malcolmia africana*, (L.) Br.—Another Mediterranean ruderal. It has small pink flowers and is common in wheat, on 'bands' and road-sides from the plains to Ladak, in the spring or early summer.

*Malcolmia strigosa*, Boiss.—Much prettier than the last with handsome pink or purple flowers with crinkly petals. It carpets dry gravelly soil in March with colour on the plains.

## DESCURAINEA.

*Descurainea sophia*, (L.) Webb.—(*Sisymbrium Sophia*, L.)—Another very common spring ruderal with small yellow flowers and finely divided leaves. Widely distributed.

## SISYMBRIUM.

*Sisymbrium irio*, L.—Another widely distributed spring weed from the Canary Islands to Kashmir.

*Sisymbrium loeselii*, L.—A weed in Murree with larger yellow flowers and shorter pods.

## S. COLUMNAE JACQ.

*Sisymbrium brassiciforme*, C. A. M.—Aitchison 318 from Rawalpindi. This record needs checking for no one else seems to have found it. It is fairly common in the Tibetan parts of Kashmir.

*Sisymbrium alliaria*, Scop.—(*Alliaria officinalis*, Andr.)—The flowers are white and the plant smells like an onion. It is found in Abbottabad, Murree, on the Pipe Line, etc. in the spring.

## ERYSIMUM.

*Erysimum sisymbrioides*, C. A. M.—A dwarf annual found once in Topi Park, Rawalpindi.

*Erysimum hieraciifolium*, L.—Wild Wallflowers. Perennial, tall, leafy, pods nearly erect. Murree (Bamber), Changla.

*Erysimum repandum*, L.—April in Abbottabad.

## DIPLTAXIS.

*Dipltaxis griffithii*, (H. and T.) Boiss.—A desert annual with pink flowers. Jhalar, Attock district; Kohat.

## MORICANDIA.

*Moricandia tortuosa*, H. and T.—A xerophytic perennial with thick leaves growing in the Salt Range.

## LEPTALEUM.

*Leptaleum filifolium*, D. C.—A dwarf, pink flowers spring ephemeral. Attock, Peshawar.

## BRASSICA.

*Brassica nigra*, (L.) Koch.—Abbottabad in April. The pods are short and erect, cir. one inch long.

*Brassica campestris*, L.—The Swedish turnip. Cultivated.

*Brassica campestris*, L.—Var sarson Prain.—Sarson is a very common early spring crop.

*Brassica napus*, L.—(*B. campestris* var. *napus*) *Shalgam* (turnip)—Commonly planted and occasionally self sown.

*Brassica oleracea*, L.—Cabbage, culiflowers, *gand ghobi*, etc. are all cultivated derivatives of this species. Common.

*Brassica juncea*, H. and T.—Rare in Rawalpindi. Pods beaked and four sided.

*Brassica alba*, L.—(*Sinapis alba*)—Reported from Rawalpindi by Aitchison.

## ERUCA.

*Eruca sativa*, Garsault.—*Tiramira* is widely cultivated in inferior soil in the plains. Note the prominent beak of the pods.

## CAPSELLA.

*Capsella bursa-pastoris*, (L.) Medik.—Ubiquitous spring weed throughout the area. "Shephrds Purse."

## SENEBIERA.

*Senebiera didyma*, (L.) Pers.—Another common spring prostrate weed in the plains and lower hills.

## LEPIDIUM.

*Lepidium stativum*, L.—*Haleon* is found cultivated and as an escape throughout the district Garden Cress.

*Lepidium draba*, L.—A common gregarious weed in fields and waste places from the plains to 7,000'. Flower. white.

*Lepidium pinnatifidum*, Ledeb.—(*L. rudicale* F Brit. Ind).—A weed in Abbottabad and Murree. Fruits look like small fruits of Shepherd's Purse.

## THLASPI.

*Thlaspi arvense*, L.—A weed of cultivated throughout the district.

*Thlaspi alpestre*, L.—Usually in forest and above 7,000'. Common in the Murree Hills. The fruits are much smaller than in the last.

## NESLIA.

*Neslia paniculata* Desv.—(*Vogelia paniculata* (L.) Hornem.)—A spring field weed with small yellow flowers and small round pods from the plains to at least 5,000'.

## EUCLIDIUM.

*Euclidium syriacum*, R. Br.—A spring field weed growing from Central Europe to Kashmir. The flowers are very small and the pods are short, ovate and sharp pointed. Rawalpindi, Peshawar, etc.

## RAPHANUS.

*Raphanus sativus*, L.—Muli, the radish, is very commonly cultivated.

## GOLDBACHIA.

*Goldbachia laevigata*, (M. Bieb.) D.C.—A common spring field weed with small pink flowers and short terete pods, about 1/3 inch long which become deflexed when ripe. Rawalpindi, Peshawar.

## CHORISFORA.

*Chorispora tenella*, D.C.—Another common spring weed in poor, desert soil resembling *Malcolmia* but the pods are beaded, curved and with a long tapering beak. Plains and Kashmir Valley.

## CAPPARIDACEAE.

## CLEOME.

*Cleome papillosa*, Steud.—A dwarf annual of the plains growing at the close of the moonsoon, hairy, scented, with ovate, cordate leaves and pods cir. 1½ inches long.

*Cleome brachycarpa*, Vahl.—A summer desert weed, Dharmyal near Rawalpindi and the N.-W. F. P.

*Cleome viscosa*, L.—Large, yellow flowered and very stricky. Found in the plains and lower hills in the summer.

## GYNANDROPSIS.

*Gynandropsis pentaphylla*, D.C.—A summer annual with white or purplish flowers bearing a conspicuous gynophore.

## MAERUA.

*Maerua ovalifolia*, H. and T.—Reported from Topi Park, Rawalpindi by Bamber but I have never found it in the district and not mentioned by Parker as growing so far north.

## CAPPARIS.

*Capparis aphylla*, Roth—*Karir, karil*, the wild caper is found in the more desert parts of the plains bearing red flowers.

*Capparis spinosa*, L.—This caper is a prostrate shrub, thorny, usually growing on cliffs in the plains, the Kashmir Valley and Ladak. The flowers are white, turning pink or purple.

## RESEDACEAE.

*Oligomeris glaucescens*, Camb.—A spring annual of the drier part of the plains. Sparing.

## VIOLACEAE.

*Viola caespitosa*, D. Don.—(*V. Patrinii* of Fl. Brit. Ind.)—Common in the spring in Abbottabad and the Murree Hills from 4,000—9,000'. Leaves much longer than broad.

*Viola serpens*, Wall.—Very common in the spring in shady forest, leaves glabrous and pointed. Plants with runners. Usually above 6,000'.

*Viola canescens*, Wall.—Very common but in drier places than the last and the flowers are pale blue or nearly white. The leaves are minutely hairy. Usually above, 4,000' in March and April.

*Viola stocksii*, Boiss.—A plant of dry desert, rocky places in the plains in March. The flowers are white with dark streaks.

*Viola odorata*, L.—And *V. tricolor*, L the pansy, are cult.

## BIXINEAE.

## FLACOURTIA.

*Flacourtia indica* (Burm f.)—Merrill (F. Ramontchi L'Herit.) *kakon*, *kakoa* is a small thorny tree in the sub-Himalayan zone from 2,000'—4,000'. Flowers in April.

## XYLOSMA.

*Xylosma longifolium*, Clos.—*Batti*, A tree of moist ravines to 5,000'. Kahuta, Punjar, Nurpur, etc.

## CASEARIA.

*Casearia tomentosa*, Roxb.—Tret, Murree Road, Saidpur, in the sub-Himalayan zone, *bhilla*, *cheela* Poisonous.

## PITTOSPOREAE.

## PITTOSPORUM.

*Pittosporum nepaulensis* (D C.)—Wilson and Rehder (*P. floribundum* W. and A.) Kulthea Reserve, Rawalpindi (Parker).

## POLYGALACEAE.

## POLYGALA.

*Polygala abyssinica*, R. Br. ex Fresen. (*P. gerdrdiana*, Wall.) Flowers pink, in April and May, sub-tropical and temperate 2,000'—8,000'.

*Polygala hohenackeriana*, F. and M.—A spring flower, white and green, growing in very dry soil from Armenia and the Caucasus to the Punjab.

*Polygala erioptera*, var. *vahliana* D. C.—A small hot weather annual in the plains.

*Polygala chinensis*, L.—Much like the last, leaves variable, racemes axillary or supra axillary, plants decumbent, wings green. A tropical annual of the plains.

*Polygala monopetala*, Cumb.—(*P. sibirica* of Fl. Brit. Ind.) Usually found above 7,000' and with bright blue flowers in gravelly soil.

## CARYOPHYLLACEAE.

## DIANTHUS.

*Dianthus caryophyllus*, L.—Attock in dry gravelly soil.

*Dianthus crinitus* Smith.—Topi Park, Rawalpindi. Perennial, flowers white with petals very fimbriate. Very xerophytic. Flowers in April.

## VELEZIA.

*Velezia rigida*, L.—A dwarf spring plant suggesting an attenuated *Dianthus* with the calyx very long and narrow for its width. Jhalar, Attock district (Nasir).

## GYPSOPHILA.

*Gypsophila cerastioides*, D. Don.—Usually above 8,000' with white flowers with lavender or reddish brown streaks. Mokshpuri and Miranjani.

## SAPONARIA.

*Saponaria vaccaria*, L.—An occasional field weed in the plains and hills with pretty pink flowers. Often cult. in gardens.

## SILENE.

*Silene venosa* (Gilib.)—Aschers. (*S. inflata* Sm.). A common temperate perennial, within flated calyx tube. Abbottabad, Kuldana, Changla, Dunga.

*Silene conoidea*, L.—A common, pink flowered weed of grain fields from the plains to W. Tibet.

*Silene arenosa*, C. Koch.—A dwarf spring sticky annual in dry gravelly places such as stream beds in the plains. It is found from Armonia to the W. Punjab.

*Silene rubella*, L.—Was collected by Aitchison in Rawalpindi in April 1871 but I have seen no specimens.

## CUCUBALUS.

*Cucubulus baccifer*, L.—An interesting forest plant, prostrate or scrambling. Easily recognized by the black, berry like fruits. Changla Gali. Upper Topa.

## LYCHNIS.

*Lychnis cachemiriana*, Royle, Murree, Changla.

*Lychnis coronaria* (L.) Desr.—flowers a fine pink and the plants hoary white all over. Abbottabad (N. Ali).

*Lychnis indica*, var *fimbriata* (Royle)—Edgew. and Hook. Murree, Upper Topa August.

## CERASTIUM.

*Cerastium triviale*, Link (under *C. vulgatum* in Fl. Brit. Ind.).

*Cerastium viscosum*, L.—(*C. vulgatum* var. *glomeratum* Thuill) Abbottabad. Very glandular.

*Cerastium dischotomum*, L.—Abbottabad.

## STELLARIA.

*Stellaria aquatica*, (L) Scop.—Sunnybank, Murree in April.

*Stellaria media*, (L) Cyr.—Very common in shady ground in cold weather in the Punjab and found as a weed up to 12,000'. Chickweed.

*Stellaria davidi* var. *himalaica* Franch. (*S. bulgosa* of Fl. Brit. Ind.) Found in rich forest humus in April and May, Murree and Changla. Delicate white flowers, base tuberous.

## ARENARIA.

*Arenaria serpyllifolia*, L.—A common dwarf weed in both plains and hills to 8,000'. A form which is smaller and more glandular which is common in dry places in the plains has been separated out as *A. leptoclades* Guss.

*Arenaria meyeri*, Boiss.—Only collected in Jhalar, Attock district by Nasir. The leaves are very small and narrow and the calyx is strongly veined.

*Arenaria holosteoides*, Edgew.—Collected at Tret in a grain field. Usually found at higher altitudes.

## SAGINA.

*Sagina apetala*, L. —A tiny ephemeral spring weed of the plains and lower hills.



## SPERGULA.

*Spergula arvensis*, L.—Another spring weed about cultivation in the plains.

## SPERGULARIA

*Spergularia diandra* (Guss.)—Held and Sart. ditto.

## PORTULACACEAE.

*Portulaca oleracea*, L.—*Launk*, *kulfa*, is common in the summer both in the hills and the plains.

*Portulaca quadrifida*, L.—Fairly common in the plains.

## TAMARICACEAE.

*Tamarix articulata* Vahl.—*Pharwan*, *farash*, *akan*. This is one of the few trees which will grow on saline soil. When found in Rawalpindi it seems to have been planted.

*Tamarix dioica* Roxb.—*Pilchi*, *lei*, *jhau* is a dwarf tamarisk which grows on the banks of the Ravi and Jhelum to about 2,500'. It is used for baskets.

## HYPERICACEAE.

*Hypericum cernuum* Roxb.—A small shrub with fine large yellow flowers growing on cliffs and steep banks in Abbottabad and the Murree Hills from 3,000'—7,000'.

*Hypericum dyeri* Rehder (*H. lysimachioides* of Fl. Brit. Ind.). Changla Gali flowers and capsules smaller and the calyx lobes are linear not ovate.

*Hypericum perforatum* L.—Common in Abbottabad and the Murree Hills and flowering from April to October.

## MALVACEAE.

## LAVATERA.

*Lavatera kashmiriana* Camb.—The pink wild hollyhock grows in Changla Gali.

## MALVA

*Malva verticillata* L.—A common weed throughout the district with flowers nearly sessile in dense axillary clusters.

*Malva rotundifolia* L.—*Saunchil*. Common in the Murree Hills.

*Malva parviflora* L.—*Saunchal*. This is common in the plains and in Abbottabad. The petals scarcely exceed the sepals while they are much longer in *M. rotundifolia*.

*Malva sylvestris* L.—Reported by Aitchison in 1871 from Rawalpindi cotton fields.

## MALVASTRUM.

*Malvastrum coromandelianum* (L.)—Gracke (*M. tricuspidadatum* A. Gray). Very common especially in shady places in the plains and up to 3,000'.

## SIDA.

*Sida veronicaefolia* Lamk.—A common tropical weed in dry forest undergrowth in the plains and lower hills. It is said to be useful as a pot herb and in medicine.

*Sida rhombifolia*, L.—Plains and lower hills. Abbottabad.

*Sida rhombifolia* L.—var *obovata* (Wall.) Masters Rawalpindi.

*Sida grewoides* Guill. and Perr.—A small xerophytic shrub in dry places on the plains.

#### ABUTILON

*Abutilon indicum* (L.) G. Don.—A tropical plant of the plains and sub-Himalayan tract in weedy places yielding a good fibre.

*Abutilon bidentatum*, Hochst.—The same distribution as the last. The ripe carpels are smaller.

*Abutilon ramosum* Guill. and Perr.—Rawalpindi flowering after the rains. There are 8—10 carpels, fewer than in the last two. The leaves are green, membranous, glabrescent and the carpels are awned.

*Abutilon fruticosum*, Guill. and Perr.—Fatehjang and Attock. Carpels 8—10, leaves hoary, carpels not beaked or awned. More xerophytic.

*Abutilon molle*, Sweet.—A shrub with pretty yellow flowers and very hairy leaves. Often cultivated and occasionally grows self sown.

#### HIBISCUS.

*Hibiscus trionum*, L.—Murree Hills during the summer.

*Hibiscus gibsoni*, Stocks.—This has large yellow flowers with a dark centre and blooms in the spring and after the monsoon. Widespread in the drier parts of India, tropical Africa and North Australia.

*Hibiscus esculentus*, L.—*Bindi tori*, *okara*, is commonly cult. and occasionally is found as an escape.

*Hibiscus cannabinus*, L.—*sanukra* is a tall prickly plant with large creamy yellow flowers with dark centres which is sometimes planted along field borders.

*Hibiscus micranthus*, L. f.—A small xerophytic shrub. Hassan Abdal, Attock.

*Hibiscus solandra*, L.—Herit. Only collected in Topi Park, Rawalpindi in September.

*Hibiscus ficulneus*, L.—Reported from Rawalpindi by Aitchison. In addition to the above *H. rosa sinensis* L. *H. mutabilis* L. and *H. syriacus* L. are cultivated in gardens.

#### GOSSYPIMUM.

*Gossypium herbaceum*, L.—Very little cotton is cultivated in Rawalpindi.

#### KYDIA.

*Kydia calycine*, Roxb.—*Pulla*, *pulian* is fairly common along the base of the mountains, Saidpur, Nurpur, Tret, etc.

#### SALMALIA (BOMBAX)

*Salmalia malabarica* (D.C.)—Schott and Endlicher (*Bombax malabarium* auctt.) *Sumbil*, *simul*. Cultivated in the plains and apparently wild along the base of the Himalaya. A fine tree with buttresses at the base of the trunk.

## STERCULIACEAE.

## STERCULIA.

*Sterculia villosa*, Roxb.—A small tree with maple like leaves found occasionally in the sub-Himalyan zone.

*Sterculia diversifolia*, G. Don.—Cultivated in Rawalpindi.

## HELICTERES.

*Helicteres isora*, L.—*Maror phali*. This plant furnishes a good fibre. I have found it in the Saidpur Hills and Aitchison found it at Barakao.

## PTEROSPERMUM.

*Pterospermum acerifolium*, Wild.—Cult. in Rawalpindi.

## MELHANIA.

*Melhania futteyporensis*, Munro.—Common on dry hills and bearing fine yellow flowers in the spring and autumn.

## TILIACEAE.

## GREWIA.

*Grewia optiva*, J. R. Drummond ex Burret, (*G. oppositifolia* Ham.) *Dhaman* is a common sub-Himalayan tree up to 4,000'.

*Grewia elastica*, Royle.—Indus east to 3,500'. Salt Range (Parker) I have found it at Saidpur.

*Grewia hainesiana*, Holc.—Indus east to 3,000' (Parker).

*Grewia hirsuta*, Vahl var. *helicterifolia* (Wall.) Parker, Indus east to 4,500' Salt Range (Parker).

*Grewia damine*, Gaertn. (*G. salvifolia* Heyne ex Roth) A plant of dry hills, very xerophytic.

*Grewia tenax* (Forsk.) Aschers. and Schweinf. (*G. populifolia* Vahl). Another xerophytic shrub ranging to Arabia and tropical Africa.

*Grewia villosa*, Willd.—Kala Chitta Hills, Attock district and the Salt Range, also N.-W. F. P.

*Grewia sapida*, Roxb.—“Indus east to 3,500', Pindi and Hazara (Parker).

*Grewia asiatica*, L.—*Phalsa* is occasionally cultivated in the plains.

## TRIUMFETTA.

*Triumfetta bartramia*, L.—(*T. neglecta* W. and A.) an annual, monsoon weed in the plains. Fruit 2" long, ovoid with hooked spines.

## CORCHORUS

*Corchorus olitorius*, L.—A fairly common weed after the rains in the plains and lower hills. One of the jutes.

*Corchorus trilocularis*, L.—A summer tropical weed in the plains.

*Corchorus tridens*, L.—Ditto, resembling the last but the leaves are more linear and the pods have three terminal teeth.

*Corchorus acutangulus*, Lam.—Ditto but ascends the hills to 4,000'. Easily recognized by the three winged angular fruits.

## LINEAE.

*Linum usitatissimum*, L.—*Alsi* is commonly cultivated and is occasionally found as an escape. Flowers blue.

*Linum strictum*, L. var. *corymbulosum* Planch. Common in the plains in the spring on stony soil bearing small yellow flowers. I have found it on the Upper Indus at Skardu, also at Abbottabad.

## REINWARDITIA.

*Reinwarditia trigyna*, Planch.—*Basant* is common in the sub-Himalayan zone in rock crevices and walls, also on steep banks up to 5,000'. Flowers in early spring.

## MALPIGHIACEAE

## HIPTAGE.

*Hiptage madablota*, Gaertn.—(*H. benghalense* (L.) Kurz). This large climbing shrub is occasionally found in the sub-Himalayan tract. Nurpur Hills and below Tret.

## ZYGOPHYLLACEAE

## TRIBULUS

*Tribulus terrestris*, L.—*Bhakhra*, *puncture vine* is a noxious prostrate herb in the plains and as high as Skardu in Baltistan.

*Tribulus alatua*, Delile, Jhalar, Attock district. Flowers not spiny but conical with thick winged ridges with teeth.

## FAGONIA.

*Fagonia cretica*, L.—A small, very spiny desert plant with pink flowers found from N. W. India to Egypt.

## PEGANUM.

(Referred to Rutaceae by some botanists.)

*Peganum harmala*, L.—*Harmal* has much the same distribution as *Linum strictum*, *Tribulus*, and *Capparis spinosa*. It is very xerophytic and grows in waste places in the plains with *ak*. Left alone by grazing animals.

## GERANIACEAE.

*Geranium wallichianum*, D. Don ex Sw.—Common in thin forest in the Murree Hills usually above 5,000'. Easily recognized by the large flowers and broad stipules.

*Geranium nepalense*, Sw.—A common perennial with pink flowers about 1/2" in diameter, from 4,000'—9,000'.

*Geranium rotundifolium*, L.—An inconspicuous annual of wide distribution flowering in the plains in February to April and ascending to perhaps 5,000' in the hills. The carpels are wrinkled and the seeds reticulate.

*Geranium robertianum*, L.—Including *G. Lindleyanum*, Royle. A strongly scented, succulent stemmed herb with small pink flowers growing in shade. Murree and Changla.

*Geranium lucidum*, L.—Small pink flowers with an angled calyx. The carpels are transversely rugose, falling off with the smooth seeds inside. Murree Hills.

*Geranium ocellatum*, Camb.— Easily identified by the scarlet flowers with a dark centre. A spring flower found from 2,000'—7,000'.

#### ERODIUM.

*Erodium malocoides* (L.) Wild.—A prostrate herb growing in the plains in March.

*Erodium cicutarium* (L.) L. Herit.—Leaves finely divided. This is also prostrate and is found from the plains to 9,000'.

#### OXALIS.

*Oxalis corniculata*, L.—A common weed on dry banks from the plains to 9,000' at Changla.

*O. Pes Caprae*, with yellow flowers and *O. corymbosa*, D.C. with pink flowers are becoming naturalized in shady places.

*O. latifolia*, H. B. K. is an escape in Murree. Flowers pink.

#### IMPATIENS

*Impatiens balsama*, L. This is found at the close of the monsoon on grassy banks from 3,000'—6,000' bearing handsome pink flowers.

*Impatiens glandulifera*, Royle (*I. Roylei* Wall.) Changla Gali.

*Impatiens gigantea* Edgew. (*I. sulcata* Wall.) Nepal to Marri (Fl. Brit. Ind.). Very near the last and some thing that the two are not specifically distinct. The leaves are more connate and the capsules longer, narrower and inclined. Changla.

*Impatiens bdgeworthii*, Hk. f.—Yellow flowered, is very common about Murree during the rains.

*Impatiens bicolor*, Royle (*I. amphorata* Edgew.).—Flowers large, rose and yellow with red veins, infundibuliform. Changla Gali.

*Impatiens micranthemum*, Edgew.—Flowers white and rose, bracts ovate, spur long for the size of the flower, with two corpuscles in place of two sepals. Murree, rare : Changla.

*Impatiens brachycentra*, K. & K.—Much the smallest flowers, beginning to bloom in shady places before the monsoon begins. The flowers are small and white, 6,000'—9,000'. Common.

*Impatiens balfourii* Hk.—Handsome flowers of three colours, pink, yellow and white, spur long and curved. Changla Gali.

*Impatiens flemingii*, Hk. f.—Flowers pink and white, spur long. of leaves sharp. Changla Gali. (Nath).

#### RUTACEAE.

##### BOENNINGHAUSENIA.

*Boenninghausenia albiflora*, Hk. Reich. ex. Heynh. *Pissu mar* is common in forest in the Murree Hills from 6,000'—9,000'. Flowers white, strongly scented.

##### ZANTHOXYLUM.

*Zanthoxylum alatum*, Roxb.—Timber is a very prickly, xerophytic shrub from the foot of the mountains to 5,000', often in pine forest. The twigs are used as tooth sticks.

## SKIMMIA.

*Skimmia Laureola*, Sieb. & Zucc.—A dwarf shrub growing in patches in dense forest often with *Viburnum*. It is strongly scented and bears white flowers in April and May and red berries in the autumn; usually above 7,000'.

## MURRAYA.

*Murraya paniculata* (L.) Jack (*M. exotica*) is cult. in Rawalpindi.

## CITRUS.

*Citrus acida*, Roxb., the *khatta*; *C. aurantium* L., the orange; *C. decumana* Murr., the *chakodra* or *pumelo* are planted in a few places in the plains but except from some orchards near Taxila there is not much citrus fruit raised in the area.

## MELIACEAE.

## MELIA.

*Melia azedarach*, L.—The *drek* or *bakin* is cult. in most plains villages and occasionally is found up to 4,000'.

## CEDRELA

*Cedrela toona*, Roxb.—The *toon* tree is planted in Pindi and Abbottabad.

*Cedrela serrata*, Royle.—*Drawa* or *drawi* is found in shady forest in the Murree Hills up to 8,000'.

## ILICINEAE.

## ILEX.

*Ilex dipyrrena*, Wall.—*Kanderu*, Holly, Grows occasionally in damp shady places in the forest from 5,000'—8,000'. The red berries are sold in Rawalpindi at Christmas for decorations.

## CELASTRACEAE.

## EUONYMUS.

*Euonymus pendulus*, Wall.—Murree Hills, 3,000'—8,000'. The leaves are evergreen, with sharp teeth, the flowers are greenish white and the seeds have a scarlet aril.

*Euonymus hamiltonianus*, Wall.—*Siki*. The leaves are deciduous, the capsules lobed, the leaves finely and closely serrulate. The bark on old trees is deeply furrowed, pale, and corky. Not rare in the Murree Hills up to 9,000'.

*Euonymus laevis* Buch-Ham.—Leaves deciduous, leaves more ovate with sharply doubly serrate teeth. The capsules are winged. Murree Hills 7,000'—10,000'.

## GYMNOSPORIA.

*Gymnosporia royleana*, Wall.—*Pataki* is one of the commonest small shrubs about Rawalpindi and in the lower hills. It is often nibbed down into large hassocks as is *Ziziphus* (*beri*).

## ELAEODENDRON.

*Elaeodendron glaucum*, Pers.—*Morindu* is occasional in the sub-Himalayan zone in the chir zone (Parkor).

## RHAMNACEAE.

*Rhamnus pentapomica*, Parkor.—Sub-Himalayan zone to 5,000'. The flowers are 4 morous and yellow green. A plant of dry rocky places.

*Rhamnus virgata*, Roxb.—*Seta paja* is common in the Murree Hills from 5,000'—8,000' often in fir forest.

*Rhamnus purpurea*, Edgew.—Another forest tree with much larger leaves suggesting those of a cherry. 6,000'—10,000'.

*Rhamnus triquetra* Wall.—The leaves have a peculiar yellowish tinge below. Occasional from 2,000'—4,000'.

*Rhamnus persicus* Boiss.—Nandkot 4,000' fide Sabnis. Probably an error.

## ZIZIPHUS.

*Zizipshu mauritiana* Lam.—*Ziziphus Jujuba*, Lamk, nonMill.—The tree "ber" is cultivated in every village in the plains and occasionally up to perhaps 4,000'.

*Ziziphus jujuba*, var *fruticosa* Haines.—Thin stemmed, in grassy patches, no rounded bushes. (Parker) in the plans.

*Ziziphus jujuba*, var. *spontanea*, Edgew.—Sub-Himalayan scrub forests, fruits yellow or orange and 1/2 " in diam (Parker) Rawalpindi.

*Ziziphus nummularia*, W. & A.—*Beri*, *Jhari*, very common and very xerophytic, every where in the plains along paths and roads, growing in patches which are constantly trimmed by goats and sheep.

*Ziziphus oxyphylla*, Edgew.—*Phitni*, *amlai*. Leaves ovate lanceolate acuminate, fruits orange, flowering in September. Base of the Himalayans to 4,000'. The leaves are used for fodder.

*Ziziphus sativa*, Gaortn.—(*Z. vulgaris* Lamk.) "Unab", "baryan". A large shrub or small tree with very spiny branches which are not straight but look as though the branching were dichotomous. Found up to perhaps 5,000'. The oldest name for this plant seems to be *Z. jujuba* Mill. 1768. Lamarck's *Z. Jujuba* of 1789 is therefore invalid. Unfortunately Lamarck's name has become generally known.

*Ziziphus hysudrica* Hol.—*Seo ber*.—This is a large tree with the leaves glabrous below while in *Z. mauritiana*, usually called *Jujuba* the leaves are pale or rusty tomentose below. This tree is commonly grafted. According to Sabnis the wild form has globose and the cult. form ovoid fruits.

## BERCHEMIA.

*Berchemia floribunda* (Wall.) Brongn.—Indus east to 4,500' (Parker).

*Berchemia lineata* (L.) DC.—A small shrub with small, white, bell shaped flowers in axillary fascicles, while the last is large, bearing the flowers in axillary panicles. Pipe Line, Changla Gali.

## SAGERETIA.

*Sageretia filiformis* (Roth) G. Don (*S. oppositifolia* Brongn.)—A large shrub, often scrambling. Trot, Poonch. "Indus east to 6,000' (Parker).

*Sageretia theezans* Brongn. var *Brandrethiana* (Sp.) Aitoh. *Gangher*.  
Common about Rawalpindi and in the sub-Himalayan tract and west to  
Arabia. Leaves white below.

*Sageretia theezans* (L.) Brongn. Leaves green below. Abbottabad

#### HELINUS.

*Helinus lanceolatus* (Wall.) Brandis.—A large climber from the Indus  
eastward. Saidpur, Nurpur, Poonch, Kohala.

#### VITACEAE (AMPELIDAE)

Leaves simple.—

Leaves 2"—3" long, plant with tendrils *V. parvifolia*.

Leaves 2"—4" long plant without tendrils. *V. persica*.

Leaves 3"—7" long

Petals cohering; leaves with deciduous tomentum below *V. vinifera*.

Petals free of cohering; leaves with dense wooly tomentum beneath. *V. lanata*.

Leaves palmately trifoliolate, stems woody.

Inflorescence terminal, rarely leaf opposed, without tendrils. *V. semicordata*.

Leaves pinnately trifoliolate, stems herbaceous, flattened. *V. trifolia*.

Leaves pedately trifoliolate *V. capreolata*

*Vitis parvifolia*, Roxb.—Above Ghora Gali, Murree Road at 5,000',  
Baghnotar.

*Vitis persica* Boiss.—Common in Hazara (Parker); Jhelum Valley Road,  
Baghnotar.

*Vitis vinifera* L. Cult. throughout the district but sparingly.

*Vitis lanata* Roxb.—The white tomentum on the lower surface of the  
leaves turns rusty with age. Found in the Himalayas and sub-Himalayan  
zone to 8,000'. Below Murree, Jhicca Gali, etc.

*Vitis semicordata* Wall. var *Roylei* King.—Fairly common in Murree and  
the Galis climbing on large trees and hanging over cliffs.

*Vitis trifolia* L.—Herbaceous and common during the monsoon in  
hedges and scrambling over small trees. A plant of the plains and lower  
Himalaya. *Rattan bel*. The roots are said to be good for carbuncles and swell-  
ings.

*Vitis caprelata* D. Don.—3,000'—7,000'. Indus east (Parker).

*Leea aspera* Wall ex. Roxb.—To 6,000' Indus east (Parker). I have  
not seen any specimens from this area.

#### SAPINDACEAE.

##### CARDIOSPERMUM.

*Cardiospermum microcarpum* Kunth (*C. Halicacabum* L. var *microcar-  
pum* Bl.) A sub-tropical annual climbing amongst bushes with winged capsules  
suggesting the fruits of *Dodonaea*. Fruiting at the close of the monsoon.



## ACER.

*Acer oblongum* Wall.—Indus east to 6,000' (Parker). Cult. in Rawalpindi and Poonch. A plant of moist places in ravines; recognized by its undivided leaves.

*Acer pentapomicum* J. L. S.—Leaves three lobed and the most xerophytic of our maples. Fairly common along the Jhelum Valley Road from Kohala to Baramulla. Reported from Gainthal by Jerram at 2,500'.

*Acer caesium* Wall.—Leaves large and five lobed, the largest of our maples and found up to about 10,000'. Common in the Murree Hills in rich forest from 7,000'—9,000'.

*Acer pictum* Thunb. (*A. vultratum* Wall.) *A. cappfidocicum* Gled var *indicum* (Pax) Rehder. Lobes of leaves 5—7', a brighter green than the last. 5,000'—10,000' from Trans-Indus to Japan.

## DODONAEA.

*Dodonaea viscosa* (L.) Jacq.—*Sanatta* is very common in the sub-Himalayan tract from about 2,000' to 4,000'. It is a pioneer on a many rocky slopes and is often the commonest plant on badly eroded hillsides. It is much appreciated as a firewood. Used for hedges in places where there is little water.

## HIPPOCASTANACEAE.

## AESCULUS.

*Aesculus indica* Colebr.—*Ban;Khor*. Common in moist places in the forest often with *Acer caesium*. It is much lopped for fodder. 4,000'—10,000'.

## STAPHYLEACEAE.

## STAPHYLEA.

*Staphylea emodi* Wall.—*Chitra, nagdawn*. Found in forest undergrowth and moist shady ravines, flowering from April-May. 6,000—9,000'. Murree, Changla.

## SABIACEAE.

## MELIOSMA.

*Meliosma pungens* Wall.—Poonch, Hazara, 3,000'—7,000'. Indus east (Parker).

## ANACARDIACEAE

## RHUS

*Rhus continus* L. (*R. coggyria* Scop.)—Leaves simple; growing in open, sunny places from 3,000'—7,000' "*Smoke bush*". *Bhan, tung*.

*Rhus chinensis* Miller (*R. semialata* Murr.) Indus east 3,000'—7,000' (Parker) Gharial, Kuldanna, etc.

*Rhus punjabensis* Stewart ex Brandis *Tatri* Indus east 4,000'—8,000', moist ravines. Murree, Gharial.

## Key

Leave simple	..	<i>R. Cotinur</i>
Leaves pinnate		
Rachis winged; leaflets toothed	..	<i>R. chinensis</i>
Rachis not winged; leaflets mostly entire, panicles terminal		<i>R. punjabensis</i> .

## MANGIFERA.

*Mangifera indica* L. The *amb* or mango is occasionally planted out, is not common in the district.

## LANNEA (ODINA)

*Lannea coromandelica* (Houtt.) Merr.—(*L. grandis* Engl.; *odina woodier* Roxb.)—Fairly common in the foothill zone from 2,000'—4,000', often with *Olea*. Twigs are large and leafless until well into the hot weather.

## PISTACIA

*Pistacia integerrima* Stewart ex Brandis *Kakkur, knagar, kakarsingi*. Common from 2,000'—5,000'. The pinnate leaves are red when new and large galls form on the inflorescence.

## SCHINUS

*Schinus molle* L.—The false pepper tree from Mexico and Chile is often cultivated in the plains as it stands dry conditions.

## CORIARIACEAE

*Coriaria nepalensis* Wall.—*Kalan, bael* is usually a dwarf pioneer shrub on rocks and bare places about Murree but becomes a tree in Mussoorie. The blue berries are purgative and harmful if too many are eaten. 3,000'—7,000' Indus east (Parker).

## MORINGACEAE

## MORINGA

*Moringa pterygosperma* Gaertn. (*M. oleifera* Lam.)—*Sohanju, soujnna* or Horse radish tree is planted occasionally in Rawalpindi.

## LEGUMINOSAE

## PAILPIONATAE

## ARGYROLOBIUM

*Argyrolobium flaccidum* Jaub and Spach—A prostrate herb with yellow flowers in grass from the plains to Murree. The form growing in gravelly places about Pindi, Margalla and Wah which is smaller, with narrower leaflets which are whiter and more silky should perhaps be called Var. *lanceolata*.

*Argyrolobium roseum* J. & S.—A pioneer on gravel slides and dry places—has red instead of yellow flowers. It grows at Riwat; Saidpur, above Kohala; Abbottabad, etc.

## LOTONONIS

*Lotononis lebordea* Benth.—A dwarf prostrate annual with small pale yellow flowers. Campbellpur, Attock, Peshawar.

## CROTOLARIA

*Crotolaria burhia* Ham.—A sand and desert plant flowering in the cold season. Campbellpur, Salt Range, Pabbi Hills, etc.

*Crotolaria mysorensis* Roth—A densely silky annual, 6—9 flowers in a raceme, pod twice as long as the calyx, Wah (Stokoe); Bani (Conventry), Ghora Gali (R. R. S.) Flowers. In autumn.

*Crotolaria albida* Heyne ?—Jhelum Valley Road.

*Crotolaria ferruginea* Grah.—Mansera in Hazara.

*Crotolaria sericea* Retz. (*C. Retzii* Hitchcock)—Aitchison's 297 Pindi Oct. 1871.

*Crotolaria juncea* L.—*Sunn* makes good rope and is occasionally cult.

*Crotolaria medicaginea* Lamk.—A common weedy, dwarf spring perennial. A vigorous form has been separated as var. *luxurians*.

#### TRIFOLIUM

*Trifolium resupinatum* L.—*Shaftal* is sometimes cultivated up to 4,000'. Common about Hasan Abdal

*Trifolium alexandrinum* *berseem*, Egyptian clover is also cultivated but not frequently.

*Trifolium repens* L.—Fairly common from 4,000'—9,000' Flowers white, plants trailing.

*Trifolium pratense* L.—Red clover is sometimes found at Murree.

#### TRIGONELLA

*Trigonella foenum-graecum* L.—*Methi*, fenugreek is cultivated in the plains and lower hills. It is strong scented.

*Trigonella incisa* Benth. (*T. polycerata* auctt.)—A common spring annual in the plains, usually prostrate. Note the net work on the pods.

*Trigonella gracilis* Benth.—4,000'—9,000'. The small yellow flowers are on filiform pedicels and the peduncle has an awnlike tip.

*Trigonella pubescens* Edgew. and Baker—4,000'—9,000'. Distinguished by its pubescence. The pods are straight and the flowers are few and umbellate.

#### MELILOTUS

*Melilotus indica* (L) All. (*M. parviflora*).—Yellow flowered and very common in the plains, wild and cult. Flowers. March May. *Sinji*.

*Melilotus alba* Lamk.—Sweet Clover. *dak sinja*. Flos. white. Occasional in Pindi.

*Melilotus corylifolia* L.—Reported by Aitchison from Rawalpindi. Probably a stray.

#### MEDICAGO

*Medicago lupulina* L.—Common weed in the plains and hills. Pod 1/12 in finally black.

*Medicago aschersoniana* Urban (*M. laciniata* All.)—A very common, prostrate spring weed from the Punjab to Ethiopia. The fruits are round spiny balls.

*Medicago minima* Lamk.—Much like the last but more downy, not common in the plains, usually growing from 2,500'—5,000'.

*Medicago denticulata* Willd.—*Devil's ears*, *maina* is one of the earliest and most abundant plains weeds. Gathered by the poor for sag. Plains to 4,000'.

*Medicago falcata* L.—Yellow lucerne is reported from Pindi by Aitchison. Probably a stray.

#### LOTUS

*Lotus corniculatus* L.—Throughout the district and good fodder. The flowers are yellow and there are five leaflets, the lowest pair resembling big stipules.

## CYAMOPSIS

*Cyamopsis psoralioides* L.—Gwara cultivated in the plains.

## CAJANUS

*Cajanus cajan* (L.)—Mills. (*C. indious* Spreng.). Arhar Cult. in the plains.

## INDIGOFERA

*Indigofera linifolia* (L.f.) Retz.—A common dwarf tropical weed of the plains. The flowers are minute, redish, the leaves linear, the pods minute, one seeded, globose.

*Indigofera cordifolia* Heyne—A small monsoon weed in the plains in gravelly soil; corolla red, flowers in dense sessile heads, leaves hairy, orbicular.

*Indigofera echinata* Willd.—Reported by Aitchison as having been found in Gujar Khan in June.

*Indigofera hirsuta* L.—Haripur, Hazara.

*Indigofera trita* L.—An undershrub found at Tret by Conventry; racemes 6—12 flowers pods deflexed,  $3/4" \times 1 \frac{1}{4}"$  long, flowers purplish red.

*Indigofera gerardiana* Wall.—A common shrub in the Murree Hills up to perhaps 9,000'. Flowers pink.

*Indigofera gerardiana* Wall. var. *heterantha* Baker.—Much like the last but all parts smaller, perhaps due to ecological reasons as it grows in drier places. The pods are about 6" long and deflexed.

*Indigofera hebetata* Benth.—6,000'—9,000'; a shrub much like the last but more mesophytic and with larger leaflets. The bracts of the flowers are boat shaped.

*Indigofera pulchella* Roxb sensu lat.—Saidpur and Abbottabad Hills and beautiful sight when in full bloom in March and April when the old leaves have fallen. A good sized shrub.

*Indigofera anabaptista* Steud.—Topi Park, Rawalpindi in September in gravelly soil. It is a small herb bearing an umbel of flat pods.

## TEPHROSIA

*Tephrosia tenuis* Wall.—A miniature dwarf annual with linear leaves and pods, after the rains in the plains.

*Tephrosia Hamiltonii* J. K. Drum.—A small shrub. Jhelum District and Pabbi Hills.

*Tephrosia purpurea* Pers.—Reported from Rawalpindi by Aitchison.

## SEASBANIA

*Sesbania aegyptiaca* Poir, (*S. sesban* (L.) Merrill) a small soft wooded shrub, cult., rarely self sown. There are two varieties one with yellow and the other maroon and red flowers. *Jaint*.

*Sesbania aculeata* Pers.—var. *elatior* Prain *Jaint, jantri*. A large shrub like annual growing to 10' high with long slender pods, round in cross section. Plains and lower hills.

## AESCHYNOMENE

*Aeschynomene indica* L.—A plant of wet places, edges of rice fields and the like, Flowers yellow, leaflets many.

## GULDENSTAEDTIA

*Guldenstaedtia mirpunbnsis* Benth. A rare spring herb suggesting *Astragalus hippocrepidis* with blue purple flowers and a shorter keel. Rawalpindi, Sadiqpur. Abbottabad.

## ASTRAGALUS

*Astragalus subumbellatus* Kl. (*A. hippocrepidis* Fl. Brit. Ind.)— A spring herb in the plains and up to 5,000' in dry places. It is prostrate and the flowers are pink when young darkening to blue purple. The flowers are often larger than they are in Kashmir.

*Astragalus Amherstianus* Benth.—Pipe Line, Murree Dhobi Ghat. Much like the last but the flowers are much smaller, little longer than the calyx lobes and the leaves more silky white.

*Astragalus aichisoni* Baker—Dry places in Rawalpindi and Attock. The flowers are small, white with purple tips and the pods are 1 1/2" long and only 1/24" wide.

*Astragalus tributoides* Delile—Another prostrate spring herb. The flowers are pale yellow or cream with a little blue, the densely pubescent pods are 3/8" long, sessile and closely aggregated. From the Punjab west to the Canary Islands.

*Astragalus hosackioides* Benth.—Flowers yellow: in chir forest, Bani and Charchan (Conventry) Ghora Gali (Hamid).

*Astragalus leucocephalus* Grah.—Foothill zone to 6,500' in the Murree Hills, flowers nearly white in open gravelly places, flowering in the spring.

*Astragalus chlorostachys* Lindl.—An erect, perennial herb with pale green flower tinged with lilac, growing in the Murree Hills from perhaps 4,000' to 9,00', also in Abbottabad.

*Astragalus longicaulis*—Baker? Pipe Line flowers denser and tinged with pink.

*Astragalus graveolens* Ham. A large perennial herb with yellow flowers and large stipules blooming in April and May in Abbottabad and below Murree.

*Astragalus pyrrolitricus* Boiss.—"Low hills west of the Jhelum 2,000'—6,000'" near Hazre, Abbottabad and Peshawar. The leaves are radical and the flowers yellow.

*Astragalus psilocentros*—Fisch. A thorny xerophytic undershrub with yellow flowers from rocky places in the plains to 7000'.

## TAVERNIERA

*Taverniera nummularia* Baker—Locally common as a small undershrub in dry rocky places in the plains and lower hills. The flowers are a fine reddish pink. The types of this species were collected by Aitchison in Rawalpindi District.

## ONOBRYCHIS

*Onobrychis stewartii* Baker—A small xerophytic perennial blooming in April in the same region as the last with pink flowers streaked with darker. The pinnae are small and rather distant, the pods are easily recognized by peculiar outgrowths.

## ALHAGI

*Alhagi camelorum* Fisch.—I have not seen this small shrub in Rawalpindi but it grows in Jhelum, the Salt Range and Peshawar and may be expected.

## LESPEDEZA

*Lespedeza elegans* Camb.—Gharial, Murree Hills. This dwarf shrub closely resembles *L. variegata* but the leaves are more obovate and the pubescence is more velvety or villous and less oppressed; the ribs on the calyx are lacking and the calyx hairs more spreading. The leaves are larger.

*Lespedeza variegata* Camb.—Murree and Changla. A small undershrub on rock banks.

*Lespedeza sericea* (Thunb.) Miq.—Very common in exposed situations in grassy forest undergrowth from 2,000'—8,000'. It is much like the last but the leaflets are cuneate.

*Lespedeza sericea* Miq.—var. *hispidula* Franch. Jhicca Gali, 7,000'.

Note—The U. S. Dept. of Agriculture is cultivating these *Lespedezas* as they are hardy, good for fodder and have proved useful in enriching depleted soils in the Southern States.

*Lespedeza falconeri* Prain—(*L. eriocarpa* var. *Falconeri* Prain). The types were collected by Fleming in the Murree Hills. A small shrub but larger than those already listed growing on rocks in Ghora Gali, the Pipe Line, Changla, etc. Note the mottling of the leaves. Flowers after the rains.

*Lespedeza floribunda* Bunge—Reported by Fleming from the Murree Hills 30th August 1851. I have collected it several times between Domel and Uriin Kashmir.

## ARACHIS

*Arach hypogoes* L.—Mung phali is sometimes cult in the plains.

## DESMODIUM

*Desmodium tiliaefolium* G. Don—*Chamkat, chamra*. A small or good sized shrub, very common in open forest and shrubby places from 3,000' or 4,000'—9,000': Abbottabad and throughout the Murree Hills.

*Desmodium podocarpum* D. C.—Murree near Lawrence College.

*Desmodium gangeticum* (L.) D. C.—In the plains and up the 6,000' at Ghora Gali. There are two types, one with large and the other with small leaves which Parker thinks may be due to ecological conditions. The large leaves form grows in Saidpur.

*Desmodium motorium* (Houtt.)—Merrill (gyrans D. C.) I have only found this at Ghora Gali in October and in Hazara.

*Desmodium concinnum* D. C.—Batrasi, Hazara District.

*Desmodium triflorum* (L.) D. C.—Morga near Rawalpindi at the close of the rains.

## ALYSICARPUS

*Alysicarpus vaginalis* (L.) D. C.—Near Rawalpindi in September.

*Alysicarpus bupleurifolius* D. C.—Also found about Rawalpindi in September. The pods fewer joints than in the last.

## LENS

*Lens esculenta* Moench—*Masur* or *masoori* is commonly cult. in the plains and lower hills and is occasionally self sown. The flowers are pale blue and darker at the tips and there are two seeds in each pod. The pods are flatter than in *Cicer*.

## CICER

*Cicer arietinum* L.—*Chana* or *gram* may be planted in the same field as *Lens*. The plants are erect and the flowers pinky purple. The seeds are often eaten raw. February to April.

## VICIA

*Vicia hirsuta* (L.)—Koch. An early spring field weed from the plains to Murree. The flowers are pale lavender, the ripe pods black and two seeded, 1/4" to 3/8" long.

*Vicia pallida* Turcz.—Murree fide Drummond also Poonch and Kashmir.

*Vicia tetrasperma* (L.)—Moench Reported from Murree at 6,000'.

*Vicia griffithii* Baker.—A small spring weed in the plains with pink flowers wens turning purple with age and more than one flower per peduncle.

*Vicia sativa* L.—A common purple flowered weed in grain fields in the plains and hills in early spring. The flowers are single and the pod is erect.

*Vicia sativa* L.—var *angustiflora* (Roth) Baker.—The variety is more slender with narrower leaflets, the lower being emarginate. Hasan Abdal, Abbottabad, Rawalpindi.

*Vicia narbonensis* L.—A spring weed in the plains. Possibly the parent of the next species.

*Vicia faba* L.—*Bakla*. Occasionally cult.

## LATHYRUS

*Lathyrus aphaca* L.—A common, yellow flowered, spring weed in the plains and lower Hills with remarkable stipules serving as leaves.

*Lathyrus sativus* L.—Another widely distributed spring weed. The stems are winged, there are two linear leaflets, flowers blue and single and pods, 1 1/2" by 1/2" broad.

*Lathyrus sphaecius* Retz.—Similar to the last but the flowers are red or vermilion. Rawalpindi and Abbottabad.

*Lathyrus inconspicus* L.—Similar to the last but with small lilac flowers and narrow leaflets, the plant suggesting *Tephrosia tenuis*. Rawalpindi, Murree, Poonch.

*Lathyrus pratensis* L.—Flowers yellow. Murree Hills.

## PISUM

*Pisum arvense* L.—*Desi Mattar* with 2- 4 leaflets and compressed, marbled seeds is planted.

*Pisum sativum* L.—The common cult. pea has 4- 6 leaflets and round seeds, uniform in colour.

## DUMASIA

*Dumasia villosa* D. C.—A vine, densely clothed with grey or rusty hairs, corolla yellow or purplish (Fl. Brit. Ind.) Near Abbottabad and Ghora Gali.

## GLYCINE.

*Glycine max* (L.)—Merrill (*G. Soja* Sieb and Zucc.) The soybean is sometimes cult. Because of the many uses for its seeds and as a source of nitrogen the use of this plant should be encouraged.

## ERYTHRINA

*Erythrina suberosa* Roxb.—*Dhauldhak*, the *Coral tree*, is rare in the foothill, zone, flowering in April. Saidpur Hills.

## BUTEA.

*Butea frondosa* Roxb.—*Dhak*, *palus*, *chichra* with handsome orange flowers, blooms in March and April and like the last is occasional in our area.

## PUERARIA.

*Pueraria tuberosa* D. C.—This large vine with enormous tubers is like the last two near the western edge of its range. It flowers in the winter when there are no leaves. Flowers blue.

## PHASEOLUS.

*Phaseolus lunatus* L.—the lima bean; *P. vulgaris* L, the 'French bean' and *P. multiflorus* Willd., the 'Scarlet runner' are all cult. Also *P. aureus* Hoxb. *urd* or black gram and *P. radiatus* L. *mung*.

*Phaseolus aconitifolius* Jacq.—*Moth* with its peculiarly shaped leaves is raised for fodder in the plains in the hot weather.

## VIGNA.

*Vigna sinensis* (L.)—Savi (*V. Catjang* Endl.) *Lobia* has a long peduncle with linear pods at the top.

*Vigna vexillata* (L.)—Benth. is a handsome vine in the chir zone with sweet pea like flowers, pink when young, changing to purple with age as in so many other plants.

## DOLICHOS.

*Dolichos Lablab* L.—*Sem* has flat pods, broad for their length, but more curved and prostrate than in *Phaseolus lunatus*.

## ATYLOSIA

*Atylosia crassa* Prain—(*A. mollis* Benth. or *Cantharospermum molle* Taub.) Rawalpindi to 6,000' and east to the Philippines (Parker). Grows during the rains.

*Atylosia scarabioides* Beth.—(*Cantharospermum scarabioides* (L.) Baill.) Mt. Tilla, Jhelum District; Jammu.

*Atylosia platycarpa* Benth.—A weed in chari fields in the summer near Rawalpindi; pods flat, up 2" long by 1/2" wide.

## CAJANUS

*Cajanus indicus* Spreng.—(*C. cajan* (L.) Millsp.) *Arhar*, the pigeon is an erect shrub cult. in the rains throughout the tropics.

## RHYNCHOSIA.

*Rhynchosia capitata* D. C.—(*R. aurea* Fl. Brit. Ind.) Common in the plains during the monsoon, prostrate, pods flat, two seeded.



*Rhynchosia pseudo-cajan* Camb.—A small, erect, hoary shrub with yellow flowers in chir forest or a on grassy hillsides. Tret and above, Abbottabad.

*Rhynchosia nima* D. C.—A common monsoon climber in the plains and lower hills; widespread in the tropics.

*Rhynchosia himalensis* Benth.—Murree fide Bamber.

#### FLEMINGIA.

*Flemingia fruticulosa* Wall.—Foothill zone to 9,000' in pine forest, forest blanks and grassy undergrowth. Note the interesting bracts which are persistent and cover flowers and fruit.

*Flemingia semialata* Roxb.—(*F. congesta* Fl. Brit. Ind.) Pindi east to China and the Philippines Ceylon (Parker).

#### ROBINIA

*Robinia pseudacacia* L.—The American locust is sometimes planted in Rawalpindi and has become naturalized in Kashmir.

#### DALBERGIA

*Dalbergia sissoo* Roxb.—*Shisham* or *tali* is the most useful tree in the Punjab plains and is both wild and cult. to 4,000'. It colonizes ravines in the loess if given an opportunity. It is excellent for firewood, furniture and for shade and in some places can be used for reclaiming bad lands. It is often damaged by *Fomes lucidus*.

#### PONGAMIA

*Pongamia glabra* Vent.—(*P. pinnata* (L.) Merrill). *Sukh chain* is not native in the north-east of the Province through it is cult. east to Rawalpindi (Parker).

#### SOPHORA

*Sophora mollis* Grah.—Trans Indus to Nepal on open hot slopes to 6,000'; flowering Mar.-May (Parker). Rawalpindi (Aitchison).

*Sophora griffithii* Stocks—Grows in patches by the Grand Trunk Road beyond Taxila with flowers in March and April. It is a plant of the Salt Range and Trans Indus. (Parker).

#### WISTARIA.

*Wistaria sinensis* D. C.—This large, beautiful climber is cult. in Rawalpindi, Murree and Abbottabad.

### CAESALPINOIDEAE

#### CAESALPINIA

*Caesalpinia decapetala* (Roth)—Merrill (*C. sepiaria* Roxb.)—*Uri* is a large, prickly vine making impenetrable hedges in the foothill zone. The flowers are yellow and the pods smooth. It is distributed from India to China and Japan.

#### PARKINSONIA

*Parkinsonia aculeata* L.—This a spiny, yellow flowered native of tropical America which like *Prosopis juliflora*, has been introduced to plant in desert situations where little else will grow. The pinnae are very small and very numerous and the rachis is flat and green.

## CASSIA

*Cassia fistula* L.—The *amaltas* is common from the Indus east up to 4,000', wild in the foothills and planted in Rawalpindi. The leaves are not eaten by cattle or goats and the seeds are purgative. One of the most decorative trees in our area.

*Cassia occidentalis* L.—Waste places about Rawalpindi.

*Cassia tora* L.—A widespread tropical weed. Hasan Abdal.

*Cassia dimidiata* Roxb.—A diminutive monsoon plant with only four or five stamens. Ghora Gali in pine forest in October and Murree.

*Cassia pumila* Lamk.—Another dwarf monsoon plant, prostrate near pond and only found once in October beside the Murree road at about 2,500'.

*Cassia mimosoides* L.—Reported from Barakao by Aitchison. Another cosmopolitan tropical weed.

*Cassia didymobotrya* Fresen.—A cult. shrub blooming in the winter in Rawalpindi.

*Cassia sophera* L.—Cult. in Rawalpindi.

## BAUHINIA.

*Bauhinia purpurea* L.—Indus east to 4,000' (Parker), Flowers in the autumn white to deep rosy purple. Planted in Rawalpindi.

*Bauhinia variegata* L.—*Kachnar* or *kaliar* is fairly common in the foothill zone and blooms in the spring. The trees are handsome when covered with the white and purplish flowers. The young flower buds are cooked and eaten.

*Bauhinia retusa* Roxb.—Found in the Jowlian Reserve near Taxila vide Parker. Usually much further east.

*Bauhinia Vahlia* Wight. and Arn.—Many years ago I found one plant of this huge creeper at Tret.

## MIMOSOIDEAE

*Mimosa pudica* L.—The "Sensitive Plant" is occasionally planted.

*Mimosa himalayana* Gamble—(*M. rubicaulis* of Fl. Brit. Ind.) This prickly shrub has pods which break up into units as in *Desmodium*. The flowers are pink and it grows on the outer ranges from Afghanistan to Asam. *Ral.*

## ACACIA

*Acacia arabica* Willd.—(*A. nilotica* (L.) Delile). Usually about villages and along roads, not indigenous in Rawalpindi. It stands alkali and kankar better than most trees. *Kikar*.

*Acacia farnesiana* Willd.—*Kabuli kikar*. A large shrub or small tree, often planted in hedges. The flowers are strongly scented and bloom in the cold weather.

*Acacia catechu* Willd.—*Klair*. Grows in the scrub forest to 3,000' or 4,000'. It is said to be better than "phulahi" but more damaged by frost. The source of *Katha*.

*Acacia modesta* Wall.—*Phulahi*. One of the commonest trees in the district and, with olive, and important constituent of the scrub forest to 4,000'. The flowers are in creamy white racemes not in round balls. It makes a strong hedge and the wood is hard and much used for firewood.

*Acacia hydaspica* J. R. Drums.—A shrub, often common on the rocky, dry, outer hills, fruiting in April and ascending to 3,000' or 4,000'.

*Acacia eburnea* Willd.—Reported by Aitchison and Parker. I have not found any in the district.

#### PROSOPIS

*Prosopis juliflora* D. C.—The American "mesquite" is being used for reclamation purposes and as a roadside tree in dry places.

*Prosopis glandulosa*.

#### ALBIZZIA

*Albizzia chinensis* (Osbeck)—Merrill, (*A. stipulata* Boiv.) *Ohi* is found from the Indus east up to 4,000' (Parker). The flowers are yellowish white.

*Albizzia julibrissin* Dur.—Indus east to 6,000' (Parker). The flowers are pink and are in bloom from April to June. I have not noticed any in the Murree Hills.

*Albizzia odoratissima* Benth.—Indus east to 3,000'. I have only found it growing on cliffs by the Murree Road at about 2,500'.

*Albizzia lebbek*, Benth.—*Suarin* or *siris* is planted everywhere in villages and up to 4,000' as a roadside tree and in compounds. The straw coloured large, flat pods hang on for months. The balls of greenish yellow flowers, with long stamens cover the tree in April and May.

*Albizzia procera* Benth.—The white *siris* is occasionally planted in the Punjab as far west as the Indus (Parker). Hasan Abdal.

#### ROSACEAE

*Prunus cerasioides* D. Don.—Indus east, 2,000'—3,000' (Parker). Flowers in October and November. Not seen in the area.

*Prunus persica* Stokes—*Aru* or peach is about the first tree to bloom at the end of February in Rawalpindi. The flowers are pink and the plant is planted up to 10,000'.

*Prunus armeniaca* L.—*Hari* or *Khurmani*, the apricot tree with beautiful pinky white flowers is planted in the plains and up to 12,000' on the Upper Indus.

*Prunus bokhariensis* Royle ex Schn.—(*P. cerasifera* Ehr.) *Aloocha* or *alu bokhara*. Plums are commonly cult. in the plains and mountains and several varieties are abundant in the Rawalpindi bazaar.

*Prunus communis* Huds.—Reported from Rawalpindi by Sabnis.

*Prunus Prunus cornuta* Steud.—*Kalakat* is a large tree, common in deciduous forest with *Acer caesiolum* and *Aesculus*. In Murree in the summer the leaves are spotted yellow with some fungus.

#### PRINSEPIA

*Prinsepia utilis* Royle—2,000'—9,000'. Indus east (Parker), *Bekhal* or *bakal* a thorny bush with white flowers in April and May, is common in Abbotabad and in Poonch but I have not noticed it in Murree. It is called "phulwara" at Kakul.

## SORBARIA

*Sorbaria tomentosa* (Lindl.) Rehder (*Spiraea Lindleyana* Wall). Flos. June to August and found from 4,000'—11,000'. I have only found it in the Murree Hills from Dunga Gali to Baghnotar. The leaves are pinnate, not simple as in *Spiraea*.

## SPIRAEA

*Spiraea vacciniifolia* D. Don Common in the Murree Hills on dry sunny hillsides from 4,000'—9,000'. Leaves pubescent, flos. white

*Spiraea hypericifolia* L. Sarban Cave, near Abbottabad at about 5,000'. Leaves small oblanceolate. Rare.

*Spiraea cantoniensis* Lour. Cult. in gardens.

## RUBUS

*Rubus paniculatus* Smith. The leaves on this strong climber are undivided and snowy below. 3,000'—6,000' (Parker.)

*Rubus ellipticus* Smith *Akhe*. *Garacha* is fairly common in the chir zone from 3,000'—6,000'. It is covered with red bristles and bears rusty brown hairs.

*Rubus micilentus* Camb. The flos. are white, leaflets three and glabrous below. 5,000'—9,000' Murree, Changla, etc.

*Rubus biflorus* Ham. The flos. are white, leaflets three, but white below. Indus east 7,000'—9,000' (Parker).

*Rubus fruticosus* L. Found at lower elevations than its relatives. growing in hedgerows from 2,000'—6,000' Saidpur, Wah, Hasan Abdal, Abbottabad, Murree, etc.

*Rubus gracilis* Roxb. (*R. niveus* Wall.) Leaflets three, white below but flowers pink and fruits red. 6,000'—10,000' Murree, Changla.

*Rubus niveus* Thunb. (*R. usiocarpus* Smith). Leaves pinnate, leaflets 5-11, white below. Fruits black. Common. 4,000'—10,000'. The species of *Rubus* are often called *anchu* or *dhak*.

## GEUM

*Geum urbicum* L. Common in the hills from 4,000'—9,000' with yellow flowers and distinctive hooks on the fruitlets.

## FRAGARIA

*Fragaria indica* Andr. (*Duchesnea indica* Andr.) Focke. The yellow flowered strawberry is common in shady places above 4,000'. The attractive red berries are tasteless.

*Fragaria vesca* L. Wild and occasionally cult. The wild plants are usually found above 4,000'. The flos. are white.

## POTENTILLA

*Potentilla sibbaldi* Haller (*Sibbaldia procumbens* L.) Mokhshpuri, 9,000'—10,000'.

*Potentilla sericophylla* Parker. A dwarf shrub related to *P. fruticosa* growing on rocky ridges with white flos. in May and June. Khaira Gali, Changla and Dunga Gali.

*Potentilla gerardiana* Lindl. (*P. fragarioides* in Fl. Brit. Ind.) A plant of dry hillsides and rather small yellow flos. Abbottabad, common in Kashmir.

*Potentilla supina* L. A small annual growing in ditches and damp soil in the spring from the plains to 8,000'. The leaves are pinnate and the flos. inconspicuous.

*Potentilla nepalensis* Hk. Easily recognized by its five leaflets together with fine reddish pink flos. usually above 6,000'.

#### AGRIMONIA.

*Agrimonia eupatoria* L.—Murree and Changla in the summer. very hairy; flowers yellow and leaves interruptedly pinnate.

#### ROSA.

*Rosa macrophylla* Lindl. including *R. Saundersiae* Rolfe *Tarni ban gulab* is common in forest undergrowth from 6,000'—11,000'. The flowers are pale to, a fine pink.

*Rosa moschata*, J. Herrm.—A very large white flowered climbing rose common from 4,000'—8,000'.

In addition to these two wild roses there are many cult. forms.

#### MALUS.

*Malus pumila* Mill. (*Pyrus Malus* auctt.) *Seb* or *seo*, the apple is commonly cult. usually above 4,000'

#### PYRUS

*Pyrus sinensis* Lindl. (*P. Lindleyi* Rehder) *Nak* or sand pear is cultivated from the plains to 6,000'.

*Pyrus communis*, L.—The *nashpati* or common pear does not do well in the plains but is much cultivated in the Murree Hills.

*Pyrus pashia*, Ham—The *batangi* or Medlar is very common in the Murree Hills and is sometimes found down to about 3,000'. According to Schneider our form is *var. himalaica*.

*Pyrus lanata*, D. Don—*Doda* with leaves white below is sometimes found in shady forest in Murree, Nathia Gali and Changla.

#### CRATAEGUS

*Crataegus monogyna* Jacq—(*C. oxyacantha* of Fl. Brit. Ind.) *Gwa budla* or *bat sangli*, the hawthorn, is fairly common in the Murree Hills from 4,000'—9,000'. The red fruits are decorative when ripe.

#### COTONEASTER.

*Cotoneaster rosea* Edgew.—*Dunga Gali* and *Thandiani*. A large shrub with pink flowers, glabrous pedicels and often only one fruit per inflorescence ripens.

*Cotoneaster integerrima* Medik.—*Nathia Gali* (Parker) A plant usually found from 8,000'—12,000.

*Cotoneaster microphylla* Wall,—A prostrate shrub making a dense network over rocks. The leaves are small, revolute and coriaceous and the fruit

are red. Our form is probably var. *thymifolia* (Baker) Kochne. 4,000'—12,000'.

*Cotoneaster bacillaris* Wall—*L. uni* or *rauns* is our largest and most common species. The wood is very strong and is much used for walking sticks. It often grows with *Viburnum* and *Lonicera*. 4,000'—10,000'.

*Cotoneaster lindleyi* Steud.—Abbottabad, Sarban; Uri, Kashmir. To be expected in Murree.

#### ERIOBOTRYA

*Eriobotrya japonica*, Lindl.—The loquat is much cultivated in the plains and up to 4,000'.

#### SAXIFRAGACEAE.

##### ASTILBE

*Astilbe rivularis* Ham.—A large herb with much divided leaves in forest. Changla and the Pipe Line.

##### SAXIFRAGA

*Saxifraga ciliata* Royle—(*Bergenia ligulata* var *ciliata* Engler) *Zakhum hayat*, often mistakenly called Rock Begonia. Gregarious on cliffs with *Gerbera*, *Wulfenia* and *Aster molliusculus*, the leaves becoming very large by August. The pink flowers are handsome in the spring. Usually above 5,000'.

*Saxifraga ligulata* Wall —(*Bergenia ligulata* Engler) Changla Gali. The leaves are larger and more glabrous than in the last, less cordate and with longer petioles.

##### PARNASSIA.

*Parnassia affinis* Hk. f. & T.—A small, white flowered Grass of Parnassus, Ghora Gali ; Changla.

##### DEUTZIA.

*Deutzia staminea* R. Br.—A Spiraea like shrub with handsome white flowers on banks in the open or at the edge of forest, 4,000'—9,000'.

##### RIBES.

*Ribes rubrum*. L. var *nigrum*.—Black Currant. A plant of moist forest undergrowth, usually from 8,000'—12,000'. The fruits ripen in June and July. Should this be called *R. himalense* Dene ?

#### ESCALLONIACEAE

##### ITEA

*Itea nutans* Royle.—A tree occasionally found in the Sub-Himalayan zone and up to 6,000'. Tret, Charra Pani. The foliage is something like that in *Ehretia acuminata*.

#### CRASSULACEAE

##### TILLAEA.

*Tillaea pentandra* Royle.—A small monsoon annual on rocks and push-tas. Murree.

##### SEDUM

*Sedum adenotrichum* Edgew.—A plant of rock crevices and push-tas with glandular, pointed, pinkish petals 4,000'—8,000'.

*Sedum pallidum*, M. Bieb.—An ephemeral, dwarf species with white flowers on limestone at Wah, Hasan Abdal and Abbottabad in March and April.

*Sedum ewersii* Ledeb. —Pipe Line and Changla on rocks in the sun with pretty pink flowers and broadly elliptic leaves.

### HAMAMELIDACEAE

#### PARROTTIA.

*Parrotia jacquemontiana*, Dene —(Parrotiopsis Jacquemontiana (Dene) Rehder) *Paser* is a large gregarious shrub. Murree, Patriata.

### COMBRETACEAE

#### TERMINALIA.

*Terminalia belerica* Roxb.—*Bahera* is a large handsome tropical tree with large elliptic leaves and an almond like fruit. Panjar to the Jhelum River, Rawalpindi District east to Malaya, Ceylon.

*Terminalia arjuna* W. & A. —*Arjan* a native of Central India is planted in Rawalpindi. It has a light coloured bark and angled fruits.

#### COMBRETUM.

*Combretum nanum*, Ham.—Massar Reserve, Hazara only. (Parker) A plant of the undergrowth in chir forests and on fire lines.

#### QUISQUALIS.

*Quisqualis indica* L.—A large handsome creeper with pink flowers. Cult. in the plains.

### MYRTACEAE.

#### EUGENIA.

*Eugenia cumini* (L.) Druce—(*E. jambolana* Lamk.) *Jaman* is cult. in the plains.

#### MYRTUS.

*Myrtus communis*, L.—A cult. shrub with fine white flowers and opposite leaves which are pellucid punctate. Strongly scented.

#### PSIDIUM.

*Psidium guajava* L.—*Amrud*, the guva, which is indigenous to Mexico is cult. in the plains.

#### CALLISTEMON.

*Callistemon viminalis* Cheel.—The 'bottle brush' is also commonly cult. in the plains.

#### EUCALYPTUS.

*Eucalyptus citriodora* Hk. and *tereticornis* Sm. and possibly other eucalypts are planted in the plains and lower hills.

### LYTHRACEAE.

#### PUNICA.

*Punica granatum* L.—*Anar*, *daruna*, *daruni*, the pomegranate, is cult. in the plains and grows wild up to 7,000' in Murree, bearing beautiful reddish flowers.

#### WOODFORDIA.

*Woodfordia fruticosa* (L.) S. Kurz.—(*W. floribunda* Salisb.) *Dhavi*. A common shrub in the sub-Himalayan zone, often on cliffs with striking, brickly red flos. in the spring which provided a red dye. Widespread in the tropics from N. Pakistan to Malaya, Sumatra and Trop. Africa.

## LAGERSTROEMIA.

*Lagerstroemia indica* L.—The Crepe Myrtle is cult. in Rawalpindi and Abbottabad.

## LAWSONIA.

*Lawsonia inermis* L.—*Mehndi* or *henna* is also cult.

## AMMANIA.

*Ammania baccifera*, L.—Jhelum, Lahore. Widespread in the tropics

## ONAGRACEAE.

## EPILOBIUM.

*Epilobium hirsutum*, L.—A tall 'willow herb' with rosy flos. growing in wet soil. Wah, Abbottabad.

*Epilobium royleanum* Haussk.—Ghora Gali.

*Epilobium brevifolium* Don.—Muree.

## CIRCAEA.

*Circaea cordata* Royle.—A shade plant on the Pipe Line and Changla Gali.

*Circaea alpina*, L. var. *himalaica*.—A smaller species, also found in shade at Changla Gali in September.

## HARTMANNIA.

*Hartmannia rosea*, G. Don.—Very common in Muree and Abbottabad with pretty pink flos. and often mistaken for an Epilobium. An introduced American weed.

## OENOTHERA.

*Oenothera biennis* the Evening Primrose is commonly cult. in Muree and specimens are now found self sown.

## CACTACEAE.

## OPUNTIA.

*Opuntia dillenii* Haw.—Commonly used as a hedge plant. The flos. are yellow and the phylloclades are glaucous.

*Opuntia monacantha* Haw.—Much like the last but the phylloclades are grass green in colour. Saidpur, Hasan Abdal.

## CUCURBITACEAE.

## TRICHOSANTHES.

*Trichosanthes dioica* Roxb.—Only collected at Saidpur at about 2,000'.

## LAGENARIA.

*Lagenaria vulgaris* Ser. (L. *alba* L.)—*Toomba*, "al", or *tori* the Bottle or Calabash gourd is often cult.

## LUFFA.

*Luffa cylindrica* (L.) Roem.—*Ghia tori* or Sponge gourd. Cult. in the summer. The young fruits are eaten.

## MOMORDICA.

*Momordica charantia*, L.—The *karela* is cult. in plains and hills.

*Momordica dioica* Roxb.—A monsoon vine in the plains with small orange, spiny fruits.



## CUCUMIS.

*Cucumis trigonus* Roxb.—A small, prostrate, prickly vine of wide distribution. Hasan Abdal, Rawalpindi (Aitchison).

*Cucumis melo*, L.—*Kharbuza*, the musk melon is cult.

*Cucumis sativus*, L.—Also *khira*, the cucumber.

## CITRULLUS.

*Citrullus colocynthis* Schroder.—*Tumba*, *kaur tumba* is a desert, medicinal vine with a woody root and with a distribution from India to Arabia. A plant of sandy soil in the plains.

*Citrullus vulgaris* Schrader.—*Tarbuз* or water melon. Cult.

*Citrullus vulgaris* var. *fistulosus*.—*Tinde*, *dil pasand*. Cult.

## CUCURBITA.

*Cucurbita pepo* DC., the pumpkin; *C. moschata* Duchesne, and *C. maxima* Duchesne, the common gourd or *halwa kadoo* may be found in gardens.

## MELOTHRIA.

*Melothria heterophylla* Cogn.—(*Zehneria umbellata* Thw) is the only wild cucurbit common in the Murree Hills from 4,000'—7,000'. The leaves are most variable.

## CORALLOCARPUS.

*Corallocarpus epigoea* H.—A monsoon, annual climber about Rawalpindi with a small orange, beaked fruit about 3/8" long.

## BEGONIACEAE.

## BEGONIA.

I have found no begonias in the area but Mr. Coventry told me that he had found one below Murree.

## FICOIDEAE. (AIZOACEAE).

## TRIANTHEMA.

*Trianthema monogyna* L.—(*T. portulacastrum* L.) *Itsit*, a prostrate, weedy plant common in the plains in the hot weather.

*Trianthema pentandra*, L.—Much like the last but having two instead of one style and smaller, more elliptic leaves. A plains plant.

*Trianthema triquetra* Rott. (*T. crystallina* of Fl. Brit. Ind).—Another weedy plant with tiny linear leaves and numerous branches. Rawalpindi, Hazro.

## ORYGIA.

*Orygia decumbens* Forsk.—A desert herb among rocks, Attock, Sangla Hill.

## MOLLUGO.

*Mollugo cerviana* Ser.—A minute herb suggesting *Spergula*, with linear leaves. Jhelum. The Salt Range.

*Mollugo nudicaulis* Lamk.—Another small summer herb with basal leaves, Rawalpindi, and Abbottabad (N. Ali).

*Barakuo* (*Aitchiaon*).—Haripur and Manjera in Hazara.

## UMBELLIFERAE.

## CENTELLA.

*Centella asiatica* (L.) Urb.—(*Hydrocotyle asiatica* L.) *Brahmi buti* is small and prostrate in damp soil in the plains.

## HYDROCOTYLE.

*Hydrocotyle sibthorpiodes* Lam.—Found only once by a pond in Topi Park, Rawalpindi. Leaves small lobed and with stellate pubescence.

## ERYNGIUM.

*Eryngium coeruleum* M. Bieb.—An erect, stiffly branched, prickly umbellifer with a bluish tinge to the foliage. Huripur, Abbottabad and Mansera in Hazara, Peshawar. Jhelum Valley Road.

## SANICULA.

*Sanicula europea* L.—Murree, Changla, Mokhshpuri. A small fruited forest species. According to Walff the form here is *raw elata* (Ham.) Walff.

## BUPLERUM.

*Bupleurum lanceolatum* Wall.—One of the larger species with the middle cauline leaves petioled, ovate or broadly lanceolate. Murree, Kuldanna, Charial, etc., flowering in the rains.

*Bupleurum candollii* Wall ex. DC.—Changla Gali. Leaves broad but not as elliptic as in the last and without petioles, the transverse veins are numerous and distinct; bracts 2 or 3 of different sizes; one fairly large.

*Bupleurum jucundum* Kurz.—Abbottabad, Changla. In this species the leaves become progressively broader from base to inflorescence. The bracts are ovate.

*Bupleurum falcatum* L.—Common from 4,000'—9,000'. Tall, erect, slender with long linear leaves, often falcate; from July to October.

*Bupleurum tenue* Don.—Leaves obtuse but bristle tipped, usually with 5—7 nerves, bracteoles longer than their umbels. When the leaves are held to the light resin is visible in the veinlets. Flowers in the summer, Murree, Ghora Gali, Changla.

*Bupleurum subuniflorum* Boiss.—Much smaller than the other species, filiform and a pioneer on open stony soil. Below Murree toward Kohala, Jhelum Vy. Road, at Barsala, Uri etc. Mansera.

## ERIOCYOLA.

*Eriocycla stewartii* (Dunn) Wolf.—A scented species with small white flowers and finely divided leaves suggesting *Carum* often growing as a pioneer on landslides. Gharial, Murree, Kohala, Abbottabad.

## SCALIGERIA.

*Scaligeria aitchisonii* Wolff.—(*Carum Bulbocastanum* auctt.) Margalla on limestone and may be recognized by its basal corm. Flowers white in April.

*Scaligeria aitchisonii* var. *multiradiata* O. E. S. Common about Abbottabad.

## CARUM.

*Carum aromaticum*—Druce (*C. copticum* Benth). *Ajowain* is cult. in the plains. The leaf segments are nearly filiform, flos. white and seeds pubescent.

## PIMPINELLA

*Pimpinella acuminata* (Edgew.) C.B.C.—Fairly common in rich forest from 6,000—9,000', 3-4', tall glabrous, twice pinnate leaves teeth sharp, pedicels long slender.

*Pimpinella diversifolia* D.C.—Pipe Line below Dhangla Gali. The basal leaves are undivided while the cauline leaves are divided. There is a form growing in the forest with thinner leaves, taller and a deeper green which may be different. Changla.

## CHAEROPHYLLUM

*Chaerophyllum villosum* Wall.—Galis 3rd July 1946, (B. B. Datta) Possibly in Mokhshpuri. Distinguished by a tuberous base and white deflexed hairs on the main stem.

## SCANDIX

*Scandix pecten-veneris* L.—var. *brevirostris* Boiss. A common spring ephemeral in ditches and about cultivation from the plains to Abbottabad and Murree.

## SESELI

*Seseli indicum* W. & A. *Ban joan* Kahuta fide Bamber.

## FOENICULUM

*Foeniculum vulgare* Gaertn.—Saunf Cult.

## OENANTHE

*Oenanthe stolonifera* Wall.—A plant of wet places, occasional in the plains and in Abbottabad.

## CONIUM

*Conium maculatum* L.—*Morkach*, *hemlock* is a very large poisonous weed about cultivation. Abbottabad, Jhikka Gali. Kashmir.

## SELINUM

*Selinum tenuifolium* Wall var. *elata* (Edgew.)—Clarke Ghora Gali, Murree, Changla. August and September.

## PLEUOSPERMUM

*Pleurospermum stylosum*—Clarke Changla (Prof. Waxton).

## FERULA

*Ferula Jaeschkeana* Vatke—var. *Parkeriana* Wolff. Common about Abbottabad in March and April. A plant with hollow stems, yellow flowers and large fruits.

*Ferula stewartiana* O. E. Schulz.—Discovered in limestone crevices on the mt. above Hasan Abdal. It also grow on hills near Abbottabad. Rare. The basal corm is hard to extuset.

## PEUCEDANUM

*Peucedanum graveolens* Benth.—*Soe* is sometimes confused with saunf. This has much shorter leaf segments and flattened fruit.

## HERACLEUM

*Heracleum cachemiricum* Clarke—Common from 3,000'—9000' on banks before the rains.

*Heracleum candicans* Wall.—Common from 4,000'—9000' Much coarser than the last with leaves white below and common both in the spring and summer.

*Heracleum canescens* Lindl.—Rare. Abbottabad and Murree.

#### CORIANDRUM

*Coriandrum sativum* L.—*Dhanya* or coriander is commonly cult. and sometimes self sown.

#### DAUCUS

*Daucus carota* L.—*Gajar*, the carrot is also cult.

#### CAUCALIS

*Caucalis leptophylla* —L. (*Torilis leptophylla* (L.) Reichenb). Common as a weed in the plains up to 7000' in Murree in the spring. Fruits very prickly.

*Caucalis anthriscus*—L. (*Torilis anthriscus* (L.) Gmel.). Changla A taller plant with smaller fruits and found in the temperate zone.

*Caucalis stocksiana*—Boiss. [*T. Stocksiana* (Boiss.) Koso-Polj.] Changla, Murree, Khalra Gali. Fruits twice as large as in the last and very numerous spines.

*Caucalis latifolia* L. Annual weed with pinkish flos. and the largest fruits of the genus in our area. Patriata, Kashmir.

#### PSAMMOGETON

*Psammogeton biternatum*—Edgew. A desert ephemeral of the plains in March and April in sandy stream beds and gravelly places. The flos. are white turning to pink.

### ARALIACEAE

#### HEDERA

*Hedera nepalensis*—K. Koch (*H. Helix* Fl. Brit. Ind.) *Banbal kari* Occasional in the foothill zone and becoming abundant in the Murree Hills ascending the highest trees climbing by a myriad of adventitious roots. Leaves very variable.

#### ARALIA

*Aralia cachemirica*—Dene. In shady forest, Changla, Leaves very large.

#### HEPTAPLEURUM

*Heptapleurum venulosum*—Seem [*Schefflera venulosa* (Seem) Harms] Only found at Tret hanging from a rock above a stream. An extension of range, as this shrub is usually found much further east. The leaves are palmately compound something like those of the horse chestnut.

#### CORNACEAE

#### Cornus

*Cornus macrophylla*—Wall. *Kandar* Very common in forest throughout the Murree Hills in the temperate zone.

*Cornus oblonga*.—Wall. Rawalpindi east, 3,500'—7,000' (Parker) Dhirkot 3,500'—4,500' (Jerram). Much like *Viburnum coriaceum* but the leaves are not varnished and this has tumid spots in the leaf angles below.

## ALANGIACEAE

## ALANGIUM (MABLEA)

*Alangium chinense* (Lour) Rehder (*Marlea begoniaefolia* Roxb.) Indus east to China, 3500'—8,000' (Parker) Maqsud and Abbottabad in Hazara, Muzaffarabad. The leaves are oblique i.e. asymmetrical.

## CAPRIFOLIACEAE

## VIBURNUM

*Viburnum continifolium*—D. Don. Very common in forest undergrowth from 4,000'—9,000'. The flos. are white and the black fruits are ripe in July and August.

*Viburnum mullaha*—Ham ex D. Don (*V. stellatum* Wall.) A large shrub with panicles of white flos. in July and growing on shady northern slopes from 6,000'—8,000'. Indus to Sikkim.

*Viburnum grandiflorum*—Wall. ex. A. P. DC. (*V. foetens* of Fl. Brit Ind. *V. nervosum* D. Don. The flos. are a handsome pink and come into flower as the snow melts and before the leaves. This shrub with *Berberis ceratophylla* is the commonest plant in the forest undergrowth throughout the Murree Hills Guch or kunch.

*Viburnum cylindricum*—Ham. ex D. Don. (*V. coriaceum* Blume) Rawalpindi east according to Parker flowering in March. A plant of the temperate Himalaya to Burma; Java.

## ABELIA

*Abelia triflora*—R. Br. Dunga Gali, Changla. Indus east, 5,000'—10,000' (Parker). The feathery, persistent calyx is distinctive.

## LONICERA

*Lonicera parvifolia*—H.&T. Common in sunny rocky places above 8,000' Changla? Mokhshpuri, Nathia.

*Lonicera webbiana*—Wall. ex. DC. (*L. alpigena* in Fl. Brit. Ind.) A plant of forest opening above 6,000'. Murree, Jhikka Gali, Changla. The corolla is yellow fading to red; the fruits are orange.

*Lonicera quinquelocularis*—Hardw. The commonest and largest sp. from 4,000'—12,000', often growing in the open and often in thin forest. The pith of small twigs is chambered. "Tita bateri".

## LEYCESTERIA

*Leycesteria formosa*—Wall. I have only found this species on the Pipe Line beyond Khanspur. Parker found it on Patriata. The bracts are large and acuminate and the berries are large and nearly black.

## RUBIACEAE

## WENDLANDIA

*Wendlandia exserta*—DC. Indus east in the outer Himalaya to 4,000' (Parker) Panjar to the Jholum River, Lehtrar. The stipules are recurved and there are from 12-20 pairs of leaf nerves while in the next the stipules are erect and there are 10—12 pairs of nerves.

*Wendlandia puberula*—D.C. Rawalpindi to Nepal (Parker) to 4,500'.

## OLDENLANDIA

*Oldenlandia corymbosa*—L. Murree fide Douie. A small, linear leaved annual with 1-4 flos. per peduncle.

## RANDIA

*Randia tetrasperma*—Benth. & Hk.f. A depressed shrub of the sub-Himalayan zone with white starry flos. Hazara to Sikkim. Saidpur Hills, Hasan Abdal.

*Randia spinosa*—(Thunb) Poir. (*R. dumetorum* Lamk.) Much larger than the last and also a plant of the sub-Himalayan zone. Rawalpindi (Parker).

## HAMILTONIA

*Hamiltonia suaveolens*—Roxb. A shrub with deep lilac or purple flos. growing in steep places in the chir zone and blooming from September to December Saidpur Hills, Tret, Hasan Abdal, Abbottabad.

## LEPTODERMIS

*Leptodermis virgata*—Edgew. A small shrub with lilac or blue flos. from Hazara east in the outer Himalaya and up to Murree. Abbottabad, the Jhelum Valley Road, Muzaffarabad.

## GAILLONIA

*Gaillonia calycopera*—J.&S. Attock in April, N.-W.F.P.

## RUBIA

*Rubia purpurea*—DC. Possibly a colour form of *R. cordifolia* with blackish purple flos. Ghora Galli, Murree, Changla. A prickly climber growing during the rains.

*Rubia cordifolia*—L. Flos. white. Abbottabad, Kashmir.

*Rubia infundibularis*—Hems. & Lace. Small, erect with linear leaves and usually on rocks from 2,000' to 6,000'. Murree-Kohala Rd., on shale; near Kohala, Baghnotar, Muzaffarabad.

## PAVETTA

*Pavetta tomentosa*—Roxb. [*P. indica* L. var. *tomentosa* (Roxb. Hk. f.) Rawalpindi east (Parker).

## GALIUM

*Galium elegans*—Wall. (*G. rotundifolium* of Fl. Brit. Ind.) Common until Sept. in Abbottabad and the Murree Hills. It is trailing, white to yellowish green, and has three veined leaves.

*Galium boreale*—L. Murree, Pipe Line, Changla. Flos. white; plants growing erect in the grass, leaves with three veins, fruitlets hairy.

*Galium asperuloides*—Edgew. (*G. triflorum* in Fl. Brit. Ind.) Murree, Gharial, Changla in forest. Inflorescence terminal or in axil of first pair of leaflets.

*Galium asperifolium*—Wall. (*G. mollugo* of Fl. Brit. Ind.) Very common from 3,000'—8,000' on banks. Leaves very small and with many branches so that it may be tangled.

*Galium tenuissimum*—Bieb. A dwarf, erect, branching form, some times bushy, pedicles filiform, 1/4" to 1/2", leaves scabrid on the edge. Rawalpindi, Hasan Abdal, Jhalar, Muzaffarabad etc.

*Galium setaceum*,—Lamk. Hasan Abdal (Aitchison). Kohala?

*Galium tricorne*—With. Nurpur, Jhalar, Attock Hills, Huripur, Hasan Abdal, The fruits are large for the genus and warted, not pubescent.

*Galium aparine*—L. The commonest species, a climbing weed, often binding vegetation together in the plains and mts.

*Galium gratium*—Wall (*G. triflorum* var. *Haffmeisteri*) Rawalpindi, Jhalar, Abbottabad.

## VALERIANACEAE

### VALERIANA

*Valeriana stracheyi*—Clarke, Ghora Gali, Pipe Line, Abbottabad, usually growing on rocks with finely pubescent leaves and the terminal leaflet two to three times larger than the others.

*Valeriana jatamansi*,—Jones (*V. Wallichii* DC.) *Mushk bala*. One of the commonest and earliest plants in the Murree Hills from 4,000'—9,000'. The roots are medicinal and have a characteristic scent even after many years in a herbarium. Usually in forest.

*Valeriana pyrolaeifolia*, —Dcne. Changla Gali. Grows above 8,000'. Smaller, more glabrous and the leaves more rounded at the tip.

### VALERIANELLA

*Valerianella szovitziana*—F. & M. A dwarf spring annual, Abbottabad Mansera, Srinagar, etc.

## DIPSACEAE

### MORINA

*Morina persica*—L. The flos. are pink and the leaves prickly. It grows on cliffs and steep banks often with *Gerbera* and *Serratula*.

### DIPSACUS

*Dipsacus inermis*,—Wall. Pipe Line, Changla. *Teasel* a compact head of creamy white flowers.

### SCABIOSA

*Scabiosa olivieri*—Coulter—An ephemeral spring annual of the plains in gravelly places from the W. Punjab to Arabia and Armenia.

*Scabiosa candolleana*—Wall. Dhamial? Mansera, Abbottabad, Kurram. An erect perennial in dry soil with mauve flos.

## COMPOSITAE

### VERNONIA

*Vernonia cinerea*—(L.) Less. A variable tropical weed from 6" to 3' in height flowering throughout the year.

*Vernonia anthelmintica*—Willd. I have only found this widespread tropical weed once in Rawalpindi. Mansera.

### ADENOSTEMMA

*Adenostemma leventii*—(L.) O. Kze. (*A. viscosum* Forst.) Hassan Abdal. Grows up to 6' tall, suggesting *Siegesbeckia* but lacks the glands.

## AGERATUM

*Ageratum conyzoides*, L.—Occasionally cult. or self sown.

## SOLIDAGO

*Solidago vira-aurea*, L.—The only wild golden rod in the Himalayas is common in Changla, from June to September.

## CYATHOCLINE

*Cyathocline lyrata*, Cass.—This widespread tropical weed has become established about Rawalpindi in damp places.

## MYRIACTIS

*Myriactis wallichii*, Less.—Common in the Murree Hills above 6000' often as a pioneer on landslips from June to October. The flos. are small and suggest *Erigeron*.

## ASTER

*Aster molliusculus*, Wall.—A handsome cliff plant with white or lavender flos. in May from 6,000'-8,000'.

## BELLIS

*Bellis perennis*, L.—Has become established in the forest in Murree especially near St. Deny's School.

## ERIGERON

*Erigeron bellidioides*, Benth.—Common about the Murree Hills from 6,000'-8,000' on rocky banks.

*Erigeron ellisii*, Hk. f.—Changla Flos. white, bracts and florets numerous

*Erigeron multicaulis*, Wall.—Changla.

## CONYZA

*Conyza canadensis*, (L.) Cronquist (*Erigeron canadensis* L.)—This weed is common in and about cultivation throughout the area.

*Conyza japonica*, Less.—This is also common on banks and roadsides in plains and hills.

*Conyza ambigua*, DC.—A weed of the plains closely resembling the next but with larger flos. and more toothed leaves.

*Conyza crispus*, Pourr.—(*Erigeron linifolius* Willd.)—The heads are larger than those in *C. canadensis* and smaller than in the last.

*Conyza stricta*, Willd.—Another pioneer in barren soil in both plains and hills with small yellow capitula.

## BLUMEA

*Blumea amplexans*, DC. Leaves 1-2 amplexicaul. heads solitary; inner phyllaries with caudate tips (Clarke).

*Blumea bifoliata*, DC.—Charehan and Bhurban (Coventry). Differs from the last in having serrate, not dentate leaves and tips of involueral bracts not hair pointed. Heads few sub-umbellate.

*Blumea lacera*, DC.—A tropical weed smelling of turpentine growing in the plains and lower hills.

*Blumea membranacea*, DC.—Rawalpindi, Siadpur.



## PLUCHEA

*Pluchea lanceolata*, (Wall.) Clarke.—A small shrub with narrowly elliptic, fleshy leaves in flower or fruit throughout the year and often found on bare soil of loess cliffs on the plains. Gregarious.

*Pluchea arguta*, Boiss.—A shrubby plant of arid rocky hills, the leaves small and deeply toothed. Khewra and Hirnpur, Jhelum District.

## FILAGO

*Filago germanica* L. sensu lat.—This common weed of the plains and lower hills should perhaps be called *F. spathulata* Presl var. *prostrata* Parl.

*Filago spathulata* Presl.—Rawalpindi, Campbellpur

## IFLOGA

*Ifloga fontanesti*, Cass.—Another dwarf spring weed, Jhalar (Nasir), Campbellpur, Peshawar. It is found from N. India west to N. Africa and the Canaries.

## LEONTOPODIUM

*Leontopodium alpinum*, Cass.—A form of this composite species, possibly *L. brachyactis* Gand., as the bracts are short, is found in the Murree Hills in rocky places in the spring and early summer.

## ANAPHALIS

*Anaphalis cinnamomea* (Wall.) Clarke, Ghora Gali in October.—The leaves are three nerved, acuminate and often cinnamon coloured below; the leaf bases are narrow, not half amplexicaul.

*Anaphalis adnata*, DC.—A large herb with snowy white pubescence growing on cliffs and among rocks from 6,000'—8,000'.

*Anaphalis araneosa*, DC.—Common on the Pipe Line and about Changla. A smaller plant with winged stems, sometimes almost green with little white wool. 6,000'—10,000' August—October.

*Anaphalis contorta*.—My 21434 which is more snowy than the last, more slender and with smaller leaves may belong here.

## PHAGNALON

*Phagnalon niveum*, Edgew.—A rock cleft plant of sunny exposures from 4,000'—9,000'.

## GNAPHALIUM

*Gnaphalium luteo-album*, L.—Rawalpindi, Wab, in February and March in damp soil. The heads are often golden yellow and the leaves are woolly on both sides; the lower narrowly spatulate, obtuse.

*Gnaphalium indicum*, L.—March and April in Rawalpindi near ponds. All the leaves are narrowly ovate, obtuse and capitula spicate (Clarke).

*Gnaphalium spathulatum*. Lam (*G. purpureum*, L.) Another spring weed about Rawalpindi, larger than the last. The cohesion of the pappus hairs by their bases is a character.

*Gnaphalium pulvinatum*, Delile, Campbellpur (Nasir), Peshawar. The inflorescences are small, white balls, Spring.

## INULA

*Inula cappa*, DC.—A shrub with yellow flowers growing from the sub-Himalayan zone to 6,000' and often found in the chir zone in September and October. Saidpur, Tret, Abbottabad, Ghora Gali.

*Inula vestita*, Wall.—(*Vicoa vestita Benth*).—A hairy, field and roadside weed in the plains in April and May.

*Inula indica*, L. (*Vicoa indica*, DC.)—Batrasi, Hazara. Leaves with varnished appearance. Flos yellow.

## BLAINVILLEA

*Blainvillea latifolia*. (L.f.) DC.—(*B. rhomboidea Cass.*)—Rawalpindi and Hasan Abdal in the autumn; flos. white.

## PULICARIA

*Pulicaria crispa*, Benth and Hk. f.—A spring weed with whitish wool found from the Punjab plains to the Canary Is.

## CARPESIUM

*Carpesium cernuum*, L.—Common in forest with peculiar nodding capitula from 4,000'–9,000', June to September

## XANTHIUM

*Xanthium strumarium*, L.—The cocklebur is fortunately not very common. It is found from June to October in the plains, at Tret and about Murree in meedy places.

## SIEGESBECKIA

*Siegesbeckia orientalis*, L.—This cosmopolitan weed of warm countries with small yellow flos, and sticky, glandular involucre is found in the summer from the plains up to 7,000'.

## ECLIPTA

*Eclipta alba*, (L) Hasskh. Another cosmopolitan weed flowering in the plains most of the year. It is prostrate, the flos are white and it grows in damp soil.

## BIDENS

*Bidens biternata*, (Lour.) Merrill & Scherff, (*B. Wallichii* DC.)—Very common after the rains from the plains to about 8,000.'

## GALINSOGA

*Galinsoga parviflora*, Cav.—An American weed of cultivation which has spread widely in the Himalayas. Common about Murree.

## ACHILLEA

*Achillea millefolium*, L.—Murree, Changla, Abbottabad. Strongly scented, growing in a sunny grassy places and said to be good for tooth ache yarrow.

## MATRICARIA

*Matricaria chamomilla*, L.—Occ. found as a weed in the spring Peshawar. Braets with white margins.

*Matricaria praecox* DC.—Peshawar Braets with reddish scarious margins.

## CHRYSANTHEMUM

*Chrysanthemum leucanthemum*, has become naturalized in the forests about Murree.

## COTULA

*Cotula aurea*, L.—This diminutive ephemeral spring weed is abundant about cultivation in the plains and up to 4,000'.

## ARTEMISIA

*Artemisia parviflora* Roxb. (*A. japonica* Thunb. var. *parviflora* (Toxb) Pamp.] 4,000'—9,000', the lower leaves simple, obovate, oblong, apex dentate. Common in grassy places.

*Artemisia parviflora scoparia*, Waldst and Kit. [*A. capillaris* Thunb, var. *scoparia* (Waldst & Kit.)]. From the plains to 7,000'. Glabrous, leaves pinnatifid, segments linear, heads minute. Flos. in the autumn.

*Artemisia tournefortiana*, Reichb.—Gharial, Changla. Leaves 1-2 pinnatifid, heads spicate in erect, congested panicles.

*Artemisia myriantha*, var. *hypoleuca* (Edgew.) Pamp. (*A. Roxburghiana* Besser) Ghora Gali, Changla. Leaves white below.

*Artemisia vulgaris*, L. var.

## TUSSILAGO

*Tussilago farfara*, L. Coltsfoot sends up dandelion like flowers early in the spring before there are any leaves. It grows in patches on steep banks above streams or where water is near. Murree.

## DORONICUM

*Doronicum roylei*, DC. A tall, large leaves forest plant with yellow flos. Changla in June.

## SENECIO

*Senecio chrysanthemoides*, DC. var. *analogus* Hk. f. Changla Gali in September. The leaves are white below.

*Senecio nudicaulis*, Ham. Common from 4,000'—7,000' on dry banks or landslips. Leaves often roddish below.

*Senecio coronopifolius*, Desf. A small desert type from the plains to Tibetan Kashmir; also N.-W. F. P.

*Senecio rufinervis*, DC.—A plant of shady forest from 6,000'—9,000', 3'—6' tall and with leaves cottony white below.

## CALENDULA

*Calendula arvensis*, L.—A very common spring weed in the plains by roadsides and in waste places.

## ECHINOPS

*Echinops echinatus*, DC.—A very xerophytic *Globe thistle*, fairly common in desert places in the plains.

*Echinops niveus*, Wall.—Grows in small patches from 6,000'—9,000'. Globes much larger.

## COUSINIA

*Cousinia minuta*, Boiss. A common xerophytic spiny weed with cobwebby leaves; April and May, in the plains.

## CARDUUS

*Carduus nutans*, L.—Abbottabad, Murree, Changla. The flos. are pink, the heads hemispherical, solitary, nodding; the stems winged.

## CNICUS

*Cnicus benedictus*, L.—Campbellpur about cultivation: N.-W. F. P.

*Cnicus arvensis* Hoffm. (*Cirsium arvense* (L.) Scop.—A very common thistle in the plains on the banks of irrigation ditches or on stiff clay soil; leaves cobwebby and decurrent. *Pohli*.

*Cnicus wallichii* DC.—Common in Abbottabad, Murree and the Galis, often on landslides and in waste places. The plant is erect, very leafy with the leaves prickly. The flos. are white or somewhat pink and the inner involucrel bracts have dilated tips.

## SILYBUM

*Silybum marianum* Gaertn.—A spring weed of the plains and lower hills growing on waste heaps and in ditches. The leaves are large, prickly and white veined. The involucre is also large and prickly.

## JURINEA

*Jurinea modesta* Boisse.—Jhalar near Campbellpur, Peshawar. April Flos. pink.

## SAUSSUREA

*Saussurea candicans* Clarke Fairly common in weedy places in the plains and up to 7000' before the rains.

*Saussurea albescens* H. f. & T.—Pipe Line in open grassy places. Lower Topa.

## SERRATULA

*Serratula pallida* DC.—A handsome scapose plant with pink or purple heads on cliffs and steep banks with *Gerbera* and *Morina*; 5,000'—8000'.

## TRICHOLEPIS

*Tricholepis furcata* DC.—Tall, white flowered in grassy places, heads nodding. Murree, Pipe Line, Changla.

*Tricholepis stewartii* Clarke. This rare species grows on precipices after the rains, often with *Onosma Thomsoni*. 7,000'—9,000'. Flos. white.

## CENTAUREA

*Centaurea cyanus*, L.—The corn flower or corn cockle is commonly planted in gardens and is sometimes self-sown.

*Centaurea calcitrapa*, L.—The "star thistle" with yellow spines and purple flos. is common in the plains and up to 6,000'.

## CARTHAMUS

*Carthamus oxyacantha*—M. Bieb, *Pohli*, a spiny, noxious weed with yellow flos. springing up in most wheat fields after the harvest on the plains.

## AINSLIAEA

*Ainsliaea aptera* DC.—Aaron's Rod is fairly common in forest with leafless stems bearing flowers in April, the leaves following in June; 7,000'—9,000'.

## GERBERA

*Gerbera gossypina* (Royle) Beaux. (*G. lanuginosa*, of Fl. Brit. Ind.) Common on steep banks and precipices from 4,000'--9,000'. The leaves are white, cottony below and this cotton used to be collected for tinder.

## CICHORIUM

*Cichorium intybus*, L. *Tukhm kashni*, or chicory with pretty blue flos. is wild in the Murree Hills, Abbottabad, etc. up to 7,000'.

*Cichorium endivia*, L.—Found occasionally in the plains as an escape. The branches of the inflorescence grow out at right angles and are somewhat swollen. The lower leaves are sinuate, not runcinate.

## LAPSANA

*Lapsana communis*, L.—Changla and the Pipe Line in forest with yellow flos. in June and July.

## KOELPINIA

*Koelpinia linearis*, Pall. A spring desert annual with peculiar, narrow clawed fruits and yellow flos. Like Capparis, Linum, Tribulus, Peganum, etc. it ascends the Indus to Baltistan in desert places.

## PICRIS

*Picris hieracioides*, L.—An erect yellow flowered weed with prickly stems. Murree, Pipe Line, Changla. It is usually from 5,000'—10,000'.

## CREPIS

*Crepis thomsonii*, Babcock (*C. foetida* of Fl. Brit. Ind.)—Not rare. Rawalpindi, Hasan Abdal, Attock District, Peshawar, etc., in the spring.

*Crepis sancta*, subsp. *bifida* Babcock (*Pterotheca Falconeri* Hk. f.) 4,000'—9,000', Abbottabad, Murree, Changla before the rains.

## YOUNGIA

*Youngia japonica*, (L.) DC. (*Crepis japonica* L.)—Plains to 7,000'. Afghanistan to Japan. The flos. are yellow and very small.

## HIERACIUM

*Hieracium vulgatum*, Koch. On dry banks in open forest, Jhikka Gali, Murree.

## TARAXACUM

*Taraxacum officinale*, Wigg.—Throughout the district.

## LACTUCA

*Lactuca scariola*, L.—According to Stebbins the name *L. serriola* L. has precedence. The wild lettuce. Is found occasionally in Rawalpindi, Abbottabad and Murree and var. *sativa*, the cult. lettuce, grows in many gardens.

*Lactuca dissecta*, D. Don.—A common plant in spring with small purplish flowers and milky juice. Throughout the district.

*Lactuca polycephala*. Benth—Wet places in Topi Park, Rawalpindi. Flos. yellow. The subumbellate character of the inflorescence is exceptional in the genus. Afghanistan to Burma, 1,000'—4,000'.

*Lactuca brunoniana* (Wall.) Stebbins [*Lactuca Brunonia* (Wall.) Clarke]  
—Common on banks in the Murree Hills in forest, flowering at the close of the monsoon. Leaves most variable; ligules few.

#### REICHARDIA (PICRIDIMUM)

*Reichardia picroides* (L.) Roth. (*Picridium tingitanum* Desf.)—A spring, desert annual ranging from the Punjab to N. Africa and the Canaries; Margalla, Hassan Abdal, Jhalar, Khyber. The corky, four edged lumpy achenes are peculiar.

#### SONCHUS

*Sonchus asper* (L.) Hill Common from the plains to 9,000'. This species is usually more spiny than *S. oleraceus*, the achenes are obscurely muricate, the leaf auricles are rounded and the leaves have a tougher texture.

*Sonchus oleraceus*, L.—Throughout the district. The leaf auricles are acute and the faces of the achenes are three ribbed and muricare between the ribs.

*Sonchus arvensis*, L.—Another cosmopolitan weed from the plains to 9,000'.

#### LAUNAEA

*Launaea chondrilloides*, DC.—(*Microrhynchus chondrilloides* Clarke). Another spring flower belonging to the Mediterranean flora; ranging from the Punjab to Egypt. Hasan Abdal, Campbellpur, Khyber. According to Stebbins this should be called *L. resedifolia* (L.) O. Kze.

*Launaea secunda*, Clarke. Common in rocky places in the *chir* zone. The leaves are in a basal rosette, the inflorescence is tall, bearing yellow flos.

*Launaea nudicaulis*, (L. Hk. f. Common from the Atlantic to the plains of India. The margins of the leaves are hardened, whitish and bear small, whitish teeth. The flowering branches are prostrate.

#### TRAGAPOGON

*Tragapogon gracile*, D. Don Hazara to Nepal, 2,000'—12,000', but in this district I have only found it on the mt. above Hasan Abadal. The leaves are undivided, almost grass like.

#### PTERACHAENIA (*Scorzonerd* in Fl. Brit. Ind.)

*Pterachaenia stewartii* (Hk. f.)—Lips. (*Scorzonera Stewartii* Hk. f.) The leaves are narrowly linear and the achenes remarkable bearing two or three white wings with echinate ribs. Rawalpindi in April. Peshawar.

#### EPILASIA

*Epilasia ammophila*, Bunge. Another spring desert type, Rawalpindi, Attock, Peshawar. The flos. are pale blue and the pappus is dark brown.

### CAMPANULACEAE

#### CAMPANULA

*Campanula canescens*, Wall. A plant of the plains and up to 4,500'. The flos. are small and pink and bloom in March and April. Rawalpindi, Saidpur, Attock, Abbottabad.

*Campanula colorata*, Wall. Common from 4,000'—9,000'. Larger blue-purple flos.

*Campanula tenuissima*, Dunn. Grows on rocks on the Pipe Line near Khanspur, much branched from the base, leaves very narrow.

## ERICACEAE

## RHODODENDRON

*Rhododendron arboreum*—Smith *Bras, Chahun, kikari*. Very rare in this area, Murree and Changla. It usually accompanies *Quercus incana*.

## PIERIS

*Pieris ovalifolia*—D. Don. This is also rare about Murree and is also near the western edge of its range. 3,000'—8,000' Indus east. The leaves are poisonous and can be used as an insecticide.

## PLUMBAGINACEAE

## PLUMBAGO

*Plumbago zeylanica*—L. A sub-Himalayan plant from the Indus east up to 5,000'. The flos. are white and are in bloom from March to May. The calyx glands are distinctive.

*Plumbago capensis*—Thunb. This South African plant with pale blue flos. is often cult. in gardens.

## STATICE

*Statice griffithii*—Aitch. & Hems. Abbottabad, Mansera, N.-W.F.P.

## PRIMULACEAE

## PRIMULA

*Primula denticulata*—Sm. April and May; Muree, Changla, Dunga. Handsome purple flos.

## ANDROSACE

*Androsace umbellata*—(Lour.) Merrill. (*A. saxifragaeifolia* Bunge). Not common, plains to 4,000'. I have only found it in April at Tahi near Abbottabad and at Palandari, Poonch.

*Androsace rotundifolia*—Hard. var. *elegans* Kunth Common from 4,000'—9,000' flos. pink often fading to white.

*Androsace foliosa*—Duby Flos. white to pale lavender or pink, centre often yellow, in June. Murree and Changla, Pipe Line.

*Androsace himalaica*—(R. Kn.). Hand. Maz. (*A. Tibetica* var. *Himalica* R. Knuth) Rare, on the Pipe Line in June.

## CORTUSA

*Cortusa matthioli*—L. Flos. pink, Mokhshpur. An alpine growing in damp soil.

## LYSIMACHIA

*Lysimachia chenopodioides*—Watt. Ghora Gali, Chenari, Uri. Plant erect, leaves alternate, acuminate, petioles long.

*Lysimachia debilis*—Wall. (*L. japonica* of Fl. Brit. Ind.) A prostrate herb in the forest, fairly common about Murree, Upper Topa, Kuldanna, Bhurban, etc. Distinguished from *L. japonica* by its acute leaves and bigger gland dotted corollas.

## ANAGALLIS

*Anagallis arvensis*—L. var. *coerulea* Gren. & Godr. A very common field weed in the plains in March and April. Blue Pimpernel.

*Anagallis arvensis*—L. var. *phoenicea* Gren. & Godr. Scarlet Pimpernel. The salmon or scarlet form is common above 4,000', but I have found it at 2,000' at Margalla.

## SAMOLUS

*Samolus valerandi*.—L. An herb of damp soil from the plains to 4,000'.

## MYRSINACEAE

## MYRSINE

*Myrsine africana*—L. *Khokhal, kukar*. A very common undershrub from 4,000'—9,000'. The fruit is anthelmintic and called *bebrang*.

*Myrsine semiserrata*—Wall. A tree of moist ravines from the N.-W.F.P. to Burma 3,000'—6,000'. Charehan (Parker).

## EMBELIA

*Embellia robusta*—Roxb. Near Punjar, sparing in *Pinus longifolia* undergrowth. (Parker).

## REPTONIA (MONOTHECA)

*Reptonia buxifolia*—Dcne. Salt Range and Kala Chitta Hills; Trans-Indus. A plant of rocky hills and often a companion of *Olea*, *Sargeretia* and *Acacia* Thorny.

## EBENACEAE

## DIOSPYROS

*Diospyros lotus*—L. *Amlok*. Probably an old introduction as it is usually found about villages, not in the forest. 2,500'—6,000'. The fruit is eaten fresh and dried.

## STYRACEAE

## SYMPLOCOS

*Symplocos paniculata*—(Thunb) Miq. (*S. crataegioides* Ham.) *Lodar lojh*, Hazara east, 3,000'—8,000' (Parker). I have seen no specimens from Murree.

## OLEACEAE

## FRAXINUS

*Fraxinus excelsior*—L. *Sum*, the Himalayan Ash is rare about Abbottabad and Murree.

## JASMINUM

*Jasminum arborescens*—Roxb., Karl (Coventry), an extension of range. The leaves are simple, opposite and cordate. A tropical plant, usually found from Kangra east and below 3,000'.

*Jasminum grandiflorum*—L. Parker thinks that this is indigenous to the Salt Range and low hills of Rawalpindi district. Leaflets 7-11. Kobuski of the Arnold Arboretum considers it to be a variety of the next. *Chameli*. 2,000'—4,000'.



*Jasminum officinale*—L. This white jasmine is common from 3000'—9,000'. It has 3—7 leaflets and the terminal is much the largest. It is wild and cult.

*Jasminum humile*—L. Common from 4,000'—10,000' in the open and bearing yellow flos.

*Jasminum pubigerum*—D. Don. Much like the last but pubescent. Changla, Abbottabad (Parker). Kobuski considers this to be a form of the last.

*Jasminum bifarium*—Wall. (*J. Sumbac* Ait *Motia* or *chambeli* is much used for garlands on the plains. Cult. in the tropics of both hemispheres. Vary sweet scented.

#### NYCTANTHES

*Nyctanthes arbor-tristis*—L. *Harsingar*, a Sub-Himalayan shrub up to 4,000' is rare in our area and I have only found it near a Pir's grave near Rawalpind and Parker found it in the Jowlian Reserve near Texila. Possibly introduced.

#### SYRINGA

*Syringa emodi*—Wall. A temperate shrub usually from 7,000'—12,000' is found on Changla and at Dunga. The flos. are white or slightly pinkish.

#### OLEA

*Olea cuspidata*—Wall. *Kao*, the Indian olive is one of the commonest trees from the plains to 5,000' its only rival being *Acacia modesta*. It is sometimes found to 6,500'.

*Olea glandulifera*—Wall. *Barkao* is found in moist ravines to 6,000' and is sometimes cult. in the plains. Charra Pani.

*Olea europaea*—L. Efforts are being made to start an olive industry and plantations have been started in the foothill zone.

#### APOCYNACEAE

##### RHAZYA

*Rhazya stricta*—Dene. *Vena* is an erect dwarf shrub which is very common in the Kala Chitta Hills, Attock District at Attock and Trans Indus. The flos. are pale lavender and the foliage a yellowish green. From the Jhelum to Arabia.

##### THEVETIA

*Thevetia nerifolia*—Juss. *Zard ganira*, the yellow or 'Exile' oleander is cult. in the plains. The leaves are said to be poisonous. A native of Peru. According to merrill the correct name is *Thenetia peruviana* (Pers.) Merr.

##### CARISSA

*Carissa opaca*—Stapf ex-Parker, (*Carissa spinarum*) *Garna* or *garaunda* is very common in scrub forest and under chil in the foothill zone. The fruits are edible and the white flos. in May scent the whole region.

##### VINCA

*Vinca major*—L. Cult. and has become naturalized in Abbottabad and Murree. Flos. blue.

## NERIUM

*Nerium indicum*—Mill. (*N. odorum*, Soland.) *Kaner, ganira*, the oleander is common in stream beds near water to 5,000'. The flos. are a beautiful pink and the shrub is cult. in the plains. The leaves are vrey poisonous.

## VALLARIS

*Vallis solanacea*—(Roth) O. Kze. (*V. Heynei*, Spreng.) A large vine with white, pink or red. flos. is cult. in Rawalpindi.

## TABERNAMONTANA

*Tabernaemontana divaricata*—R. Br. Ex- R. & S. (*T. coronaria*, Willd.) An erect shrub with handsome jasmine like flos. is cult. in Rawalpindi and is wild east of the Ravi.

## TRACHELOSPERMUM

*Trachelospermum lucidum*—(D. Don.) K. Schum. (*T. fragrans*, Hk. f.) A large climber on rocks or over bushes in the sub-Himalayan zone from 2,000'—6,000' from the Indus east (Parker). Chenari, Jhelum Valley Road. I have not found it in the Murree Hills.

## ASCLEPIADACEAE

## CRYPTOLEPIS

*Cryptolepis buchmanii*—R. & S. A fine, large climber in the foot hill zone flowering in May and June and with glaucous leaves, very pale below. Tred, Nurpur, Kohala, etc.

## PERIPLUCA

*Periploca aphylla*—Dcne. *Bata* is a leafless switch plant growing in rocky places in the plains and up to 4,000' near Abbottabad. The flos. are purple within, green outside and with long hairs on the petals.

## CALATROPIS.

*Calatropis procera*—R. Br. *Aka* or *mudar* is one of the commonest plants in waste places, on banks and by road-sides in the plains. Not eaten by animals.

## PERGULARIA

*Pergularia extensa*—(R. Br.) N.E. Brown (Daemia). A monsoon climber of the Plains and up to 3,000' which is easily recognized by its long pointed reflexed follicles covered with long soft prickles. Flos. greenish white.

## PENTATROPIS

*Pentatropis spiralis*—Dcne. A xerophytic vine found from the Punjab to the Red Sea and Nubia. Topi Park Rawalpindi.

## HOLOSTEMMA

*Holostemma rheedianum*—Spreng. Falconer reports from Kala ki Sarai 4-8-1837. Not now known west of the Sutlej (Parker).

## TYLOPHORA

*Tylophora hirsuta*—Wight. Grows over rocks, Saidpur at 2 000'. Pubescent with yellowish hair. Flos. in May.

## CYNANCHUM

*Cynanchum dalhousiae*—Wight. Himalaya 4 000'—8 000', Abbottabad, Ghora Gali, leaves 1/2" to 1" wide and long. Flos. July and August.

*Cynanchum auriculatum*—Royle. A common climber from 6 000'—9,000', flos. June-August, follicles hanging on through the winter.

*Cynanchum arnottianum*—Wight. Flos. erect dark purple Abbottabad, Murree.

*Cynanchum vincetoxicum*—Changla (M. Nath) Stem erect, flos. glabrous.

## MARSDENIA

*Marsdenia roylei*—Wight 3 000'—7 000' from the Indus eastward; flos. orange on open hill sides. Rare in our area.

## DREGEA

*Dregea volubilis*—(L.f) Benth. Lower Himalya to 5,000', Margalla, Kohala, flos. green or greenish yellow, corolla cup shaped.

## TELOSMA

*Telosma cordata*, (Burm.) Merrill, (*Pergularis pallida* W. & A) Indus east ascending to 5,000'.

## ASCLEPIAS

*Asclepias curassivica*—L. Flos. orange, cult. and as an escape about Rawalpindi. A west Indian species with orange flos.

## CORALLUMA

*Coralluma edulis*—Benth. *Chaunga*, a small succulent, growing on rocks, Saidpur Hills, Margalla, Fatehjang, Jhalar, etc., Flos. & fruit in the spring. Eaten as a vegetable.

## CEROPEGIA

*Ceropegia wallichii*—Abbottabad, July.

## LOGANACEAE

## BUDDLEIA

*Buddleia neemda*—Ham. (*B. asiatica* Lour.) *Bhatti*, widespread, India to China. Often planted in the plains and wild on earth banks above streams, Abbottabad.

*Buddleia crista*—Benth (*B. paniculata* Wall.) Hot dry places from 2,500'—8,000'. Trans-Indus to Sikkim. Kagan Vally, Poonch. The tomentum is white when fresh becoming tawny with time

## GENTIANACEAE

## ERYTHRAEA

*Erythraea ramosissima*—Pers. Hasan Abdal, Rawalpindi, Peshawar. Flos. pink, pedicels short, basal leaves few.

*Erythraea Roxburghii*—G Don. Basal leaves persistent, pedicels long. Both grow in the plains in damp soil. April, May.

## GENTIANA

*Gentiana argentea*—Royle. Abbottabad, Murree, Poonch; February to June.

*Gentiana capitata*—Ham. Lower-Forest Road, Murree in October.

*Gentiana kurroo*—Royle. Flos. large and very handsome in grassy places, Ghora Gali, Murree, Barian. September, October.

*Gentiana decemfida*—Ham. var. *aprica*. Kahuta in March (M. Nath). Strict, erect, with a rosette of basal leaves.

## SWERTIA

*Swertia purpurascens*—Wall. Petals reflexed and flos. purplish. Changla. August, September *chirayetta*.

*Swertia paniculata*—Wall. Barian, Ghora Gali, Changla; petals five, not reflexed, petals white with blue spots, leaves linear, glaucous below.

*Swertia cordata*—Wall. Murree Hills, 6,000'—9,000' August to October, flos. white or with purplish veins, leaves nearly as broad as long.

*Swertia angustifolia*—Ham. Resembles *S. paniculata* but with 4 petals. Murree, Kashmir.

*Swertia alata*—Royle. Ghora Gali in October. Recognized by the winged stems and greenish flos. with dark purple spots.

## JAESCHKEA

*Jaeschkea latifolia*—Clarke. Reported by Clarke from Murree probably in error.

## BORAGINACEAE

## CORDIA

*Cordia obliqua*—Willd. *Lasoora*, Cult. in Rawalpindi.

## EHRETIA

*Ehretia serrata*—Roxb. (*E. acuminata* R. Br.) *Punna* or *puna*. Sub-Himalayan zone to 5,000'. Above Tret, Flos. March to May.

*Ehretia aspera*—Roxb. Dry places in the foothill zone, common. The leaves are scabrid above, persistently hairy below. Flos. March-April.

*Ehretia laevis*—Roxb. *Chamror*, *Sakar*. The mature leaves are glabrous below. Locally in the plains in moister places. Persia to China.

## HELIOTROPIUM

*Heliotropium europaeum*—L. (*H. Eichwaldi* Steud.). Rawalpindi, May, white flos. with a tinge of lavender.

*Heliotropium undulatum*—Vahl. A desert perennial, Riwat, Pindi, Margalla, etc.

*Heliotropium strigosum*—Willd. Common in the plains after the rains also in April.

*Heliotropium strigosum*—Var. *brevifolia* Clarke. Rawalpindi.

## TRICHODESMA

*Trichodesma indicum*—Br. Common in the plains and up to 4,000' on dry banks, flowering much of the year, flos. white to lavender.

## CYNOGLOSSUM

*Cynoglossum lanceolatum*—Forsk. (*C. micranthum* Desf.) A fairly common weed from the plains to 7,000'; flos. very small; white; nutlets small and glochidiate on all sides. August—October.

*Cynoglossum zeylanicum*—(Vahl) Thunb. (*C. furcatum* Wall.)—Rawal-

pindi (Aitch.). Flos. white, inflorescence broader, leaves larger and with shorter tomentum, nutlets larger.

*Cynoglossum wallichii*—G. Don. Common 4,000'—11,000'; flos. blue, June—September glochidia sparing on faces of nutlets.

*Cynoglossum neryosum*—Benth ex. Clarke, Changla Gali in forest in June. Much larger than the other species.

#### HACKELIA

*Hackelia macrophylla*—(Brand) Johnston, another forest form with large leaves, pale flowers and long glochidia. Changla.

#### HETEROCARYUM

*Heterocaryum echinophorum*, var. *minimum* Brand, (*Echinosperrum minimum* Lehm.) Hurroo (Aitchison). Peshawar (N. Ali).

#### ROCHELIA

*Rochelia stylaris*—Boiss. An erect, branched, delicate, annual with tiny white flos. in March and April, in the plains and in Kashmir.

#### ASPERUGO

*Asperugo procumbens*—L. A climber or scrambler in hedgerows and waste places in the spring, common in the plains and occasionally up to 10,000'. The plants are prickly and the calyx is persistent and enlarges greatly with age.

#### GASTROCOTYLE

*Gastrocotyle hispida*—Bunge, a desert weed of the plains in March and April resembling *Lycopsis arvensis* but the bracts of the inflorescence are leafy to the tops of the branches. The Punjab to Egypt; Soongaria.

#### NONNEA

*Nonnea picta*—F. & M. Occasional about Rawalpindi; flos. red.

*Nonnea pulla*,—L. Var. *sordida* O. Kze. The common *Nonnea* in the spring around Rawalpindi in ditches has white or greenish white flos. It is *N. Edgeworthii*.

#### MOLTKIA.

*Moltkia parviflora*—(Dene.) Clarke, Murree and Poonch, 5,000'—6,000' with delicate white flos. in April.

#### LITHOSPERMUM

*Lithospermum arvense*—L. Vary common in grain fields, flos. white rarely blue, corolla tube not longer than the calyx, nutlets, tuberculate, brown, gradually narrower upwards; plains to 6,000'.

*Lithospermum tenuiflorum*—L.f. Closely resembles the last but the flos. are usually blue, the tube is longer than the calyx, nutlets suddenly narrowed upwards; usually decumbent. In the plains; Abbottabad.

#### ARNEBIA

*Arnebia hispidissima*—(Sieb) D.C. Hotter, drier parts of N. India, W. Asia, N. Africa. Rawalpindi (Aitchison), Campbellpur.

*Arnebia griffithii*—Boiss. Jhalar, Campbellpur, Peshawar; flos. yellow, scented, with a dark spot on each petal, blooming in March and April. *Prophet's flower*.

## ONOSMA

*Onosma thomsoni*—Clarke, a cliff plant, 4,000'—9,000', flos. white when fresh. Abbottabad, Barian, Pipe Line, etc. Muzaffarabad.

## CONVOLVULACEAE

## IPOMOEA

*Ipomoea hederacea*, Jacq.—Plains to 7,000', September—October, flos. pink, leaves 3 lobed.

*Ipomoea purpurea*, Lamk. Plains to 7000'; leaves ovate cordate, entire flos. white, pink, or purple, Cult. and naturalized. *Morning Glory*.

*Ipomoea pentaphylla* Jacq. [*Oxerculina aegyptia* (L.) House]—In the plains, September and October. White.

*Ipomoea pes-tigridis*, L. Topi Park, Rawalpindi in September, flos. white. Note the peculiar lobing of the leaves.

*Ipomoea pilosa*, Sw. Flos. small, pinkish; leaves very pale below; September, Topi Park.

*Ipomoea hispida* (Vahl), R.&S. Common in the plains to 4,000', flos. small, pinky white.

*Ipomoea palmata*, Forsk. Flos. blue, cult. in the plains, especially at R. R. stations. *Ipomoea muricatum*, L. (*Calonyction muricatum* (L.) G. Don) Flos. lavender or mauve, stems prickly September, October in the plains.

## CONVOLVULUS

*Convolvulus aitchisoni*, Clarke, Jhelum and Salt Range (Bamber); characteristic of open gravel plains.

*Convolvulus pluricaulis*, Choisy var. *macra* Clarke, prostrate, a rosette of stems in the plains flowering in the spring; white or pale pink.

*Convolvulus arvensis*, L.—A very common bindweed in the plains and hills with pretty pink flos. *Leli*. Leaves hastate.

## EVOLVULUS

*Evolvulus alsinoides* L.—Fairly common in the plains and lower foothills, prostrate slender, flos. blue; spring and autumn

## PORANA

*Porana paniculata*, Roxb *Bridal Wreath*. A large and handsome creeper with a multitude of small white flos. from November to December in the foothills. Sometimes planted.

## CUSCUTA

*Cuscuta reflexa* Roxb *Nila tar* or dodder is very common in the plains and Murree Hills to 8 000'. It often covers *Ziziphus* trees in the plains.

## SOLANACEAE

## SOLANUM

*Solanum nigrum*, L. *Kach mach* is a very common ruderal throughout the district.

*Solanum dulcamara*, L. Woody Nightshade. Indus east 6 000'—8,000' (Parker) A scrambler with blue purple flos Murree.

*Solanum verbascifolium*, L.—A far ranging shrub, Indus east to Indus

China, Samoa, etc. ascending to 5,000' *Kala mewa*. Tret, Nurpur Hills, Saidpur Hills.

*Solanum incanum*, L (*S. coagulans* Forsk ) in the plains, Dharmyal, Saidpur, Riwat.

*Solanum indicum*, L. Saidpur, Murree Road Stellately wooly beneath; looks like the last but the fruits are smaller, about  $\frac{1}{2}$ " in diam

*Solanum melongena*, L — *Brinjal*, the egg plant, is a commonly cult.

*Solanum surattense*, Burman f (*S. xanthocarpum* Schrad & Wend ) *kandiali* is a very common thorny prostrate weed to about 3,000' The flos. are blue purple and the prickles are yellowish as are the ripe fruits

*Solanum gracilipes*, Dcne Xerophytic with very small leaves in the shade of bushes on rocky hills, Jhelum, Rawalpindi and Attock Districts Flos. purple in March and April.

*Solanum tuberosum*, L — The potato is raised up to about 8,000'

*Solanum pseudocapsicum*, L — A small shrub which is now naturalized in many parts of the Himalayas. Abbottabad, Jhelum Valley Road. *Jerusalem Cherry*.

#### LYCOPERSICUM

*Lycopersicum esculentum*, Miller, commonly cult. The tomato

#### PHYSALIS

*Physalis minima*, L — A field weed during the rains in both plains and hills. The persistent calyx hides the fruits in this genus.

*Physalis minima*, L. var. *indica* Clarke (*P. angulata*) has larger, more angled fruits. Topi Park, Rawalpindi.

*Physalis peruviana*, L. *Ras berry*, the *Cape Gooseberry*, cult.

#### WITHANIA

*Withania somnifera* (L.) Dunal, *Aksan*, *agsand* is a weed of the plains with a wide distribution, Syria, Arabia, Africa, etc.

*Withania coagulans*, Dunal, *panir band*, is very xerophytic and glaucous from Jhelum westward, Rawalpindi rare, commoner in Attock and Trans Indus. The Salt Range.

#### ATROPA

*Atropa acuminata*, Royle ex Lindl. Changla Gali. Flos. yellow and fruits dark purple. Furnishes a valuable drug, belladonna.

#### DATURA

*Datura stramonium*. L. Flos. white and fruits erect, Murree Hills. Poisonous.

*Datura innoxia*, Mill. (*D. Metel* Sims non L.)—Fruiting pedicle turned to one side, plant softly pubescent, corolla white, ten toothed. Rawalpindi, Tret.

*Datura meteloides*, Dunal Plant glaucescent, corolla usually suffused with purple, five toothed Rawalpindi, Peshawar

#### NICOTIANA

*Nicotiana tabacum*, L with pink flos and *N. rustica* L with yellow flos. are cult. but not in large quantities.

*Nicotiana plumbaginifolia*, Viv. Apparently a recent introduction in weedy places in the plains Flos. white like a small petunia

## CAPSICUM

*Capsicum minimum*, Roxb. Cult. A red pepper.

*Capsicum annum*, L.—*Mirch*, Red pepper, Cayenne pepper. Cult.

## LYCIUM

*Lycium europaeum*, L. Abbottabad fide N. Ali. A spring shrub.

## CESTRUM

*Cestrum nocturnum*, L. *Rat ki rani* with greenish flos. and a sweet scent at night is cult. in Rawalpindi.

## SCROPHULARIACEAE

## VERBASCUM

*Verbascum thapsus*, L.—From the plains to 9,000', nowhere abundant.

*Verbascum coromandelianum*, (Vahl) O, Kze. (*Clsia* auctt.) A weedy plant with yellow flos. widespread in lowland India.

KICKXIA (*LINARIA* in part)

*Kickxia ramosissima*, (Wall.) Janchen, rocks and stony places to 5,000', glabrous with small yellow flos.

*Kickxia incana* (Wall.) Pennell (*Linaria cabulica* Benth). Much like the last but the leaves are pubescent and less acuminate. Rocky places to 3,500'.

## LINARIA

*Linaria jonstonii* (Stapf) Penn. (*L. minus* L.)—A small, erect, annual weed in fields in Marchi Sohan, Rawalpindi, Margalla, Attock District, etc., Flos. blue.

## ANTIRRHINUM

*Antirrhinum orontium*, L.—Another spring ephemeral weed, Margalla, Jhalar, Muzaffarbad, etc. Flos. nearly white.

## SCROPHULARIA

*Scrophularia polyantha*, Royle ex Benth. June and July Changla Gali; flos. green, tall by roadsides.

*Scrophularia decomposita latifolia* (Benth.) Pennell (*S. scopolii* Fl. Brit Ind.) Common in forest flowering before the rains 6,000'—10,000' Flos. crimson.

*Scrophularia stewartii*. Pennell Jhelum District. Phullaren. Mt. Tilla; Sakesar, Shahpur District.

*Scrophularia striata*, Boiss. Rawalpindi to Persia. Big clumps of stems with crimson flos. in dry soil. Morga, Kala Chitta Hills, Havelian, etc.

*Scrophularia scabiosaefolia*. Benth. Lahul to Afghanistan 3,500'—11,000'. Mansera to Abbottabad, Muzaffarabad.

## MIMULUS

*Mimulus strictus*, Benth, (*M. gracilis* Br.)—A species of wet places in the plains and lower foot hills.



## MAZUS

*Mazus Delavayi*, Bonati, Attock and Hazara to China. A prostrate leaved species from the plains to 7,000'.

## LINDENBERGIA

*Lindenbergia macrostachya*, Benth.—Tall and woody, flos. yellow from the plains to perhaps 5,000'. Rawalpindi, Abbottabad, Kashmir.

## BRAMIA

*Bramia monnieri* (L.) Pennell, (*Bacopa* or *Herpestis* in some books). A prostrate plant by streams or marshes, flos. lavender to pale white. Widespread in the tropics.

## WULFENIA

*Wulfenia amherstiana* (Wall) Benth. Common in shady places in the forest on cliffs and banks with spikes of pretty blue purple flos. from 4,000'—9,000'.

## VERONICA

*Veronica serpyllifolia*, L.—Murree, common on walks and by road-sides.

*Veronica arvensis*, L.—A common spring ruderal in Abbottabad, Poonch and Kashmir with pale mauve flos. up to 7,000'.

*Veronica persica*, Poir.—Common from about 4,000'—9,000'. Prostrate with dark blue flos. on rather long pedicels, flowering on walls as early as March.

*Veronica biloba*, L.—A common, erect. dwarf weed in fields in the spring above 2,000'. Domel, Abbottabad, Ghora Gali, etc.

*Veronica stewarti*, Pennell, Abbottabad, above Uri; Sirinagar and ephemeral with basal leaves, oval of elliptic.

*Veronica melissacfolia*, Poir. (*V. laxa* Benth). The largest and prettiest of the genus in our area growing in the forest with pretty violet flos. 6,500'—10,000'. Murree-Changla.

*Veronica—anagallis-aquatica*, L.—Plains to 7,000', in wet places, Peshawar, Abbottabad, Murree.

*Veronica undulata*, Wall.—Much like the last, but glandular. Plains to Murree. Peshawar, Abbottabad, etc.

*Veronica didyma tenore*, (*V. polita* Fries)—A common field weed in the spring in the plains and ascending to Baltistan on the Upper Indus. Prostrate and flos. pale violet.

## LEPTORRHABDOS

*Leptorrhabdos parviflora*, Benth. 4,500'—10,000', Ghora Gali, Murree, Changla. Usually tall and slender, flos. pink. After the rains.

## PEDICULARIS

*Pedicularis gracilis*, Wall, ex-Benth. Hazara to Sikkim. A coarse annual species, Ghora Gali, Murree, Changla.

*Pedicularis pectinata*, Wall. var. palans Prain. Perennial.—I have only found it at Ghora Gali in pine forest in October and on the Pipe Line on cliffs July—August. Pink and white.

## LATHRAEA

*Lathraea squamaria*, L.—A fleshy, leafless parasite. April. Murree, Dunga, Changla. According to Pennell this should be transferred to Orobanchaceae.

## STRIGA

*Striga euphrasioides* (Vahl) Benth. (*S. asiatica* (L.) O. Kze.) Corolla white, Found once in a field of millet after the rains, near Rawalpindi.

## OROBANCHACEAE

## AEGINETIA

*Aeginetia pedunculata*, Wall.—Reported from Murree in Fl. Brit. Ind., but I have not seen any specimens.

## OROBANCHE

## BOREALIS TURCZ

*Orobanche*,—Murree. Kishtwar fide Fl. Brit. Ind. Not seen.

*Orobanche indica*, Ham. Flos. blue in April and May, a parasite on tobacco and petunia. Sohawa, Capbollpur, Hazro.

## LENTIBULARIACEAE

## UTRICULARIA

*Utricularia*, Sp. Before the removal of the water hyacinth there was a specie growing in a pond in Topi Park, Rawalpindi.

## BIGNONIACEAE

## TECOMA

*Tecoma undulata* G. Don, Outer Himalaya and Salt Range, flowering in March and April, Lahura. Sohan near Rawalpindi, Barakao, Murree Road 22nd. mile, etc.

*Tecoma stans*. Juss. An erect shrub; as well as *T. capensis* Lindl. and *T. radicans* Juss, both handsome climbers are cult. in the plains.

## AMPHICOME

*Amphicome emodi* Lindl. *Kaur* is a very handsome rock plant with large pink flos with a yellow throat. Margalla, Saidpur Hills, Abbottabad, Lower Topa. Probably the finest wild flower in our area, worth cultivating.

## JACARANDA

*Jacaranda ovalifolia* R. Br.—One of the finest flowering trees with fine blue flos. in April is a native of S. America.

## BIGNONIA

*Bignonia tweediana* Lindl. with large yellow flos. and *B. speciosa* R. Grah. with lilac flos. are cult. in Rawalpindi.

## STEREOSPERMUM

*Stereospermum suaveolens*, DC.—Sub-Himalayan zone from Rawalpindi east (Parker) *padal*. Superficially like *Cassia fistula* but with opposite leaves.

## PEDALINEAE

## SESAMUM

*Sesamum orientale*, L.—*Til* is sometimes cult. in the plains.

## ACANTHACEAE

## RUELLIA

*Ruellia prostrata* Lamk. var. *dejecta* Clarke, Topi Park, Rawalpindi in Mar.

## DAEDALACANTHUS

*Daedalacanthus nervosus* T. Anders.—Foot hills to 3,000', Punjab to Bhotan. Treat. Cult. in Rawalpindi.

## HEMIGRAPHIS

*Hemigraphis latebrosa* Nees. var. *rupestris* Clarke. Flos. blue. Found once on the Murree Road in the pine zone at about 4,000'.

## AECHEMANTHERA

*Aechmanthera tomentosa* Nees var. *Wallichii* Clarke. Flos. August to October. Usually from the Ravi east.

## STROBILANTHES

*Strobilanthes glutinosus* Nees Flos in the winter beginning in November pale lavender, 2" long, sticky, smelling of camphor. 3,000'—6,000', Indus east to Nepal (Parker), Abbottabad, Murree.

*Strobilanthes attenuatus* Nees (*S. alatus* Nees non Blume), 6,000'—10,000', common on shady banks' dark blue flos. cordate leaves with winged petioles, blooming during the rains.

*Strobilanthes dalhousieanus* Clarke, Indus east 6,000'—8,000', leaves acuminate both ways. bracts rounded, inflorescence capitate, in moist forest.

## BARLERIA

*Barleria cristata* L.—Very common in the sub-Himalayan zone (Trans-Indus to China) and some times up to 6,000', flos. white or pink.

## LEPIDAGATHIS

*Lepidagathis incurva* D. Don (*L. hyalina* Nees).—Base of the Himalaya to 4,000', large with very dense, hairy heads. Nurpur, Saidpur. North India to China.

*Lepidagathis fasciculatus* Nees, Narb, Murree Hills, 6,500' (Conventry) Resembles *Hemigraphis latebrosa* but this has baretoles, is capitellate, has a sub bifid stigma, corolla suddenly ventricose in the middle, not tubular.

## JUSTICIA

*Justicia peploides* (Clarke) T. Anders. (*J. quinqueangularis* Koen, var. *peploides* Clarke), August, September in the plains.

*Justicia simplex* Don, A monsoon annual weed, smaller than the last, pink, more erect and more pubescent, from the plains to 6,000' at Ghora Gali.

## ADHATODA

*Adhatoda vasica* Nees, *Bhakar* or *baikar*. Very common in the lower hills in garveyards and waste places to 4,000', also in the plains. It owes its abundance to its unpalatability. Flos. white.

## DICLIPTERA

*Dicliptera roxburghiana* Nees. var. *bupleuroides* Nees. Very common in the plains and up to 6,000', flowering much of the year. Flos. pink.

## PERISTROPHE

*Peristrophe bicalyculata* Nees, a common monsoon weed in shady places, often with *Malvastrum*. Flos. pink but smaller than the last. The fruiting inflorescence hangs on through the winter.

## PHRYMACEAE

## PHRYMA

*Phryma leptostachya*, L.—Lower Forest Road, Murree, 6,500', flos. pale pink. The flos. are erect but the fruits turn down, appressed to the stem.

## VERBENACEAE

## LIPPIA

*Lippia nodiflora* Rich.—A common prostrate weed in damp soil in the plains, flowering in the spring.

## VERBENA

*Verbena officinalis*, L.—A common weed in the plains and hills with tiny pink flos.

## CLLICARPA

*Callicarpa macrophylla* Vahl, a shrub 4'—8' tall, with large oblong lanceolate leaves, wooly tomentose beneath, Flos. numerous, pink, during the monsoon. In the winter the small white fruits look like flos. from a distance. Ascends to 4,000'. Tret.

## PREMNA

*Premna barbata* Wall.—From the Indus eastwards (Parker). I have not seen any Rawalpindi specimens.

## VITEX

*Vitex negundo*, L.—Gregarious in small patches from the plains to 4,000', especially on the banks of streams. Very useful in controlling bank erosion. Flos. blue or lavender and leaves opposite and digitately 3—5 foliate.

## CLERODENDRON

*Clerodendron fragrans* (Vent.) Berol. A small shrub with large leaves, evil smelling, and corymbose panicles of white, double flos.; introduced from China. Cult. in Rawalpindi and apparently wild up to 4,000' on the Murree Road.

## CARYOPTERIS

*Caryopteris wallinichiana* Schauer [*C. odorata* (Ham.) Robinson]. A handsome shrub, sometimes cult. with a wealth of purplish flos. in the spring from the plains to 4,000', Hazara to Bhutan. Saidpur Hills, Tret, Abbottabad.

*Caryopteris grata* Benth. Common 4,000'—5,500' in Rawalpindi (Parker), Flos. small, numerous white or purplish, fruits red when ripe. Dhirkot (Jerram).

## DURANTA

*Duranta plumieri* Jacq.—This tropical American shrub seems to be the best hedge plant for Rawalpindi conditions. The flos. are blue, less commonly white.

## LANTANA

*Lantana indica* Roxb. (*L. indica* var. *alba* Wight).— A small shrub, to 3,000', with white flos. fairly common to 3,000' flowering in the spring and again in the autumn.

*Lantana camara* L. *Panch phul*.—This pan tropic weed which has run wild in many places in India is planted in some Rawalpindi gardens. The vernacular name is due to the fact that the flos. change colour with age and flos. of different colours are found in one inflorescence.

## LABIATAE

## OCIMUM

*Ocimum basilicum* L. *Nyazbo*, or Sweet basil, with a fine, distinctive scent is commonly cult. in Rawalpindi.

*Ocimum canum* Sims, [*O. americanum* L. fide Parker] a dwarf shrub resembles the last, but is smaller in all its parts. It is wild in Hirnpur, Jhelum District, Pabbi Hills, Attock District. *Hoary basil*.

*Ocimum sanctum* L. *Tulsi* with red flos. was cult. especially by Hindus.

## ORTHOSIPHON

*Orthosiphon pallidus* BENTH. A small white flowered herb with a woody root suggests *Ocimum* but the calyx is more asymmetrical. Occasional about Rawalpindi after the rains.

## PLEOTRANTHUS

*Plectranthus striatus* BENTH. is a small annual, 6—12" tall found at Ghora Gali in October.

*Plectranthus coetsa* Ham. is tall, branching, herbaceous, with lavender flos. in forest in the Murree Hills, flowering during the monsoon.

*Plectranthus rugosus* Wall' is a very common shrub from 3,000'—8,000', often growing with *Indigofera*, *Margalla*, *Kahuta* and on sunny banks throughout the Murree Hills; leaves white below.

## COLEBROOKIA

*Colebrookia oppositifolia* Sm. An anomalous silky tomentose shrub of the foothill zone to 4,000' with conspicuous catkin like fruiting spikes which persist most of the year; flos. January—April; Peshawar to Burma.

## ELSHOLTZIA

*Elsholtzia patrini* (Lopech) Gareke, (*E. cristata* Willd.) Pipe Line, October.

## PERILLA

*Perilla frutescens* (L.) Britt. (*P. ocimoides* L.) I have a record that this was found in the Murree Hills in June 1925 but have no specimen.

## MENTHA

*Mentha sylvestris* L. var. *incana* (Willd.) Hk. f. Common in damp places from the edge of the plains and in the hills.

*Mentha piperita* L.—*Podina* is planted.

## LYCOPUS

*Lycopus europæus* L. var. *exaltata* Hk. f.—Hasan Abdal and Huripur Hazara in wet places after the rains. Leaves pinnatifid ; inflorescence whorled, axillary, calyx teeth sharp.

## ORIGANUM

*Origanum vulgare* L.—Very common on dry banks from 2,000'—9,000', often a pioneer on landslips. Flowers small, white.

## MICROMERIA

*Micromeria biflora* Benth.—Very common from Rawalpindi to 7,000', xerophytic in poor stony soil or in rock crevices, flowers small, pink; spring and summer.

## CALAMINTHA

*Calamintha clinopodium* Benth.—Murree, Pipe Line, Changla ; April-July.

*Calamintha umbrosa* Benth.—Very common, Abbottabad, and the Murree Hills in the forest and in waste places ; often prostrate, . Flos. smaller. Bracts shorter than the calyx not forming an involucre as in the last.

*Calamintha longicaulis* Benth.—Larger, suggesting a *Nepeta* about 16" tall, only collected near Khanspur on the Pipe Line in October.

## SALVIA

*Salvia moorcroftiana* Wall.—Common in the plains in waste places with lavender flowers and a basal rosette of leaves, also in Abbottabad and the valley of Kashmir. Flos. in April in the plains, showy.

*Salvia lanata* Roxb.—Usually above 4,000' flowering in June with handsome blue flos. and growing on sunny, gravelly banks.

*Salvia plebeia* R. Br.—An unattractive weed growing in poorly drained or wet soil in the plains and up to 5,000' Flos. in April in Rawalpindi.

*Salvia aegyptiaca* L.—A small, unattractive perennial with a woody base found from the Punjab west to the Cape Verde Is.

*Salvia santoliniaefolia* Boiss.—Very xerophytic with peculiarly divided leaves which are very small ; calyx hairy. Jhalar, Attock District (Nasir), N.-W. F. P.

## NEPETA

*Nepeta prainii* Duthie, from 2,000'—7,000', with very pale, interrupted spikes, leaves much veined below, ovate to ovate elliptic, crenate, about 1" long.

*Nepeta spicata* Benth.—Is a rather weedy species from 4,000'—9,000', Abbottabad, Ghora Gali, Changla.

*Nepeta raphanorhiza* Benth.—Is easily recognized by its radish like tuberous root. Common at Havelian and Abbottabad. Flos. purple in April.

*Nepeta graciliflora* Benth.—Mt. Tilla, Jhelum District, Attock. Flos. few and pedicelled.

*Nepeta mollis* Benth.—Hirnpur, Jhelum District, May ; flos. minute, lower verticillasters stalked.

*Nepeta distans* Benth.—Murree Hills side

*Nepeta erecta* Benth.—June to October Dunga Gali, Changla. Flos. Blue.

#### LALLEMANTIA

*Lallemantia royleana* (Wall.) Benth.—A small, erect annual, flowering in March and April in the plains, flos. pale to dark blue suggesting a *Nepeta*. Widely distributed in the deserts of Central Asia.

#### SCUTELLARIA

*Scutellaria teucrifolia* Dunn.—Murree Hills. My 6180 is co-type. Rare, the upper lip is dark purple and the lower cherry pink, the tube white, faintly streaked with pink. June.

*Scutellaria linearis* Benth.—Grows from Murree to Kohala on hot gravelly banks or landslips, also on the Jhelum Valley Road in Kashmir. The tube is cream colour and the corolla pink.

#### BRUNELLA

*Brunella vulgaris* L.—Fairly common in Murree and the Galis with blue purple flos. by paths and open places in the forest.

#### ANISOMELES

*Anisomeles indica* (L.) O. Kze. (*A. ovata* R. Br.)—A large, rosy flowered herb growing in the plains and lower hills to 5,000'. After the rains from the Indus to the Philippines.

#### STACHYS

*Stachys sericea* Wall.—Is fairly common from 4,000—9,000 in Abbottabad and Murree during the monsoon.

*Stachys melissaefolia* Benth.—Ghora Dakka, near Dunga Gali (Dehra Dun Herbarium). The tips of the calyx are triangular, not spiny tipped as in the last.

*Stachys parviflora*, Benth.—*Bui*, is an evil smelling perennial growing in small clumps in the plains in xerophytic places, flowering in the hot weather April to June.

#### LEONURUS

*Leonurus cardiaca*, L.—Is a temperate species found on the Pipe Line, Changla and Mokhshpuri.

#### LAMIUM

*Lamium amplexicaule*, L.—Is a common pink flowered, prostrate field weed from the plains to 9,000'.

*Lamium album* L.—Has white flos. and grows in damp shady places in forest in Murree and the Galis.

#### OTOSTEGIA

*Otostegia limbata*, (Benth.) Boiss.—*Chitti bui*, is a spiny shrub in the plains and lower hills with handsome orange flos.

#### LEUCAS

*Leucas urticifolia*, Br.—A white flowered, monsoon annual weed in the plains from the Punjab to Arabia and Ethiopia with long leafy bracts.

*Leucas mollissima*, Wall.—Var. *pilosa* (Haines) Muk. is an annual of the lower hills, Tret, Batrasi, Garhi, etc.

*Leucas nutans*, Spreng.—Is like the last but the flos. are depressed, not erect. Khanna, Rawalpindi, Toll Gate, Murree Road, etc., growing during the monsoon.

*Leucas cephalotes*, Spreng.—Is another summer field weed with large rounded bracteate heads., common in the plains.

#### PHLOMIS

*Phlomis spectabilis* Falc. ex. Benth.—*Gaur* is a large, handsome plant with ovate, cordate leaves and rose purple flos. Kotli, Abbottabad, Pipe Line.

*Phlomis cashmeriana*, Benth.—Another handsome plant which would be worth bringing into cultivation. The leaves are long for their width and hoary white below. Murree, Patriata.

#### EREMOSTACHYS

*Eremostachys vicaryi*, Benth.—A handsome, white flowered plains species with a basal rosette of leaves and growing in desert soils in the plains, Kala Chitta Hills, etc., flowering in April.

#### TEUCRIUM

*Teucrium royleanum*, Wall.—With white flowers grows in Murree among rocks and Changla in June to September spreading by suckers.

#### AJUGA

*Ajuga bracteosa* Wall.—Is common from Ethiopia to China from the plains to 7,000' in open dry places blooming from March to December.

*Ajuga parviflora* Benth.—Is also common but can be distinguished by smaller flos. and longer and narrowed bracts. Abbottabad, Murree, Pipe Line, April to June.

#### PLANTAGINEAE

##### PLANTAGO

*Plantago major* L.—sensu lat.—A common weed, usually in moist or rich soil from the plains to 9,000'. All or part is *P. asiatica* L. var. *angusta* Pilger.

*Plantago lanceolata* L.—Another common weed from the plains to 9,000'.

*Plantago amplexicaulis* Cav. var. *Bauphula* (Edgew.)—Pilger, a plains plant in the spring, acaulescent and with 5 nerved leaves.

*Plantago ovata* Forsk.—Common in the plains in gravelly places and westward to the Canaries; leaves 3 nerved, narrow, flowering in March and April. *Isafgol*.

*Plantago ciliata* Desf.—A desert species of the plains, very hoary, white ciliate; Jhelum district, Attock district, Peshawar.

#### NYCTAGINACEAE

##### BOUGAINVILLEA

*Bougainvillea glabra* L. and *B. spectabilis* Wild.—cult. in the plains.



## BOERHAAVIA

*Boerhaavia diffusa* L.—(*B. repens* L.) *Itsit* is a common, prostrate, tropical plant with small pink flos. in the plains and foot hills. *Glue weed*.

*Boerhaavia verticillata* Porr. Mt.—Tilla, Jhelum district. Fruit 1/6", clavate with large glands around the Crown.

*Boerhaavia elegans* Choisy.—*Sant*, Kahuta fide Duthie.

## MIRABILIS

*Mirabilis jalapa* L., the Marvel of Peru with pretty white, pink or red flos. is an escape about Pindi in September and October.

## ILLECEBRACEAE

## HERNIARIA

*Herniaria hirsuta* L.—Common west to the Canary Is. is a common prostrate weed in desert places in the plains and up to 8,000'. The genus is included in the *Caryophyllaceae* by some authors. It is dwarf and prostrate with very small leaves.

## AMARANTHACEAE.

## CELOSIA.

*Celosia argentea* L.—With a silvery inflorescence is a common monsoon weed in the plains and up to 4,000'.

## DIGERA.

*Digera arvensis* Forsk.—A small, erect, field and wayside weed ascending to 4,500' in the autumn. N. Africa to Java.

## AMARANTHUS.

*Amaranthus spinosus* L.—The only spiny species is a common weed in waste places April to September ascending to 4,000'.

*Amaranthus cruentus* L.—(*A. paniculatus* L.) Abbottabad and Murree. Sometimes cult. in the rainy season. Cocks comb.

*Amaranthus viridis* L. (*A. gracilis* Desf.)—A weed of the plains in the spring with a slender terminal inflorescence.

*Amaranthus blitum* L.—A summer weed of the plains and up to 7,000'. Procumbent.

## PUPALIA

*Puplia lappacea* (L.) Juss.—A noxious perennial flowering from September to April and bearing prickly fruits which catch in clothes, native to tropical Africa and Asia.

## AERUA

*Aerua persica* (Burm.) Merrill ; (*A. tomentosa* Forsk.), (*A. javanica* Juss.) Erect, spicate, very xerophytic, Cape Verde Is. to Java and Ceylon. Rawalpindi, Margalla, Hasan Abdal, etc.

*Aerua scandens*, (Roxb.) Wall.—A leaner, not stiff like the last, ranging from Tropical Africa to the Phillippines and ascending to 6,000'.

## ACHYRANTHES

*Achyranthes aspera* L.—*Phut kanda* is a common tropical weed, very abundant in the plains after the monsoon with reversed spines causing the fruits to stick to wool, etc.

*Achyranthes bidentata*—Blume is much more mesophytic and is found in the hills about Murree to 9,000'.

## ALTERNANTHERA

*Alternanthera sessilis* (L.) R. Br.—Is a common weed in the plains in the autumn.

## CHENOPODIACEÆ

## CHENOPODIUM

*Chenopodium album* L.—*Bathu* is very common as a weed in plains and mountains. from April to September. Makes a good pot herb.

*Chenopodium botrys* L.—Attock in hot gravel, Kashmir.

*Chenopodium murale* L.—*Kurand* is another plains weed, common in fields in March, green, not glaucous is in *C. album*.

*Chenopodium ambrosioides* L.—A medicinal weed on the plains and lower hills with a very strong aromatic odour.

*Chenopodium foliosum*—(Moench) aschers. (*C. blitum* of Fl. Br. Ind.) Strawberry goosefood, with reddish fruits grows in Murree.

*Chenopodium ofuliphuim*, Schuad—Murree. This resembles *C. album* but the leaves are broader and the seeds minutely datted, not smooth. Murree.

## BETA

*Beta vulgaris* L.—The beet, *chakandar* is commonly cult. throughout.

## SPINACIA

*Spinacia oleracea* L.—Spinach or *palak* is also much cult.

## ATRIPLEX

*Atriplex laciniata* L.—(*A. crassifolia* C.A.M.) A weed of the plains and ascending to 12,000' in Tibetan Kashmir. The stems are white and smooth.

## KOCHIA

*Kochia indica*—Wight, is a weed of the plains before the rains.

## SUAEDA

*Suaeda fruticosa* —Forsk. *lana*, *lani* is a plant of saline soils from the Punjab to the Atlantic. A source of *sajji*.

## SALSOLA

*Salsola foetida* Del.—Another source of *sajji*, Jhelum district.

## HALOXYLON

*Haloxylon recurvum* Bunge—The West Punjab and the Salt Range.

## HALOCHARIS

*Halocharis*—There is a dwarf. ciliate, succulent growing in stony places near Rawalpindi at Margalla, the Nurpur Hills and the Kala Chitta Hills which may belong here.

## PHYTOLACCACEÆ

## PHYTOLACCA

*Phytolacca acinosa*—Roxb. A large coarse perennial herb in open places in forest in Murree and Upper Topa.

## POLYGONACEAE

*Polygonum aviculare* L.—A very common, prostrate, nitrophilous weed in waste places from 4,000'—9,000' in the Murree Hills; Abbottabad.

*Polygonum plebium* R. Br.—Common in drying ponds and ditches in the spring to 4,000'; prostrate, flos. a pretty pink.

*Polygonum amplexicaule* D. Don.—Is common in forest in the Murree Hills, erect up to 3' tall, flos. white, pink or crimson, the leaves stem clasping and the rootstock rhizomatous.

*Polygonum glabrum* Willd. This large, gregarious species grows near streams in the plains. Whole plant glabrous, stipules usually ciliate.

*Polygonum caespitosum*—Blume var. *longisetum* (D. Br.) Danser, (*P. serulatum* Lagasc) is found from the plains to 8,500'. The leaves are pale and the ochreae and cilia are unusually long. April to June.

*Polygonum nepalense* Meissn. (*P. Alatum* Ham.), an erect, rather small, abundant summer weed in fields and roadsides, 3,000'—10,000', bearings small pink flos. The leaf petioles are winged.

*Polygonum barbatum* L.—Another plains species near *P. vcaespitosum* but the leaf bases are acute or acuminate, not obtuse or slightly cordate.

*Polygonum hydropiper* L.—Usually by water. Abbottabad (N. Ali).

*Polygonum affine* D. Don is a handsome perennial species with a pink, spicate inflorescence, common on rocky ridges. Mokhshpuri top, 10,000'.

*Polygonum flaccidum* Meissn. is reported from Rawalpindi District by Gage.

## RUMEX

*Rumex dentatus*, L. subsp. *Klotzschianus* (Meissn.) Rech. fil. is very common in lowlying places in the plains, flowering in March—April.

*Rumex hastatus*, D. Don, a very common pioneer undershrub growing on cliffs and banks in the sub Himalayan zone and up to 8,000'. The flos. are pink and the leaves hastate.

*Rumex vesicarius* L. A xerophytic, spring, plains species flowering in March and April with a persistent, inflated pink calyx, Margalla, Attock District, N.-W.F.P.

*Rumex nepalensis*, Spreng. A large, erect, perennial species with many basal leaves. The calyx is prickly and hooked and catches in clothing in the autumn. Usually above 6,000'.

## MUEHLENBECKIA

*Muehlenbeckia platyclados* Meissn., *Ribbon bush* is cult. in the plains.

## ANTIGONON

*Antigonon leptopus* Hk. & Arn., the *Coral creeper* is a handsome, cult. vine, flowering in the summer and early autumn.

## ARISTOLOCHIACEAE

## ARISTOLOCHIA

*Aristolochia punjabensis* Lae, *Ghore sum or nag bel*, is a large vine in hedges or hanging from cliffs with peculiar browish flowers curved like a Dutch.

mans pipe and six ridged fruits about 2' 1/2" long. Murree, Upper Topa, Barain, Trarkhal in Poonch. Flos. in June and July.

## LAURACEAE

### MACHILUS

*Machilus odoratissima*, Nees, *char.* is found from the Indus east to Cochin. China in moist places at low elevations and sometimes up to 6,000'. Abbotabad, Panjar near Kahuta (Parker), Trarkhal, Poonch.

*Machilus duthiei* King ex Hk.f. grows on shady northern slopes of the Murree Hills in ravines from 4,000'—8,000' from the Indus eastwards.

### LITSAEA

*Litsea chinensis* Lamk. [*Neolitsea chinensis* (Gamble) Chun] is found from Rawalpindi District eastwards bearing leaves which are grey tomentose beneath, in the sub-Himalayan tract and adjacent plains. (Parker). *maidasak*.

*Litsea monopetala* (Roxb.) Pers. (*L. polyantha* Juss.) Not common. Rawalpindi eastward in the foothill zone. Salt Range. Leaves brown pubescent beneath.

*Litsea umbrosa* Nees. (*Neolitsea umbrosa* (Nees) Gamble.) is common in the Murree Hills from 4,000'—8,000' with glabrous leaves, pale glaucous below, in shady ravines on northern slopes.

### PROTEACEAE

*Grevillea robusta* A. Cunn., the *Silver* or *Australian oak* is cult. in Rawalpindi. The grain of the wood suggests oak.

## THYMELEACEAE

### THYMELAEA

*Thymelaea arvensis* Lamk., an inconspicuous spring annual with minute, sessile, axillary flos. grows near Hasan Abdal, Huripur, Peshawar and Srinagar.

### DIARTHRON

*Diarthron vesiculosum* F. & M., resembling the last but with terminal racemes has been collected in May at Khanna near Rawalpindi, in the Kala-Chitta Hills, Peshawar, etc.

### DAPHNE

*Daphne oleoides* Schreb. grows at Kakul, Daddar and other places in Hazara and in Poonch but I have not found it as yet in Rawalpindi. *Kutti lal*.

*Daphne papyracea* Dcne. is common in forest undergrowth from 5,000'—10,000' with pretty white flowers in spring and autumn. It lacks the aromatic odour of *Skimmia* with which it may be confused.

### WIKSTROEMIA

*Wikstroemia canescens* Meissn., a shrub with small yellow flos. and a bark yielding a strong fibre grows on the Pipe Line near Khaira Gali in the open.

## ELAEAGNACEAE

## ELAEAGNUS

*Elaeagnus umbellata* Thunb. a deciduous shrub, which can be recognised by the silvery scales on young branches and the lower surfaces of its leaves. grows in Abbottabad, Murree, Upper Topa and Poonch.

## LORANTHACEAE

## LORANTHUS

*Loranthus longiflorus* Desr. is found from Rawalpindi District eastwards to Sumatra and New Guinea in the plains and foothills growing on various trees and bearing handsome scarlet racemes of flos. much of the year.

## VISCUM

*Viscum album* L. is found from 3,000'—9,000' but is no longer common because of the Christmas demand in Rawalpindi. The white berries ripen in November and December. It is found on horse chestnut at Murree and Kundanna.

*Viscum japonicum* Thunb. grows occasionally on *Quercus dilatata* about Murree.

## SANTALACEAE

## THESIUM

*Thesium himalense* Royle, a herbaceous semi parasite grows at Margalla and Abbottabad.

## EUPHORBIACEAE

## EUPHORBIA

*Euphorbia hypericifolia* L. is common in the plains and lower hills after the rains.

*Euphorbia hirta* L., a pan tropic weed, grows, in the plains in September.

*Euphorbia granulata* Forsk. var. *glabrata* Boiss. which is often identified as *E. thymifolia* is very common, often in lawns in the plains.

*Euphorbia clarkeana* Hk. f. is reported from Rawalpindi by Aitchison, and from Hazara by Falconer.

*Euphorbia royleana* Boiss., *danda thor*, is fairly common in rocky places in the foothills and is planted in Rawalpindi, flowering in April.

*Euphorbia wallichii* Hk. f. (*E. Jacquemontii* Boiss. fide Croizat) with large yellow bracts and growing in large clumps grows in Changla and at Nathia Gali.

*Euphorbia cognata* Kl., another perennial, mistakenly connected with *E. pilosa* in the Fl. Brit. Ind. is found in Abbottabad, Murree, the Pipe Line and Changla.

*Euphorbia helioscopia* L. is a very common annual in the plains from February to April and ascends into the hills.

*Euphorbia dracunculoides* Lamk. is a common spring weed in fields in the plains in March and April. The bracts are more linear than in the last and the seed are leprous.

*Euphorbia notoptera* Boiss? This species suggests *E. Maddeni* Boiss but there are parallel ridges at the three corners of the capsule. It is common about Murree in weedy places and roadsides in the summer. Annual.

*Euphorbia falcata* L. Another spring annual in grain fields but not common in Rawalpindi; Hasan Abdal, Peshawar, Jhelum Valley Road.

*Euphorbia prolifera* Ham. a perennial of the plains and low rocky hills is common about Rawalpindi, flowering in March and April. The leaves are three nerved and the glands fimbriate.

*Euphorbia hispida* Boiss., a dwarf, prostrate annual with white involucres grows at Attock, Gharial and probably elsewhere.

*Euphorbia pulcherrima* Willd., the *Poinsettia*, a native of Central America is much cult. in Rawalpindi.

*Euphorbia bojeri* Hook., often called *E. splendens*, is also cult. in Rawalpindi. *Crown of Thorns*.

#### BRIDELIA

*Bridelia verrucosa* Haines, Indus east. (Parker). I have not seen any specimens in our area.

#### ANDRACHNE

*Andrachne aspera* Spreng. Attock and the N.-W.F.P.; a prostrate herb.

*Andrachne cordifolia* Muell. is a very common shrub in forest undergrowth from 5,000'—8,000' in Hazara and the Murree Hills.

#### PHYLLANTHUS

*Phyllanthus emblica* L., *gonla*, *ambli*, grows in the lower hills from the Indus east to 4,500' The fruit is commonly picked and has been found to be unusually rich in vitamins and its use should be encouraged. The leaves are useful in tanning.

*Phyllanthus niruri* L. is a small, annual field weed fruiting at the close of the monsoon from the plains to 6,000'.

#### GLOCHIDION

*Glochidion velutinum* Wight, is a small tree of the foothill zone, and often in chir forest. The seeds are bright red. Ghora Gali (Coventry).

#### SECURINEGA

*Securinega virosa* (Willd.) Pax & Hoffm. (*Flueggea microcarpa* Blume) is a small unarmed tree of the foothills to 5,000'. It has two kinds of fruit, most of it being small and dry and a few, white, succulent and edible. Margalla, Pabbi Hills, Batrasi, Muzaffarabad, etc.

#### CHROZOPHORA

*Chrozophora hierosolmitana* Spr. is a weedy annual growing in the plains in the hot weather before the rains.

#### ACALYPHA

*Acalypha brachystachya* Hoernem., a dwarf spring weed of the plains and up to 6,000' at Ghora Gali; Wah, Jhalar, Havelian, etc.

*Acalypha ciliata* Forak. Saidpur and Hasan Abdal in September vide Aitchison.

#### MALLOTUS

*Mallotus philippinensis* Muell., *kameela* is common from the Indus east to the Far East and ascending to 4,000'. The red powder on the capsules is used as a dye. The leaves are not eaten.

#### RICINUS

*Ricinus communis* L. is common in the plains and up to 4,000'. It is usually found about villages and is probably African in origin. The Castor Oil plant, or *arind*.

#### SAPIUM

*Sapium sebiferum* Roxb., *pepli*, *makkun* or *charbi* is cult. or self sown up to 6,000'. Grows well near water.

#### BUXACEAE

##### BUXUS

*Buxus papillosa* C. K. Schn., *shamshad*, a shrub or small tree often grows gregariously on limestone; Margalla, Kala Chitta Hills, Chattar Bagh from 2,000'—4,000'.

#### SARCOCOCCA

*Sarcococca saligna* Muell. is a very common shrub in forest undergrowth from 5,000'—9,000', often with *Andrachne*.

#### ULMACEAE

##### ULMUS

*Ulmus Wallichiana* Planch, the large leaved elm is fairly common in the forest around Murree from 6,000'.

*Ulmus laevigata* Royle, the small leaved elm, is found from the Indus to the Jumna according to Parker. I have found it in Abbottabad, Poonch and Kashmir.

#### URTICACEAE

##### CELTIS

*Celtis australis* L., *batkar* is found in Abbottabad, possibly cult., and about Murree.

*Celtis eriocarpa* Dene. is found from the plains to 6,000' and can be separated from the last by its prominently 3 nerved leaves, irregular toothing, obscure secondary veins and tomentose ovary.

#### OREOCNIDE

*Oreocnide frutescens* Miq. (*Villebrunea* Biume), Indus east to 5,000' growing along the rocky banks of streams and water channels (Parker); Poonch.

#### TREMA

*Trema politoria* Planch, Rawalpindi east, common along the Jhelum River (Parker). The leaves are so rough that they can be used for sand paper. A plant of the foothills.

## CANNABIS

*Cannabis sativa* L. (*C. indica* L.). *bang* grows everywhere in the district by roadsides and in waste places. Indian Hemp.

## BROUSSONNETIA

*Broussonnetia papyrifera* Vent., the Paper mulberry, with circular, roddish mulberry like fruit is planted in Rawalpindi, often as a roadside tree. It grows with great rapidity, and is used to make paper.

## MORUS

*Morus alba* L. the common silkworm mulberry, is planted and self sown throughout the district. The wood is very useful and is excellent for sports goods. The fruits are red or white. *Tut*.

*Morus serrata* Roxb., with large serrate leaves is much lopped for fodder in the Murree Hills. It is common in forest from 4,000'—9,000', wide not planted.

*Morus laevigata* Wall., the *shah tut* with long white fruits is cult. in the plains and Abbottabad.

## FICUS

*Ficus bengalensis* L., the *bor* or *banyan* is found in every village in the plains and up to 3,000'.

*Ficus religiosa* L., the *peepul*, is wild in the foothills and is commonly planted in the plains. It does much damage to walls.

*Ficus infectoria* Roxb., an excellent shade tree is also sub-Himalayan from the Indus east but is not as common as the last two. Saidpur, Kala Chitta Hills, Havelian etc.

*Ficus cunia* Ham., which is easy to recognize by its very lopsided leaves is found from the Rawalpindi District east (Parker). I have found it in Hazara but not in Rawalpindi.

*Ficus foveolata* Wall. is the only wild climbing fig in the area and it is abundant on rocks and cliffs up to 7,000'.

*Ficus palmata* Forsk., *phagwara*, is found from the plains to 9,000'. It has both palmate and ovate leaves.

*Ficus nemoralis* Wall. From Hazara eastwards to 7,000', not common (Parker) Ghora Gali.

*Ficus roxburghii* Wall., *dhusi*, *trembal* with large ovate or rounded leaves is fairly common up to 5,000'.

*Ficus glomerata* Roxb., *gular*, grows in the plains and foothills with the figs on leafless branches, usually full of insects.

*Ficus carica* L., *anjir* is sparingly cult.

## URTICA

*Urtica dioica* L. *bichchu buti* is fairly common in waste places about Abbottabad and Murree and up to 9,000'.

*Urtica* sp. with larger leaves and stipules is found in Murree.

## GIRARDINIA

*Girardinia heterophylla* Dene. with longer even more irritating hairs than the last is occasional about Murree.



## PILEA

*Pilea umbrosa* Wedd. grows during the rains in Gharial, Murree, Changla etc.

*Pilea scripta* Wedd. Gharial, the leaves longer and more acuminate.

## LECANTHUS

*Lecanthus peduncularis* (Royle) Wedd., a plant of damp soil in the forest during the rains, the receptacles often very small. Ghora Gali, Jhikka Gali, etc.

## GONOSTEGIA

*Gonostegia (Pouzolzia) pentandra* (Roxb.) Miq. is a tropical plant of the plains with long prostrate branches and slender spikes. Rawalpindi Wah.

## DEBREGEASIA

*Debregeasia salicifolia* (D. Don) R. R. S. (*D. hypoleuca* Wedd.) is common in wet places in the foothill zone and up to 6,000'. The leaves are shaped like those of a willow and white below. Wah, Saidpur Hills, Murree, Poonch, etc.

## PARIETARIA

*Parietaria debilis* Forst. f., a delicate annual growing in the shade of rocks, Abbottabad, Changla.

## FORSKOHLEA

*Forskohlea tenacissima* L., a weedy, xerophytic herb, with a distribution westward to Egypt and Arabia. Hasan Abdal, Attock, Cherat Salt Range etc.

## PLATANACEAE

## PLATANUS

*Platanus orientalis* L., the chenar or Oriental Plane tree is cult. in Abbottabad and occasionally in Rawalpindi.

## JUGLANDACEAE

## JUGLANS

*Juglans regia* L., the walnut, is cult. in the Murree Hills, 5,000'—9,000'.

## ENGELHARDTIA

*Engelhardtia colebrookeana* Lindl., *samma* grows at Punjar, ranging eastward from Rawalpindi District to Burma.

## CUPULIFERAE

## ALNUS

*Alnus nitida* Endl., the alder, grows at Abbottabad, Kakul, Poonch and on the Jhelum Valley Road but I have not seen any in Rawalpindi.

## CORYLUS

*Corylus colurna* L., the hazel, *urni* or *thangi* is found on Changla Gali.

## QUERCUS

*Quercus incana* Roxb., the *ban* oak, with leaves white below is very common from 4,000' chiefly on southern slopes.

*Quercus dilatata* Lindl., *moru* or *barungi* with leaves green below is one of the commonest trees throughout the Murree Hills. Because of the pressure of population this valuable tree like many others is lopped excessively for fodder and undamaged trees are not common.

*Quercus glauca* Thunb. Indus to Japan, 2,000'—6,000', rare in Rawalpindi.

*Quercus pedunculata* Ehrh., the English oak is planted in Abbottabad and Ghora Gali.

#### CASTANEA

*Castanea sativa* Mill., the European chestnut, has been planted in Abbottabad and Ghora Gali but does not do well. (Parker).

#### SALICACEAE

##### SALIX

*Salix acmophylla* Boiss. is very common near water in the plains and up to 5,000', usually planted.

*Salix wallichiana* Anders., Murree, 5,000'—9,000', flowering before the leaves, the leaves are usually pubescent below, capsules silky. A tree.

*Salix denticulata* Anders., a gregarious shrub, is found on Changla.

*Salix denticulata* var. *hazarica* Parker, with pubescent capsules is found on the Pipe Line, Changla and Dunga Gali.

*Salix babylonica* L., the weeping willow, is sometimes planted in the plains and in Murree.

##### POPULUS

*Populus nigra* L. var. *pyramidalis* Spach, the Lombardy Poplar or *safeda* is planted in Rawalpindi and about Murree, also in Abbottabad.

*Populus alba* L., the white poplar is planted in Abbottabad and about Murree and according to Parker is wild near Ghora Gali.

*Populus ciliata* Wall., *palach*, the Himalayan poplar, is common among blue pine and fir on northern slopes about Murree and the Galis.

#### MONOCOTYLEDONS HYDROCHARIDACEAE

##### HYDRILLA

*Hydrilla verticillata* Casp. is common in the plains in still or slowly moving water.

##### VALLISNERIA

*Vallisneria spiralis* L., in water above Sohan Bridge near Rawalpindi, Wah.

#### ORCHIDACEAE

##### MICROSTYLIS

*Microstylis muscipera* Ridley? Pipe Line, Murree Hills, August 1948.

##### LIPARIS

*Liparis rostrata* Reichb., Bhurban, Gharial, Jhikka Gali during the rains.

## NEOTTIA

*Neottia listeroides* Lindl., Jhikka Gali, Changla in damp humus in August Leafless.

## GASTRODIA

*Gastrodia orobanchoides* Benth., another leafless plant, up to 3' tall in forest with a potato like tuber at the base and a spike of greenish yellow flos.

## CEPHALANTHERA

*Cephalanthera ensifolia* Richard, with white flos. grows at Upper Topa before the rains.

## EPIPACTIS

*Epipactis veratrifolia* Boiss. & Hohen. (*E. consimilis* Wall.) grows on the banks of streams, bearing pretty green and yellow flos. in March at Kala, Dhamial and near the 17th mile on the Murree Road.

*Epipactis latifolia* Swartz (*Amesia latifolia* (Wall.) Nels. & Macbr.) is the commonest orchid in forest throughout the Murree Hills. The flos. are a dingy purple. July—September.

## GOODYERA

*Goodyera repens* R. Br. grows along the Pipe Line and on Changla in the summer. It grows on the forest floor bearing a spike of small white flos.

## ORCHIS

*Orchis latifolia* L. grows on Changla in moist soil bearing pink or crimson flos.

## HABENARIA

*Habenaria digitata* Lindl., in pine forest at 3,500' at Samli (Coventry).

*Habenaria susannae* Lindl., the largest flowered of the genus in our area was found at Bani by Coventry.

*Habenaria latilabris* Hk.f. has been reported from Ghora Gali and Charehan.

*Habenaria edgeworthii* Hk. f. with yellow flos. bearing upturned spurs grows at Upper Topa.

*Habenaria aitchisoni* Reichb. with two ovate basal leaves is fairly common in forest in Murree, Upper Topa and Gharial.

*Habenaria intermedia* D. Don, the Reindeer orchid, with handsome, fringed white flos. has been collected on grassy slopes in Murree.

## HERMINIUM

*Herminium gramineum* Lindl. with one leaf and very small green flos. has been collected at Ghora Gali.

*Herminium angustifolium* Benth., with a tall spike of small green flos. grows in Murree and Ghora Gali.

## SATYRIUM

*Satyrium nepalense* D. Don, Ghora Gali and Murree with fine pink and white flos.

## CYMBIDIUM

*Cymbidium macrorhizon* Lindl., Ghora Gali; Samli in July (Coventry)  
The leaves are very large for an orchid suggesting over sized leaves of  
*Plantago major*.

## CYPRIPEDIUM

*Cypripedium cordigerum* D. Don., the yellow Lady Slipper has been  
collected at Nathia Gali.

## ADENOSTYLIS

*Adenostylis strateumatica* (L) Ames, (*Zeuxine sulcata* Lindl.) is the only  
orchid which is common in the plains of the Punjab. It grows in the grass at  
the edge of streams, often in abundance and bears small white flos. in March  
and April.

## EPIPOGUM

*Epipogum* sp., leafless with yellowish flos. was collected at Kala by  
M. Nath.

## SCITAMINEAE

## CANNA

*Canna indica* L. Commonly cult. in gardens.

## MUSA

*Musa sapientum* L. The banana is sometimes planted up to 4,500' in  
the Murree Hills but there are no good varieties raised in our area.

## ROSCOEA

*Roscoea alpina* Royle with pretty pink flos. grows on the Pipe Line in  
July.

## HAEMADORACEAE

## LIRIOPE

*Liriope graminifolia* (L.) Baker with pale blue flos. grows at Abbottabad,  
in Muzaffarabad and Uri.

## OPHIPOGON

*Ophiopogon intermedius* D. Don, with pretty spikes of white flos. and  
narrow grass like leaves is found on forest banks during the rains.

*Ophiopogon planiscapum* Bailey has a flattened peduncle and broaden  
leaves. Murree in forest August.

## IRIDACEAE

## IRIS

*Iris aitchisoni* Boiss. var *chrysantha* Baker, with yellow flos. is found  
on limestone at Margalla and the Kala Chitta Hills in March. Occasionally  
a few plants are found first outside of Rawalpindi. March—April.

*Iris germanica* L. Blue and white varieties are cult. in the plains and  
hills.

## AMARYLLIDACEAE

## HYPOXIS

*Hypoxis aurea* Lour, a small yellow flowered herb with grass like leaves  
grows in Abbottabad and Murree during the late summer.

## AGAVE

*Agave Cantala*, the Century plant or *kawar gandal*, is much used for hedges in the plains. The flos. are replaced by large bulbils.

*Agave americana* L., with yellow and green variegated leaves is also planted in the plains and in Murree.

## HEMEROCALLIS

*Hemerocallis fulva* L., the Day lily, is planted in gardens.

## ZEPHYRANTHES

*Zephyranthes rosea* is a hot weather favorite in gardens.

## NARCISSUS

*Narcissus poetica* begins to bloom in November. *Nargus*.

## DIOSCOREACEAE

*Dioscorea melanophyma* Prain ex-Burkill, (*D. kumaonensis* of Fl. Brit. Ind.) with leaves digitately compound and with curious black bulbils grows between Kuldanna and Barian.

*Dioscorea deltoidea* Wall is very common in open places in the forest and amongst shrubs from 3,000—8,000'; Afghanistan to Nepal.

*Dioscorea bulbifera* L. gets its name from the large bulbils which are warted and about 1" across. I have collected this at Tret in September. It is usually a sub Himalayan climber.

## LILIACEAE

## SMILAX

*Smilax aspera* L. with prickly branches, white flos. and deltoid leaves is common up to 6,000'.

*Smilax parvifolia* Wall. with cirrhose petioles and acute or acuminate leaves and purple flos. is common from 4,000<sup>1</sup>—8,000.

*Smilax vaginata* Dene. is a dwarf, erect shrub, usually less than 2' high growing in forest from 6,000<sup>1</sup>—9,000'.

## ASPARAGUS

*Asparagus gracilis* Royle is common in dry places in the plains and the foothill zone.

*Asparagus adscendens* Roxb. is another sub-Himalayan species with stronger spines, more cladodes per tuft and flos. in racemes.

*Asparagus filicinus* Ham. is a herbaceous species in forest in the temperate zone. Changla, Mokshpuri. *shakakal*, *safed musli*.

*Asparagus sprengeri* Rogel and *A. plumosus* Baker are frequently planted in gardens for decorative purposes and *A. officinalis* L., the Garden *Asparagus* sometimes planted.

## POLYGONATUM

*Polygonatum multiflorum* All. is common in thin forest from 5,000'—8,500' blooming in April and May.

*Polygonatum geminiflorum* Dene., a plant of the lower alpine zone in Kashmir has been collected in Changla.

*Polygonatum verticillatum* All. with leaves in whorls grows in Murree and Chagla.

#### ASPHODELUS

*Asphodelus tenuifolius* Cavan., *piazi* or *bhagat* is one of the commonest weeds in grain fields in the plains with a distribution from Bengal to the Canary Is.

#### EREMURUS

*Eremurus persicus* Boiss. *hoad* is very rare, growing on limestone above Abbottabad, above Kakul and at Lehrtar, flowering in March and April.

#### ALLIUM

*Allium ascalonicum* L. grows wild on the Pir's Mt. above Hasan Abdal at Margalla, the Kala Chitta Hills and Abbottabad. The flos. are white and the outer scales of the bulbs reddish.

*Allium griffithianum* Boiss. is common in desert soils in March in the plains and in the Salt Range.

*Allium grubellum* M. Bieb. resembles the last, often growing nearby. This has smaller, pinker flos. Abundant.

*Allium ameloprasum* Leek *A. cepa* L., the onion and *A. sativum* L., the garlic, are all cult.

#### DIPCADI

*Dipcadi serotinum* Medic. with greenish brown flos. without, white, within, is found at Margalla in March and April on limestone.

#### SCILLA

*Scilla hohenackeri* F. & M. with blue flos. and white corms is common in March in desert areas of Rawalpindi and Attock Districts.

#### LILIUM

*Lilium polyphyllum* D. Don is rare about Murree. I found it once at Barian in June.

#### NOTHOLIRION

*Notholirion thomsonianum* (Royle) Stapf, (*Lilium Thomsonianum* Royle) with delicate pale lavender flos. in April grows in open rocky places at Abbottabad, Domel, Margalla and the Jhelum Valley Road. This is worth cultivating.

#### TULIPA

*Tulipa stellata* Hook. is one of the prettiest wild flos. of the district with a white perianth with pink stripes, yellow within. It blooms in March in Rawalpindi and in April in Murree.

#### GAGEA

*Gagea lutea* (L.) Ker-Gawl grows in Murree and Hazara, also in Kashmir soon after the snow melts.

*Gagea reticulata* R. & S. with small yellow flos. is very common in the plains in February and March, in Abbottabad and Poonoh.

## COLCHICUM

*Colchicum luteum* Baker, *surinjan* is very common in Abbottabad and in places in the Murree Hills from January to March. Flos. yellow.

## MERENDERA

*Merendera persica* Boiss. & Kotsch. is one of the earliest spring flos. in desert places in the plains with white to lavender flos. Fatehjang, Margalla, etc. *surinjan shireen*. Flos. in February—March.

## IPHIGENIA

*Iphigenia indica* Kunth, one of the few flos. with a perianth which is nearly black in colour. Ghora Gali in October.

## GLOBIOSA

*Gloriosa superba* L. Rare in the area but has been collected by Coventry in the Margalla Range and near Kahuta and at Barakao by Aitchison, in September.

## TRILLIUM

*Trillium govanianum* Wall. grows in shady woods from April to June in Murree and Changla.

## PONTEDERIACEAE

## EICHORNIA

*Eichornia crassipes* (Mart.) Solms., the Water Hyacinth, with blue flos. used to fill a pond in Topi Park, Rawalpindi.

## MONOCHORIA

*Monochoria vaginlis* Presl ?

## COMMELINACEAE

## COMMELINA

*Commelina benghalensis* L. is fairly common after the rains up to 6,000'.

*Commelina obliqua* Ham. with longer leaves from 4"—7" long with acute acuminate tips is not rare in the plains in August and September.

*Commelina glabra* Clarke is reported from Rawalpindi by Aitchison.

## JUNCACEAE

## JUNCUS

*Juncus bufonius* L. is common in the spring in the plains by drying ponds and slow streams and ascends into the mountains.

*Juncus glaucus* Ehrh. Murree and Jhikka Gali.

*Juncus lampocarpus* Ehrh. About Rawalpindi and Murree.

## PALMAE

## PHOENIX

*Phoenix dactylifera* L. The *khajur* or date palm native of Arabia and the Sahara is planted here and there in the plains but the fruits are not of good quality.

*Phoenix svestrisly* Roxb. is also planted in the plains and is much like the last but lacks the root suckers which spring up freely about the base of date palms. The leaves are usually a darker green and droop more gracefully.

*Phoenix humilis* Royle is found occasionally in the foothill zone upto 3,000' in the Saidpur Hills etc.

#### NANNORHOPS

*Nannorhops ritchieana* H. Wendl. is common in the rocky hills of the N.-W.F.P. and I found one patch on limestone at Margalla.

#### LIVISTONA

*Livistona chinensis* R. Br. is the common fan type palm cultivated in pots in Rawalpindi.

#### TYPHACEAE

*Typha angustata* Chaub & Bory, *kundar* is common on the borders of ponds and slow streams in the plains.

*Typha elephantina* Roxb., is reported from Rawalpindi by Aitchison. I have seen no specimens.

#### SPARGANIACEAE

##### SPARGANIUM

*Sparganium ramosum* Huds., a plant of marshy places grows at Wah, in Hazara and Kashmir.

#### ARACEAE

##### ARISAEMA

*Arisaema wallichianum* Hk.f. with three leaflets grows in Changla and Nathia Gali in June and July in the forest.

*Arisaema jacquemontii* Blume is very common in forest throughout the Murree Hills. It has five leaflets, rarely more or less.

*Arisaema flavum*. Schott, has pedate leaflets and a very small spathe and grows in the open in shallow soil in June and July from 7,000'—9,000'. Common on the Pipe Line in July.

##### SAUROMATUM

*Sauromatum guttatum* Schott, *samp ki buti* is very common from 3,000'—8,000' and like the other *Araceae* is left along by grazing animals. The leaves are large, pedate and the stalks are mottled suggesting a snake. The large inflorescence appears before there are any leaves.

#### COLOCASIA

*Colocasia esculenta* (L.) Schott, *kach alu* is sometimes cult. in the plains and lower hills and is established along irrigation ditches at Wah and Hasan Abdal.

#### RICHARDIA

*Richardia africana* Kunth, the *Arum lily* is commonly cult. in gardens.

#### LEMNACEAE

##### LEMNA

*Lemna minor* L. grows about Rawalpindi and at Wah in ponds.



*Lemna gibba*, with thicker fronds, has also been found around Rawalpindi.

*Lemna polyrhiza* L. was collected at Khanna in May.

*Lemna paucicostata* Hegelm. is reported from Rawalpindi by Aitchison. It may have been what I am calling *L. minor*.

#### WOLFFIA

*Wolffia arrhiza* Wimm. which looks like green sand floating on stagnant ponds after the rains is abundant in the plains.

#### ALISMACEAE

##### ALISMA

*Alisma plantago aquatica* L. grows at Wah and near Rawalpindi and is reported from Ghora Gali by Prof. Hamid.

##### SAGITTARIA

*Sagittaria guayanensis* Humb. grows in ponds in the plains of Jhelum and Rawalpindi.

#### NAIDACEAE

##### POTAMOGETON

*Potamogeton indicus* Roxb. and the following species have been found in ponds or pools around Rawalpindi.

*Potamogeton perfoliatus* L. with sessile, ovate, translucent, submerged leaves.

*Potamogeton crispus* L. with rather narrow translucent leaves, toothed on the edges.

*Potamogeton pectinatus* L. with very narrow leaves, achenes little beaked and a interrupted inflorescence.

*Potamogeton pusillus* L. ? Wah Pump House, with leaves a little wider, achenes more beaked, leaves with 3 veins and free stipules.

#### ZANNICHELLIA

*Zannichellia palustris* L. subsp. *pedicellata* Wahl. is common in the plains.

#### NAIAS

*Naias graminea* Del., Riwat and Rawalpindi.

#### CYPERACEAE

##### KYLLINGA

*Kyllinga cephalotes* (Jacq.) Druce, (*K. monocephala* Rottlb.) at Wah.

*Kyllinga brevifolia* Rottlb. is reported by Aitchison from the Soban Bridge, September 1870.

##### PYCREUS

*Pycrus sanguinolentus* (Vahl.) Nees, (*Cyperus eragrostis* Vahl) is common in damp soil in both plains and hills.

*Pycrus globosus* (All.) Reichb., (*Cyperus globosus* All.), is common in damp soil in both plains and hills.

## JUNCCELLUS

*Juncellus serotinus* Clarke, (*Cyperus serotinus* Rotib.) Rawalpindi in September and October.

*Juncellus laevigatus* (L.) Clarke, Rawalpindi and Jhelum near water.

## CYPERUS

*Cyperus difformis* L. Rawalpindi and Jhelum near water.

*Cyperus niveus* Retz., with handsome white spikes; flowers in late spring and summer on stony hills up to 4,000', common, perennial.

*Cyperus aristatus* Rotlb. a summer annual weed grows in Murree, Hazara, etc.

*Cyperus iria* L. is common beside water as on the margins of rice fields, Rawalpindi, Abbottabad, Kashmir.

*Cyperus eleusinoides* Kunth, is common in the plains after the rains in wet places.

*Cyperus tegetum* Roxb. Rawalpindi (Aitchison).

*Cyperus rotundus* L. with reddish inflorescences and a perennial is a pestiferous weed in the plains and is hard to eradicate. It grows in all warm regions.

*Cyperus arenarius* Retz., with a woody rhizome is reported from Rawalpindi by Aitchison.

## ELEOCHARIS

*Eleocharis dulcis* (Burm.f.) Trin. Ex Henschel, (*E. plantaginea* Br.) grows gregariously in shallow water in the plains of Rawalpindi and Jhelum Districts.

*Eleocharis mitracarpa* Steud. grows in flooded brick fields and wet places in the plains and as high as Ladak and Zanskar.

*Eleocharis monostachya* Hassk. Khanna near Rawalpindi.

## FIMBRISTYLIS

*Fimbristylis schoenoides*, Vahl, with the one or two small white heads with pale ovate bracts and nuts is found in the plains

*Fimbristylis dichotoma* (L.) Vahl is common in rice fields and wet places in warm regions bearing many small heads with glumes more keeled than the next.

*Fimbristylis annua* (All.) R. & S. [*F. diphylla* (Retz.) Vahl] is also common in wet places in the plains and up to 7,000' with fewer and larger heads. Crush a head to get some of the distinctive nutlets with longitudinal ridges and trabiculæ at right angles.

*Fimbristylis ferruginea*, Vahl is also common in all warm regions. Rawalpindi, Hasan Abdal, N.-W.F.P. etc.

*Fimbristylis quinqueangularis*, Kunth grows in Khanna near Rawalpindi and can be recognized by the angled stems.

*Fimbristylis juvaefornis*, Kunth also grows in Rawalpindi and Hazara. It has short woody rhizomes.

## MARISCUS

*Mariscus sieberianus* Nees, Abbottabad (N. ali).

## SCIRPUS

*Scirpus mucronatus* L. Rawalpindi, Srinagar.

*Scirpus roylei* (Wight) A.A. Beetle, (*S. quinquefarius* Ham.) grows in Rawalpindi and Jhelum Districts after the rains. (*S. tuberosus* Debt.)

*Scirpus maritimus* L. with tubers on its rhizomes grows in the Rawalpindi brick fields.

*Scirpus lacustris* L. var. *Tabernaemontani* (Gmel.) Doll. Kala Bridge.

*Scirpus affinis* Roth (a var. of *maritimus* in Fl. Brit. Ind.) is common in water at Khanna.

*Scirpus pectinatus* Roxb. 'Under *S. littoralis* in Fl. Brit. Ind.), Rawalpindi.

## ERIOPHORUM

*Eriophorum comosum* Wall. the false babbar or gorbaggar is very common in both plains and hills almost always growing on cliffs.

## CAREX

*Carex foliosa* D. Don (*C. muricata* var. *foliosa* Clarke), Abbottabad, Jhikka Gali.

*Carex longipes* Don var. *dissitiflora* Clarke, Ghora Gali, Chenari, Kashmir.

*Carex flicina* Nees var. *meiogyne* (Nees) Strachey: common in rocky places during the rains about Murree.

*Carex sanguinea* Boott, on rocks in April and May about Murree, Poonch. Heads many, coloured deep red.

*Carex longicurvis* Nees, Gharial at 6,000'; August.

*Carex psychrophila* Nees, Murree, Changla with scales yellow and green.

*Carex setigera* D. Don var. *Schlagintweitiana* (Boeck.) Kuk. Murree.

*Carex haematostoma* Nees, Murree and Hazara.

*Carex cardiolopis* Nees, Pipe Line, Changla Gali.

*Carex hebecarpa* C. A. M. var. *ligulata* (Nees) Kuk. Gharial in August.

*Carex wellichiana* Prescott is the only *Carex* to grow in the plains in our area; Khanna, Wah, Hurroo (Aitchison).

## GNETACEAE

## EPHEDRA

*Ephedra foliata* Boiss. is a climber in scrub forest in the plains with fls. in March and white juicy fruits in May. It is found from the Punjab to Syria.

## CONIFERAE

## PINUS

*Pinus longifolia* Roxb. *chir chil*, is found from Afghanistan to Bhutan and is the commonest tree in our district from 3,000—6,000', frequently in pure or nearly pure stands. It resists fire well and is very hardy. Accord-

ing to Sargent it should be called *P. Roxburghii* as the name *P. longifolia* had been given earlier to another plant.

*Pinus excelsa* Wall. *biar*, *kail* usually begins at the upper limit of the last species and is found in both pure and mixed forests usually above 7,000'.

#### PICEA

*Picea smithiana* Boiss, the spruce, *rai*, *tos* or *kachal* is rare near Murree and is only found on Mochpuri (Parker).

#### ABIES

*Abies pindrow* Royle, *paludar*, *palandar*, the Himalayan fir, is common in the Murree Hills from 6,500' up, on shady slopes with *Pinus excelsa* and broad leaved species.

#### CEDRUS

*Cedrus deodara* Roxb. ex Loudon, *diar* or *keelu*, the Cedar of Lebanon or doodar in English which furnishes the best conifer lumber is planted in Murree and is only wild at Biran Gali. (See Parker.)

#### CUPRESSUS

*Cupressus sempervirens* L. the *saru* or funeral cypress is often planted in the plains and up to 4,000' in Abbottabad.

#### TAXUS

*Taxus baccata* L., the yew, is fairly common, often in fir forest from 6,000'—10,000'.

#### THUJA

*Thuja orientalis* L., *maju*, a native of China and Japan is cult. in Rawalpindi and Abbottabad.

### PTERIDOPHYTA

#### CYSTOPTERIS

*Cystopteris fragilis* (L.) Bernh., Ghora Gali, Murree, Nathia.

#### DRYOPTERIS

*Dryopteris odonotoloma* Moore, is very common in fir forest and throughout the Murree Hills above 6,000'.

*Dryopteris marginata* (Wall.) Christ, Dunga Gali and Hazara, has large triangular fronds and a thick creeping rhizome.

*Dryopteris crenata* (Forsk.) O. Kze, Abbottabad and the Pipe Line is a plant of rock crevices in the open with a beautiful tuft of chestnut coloured basal scales.

*Dropteris blanfordii* (Hope) C. Chr. Dunga Gali; Ghora Daka.

*Dryopteris ramosa* (Hope) C. Chr., thrice pinnate, broad fronds with pale basal scales and an erect rhizome. Changla and the Galis.

*Dryopteris parasitica* O. Kze., [*D. mollis* (Jacq.) Hier], is common in damp places in the foothill zone.

*Dryopteris laterrepens* (Trotter & Hope) with a widely creeping rhizome and tall, rather narrow fronds, Pipe Line, Dunga, Changla, etc.

## POLYSTICHUM

*Polystichum aculeatum* Schott var. *angulare* is common in forest about Murree.

*Polystichum thomsoni* (Hook.) Bedd. Changla Gali.

## ATHYRIUM

*Athyrium mackinnoni* (Hopo) C. Chr., Murree, Changla.

*Athyrium acrostichoides* Diels, Pipe Line and Changla in forest.

*Athyrium schimperi* Moug. Ghora Gali fide A. Hamid.

## ASPLENIUM

*Asplenium trichomanes* L., the *Maidenhair Spleenwort*, grows in rock crevices about Murree; Ghora Gali, Shikka Gali, Changla, etc.

*Asplenium ruta-muraria* L. Murree Hills and Nathia Gali in sunny places.

*Asplenium varians* Hk. & Grev., common on rocks and the bases of old trees in forest; Ghora Gali, Murree, Jhikka Gali, Changla, etc.

## DIPLAZIUM

*Diplazium polypodioides* Bl. *lingra* is a very large fern with the young fronds edible, Murree, 7,000' in Trotter collection.

## CETERACH

*Ceterach dathousiae* (Hook.) C. Chr. (*Asplenium a ternans* Wall) is one of the commonest ferns on dry banks and rocks about Murree.

## CONIOGRAMME

*Coniogramme fraxinea* (Don) Diels, Ghora Gali, Jhikka Gali, Murree Poonch.

## PELLAEA

*Pellaea hastata* (Thunb.) Prantl., (*P. calamitanos* Link), Abbottabad on rocks in chir forest.

*Pellaea nitidula* (Wall.) Baker, Abbottabad, Ghora Gall, Pipe Line, Changla.

## CHEILANTHES

*Cheilanthes pleridioides* C. Chr., (*C. fragrans* Webb; & Berth.), Margalla, Abbottabad, Attock, Murree-Kohala, Muzaffarabad. Xerophytic.

*Cheilanthes persica* (Bory) Mett., (*C. Szovitzii* F. & M.), Hasan Abdal, Kala Chita Hills is another xerophytic Mediterranean type.

*Cheilanthes farinos* (Forsk. Kaulf., Abbottabad; Ghora Gali, below Pindi Pt.

*Cheilanthes subvillosa* Hk. Kalabagh, Hazara at 7,500' (Trotter.) Murree.

*Cheilanthes albomarginata* Clarke. Ghora Gali (Hamid) Changla Gali, Hazara.

*Cheilanthes dalhousiae* Hk. Murree the Galis Thandiani.

*Cheilanthes grisea* Blandford, Abbottabad, Murree?

*Cheilanthes anceps* Blandford, Dhamtaur, Hazara; Mansera.

## ONYCHIUM

*Onychium lucidum* (Don) Spr. (*O. japonicum* var. *multisecta* Bedd.) is common in small patches in forest, Mirroo, Jikka Gali, the Gallis.

## ADIANTUM

*Adiantum caudatum* L. grows in patches in the foothill zone to 6,000'.

*Adiantum capillus-veneris* L., from the plains to 7,000' near water.

*Adiantum venustum* Don is ubiquitous in forest from 5,000'—9,000'.

## PTERIS

*Pteris vittata* L. (*P. longifolia* L.) is wild at Hasan Abdal and cult. commonly in Rawalpindi. A plant of the foothill zone.

*Pteris cretica* L. Common in forest from 4,500'—9,000'.

## PTERIDIUM

*Pteridium aquilinum* (L.) Bernh., the bracken, grows on Changla.

## OPHIOGLOSSUM

*Ophioglossum aitchison* (Clarke) D Almedida, Rawalpindi in April.

## EQUISETUM

*Equisetum arvense* L. Murree.

*Equisetum ramosissimum* Desf. (*E. debile* Roxb.) Plains, Ghora Gali.

## SELAGINELLA

*Selaginella chrysorrhizos* Spring which should possibly be called *S. subdiaphana* Spring grows sparingly in Murree.

**Catalogue of plants of Rawalpindi district by Dr. R. R. Stewart, Late Principal, Gordon College, Rawalpindi.**

Alphabetical Index of the Natural Orders and General prepared by Khan Fazal Muhammad Khan, I.F.S. (Retd.), Divisional Forest Officer, Silvicultural Research Division, Punjab (Pakistan).

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