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A BOTANICAL TOUR IN CHAMBA AND KANGRA.

BY

G. A. GAMMIE.

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I left Saharanpur on the evening of the 13th August 1896 and arrived at Pathankote the following afternoon.

Pathankote stands on the verge of the undulating Siwalik tract which extends outwards from the precipitous southern slopes of the Dhaula Dhar, or first range of the Himalayas. The mountain valleys of the Ravi which are contained in the State of Chamba lie between this and the loftier second range, beyond which is Lahaul. As the area comprised between the first and second ranges is of great extent, I at once decided to confine my tours strictly within its limits. I first travelled through the western portion of the State as far as the Sach Pass and afterwards undertook the survey of the eastern side as far as Barmaor, from whence I proceeded to Kangra through Chanota and Kuarsi and over the Mharam Ghati Pass. Pathankote and its vicinity are well wooded, but many of the trees have certainly been planted, such as *Eugenia Jambolana*, *Acacia Catechu*, and *Ficus religiosa*, while *Adhatoda Vasica*, *Cassia Tora*, *Cannabis indica*, *Ricinus communis*, etc., are the principal components of the scrubby undergrowth. Although a distance of twenty-eight miles intervenes between Pathankote and Dunera, the trifling increase of altitude produces but little change worthy of especial remark in the vegetation. The commonest trees observed were *Pinus longifolia*, *Bombax malabaricum*, *Mallotus philippinensis*, *Terminalia tomentosa*, several species of *Acacia*; and there were good specimens of the Banyan and Pipal along the road at intervals. Grasses grew luxuriantly on many slopes which would have been bare and sterile but for their presence, and there were dense tracts of *Olea glandulifera*, *Adhatoda Vasica*, etc. The herbaceous flora was still that characteristic of the adjacent plains.

Leaving Dunera the road ascends steadily for twenty-two miles to Dalhousie; and towards the upper end oaks, rhododendrons, maples, horse-chestnuts and other trees form the humid forests, while the shrubby and herbaceous vegetation of a temperate climate replace at last the tropical forms left behind only a few miles lower down. *Desmodium tiliæfolium*, *Indigofera Gerardiana*, *Lespedeza sericea* give the locality a distinctive coloration from the profusion of their flowers, as do also those of humbler plants, such as *Geranium Anemone*, *Potentilla*, *Dipsacus*, *Aster*, *Cynoglossum*, *Bœnninghausenia*, and many others.

A variety of ferns grow on shady banks in woods and along watercourses. *Polypodium lachnopus* and *P. lineare* thrive on the trunks and branches of trees and their occurrence draws the observer's attention to the fact that, excepting themselves, mosses and lichens, and occasionally mistletoe, other epiphytic and parasitical forms of vegetation are markedly absent from the flora of this region.

The third march was from Dalhousie to the town of Chamba, a distance of seventeen miles. For some miles the route runs at, and also above, the level of Dalhousie through magnificent forests of deodar and other conifers ; and these forests, together with gigantic rocks and shady ravines, all yield an interesting series of plants. At Kajiar the conifers become rarer and a mixed growth of oaks, rhododendrons, laurels, maples, walnut, *Rhus*, etc., replace them. At a considerable distance lower down these woods come to an end and the remainder of the steep ascent is through cultivated slopes, consisting of fields of excellent maize, various millets, and *Amarantus paniculatus*. The last with its ample red and yellow panicles brightens the landscape, and its fields of vivid hue serve to mark the positions of widely scattered hamlets among the valleys, miles away from the traveller's standpoint. The town of Chamba lies at an elevation of 3,000 feet above the sea, but many plants ascending to a similar height on the southern face of the range are absent here, while plants hitherto confined to higher levels descend to the banks of the Ravi on this side. A marked diminution of the rainfall, due to the interposition of the lofty southern range ; and a milder summer climate and severer winter, depending on the proximity in almost all directions of enormous snowy mountains, must be the true causes for the decided change in the *facies* of the vegetation. Side by side with such distinctly tropical plants as *Bauhinia purpurea, Solanum verbascifolium, Ficus religiosa, Lippia nodiflora, Lantana crenulata, Vitex trifolia, Sapindus Mukorossi, Dalbergia Sissoo, Solanum xanthocarpum, Melia Azederach, Phyllanthus Urinaria, Lagerstræmia indica, Adiantum caudatum, Heliotropium strigosum*, etc., may be found *Anemone vitifolia, Clematis grata, Thalictrum foliolosum, Origanum vulgare, Roylea elegans, Cotoneaster microphylla, Micromeria biflora, Astragalus chlorostachys, Platanus orientalis, Juglans regia, Pyrus armeniaca, Indigofera Gerardiana, Desmodium tiliæfolium*, and many others.

From Chamba I travelled on the western side as far as the Sach Pass which crosses the second range into Pangi. The first march was to Musroond. For some miles after leaving Chamba the road is

comparatively level and skirts the bank of the Ravi. *Olea cuspidata* seems to be the commonest small tree. *Zanthoxylum alatum*, *Zizyphus Jujuba*, *Adhatoda Vasica*, *Prinsepia utilis* are also abundant and a gaunt tree-like *Euphorbia* grows on the cliffs near the town. The path is shaded with good trees of *Celtis australis*, *Ficus palmata*, *Ficus religiosa*, and *Melia Azedarach*. *Mallotus phillippinensis* and *Dalbergia Sissoo* are common near the town, but do not extend far from it. There are also a few specimens of *Bombax malabaricum* and *Phœnix sylvestris* on the wide flats near the river. Good rice is grown on the irrigated level lands here, and the fields of Indian corn appeared to be exceedingly productive. *Ipomœa hederacea* beautifies the hedges with its bright blue flowers, The remaining part of the march was steep and in parts the vegetation very scanty. There are many small trees of *Pinus longifolia* and shrubs of *Berberis vulgaris* and *Plectranthus rugosus*. Looking out from the forest-house at Musroond one obtains a definite idea of the general scenery of this State. The view northwards is terminated by a line of snowy peaks. Towards the west is the deep valley of the Ravi bounded on the further bank by steep grass-clad mountains with broad terraces overlooking the river. In this, as in other parts of the Himalayas, the slopes facing southwards are steep and rocky, and bear trees only at widely scattered intervals, even the ravines being wanting in the dense thickets of shrubs and herbs which are so distinctive a feature in the side valleys and gullies of the northern ridges where, moreover, alone may be found extensive forests of conifers, oaks and other trees. Immediately under the lofty second range the radiating spurs are covered with forests in all directions. This, perhaps, may be due to a more liberal rainfall.

From Musroond the next march was to Kulel. The steep descent to the river below winds through an almost continuous stretch of cultivated land. The villages have to maintain a night-long clamour to warn off the black bears from the fields of ripening Indian corn which is the main crop at this season. The hillsides are usually so steep that the natives form their fields into broad terraces. This system must prevent the erosion of the shallow soil; moreover the walls of the terraces, often of considerable height, being covered with grass, a plentiful supply of good fodder must be furnished close to the homesteads of the people. Bees were seen issuing from many holes in the stone walls of the houses. I had no opportunity of tasting the honey, but it ought to be abundant and good in a country so well stocked with flowers. The road continues by a gradual ascent to Kulel,

mostly through cultivated land. Here and there the shade cast by small willow groves assists to mitigate the intense heat experienced along the exposed paths. Everywhere Apricot and Walnut trees are carefully preserved. It was past the fruiting season of the former, but the latter bore fruits of excellent quality which were greedily consumed, fresh from the tree, by my native followers. At Kulel, a broad lateral valley, well wooded with pine trees, opens out towards the east; but the main valley continues in a northerly direction. The slopes of the latter are excessively steep, but are green with herbage. There are many good plants to be found around Kulel.

The next march was to Tisa, a village of importance judged by the standard of the country. There are three small rivers to be crossed on the way, and the flora along their courses is interesting. In one village we passed some trees of *Cratægus Oxyacantha*, cultivated for its fruit, which is of the size of a small plum and is considered palatable by the people. *Rubus ellipticus*, now in leaf only, is common enough to yield a moderate quantity of fruit. Taking into consideration that the climatic conditions of this State are, to all appearances, favourable to fruit culture, it is difficult to understand why its capability in this direction has not been encouraged and developed. The camping ground at Tisa is on a small flat above the bungalow, and a considerable portion of its area is shaded by a noble Poplar (*Populus ciliata*), the base of the stem of which is surrounded by a slate platform.

The succeeding march was to Alwas. After a short ascent above the village of Tisa the path crosses the ridge and strikes into a small Deodar forest. Lower down many groups of *Quercus dilatata* occur; this is an exceedingly common tree everywhere at this elevation. Further on there is a most interesting forest which descends to a river. *Marlea begoniæfolia*, *Parrottia Jacquemontiana*, *Ulmus campestris*, *Carpinus*, *Cæsalpinia sepiaria*, *Berchemia floribunda*, *Rosa moschata*, *Impatiens* of many species, and ferns in great variety are examples of the plants to be found here. Onwards the landscape again becomes bare and dreary, relieved sometimes by copses and village-lands. However, after descending to another river, the vegetation became more luxuriant and we gradually approach the pine forests which sweep upwards to the limit of trees. Purple and yellow Balsams are gregarious in moist ravines. *Pedicularis gracilis*, a yellow *Corydalis*, *Dispsacus inermis*, *Cnicus*, *Senecio*, *Polygonum*, *Potentilla*, and many other plants are abundant.

Above and around the camping ground at Alwas are dark pine

forests, and over all are towering rocky peaks with beds of snow descending their hollows. Thus far our journey had taken us among comparatively low mountains and ridges, with glimpses only of snowy ranges enclosing lateral valleys, but now the slopes ran upwards on all sides to elevations favouring the deposit of perpetual snow. From Alwas a short excursion was made through a valley to the westward. In the lower portion of this valley the trees are large and of varied aspect, consisting as they do of *Corylus Colurna*, *Quercus dilatata*, *Prunus Padus*, *Cedrus Deodara*, *Picea Morinda*, *Ulmus Wallichiana*, *Acer villosum*, and others. The shrubs are of equal interest and include (with many more) *Viburnum*, *Berberis*, *Desmodium tilæfolium* (which here attains its highest level), *Spiræa sorbifolia*, *Girardinia*, *Vitis*, etc. The density of the forest area prevents the growth of all but a few forms of herbaceous vegetation; but higher up, where the trees first become scattered and then disappear, small plants exist in great profusion. As examples of these may be cited *Parochetus*, *Impatiens*, *Ranunculus*, *Epilobium*, *Arctium*, *Malva*, *Polygonum*, *Fagopyrum*, *Heracleum* and other Umbelliferous plants, *Senecio*, *Cnicus*, *Urtica*, and several species of ferns.

A visit to the Sach Pass was undertaken on the following day. For some miles the road winds up through a forest of conifers, walnut, horse-chestnut, maple, oak, bird-cherry, etc. In several village-clearances, Indian corn and *Amarantus paniculatus* are cultivated up to an elevation of 9,000 feet. *Quercus dilatata* attains this level but a little higher up it is replaced by *Q. semecarpifolia*. At first the latter is a tree of noble proportions rendered conspicuous by its reddish-brown foliage. Further on it gradually decreases in size until at, and also above, the limit of other trees, it is reduced to a gregarious shrub with sweeping branches. It forms dense copses appearing somewhat like Rhododendron-scrub in the distance. The forest tracts are at length succeeded by the open grassy slopes of the Alpine zone covered knee-deep with multitudes of herbaceous plants too numerous to mention here in detail; but the following genera named at random may serve as examples,—*Astragalus*, *Epilobuim*, *Nepeta*, *Salvia*, *Delphinium*, *Lactuca*, *Sedum*, *Lychnis*, *Pedicularis*, *Swertia*, *Potentilla*, *Morina*, *Geranium*, *Corydalis*, *Erigeron*, *Saxifraga*, *Primula*, *Caltha*, *Meconopsis*, *Cynoglossum*. Standing in the midst of such a magnificent floral display my attention was drawn to a fact often already noted at the same altitude in other parts of the Himalayas. In the immediate vicinity the air blazed with the vivid hues possessed in such

perfection by Alpine flowers, while at a short distance and still more so on the adjacent slopes, the whole mass became resolved into a simple carpet of yellowish-green in which no other colour was apparent. One naturally anticipates that myriads of bright flowers borne above the level of the green herbage would give colour to scenery on every hand; but I have never found this to be really the case, and although so great a variety of coloration was everywhere around me, I could not but perceive that the general effect was that of a remarkable monotony, which, however, was redeemed in a measure by the grandeur of the culminating peaks of rocks and snow.

From Alwas I returned to Chamba. No fresh observations were made, but many plants, overlooked on the upward journey, were gathered. I remained at Chamba for three days to complete arrangements for making a tour through the eastern part of the State as far as Barmaor, from whence I purposed crossing over the first range to reach the district of Kangra. The first march terminated at a village named Rakh. This is the easiest walk in Chamba, as the road runs for twelve miles along the bank of the Ravi, and there are only slight ascents to be overcome. Large areas along the route were covered with Indian corn which was now ripe, and the villagers were busily employing themselves in collecting the produce which they expose for some time to sun and air on the roofs of their houses. The mountains on the right bank of the river are steep and rocky, and the tree-like *Euphorbia* is common. This plant seems to affect situations where it can remain in almost undisputed possession, under conditions unfavourable for the well-being of ordinary trees. The slopes on the left bank, also steep, are covered with grasses and various kinds of shrubs; behind them rise pine-clad hills. Soon after leaving Chamba two plane trees were passed. They were not good specimens. This tree is planted in various villages and I saw one of noble proportions in the Kangra Valley. Further on there was a rocky corner where many figs were found. I observed *Ficus clavata*, *Ficus hispida* and another which we were unable to reach. *Wendlendia puberula* was also collected here. Many tropical plants not seen during former marches were common in this one, such as *Buddleia asiatica*, *Plumbago zeylanica*, *Torenia cordifolia*, *Trema politoria*, *Lantana*, *Xanthium strumarium*, *Hibiscus pungens*, *Boehmeria platyphylla*, *Tephrosia purpurea*, *Amarantus spinosus*, etc. The rest-house at Rakh stands in a small wood of *Dalbergia Sissoo*.

The second march was to Chitrari. For some eight miles the road still runs comparatively level. The valley is exceedingly narrow

and the bounding mountains are rocky and bare. The prevailing vegetation remained of a sub-tropical type and presented few features worthy of remark. *Rubia cordifolia*, *Periploca calophylla*, *Daemia extensa*, *Cissampelos Pareira*, *Vitis lanata*, *Vitis parvifolia* were noted as climbers, while *Phagnalon niveum*, *Androsace rotundifolia*, *Athyrium pectinatum*, *Linaria ramosissima*, *Conyza stricta* were collected from the faces of cliffs. A steep ascent abruptly succeeded through a scrub composed principally of *Berberis*, *Plectranthus rugosus*, *Indigofera Gerardiana*, and *Desmodium tiliæfolium*. Near the end of the climb there was a spring of good water with a shady willow-tree close at hand. Beyond the top of the ascent we passed through a small Deodar forest and reached the village of Chitrari.

The third march was to Alwasa. This began with a long and steep descent to a river followed by a correspondingly laborious climb to the village of Koti. Between the river and up to a considerable elevation above Koti there are many villages and much cultivation. At the higher levels *Pinus excelsa* and Deodar are common. I anticipated finding many plants around the pass leading over to Alwasa, but I was disappointed in my expectation. The forests are good and extensive, but smaller vegetation was scanty in the extreme. The season had been abnormally dry, and probably the continued drought had prevented herbaceous plants from growing with their accustomed luxuriance. Below the pass a steep path winds through groups of Deodar and *Pinus excelsa*. From Alwasa a good view was obtained of the mountain range on the opposite side of the Ravi. The grass was drying up at lower elevations and there were few trees visible; upwards the prospect closed with enormous rocky cliffs capped with snow.

The fourth march was to Barmaor and it included a long descent and ascent. *Quercus dilatata* was abundant everywhere. Pine forests clothe considerable areas at Barmaor, and *Cupressus torulosa* is moderately common. A fine ash-tree grows at one end of the camping ground above the village. I saw the villagers engaged in preserving their winter supply of fodder by the identical method adopted in Kashmir, which is that the grass is first twisted into thick ropes and then hung about the branches of trees. There was a variety of plants growing on the sodden verges of the streams. After a stay of two days at Barmaor the journey to Kangra, over the Mharam Ghati Pass, was undertaken.

The first march was to Soai. After crossing the bridge at the foot of the long descent from the village of Kani the path turns

sharply to the left through dense thickets of oak. The long ascent to Soai follows, through woods of *Quercus dilatata*, *Q. Ilex*, *Q. lineata*, pines, deodar, horse-chestnut, walnut, etc. *Phytolacca acinosa* is common in these forests. The second march was to Chanota, and comprised alternating ascents and descents over bad paths. *Jasminum dispermum* and *Clematis* were common climbers; *Abelia triflora*, *Desmodium tiliæfolium*, *Plectranthus rugosus*, *Artemisia*, *Salvia Moorcroftiana*, *Cnicus*, *Erianthus Ravennæ*, *Erianthus fulva*, *Pennisetum*, *Andropogon* and many other plants were abundant. Large trees of *Alnus nepalensis* flourished near the banks of streams. The third march was to Kuarsi over an execrable native path which skirted the face of a precipice the greater part of the way. All our energies had to be devoted to the task of getting through without accident, so that few plants were collected. Here and there on jutting ridges we passed fine deodars which had grown very large in spite of these situations affording them such insecure-looking perches. The fourth march was to Ilas. It commenced with a steep ascent for a mile and a half through pine forests and fields of buckwheat and millets. Further on, as the steep rise which terminates in the peaks around the pass attains higher elevations, arboreal vegetation is left behind, and is replaced by dense thickets of willows and grassy flats full of herbs, which had, however, been browzed down by the sheep and goats. The fifth march was from Ilas to Laka above Dharmsala, by the Mharam Ghati Pass. A good variety of herbaceous vegetation straggled up close to the pass. For example there were *Saxifraga diversifolia*, *Corydalis*, *Pedicularis*, *Arenaria festucoides*, *Cyananthus lobatus*, *Tanacetum*, *Lactuca*, *Parnassia nubicola*, *Inula Royleana*, *Inula grandiflora*, *Sedum Ewersii*, *Lagotis*, *Athyrium thelypteroides*, *Cystopteris fragilis*, and many more. On the Kangra side of the pass there is a precipitous descent to Laka which we accomplished through blinding rain and sleet. On the following morning we marched to Dharmsala. A noble forest of *Quercus semecarpifolia* extends round Laka. The stems of these trees are covered thickly with mosses, and they also support *Woodsia elongata* and *Davallia pulchra* in great quantity. This fact proved we had again entered a moister climate, for the last few marches in Chamba had been through forests but scantily furnished with epiplytes. Around the traveller's bungalow at Dharmsala the sub-tropical vegetation of the North-West Himalayas appears in great abundance.

The period allowed for the duration of my tour being almost exhausted, there was no time available for another extended

journey, I therefore decided to spend the last days on an excursion as far as Palampur, from whence I could return to Dharmsala. All the level ground between Dharmsala and Palampur is devoted almost exclusively to the culture of rice, and the fields are irrigated by an elaborate system of water channels. There are many streams pouring down from the lofty snowy range which rise abruptly behind these wide plateaux, water is therefore good and plentiful. The undulating ridges and knolls which crop up in every direction are covered with *Pinus longifolia* and *Quercus incana*. The small rivers have here cut wide and deep channels, and their banks proved good collecting grounds. The rice fields and water channels yielded a harvest of plants characteristic of wet cultivated land, such as *Sagittaria*, *Alisma*, *Nymphæa*, *Potamogeton*, *Marsilea*, *Eriocaulon*, *Veronica Anagallis*, *Epilobium*, *Jussiæa*, *Limnophila hypericifolia*, *Ranunculus*, *Cyperus*, *Polygonum*, *Ammannia*, *Monochoria*, *Floscopa*, *Coix*, and many others On higher ground other types of vegetation were found, such as *Desmodium*, *Justicia*, *Adhatoda*, *Barleria*, *Hedyotis hispida*, *Smithia ciliata*, *Plectranthus*, *Scutellaria*, *Triumfetta*, *Crotalaria*, *Spermacoce*, *Osbeckia*, *Mimosa*, *Indigofera*, *Jasminum*, *Cassia*, *Phyllanthus*, *Nerium*, *Alysicarpus*, etc., *Cedrela*, *Sapium sebiferum*, *Sapindus Mukorossi*, and other trees are grown to shade the main roads. From Dharmsala I travelled quickly to Pathankote and arrived at Saharanpur on the 1st of October.

I append a list of all the plants observed in Chamba and Kangra. Although very incomplete, it may serve to illustrate the Flora of these districts.

List of Plants collected or noted in Chamba and Kangra.

Ranunculaceæ.

Clematis montana, Ham., *Clematis grata*, Wall., *Clematis connata*, DC., are common climbers.

Anemone vitifolia, Ham. Extends from the town of Chamba upwards to 10,000 feet. This was the only *Anemone* observed in flower during the tour.

Thalictrum foliolosum, DC., and various species not identified, ranged from 3,000 feet to 12,000 feet.

Adonis sp. at 12,000 feet, in fruit only.

There were indications of several species of *Ranunculus*, but none were in flower, excepting *R. sceleratus*, Linn., which grows in the irrigation channels of the rice fields in the Kangra Valley.

Caltha palustris, Linn., was seen in marshy places about 12,000 feet.

Delphinium denudatum, Wall., and *D. vestitum*, Wall., are common on sub-alpine slopes, as are also *Aconitum Napellus*, Linn. and *A. heterophyllum*, Wall.

Magnoliaceæ.

Michelia Champaca, Linn. Well-grown trees were observed near villages in the Kangra Valley up to 4,000 feet. It has no claim, however, to be considered a native of this region.

Menispermaceæ.

Cocculus laurifolius, DC. A small tree which scarcely ascends above 3,000 feet in Chamba.

Cissampelos Pareira, Linn. A common climber growing over shrubs and small trees at moderate elevations.

Stephania elegans, Hook. f. and T. A small climber seen at 6,000 feet.

Berberideæ.

Berberis vulgaris, Linn., *Berberis aristata*, DC., *Berberis Lycium*, Royle, are all more or less common.

Podophyllum Emodi, Wall. Plants of this were found in ripe fruit between 10,000 and 14,000 feet below the Sach Pass.

Nympheaceæ.

Nelumbium speciosum, Willd., grows in the tank in the Rajah's garden at Chamba. I saw no other place with suitable conditions for its growth. *Lemna* covered the water in the same tank.

Leaves of *Nymphæa* sp. were seen in ponds and rice-fields in Kangra Valley.

Papaveraceæ.

Meconopsis aculeata, Royle, is common in shady situations between 10,000 and 15,000 feet.

Fumariaceæ.

Various species of *Corydalis*, ranging from 5,000 feet to the upper limits of vegetation.

Cruciferæ.

I collected *Capsella Bursa-pastoris*, Mœnch., and a few other species not identified. At the time of my visit examples of this order were conspicuous by their absence.

Capparideæ

Cleome viscosa, Linn., is common in fields and waste places at moderate elevations.

Capparis spinosa, Linn. This is a shrub which usually grows on the driest rocks exposed to the fierce sun-light. The branches hang downwards, and the flowers are large and strikingly handsome with white petals and purple filaments.

Violaceæ.

Viola biflora, Linn., *V. Patrinii*, DC., *V. serpens*, Wall., are common throughout Chamba.

Polygaleæ.

Polygala crotalaroides, Ham., a dense dwarf shrub with dark red flowers; *P. abyssinica*, Fresen., bearing long racemes of light pink flowers; *P. persicariæfolia*, DC., *P. chinensis*, Linn., *P. sibirica*, Linn., *Salamonia* sp. are all abundant on road-sides and sandy banks at the lower levels.

Caryophyllæ.

Gypsophila; Silene inflata, Smith; *S. Falconeriana*, Benth., and other species; *Cucabalus bacciferus*, Linn.; *Lychnis indica.*, Benth.; *L. pilosa*, Edgew., and other species; *Cerastium; Stellaria; Arenaria; Sagina; Drymaria cordata*, Willd. Examples of the foregoing are abundant and are distributed throughout the zones of vegetation.

Hypericineæ.

Hypericum patulum, Thunb., *H. perforatum*, Linn., *H. elodioides*, Choisy. The two last are extremely common and extend to 8,000 feet and perhaps higher.

Ternstræmiaceæ.

Camellia theifera, Griff., is extensively cultivated in the Kangra Valley. There are no indigenous representatives of this order.

Malvaceæ.

Malva verticillata, Linn., *M. silvestris*, Linn., *M. rotundifolia* Linn., are three herbs more or less common from 3,000 to 10,000 feet.

Sida humilis, Willd., *S. spinosa*, Linn., *S. rhombifolia*, Linn. *S. cordifolia*, Linn., *Abutilon indicum*, G. Don., *Urena lobata*,

Linn., and *Hibiscus pungens*, Roxb., are all met with in the warmer valleys.

Hibiscus cannabinus, Linn., is cultivated up to 5,000 feet.

Gossypium herbaceum, Linn., is also cultivated.

Bombax malabaricum, DC. There are a few good trees of this in the vicinity of the town of Chamba, but it does not extend upwards beyond 3,000 feet.

Tiliaceæ.

Grewia oppositifolia, Roxb. A small tree, occurring up to 7,000 feet, found near villages where it is probably preserved for the sake of its fruit.

Triumfetta pilosa Roth., and *T rhomboidea*, Jacq., are common on banks and waste places at low levels.

Corchorus trilocularis, Linn., and *C. acutangulus*, Lam., are frequently seen in fields of maize, etc.

Lineæ.

Reinwardtia trigyna, Planch., is a very common undershrub on sunny slopes up to 6,000 feet.

Zygophylleæ.

Tribulus terrestris, Linn., grows prostrate in pastures at low elevations.

Geraniaceæ.

Geranium Wallichianum, Sweet., *G nepalense*, Sweet., and a few other species are all characteristic plants of the upper forests but are also to be seen in suitable localities much lower.

Oxalis corniculata, Linn., is a creeping weed in sandy spots up to 5,000 feet.

Impatiens Balsamina, Linn., *I. Thomsoni*, Hook. f., *I. sulcata* Wall., *I. scabrida*, DC., *I. amphorata*, Edgew., and many others, grow gregariously in moist shady ravines.

Rutaceæ.

Bœnninghausenia albiflora, Reichb., is an herb with white flowers ranging upwards to 8,000 feet.

Zanthoxylum alatum, Roxb. Is a small thorny tree, very fetid when bruised. It is abundant on the slopes running down to the banks of the Ravi at 3,000 to 5,000 feet.

Skimmia Laureola, Hook. f., is a common undershrub of the upper forests.

Meliaceæ.

Melia Azadirachta, Linn., and *M. Azedarach*, Linn., are trees cultivated in low hot valleys.

Cedrela serrata, Royle. This is a tall leafy tree with smooth dark-coloured capsules and attains an elevation of about 5,000 feet.

Ilicineæ.

Ilex dipyrena, Wall., is a tree associated with oaks, maples, etc., at 8,000 to 9,000 feet.

Celastrineæ.

Euonymus Hamiltonianus, Wall. Grows at moderate elevations.

Rhamneæ.

Zizyphus Jujuba, Lam., is a common shrub or small tree at low elevations.

Zizyphus vulgaris, Lam., is a tree cultivated near villages up to 6,000 feet. Its fruit is palatable and is largely eaten by the natives.

Berchemia floribunda, Wall., is a climber observed only at about 5,000 feet.

Rhamnus davaricus, Pallas, and *R. purpureus*, Edgew., are common shrubs ascending to 9,000 feet.

Sageretia theezans, Brogn., is a rigid, spinose leafy shrub, plentiful at 5,000 feet.

Ampelideæ.

Vitis lanata, Roxb., is a large climber covering small trees with its reddish leaves. It is abundant near the town of Chamba and occurs in many localities.

Vitis vinifera, Linn. Is cultivated at low elevations, but was not often observed.

Vitis parvifolia, Roxb., and *V. himalayana*, Brandis, are common up to 8,000 feet.

Sapindaceæ.

Cardiospermum Halicacabum, Linn., is a small, tender climber found on fences round fields.

Æsculus indica, Colebr., is a very common large tree ranging from 3,000 to 10,000 feet. The exfoliated bark hanging in long loose stripes on the trunk gives a distinctive character to the tree.

Sapindus Mukorossi, Gærtn., is cultivated in the town of Chamba and in the Kangra Valley; is planted as a road-side tree.

Acer oblongum, Wall., *A. cæsium*, Wall., *A. caudatum*, Wall., and *A. pictum*, Thunb., are components of the upper forests.

Anacardiaceæ.

Rhus Cotinus, Linn., is a large shrub common in many places but most abundantly seen about 5,000 feet.

Rhus semi-alata, Murray. A small tree, with fruits covered with a white acid secretion, seen in forests from 3,000 to 6,000 feet.

Rhus succedanea, Linn., is common about 4,000 feet.

Mangifera indica, Linn., is not seen in Chamba, but there are many fine trees in the Kangra Valley.

Coriarieæ.

Coriaria nepalensis, Wall., extends as high as 6,000 feet.

Leguminosæ.

Argyrolobium flaccidum, Spach.,s a prostrate bush, most frequent in hot valleys.

Crotalaria prostrata, Roxb., *C. mysorensis*, Roth., *C. albida*, Heyne, *C. medicaginea*, Lam., are all frequent at low levels

Trifolium pratense, Linn., and *T. repens*, Linn., grow in pastures from 5,000 feet upwards.

Parochetus communis, Hamilt., is a herb covering banks in moist ravines.

Indigofera linifolia, Retz., *I. trifoliata*, Linn., *I. hirsuta*, Linn., and other species occur in warm localities.

Indigofera Gerardiana, Wall., with its variety *heterantha*, are abundant small shrubs with a wide range of altitudinal distribution. *I. hebepetala*, Benth., is almost equally common.

Tephrosia purpurea, Pers., is frequent at low elevations.

Astragalus is represented by many species mostly at high levels.

Lespedeza eriocarpa, DC., abounds at 7,000 feet.

Zornia diphylla, Pers., was collected in Kangra Valley.

Smithia ciliata, Royle, is common on dry banks.

Æschynomene indica, Linn., grows in wet places up to 5,000 feet. In the submerged rice-fields in Kangra many plants of this were seen to form thick pithy stems between the roots and upper surface of the water.

Uraria picta, Desv, *U. lagopus*, DC., are found in warm valleys, as are also *Alysicarpus vaginalis*, DC., *A. bupleurifolius*, DC., *A. rugosus*, DC.,

Desmodium triquetrum, DC., *D. laxiflorum*, DC., *D. podocar-*

pum, DC. *D. floribundum*, G. Don, *D. tiliæfolium*, G. Don., *D. concinnum* DC., *D polycarpum*, DC., *D. triflorum*, DC., *D. parvifolium*, DC., and *D. gyrans*, DC., are all common. *Desmodium tiliæfolium*, G. Don., and its variety *argenteum*, are two of the commonest and most widely distributed shrubs in Chamba, and they extend from the lowest level to 9,000 feet.

Vicia pallida, Turcz., is a climber of warm tracts.

Phaseolus calcaratus, Roxb., grows at low elevations.

Vigna vexillata, Benth., with large purple flowers, is a characteristic small climber on grassy slopes exposed to the sun.

Dolichos Lablab, Linn., is cultivated.

Rhynchosia sericea, Spanoghe, and *R. himalensis*, DC., are climbers common about 6,000 feet.

Flemingia strobilifera, R. Br., was seen only in Kangra Valley.

Flemingia congesta, Roxb., var. *semialata*, does not ascend above the lowest levels of the banks of Ravi.

Dalbergia Sissoo, Roxb., is frequent near the town of Chamba, but does not grow above 3,500 feet.

Sophora mollis, Grah., is a common shrub at low elevations.

Cæsalpinia sepiaria, Roxb., is a large climber rarely seen about 5,000 feet.

Cassia occidentalis, Linn., *Cassia Tora*, Linn., *Cassia Absus*, Linn., *Cassia mimosoides*, Linn., are all common at low elevations.

Bauhinia Vahlii, W. and A., was seen only in Kangra Valley.

Bauhinia purpurea, Linn., is cultivated only about the town of Chamba.

Mimosa rubricaulis, Lam., is a small thorny shrub of low levels.

Albizzia Julibrissin, Durazz, was frequently met with about 5,000 feet.

Rosaceæ.

Prunus persica, Benth. and Hook. f., is cultivated.

Prunus armeniaca, Linn., is cultivated everywhere and is one of the commonest trees near villages.

Prunus communis, Huds., variety *insititia*, is cultivated.

Prunus Padus, Linn., is a common tree, particularly in the forests from 7,000 to 12,000 feet.

Prinsepia utilis, Royle, is an abundant shrub often utilized to make hedges.

Spiræa vestita, Wall., grows in the upper forests.

Spiræa sorbifolia, Linn., is a large handsome shrub plentiful about 8,000 feet.

Spiræa canescens, Don., is a dense shrub found between 5,000 and 12,000 feet.

Spiræa parvifolia, Bert., was seldom observed and appears to be a rare plant.

Rubus paniculatus, Smith, was noted in several ravines below 6,000 feet.

Rubus niveus, Wall., is common up to 6,000 feet; *R. ellipticus*, Smith, and *R. lasiocarpus*, Smith, are plentiful up to 6,000 feet.

Geum urbanum, Linn., is abundant in forests from 5,000 to 12,000 feet.

Geum elatum, Wall., grows from 9,000 to 12,000 feet.

Fragaria indica, Andr., is a plant of warm valleys.

Fragaria vesca, Linn., is common from 5 000 to 10,000 feet.

Potentilla Sibbaldi, Haller f., *P. nepalensis*, Hook., *P. argyreophylla*, Wall., and a few more of the same genus are most common at the higher levels.

Agrimonia Eupatorium, Linn., and *A. pilosa*, Ledeb., are two closely allied species. The former has a wider range than the latter which is most frequent about 7,000 to 8,000 feet.

Rosa macrophylla, Ldl., was seen on rocky slopes about 10,000 feet.

Rosa moschata, Mill., is a large climber abundant everywhere from 3,000 to 9,000 feet.

Cydonia vulgaris, Pers., is cultivated, as is also *Pyrus Malus*, Linn.

Pyrus baccata, Linn., is one of the commonest trees in Chamba.

Pyrus communis, Linn., is cultivated.

Pyrus lanata, Don., is a tree of the upper forests.

Crætegus Oxyacantha, Linn., was not seen in a wild state, but I noted cultivated trees with palatable, plum-like fruits.

Cotoneaster bacillaris, Wall., is common.

Cotoneaster microphylla, Wall., is a low dense shrub common everywhere at almost every elevation.

Saxifragaceæ.

Astilbivularis, Ham., is a denizen of humid forests.

Saxifraga diversifolia, Wall., is abundant at high levels.

Saxifraga lingulata, Wall., is common on rocks. There are other species of this genus, but these were the only examples found in flower or fruit.

Parnassia nubicola, Wall., and *P. ovata*, Ledeb., are common at high levels.

Hydrangea altissima, Wall., is a climbing shrub observed only in one locality at about 5,000 feet.

Deutzia corymbosa, Br., and *D. staminea*, Br., are found at the higher elevations.

Ribes. I do not recollect seeing any examples of this genus, but it must certainly be represented.

Crassulaceæ.

Tillæa pentandra, Royle, grows on rocks at 6,000 feet and upwards. It is common below Laka, near Dharmsala.

Crassula indica, Dcne., also grows on rocks.

Kalanchæ spathulata, DC., is found at low elevations only and in dry places.

Sedum Rhodiola, DC., *S. quadrifidum*, Pall., *S. asiaticum*, DC., *S. trifidum*, Wall., *S. rosulatum*, Edgew., *S. Ewersii*, Ledeb., *S. multicaule*, Wall., and probably others, are all common.

Hamamelideæ.

Parrottia Jacquemontiana, Dcne. A shrub or small tree, gregarious where it occurs, which is generally about 6,000 feet.

Combretaceæ.

Terminalia tomentosa, Bedd., is a tree of the low levels only.

Myrtaceæ.

Psidium Guyava, Linn., is cultivated at moderate elevations.

Melastomaceæ.

Osbeckia chinensis, Linn., and *O. stellata*, Wall., were collected in Kangra Valley.

Lythraceæ.

Ammannia pentandra, Roxb., is seen only in rice-fields in Kangra Valley.

Woodfordia floribunda, Salisb., is a small shrub found in abundance up to 5,000 feet.

Lagerstræmia indica, Linn., is cultivated at Chamba.

Onagraceæ.

Epilobium angustifolium, Linn., *E. hirsutum*, Linn. *E. roseum* Schreb, are all common plants.

Jussiæa suffruticosa, Linn., was collected in Kangra Valley.

Circæa cordata, Linn., and *C. alpina*, Linn, are plentiful above 7,000 feet.

Cucurbitaceæ.

Trichosanthes sp. is a common climber at low levels.
Momordica Charantia, Linn., is cultivated.
Cucumis Pepo, Linn., is cultivated.
Mukia scabrella, Arn., is a small climber in warm situations.
Zehneria umbellata, Thwaites, is also a common climber.
Sechium edule, Swartz.. is cultivated in the Kangra Valley.

Begoniaceæ.

Begonia picta, Smith, and *B. amœna*, Wall., are moderately common up to 7,000 feet.

Cacteæ.

Opuntia Dillenii, Haw., was seen in Kangra Valley.

Ficoideæ.

Mollugo stricta, Linn., is common at low levels.

Umbelliferæ.

Sanicula europæa, Linn., is common at most elevations.
Bupleurum falcatum, Linn., *B. longicaule*, Wall., *B. tenue*, Don,, and other species are plentiful. Other plants of this order collected were, *Pimpinella divesifolia*, DC., *Chærophyllum reflexum*, Lindl., *Fœniculum vulgare*, Gærtn., *Selinum tenuifolium*, Wall., *Pleurosperum Brunonis*, Wall., *Heracleum candicans*, Wall.
The order ought to be well represented, but the above are really all I found in a condition fit for identification.

Araliaceæ.

Hedera Helix, Linn., abundant everywhere up to 10,000 feet.

Cornaceæ.

Marlea begoniæfolia, Roxb. A small tree observed in thickets about 5,000 feet.
Cornus macrophylla, Wall., is a tree at low levels.

Caprifoliaceæ.

Viburnum stellulatum, Wall., *V. fœtens*, Dcne., are shrubs of the upper forests.
Abelia triflora, Br., is a small shrub occurring at 6,000 feet.

There are various species of erect, shrubby *Loniceræ* in the upper forests.

Rubiaceæ.

Hymenodictyon excelsum, Wall., was seen on the low hills between Pathankote and Dalhousie.

Wendlandia puberula, DC., was occasionally observed at low elevations.

Hedyotis hispida, Retz., was seen by me only in Kangra Valley, but Mr. C. B. Clarke has recorded it from Chamba.

Oldenlandia coccinea, Royle., was rarely observed about 5,000 feet.

Anotis calycina, Wall., grows on marshy banks of streams about 6,000 feet.

Hamiltonia suaveolens, Roxb., is common in warm valleys.

Leptodermis lanceolata, Wall, is abundant, ranging from 3,000 to 9,000 feet.

Spermacoce stricta, Linn., is found in warm localities.

Rubia cordifolia, Linn., is a common climber.

Galium rotundifolium, Linn., *G. triflorum*, Michx., *G. Aparine* Linn., *G. vestitum*, Don., *G. Mollugo*, Linn., are all common ; and *G. vernum*, Scop., also has been collected in Chamba by Mr. C. B. Clarke.

Valerianeæ.

Valeriana Wallichii, DC., and *V. Hardwickii*, DC., are common.

Dipsaceæ.

Morina persica, Linn., *M. longifolia*, Wall., *M. Coulteriana*, Royle, abound in sub-alpine grassy tracts.

Dipsacus inermis, Wall., is common.

Compositæ.

Vernonia anthelmintica, Willd., was very rarely seen at 5,000 feet.

Adenostemma viscosum, Forst., grows in warm valleys.

Solidago Virga-aurea, Linn., is common up to 8,000 feet.

Myriactis nepalensis, Less., abounds in the upper forests.

Aster Thomsoni, Clarke, is common about 8,000 feet. *Aster asperulus*, Nees, is recorded from Chamba, and *A. Laka*, Clarke, from Laka, above Dharmsala.

Brachyactis umbrosa, Benth., and *B. robusta*, Benth. are both common.

Erigeron canadensis, Linn., is frequent in warm localities.

Erigeron alpinus, Linn., and *E. multiradiatus*, Benth., are abundant at high levels.

Conyza japonica, Less., and *C. stricta*, Willd., inhabit warm places

Leontopodium alpinum, Cass., is a plant of the alpine zone.

Anaphalis nubigena, DC., *A. Royleana*, DC., *A. triplinervis*. Clarke, *A. contortus*, Hook, are abundant.

Phagnalon niveum, Edgew. Grows on rocks about 5,000 feet.

Gnaphalium luteo-album, Linn., *G. hypoleucum*, DC., are common in waste places.

Inula Royleana, DC., is common from 10,000 to 12,000 feet.

Inula grandiflora, Willd., and *I. cuspidata*, Clarke, are also common.

Vicoa auriculata, Cass., was seen at low levels only.

Carpesium cernuum, Linn., and *C. abrotanoides*, Linn., are frequent.

Xanthium strumarium, Linn., *Siegesbeckia orientalis*, Linn., were seen at low elevations in waste places.

Bidens cernua, Linn., is recorded from Chamba.

Bidens tripartita, Linn., is a marsh plant of low levels, and *B. pilosa*, Linn., luxuriates in waste places.

Achillea millefolium, Linn., is common, as are also various species of *Tanacetum* not identified.

Artemisia parviflora, Roxb., *A. scoparia*, Waldst. and Kit., *A. vulgaris*, Linn., and others are common and gregarious.

Senecio graciliflorus, DC., *S. chrysanthemoides*, DC., *S. amplexicaulis*, Wall., *S. Kunthianus*, Wall., *S. rufinervis*, DC., and others, are more or less common.

Werneria Ellisii, Hook. f., is recorded from Chamba.

Echinops cornigerus, DC., and *E. nivens*, Wall., are common from 5,000 to 9,000 feet.

Arctium Lappa, Linn., was only seen about 8,000 feet.

Cnicus involucratus, DC. and *C., Wallichii*, DC., are common.

Saussurea Candolleana, Wall., *S. piptathera*, Edgew., *S. labescens*, Hook. f. and T. : I found only these three species in flower, but from indications observed there must be many more.

Jurinea macrocephala, Benth., is common about 13,000 feet.

Tricholepis elongata, DC., is common up to about 8,000 feet,

Ainsliæa aptera, DC., is common.

Hieracium crocatum, Fries., is recorded from Dalhousie.

Taraxacum officinale, Wigg., is common.

Lactuca scariola, Linn., is common near villages.

Lactuca longifolia, DC., is abundant at moderate elevations.

Lactuca hastata, DC., *L. macrorrhiza*, Hook, f., *L. Lessertiana*, Clarke, are common.

Lactuca sagittarioides, Clarke, was only seen in Kangra Valley.

Sonchus oleraceus, Linn., and *Launæa secunda*, Clarke, are common in warmer parts.

Campanulaceæ.

Lobelia trialata, Ham., is recorded from Chamba.

Cyananthus lobatus, Wall., was collected above Laka at about 13,000 feet.

Campanula canescens, Wall., *C. colorata*, Wall., and *C. argyrotricha*, Wall., are common.

Ericaceæ.

Gaultheria trichophylla, Royle, grows on rocks about 12,000 feet.

Pieris ovalifolia, D. Don, is a common small tree up to 8,000 feet.

Rhododendron arboreum, Smith, is a common tree.

Rhododendron campanulatum, Don, was moderately plentiful at from about 12,000 to 13,000 feet.

Rhododendron Anthopogon, D. Don, *R. lepidotum*, Wall., were seen at 13,000 feet.

Plumbagineæ.

Plumbago zeylanica, Linn., was collected about 3,000 feet.

Primulaceæ.

No Primulas were seen in flower.

Androsace rotundifolia, Hardw., and *A. sarmentosa*, Wall., were collected.

Myrsineæ.

Myrsine africana, Linn., is a small tree of the lower elevations.

Oleaceæ.

Jasminum dispermum, Wall., is a common climber.

Jasminum humile, Linn,, and *J. grandiflorum*, Linn., are small shrubs.

Syringa Emodi, Wall., was seen at 12,000 feet.

Fraxinus floribunda, Wall., becomes a large tree about 6,000 feet.

Olea cuspidata, Wall., and *O. glandulifera*, Wall., are small trees abundant at lower elevations.

Apocynaceæ.

Nerium odorum, Soland., is found in warm localities only.

Asclepiadaceæ.

Cryptolepis Buchanani, Rœm., and Sch., is a climber at low elevations.

Periploca calophylla, Falc., is a climber of the warm valleys.

Calotropis procera, Br., was only seen in Kangra Valley.

Dæmia extensa, Br, a large climber observed at 4,000 feet.

Cyanchum auriculatum, Herb. Royle, and *C. Dalhousiæ*, Wight, at 6,000 feet.

Marsdenia Roylei, Wight, a climber at moderate elevations.

Ceropegia sp. (probably *macrantha*, Wight), was seen at 3,500 feet, but the specimens were lost.

Loganiaceæ.

Buddleia asiatica, Lour., is common at low elevations.

Gentianaceæ.

Gentiana Kurroo, Royle, was the only representative of the genus seen in flower.

Jaeschkea latisepala, Clarke, grows at high levels.

Swertia purpurascens, Wall., *S. petiolata*, Royle, and several species not identified, were collected.

Borragineæ.

Cordia Myxa, Linn., is grown at the town of Chamba.

Heliotropium strigosum, Willd., is plentiful in warm localities.

Cynoglossum micranthum, Desf., *C. denticulatum*, A. DC., *C. Wallichii*, G. Don, *C. microglochin*, Benth., *C. nervosum*, Benth., are all common.

Lindelofia spectabilis, Lehm., and *Paracaryum glochidiatum*, Benth., were found at high levels.

Convolvulaceæ.

Ipomœa hederacea, Jacq., *I. pes-tigridis*, Linn., *I. eriocarpa*, Br., are plentiful at low elevations

Convolvolus arvensis, Linn., is a weed in fields.

Evolvulus alsinoides, Linn., is common in warm situations.

Cuscuta reflexa, Roxb., is a common climbing parasite.

Solanaceæ.

Solanum nigrum, Linn., *S. verbascifolium*, Linn., *S. indicum*, Linn., *S. xanthocarpum*, Schrad., and Wendl., are common.

Capsicum frutescens, Linn., is cultivated.

Withania somnifera, Dunal, is frequent about 5,000 feet.

Datura Stramonium, Linn., and *Hyoscyamus niger*, Linn., are common.

Scrophularineæ.

Verbascum Thapsus, Linn., is common.

Linaria ramosissima, Wall., is abundant on dry rocks about 3,000 to 4,000 feet.

Scrophularia (several species of this genus collected were not identified).

Mazus surculosus, Don, is common.

Lindenbergia urticæfolia, Lehm., is common on rocks up to 6,000 feet.

Limnophila hypericifolia, Benth., was gathered from swampy ground in the Kangra Valley.

Torenia cordifolia, Roxb., was once seen in Chamba at 5,000 feet.

Vandellia pedunculata, Benth., and other species grow in rice swamps.

Picrorrhiza Kurrooa, Benth., is common at high levels.

Wulfenia Amherstiana, Benth., is to be found from 7,000 to 12,000 feet.

Veronica Anagallis, Linn., grows at low levels. Other species inhabit the alpine zone.

Buchnera hispida, Ham., and *Centranthera hispida*, Br., are seen in dry places.

Leptorhabdos Benthamiana, Walp., is frequent on grassy slopes.

Euphrasia officinalis, Linn., exists in profusion between 3,000 and 13,000 feet.

Pedicularis pectinata, Wall., *P. gracilis*, Wall., *P. porrecta*, Wall., *P. megalantha*, Don,, *P. siphonantha*, Don, *P. carnosa*, Wall., were all collected in flower.

Pedalineæ.

Sesamum indicum, D C. is cultivated.

Martynia diandra, Glox., was seen only in Kangra Valley.

Acanthaceæ.

Strobilanthes alatus, Wall., is common in the upper forests; *S. angustifrons*, Clarke, has been recorded from the Kangra District.

Barleria cristata, Linn., *Lepidagathis hyalina*, Nees, *Justicia simplex*, Don, *Adhatoda Vasica*, Nees, *Dicliptera Roxburghiana*, Nees, (variety *bupleuroides*), and *Peristrophe bicalyculata*, Nees, are all common at moderate elevations.

Selagineæ.

A species of *Lagotis* was seen at 13,000 feet.

Verbenaceæ.

Lantana crenulata, Ott. and Dietr., grows at the town of Chamba.

Lippia nodiflora, Rich., *Verbena officinalis*, Linn., and *Vitex trifolia*, Linn. f., are common at low elevations.

Callicarpa macrophylla, Vahl., is a shrub of the shady parts of the lower forests. *Clerodendron fragrans*, Vent., with double white flowers, has run wild about Chamba and its vicinity.

Labiatæ.

Acrocephalus capitatus, Benth., and *Orthosiphon pallidus*, Royle, are found at low levels, as are *Plectranthus striatus*, Benth., *P. Coetsa*, Ham., *P. rugosus*, Wall., *P. incanus*, Link, *Colebrookia oppositifolia*, Smith, *Elsholtzia incisa*, Benth., *E. cristata*, Willd.

Elsholtzia polystachya, Benth., is a common shrub in the higher forests.

Perilla ocimoides, Linn., and *Mosla dianthera*, Maxim., are to be found in warm localities.

Mentha sylvestris, Linn., *Origanum vulgare*, Linn., *Thymus Serpyllum*, Linn., *Micromeria biflora*, Benth., *Calamintha Clinopodium*, Benth., *Calamintha umbrosa*, Benth., *Melissa parviflora*, Benth., are all common.

Salvia glutinosa, Linn., *S. hians*, Royle, *S. Moorcroftiana*, Wall., and other species are abundant at high levels, as are also *Nepeta linearis*, Royle, *N. connata*, Royle, *N. eriostachya*, Benth., *N. spicata*, Benth., *N. erecta*, Benth., and other species.

Scutellaria discolor, Colebr., *S. grossa*, Wall., *S. angulosa*, Benth., *Brunella vulgaris*, Linn., are abundant.

Craniotome versicolor, Reichb., was seen several times about 5,000 feet.

Anisomeles ovata, Br. is common at the lower elevations.

Stachys sericea, Wall., and other species of the genus inhabit higher levels.

Leonurus Cardiaca, Linn., is common, and *Roylea elegans*, Wall., was found as a large bush about Chamba town.

Leucas Cephalotes, Spreng., and *L. hyssopifolia*, Benth., are common at low levels.

Phlomis spectabilis, Falc., *P. setigera*, Falc., and *P. bracteosa*, Royle, grow in the sub-alpine pastures.

Ajuga bracteosa, Wall., and *A. parviflora*, Benth., are both in abundance.

Plantagineæ.

Plantago major, Linn., and *P. lanceolata*, Linn., are common.

Nyctagineæ.

Mirabilis Jalapa, Linn., is cultivated and also frequently occurs as an escape in warm localities.

Amarantaceæ.

Celosia argentea, Linn., and *C. cristata*, Linn., grow in fields.

Bosia Amherstiana, Hook. f., is a common climber at 3,000 to 4,000 feet.

Amarantus spinosus, Linn., occurs in waste places up to 5,000 feet.

Amarantus paniculatus Linn., is extensively cultivated.

Amarantus Blitum, Linn., is found in waste places, as is also *Alternanthera sessilis*, Br.

Ærua scandens, Wall., is frequently seen at moderate elevations.

Cheonopodiaceæ.

Acroglochin chenopodioides, Schrad., was collected on various occasions about 5,000 feet.

Chenopodium Botrys, Linn., is common in waste places.

Phytolaccaceæ.

Phytolacca acinosa, Roxb., is abundant in many places at 6,000 feet.

Polygonaceæ.

Polygonum aviculare, Linn., *P. plebejum*, Linn., *P. viviparum*, Linn., *P. amplexicaule*, Don, *P. vaccinifolium*, Wall., *P. stagninum*, Ham., *P. Hydropiper*, Linn., *P. alatum*, Ham., *P. capitatum*, Ham., *P. dumetorum*, Linn., etc. are all more or less common.

Fagopyrum cymosum, Meissn., is abundant in moist ravines, especially about 8,000 feet.

Rheum. I saw no species of this genus in flower or fruit.

Oxyria digyna, Hill., is a common plant of the Alpine Zone.

Rumex nepalensis, Spreng, is common in wet places where cattle have been kept.

Rumex hastatus, Don, is frequent on banks up to 7,000 or 8,000 feet.

Laurineæ.

Litsæa umbrosa, Nees, is a small tree of the forests about 6,000 feet.

Thymelaceæ.

Daphne oleoides, Schreb., is a small shrub most frequent about 5,000 feet.

Wikstræmia canescens, Meissn. was seen rarely about 6,000 feet.

Eleagnaceæ.

Eleagnus umbellatus, Thunb., a small tree with acidulous fruit, found about 5,000 feet.

Loranthaceæ.

Loranthus pulverulentus, Wall., is frequent on Apricot trees.

Viscum album, Linn., affects Walnut trees and *Viscum japonicum*, Thunb., seems to prefer *Quercus dilatata*.

Euphorbiaceæ.

Euphorbia hypericifolia, Linn., *E. Emodi*, Hook. f., and *E. pilulifera*, Linn., are three common procumbent weeds in warm localities.

E. Wallichii, Hook. f., has been recorded from Chamba.

E. pilosa, Linn., is common at high levels, and indications of other species were noted.

Sarcococca pruniformis, Lindl., is a small shrub in thickets up to 10,000 feet.

Phyllanthus urinaria, Linn., *P. Niruri* Linn., are common weeds near streams in warm situations.

Acalypha brachystachya, Hornem., and *A. ciliata*, Forst., are frequent in waste places up to 6,000 feet.

Mallotus philippinensis, Muell. Arg., is a common tree in warm valleys, but scarcely extends upwards beyond 4,000 feet.

Ricinus communis, Linn., was seen near villages in Kangra Valley.

Sapium sebiferum, Linn., is cultivated as a road-side tree in Kangra Valley.

Urticaceæ.

Ulmus Wallichiana, Planch., is a large tree ascending to about 10,000 feet.

Celtis australis, Linn., is a tree common at low elevations. Some well-grown specimens can be seen within a short distance of the town of Chamba.

Trema politoria, Planch., is confined to elevations below 3,500 feet. It was often noted as a low, twiggy shrub, bearing flowers in profusion.

Cannabis sativa, Linn., is extremely common near villages and in waste places.

Morus alba, Linn., is cultivated.

Ficus religiosa, Linn. Large trees are planted in the low valleys where they afford a grateful shade.

Ficus clavata, Wall., and *F. hispida*, Linn. f., are shrubs not ascending above 4,000 feet.

Ficus foveolata, Wall., is a common climber, generally found on rocks, ascending to 7,000 feet.

Ficus palmata, Forsk., is an extremely abundant tree ranging upwards to 6,000 feet.

Ficus nemoralis, Wall., and *F. Roxburghii*, Wall., ascend to 6,000 feet.

Pilea umbrosa, Wedd., and *P. scripta*, Wall., are common.

Urtica parviflora, Roxb., ascends to 10,000 feet.

Girardinia heterophylla, Dcne., is common in moist forests up to 6,000 feet.

Lecanthus Wightii, Wedd., and *Elatostema sessile*, Forst., are abundant in narrow humid gorges.

Boehmeria platyphylla, Don., was rarely seen in ravines at 3,000 feet.

Pouzolzia indica, Gaud., *P. hirta*, Hassk., are found at low levels.

Pouzolzia pentandra, Benn., was collected in rice-fields in Kangra Valley.

Debregeasia hypoleuca, Wall., is common up to 5,000 feet.

Platanaceæ.

Platanus orientalis, Linn. Several fine specimens of this tree were observed in various localities at moderate elevations.

Juglandeæ.

Juglans regia, Linn. Cultivated trees, yielding large crops of excellent fruit, are abundant everywhere.

Cupuliferæ.

Betula utilis, Don, becomes a shrub at and above 12,000 feet.

Alnus nepalensis, Don, is a large tree common in many places up to 8,000 feet.

Quercus semecarpifolia,, Smith, is a large tree at 6,000 to 10,000 feet, extending upwards almost to the limits of woody vegetation as a densely gregarious shrub. There is a noble forest of this species at Laka above Dharmsala.

Quercus dilatata, Lindl., is a tree so common in Chamba as to be a characteristic feature of the landscape between 4,000 and 9,000 feet. At the latter elevation it is almost immediately replaced by *Quercus semecarpifolia*.

Quercus Ilex, Linn., is found at the same elevations, but is rarer than the last.

Quercus incana, Roxb., is common in the Kangra Valley.

Quercus glauca, Thunb., was seen in a few localities about 6,000 feet.

Corylus Colurna, Linn., is common in forests from 6,000 to 10,000 feet.

Carpinus viminea, Wall., is frequent about 7,000 feet.

Salicineæ.

Salix alba, Linn., is cultivated as a shady road-side tree.

Salix elegans, Wall., was found in fruit about 12,000 feet.

Indications of additional species were noted, but in the absence of flowers and fruits no specimens were collected.

Populus ciliata, Wall., is a tree common up to 10,000 feet. There is a fine specimen on the flat above the bungalow at Tisa.

Gnetaceæ.

Ephedra vulgaris, Rich., was seen on dry slopes at 12,000 feet.

Coniferæ.

Cupressus torulosa, Don, was a tree observed in various localities.

Juniperus communis, Linn., *J. pseudo-sabina*, Fisch. and Mey., *J. recurva*, Ham., were seen.

Pinus excelsa, Wall., replaces *P. longifolia* above 6,000 feet.

Pinus longifolia, Roxb., is common up to 6,000 feet.

Cedrus Libani, Barrel. var. *Deodara*, Hook. f., is abundant in many localities.

Picea Morinda, Linn., is common, as is also *Abies Webbiana*, Lindl.

Orchideæ.

Very few examples of this order were found in flower. Those collected were *Liparis sp.*, *Epipactis latifolia*, Swartz., *Herminium angustifolium*, Benth., *Habenaria marginata*, Colebr.

Scitamineæ.

Roscœa alpina, Royle , ascends to about 10,000 feet.

Cautleya lutea, Royle., was seen rarely about 7,000 feet.

Irideæ.

The genus *Iris* is represented in Chamba, but no plants were found in flower.

Dioscoreaceæ.

Dioscorea kumaonensis, Kunth, and *D. deltoidea*, Wall., were seen.

Liliaceæ.

Smilax parvifolia, Wall., is common.

Several species of *Polygonatum* were observed, but none were in flower.

Lilium polyphyllum, Don, was collected in woods about 8,000 feet.

Pontederiaceæ.

Monochoria hastæfolia, Presl., was common in rice-fields and pools in Kangra Valley.

Commelinaceæ.

Aneilema nudiflorum, Brown, and *Cyanotis barbata*, Don, are common up to 6,000 feet.

Floscopa scandens, Lour., was collected in rice-fields in Kangra Valley.

Juncaceæ.

Several species of *Juncus* collected were not identified.

Palmeæ.

There are a few cultivated trees of *Phœnix sylvestris*, Roxb., on flat land near the town of Chamba.

Aroideæ.

Several species of *Arisæma* collected but not identified.

Lemnaceæ.

Lemna sp. seen in a tank at Chamba. It is common in Kangra Valley.

Alismaceæ.

Alisma Plantago, Linn. was seen in pools in Kangra Valley.

Sagittaria guayanensis, H. B. and K., was once collected in Kangra Valley.

Naiadaceæ.

Potamogeton spp. were common in rice-fields in Kangra Valley but no flowers nor fruits were seen.

Eriocauleæ.

Eriocaulon quinquangulare, Linn., is abundant in Kangra Valley.

Cyperaceæ.

Pycreus sanguinolentus, Nees., *P. capallaris*, Nees., *Cyperus difformis*, Linn., *C. Haspan*, Linn., *C. niveus*, Retz., *C. aristatus*, Rottb., *C. Iria*, Linn., *C. eleusinoides*, Kth. and certainly many more were all more or less common.

Mariscus Sieberianus, Nees, *Bulbostylis barbata*, Kunth., *Eriophorum comosum*, Wall., and *Lipocarpha argentea*, Brown, were common at low elevations.

Carex filicina, Nees, was the only species of the genus I found in flower.

Gramineæ.

Paspalum scrobiculatum, Linn., *P. sanguinale*, Lamk., at low levels.

Panicum Isachne, Roth., *Panicum miliaceum*, Linn., extensively cultivated; *Panicum plicatum*, Lamk. is common in Kangra Valley. *Oplismenus spp.* are common; *Arundinella setosa*, Trin., is recorded from Chamba; *A brasiliensis*, Raddi, is common; *A. Wallichii*, Nees, is frequent in Kangra Valley.

Setaria italica, Beauv., is cultivated; *S. glauca*, Beauv., and *S. verticillata*, Beauv., are common.

Pennisetum flaccidum, Griseb., and *P. orientale*, Rich., are common.

Oryza sativa, Linn., is cultivated on the flat floors of valleys in Chamba and is the principal grain crop in the Kangra Valley.

Coix Lachryma-Jobi, Linn., grows in swamps.

Pollinia argentea, Trin., and *P. nuda*, Trin., are common.

Erianthus Ravennæ, Beauv., and *E. fulvus*, Nees, are tall handsome grasses and common.

Pogonatherum saccharoideum, Beauv., is common in warm situations.

Arthraxon lanceolatus, Hochst., *A. ciliaris*, Hack., *A. microphyllus*, Hochst., are all common.

Apluda varia, Hack., is abundant.

Rottboellia speciosa, Hack., *R. perforata*, Roxb., *Manisuris granularis*, Linn. f., are frequent in low valleys.

Andropogon tristis, Nees, *A. Ischæmum*, Linn., *A. micranthus*, Kunth, *A. assimilis*, Steud., *A. serratus*, Thunb., *A. squarrosus*, Linn. f., *A. Gryllus*, Linn., *A. monticola*, Schult., *A. annulatus*, Forsk., *A. contortus*, Linn., *A. Iwaranacusa*, Jones, and others of the genus are common.

Anthistiria anathera, Nees, *Aristada Adscenscionis*, Linn., *A. cyanantha*, Steud., are frequent at lower levels.

Stipa Orthoraphium, Steud, *Oryzopsis sp.*, *Phleum alpinum*, Linn., abound in the higher zones.

Sporobolus diander, Beauv., and *S. piliferus*, Kunth, grow at moderate elevations.

Several species of *Agrostis*, *Calamagrostis*, *Eragrostis*, *Poa*, *Festuca*, etc., were not identified.

Muehlenbergia sylvatica, Torr. and Gr., *M. viridissima*, Nees, are frequent, and *M. himalayensis*, Hack., has been recorded from Chamba.

Cynodon dactylon, Pers., and *Elytrophorus articulatus*, Beauv., grow in sunny places.

Neyraudia madagascarensis, Hook., has been recorded from Chamba.

Dactylis glomerata, Linn., and *Brachypodium sylvaticum*, Beauv., grow in the upper forests.

Triticum vulgare, Vill., is cultivated.

Arundinaria falcata, Nees, is found at moderate elevations.

A species of *Bambusa* is cultivated about villages in Kangra Valley.

Filices.

Woodsia elongata, Hook., is common at Laka above Dharmsala.

Davallia pseudo-cystopteris, Kunze, is also common on trees at Laka, and *D. immersa*, Wall., has been recorded from Chamba.

Cystopteris fragilis, Bernh., occurs at higher levels.

Adiantum lunulatum, Burm., and *A. caudatum*, Linn., are confined to warm situations.

Adiantum Capillus-Veneris, Linn., and *A. venustum*, Don, reach elevations of 10,000 feet.

Adiantum pedatum, Linn., is recorded from Kangra and Chamba.

Cheilanthes farinosa, Kaulf., with its variety *Dalhousiæ*, *C. albo-marginata*, Clarke, and *C. rufa*, Don., are common, as are *Onychium japonicum*, Kunze, *Pellæa nitidula*, Wall., *Pteris longifolia*, Linn., *P. cretica*, Linn., *P. excelsa*, Gaud., *P. aquilina*, Linn., *P. Wallichiana*, Agardh, and *Woodwardia radicans*, Smith.

Asplenium alternans, Wall., is very common, as are the other members of the genus noted below.

A. Trichomanes, Linn., *A. septentrionale*, Linn., *A. unilaterale*, Lamk., *A. Adiantum-nigrum*, Linn., *A. fontanum*, Bernh., *A. varians*, Hk. and Gren., *A. thelypteroides*, Michx., *A. nigripes*, Mett., *A. Filix-fœmina*, Bernh. and its varieties, *A. fimbriatum*, Wall., *A. japonicum*, Thunb., (in Kangra only), *A. polypodioides*, Mett., and *A. Ceterach*, Linn.

Aspidium auriculatum, Linn., *variety*, is common about 8,000 feet.

A. ilicifolium, Don., *A. Thomsoni*, Hook., *A. aculeatum*, Swartz, *A. Prescottianum*, Wall., with its *variety Bakeriana*, are common at higher levels.

A. coryotideum, Wall., has been recorded from Chamba.

Nephrodium prolixum, Baker, *N. Brunonianum*, Wall., *N. barbigerum*, Hook., *N. Filix-mas*, Linn., and its varieties; *N. odoratum*, Baker, *N. Boryanum*, Willd., *N. aridum*, Don., *N. molle*, Desv., are common.

The remaining forms of the order observed were *Polypodium distans*, Don, *P. punctatum*, Thunb., *P. amœnum*, Wall., *P. lachnopus*, Wall., *P. fissum*, Blume, *P. lineare*, Thunb., *P. clathratum*, Clarke, *P. hastatum*, Thunb, *P. ebenipes*, Hook, *Nothochlæna vellea*, R. Br., *Gymnogramme Totta*, Hook., *G. Levingii*, Clarke, *G. fraxinea*, Don., *G. vestita*, Wall., *Vittaria elongata*, Swartz, *Osmunda Claytoniana*, Linn., and *Lygodium japonicum*, Swartz.

G. I. C. P. O.—No. 817 R & A.—26-4-98.—J. E. F.