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BY

I. H. BURKILL

CALCUTTA

SUPERINTENDENT GOVERNMENT PRINTING, INDIA

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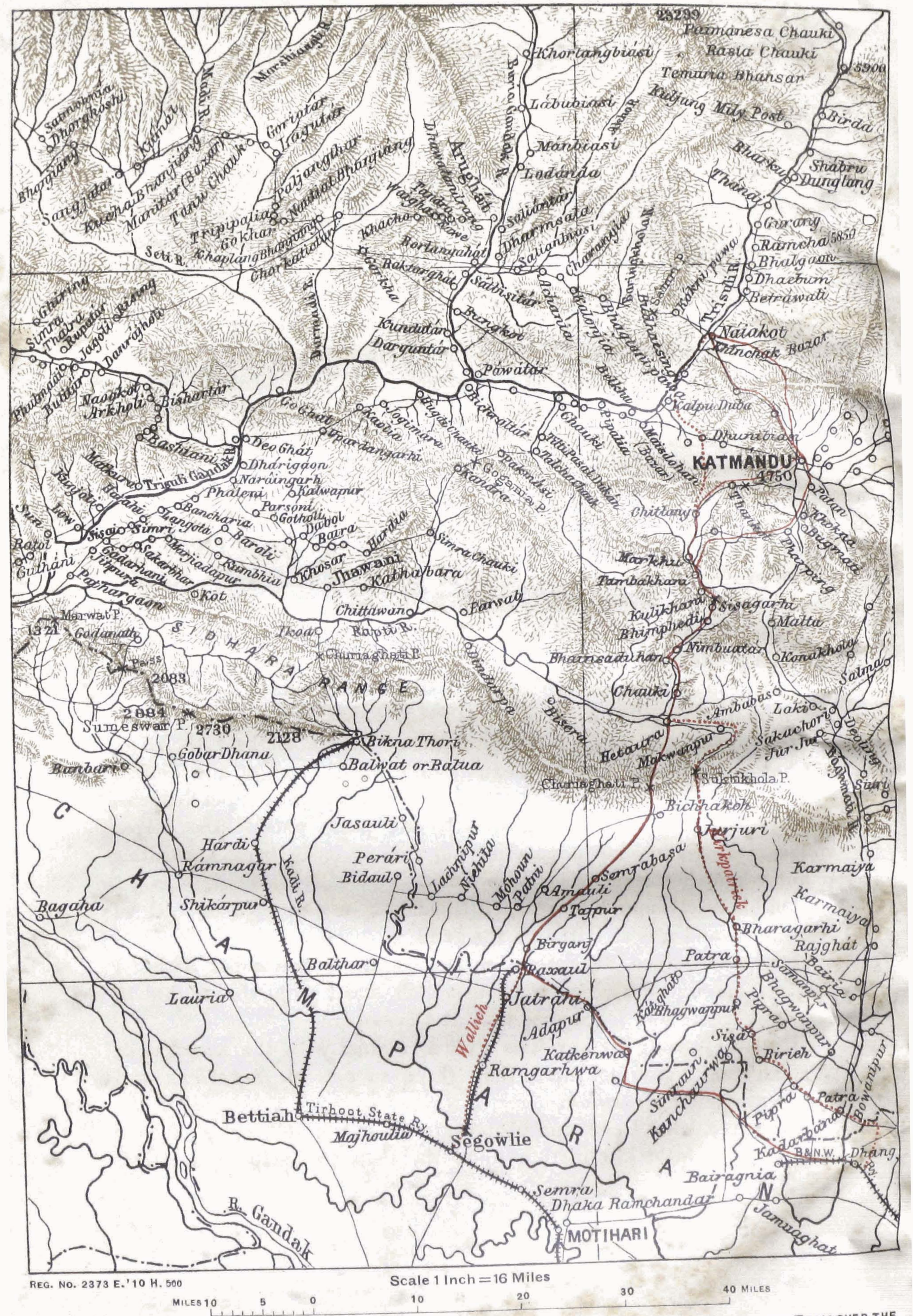

Reg. No. 2373 E.'10 H. 500

Scale 1 Inch = 16 Miles

Miles 10 5 0 10 20 30 40 Miles

Explanations:—Author's route, the continuous red line: Kirkpatrick travelled into Nepal through the Terai over the dotted line and from Chitlang to Naiakot over the dotted line: he returned by the author's route through Pharping. [illegible] first twenty miles. Wallich entering the Terai from Segowlie,

NOTES FROM A JOURNEY TO NEPAL.

By I. H. Burkill.

ON November 28th, 1907, after marching along nearly one hundred miles of the Nepalese frontier between Jáinagar and Raksál, I turned, with the permission of the Nepalese Darbar, into the kingdom of Nepál and reached Khátmándu by the usual route on December the second. Thence with my kind friend, Lieut.-Colonel J. Manners-Smith, V. C., the Resident, I visited the Trisuli valley, in the neighbourhood of Niakot.

I returned from Nepál to the plains by a route through Pherphing, which diversifies the first seventeen miles of the way.

The writer collected at the same season as Wallich.

My dates almost coincide seasonally with the dates of Wallich's march to Khátmándu, and we seem, he and I, to have gathered at a period 87 years apart the same plants in the same spots.

There is no clear record left of Wallich's wanderings; but from E. Gardner's letters to him preserved in the Royal Botanic Gardens, Calcutta, and from dates on the labels of the first plants which he collected in the kingdom of Nepál it is evident that he was at Parsua in the terai at the edge of the forest on or about December the 12th, 1820, at Chessapáni on the 18th, at Thánkot on the 20th, and at the British residency on December 21st. There he remained until about November 7th, 1821, visiting, perhaps, only one place outside the Nepál valley, *viz.*, Niakot, but persuading pilgrims to bring back curiosities to him when they went to Gossáin Thán.

On his return march he reached Bichiakoh on the 11th or 12th of November, and was at Patna on the 22nd.

I was encamped at Parsua on the night of November 28th. I returned through Parsua on December 15th, and I spent the nights of November 30th and December 14th at Chessapáni.

It is ill gleaning for novelties after a botanist with the keenness of Wallich: so I got no more than three species of *Impatiens* and apparently one *Eriocaulon*.

However, what I can, and propose to do, in the following pages is to present a little information upon the features of the vegetation.

The plants collected have been named in scanty leisure hours scattered over two years, by comparison at the Royal Botanic Gardens, Calcutta, except the species of *Impatiens*, which were kindly named by Sir Joseph Hooker. For help in various ways I wish to record my thanks to him and to Lieut.-Colonel D. Prain, Lieut.-Colonel J. Manners-Smith, Major A. T. Gage and Mr. W. W. Smith. Further my best thanks are given to Mr. C. Gilbert Rogers of the Indian Forest Service whose knowledge of the forests of Sikkim and Dehra Dun has been freely put at my service.

The belts of vegetation that the road enters.

The vegetation of the Himalaya has been classed altitudinally by Brandis, and the classification accepted by Drude (*vide* Drude et Poirault, Manuel de Géographie Botanique, pp. 451—453), thus :— (i) alpine belt; (ii) temperate forest belt; (iii) subtropical forest belt; and (iv) tropical forest belt. The third belt may well be called the cultivation belt, because all along the Himalaya cultivation is most intense in it, and more distinctly cuts off the upper forests from the lower forests than any other feature. It is indeed very convenient to use this intenser cultivation as an aid in defining the vegetative belts.

I shall now state which parts of the road from British India to Nepál are in the tropical forest belt, the cultivation belt and the belt of temperate forests.

The road from the plains up to Bhimpedi is in the tropical forest belt. It strikes the forest some fourteen miles from the British border, penetrates it to the foot of the Chorea Ghâti hills, crosses the Chorea Ghâti by the Bichiakoh pass, and descends slightly to Hettáunda, which is in the *mári*, *i.e.*, *dun* or open valley of the Rápti river; thence entering a gorge it climbs gently by Bháinsa-duhán and Pánrán to the head of the valley, where detritus has created a small gravel plain. On the plain is Bhimpedi and just under it Mákápáká. At Bhimpedi a very steep ascent begins; and the road lies in the cultivation belt; but the hill side up which the path goes is too steep for crops, and only a small area bearing them is seen just below the village; however some miles away to the east there is extensive cultivation. The fort of Sisagárhi is near the top of this hill; and above it, about the Chessapáni pass at 6,000 feet, the road reaches the first bit of hill-forest, the trees at the pass itself being festooned as on the wet ridges of Sikkim with mosses. From the pass the road goes down again into the cultivation belt and winds by the river Pinouni through the cold valley of Lohári Nepál, past Támbeh Kháni to Márkhu at 4,500 feet; thence it ascends over downs to Chitlong and so once more into

the temperate forest belt. In this belt it climbs to 6,800 feet, to a pass on the hills called Chándagiri, whence the traveller sees like a map spread out below, the wide valley of Nepál with its three cities, and many towns and villages. The irregularities of the broad valley are not large and are little noticeable from this height: we see only a ring of wooded hills* on one part of which we stand, and below a wide stretch of cultivation with here and there a town or city and here and there a small patch of woodland.† I was allowed to cross this ring of hills at four places, (*i*) by Pherphing, (*ii*) by the Chándagiri pass, (*iii*) by Kakni, and (*iv*) by the Sángli khola: as already said, none of the passes crossed are of any height; but visiting them gave me some slight acquaintance with the variety of vegetation existing. I left the valley, when returning to the plains, by Pherphing; I travelled to Niákot by Kakni and returned by the Sángli khola.

Niákot stands at about 3,000 feet on a hill crest between the junction of the Tádi and Trisuli rivers. The town itself is in the cultivation belt, but the valleys, which are 1,000 feet below, are in the belt of the tropical forests. They are full of crops of rice and sugarcane, and contain sál forest. The rices are the rices of the terai, and not the hill rices of Nepál proper; they are reaped in December just like those of northern Champáran and Darbhanga:— indeed they are for a large part identical ‡.

The use of two local words—'biási' and 'tár' is well exemplified in the valleys under Niákot. A biási is a low flat place irrigated generally; a tár is a place which can not be irrigated and so produces rain-crops only. The snow-river Trisuli rushes down a narrow valley past Niákot under cliffs; and the bits of even ground above the cliffs are társ: the Likhu and Tádi fall more evenly through moderately broad flats, whither irrigation channels bring water to crops: these flats are biásis. On a cold December morning, these biásis give off a thick fog; but none rises in the Trisuli valley. The Tádi is capable in the rains of being a fierce stream: it has destroyed many bridges built over it (Oldfield, Sketches from Nepal, 1880, p. 33); and when in 1792 the Chinese and Gurkhas fought on its banks, it swept away more men than actually fell in battle. In the valleys near Niákot are some royal gardens, whence is drawn a supply of that fruit which the

* Kirkpatrick in his *Account of the Kingdom of Nepal* exaggerates in regard to these hills. There is no call for the expression "stupendous mountain of Sheoopoori," that he uses (page 69).

† The reader should note that properly speaking, this valley is Nepál: its centre is the old temple of Khátmándu; and the kingdom which it rules is the "Kingdom of Nepál."

‡ *Cf.* Brian Houghton Hodgson's Essays, ii, page 56.

valley of Nepál does not produce well; I visited one at a village called Gurkháh. The plants cultivated are mentioned on page 71 forward. The court of Prwithi Náráyan was at Niákot for a time after the conquest of Nepál in 1764, while the Gurkhas were still widening their kingdom. Thither, therefore, went Kirkpatrick in 1793, as envoy from the Governor-General of India, by a road from Chitlong which he describes as ascending through stunted oak scrub (*i.e.*, much lopped *Quercus semecarpifolia*) to a crest over the Doona biási beautifully wooded with trees, just as is the crest of Chándagiri.* The old palaces can be seen still under Niákot by the Tádi: they were too low to be healthy and the court moved from the riverside up the hill, and then finally to the much more salubrious neighbourhood of Khátmándu.

In discussing the vegetation I shall begin with the terai and I shall in no way concern myself with what is west of Bikna Thori.

The bhavar or Sál forest under the mountains.

The atlas of India does not represent correctly the limits where the open terai abuts against the "bhavar" or Sál forest on the east side of the Bágmati river, though it represents it approximately correctly on the west. It is incorrect in that it represents forest as extending to the limits of British territory whereas one must go so much nearer to the foot-hills as eight miles north of Janikpur before the edge is reached.

Roughly over this part of the country the "bhavar" or Sál forest spreads from the foot-hills for upwards of ten miles on to the plain. At Simulbása it begins very abruptly—a long wall of forest stretching east and west with cultivated fields abutting on it; and its definiteness is obviously due to cultivation. Probably this is the general condition.

The southern limits of the Sál forest in the eighteenth century and now.

I had wished in this place to discuss the age of this forest line; but there are not data enough for the purpose. This much is certain, that 125 years ago the edge of the great forest was as now near Simalbása: and it may be stated that evidence does not exist to show that it has been of much wider extent during the Christian era, though the extent of the waste lands on its borders have varied. Father Marc, who resided in Bettiah from 1758 to 1768, narrates how in his time in going from

* He mentions (page 79 sissoo and pines as growing in the chasms under the shoulders: the first probably does not grow there: what pine the second is it would be interesting to ascertain.

Bettiah to Khátmándu one travelled through long grass for three days, and then met the forest near Parsua (*vide* Lévi, Le Népal, i, p. 123). Kirkpatrick who in 1793 passed out of Nepál by this road represents in his map the forest as ending near Simalbása and says (Account of Nepal, p. 30) "Goor pussra stands very near the skirt of the great forest; ..... the country all round the village is ..... by no means bare of cultivation". Gurparsua is a little south of Simalbása. Hamilton who followed him in 1802 found the edge of the forest "3 miles beyond Gar pasara," *i.e.*, at Simalbása.

Kirkpatrick in going to Nepál crossed the foot-hills by the Sakti-khola pass on the east of my route: he relates of it (p. 15) that the forest began just beyond Soopeah (Soophye), and this is about the spot where it begins now.

The Nepalese wars of 1814 and 1815-16, and subsequent boundary survey, resulted in a map of the terai wherein the limit of the forest is given east and west of the roads that Kirkpatrick and Hamilton had taken (*vide* Prinsep's Transactions in India, 1813-1823, vol. i, 1825, map facing p. 179). The military operations of 1814 had taken place along its edge.

The "bhavar" or forest, it may be said, is neither much deeper nor much shallower than it was a century and a quarter ago.

Patches of forest south of the Bhavar; no ground for assuming that they have been part of the Bhavar.

South of the limits of the great forest persist small areas of poor forest, isolated by wide spreads of cultivation. There is one patch at Parsua and another within British territory on the bank of the Tiur nadi south of Cháuradána. It is probable that the latter represents the forest spoken of by Firishta in connection with the capture of Semráon in 1352. This is how Firishta describes the event. "As the king (Tughluk Sháh) was passing near the hills of Tirhut, the Raja (of Semráon) appeared in arms, but was pursued into the woods. Finding his army could not penetrate them, the king alighted from his horse, called for a hatchet, and cut down one of the trees with his own hand. The troops on seeing this, applied themselves to work with such spirit that the forest seemed to vanish before them. They arrived at length at a fort surrounded by seven ditches full of water and a high wall. The king invested the place, filled up the ditches and destroyed the wall in three weeks. The Raja and his family were taken and great booty obtained." The forest encountered by the Mohammedans may well have been more extensive than the line now persisting, but could hardly have been part of the great

forest; for cities as large as Semráon (2 miles square) cannot exist without cultivation round them. I am quite aware that Georgi, describing from hearsay the road from Myhsi to Makwanpur *viâ* the Sakti-khola pass and referring to Semráon describes it as if it were then ruins in the middle of the great forest: but in the light of Kirkpatrick's remarks that north of Semráon in 1793, was a jungle of *Butea frondosa* infested by bears, it is evident that Georgi wrote loosely, and that Semráon was not truly in the middle of the great forest.

The waste grass lands of the teral; their want of history and migratory population.

The long grass which Father Marc mentions is the vegetative formation often spoken of as "kháraul".* Father Marc's wide stretch of kharául has now given way to almost uninterrupted tilled fields, except that one small area persists just north of Bettiah, and there are a few others elsewhere.

The kháraul south of the forest in Father Marc's time grazed large herds of cattle much bought by the East India Company as draught animals: and the fires kindled yearly by the graziers, when they returned after the rains, kept the country under grass, destroying the young trees and maintaining the forest limit definite.

It is a pity that none of the old pilgrims has left any record of the condition of this country in his times. There has been for ages a pilgrim route east of the Gandak from Vaisali or somewhere near the Ganges by the Bikna Thori pass into Nepál. Fa Hian went over part of it in the fourth century, but left no record. Sung Yun in 518 did the same. Huien Tsang gives little information; and regarding this great traveller Watters (On Yuan Chwang, in the publications of the Oriental Translation Fund, vol. xv, 1904, page 83) even doubts if he visited Nepál from Vaisali; Kusinágará, which he did visit, coming from the west and returning south-west, may have been west of the Gandak or if east of that river, must have been not nearly so far east as Bikna Thori. Wang-hiuen-tze in 648 and 657 probably crossed the Bikna Thori pass, but left no information.

West of the Gandak according to Huien Tsang were ruined cities and near them forests with insecure roads, marks of the decay of old power: it is probable that in his time the east side of the Gandak was equally in a state of decay, out of which in time rose Semráon, to fall

* Kharaul is to be distinguished clearly from darbi or thatching grass which occurs in abundant small areas up and down the country, and it to be classed under cultivation as a meadow.

in 1325 before a Mahommedan incursion, the country being left worse off than before.

The actual terai has had little history from 1325 until at the end of the eighteenth century the British raj and the new power of the Gurkhas began to rescue it from its impoverished state. It seems, through the intervening centuries, to have been almost always insecure, chiefly waste and always unhealthy—the land of the marches where the hill rulers at times had the upper hand and at times the plains rulers. Bettiah on the southern edge was the end fort of the line of forts that Husáin Sháh (1493-1518) built to keep out invasion from the north.

When in the eighteenth century history again begins to notice the terai, we find that hill rajas, *e.g.*, of places like Makwanpur, hunted in it, and contrived to levy dues, and the early missionaries complained of the exactions and annoyances of their imposts (*vide* Lévi's Le Népal, p. 120 footnote). Ivory was collected. We find too that graziers went to it when the hot weather dried up their pastures in the south and paying what was demanded to the power of the day, fired the grasses and stayed until the unhealthy rains drove them south. We find a little later that timber was cut in the forests on its northern border and exported through it for boat building on the Ganges and for beams and rafters of houses in quantity sufficient, as Prinsep says, to bring it into universal use as far as Calcutta. The migratory population of graziers, woodcutters, and hunters, persisted still in Oldfield's time (*vide* page 60 of his Sketches), though diminished.

The spread of the present state of cultivation into the terai.

It was in 1764 that the battle of Buxar made British the plains of Tirhut ; and it was in 1768 that the Gurkhas captured Nepál. From these years is to be counted the change in the fortunes of the terai : and in desire to improve its conditions the court of Khátmándu has not been less anxious than the British have been south of the border. A firm rule has caused cultivated fields to extend uninterruptedly to the edge of the forest itself. How cultivation increased through northern Champáran may be judged from information to be found in O'Malley's Gazetteer of that district, 1907, page 74, and Oldfield's Sketches, page 55.

The present cultivation near the forest limit at Simalbása is not so intense as southwards and fallows are very common, but almost all the land has been brought under the plough. Rice is the chief crop ; but in December mustard is also common.

Crops and weeds of cultivation in the terai.

The weeds of the fallows and waste land at the edges of the fields are chiefly:—*Sida rhombifolia*, *Urena lobata*, *Triumfetta rhomboidea*, *Indigofera linifolia*, *Cassia Tora*, *Mimosa pudica*, *Vernonia cinerea*, *Cæsulia axillaris*, *Eclipta alba*, *Chrysanthellum indicum*, *Emilia sonchifolia*, *Hydrolea zeylanica*, *Cynoglossum lanceolatum*, *Solanum xanthocarpum*, *Scoparia dulcis*, *Rungia parviflora*, *Leucas linifolia*, *Anisomeles ovata*, *Amarantus spinosus*, *Achyranthes aspera*, *Alternanthera sessilis*, *Polygonum glabrum*, *Polygonum Hydropiper*, *Euphorbia pilulifera*, *Cyperus flavidus*, *Cyperus auricomus*, *Mariscus microcephalus*, *Fimbristylis dichotoma*, *Kyllingia triceps*, *Panicum colonum*, *Andropogon aciculatis*, *Cynodon dactylon*, *Eragrostis amabilis* and *Eragrostis stenophylla*. They are all wide spread plants of the plains of India except *Chrysanthellum indicum*; and that little plant is not of restricted distribution.

Half way between Parsua and Simalbása is a thatching-grass meadow. This meadow on examination was found to be composed of *Andropogon intermedius*, *Cymbopogon Martini*, and *Setaria glauca*, with abundant plants of *Exacum tetragonum*, *Cassia mimosoides*, and *Alysicarpus rugosus*. The thatching-grass meadows seen further south within British territory contained a different vegetation.

The plants associated in an isolated patch of forest at Parsua.

The little patch of thin forest at Parsua consists of trees of:—*Cedrela Toona*, *Lagerstræmia parviflora*, *Bridelia retusa*, *Mallotus philippinensis*, *Trema orientalis*, *Salix tetrasperma*, and a *Tetranthera*, with a growth of small shrubs and rather tall herbs between them, *e. g.*, *Crotalaria alata*, *Desmodium gyroides*, *Pueraria phaseoloides*, *Melastoma malabathricum*, *Osbeckia nepalensis*, *Anisomeles ovata*, *Leucas hyssopifolia*, *Leonotis nepetæfolia* and *Plectranthus ternifolius*.

Here and there in the country side stand trees of *Bombax malabaricum*. Hamilton remarked that in 1802 it and *Butea frondosa* were the commonest trees of the terai. With the extension of cultivation at the expense of the tall kharául grass, they and probably also *Salix tetrasperma* have become much less abundant.

Plants of the coarse grass lands.

A study of the patches of kharául grass which remain, and a comparison with stretches existing in the Duars, will give some idea of the past vegetation. *Saccharum Narenga* in the Nepál terai is its chief species, and is associated with *Cymbopogon*

Martini and *Saccharum arundinaceum*. When fire is withheld long enough or is not fierce enough, *Bombax malabaricum* can get a hold and flourish.

Appearance of the bhavàr or great forest: its climbers, its two divisions.

The bhavar or level forest is not dense, and the ground under the trees is lit in November with checkered sunlight, whether the overhead canopy be of leaves of the sál (*Shorea robusta*), or of the leaves of the variety of trees which grow together south of the sál. It becomes yet more open on the Chorea Ghâti hills.

Yapp has recently used the happy expression "general vegetation level" to indicate the height above the ground that an assemblage of plants in chief part attains. We have two general vegetation levels in this forest, one of the trees, and the other of the half shrubby, half herbaceous assemblage under them. As the lowest foliage of the trees is generally ten feet above the lower general vegetation level, one can look widely through the forest over the grass and shrub tops. This condition is of course exaggerated in the Dipterocarp forests of northern Burma, where one can see down aisles and avenues in all directions over quite a short undergrowth: and it is in great contrast to the tangle of creepers and shrubs of all sizes which occurs in the mixed forests on the lower slopes of the Himalaya.

Large tree-ascending creepers, except *Spatholobus*, are generally absent: small shrub-climbing creepers are very common: such are *Dioscorea dæmona, D. glabra, D. anguina, D. bulbifera, D. pentaphylla, Zehneria umbellata* and *Cissampelos Pareira*. It has seemed to me that some of the sál forests of the Darjeeling district are peculiarly full of fleshy rooted plants, such as these creepers are.

Entering the forest at Simalbása we find trees of *Bombax malabaricum, Bauhinia malabarica, Mallotus philippinensis, Adina cordifolia, Bridelia retusa, Cedrela Toona, Dillenia pentagyna, Hymenodictyon excelsum, Spondias axillaris*, and *Terminalia tomentosa*, with, below them, *Phyllanthus Emblica, Streblus asper, Randia dumetorum* and *Thespesia Lampas*. Again below on the ground is a short vegetation of the grasses, *Oplismenus compositus, Setaria glauca, Pollinia articulata, Chloris incompleta, Panicum prostratum, Eragrostis amabilis, Andropogon fasciculatis, Panicum flavidum*, mixed with a *Leea*, the composites *Elephantopus scaber, Vernonia cinerea*, and *Adenostemma viscosum*, the Leguminosæ *Mimosa pudica, Crotalaria alata* and

C. calycina, the Malvaceæ *Sida cordifolia*, *S. carpinifolia*, *Hibiscus cancellatus*, and *Urena lobata*, the Tiliacea *Triumfetta rhomboidea*, *Asparagus racemosus*, *Rungia parviflora*, *Trichodesma indicum*, *Anisomeles ovata* and a plant which appears to be an *Alpinia*.

It will be noticed at once that this is a vegetation mainly composed of common weeds of India.

The sunlight gets to this vegetation the more readily in November and December because some trees are then becoming bare, *e.g.*, *Dillenia*, *Spondias axillaris*, and *Hymenodictyon excelsum*.

Where we meet with sál at Adhabhár, *Laggera flava* and *Symplocos spicata* suddenly become abundant; and nearer to the hills is plenty of *Nyctanthes Arbor-tristis*. These plants with *Antidesma diandrum*, *Vernonia teres*, and *Clausena pentaphylla* are characteristic of the sál forest.

Looking through the sál trees with one's eye at about the level of the top of the undergrowth, *Thespesia Lampas*, *Rivea ornata*, *Asparagus racemosus*, and *Grewia hirsuta* chiefly attracted notice.

The leaves of *Antidesma diandrum* in December go red. There were no other red leaves in the forest, but yellow dying leaves were plentiful.

Pine-woods of the south face of the foot hills.

The road very gently ascends through the forest to Bichiakoh at the foot of the hills and then taking to the wide shingly bed of the stream ascends the Chorea Ghâti to a pass at 2,000 feet. The hills are in their lower parts of sandstone with rounded stones or above of conglomerate: they are cut into knife-edge ridges on which *Pinus longifolia*, *Terminalia tomentosa* and *Shorea robusta* (sál) grow in a loose forest out of 2-3 feet high grass. No place except the river margin is level; and late in the dry weather the well-drained slopes must be very dry; *Dalbergia Sissoo* grows along the sides of the stream and makes islands in it. On the margin of the river bed was a vegetation of some slight luxuriance, where the yellow flowers of *Reinwardtia trigyna* made a brave show; and with it were in plenty the large-flowered *Lindenbergia grandiflora*, *Saurauja nepalensis*, *Inula Cappa*, and *Leucas mollissima*. A remark which must be made regarding *Inula Cappa*, is that my specimens are exactly the *Inula eriophora* of De Candolle, which is reduced in the Flora of British India to *Inula Cappa*, but is probably a good variety. I found it plentiful over nearly the whole of the march between Bichiakoh and Hettáunda and doubtless in the very places where Wallich collected the type of *Inula eriophora*.

Osbeckia chinensis, *Crotalaria albida*, and *Meliosma simplicifolia* occur on the stream side; and the climbing *Dioscorea belophylla*, *Sabia paniculata*, *Hedyotis scandens*, *Ficus scandens* and *Thunbergia coccinea* put in an appearance.

There are further,—because carters encamp so much there,—a number of weeds dependent on man which need not be enumerated. Only the occurrence of *Artemisia vulgaris* may be mentioned, because it is interesting to see how low it, which descends to the plains of Upper Assam, can descend in this longitude.

Vegetation about the top of the foot hills, more or less 2,000 feet above sea level.

From half way up the Chorea Ghâti hills to the top of the ridge, plants not seen earlier are met with, *viz.*, *Swertia angustifolia*, var. *Wallichii*, *Æchmanthera Wallichii*, *Indigofera hirsuta*, *Maoutia Puya*, and *Bœhmeria rugulosa*; and at the top appear *Blumea obovata*, *Scutellaria repens*, *S. discolor*, *Echinacanthus longistylus*, *Anaphalis araneosa*, *Strobilanthes capitatus*, *Mussænda Roxburghii*, and *Geniosporum strobiliferum*. *Blumea obovata* was one of the most conspicuous of plants on the top of the pass, though over a restricted area: its large heads nod and it does not look at all like a *Blumea*. It was only known formerly from Wallich's specimens, probably obtained exactly whence mine came. I am indebted to the Director of the Royal Botanic Gardens, Kew, for a comparison of my specimens with the type. *Echinacanthus longistylus* was also abundant over a small area.

North slope of the foot-hills.

The descent northwards is for a very short way steep; then it becomes quite gentle, winding through open sál forests down to the Kuró nadi near Hettáunda and on to the Rápti at Hettáunda itself. *Pinus longifolia* hardly descends these damper northern slopes; *Shorea robusta* instead rules in exactly the same positions as it does at Dehra Dun. The grasses are here taller than they were on the south side of the hills; there is abundance of *Phragmites Karka*, *Anthistiria gigantea* and a *Saccharum*: *Phyllanthus Emblica* is very common; and towards Hettáunda *Mimosa rubricaulis* lashes the shrubs together; and *Asystasia macrocarpa* grows among them. A few epiphytic orchids appear; and at Hettáunda itself Dioscoreas are vigorous.

The vale of the Rapti put out of cultivation by order.

Hettáunda is a poor hamlet, living on the trade which passes through it. The small area of land that had been ploughed was, in December, a waste of tall weeds chiefly *Ageratum, Siegesbeckia, Nicandra physaloides, Cassia Tora, Euphorbia pilulifera, E. neriifolia*, and *Jatropha Curcas*: *Bœrhaavia* sp. and *Achyranthes aspera* were present also, as followers of man. East of Hettáunda is the Makwanpur mári or vale of Makwanpur, said formerly to have been much cultivated, but now nearly all under forest; westward the forest extends down the wide vale of the Rápti getting thinner and thinner until it almost disappears. In 1815 this lower valley was reported abundantly cultivated: but now the forest is pressing in more on to Hettáunda than it used to do a century ago, when, as Hamilton, for instance, said (Account of Nepal, p. 197) "the country had few trees." The policy of the Nepalese Government after the Gurkha wars was to build a barrier of malarious forest under the hills that no invading army should there obtain a base: and without doubt the Makwanpur mári was put out of cultivation by order. It is as Oldfield says (Sketches, p. 49) that "previous to the first Nepál war, the dhuns of Chitáun and Makwanpur were extensively cultivated, but since the peace of 1816 the Gurkha Government from motives of policy has caused the inhabitants to abandon the greater part of them and they have been allowed to revert to their natural state of forest and grass jungle." Kirkpatrick had seen "abundance and great variety of rice" grown in the Makwanpur mári (Account of Nepal, p. 23). The Gurkhas had had very good reason to appreciate the value to them of the malarious forest; for in 1764 it took heavy toll from Captain Kinloch's force at Bhareh on its skirt under the Sakti khola pass.

Clematis Gouriana and *Drymaria cordata* appear at Hettáunda representing two distinctly temperate orders of plants.

Dense tangled forest of the outer face of the mountains and gorge of Bhainsi Duhan.

North of Hettáunda the hills consisting chiefly of limestones and quartzites (*vide* Medlicott in Records of the Geological Survey of India, viii, 1875, p. 95) rise abruptly to 6,000 feet and carry forest quite unlike that southwards,—dense forest with tangles of creepers, aroids, epiphytes, screw pines, etc., and having nearly the appearance of the wet forests of lower Sikkim. Where the gorge, up which the road runs, is at its deepest, the cold weather sunshine at midday hardly falls direct on the damp tangle of vegetation in hollows on the hill face

towards the north and the strata are much broken and confused, great masses of the white limestone forming irregular cliffs on both hill sides.

The conspicuous large trees of this dense forest are *Duabanga sonneratioides*, *Terminalia tomentosa*, *Shorea robusta*, *Anthocephalus Cadamba*, *Bombax malabaricum*, a *Bauhinia*, and another Leguminosa, with sissoo for the first part of the way in the stream bed. At the deepest part of the gorge *Pandanus furcatus* grows; and *Rhaphidophora glauca* climbs up the tree trunks. On the hill face towards Hettáunda plants of the large creeper *Combretum decandrum* are very plentiful, just as they are where the Tista debouches on to the plains. *Dalbergia volubilis* was common in the forest, sprawling over other shrubs: a rambling *Zanthoxylum*, *Holmskioldia*, a *Vitis*, *Mimosa rubricaulis*, a *Thunbergia*, and two Menisperms are other climbers. Big ferns are plentiful, and *Selaginellas*, which in December were drying up. A bamboo with long whip-like terminations to its shoots grows in the drier parts of the forest: and so also grow in abundance *Oroxylum indicum*, *Hamiltonia suaveolens*, and *Antidesma diandrum*. *Mussænda Roxburghii* is also present: and where the rocks break through *Kalanchoe spathulata* appears. Every damp hollow is full of *Strobilanthes* covered with flowers, with *Reinwardtia trigyna*, and with *Elatostema rupestre*. Every level corner where travellers can rest for a night carries weeds associated with man, such as *Girardinia heterophylla*, *Urtica parviflora*, *Ageratum conyzoides*, and *Polygonum mite*. As we reach the upper part of the gorge *Rubus ellipticus*, *Colebrookia oppositifolia*, and *Adhatoda Vasica* appear.

In the old days the road up this gorge wound along the stream bed. Father Marc says (from hearsay) that it crossed the stream thirty-five times, and in the rains was impassable. Kirkpatrick enumerates twenty-four crossings, and Hamilton mentions twenty-two. Father Giuseppe (Asiatic Researches, ii., 1790, *p.* 307 translation by John Shore) writes of more than fifty crossings of streams on the road to Nepál half of which would be over this river.

Now-a-days a well-laid cart road runs along the east bank from Hettáunda to Bháinsa Duhán, and there it crosses by a cantilever bridge on to the other bank, to climb gently out of the tropical forest belt to Bhimpedi.

The valleys under Niakot: their cultivation and their weeds.

As said, at Bhimpedi we enter the cultivation belt, but before leaving the tropical forest region it is necessary to say something about the vegetation below Niákot. The Niákot valley is fenced off against the south wind by the line of mountains which is penetrated by the

road of which we have been speaking. It is open and tilled where level. Its sides are covered with sál forests, whence the Nepál valley draws its supply of leaf-platters. The ground if low, such as is called a biási, carries rice crops : if high, such as is called a tár, was chiefly fallow in December after a crop of *Sesamum*. I imagine that the cultivation formerly existing in the vales of Chitaun and Makwanpur was similar.

An interesting account of the crops of Niákot may be read in Hodgson's Essays, ii, pp. 56-57.

Striking features of the Niákot valley are its patches of sugarcane, and its orchards of plantains, mangoes, guavas, pears, oranges, carambol, etc., and its gardens of pineapples, yams (*Dioscorea alata* Linn.), wax gourds (*Benincasa cerifera* Savi), Tapioca (*Manihot utilissima* Pohl) and various forms of *Cucumis*. Oranges grow remarkably well.

Vicoa auriculata, *Evolvulus alsinoides* and *Vernonia cinerea* were plentiful as weeds. *Agave Vera-Cruz* occurred. *Glossogyne*, *Rubus ellipticus*, *Euphorbia neriifolia*, *Zizyphus nummularia*, *Colebrookia*, *Wendlandia pendula*, *Holmskioldia sanguinea*, *Bryophyllum calycinum*, *Cassia Fistula*, *Clerodendron serratum*, *Calotropis procera*, and *Callicarpa macrophylla* were abundant on the conglomerate cliffs over the Trisuli. On its bank was *Ficus pyriformis* nestling among boulders ; and just above the flood-level *Gentiana decemfida*, *Zeuxine sulcata*, *Oldenlandia corymbosa*, *Cyperus tuberosus*, *Scutellaria rivularis*, *Fragaria indica* and *Ophioglossum vulgatum* were together.

The *Gentiana* which I examined with considerable care, exactly agrees with the type collected by Wallich, and is distinct enough from the var. *aprica* of the Punjab Siwaliks. I made a careful search for Podostemaceæ without any success.

In the rice stubble along the Tárdi valley *Oplismenus compositus*, *Herpestis Monnieria*, *Cæsulia axillaris*, *Eragrostis amabilis*, *Mariscus microcephalus*, and *Setaria glauca* were common. *Arabis hirsuta* was once seen.

Ficus lævis was seen near Gurkháh, * perhaps planted. Wallich's type of *F. Emodi*, which is this species, is labelled "towards Gossain Than" and therefore probably came from one of the valleys near Niákot, and if so from not far from Gurkháh. *Limnophila conferta* was found at Thánsing which is the extreme of its distribution towards the north-west.

Plants of the Sál forests under Niakot.

In the sál forest, *Phœnix humilis*, *Phyllanthus Emblica*, and *Laggera flava* were common.

* This Gurkháh is a village about seven miles from Niákot

The Sál forest at Thánsing in the Likhu valley where it is near its upper limit contained as undergrowth an abundance of *Wendlandia coriacea*, *Hyptianthera stricta*, *Ardisia humilis*, and sheets of *Nephrolepis tuberosa*.

Pteris aquilina, *Woodfordia floribunda*, and *Schima Wallichii* thither descend so as to come into contact with the sál. Other plants associated with the sál were *Desmodium confertum*, *Celastrus paniculata*, *Heynea trijuga*, *Ficus Cunia*, *Pieris ovalifolia*, *Polygonum barbatum*, a *Strobilanthes*, *Plectranthus striatus*, *Dysophylla cruciata*, *Reinwardtia*, a *Smilax* and an *Eugenia*.

Forests of Castanopsis.

The Sál forest give place to a forest of *Castanopsis indica* both on the hill of Niákot and above Thánsing. I think that this change marks the place where the tropical forests may be conveniently considered to end.

Crops under Niákot.

Cultivation of the following crops was observed :—

Juár (*Sorghum vulgare* Pers.), Marwa (*Eleusine coracana* Gærtn.), Tapioca (*Manihot utilissima* Pohl), *Dioscorea alata* Linn., *Benincasa cerifera* Savi, *Cucurbita Pepo* DC. or *C. maxima* Duchesne. *Lagenaria vulgaris* Ser., *Amorphophallus*, Sugar-cane, *Sesamum*, Peas, *Dolichos Lablab* Linn., Tomatoes, *Mucuna pruriens* DC., *Chenopodium album* Linn., Guavas, Plantains, Jack fruit, Mangoes, Máhua (*Bassia butyracea* Roxb.), Ber (*Zizyphus Jujuba* Lamk.), Jámun (*Eugenia Jambolana* Lamk.), Pineapples, and Kamrak (*Averrhoa Carambola* Linn.).

A list of all the plants observed in the tropical Forest belt.

The following is a list of all the plants observed in the tropical forest belt. Those in Capitals were more abundant either locally or generally than the others.

Clematis Gouriana Roxb.
Clematis grewiæflora DC.
DILLENIA PENTAGYNA Roxb.
Cocculus villosus DC.
Cissampelos Pareira Linn.
Argemone mexicana Linn.
Cardamine hirsuta Linn.
Flacourtia Ramontchi L'Her.
Xylosma longifolium Clos.
Polygala leptalea DC.
BRACHYSTEMMA CALYCINUM Don.
DRYMARIA CORDATA Willd.
Polycarpon Læflingiæ Benth. & Hook. f.
Hypericum japonicum Thunb.
Mesua ferrea Linn.
SARAUJA NEPAULENSIS DC.
SHOREA ROBUSTA Gærtn.

Sida rhombifolia Linn.
Sida carpinifolia Linn.
Sida cordifolia Linn.
Urena lobata Linn.
Hibiscus cancellatus Roxb.
Thespesia Lampas Dalz. & Gibs.
Kydia calycina Roxb.
Bombax malabaricum DC.
Abroma augusta Linn.
Grewia scabrophylla Roxb.
Grewia hirsuta Vahl.
Triumfetta rhomboidea Jacq.
Corchorus capsularis Linn.
Corchorus olitorius Linn.
Elæocarpus Ganitrus Roxb.
Reinwardtia trigyna Planch.
Oxalis corniculata Linn.
Zanthoxylum ovalifolium Wight.
Clausena pentaphylla DC.
Ochna pumila Ham.
Cedrela Toona Roxb.
Schœpfia fragrans Wall.
Natsiatum herpeticum Ham.
Zizyphus Jujuba Lamk.
Zizyphus nummularia W. & A.
Zizyphus rugosus Lamk.
Vitis carnosa Wall.
Leea sp.
Sabia paniculata Edgew.
Meliosma simplicifolia Walp.
Mangifera indica Linn.
Semecarpus Anacardium Linn. f.
Spondias axillaris Roxb.
Crotalaria prostrata Roxb.
Crotalaria acicularis Ham.
Crotalaria alata Ham.
Crotalaria albida Heyne.
Crotalaria calycina Schrank.
Crotalaria sessiliflora Linn.
Crotalaria sericea Retz.
Crotalaria tetragona Roxb.
Crotalaria medicaginea Lamk.
Parochetus communis Ham.
Indigofera linifolia Retz.
Indigofera hirsuta Linn.
Indigofera pulchella Roxb.
Millettia auriculata Baker.
Geissaspis cristata W. & A.
Uraria hamosa Wall.
Alysicarpus rugosus DC.
Desmodium confertum DC.
Desmodium latifolium DC.
Desmodium gyroides DC.
Abrus precatorius Linn.
Shuteria vestita W. & A.
Dumasia villosa DC.
Mucuna pruriens DC.
Erythrina arborescens Roxb.
Spatholobus Roxburghii Benth.
Butea frondosa Roxb.
Pueraria phaseoloides Benth.
Dalbergia volubilis Roxb.
Dalbergia Sissoo Roxb.
Pongamia glabra Vent.
Derris scandens Benth.
Mezoneurum cucullatum W. & A.
Cassia Tora Linn.
Cassia occidentalis Linn.
Cassia Sophera Linn.
Cassia mimosoides Linn.
Cassia Fistula Linn.
Bauhinia malabarica Roxb.
Bauhinia purpurea Linn.
Mimosa pudica Linn.
Mimosa rubricaulis Lam.
Acacia concinna DC.
Acacia pennata Willd.
Albizzia lucida Benth.
Rubus ellipticus Sm.
Fragaria indica Anders.
Kalanchoe spathulata DC.
Bryophyllum calycinum Salisb.
Terminalia Chebula Retz.

TERMINALIA TOMENTOSA Bedd.
ANOGEISSUS LATIFOLIA Wall.
COMBRETUM DECANDRUM Roxb.
Eugenia Jambolana Lam.
Eugenia sp.
OSBECKIA CHINENSIS Linn.
Osbeckia nepalensis Hook.
MELASTOMA MALABATHRICUM L.
Oxyspora cernua Triana.
WOODFORDIA FLORIBUNDA Salisb.
LAGERSTRŒMIA PARVIFLORA Roxb.
DUABANGA SONNERATIOIDES Ham.
Jussiæa repens Linn.
Bryonia laciniosa Linn.
ZEHNERIA UMBELLATA Thwaites.
Mukia scabrella Arn.
Begonia gigantea Wall.
Opuntia monacantha Haw.
Hydrocotyle rotundifolia Roxb.
Œnanthe stolonifera Wall.
Heteropanax fragrans Seem.
Viburnum punctatum Ham.
Anthocephalus Cadamba Miq.
Adina cordifolia Hook. f.
Stephegyne parvifolia Korth.
HYMENODICTYON EXCELSUM Wall.
Wendlandia exserta DC.
WENDLANDIA ? CORIACEA DC.
Wendlandia pendula DC.
HEDYOTIS SCANDENS Roxb.
Oldenlandia corymbosa Linn.
Mussænda Roxburghii Hook. f.
Randia dumetorum Lamk.
HYPTIANTHERA STRICTA W. & A.
KNOXIA CORYMBOSA Willd.
HAMILTONIA SUAVEOLENS Roxb.
Rubia angustissima Wall.
VERNONIA TERES Wall.
Vernonia subsessilis DC.
VERNONIA CINEREA Less.
Vernonia anthelmintica Willd.
ELEPHANTOPUS SCABER Linn.
ADENOSTEMMA VISCOSUM Forst.
AGERATUM CONYZOIDES Linn.
CONYZA STRICTA Willd.
Blumea obovata DC.
Blumea procera DC.
LAGGERA FLAVA Benth.
LAGGERA ALATA Schultz-Bip.
Anaphalis araneosa DC.
Cæsulia axillaris Roxb.
Inula Cappa DC.
Siegesbeckia orientalis Linn.
Eclipta alba Hassk.
SPILANTHES ACMELLA Linn.
BIDENS PILOSA Linn.
Cosmos sulfureus Cav.
Vicoa auriculata Cass.
Glossogyne pinnatifida DC.
Chrysanthellum indicum DC.
Galinsoga parviflora Cav.
AIRTEMISIA VULGARIS Linn.
Emilia sonchifolia DC.
Lobelia trigona Roxb.
Wahlenbergia gracilis DC.
Plumbago zeylanica Linn.
Embelia robusta Roxb.
ARDISIA HUMILIS Vahl.
SYMPLOCOS SPICATA Roxb.
NYCTANTHES ARBOR-TRISTIS Linn.
Tabernæmontana coronaria R.Br.
Ichnocarpus frutescens R.Br.
Calotropis procera R.Br.
Exacum teres Wall.
EXACUM TETRAGONUM Roxb.
CANSCORA DECUSSATA C. B. Clarke.
Gentiana decemfida Ham.
Swertia angustifolia Ham.
Hydrolea zeylanica Vahl.
Trichodesma indicum Br.

Cynoglossum furcatum Wall.
Cynoglossum lanceolatum Forsk.
Rivea ornata Chois.
Argyreia Hookeri C. B. Clarke.
Lettsomia setosa Roxb.
Ipomœa ?Bona-nox Linn.
Ipomœa hederacea Jacq.
Evolvulus alsinoides Wall.
Porana paniculata Roxb.
Solanum verbascifolium Linn.
Solanum indicum Linn.
Solanum xanthocarpum Schrad. & Wendl.
Nicandra physaloides Gaertn.
Datura Stramonium Linn.
Datura fastuosa Linn.
Mazus rugosus Lour.
Lindenbergia grandiflora Benth.
Lindenbergia urticæfolia Lehm.
Limnophila conferta Benth.
Limnophila sessiliflora Blume.
Herpestis Monnieria H. B. K.
Torenia vagans Roxb.
Scoparia dulcis Linn.
Ægineta indica Roxb.
Utricularia orbiculata Wall.
Oroxylum indicum Vent.
Stereospermum suaveolens DC.
Martynia diandra Glox.
Thunbergia coccinea Wall.
Hygrophila polysperma T. Anders.
Echinacanthus attenuatus Nees.
Echinacanthus longistylus C. B. Clarke.
Dædalacanthus nervosus T. Anders.
Æchmanthera Wallichii Nees.
Strobilanthes sabinianus Nees.
Strobilanthes capitatus T. Anders.
Barleria cristata Linn.
Asystasia macrocarpa Nees.
Lepidagathis hyalina Nees.
Adhatoda Vasica Nees.
Rungia parviflora Nees.
Dicliptera bupleuroides Nees.
Peristrophe bicalyculata Nees.
Callicarpa macrophylla Vahl.
Gmelina arborea Linn.
Vitex ?trifolia Linn. f.
Clerodendron serratum Spreng.
Clerodendron siphonanthus R. Br.
Holmskioldia sanguinea Retz.
Ocimum gratissimum Linn.
Geniosporum strobiliferum Wall.
Plectranthus Gerardianus Benth.
Plectranthus ternifolius Don.
Plectranthus striatus Benth.
Pogostemon sp.
Dysophylla cruciata Benth.
Colebrookia oppositifolia Sm.
Mosla dianthera Maxim.
Mentha arvensis Linn.
Scutellaria discolor Coleb.
Scutellaria angulosa Benth.
Scutellaria repens Ham.
Scutellaria rivularis Wall.
Anisomeles ovata R. Br.
Leucas mollissima Wall.
Leucas hyssopifolia Benth.
Leucas nepetæfolia R. Br.
Leucas linifolia Spreng.
Leonotis nepetæfolia R. Br.
Plantago major Linn.
Bærhaavia repens Linn.
Deeringia celosioides R. Br.
Amarantus spinosus Linn.
Cyathula capitata Moq.
Cyathula tomentosa Moq.
Achyranthes aspera Linn.
Alternanthera sessilis R. Br.

Chenopodium ambrosioides Linn.
Polygonum tomentosum Willd.
Polygonum glabrum Willd.
Polygonum barbatum Linn.
POLYGONUM HYDROPIPER Linn.
Polygonum flaccidum Meissn.
Polygonum capitatum Ham.
Polygonum chinense Linn.
POLYGONUM MITE Schrank.
Piper nepalense Miq.
Tetranthera glauca Wall.
Loranthus Scurrula Linn.
Loranthus longiflorus Desr.
Viscum monoicum Roxb.
EUPHORBIA PILULIFERA Linn.
Euphorbia neriifolia Linn.
Euphorbia Tirucalli Linn.
BRIDELIA RETUSA Spreng.
Phyllanthus urinaria Linn.
PHYLLANTHUS EMBLICA Linn.
Breynia patens Benth.
ANTIDESMA DIANDRUM Roth.
Jatropha Curcas Linn.
MALLOTUS PHILIPPINENSIS Muell. Arg.
TREMA ORIENTALIS Blume.
STREBLUS ASPER Lour.
Ficus religiosa Linn.
Ficus Cunia Ham.
Ficus glomerata Roxb.
Ficus pyriformis Hook.
Ficus lævis Blume.
Ficus scandens Roxb.
URTICA PARVIFLORA Roxb.
Girardinia heterophylla Decne.
Elatostema rupestre Wedd.
Bœhmeria rugulosa Wedd.
BŒHMERIA PLATYPHYLLA Don.
Maoutia Puya Wedd.
Myrica Nagi Thunb.
Salix tetrasperma Roxb.
Oberonia iridifolia Lindl.
Eria sp.
Arundina bambusifolia Lindl.
Otochilus alba Lindl.
Otochilus sp.
RHYNCHOSTYLIS RETUSA Blume.
Vanda parviflora Lindl.
Saccolabium papillosum Lindl.
Zeuxine sulcata Lindl.
Costus speciosus Sm.
Alpinia ?
DIOSCOREA DÆMONA Roxb.
DIOSCOREA PENTAPHYLLA Linn.
DIOSCOREA ANGUINA Roxb.
Dioscorea glabra Roxb.
DIOSCOREA BULBIFERA Linn.
DIOSCOREA BELOPHYLLA Wight.
Dioscorea sikkimensis Prain & Burkill.
Smilax prolifera Roxb.
ASPARAGUS RACEMOSUS Roxb.
Monochoria hastæfolia Presl.
Commelyna sp.
PHŒNIX HUMILIS Royle.
Phœnix sylvestris Roxb.
Pandanus furcatus Roxb.
Amorphophallus sp.
Colocasia Antiquorum Schott.
Rhaphidophora glauca Schott.
Lasia heterophylla Schott.
Sagittaria sagittifolia Linn.
Kyllingia triceps Roxb.
Kyllingia brevifolia Rottb.
Cyperus flavidus Retz.
CYPERUS TUBEROSUS Rottb.
CYPERUS RADIATUS Vahl.
CYPERUS AURICOMUS Sieber.
Cyperus pumilus Linn.
MARISCUS MICROCEPHALUS Presl.
Fimbristylis dichotoma Vahl.
ERIOPHORUM COMOSUM Wall.
Carex hymenolepis Nees.
PANICUM COLONUM Linn.
Panicum flavidum Retz.
PANICUM PROSTRATUM Lamk.

Panicum indicum Linn.
Panicum myosuroides R. Br.
Thysanolæna acarifera Nees.
Oplismenus compositus Beauv.
Arundinella brasiliensis Raddi.
Setaria glauca Beauv.
Coix Lachryma-Jobi Linn.
Pollinia articulata Trin.
Saccharum narenga Ham.
Saccharum spontaneum Linn.
Pogonatherum polystachyum Kunth.
Andropogon assimilis Steud.
Andropogon fasciculatis Roxb.
Andropogon intermedius Willd.
Andropogon aciculatis Willd.
Andropogon melanocarpus Elliott.
Andropogon ? distans Nees.
Cymbopogon Martini Stapf.
Anthistiria gigantea Cav.
Chloris incompleta Roth.
Eragrostis amabilis W. & A.
Eragrostis stenophylla Hochst.
Cynodon dactylon Pers.
Phragmites Karka Trin.
Bambusa ?
Pinus longifolia Roxb.
Ceratopteris thalictroides Linn.
Cheilanthes farinosa Kaulf.
Adiantum Capillus-veneris Linn.
Adiantum caudatum Linn.
Nephrolepis tuberosa Presl.
Polypodium coronans Wall.
Ophioglossum vulgatum Linn.
Lycopodium cernuum Linn.

Sál forests compared with those to the west.

We will now look for east and west elements in this flora.

There is in the Indian Forester, vol. x., 1884, p. 325, a list of the chief constituents of the Sál forest flora in Kheri, and with those forests I propose first to compare the forest seen in the Nepál terai. The following trees or shrubs named in the Kheri list are very conspicuous plants in the Sál forest between Adhabhár and Hettáunda :—*Dillenia pentagyna*, *Kydia calycina*, *Grewia* sp. (in the Nepál forests there is *G. scabrophylla*), *Clausena pentaphylla*, *Leea* sp. (in the Kheri forests it is *L. aspera*), *Semecarpus Anacardium*, *Indigofera* sp. (in the Nepál forests it is *I. pulchella*), *Millettia auriculata*, *Bauhinia* sp. (in the Nepál forests it is *B. malabarica*), *Spatholobus Roxburghii*, *Terminalia Chebula*, *Terminalia tomentosa*, *Lagerstræmia parviflora*, and *Phyllanthus Emblica* ; while the following named in the Kheri list are present in less obvious degree :—*Ochna pumila*, *Adina cordifolia*, *Stephegyne parvifolia*, *Stereospermum suaveolens*, and *Bridelia retusa*.

The following are found in the Kheri list, and were not seen by me in the Nepál Sál forests :—*Murraya Kœnigii*, *Garuga pinnata*, *Schleichera trijuga*, *Buchanania latifolia*, *Pterocarpus Marsupium*, *Terminalia Bellerica*, *Eugenia* sp., *Careya arborea*, *Casearia graveolens*, *Casearia tomentosa*, *Bassia latifolia*, *Holarrhena antidysenterica*, *Ficus Rumphii* (F. cordifolia and *Ficus benga-*

lensis. As my journey through the forest was hurried, my failure to record them by no means proves their absence: but it is quite possible that *Schleichera trijuga*, *Buchanania latifolia*, *Pterocarpus Marsupium*, and *Bassia latifolia* are really absentees: they are not Sikkim trees.

Other woody plants which I noticed, and which are not named in the Kheri list are:—*Thespesia Lampas*, *Abroma augusta*, *Spondias axillaris*, *Anogeissus latifolia*, *Symplocos spicata*, *Nyctanthes Arbortristis*, *Ichnocarpus frutescens* and *Antidesma diandrum*. A few of these, which are almost all shrubs, were common enough to be features of the undergrowth, *e. g.*, the *Thespesia*, *Anogeissus*, *Symplocos*, *Nyctanthes* and *Antidesma*: I think that only *Spondias axillaris* and *Symplocos spicata* can be absent from the Kheri Sál forests.

The Sál forests we know to extent westwards under the hills nearly to the exit of the Sutlej. Many of the associated plants have almost the same western limit.

Eastern plants in the Pine forest.

Associated with the pines on the Chorea Ghâti are plants which have no place in the Sál forest, and the dispersal of which is more restricted, among them *Meliosma simplicifolia*, *Begonia gigantea*, *Mussænda Roxburghii*, *Rubia angustifolia*, *Vernonia subsessilis*, and *Echinacanthus longistylus* are distinctly eastern plants. *Blumea obovata* is known only from this one place.

Markedly eastern nature of the vegetation of the gorge of Bhâinsa Duhân.

The vegetation of the damp gorge of Bhâinsa Duhân is yet more eastern still in character than the forest of the Chorea Ghâti as witness the following plants found there:—*Brachystemma calycinum*, *Schœpfia fragrans*, *Natsiatum herpeticum*, *Shuteria vestita*, *Dalbergia volubilis*, *Mezoneurum cucullatum*, *Acacia concinna*, *Acacia pennata*, *Albizzia lucida*, *Duabanga sonneratioides*, *Hedyotis scandens*, *Torenia fragrans*, *Utricularia orbiculata*, *Strobilanthes sabinianus*, *Elatostema rupestre*, *Otochilus alba*, *Arundina bambusifolia*, *Pandanus furcatus*, and *Rhaphidophora glauca*.

In appearance this vegetation distinctly suggests that of the hills below Tindhária in the Darjeeling District.

Cultivation belt; its common plants.

I pass on to the cultivation area. Forest vegetation in it is limited to steep slopes: elsewhere spread terraced fields. Campbell (Trans.

Agri-Hort. Soc. iv. 1837, p. 59) and Lévi (Le Nepál, i, pp. 297-306) have described these fields with their narrow grassy banks which permit but few plants to grow. The trees most common in the cultivation belt are *Schima Wallichii*, *Alnus nepalensis* and *Acer oblongum*, the bushes *Rubus ellipticus*, *Myrsine capitellata*, *M. semiserrata*, *Eurya acuminata*, *Viburnum coriaceum*, *Rosa moschata*, *Mæsa indica*, *Prinsepia utilis*. and *Melastoma malabathricum*; the herbs *Pteris aquilina*, *Nephrolepis tuberosa*, *Gleichenia dichotoma*, *Kalanchoe spathulata*, *Drymaria cordata*, *Bœnninghausenia albiflora*, *Parochetus communis*, and various grasses.

The hamlets dotted all over the hill-faces take a large toll of firewood out of whatever forest or scrub is left, and the tendency is to clear the ground more and more. The result is a rarity of well grown trees; and in Lohári Nepál the timber has wholly disappeared as a result of the old smelting works. Some groves of trees near Khátmándu preserved from the axe, are well grown: the steep slopes, for instance, near Páshupati carry large trees of *Alnus nepalensis*, *Acer oblongum*, *Schima Wallichii*, and *Fraxinus floribunda*. The trees named are all leafy in December: the *Alnus* flowers then. Where the trees are well grown there is little under them but here and there a bush of *Daphne cannabina* with fragrant white flowers.

Where the trees have been cut from off the steep slopes, shrubs generally remain with an abundant herbaceous vegetation between them. If, for instance, one goes to the edge of the valley of Nepál and begins to climb the lower slopes of the hills that bound it, one finds oneself among *Pyrus Pashia*, *Symplocos theæfolia*, *Myrsine capitellata*, *Luculia gratissima* and *Mæsa indica*; none of these growing higher than fifteen feet and generally only six feet high. In many places among them is *Camellia Thea*—the Tea bush, healthy and vigorous.

Phyllanthus parvifolius is not uncommon.

The herbs among the bushes are such as:—*Drymaria cordata*, *Bœnninghausenia albiflora*, *Artemisia vulgaris*, *Anaphalis cinnamomea*, *Anaphalis contorta*, *Swertia angustifolia*, *Lindenbergia grandiflora*, *Æchmanthera Wallichii*, *Anisomeles ovata*, *Pteris aquilina*, and *Gleichenia linearis*.

The Downs in the cultivation belt.

The downs above Márkhu and near Pherphing carry short grass at the beginning of December, with the little blue bells of *Campanula sylvatica* dotting them. The grasses of the downs are chiefly *Pollinia* and *Anthistiria imberbis*: flowerless in December on them

stand plants of *Potentilla fulgens*, *Teucrium quadrifarium*, *Artemisia parviflora*, *Hypericum japonicum*, *Hypericum elodeoides*, *Swertia paniculata*, *Swertia parviflora* and an Umbellifer. *Micromeria biflora* occurs near Chitlong and abundantly about Jáitpur.

Lotus corniculatus occurs at Chitlong—its eastern limit as far as at present known. With it on grassy banks are two *Violas*, *Gentiana*, a *Stellaria* and an *Arenaria*: and not far away *Oldenlandia gracilis* was found. The *Oldenlandia* finds its eastern known limit there; and Nepál is also the eastern known limit of *Campanula sylvatica*.

To see *Micromeria biflora* growing with an abundance of *Rosa moschata*, *Rubus ellipticus*, and *Prinsepia utilis* suggests the vegetation of the Simla hills. But after enumerating the plants found in the cultivation belt in discussing the east and west affinities, we shall see that the flora is distinctly eastern.

The cold winds and hail storms of Lohári Nepál are proverbial. With this cold and the denudation of its forests the valley has become peculiar.

Crops in the cultivation belt.

In the cultivation belt besides crops of Marwa (*Eleusine coracana* Gaertn.), wheat, Juár, and Buckwheat (*Fagopyrum esculentum* Moench), were seen Tobacco, imported chillies (*Capsicum annuum* Linn.), Turnips and sárson, Radishes, Fenugreek, Chinese cabbage and *Dioscorea alata* Linn.

Oranges grow well, and apples satisfactorily; but the former do better below the cultivation belt than in it.

A list of all the plants observed in the cultivation belt.

The following is a list of the plants observed in the cultivation belt: as before capitals indicate the more common plants.

CLEMATIS BUCHANANIANA DC.
Anemone sp.
Ranunculus sceleratus Linn.
Berberis asiatica Roxb.
Berberis nepalensis Spr.
Fumaria sp.
Cardamine hirsuta Linn.
Viola canescens Wall.
Viola sp.
Polygala arillata Ham.
Stellaria ? saxatilis Wall.
Cerastium triviale Link.
Cerastium glomeratum Thuill.
Arenaria ? serpyllifolia Linn.
DRYMARIA CORDATA Willd.
HYPERICUM ELODEOIDES Choisy.
HYPERICUM JAPONICUM Thumb.
Cleyera ochnacea DC.
Eurya symplocina Blume.
Eurya acuminata DC.

SCHIMA WALLICHII Choisy.
Camellia theifera Griffith.
REINWARDTIA TRIGYNA Planch.
GERANIUM NEPALENSE Sweet.
OXALIS CORNICULATA Linn.
Impatiens densifolia Hook. f.
Impatiens Pershadiana Hook. f.
BŒNNINGHAUSENIA ALBIFLORA Reichb.
Evodia fraxinifolia Hook. f.
Zanthoxylum ovalifolium Wight.
ZANTHOXYLUM ALATUM Roxb.
Melia Azadirachta Linn.
Heynea trijuga Roxb.
ILEX EXCELSA Wall.
Celastrus paniculata Willd.
Zizyphus incurva Roxb.
Zizyphus Œnoplia Mill.
Acer oblongum Wall.
Dobinea vulgaris Ham.
Rhus succedanea Linn.
RHUS WALLICHII Hook. f.
Crotalaria prostrata Roxb.
Crotalaria sessiliflora Linn.
PAROCHETUS COMMUNIS Ham.
Lotus corniculatus Linn.
Desmodium confertum DC.
Desmodium parvifolium DC.
Abrus pulchellus Wall.
Shuteria vestita DC.
Mezoneurum cucullatum W. & A.
Cassia occidentalis Linn.
CASSIA LÆVIGATA Willd.
Prunus Puddum Roxb.
PRINSEPIA UTILIS Royle.
Rubus moluccanus Linn.
RUBUS ELLIPTICUS Sm.
Fragaria indica Anders.
POTENTILLA FULGENS Wall.
ROSA MOSCHATA Mill.
Stranvæsia glaucescens Lindl.
ASTILBE RIVULARIS Ham.
DICHROA FEBRIFUGA Lour.
KALANCHOE SPATHULATA DC.
Bryophyllum calycinum Salisb.
Eugenia sp.
OSBECKIA NEPALENSIS Hook.
MELASTOMA MALABATHRICUM Linn.
Oxyspora cernua Triana.
Lagerstræmia parviflora Roxb.
WOODFORDIA FLORIBUNDA Salisb.
Bryonia laciniosa Linn.
HYDROCOTYLE ROTUNDIFOLIA Roxb.
Sanicula europæa Linn.
HEDERA HELIX Linn.
CORNUS CAPITATA Wall.
VIBURNUM STELLULATUM Wall.
LUCULIA GRATISSIMA Sweet.
WENDLANDIA ? CORIACEA DC.
Hedyotis scandens Roxb.
Oldenlandia gracilis DC.
Ophiorrhiza fasciculata Don.
HAMILTONIA SUAVEOLENS Roxb.
RUBIA CORDIFOLIA Linn.
Dipsacus inermis Wall.
Vernonia teres Wall.
Vernonia cinerea Less.
Vernonia anthelmintica Wild.
Adenostemma viscosum Forst.
AGERATUM CONYZOIDES Linn.
ERIGERON BELLIDIOIDES Benth.
Conyza japonica Less.
Laggera alata Schultz-Bip.
Laggera pterodonta Benth.
Anaphalis triplinervis C. B. Clarke.
Anaphalis araneosa DC.
ANAPHALIS CONTORTA Hook. f.
Gnaphalium luteo-album Linn.
Siegesbeckia orientalis Linn.
Spilanthes Acmella Linn.
GALINSOGA PARVIFLORA Cav.

ARTEMISIA PARVIFLORA Roxb.
ARTEMISIA VULGARIS Linn.
Senecio chrysanthemoides DC.
SENECIO VAGANS Wall.
Cnicus argyracanthus DC.
Picris hieracioides Linn.
Sonchus arvensis Linn.
Launæa nudicaulis Less.
Tagetes patula Linn.
Lobelia radicans Thunb.
Campanula sylvatica Wall.
Gaultheria fragrantissima Wall.
Pieris ovalifolia Don.
Rhododendron arboreum Sm.
PLUMBAGO ZEYLANICA Linn.
Androsace saxifragæfolia Bunge.
MÆSA RAMENTACEA A. DC.
Mæsa macrophylla Wall.
Myrsine africana Linn.
Myrsine semiserrata Wall.
Myrsine capitellata Wall.
Embelia Ribes Burm.
Ardisia humilis Vahl.
Symplocos theæfolia Ham.
Jasminum humile Linn.
Nyctanthes Arbor-tristis Linn.
FRAXINUS FLORIBUNDA Wall.
LIGUSTRUM NEPALENSE Wall.
Buddleia asiatica Lour.
Gentiana capitata Ham.
Gentiana pedicellata Wall.
SWERTIA AUGUSTIFOLIA Ham.
SWERTIA PANICULATA Wall.
SWERTIA DILATATA C. B. Clarke.
Cynoglossum furcatum Wall.
Bothriospermum tenellum Fisch. et Mey.
Cuscuta reflexa Roxb.
Solanum xanthocarpum Schrad. et Wend.
Solanum indicum Linn.
Nicandra physaloides Gaertn.
DATURA STRAMONIUM Linn.
Datura fastuosa Linn.
Verbascum Thapsus Linn.
LINDENBERGIA GRANDIFLORA Benth.
Lindenbergia philippensis Benth.
Lindenbergia urticæfolia Lehm.
Vandellia crustacea Benth.
Veronica Anagallis Linn.
Utricularia bifida Linn.
Oroxylum indicum Vent.
Thunbergia fragrans Roxb.
Thunbergia coccinea Wall.
Hemigraphis latebrosa Nees.
ÆCHMANTHERA WALLICHII Nees.
Strobilanthes penstemonoides T. Anders.
Lepidagathis hyalina Nees.
ADHATODA VASICA Nees.
Rungia parviflora Nees.
Dicliptera bupleuroides Nees.
Clerodendron infortunatum Gaertn.
HOLMSKIOLDIA SANGUINEA Retz.
Plectranthus Gerardianus Benth.
Coleus barbatus Benth.
POGOSTEMON GLABER Benth.
Colebrookia oppositifolia Smith.
ELSHOLTZIA BLANDA Benth.
Mentha arvensis Linn.
MICROMERIA BIFLORA Benth.
Calamintha longicaulis Benth.
Scutellaria discolor Colebr.
Scutellaria repens Ham.
Prunella vulgaris R. Br.
Craniotome versicolor Reichb.
Anisomeles ovata R. Br.
Colquhounia coccinea Wall.
Leucas Cephalotes Spreng.
Teucrium quadrifarium Ham.

Plantago major Linn.
Deeringia celosioides R. Br.
Amarantus spinosus Linn.
CYATHULA TOMENTOSA Moq.
Cyathula capitata Moq.
Alternanthera sessilis R. Br.
Chenopodium ambrosioides Linn.
Polygonum Hydropiper Linn.
POLYGONUM CAPITATUM Ham.
Polygonum chinense Linn.
Litsæa oblonga Wall.
Litsæa lanuginosa Nees.
Daphnidium bifarium Nees.
DAPHNE CANNABINA Wall.
Elæagnus latifolia Linn.
Euphorbia neriifolia Linn.
Euphorbia pilosa Linn.
SARCOCOCCA PRUNIFORMIS Lindl.
Andrachne cordifolia Muell.-Arg.
PHYLLANTHUS PARVIFOLIUS Ham.
Jatropha Curcas Linn.
Celtis australis Linn.
Ficus religiosa Linn.
URTICA PARVIFLORA Roxb.
Pilea anisophylla Wedd.
Lecanthus Wightii Wedd.
ELATOSTEMA LINEOLATUM Wight.
Girardinia heterophylla Dcne.
ALNUS NEPALENSIS Don.
QUERCUS SEMECARPIFOLIA Smith.
Quercus lanuginosa Don.
Quercus glauca Thunb.
CASTANOPSIS INDICA A. DC.
Salix tetrasperma Roxb.
Carpinus viminea Wall.
Ceratophyllum demersum Linn.
Hydrilla verticillata Casp.
Otochilus alba Lindl.
AGAVE VERA-CRUZ Mill.
Agave Wightii Drummond & Prain.
Dioscorea belophylla Voigt.
Dioscorea sikkimensis Prain & Burkill.
Smilax parvifolia Wall.
Pandanus furcatus Roxb.
Remusatia vivipara Schott.
Colocasia Antiquorum Schott.
Lemna sp.
Potamogeton oblongus Viv.
Potamogeton crispus Linn.
Eriocaulon sp.
ERIOPHORUM COMOSUM Wall.
CAREX FILICINA Nees.
Thysanolæna acarifera Nees.
POLLINIA ARGENTEA Trin.
Ischæmum angustifolium Hack.
Erianthus fulvus Nees.
Andropogon assimilis Steud.
Andropogon contortus Linn.
ANTHISTIRIA IMBERBIS Retz.
Eleusine coracana Gaertn.
Eragrostis stenophylla Hochst.
GLEICHENIA DICHOTOMA Wall.
Alsophila sp.
NEPHROLEPIS TUBEROSA Presl.
Polypodium coronans Wall.
POLYPODIUM SIMPLEX Sw.
PTERIS AQUILINA Linn.
Equisetum ? *debile* Roxb.

The plants which reach from the cultivation belt down to the plains of Bengal or avoiding them re-appear in Chota Nagpur.

Out of the above 247 plants, thirty-seven are of general distribution in Bengal—forty-seven, while not of general distribution, occur in Chota Nágpur, twenty-five occur in Chittagong, twenty-four appear in Northern Bengal chiefly in the Duárs, twenty-two are recorded from Behár,

ten from the plains of Tirhut, nine from central Bengal and nine from Eastern Bengal. That Behár should possess so many is due to its higher lands bordering on Chota Nágpur, if we add Behár to Tirhut the number common to the Nepál Cultivation belt and Behár-Tirhut is twenty-five, being *Hypericum japonicum*, *Reinwardtia trigyna*, *Heynea trijuga*, *Celastrus paniculata*, *Crotalaria prostrata*, *Melastoma malabathricum*, *Lagerstræmia parviflora*, *Woodfordia floribunda*, *Oldenlandia gracilis*, *Hamiltonia suaveolens*, *Vernonia teres*, *Launæa nudicaulis*, *Androsace saxifragæfolia*, *Nyctanthes Arbor-tristis*, *Bothriospermum tenellum*, *Hemiphragma latebrosa*, *Lepidagathis hyalina*, *Clerodendron infortunatum*, *Deeringia celosioides*, *Salix tetrasperma*, *Thysanolæna acarifera*, *Pollinia argentea*, *Ischæmum angustifolium*, *Andropogon assimilis*, and *Andropogon contortus*.

If we add together the thirty-seven plants which are of general distribution in Bengal and the plants which are common to the cultivation belt and the other places mentioned, then

84 or 34 per cent. are common to this belt in Nepál and Chota Nágpur.

62 or 25 per cent. are common to this belt in Nepál and Chittagong.

61 or 25 per cent. are common to this belt in Nepál and northern Bengal including the Duárs.

59 or 24 per cent. are common to this belt in Nepál and the plains of Behár-Tirhut.

It is certainly of interest to notice that the percentage of plants common to the belt and Chota Nágpur is greater by 10 per cent. than the percentage of plants common to the belt and the plains below: this difference is of course due to the elevation of the Chota Nágpur plateau. It is also of interest further to note that the Duárs and Chittagong have no greater percentage in common with this belt than have the plains below.

In the cultivation belt may be found a very considerable number of plants,—nearly fifty in the above list,—which extend southwards very generally throughout India.

Montane plants of the Himalaya which extend eastwards or westwards from Nepal.

There are in the list just over one hundred and twenty montane plants the distribution of which goes both eastwards and westwards beyond Nepál.

Two of these plants, *Wendlandia pendula* and *Senecio vagans*, have been collected both in the central Himalaya and in the extreme east of the kingdom of Nepál.

The following montane plants extend from Nepál eastwards only beyond the boundary of the kingdom:—*Polygala arillata, Stellaria saxatilis, Cleyera ochnacea, Eurya symplocina, Schima Wallichii, Heynea trijuga, Zizyphus incurva, Dobinea vulgaris, Desmodium confertum, Shuteria vestita, Mezoneurum cucullatum, Rubus moluccanus, Stranvæsia glaucescens, Dichroa febrifuga, Osbeckia nepalensis, Oxyspora cernua, Bryonia laciniosa, Luculia gratissima, Wendlandia coriacea, Hedyotis scandens, Gaultheria fragrantissima, Mæsa ramentacea, Mæsa macrophylla, Myrsine semiserrata, Myrsine capitellata, Symplocos theæfolia, Swertia dilatata, Strobilanthes penstemonoides, Pogostemon glaber, Elsholtzia blanda, Litsæa oblonga, Pilea anisophylla, Castanopsis indica, Otochilus alba, Pandanus furcatus, Carex filicina,* and *Polypodium coronans.*

The following extend from Nepal westwards only:—*Arenaria serpyllifolia, Rhus Wallichii, Lotus corniculatus, Erigeron bellidioides, Myrsine africana, Ligustrum nepalense, Swertia paniculata, Coleus barbatus, Euphorbia pilosa, Celtis australis,* and *Anthistiria imberbis,* var. *Roylei.*

Rosa moschata might almost be classed as western, for it disappears in Sikkim; but it re-appears in the Chumbi valley and Bhutan.

We must admit a greatly preponderating eastern element.

Of interesting irregular distribution are:—

Lobelia radicans: Khási hills, Ránchi and Nepál; it is probably an introduced plant in Nepál.

Nyctanthes Arbor-tristis: the hills of southern India generally and in the north along the lower Himalaya from Nepál westwards; not in Sikkim; to the east in the hills of Assam and Burma.

Lindenbergia philippensis: Burma and Assam, jumping from Chittagong and the Naga hills to Nepál, being in this respect rather like *Lobelia radicans.*

Temperate Forest Belt: its characteristic plants.

The temperate forests I am inclined to define by the presence of Rhododendrons. *Rhododendron arboreum* occurs first above Sisaghári, with pines and *Quercus semecarpifolia,* making on this south side of the pass a thin forest.

The grass in December under these trees above Sisaghári is yellow and contains an abundance of *Anaphalis contorta* out of flower. On the north side of the pass there is less grass, and there are more bushes, *e.g.*, of *Luculia gratissima, Viburnum stellulatum, Rhus succedanea* with red autumn leaves, and two species of *Rubus,* together with trees of *Prunus Puddum* and Lauraceæ. Mosses just at the

Chessapáni pass festoon the trees; and epiphytes are abundant, chiefly the orchid *Otochilus alba*, and *Peperomia reflexa*. Under the trees just at the pass occur the following, whose generic names in a large measure suggest a temperate flora:—*Clematis grewiæflora*, *Hypericum patulum*, *Bœnninghausenia albiflora*, *Galium Aparine*, *Galium Mollugo*, *Valeriana Hardwickii*, *Dipsacus inermis*, *Gerbera macrophylla*, *Myriactis nepalensis*, *Swertia nervosa*, *Cuscuta reflexa*, *Cynoglossum furcatum*, *Strobilanthes glutinosus*, *Craniotome versicolor*, and *Calamintha umbrosa*.

The forest above Chitlong on Chándagiri begins with *Quercus semecarpifolia*, *Rhododendron arboreum*, *Pyrus Pashia* and *Prunus Puddum*. It continues over the crest, pines being absent, and down the steep slope to Thánkot, *Quercus glauca* in the upper parts being very common.

Under the trees we get bushes of *Jasminum humile*, *Hypericum patulum*, *Berberis aristata*, *B. nepalensis*, *Buddleia macrostachya*, *Viburnum stellulatum*, *Randia tetrasperma*, *Neillia thyrsiflora*, *Embelia Ribes*, and *Eurya acuminata*. We find climbers such as *Vitis semicordata*, *Smilax prolifera*, *Trachelospermum fragrans* and *Euonymus vagans*; and sprawling bushes of *Rubus acuminatus*, *Senecio scandens*, and *Asparagus racemosus*; herbs as *Ranunculus pennsylvanicus*, *Thalictrum sp.*, *Sanicula europæa*, *Pimpinella diversifolia*, *Heracleum* sp., *Galium sp.*, *Dipsacus inermis*, *Valeriana Hardwickii*, *Senecio vagans*, *Artemisia vulgaris*, *Cnicus Wallichii*, *Lactuca hastata*, *Lindenbergia grandiflora*, *Dicliptera Roxburghii*, *Girardinia heterophylla*, and *Polygonatum*. *Viscum articulatum* was on the oak trees.

A remark must be made in passing regarding *Senecio scandens*: my specimens exactly agree with Wallich's *S. flexuosus* founded on material collected in Nepál; and it may perhaps be a definable variety.

The forest south of Chándagiri along the Pherphing-Támbeh-kháni road has been very much cut over: full grown trees are rare in it; but on the less accessible slopes well above the road is better forest.

In the well cut-over forest *Rhododendron arboreum* is plentiful on shady slopes mixed with polled trees of *Quercus lanuginosa*, *Pieris ovalifolia*, *Viburnum coriaceum* and *Rhus Wallichii*.

On sunny slopes grass occurs plentifully with *Anaphalis contorta* and *Phyllanthus parvifolius*. *Aechmanthera Wallichii* is in places very abundant. *Alnus nepalensis*, as a small tree, appears. *Carpinus*

Mr. C. G. Rogers has called my attention to the low level at which *Quercus semecarpifolia* here appears. Looking up my records I find that I found it once three marches from Simla at 8,000 feet. Sir Henry Collett (Flora Simlensis, 1902, p. 474) gives its lower limit as 8,500 feet: and Mr. Rogers finds the limit to be much higher in Jaunsar.

grows sparingly; and *Berberis nepalensis*. Orchids, *Peperomia*, *Polypodium coronans* and *Usnea* are present as epiphytes. *Jasminum humile*, in December flowerless and frost bitten, was seen plentifully in one spot. *Viburnum coriaceum*, *Cleyera ochnacea*, *Cornus oblonga*, *Galium rotundifolium*, *Coleus barbatus* and *Astilbe rivularis*, were observed.

The forest round Kakni is altogether cut over: here and there in it stout tree stumps suggest what has been; but there are no large trees now. The small trees there are chiefly *Prinsepia utilis*, *Mæsa ramentacea*, *Gaultheria fragrantissima*, *Luculia gratissima*, *Daphne cannabina*, *Cratægus crenulata*, *Viburnum coriaceum*, *Randia tetrasperma*, and *Ilex excelsa*. Patches of *Gleichenia longissima* occur in hollows. *Pteris aquilina* is sporadic.

Two species of *Anaphalis* had flowered very abundantly over the grassy parts of the hill top, where grew also *Potentilla fulgens*. In the most shady places mosses and *Selaginella* were very abundant. Two species of *Galium* occurred. *Pardanthus chinensis* and an *Arisaema*, perhaps *A. concinnum*, occurred. *Swertia dilatata* was very common. with *Pratia begonifolia*, *Sanicula europæa*, *Trifolium repens*, *Galinsoga parviflora* and *Myriactis nepalensis*.

The nectaries of *Swertia dilatata* appear better developed in Nepál than in Sikkim.

The vegetation on the Sángli Khola was found to be very like that at Kakni. But of plants not seen at Kakni were found on the Sángli khola:—*Gynura angulosa*, *Dichrocephala latifolia*, *Anaphalis araneosa*, *Anaphalis adnata*, and *Mæsa macrophylla*.

Lichens are not uncommon on the tree stems especially of *Pyrus*.

A list of all the plants observed in the temperate Forest Belt.

The following is a list of all the plants observed in the temperate forest: capitals in it indicate abundance.

CLEMATIS BUCHANANIANA DC.
CLEMATIS GREWIÆFLORA DC.
Thalictrum sp.
Ranunculus diffusus DC.
Ranunculus pennsylvanicus Linn.
Berberis aristata DC.
BERBERIS NEPALENSIS Spreng.
HYPERICUM PATULUM Thunb.
HYPERICUM JAPONICUM Thunb.
EURYA ACUMINATA DC.
Schima Wallichii Choisy.
Camellia theifera Griffith.
Reinwardtia tetragyna Planch.
Geranium nepalense Sw.
Impatiens aureola Hook. f.
BŒNNINGHAUSENIA ALBIFLORA Reichb.
Cipadessa fruticosa Blume.
Ilex excelsa Wall.
Euonymus vagans Wall.
Vitis semicordata Wall.
Rhus Wallichii Hook. f.
Priotropis cytisoides W. & A.
Trifolium repens Linn.

Indigofera sp.
PRUNUS PUDDUM Roxb.
Prinsepia utilis Royle.
Neillia thyrsiflora D. Don.
Rubus acuminatus Sm.
RUBUS PANICULATUS Sm.
Rubus ellipticus Sm.
POTENTILLA FULGENS Wall.
Rosa moschata Mill.
PYRUS PASHIA Ham.
CRATÆGUS CRENULATA Roxb.
Cotoneaster bacillaris Wall.
TIARELLA POLYPHYLLA Don.
Hydrangea ?aspera Don.
DICHROA FEBRIFUGA Lour.
Oxyspora paniculata DC.
AMMANNIA ROTUNDIFOLIA Ham.
Begonia laciniata Roxb.
HYDROCOTYLE ?ROTUNDIFOLIA Roxb.
Hydrocotyle javanica Thunb.
SANICULA EUROPÆA Linn.
Pimpinella diversifolia DC.
HERACLEUM sp.
HEDERA HELIX Linn.
Cornus oblonga Wall.
VIBURNUM STELLULATUM Wall.
VIBURNUM CORIACEUM Blume.
Luculia Pinceana Hook. f.
RANDIA TETRASPERMA Roxb.
LEPTODERMIS LANCEOLATA Wall.
Rubia cordifolia Linn.
Galium rotundifolium Linn.
Galium Aparine Linn.
Galium Mollugo Linn.
VALERIANA HARDWICKII Wall.
DIPSACUS INERMIS Wall.
Dichrocephala latifolia DC.
MYRIACTIS NEPALENSIS Less.
ANAPHALIS CINNAMOMEA C. B. Clarke.
Anaphalis adnata DC.
Anaphalis araneosa DC.
ANAPHALIS CONTORTA Hook. f.
Galinsoga parviflora Cav.
Artemisia vulgaris Linn.
Gynura angulosa DC.
SENECIO SCANDENS Wall.
Senecio densiflorus Wall
SENECIO VAGANS Wall.
Cnicus Wallichii DC.
Ainsliæa pteropoda DC.
Ainsliæa aptera DC.
GERBERA MACROPHYLLA Benth.
LACTUCA HASTATA DC.
PRATIA BEGONIFOLIA Lindl.
Lobelia pyramidalis Wall.
Campanumæa inflata C. B. Clarke.
CAMPANULA COLORATA Wall.
GAULTHERIA FRAGRANTISSIMA Wall.
PIERIS OVALIFOLIA Don.
RHODODENDRON ARBOREUM Sm.
Mæsa ramentacea A. DC.
Mæsa macrophylla Wall.
MYRSINE SEMISERRATA Wall.
MYRSINE CAPITELLATA Wall
Embelia Ribes Burm.
SYMPLOCOS THEÆFOLIA Ham.
Jasminum humile Linn.
Trachelospermum fragrans Hook. f.
Buddleia ? macrostachya Benth.
Swertia paniculata Wall.
SWERTIA DILATATA C. B. Clarke.
Swertia nervosa Wall.
Swertia angustifolia Ham.
Cynoglossum furcatum Wall.
Cuscuta reflexa Roxb.
Lindenbergia grandiflora Benth.
Hemiphragma heterophylla Wall.
Æchmanthera Wallichii Nees.

Strobilanthes glutinosus Nees.
Strobilanthes pentstemonoides T. Anders.
Dicliptera roxburghiana Nees.
Elsholtzia ?strobilifera Benth.
Calamintha umbrosa Benth.
Calamintha longicaulis Benth.
Scutellaria repens Ham.
Craniotome versicolor Reichb.
Leucas ciliata Benth.
Plantago major Linn.
Deeringia celosioides R. Br.
Peperomia reflexa Dietr.
DAPHNE CANNABINA Wall.
Loranthus odoratus Wall.
Loranthus Scurrula Linn.
Loranthus umbellifer Schultz.
Viscum articulatum Burm.
OSYRIS ARBOREA Wall.
PHYLLANTHUS PARVIFOLIUS Ham.
Urtica parviflora Roxb.
Girardinia heterophylla Decne.
Lecanthus Wightii Wedd.
ELATOSTEMA LINEOLATUM Wight.
ALNUS NEPALENSIS Don.
QUERCUS SEMECARPIFOLIA Smith.
Quercus lanuginosa Don.
QUERCUS GLAUCA Thunb.
Carpinus viminea Wall.
OTOCHILUS ALBA Lindl.
Pardanthus chinensis Ker.
Agave Vera-Cruz Mill.
Agave Wightii Drummond & Prain.
SMILAX PARVIFOLIA Wall.
Asparagus racemosus Roxb.
TUPISTRA AURANTIACA Wall.
Colocasia Antiquorum Schott.
Arisæma sp.
ANDROPOGON ASSIMILIS Steud.
ARUNDINARIA sp.
Gleichenia dichotoma Wall.
GLEICHENIA LONGISSIMA Blume.
Polypodium sp.
PTERIS AQUILINA Linn.

Very few plants of the Temperate Forest Belt reach the plains but a few reappear on Parasnath and in the Chittagong hills.

In the temperate forest belt the vegetation is very different from that of the plains: and of the plants in the above list only *Ammannia rotundifolia, Dicliptera Roxburghiana, Asparagus racemosus* and *Colocasia Antiquorum* are at all general in the plains of Bengal.

The few indigenous plants common to this belt and the Chota Nágpur plateau, with Párasnáth rising to 4,000 ft., may be named: they are *Hypericum japonicum, Rubia cordifolia, Calamintha umbrosa, Peperomia reflexa, Loranthus Scurrula, Viscum articulatum, Girardinia heterophylla* and *Andropogon assimilis.*

The hills of Chittagong carry almost the same number, *viz.*, *Hypericum japonicum, Eurya acuminata, Schima Wallichii, Mæsa ramentacea, Æchmanthera Wallichii, Loranthus Scurrula* and *Gleichenia linearis.* Every one of these is found in the Sikkim Himalaya and mountains of Assam. *Mæsa ramentacea* and *Loranthus Scurrula* reach their western known limit in Nepál.

Distribution of the montane plants along the Himalaya: some avoid wet Sikkim.

The montane plants are for the most part of general distribution along the Himalaya, a very large portion of them growing all along the chains from Káshmir eastwards to Sikkim and Bhután. A slightly less part while not growing in Káshmir grow in Garhwál and Kumáon and thence extend eastwards through Nepál to Sikkim and Bhután. *Six interesting plants of this wide distribution avoid the wet hills of Sikkim but re-appear in the mountains east of Sikkim: they are *Hypericum patulum*, *Ilex excelsa*, *Rosa moschata*, *Cornus oblonga*, *Jasminum humile*, *Trachelospermum fragrans* and *Osyris arborea* *Randia tetrasperma*, and *Prinsepia utilis*, while not completely avoiding Sikkim, are there confined to the drier remote regions in the interior of the mountains. *Leptodermis lanceolata* is very similarly distributed.

Eastern and Western Elements.

The following plants are eastern:—*Schima Wallichii*, *Euonymus vagans*, *Priotropis cytisoides*, *Neillia thyrsiflora*, *Dichroa febrifuga*, *Tiarella polyphylla*, *Oxyspora paniculata*, *Begonia laciniata*, *Luculia gratissima*, *Senecio densiflorus*, *Senecio vagans*, *Pratia begonifolia*, *Gaultheria fragrantissima*, *Mæsa ramentacea*, *Mæsa macrophylla*, *Myrsine semiserrata*, *Myrsine capitellata*, *Symplocos theæfolia*, *Buddleia macrostachya*, *Swertia dilatata*, *Swertia nervosa*, *Strobilanthes pentstemonoides*, *Leucas ciliata*, *Loranthus odoratus*, *Loranthus Scurrula*, *Loranthus umbellifer*, *Otochilus alba*, and *Tupistra aurantiaca*: and the following are western:—*Rhus Wallichii*, *Swertia paniculata*, *Strobilanthes glutinosus*, and doubtfully *Cotoneaster bacillaris*.

On the whole then the flora of these ridge tops, where clouds are apt to gather, and the trees, as in Sikkim, to be festooned with mosses, is more eastern than western.

One plant of the belt has a peculiar distribution. It is *Ranunculus pennsylvanicus*, which while climbing to 6,000 ft. in the Khási hills, mountains of Burma and Nepál has been found on the Panjáb plain at Ludhiána and on the Ganges at Bhojpur. Both Wallich and Scully collected it in Nepál.

CONCLUSIONS.

What is written above is, indeed, but a superficial account of the features of the vegetation between Raksál and the Himalaya of Central Nepál as far back as 35 miles in a straight line from the skirts of the

* Although not mentioned in the Flora of British India, as found in Sikkim *Hypericum patulum*, *Jasminum humile* and *Trachelospermum fragrans* do occur there. [Editor].

plains and not higher than 7,000 feet. There was but one excuse for writing it, *i.e.*, the great want of knowledge of the Botany of that part of the chain.

The outstanding result is an expression of the easternness of the vegetation. It is so much more like that of the Darjeeling District than that of the North-Western Himalaya. In bringing forward this statement I do but emphasize what Sir Joseph Hooker has already stated in the Imperial Gazetteer of India (Oxford, 1907) i., 165, where he classes Central Nepál with Sikkim.

The botanist who has not visited both places has largely to rely on statistics for comparative purposes. I have treated above, as far as I can, my subject from his point of view and have shown that:—

1. The sál (*Shorea robusta*) forests of the tropical forest belt seem not to possess trees of *Schleichera trijuga*, *Buchanania latifolia*, *Pterocarpus Marsupium* and *Bassia latifolia*, which are wanting likewise in the Sikkim Terai forests, but present in the Kheri forests; while they possess *Spondias axillaris* and *Symplocos spicata*, of which the reverse is the case. They are thus a little more eastern than western.
2. The pine forests of the Chorea Ghâti hills have six plants in them obviously eastern, *viz.*, *Meliosma simplicifolia*, *Begonia gigantea*, *Mussænda Roxburghii*, *Vernonia subsessilis* and *Echinacanthus longistylus*, and considering their Flora as a whole are rather eastern.
3. The tangle of vegetation in the Bháinsa Duhán gorge contains the following distinctly eastern plants—*Brachystemma calycinum*, *Schœpfia fragrans*, *Natsiatum herpeticum*, *Shuteria vestita*, *Dalbergia volubilis*, *Mezoneurum cucullatum*, *Acacia concinna*, *Acacia pennata*, *Albizzia lucida*, *Duabanga sonneratioides*, *Hedyotis scandens*, *Torenia fragrans*, *Utricularia orbiculata*, *Strobilanthes sabinianus*, *Elatostema rupestre*, *Otochilus alba*, *Arundina bambusifolia*, *Pandanus furcatus* and *Rhaphidophora glauca*. It is distinctly eastern.
4. The cultivation belt carries 37 plants which have not been collected west of Nepál, and only 11 which have not been collected east.
5. The temperate forest belt carries 28 plants which have not been collected west of Nepál, and only 3 or 4 which have not been collected east.

Now having myself been in both places, I wish next to exchange the statistical method for the ecological, and to compare the eye-appear-

ances of the vegetation in Sikkim and Nepál. The comparison will be much more superficial than is desirable, but will be a beginning of knowledge of the relationship of the two.

First of all to the eye the Sál forests under the hills present great similarities. On the edge in both places, the tall scarlet *Leonotis nepetæfolia* and the lilac *Plectranthus ternifolius* occur. *Stereospermum suaveolens*, *Heynea trijuga* and *Cedrela Toona* flourish where the forest is not pure; and *Anisomeles ovata* is common. Dioscoreas and other climbers, with annual stems, twine round the sál trees separately, not binding them together; and a variety of smallish plants find a place in the shade.

The dissimilarities which are noteworthy are that epiphytic orchids and the epiphyte *Polypodium coronans* are far more common in the Sikkim Terai forests than in those of the Nepál Terai; and that while *Nyctanthes* makes a feature in parts of the Nepál forests it is absent from those of Sikkim.

Just where the level Sál forest gives place to the pines on the slopes of the Chorea Ghâti hills, *Desmodium confertum* becomes most abundant: it is a plant very common in the Sál forests of the Darjeeling district at a little distance from the plains. *Boehmeria platyphylla* is like it common in the two places, and both *Deeringia celosioides* and *Polygonum chinense* are common in the Sál forests of the Nepál hills and in the Tista valley of Sikkim.

The pine forests of the Chorea Ghâti are absent from the Sikkim Himalaya. The pines (*Pinus longifolia*) are quite absent from the hill faces south of Darjeeling, and almost absent from the Tista valley where they do but grow on some dry rocky spurs near Pashok, which is over the junction of the Tista and Runjit; and they grow in the Runjit valley, as at Badamtam. Of the plants associated with them in Nepál, *Æchmanthera Wallichii* and *Scutellaria repens* absent themselves in Sikkim. *Blumea obovata* is also absent; *Swertia angustifolia*, var. *Wallichii* and *Anaphalis araneosa* are rare or absent from the wetter hill faces of Sikkim, though found abundantly further back at Darjeeling and northwards on rather dry slopes; *Bœhmeria rugulosa* becomes very rare in Sikkim; and *Scutellaria discolor*, to be found in quantity, must be searched for north of the Tista Bridge, *i.e.*, where Pinus appears. The other plants, *e.g.*, *Indigofera hirsuta*, *Maoutia Puya*, *Echinacanthus longistylus*, *Strobilanthes capitatus*, *Mussænda Roxburghii* and *Geniosporum strobiliferum* hold their own in the Sikkim Himalaya; but they do not make any plant association as in Nepál: they associate in these forests of Nepál with plants of Eastern type, so that we have a curiously mixed eastern and western vegetation on the Chorea Ghâti belt.

Just north of the pine forests of the Chorea Ghâti come the wetter Sâl forests towards Hettáunda. They are very like the Sâl forests on the edge of the hills of Sikkim : *Hedyotis scandens*, *Leucas mollissima*, *Callicarpa macrophylla* and *Laggera flava* are common plants in each country ; *Anthistiria gigantea* is a characteristic grass in each ; and the Leguminosæ are similar, *e.g.*, *Mezoneurum cucullatum*, *Mimosa rubricaulis* and *Acacia pennata*, though they become rare in the Tista valley, north of the Tista Bridge ; *Castanopsis indica* is found bordering on the Sâl in both places ; *Desmodium confertum* is common in the Nepál forests, and locally common in the Sikkim Sâl forests, but chiefly above the Tista Bridge. In this damp Sâl forest of Hettáunda I found more epiplytic orchids than in the Sâl forest of the plain.

Again beyond Hettáunda the tangle of vegetation present in the Bháinsa Duhán gorge is like that of Sikkim. The abundance of trees of the peculiar *Duabanga sonneratioides* and tall *Bombax malabaricum* alone would make the forests in a measure alike : in addition there is the conspicuous creeper *Combretum decandrum* in both places ; there is the abundance of *Strobilanthes capitatus* and *Elatostema rupestre* ; the presence of *Kalanchoe* on rocks, of *Oroxylum indicum* with its enormous pods, of *Hamiltonia suaveolens*, of *Anthocephalus Cadamba*, of *Terminalia tomentosa*, of *Antidesma diandrum*, and of *Mussænda Roxburghii*. *Pandanus furcatus*, local in the Bháinsa Duhán gorge, is far more abundant in the Tista valley ; while the reverse is the case in regard to *Kalanchoe*. *Rhaphidophora glauca* is also more abundant in the Sikkim valleys. *Gynocardia odorata*, which occurs along the Tista valley is apparently absent from the Bháinsa Duhán gorge. *Urtica parviflora* is enormously plentiful in both places, and so is *Ageratum conyzoides* ; while *Girardinia heterophylla* is common enough. *Arundina bambusifolia* is equally found in both countries. Associated with *Arundina* in Sikkim and common, is *Exacum teres*, but it was not observed by me in Nepál, though found on the Nepál border near Báirágnia.

In the upper part of the Bháinsa Duhán gorge the similarity to Sikkim continues in the presence of *Rubus ellipticus* and *Colebrookia oppositifolia*. *Holmskioldia sanguinea* is more common in Nepál than in Sikkim. *Thunbergia grandiflora* is absent from Nepál ; and *Thunbergia fragrans*, a feature of the hills under Tindhária in Sikkim, seems to be less common in Nepál than in Sikkim.

The abundance of *Nephrolepis tuberosa* at the upper limits of the tropical forest belt is alike in both countries.

The cultivation belt both in Nepál and Sikkim in common is characterised by the abundance of *Schima Wallichii*, *Pteris aquilina*,

Nephrolepis tuberosa, *Gleichenia dichotoma*, *Drymaria cordata*, *Artemisia vulgaris*, *Bœnninghausenia albiflora*, *Laggera pterodonta*, *Melastoma malabathricum*, *Colocasia Antiquorum* and *Rubus ellipticus*. *Lindenbergia grandiflora*, common in Nepál, is locally common in Sikkim. But whereas in Nepál *Rosa moschata* is most abundant and a feature of the Nepál valley, it is absent from the Sikkim Himalaya—driven out (one must conclude) by the rain. *Oxyspora paniculata* locally abundant in Nepál seems to be rare on the wettest hills of Sikkim, though very common at some distance from the plains.

In the cultivation belt are the downs of Márkhu with plants most unlike those of Sikkim, *e.g.*, *Lotus corniculatus*, *Campanula sylvatica* and *Oldenlandia gracilis*. These grassy downs with their short turf and bushes of *Prinsepia*, *Rosa* and *Rubus* are much more like hill-sides towards Simla than hill-sides towards Darjeeling. High up on them *Gaultheria fragrantissima* makes little fence-like lines in places where the slope of the hill has favoured its growth. *Phyllanthus parvifolius* is there most common; but in British Sikkim I have only seen it in one place.

The upper forest belt is the hardest to write of, because so little of it could be examined. It has been shown how much more eastern than western is its vegetation; its appearance is often more western than eastern—a consequence of the wholesale destruction for firewood to which it is subjected, and which is more a feature of the hills towards Simla than the less populated hills of Sikkim: but this resemblance is fortuitous. The oaks of the upper forest belt along the ridges where they have escaped the axe, the moss that hangs thick on their branches, the trees of *Prunus Puddum* and *Alnus nepalensis*, the bushes of *Luculia*, *Mæsa*, *Neillia thyrsiflora*, *Priotropis cytisoides*, *Dichroa febrifuga*, *Berberis nepalensis* and *Hypericum patulum*, the climbers as *Clematis Buchananiana*, *Rubus paniculatus* and *Hedera Helix*, the patches of *Gleichenia longissima* filling hollows, the abundance of *Swertias*, *Valeriana Hardwickii*, *Hydrocotyle javanica* *Sanicula europæa*, *Geranium nepalense*, *Parochetus communis*, *Gynura angulosa*, *Pratia begonifolia* and *Andropogon assimilis*, are as in Sikkim. But whereas in Sikkim one generally finds several Rhododendrons on the hills where *R. arboreum* grows, one does not do so in Nepál. One of the Nepál oaks *Quercus semecarpifolia*, like several plants mentioned already, avoids the wettest forests of the outer Sikkim Himalaya.

The hills of Nepál show a great poverty, as compared with Sikkim, in the number of species present; but then we know so little of the Nepál hills, and there are doubtless so many plants yet to be found

at 7,000 feet and above, that we are hardly justified in drawing deductions.

As far as we know at present, the temperate forest belt contains fewer western types than the cultivation belt, and this we must largely ascribe to our accidental knowledge of the unusually cold and deforested Lohári-Nepál Valley, and to the want of knowledge of anything but damp hill crests in the temperate forest belt.

Summing up, then, we may say of the road into Nepál:—

1. Its Sál forests on the flat are not quite like those of the Sikkim Terai, nor as those of Kheri.
2. The pine forests of the Chorea Ghâti are unrepresented in Sikkim, though a few of their plants are distinctly Eastern.
3. The Sál forests of the Hettáunda mári are like the Sál forests of the lower Sikkim Himalayan slopes.
4. The vegetation of the wet gorge of Bháinsa Duhán is very like that of corresponding places in Sikkim.
5. The vegetation of the cultivation belt is rather diverse from that of Sikkim.
6 The vegetation of the wet hill tops is like that of corresponding places in Sikkim.

The similarities noticed are the effect of the monsoon; and of course one could not expect any barriers to dispersal along the chain other than climatic changes. The wet south-west wind streaming straight up the Bay of Bengal on to the Sikkim Himalaya brings so much rain thither as to drive certain plants out of those hills, chiefly out of the hills that it first strikes, and thereby it creates the diversity of the Sikkim Flora—a most worthy subject for study. Where this same wind in some similar degree strongly blows on to the hills that we are dealing with, their vegetation resembles that of the Sikkim Himalaya.

The known endemic element in our region, as far as it came under my observation, consists of *Blumea obovata* on the Chorea Ghâti hills, of three species of *Impatiens*, of *Calamintha longicaulis* and possibly of an *Eriocaulon*—plants not numerous enough in the present state of our knowledge to justify deductions. There are also some varieties which are endemic, among which may be included those of *Inula Cappa* and *Senecio scandens*, mentioned earlier (pp. 68 and 87).

ENUMERATION OF PLANTS OBSERVED.

Those were collected which are numbered or dated: The rest are recorded as growing in the notes made en route. (1) indicates lower forests, (2) cultivation belt, (3) upper forests.

DICOTYLEDONES.

Ranunculaceæ.

Clematis Gouriana Roxb.

(1) Hettáunda. 29544.

Clematis Buchananiana DC.

(2) Chitlong, abundant, 29679:

(3) Saddle on the road near Pherphing.

Clematis grewiaeflora DC.

(1) Below Bhimpedi, 29580:

(3) Chessapáni pass, not uncommon, 29588.

Anemone sp.

(2) Markhu valley: Khágu, west of Pherphing.

Thalictrum sp.

(3) North side of Chándagiri.

Ranunculus sceleratus Linn.

(2) Márkhu valley.

Ranunculus diffusus DC.

(3) North side of Chándagiri pass, 6,000 ft. 29819.

Ranunculus pensylvanicus Linn.

(3) Forest above Chitlong, 29691.

Dilleniaceæ.

Dillenia pentagyna Roxb.

(1) Simalbása: Chorea Gháti above Bichiakoh.

Menispermaceæ.

Cocculus villosus DC.

(1) Parsua, in jungle.

is sampelos Pareira Linn.

(1) Adhabhár to Bichiakoh, in the sál forest, 29473.

Berberidaceæ.

Berberis nepalensis Spreng.

(2) Márkhu valley.

(3) Forest above Chitlong; Fákhel.

Berberis aristata DC.
(3) Forest just above Chitlong, 29696.
Berberis asiatica Roxb.
(2) Márkhu, 3,800-4,000 ft. 29644.

Papaveraceæ.

Argemone mexicana Linn.
(1) Shingle river bed, Bhimpedi.

Fumariaceæ.

Fumaria sp.
(2) Niakot.

Cruciferæ.

Cardamine hirsuta Linn.
(1) Tádi valley near Niakot, 11th December 1907: Likhu valley, rare:
(2) Márkhu.

Violaceæ.

Viola canescens Wall.
(2) Chitlong, 29682.
Viola sp.
(2) Chitlong.

Bixaceæ.

Flacourtia Ramontchi L'Herit.
(1) Parsua.
Xylosma longifolium Clos.
(1) Sángu on Trisuli, 29913.

Polygalaceæ.

Polygala arillata Ham.
(2) Ascent from Thánsing to the Sángli khola, 29943.
Polygala leptalea DC.
(1) By the Kuro nadi, near Hettáunda, 29526.

Caryophyllaceæ.

Cerastium glomeratum Thuill.
(2) Khágu.
Cerastium triviale Link.
(2) Márkhu valley.
Stellaria ? saxatilis Wall.
(2) Márkhu, 4,000 feet, abundant, 29674

Brachystèmma calycinum Don.

(1) Supári tár, very abundant: Nimbua tár, 28161, 28168.

Arenaria ? serpyllifolia Linn.

(2) Chitlong, 29684.

Drymaria cordata Willd.

(1) Hettáunda, 29548: Pánrán and above, common

(2) Márkhu valley: Chitlong.

Polycarpon Loeflingiæ Benth. & Hook. f.

(1) Tádi valley.

Hypericaceæ.

Hypericum patulum Thunb.

(3) Chessapáni, 5,000-6,000 ft., common, 29597: Chándagiri pass, 7,400 ft., 29809.

Hypericum elodeoides Choisy.

(2) Above Márkhu, common on the pastures, 29664.

Hypericum japonicum Thunb.

(1) Thánsing.

(2) Márkhu and above, 4,000-4,500 ft., very abundant, 29671, Khátmándu to

(3) Kakni, common, 29848.

Guttiferæ.

Mesua ferrea Linn.

(1) Planted at Gurkháh in the Tádi valley: called "Náresur," 29928.

Ternstrœmiaceæ.

Cleyera ochnacea DC.

(2) Near Khátmándu, 5th December 1907: Korkus khola, 29974.

Eurya symplocina Bl.

(2) North descent from Chessápáni pass, 4,500 ft., 29620.

Eurya acuminata DC.

(2) Near Khátmándu, 5th December 1907:

(3) Forest above Chitlong, 29695: west of Pherphing: Kakni, 9th December 1907.

Saurauja nepaulensis DC.

(1) Above Bichiakoh to summit of pass, 1,200-1,600 ft., 29494.

Schima Wallichii Choisy.

(2) Thánsing: above Bhimpedi to Sisagárhi, 4,500-6,000 ft., 29581: near Khátmándu, 5th December 1907:

(3) Chessápáni pass.

Camellia theifera Griffith.

(2) Thánsing: Thánkot, 5,500 ft., abundant, 29823½: near Támbeh Kháni, 3,800 ft., 29630: west of Pherphing in one spot:

(3) Kakni.

Dipterocarpaceæ.

Shorea robusta Gærtn.

(1) Adhabhár to Bichiakoh, the chief tree: Chorea Ghâti hills, common: just above Bhimpedi: from half way between the Tádi river and Sinduri to Debi ghát and all round under Niakot, and up the Tádi valley to above Thánsing.

Malvaceæ.

Sida rhombifolia Linn.

(1) Terai, Birganj to Parsua: Bichiakoh village.

Sida carpinifolia Linn.

(1) Simalbása.

Sida cordifolia Linn.

(1) Simalbása.

Urena lobata Linn.

(1) Terai, Birganj to Parsua: Simalbása: Chorea Ghâti above Bichiakoh.

Hibiscus cancellatus Roxb.

(1) Simalbása to Bichiakoh, 29436.

Thespesia Lampas Dalz. & Gibs.

(1) Simalbása to Bichiakoh, 29478.

Kydia calycina Roxb.

(1) Simalbása to Bichiakoh, not uncommon, 29443.

Bombax malabaricum DC.

(1) Parsua, Simalbása: Chorea Ghâti above Bichiakoh: Hettáunda to Guelbi, very plentiful, 29569.

Sterculiaceæ.

Abroma augusta Linn.

(1) Bichiakoh: Hettaunda.

Tiliaceæ.

Grewia scabrophylla Roxb.

(1) Hettaunda, 29546.

Grewia hirsuta Vahl.

(1) Adhabhár to Bichiakoh, 29464: Shingle river bed, Bhimpedi.

Triumfetta rhomboidea Jacq.

(1) Terai, Birganj to Parsua : Simalbása, 29423.

Corchorus capsularis Linn.

(1) By the Kuro nadi, near Hettáunda, 29535.

Corchorus olitorius Linn.

(1) Gorge north of Hettáunda in its northern part, once : Battár under Niakot.

Elæocarpus Ganitrus Roxb.

(1) Gurkháh on Tádi river, called "Rudrách," 29923.

Linaceæ.

Reinwardtia trigyna Planch.

(1) Chorea Gháti, from Bichiakoh to Hettáunda, very abundant, 29482, 29483 : in the gorge north of Hettáunda, Thánsing :

(2) From close under Chessapáni pass to Márkhu, at the latter place among the stones of bunds between fields.

Reinwardtia tetragyna Planch.

(3) Kakni, 29884.

Geraniaceæ.

Geranium nepalense Sweet.

(2) Márkhu, 4,000 ft., not uncommon, 29650 : Pherphing, abundant, 29964 :

(3) Khágu, abundant.

Oxalis corniculata Linn.

(1) Parsua :

(2) Márkhu valley, common : Khágu.

Impatiens densifolia Hook. f.

(2) Chitlong, 29689.

Impatiens Pershadiana Hook. f.

(2) Jáitpur, 29852 : Khágu.

Impatiens aureola Hook. f.

(3) Sisagárhi, 29982.

Rutaceæ.

Boenninghausenia albiflora Reichb.

(2) Descent from Chessápáni to Márkhu, common, 29595 : between the river Bágmati and Pherphing, very common.

(3) Chessápáni.

Evodia fraxinifolia Hook. f.

(2) Sinduri, under Kákni, 29894.

Zanthoxylum ovalifolium Wight.

(1) Bháinsa Duhán, 29989 :

(2) Over the Bágmati river on the road from Pátan to Pherphing.

Zanthoxylum alatum Roxb.

(2) Common below Márkhu and sparingly above, 29641.

Clausena pentaphylla DC.

(1) Adhabhár to Bichiakoh, common, 29471.

Ochnaceæ.

Ochna pumila Ham.

(1) Adhabhár to Bichiakoh, 29469.

Meliaceæ.

Melia Azadirachta Linn.

(2) Near Khátmándu, 5th December 1907.

Cipadessa fruticosa Blume.

(3) Sisagárhi, 29986.

Heynea trijuga Roxb.

(2) Niakot, called "Akhar tárua," 29910 : above Thánsing.

Cedrela Toona Roxb.

(1) Parsua, 29396 : Simalbása, 29430.

Olacineæ.

Schoepfia fragrans Wall.

(1) Under the Sangli khola at Thánsing, 29937.

Natsiatum herpeticum Ham.

(1) Gorge north of Hettáunda from Bháinsa Duhán to Pánrán, abundant, 28171, 29571.

Ilicineæ.

Ilex excelsa Wall.

(2) Támbeh Kháni and Márkhu, 3,800 and 4,500 ft., 29635 : near Khátmándu, 5th December 1907 :

(3) Kákni.

Celastraceæ.

Euonymus vagans Wall.

(3) Forest just above Chitlong, 29801.

Celastrus paniculata Willd.

(2) Above Thánsing.

Rhamnaceæ.

Zizyphus Jujuba Lamk.
(1) Parsua : near Adhabhár.

Zizyphus nummularia W. & A.
(1) Below Niakot, 10th December 1907.

Zizyphus Œnoplia Mill.
(2) Near Pherphing.

Zizyphus incurva Roxb.
(2) Near Khátmándu, 5th December 1907.

Zizyphus rugosa Lamk.
(1) Chorea Ghâti, from Bichiakoh to Hettáunda.

Ampelidaceæ.

Vitis carnosa Wall.
(1) Simalbása to Adhabhár, 29441.

Vitis semicordata Wall.
(3) From Chitlong to Thánkot, 29688.

Leea sp.
(1) Forest near Simalbása.

Sapindaceæ.

Acer oblongum Wall.
(2) Near Khátmándu, 5th December 1907.

Dobinea vulgaris Ham.
(2) Ascent from Thánsing to Sángli khola, 29953.

Sabiaceæ.

Sabia paniculata Edgew.
(1) Top of Bichiakoh pass, 29516.

Meliosma simplicifolia Walp.
(1) Top of Bichiakoh pass, 28176.

Anacardiaceæ.

Rhus succedanea Linn.
(2) North side of Chessapáni pass, 5,000 ft., 29611.

Rhus Wallichii Hook. f.
(2) Below Chessapáni, 29583.
(3) West of Pherphing.

Mangifera indica Linn.
(1) Planted on roadside, Birganj and in villages near : under Niakot : Gurkháh.

Semecarpus Anacardium Linn. f.

(1) Near Bichiakoh, under the sál trees, 29475.

Spondias axillaris Roxb.

(1) Simalbása to Bichiakoh, 29456.

Leguminosæ.

Priotropis cytisoides W. & A.

(3) North side of Chessapáni pass, 29616.

Crotalaria prostrata Roxb.

(1) Simalbása to Bichiakoh, 29476 :

(2) south of Támbeh Kháni.

Crotalaria acicularis Ham.

(1) Tádi valley near Niakot, 11th December 1907.

Crotalaria alata Ham.

(1) Parsua, 29388 : Simalbása.

Crotalaria albida Heyne.

(1) Top of Bichiakoh pass, 29510.

Crotalaria calycina Schrank.

(1) Simalbása.

Crotalaria sessiliflora Linn.

(1) Near Bichiakoh, 29466 : north face of Chorea Ghâti towards Hettáunda : under Niakot :

(2) Márkhu, 4,000 ft., 29659.

Crotalaria sericea Retz.

(1) Simalbása to Bichiakoh, very common, 29460.

Crotalaria tetragona Roxb.

(1) Near Bichiakoh, 29490 : south of Hettáunda.

Crotalaria medicaginea Lamk.

(1) Parsua, 29377.

Trifolium repens Linn.

(3) Kakni.

Lotus corniculatus Linn.

(2) Chitlong.

Parochetus communis Ham.

(1) Thánsing :

(2) Between Thánsing and the Sángii khola, common : Márkhu, common, 29649 : Khágu.

Indigofera linifolia Retz.

(1) Terai, Birganj to Parsua.

Indigofera hirsuta Linn.

(1) Half way between Bichiakoh and the top of the pass, 29499.

Indigofera pulchella Roxb.

(1) From half way down the north slope of the Bichiakoh pass to Hettáunda, 29525.

Indigofera sp.

(3) Kakni, 29880.

Millettia auriculata Baker.

(1) Adhabhár to Bichiakoh, very common, 29462 ; Bichiakoh pass, 29992.

Geissapsis cristata W. & A.

(1) Thánsing.

Uraria hamosa Wall.

(1) Simalbása, 29427.

Alysicarpus rugosus DC.

(1) Between Parsua and Simalbása, very abundant, 29417.

Desmodium confertum DC.

(1) Bichiakoh to Hettáunda, 29485 : Thánsing :

(2) Sinduri 29898.

Desmodium latifolium DC.

(1) Simalbása, 29425.

Desmodium parvifolium DC.

(2) Márkhu, 4,000 ft., 29647.

Desmodium gyroides DC.

(1) Parsua, 29382.

Abrus precatorius Linn.

(1) Parsua.

Abrus pulchellus Wall.

(2) Near Khátmándu, 5th December 1907.

Shuteria vestita DC.

(1) Bháinsa Duhán, 29991 :

(2) Jaitpur to Kakni, 29879.

Dumasia villosa DC.

(1) Bichiakoh pass, 29999.

Mucuna pruriens DC.

(1) Parsua, in the jungle.

Erythrina arborescens Roxb.

(1) Bichiakoh, 29487 : gorge north of Hettáunda, rare.

Spatholobus Roxburghii Benth.

(1) Terai forest, Simalbása to Bichiakoh.

Butea frondosa Roxb.

(1) Terai north of Birganj.

Pueraria phaseoloides Benth.

(1) Parsua, 29381.

Dalbergia Sissoo Roxb.

(1) Chorea Ghâti above Bichiakoh, Hettáunda to Bháinsa Duhán, and at Nimbua tar.

Dalbergia volubilis Roxb.

(1) Gorge north of Hettáunda, common, 28172.

Pongamia glabra Vent.

(1) North of Parsua, planted.

Derris scandens Benth.

(1) Bichiakoh, 29486.

Mezoneurum cucullatum W. & A.

(1) Simalbása, 29428 : Pánrán and Guelbi, not uncommon :

(2) Ascent from Thánsing to Sángli khola, 29942.

Cassia Fistula Linn.

(1) Hettáunda : under Niakot.

Cassia occidentalis Linn.

(1) Terai, Birganj to Parsua : Bichiakoh village : below Niakot, 29900 :

(2) Above Bhimpedi : Niakot.

Cassia Sophera Linn.

(1) Terai, Birganj to Parsua : Niakot.

Cassia Tora Linn.

(1) Simulbása : Bichiakoh village : Hettáunda ; Niakot.

Cassia mimosoides Linn.

(1) Between Parsua and Simalbasa, sparingly in grass meadow, 29419.

Cassia laevigata Willd.

(2) Between the river Bágmati and Pherphing, very abundant, 29959.

Bauhinia malabarica Roxb.

(1) Parsua to Bichiakoh, 29420 : Chorea Ghâti above Bichiakoh : upper part of the gorge north of Hettáunda.

Bauhinia purpurea Linn.

(1) Bichiakoh pass, 29994.

Mimosa pudica Linn.

(1) Between Birganj and Parsua : Simalbása.

Mimosa rubricaulis Lam.

(1) Bichiakoh, 29480 : Kuro nadi and Hettáunda to Supári tár, very common, 28173.

Acacia concinna DC.

(1) Nimbua tár, 29578.

Acacia pennata Willd.

(1) Supári tár, 28174.

Albizzia lucida Benth.

(1) Bhainsa Duhán, 29988.

Rosaceæ.

Prunus Puddum Roxb.

(2) Above the Bágmati on the road from Pátan to Pherphing : north side of Chessapáni pass, 4,500 ft., 29618 :

(3) Forest above Chitlong 29697 : north side of the Sángli khola.

Prinsepia utilis Royle.

(2) Chitlong, abundant. 29678 : between the river Bágmati and Pherphing :

(3) Kakni.

Neillia thyrsiflora D. Don.

(3) North side of Chándagiri pass, 6,500 ft., 29817.

Rubus acuminatus Smith.

(3) Chándagiri pass, 7,400 ft., 29807.

Rubus paniculatus Smith.

(3) Above Chitlong : west of Pherphing : near Kakni, not uncommon, 29881.

Rubus moluccanus Linn.

(2) North descent from Chessapáni, 4,000 ft., 29633.

Rubus niveus Wall.

(1) Hettáunda.

Rubus ellipticus Smith.

(1) From above Bháinsa Duhán to Bhimpedi : But tár under Niakot :

(2) Bhimpedi to Chessapáni pass, 6,000 ft., 29590 : Chitlong, common : over the Bágmati river on the road from Pátan to Pherphing.

(3) West of Pherphing, very common : Kakni.

Fragaria indica Andr.

(1) Trisuli river banks under Niakot :

(2) Támbeh Kháni to Márkhu, 4,000 ft., 29655.

Potentilla fulgens Wall.

(2) Above Márkhu, 4,500 ft., 29665 :

(3) Kakni.

Rosa moschata Mill.

(2) Támbeh Kháni, 3,800 ft., 29637 : Chitlong : Valley of Nepál, common :

(3) West of Pherphing.

Pyrus Pashia Ham.

(3) Forest above Chitlong, 29805 : west of Pherphing, very common : Jáitpur to Kakni, 29853 : Sángli khola, common on south hill face.

Stranvæsia glaucescens Lindl.

(2) Near Khátmándu, 5th December 1907.

Crataegus crenulata Roxb.

(3) Near Kakni, common, 29870.

Cotoneaster bacillaris Wall.

(3) Kakni, on the top of the ridge, 9th December 1907.

Saxifragaceæ.

Astilbe rivularis Ham.

(2) Márkhu valley : Khágu, 29973.

Tiarella polyphylla Don.

(3) Kakni.

Hydrangea ? aspera Don.

(3) Fákhel.

Dichroa febrifuga Lour.

(2) North descent from Chessapáni pass and near Márkhu, 4,000-4,500 ft., 29623 : near Khátmándu, 5th December 1907 :

(3) Near Kakni, 29862 : Sángli khola.

Crassulaceæ.

Bryophyllum calycinum Salisb.

(1) Banks of the Trisuli below Niakot, abundant,

(2) Near Pherphing.

Kalanchoe spathulata DC.

(1) Hettáunda to Chessapáni pass, one of the commonest of plants in sunny places, 29561 :

(2) Niakot : between the river Bágmati and Pherphing.

Combretaceæ.

Terminalia Chebula Retz.

(1) About Adhabhár and to Bichiakoh, not uncommon, 29448.

Terminalia tomentosa Bedd.

(1) Chorea Ghâti, from Bichiakoh to Hettáunda and on to Nimbutár, very common at Bháinsa Duhán : Simalbása to Bichiakoh, 29429 : Thánsing on the Likhu, 11th December 1907.

Anogeissus latifolia Wall.

(1) Adhabhár to Bichiakoh, 29474.

Combretum decandrum Roxb.

(1) Chorea Ghâti near Bichiakoh : Hettáunda : Bháinsa Duhán, 29990.

Myrtaceæ.

Eugenia Jambolana Lam.

(1) Planted on roadsides, Birganj.

Eugenia sp.

(1) Thánsing :

(2) Nepál : Pherphing.

Melastomaceæ.

Osbeckia chinensis Linn.

(1) About the top of the Bichiakoh pass, abundant, 29509, 28175.

Osbeckia nepalensis Hook.

(1) Parsua, 29399.

(2) Near Támbeh Kháni, 4,000 ft., 29628 : north descent from Chessapáni pass : Jáitpur to Kakni, plentiful, 29857, 29859.

Melastoma malabathricum Linn.

(1) Parsua, 29400 : Likhu valley :

(2) West of Pherphing.

Oxyspora paniculata DC.

(1) Thansing, under the Sángli khola, 11th December 1907 :

(2) Jáitpur to Kakni, 29860.

Lythraceæ.

Ammannia rotundifolia Ham.

(3) Ascent from Jáitpur to Kakni, abundant, 29855.

Woodfordia floribunda Salisb.

(1) Parsua : Thánsing, abundant : gorge north of Hettáunda towards Nimbua tár :

(2) above Thánsing, towards the Sángli khola.

Lagerstrœmia parviflora Roxb.

(1) Parsua, 29385 : Simalbása :

(2) About Sinduri under Kakni, 29892.

Duabanga sonneratioides Ham.

(1) Hettáunda to above Bháinsa Duhán, one of the commonest trees at the latter place, 29987.

Onagraceæ.

Jussiæa repens Linn.

(1) Tájpur, north of Birganj, 29373.

Cucurbitaceæ.

Bryonia laciniosa Linn.

(1) Parsua in jungle, 29393 : Hettáunda :

(2) Between the Bágmati river and Pherphing.

Zehneria umbellata Thwaites.

(1) Adhabhár to Bichiakoh, apparently common enough, 29461.

Mukia scabrella Ham.

(1) Hettáunda.

Begoniaceæ.

Begonia gigantea Wall.

(1) Top of Bichiakoh pass, 29997.

Begonia laciniata Roxb.

(3) Near Kakni, 29882.

Cactaceæ.

Opuntia monacantha Haw.

(1) Shingle river bed, Bhimpedi under Niakot.

Umbelliferæ.

Hydrocotyle javanica Thunb.

(3) Kakni, 9th December 1907.

Hydrocotyle rotundifolia Roxb.

(1) Hettáunda :

(2) Márkhu valley :

(3) Kakni, abundant.

Sanicula europæa Linn.

(3) North side of Chándagiri : Kakni, abundant :

(2) Khágu.

Pimpinella diversifolia DC.

(3) North side of Chándagiri pass, 29814.

Œnanthe stolonifera Wall.

(1) Parsua, apparently rare, 29408.

Heracleum sp.

(3) Forest above Chitlong.

Araliaceæ.

Heteropanax fragrans Seem.

(1) Between Supári tár and Bháinsa Duhán, 29568.

Hedera Helix Linn.

(2) Márkhu valley : near Khátmándu, 5th December 1907.

(3) Kakni, 6,500 ft., common, 8th December 1907.

Cornaceæ.

Cornus oblonga Wall.

(3) Just above Thánkot, 5,500 ft., 29822 : Fákhel, west of Pherphing, 29967.

Cornus capitata Wall.

(2) Near Kárgu, very abundant over a short space, 29976 : between Khágu and Támbeh Kháni, rare.

Caprifoliaceæ.

Viburnum stellulatum Wall.

(2) North side of Chessapáni pass, 5,000 ft., 29613, 29614 :

(3) Southern side of Chándagiri pass, 29806 : Khágu, not uncommon.

Viburnum punctatum Ham.

(1) Top of Bichiakoh pass, 16th December 1907.

Viburnum coriaceum Blume.

(2) Near head of Khágu nadi, 29975 : west of Pherphing, plentiful : ridge near Kakni, 29878.

Rubiaceæ.

Anthocephalus Cadamba Miq.

(1) North of Hettáunda.

Adina cordifolia Hook. f.

(1) North of Parsua : Simalbása.

Stephegyne parvifolia Korth.

(1) Chorea Ghát near Bichiakoh.

Hymenodictyon excelsum Wall.

(1) Simalbása to Adhabhár, 29455, 29457.

Luculia gratissima Sweet.

(2) North slope under Chessapáni pass to Márkhu, 3,500-5,000 ft., not uncommon, and plentifully on rocks by the river, 29610 : near Khátmándu, 5th December 1907 : over the Bágmati river on the road from Patan to Pherphing ;

(3) Kakni.

Wendlandia exserta DC.

(1) Parsua.

Wendlandia ? coriacea DC.

(1) Under the Sangli khola at Thánsing, common under sál trees 29934, and

(2) Common above the sál forest.

Wendlandia pendula DC.

(1) Near the Trisuli, by But tár under Niakot, 29902 : Bháinsa Duhán, 29570.

Hedyotis scandens Roxb.

(1) On the north side of Bichiakoh pass about five hundred feet below the summit and thence on through Hettáunda to Pánrán, not uncommon, 29520, 29558.

(2) West of Pherphing, rare.

Oldenlandia corymbosa Linn.

(1) Bank of Trisuli below Niakot, in the sand of the river bank, 29920.

Oldenlandia gracilis DC.

(2) Above Márkhu, 4,200 ft., 29673 : Chitlong, 29680.

Ophiorrhiza fasciculata Don.

(var. With a few hairs on leaves).

(2) Near Khátmándu, 5th December 1907.

Mussaenda Roxburghii Hook. f.

(1) Top of Bichiakoh pass, 29517 : north of Hettáunda.

Randia tetrasperma Roxb.

(3) Sisagárhi, 29984 : Chándagiri pass, 7,400 ft., 29810 : ridge near Kakni, 29876 : Sángli khola.

Randia dumetorum Lamk.

(1) Parsua : Simalbása.

Hyptianthera stricta W. & A.

(1) Under the Sángli khola at Thánsing, not uncommon under sál trees, 29935.

Knoxia corymbosa Willd.

(1) Adhabhár, not uncommon, 29467.

[**Pæderia fœtida** Linn.

Sold in Khátmándu, origin not exactly ascertained, called " Biri, " 29824.]

Hamiltonia suaveolens Roxb.

(1) Hettáunda to Nimbua tár, common, 29579 :

(2) Near Pherphing, plentiful.

Leptodermis lanceolata Wall.

(3) Kakni, abundant, 29887.

Rubia cordifolia Linn.

(2) Between Támbeh Kháni and Markhu, 4,000 ft., 29642 : Chitlong, common : between the river Bágmati and Pherphing abundant, 29960 :

(3) Fakhel.

Rubia angustissima Wall.

(1) Top of Bichiakoh pass, 29993.

Galium rotundifolium Linn.

(3) Between Khárgu and Tambeh Kháni, 29978.

Galium Aparine Linn.

(3) Chessapáni, north side of pass, 5,500 ft., 29607 : Kakni, 9th December 1907. Our Indian plant is a distinct variety.

Galium Mollugo Linn.

(*G. asperifolium* Wall.)

(2) Chessapáni pass, 5,800 ft., 29603 : Kakni. I should prefer to see *G. asperifolum* considered as a species.

Valerianaceæ.

Valeriana Hardwickii Wall.

(3) Chessapáni pass, 29601 : north side of Chándagiri.

Dipsaceæ.

Dipsacus inermis Wall.

(2) Márkhu :

(3) Chessapani pass, not uncommon, 5,500-6,000 ft., 29605 : Chitlong to Thánkot.

Compositæ.

Vernonia teres Wall.

(1) Adhabhár to Bichiakoh, 29459 and 29470 : But tár, south of Niakot, 11th December 1909 :

(2) Niakot, 3,000 ft., 10th December 1907.

Vernonia subsessilis DC.

(1) Top of Bichiakoh pass, 29995.

Vernonia cinerea Less.

(1) Terai, Birganj to Parsua : Simalbása : north side of Chorea Gháti : Pánrán and Guelbi, common : But tár under Niakot :

(2) Nepal Valley.

Vernonia anthelmintica Willd.

(1) Chorea Ghâti above Bichiakoh :

(2) Niakot village, 3,000 ft., 10th December 1907.

Elephantopus scaber Linn.

(1) Parsua, common : Simalbása : north side of Chorea Ghâti, common.

Adenostemma viscosum Forest.

(1) Parsua, abundant, 29411 : Simalbása :

(2) Near Khátmándu, 5th December 1907.

Ageratum conyzoides Linn.

(1) Chorea Ghâti above Bichiakoh : top of Bichiakoh pass : Hettáunda, in sheets and in the gorge northwards, common :

(2) Márkhu valley, common.

Dichrocephala latifolia DC.

(3) Sángli khola, 29948.

Myriactis nepalensis Less.

(3) Chessapáni pass, not uncommon, 5,500-6,000 ft., 29604 : Kakni.

Erigeron bellidioides Benth.

(2) Above Márkhu, 4,500 ft., 29661 : near Khátmándu, 5th December 1907 : close to the river Bágmati on the road from Pátan to Pherphing, 29958.

Conyza japonica Less.

(2) Márkhu, 4,000 ft., 29657.

Conyza stricta Willd.

(1) Near the top of Bichiakoh pass, 29504 : Pánrán and Guelbí, common : Shingle river bed, Bhimpedi.

Blumea obovata DC.

(1) Top of Bichiakoh pass, 29512.

Blumea procera DC.

(1) Near Thánsing, 29952.

Laggera flava Benth.

(1) Adhabhár to Bichiakoh, very common, 29451 : north face of Chorea Ghâti : under Niakot : Thansing.

Laggera alata Schultz-Bip.

(1) Nimbua tár, common, 29577 : Shingle river bed, Bhimpedi : under Niakot :

(2) South of Khágu.

Laggera pterodonta Benth.

(2) Near Khátmándu, 5th December 1907.

Anaphalis triplinervis C. B. Clarke.

(2) Above Márkhu, 4,500 ft., 29666.

Anaphalis cinnamomea C. B. Clarke.

(3) Chessapáni, 6,000 ft., not common, 29594: Kakni, near the bungalow, at 6,500 ft., common, 9th December 1907.

Anaphalis adnata DC.

(3) North of Sángli khola, 12th December 1907.

Anaphalis araneosa DC.

(1) Near top of Bichiakoh pass, 29505: Shingle river bed, Bhimpedi:

(2) Niakot, 10th December 1907:

(3) Sángli khola, 12th December 1907.

Anaphalis contorta Hook. f.

(2) Chessapáni to Márkhu, 3,500-6,000 ft., common, 29602:

(3) west of Pherphing, common.

Gnaphalium luteo-album Linn.

(2) Márkhu valley: Chitlong.

Cæsulia axillaris Roxb.

(1) Terai, north of Birganj: rice fields along the Tárdi river.

Inula Cappa DC. (*I. eriophora* DC).

(1) From a little above Bichiakoh to 4 miles short of Hettáunda, 29495. *I. eriophora* appears to be a good variety.

Vicoa auriculata Cass.

(1) But tár under Niakot: Thánsing.

Siegesbeckia orientalis Linn.

(1) Hettáunda:

(2) Chitlong.

Eclipta alba Hassk.

(1) Parsua: Trisuli river banks, under Niakot.

Spilanthes Acmella Linn.

(1) Hettáunda: Nimbua tár, common:

(2) Márkhu valley.

Bidens pilosa Linn.

(1) Bichiakoh to Hettáunda, common, 29491.

Cosmos sulfureus Cav.

(1) Hettáunda, by the river, 29542.

Glossogyne pinnatifida DC.

(1) But tár under Niakot.

Chrysanthellum indicum DC.

(1) Tájpur, north of Birganj, 29374: Parsua in jungle.

Galinsoga parviflora Cav.

(1) Fields near the Tádi river, rare:
(2) Chessapáni pass to Márkhu: Chitlong, abundant:
(3) Kakni.

Artemisia parviflora Roxb.

(2) Above Márkhu, 4,500 ft., 29670.

Artemisia vulgaris Linn.

(1) Near the top of Bichiakoh pass, 29502: Hettáunda, very abundant, and onwards to Bhimpedi:
(2) Márkhu valley: between Pátan and Pherphing:
(3) Forest above Chitlong.

Gynura angulosa DC.

(3) North slope under the Sángli khola, 29949.

Emilia sonchifolia DC.

(1) Parsua, 29414.

Senecio chrysanthemoides DC.

(2) Above Támbeh Kháni, very rare, 29638.

Senecio scandens Wall. (*S. flexuosus* Wall.).

(3) Forest above Chitlong, 29690: below Kakni towards Niakot: Sángli khola.

Senecio densiflorus Wall.

(3) North side from Chessapáni pass, 29622: below Kakni towards Niakot, 9th December 1907.

Senecio vagans Wall.

(2) Near Khátmándu, 5th December 1907:
(3) North side of Chándagiri pass, 6,000 ft., 29818: north side of Chessapáni pass, 5,000 ft., 29615.

Cnicus argyracanthus DC.

(2) Márkhu.

Cnicus Wallichii DC., var. **nepalensis** Hook. f.

(3) Summit of Chándagiri pass, 7,700 ft., 29812.

Ainsliæa pteropoda DC.

(3) Kakni, on the Niakot side of the watershed, 6,000 ft., 9th December 1907.

Ainsliæa aptera DC.

(3) Sisagárhi, 29983.

Gerbera macrophylla Benth.

(3) Chessapáni pass, common, 29593.

Picris hieracioides Linn.

(2) Near Támbeh Kháni, 29639.

Lactuca hastata DC.

(3) North side of Chándagiri pass, and summit 29811, 29815.

Sonchus arvensis Linn.

(2) Márkhu, 29676.

Launæa nudicaulis Less.

(2) Jáitpur, 29849.

Tagetes patula Linn.

(2) About Kuli Kháni on the road to Chessapáni, 4,500 ft., 29619.

Campanulaceæ.

Pratia begonifolia Lindl.

(3) North side of Chessapáni pass, 5,000 ft., 29612 : Kakni : Sángli khola.

Lobelia trigona Roxb.

(1) Parsua, 29413 : by the Kuro nadi near Hettáunda, 29534.

Lobelia radicans Thunb.

(2) Near Khátmándu, 5th December 1907.

Lobelia pyramidalis Wall.

(3) Between Kakni and Sinduri, 29,897.

Wahlenbergia gracilis DC.

(1) Under the Sángli khola at Thánsing, 29929.

Campanumæa inflata C. B. Clarke.

(3) Kakni, 9th December 1907.

Campanula sylvatica Wall.

(2) Márkhu, 4,000-4,500 ft., 29653 : near Pherphing.

Campanula colorata Wall.

(3) North side of Chessapáni pass : Chitlong to Thánkot, common, 29685.

Ericaceæ.

Gaultheria fragrantissima Wall.

(2) Above Márkhu, 4,500 ft., 29663 :

(3) Kákni, abundant, 9th December 1907 : Sángli khola.

Pieris ovalifolia Don.

(2) Under Kákni towards Niakot, 29891 : upper edge of the sál forest near Thánsing : over the Bágmati river on the road from Pátan to Pherphing :

(3) West of Pherphing, abundant, called "Ayeri," 29966 : Chessapáni south of Khágu, very abundant.

Rhododendron arboreum Sm.

(2) On the downs near Chitlong :

(3) Chessapáni pass, 5,000-6,000 ft., common, 29585 : Chándagiri pass, 7,400 ft., and below, 29808 : west of Pherphing, very abundant : alone crowning a hill top south of Khágu.

Plumaginaceæ.

Plumbago zeylanica Linn.

(1) South side of Bichiakoh pass : Nimbua tár :

(2) Near Khátmándu, 5th December 1907 : between the river Bágmati and Pherphing.

Primulaceæ.

Androsace saxifragæfolia Bunge.

(2) Close to the river Bágmati on the road from Pátan to Pherphing, 29956.

Myrsinaceæ.

Mæsa ramentacea A. DC.

(2) Under Kákni along the road to Niakot, 4,00-6,000 ft., 9th December 1907 : Niakot :

(3) Kákni : Sángli khola : west of Pherphing.

Mæsa macrophylla Wall.

(2) Under Kakni towards Niakot, 29890 :

(3) Sángli khola, 12th December 1907.

Myrsine africana Linn.

(2) On the downs above Márkhu, in sheltered corners, 29677.

Myrsine semiserrata Wall.

(2) Near Khátmándu, 5th December 1907 : ascent from Thánsing to the Sángli khola, 29994 :

(3) Sángli khola, 12th December 1907.

Myrsine capitellata Wall.

(2) Near Khátmándu, 5th December 1907 :

(3) Jáitpur to Kakni, 29,868.

Embelia Ribes Burm.

(2) Near Khátmándu, 5th December 1907.

(3) North side of Chándagiri pass, 5,500-6,000 ft., 29820, 29821.

Embelia robusta Roxb.

(1) Half way between the top of the Bichiakoh pass and Hettáunda, 29523.

Ardisia humilis Vahl.

(1) Thánsing :

(2) Niakot, 29908.

Styraceæ.

Symplocos spicata Roxb.

(1) North of Adhabhár to Bichiakoh, common in sál forest, 29468 : north side of Chorea Ghâti towards Hettáunda.

Symplocos theæfolia Ham.

(2) Near Khátmándu, 5th December 1907 ; Jáitpur to Kakni, very common, 29867 :

(3) Kakni, 6,000 ft., 9th December 1907.

Oleaceæ.

Jasminum humile Linn.

(2) Khágu.

(3) Chándagiri :

Nyctanthes Arbor-tristis Linn.

(1) Near Bichiakoh, 29477 :

(2) Bhimpedi to Sisagàrhi.

Fraxinus floribunda Wall.

(2) Near Khátmándu, 5th December 1907.

Ligustrum nepalense Wall.

(2) Támbeh Kháni, 3,800 ft., common, 29636.

Apocynaceæ.

Tabernæmontana coronaria R. Br.

(1) Bháinsa Duhán, 29572.

Trachelospermum fragrans Hook. f.

(3) Forest above Chitlong 29700.

Ichnocarpus frutescens R. Br.

(1) North of Parsua between Adhabhár and Biahiakoh, rare.

Asclepiadaceæ.

Calotropis procera R. Br.

(1) Banks of Trisuli below Niakot : banks of the Tádi.

Loganiaceæ.

Buddleia sp.

(Almost certainly *B. macrostachya* Benth.)

(3) Forest above Chitlong, 29698.

Buddleia asiatica Lour.

(2) Márkhu, 4,000 ft., 29645.

Gentianaceæ.

Exacum teres Wall.

(1) Bichiakoh, 29481.

Exacum tetragonum Roxb.

Canscora decussata Roem. & Sch.

(1) Adhabhár to Bichiakoh: Chorea Gháti, not infrequent.

(1) Between Parsua and Simalbása, common, 29418.

Gentiana decemfida Ham.

(1) Bank of Trisuli below Niakot, common, 29918.

Gentiana capitata Ham.

(2) Chitlong, 29681.

Gentiana pedicellata Wall.

(2) Half way down the hill from Kakni to the Tádi valley, 10th December 1907 : Jáitpur, near Khátmándu, 29846.

Swertia paniculata Wall.

(2) Between Kargu and Támbeh Kháni, 29980 : Márkhu, 4,000 ft., 29646; and var. *brachypetala* Griseb :

(2) Márkhu, 4,000 ft., 29646, 29660: above Márkhu, 4,500 ft., 29672 : between Kargu and Támbeh Kháni, 29979 :

(3) Edge of forest above Chitlong, very common, 29699.

Swertia dilatata C. B. Clarke.

(2-3) Jáitpur to Kakni, excessively common, 29854, 29873 : north of pass Sángli khola, 12th December 1907.

Swertia nervosa Wall.

(3) Above Jáitpur, 29869 Chessapáni, 6,000 ft., 29586 : Sángli khola.

Swertia angustifolia Ham. var. **Wallichii** Burkill.

(1) South and north slopes of Bichiakoh pass, 29496, 29522 : Hettáunda to Supári tár, 29584 : south of Bhimpedi :

(2) Márkhu and above : above Thánsing to the Sángli khola, 12th December 1907.

Hydrophyllaceæ.

Hydrolea zeylanica Vahl.

(1) Terai, Birganj to Parsua : Kuro nadi.

Boraginaceæ.

Trichodesma indicum R. Br.

(1) Parsua, in jungle : Simalbása.

Cynoglossum furcatum Wall.

(1) By the Trisuli under Niakot, 29901 :

(2) Ascent from Thánsing to Sangli khola, 29947 :

(3) Chessapáni pass, 5,800 ft., 29598.

Cynoglossum lanceolatum Forsk.

(1) Between Birganj and Parsua.

Bothriospermum tenellum Fisch. & Mey.

(2) Chitlong, 29687.

Convolvulaceæ.

Rivea ornata Chois.

(1) Adhabhár to Bichiakoh, 29472.

Argyreia Hookeri C. B. Clarke.

(1) Simalbása to Bichiakoh, not uncommon, 29440.

Lettsomia setosa Roxb.

(1) Parsua, in jungle, 29386.

Ipomoea Bona-nox Linn.

(1) Hettáunda.

Ipomoea hederacea Jacq.

(1) Hettáunda, 29549.

Evolvulus alsinoides Linn.

(1) Parsua, in jungle : But tár under Niakot.

Porana paniculata Roxb.

(1) Bichiakoh, 29479 : Supári tár : Nimbua tár, 28170.

Cuscuta reflexa Roxb.

(2) North slope of hill side under Chessapáni pass, 5,000 ft., 29508.

(3) Forest above Chitlong, 29804 : Kakni.

Solanaceæ.

Solanum verbascifolium Linn.

(1) Simalbása, at edge of forest : between Nimbua tár and Bhimpedi.

Solanum indicum Linn.

(1) Gorge north of Hettáunda, common : Shingle river bed, Bhimpedi, plentiful :

(2) West of Pherphing.

Solanum xanthocarpum Schrad. & Wendl.

(1) Terai, Birganj to Parsua : near Adhabhár : Shingle river bed, Bhimpedi :

(2) Márkhu valley.

Nicandra physaloides Gærtn.

(1) Hettáunda :

(2) Chitlong.

Datura Stramonium Linn.

(1) Shingle at Bhimpedi :

(2) Márkhu valley, plentiful : Pherphing.

Datura fastuosa Linn.

(1) Shingle at Bhimpedi :

(2) Niakot, called "Kala Dhatura," 29911.

Scrophulariaceæ.

Verbascum Thapsus Linn.

(2) Márkhu valley.

Mazus rugosus Lour.

(1) Fields along the Likhu.

Lindenbergia grandiflora Benth.

(1) Bichiakoh to the top of the pass and to Hettáunda, 29493 : Hettáunda Sángli khola :

(2) Under Kakni towards Niakot, 29889 : descent from Chessapáni pass to Márkhu :

(3) North side of Chándagiri Sángli khola, 12th December 1907 : over the Bágmati on the road from Pátan to Pherphing.

Lindenbergia philippensis Benth.

(2) Márkhu, 4,000 ft., 29654.

Lindenbergia urticaefolia Lehm.

(1) Tárdi valley near Niakot, 11th December 1907 :

(2) Chitlong, 29686.

Limnophila conferta Benth.

(1) Under Sángli khola at Thánsing, 29930.

Limnophila sessiliflora Blume.

(1) Tájpur, north of Birganj, 29370.

Herpestis Monniera H. B. K.

(1) Among rice fields under Niakot.

Torenia vagans Roxb.

(1) Hettáunda to Guelbi, 29556.

Vandellia crustacea Benth.

(2) Khátmándu to Jáitpur 29850.

Scoparia dulcis Linn.

(1) Near Raksál on the banks of the boundary stream, 29363 : Parsua : near Adhabhár : Bichiakoh village.

Hemiphragma heterophyllum Wall.
(3) Kakni, 9th December 1907.
Veronica Anagallis Linn.
(2) Márkhu valley: Khágu.

Orobanchaceæ.

Aeginetia indica Roxb.
(1) Top of Bichiakoh pass, 29513.

Lentibulariaceæ.

Utricularia bifida Linn.
(2) Jáitpur near Khátmándu, 29845.
Utricularia orbiculata Wall.
(1) Supári tár, near Hettáunda, 29560.

Bignoniaceæ.

Oroxylum indicum Vent.
(1) Bichiakoh : gorge north of Hettáunda :
(2) Near Khátmándu, 5th December 1907.
Stereospermum suaveolens DC.
(1) Bichiakoh: near Hettáunda.

Pedaliaceæ.

Martynia diandra Glox.
(1) Bichiakoh village.

Acanthaceæ.

Thunbergia fragrans Roxb.
(2) North descent from Chessapáni pass, 4,500 ft., 29625.
Thunbergia coccinea Wall.
(1) Close to the top of Bichiakoh pass, 29508 : north parts of gorge. north of Hettáunda, 3,000 ft :
(2) Half way between Kakni and the Tádi river.
Hygrophila polysperma T. Anders.
(1) Parsua, 29389.
Echinacanthus attenuatus Nees.
(1) By the Kuro nadi near Hettáunda, 29527.
Echinacanthus longistylus C. B. Clarke.
(1) Just on the south side, near the top of the Bichiakoh pass, 29506.
Dædalacanthus nervosus T. Anders.
(1) ar Adhabhár, 29447 : Chorea Ghâti above Bichiakoh.

Hemigraphis latebrosa Nees.

(2) North descent from Chessapáni pass, 4,500 ft., 29627.

Aechmanthera Wallichii Nees.

(1) Half way between Bichiakoh and the top of the pass, 29498 :
(2) Márku, 4,000 ft., abundant, 29675 dry slopes near Khágu :
(3) West of Pherphing, common over a short space, 29972 :

Strobilanthes Sabinianus Nees.

(1) Supári tár to pánrán, common, 29562, 29563.

Strobilanthes glutinosus Grah.

(3) Chessapáni pass, 6,000 ft., 29592.

Strobilanthes capitatus T. Anders.

(1) Top of Bichiakoh pass, 29515 : Supári tár to Pánrán, common, 29564, 29565 : by the Kuro nadi, near Hettáunda, 29530.

Strobilanthes pentstemonoides T. Anders.

(2-3) Jáitpur to Kakni, 29856.

Barleria cristata Linn.

(1) Simalbása to Bichiakoh, common in the sál forest, 29444 : Chorea Ghâti, rare.

Asystasia macrocarpa Nees.

(1) By Kuro nadi, near Hettáunda, 29536.

Lepidagathis hyalina Nees.

(1) Bháinsa Duhán, 29574.
(2) Ascent from Thánsing to Sángli khola, 29945.

Adhatoda vasica Nees.

(1) In the gorge north of Hettáunda : Guelbi to Bhimpedi :
(2) Márkhu valley ; Niakot : between the river Bágmati and Pherphing, plentiful.

Rungia parviflora Nees.

(1) Birganj to Bichiakoh, especially common in the forest, 29426 : Chorea Ghâti : Thánsing under Sángli khola, common under sál trees, 11th December 1907 :
(2) Márkhu, 4,000 ft., 29648.

Dicliptera Roxburghiana Nees.

(3) Forest above Chitlong, 29694.

Dicliptera bupleuroides Nees.

(1) Gorge north of Hettáunda common :
(2) Near Pherphing.

Peristrophe bicalyculata Nees.

(1) Near Adhabhár.

Verbenaceæ.

Callicarpa macrophylla Vahl.

(1) Hettáunda by the river, 29541 : Pánrán and Guelbi to Bhimpedi, abundant : banks of the Trisuli under Niakot.

Gmelina arborea Linn.

(1) Bichiakoh to Hettáunda, 29521.

Vitex ? trifolia Linn. f.

(1) Under Niakot.

Clerodendron serratum Spreng.

(1) Banks of Trisuli below Niakot.

Clerodendron infortunatum Gærtn.

(2) Chitlong : Niakot : Pherphing.

Clerodendron Siphonanthus R. Br.

(1) From down the Chorea Ghâti between Bichiakoh pass to Hettáunda, not uncommon, 29524.

Holmskioldia sanguinea Retz.

(1) Hettáunda to Bhimpedi, plentiful, 29551 : over the Trisuli at Battár near Niakot :

(2) Bhimpedi to Chessapáni, plentiful.

Labiatæ.

Ocimum gratissimum Linn.

(1) Near Parsua on the south side, 29375.

Geniosporum strobiliferum Wall.

(1) Top of Bichiakoh pass, 29518.

Plectranthus Gerardianus Benth.

(1) Hettáunda to Bhimpedi, common, 29553 :

(2) Chitlong, rare : south of Khágu.

Plectranthus striatus Benth.

(1) Hettáunda to Supári tár, very common, 29555 : under the Sángli khola at Thánsing, 29938.

Plectranthus ternifolius Don.

(1) Parsua, 29376 : between the Bichiakoh pass, and Hettáunda, very common.

Coleus barbatus Benth.

(2) Between Khágu and Támbeh Kháni, 29977.

Pogostemon glaber Benth.

(2) North face under Sángli khola, 29954 : below Kakni, very common, 9th December 1907.

Pogostemon sp.

(1) By the Kuro nadi near Hettáunda.

Dysophylla cruciata Benth.

(1) Under the Sángli khola at Thánsing, 29939.

Colebrookia oppositifolia Smith.

(1) North of Parsua: gorge north of Hettáunda to Bhimpedi: Battár under Niakot:

(2) Márkhu valley.

Elsholtzia ? strobilifera Benth.

(3) Kakni.

Elsholtzia blanda Benth.

(2) Below Kakni towards Niakot, very common, 9th December 1907.

Mosla dianthera Maxim.

(1) By the Kuro nadi near Hettáunda, 29532.

Mentha arvensis Linn.

(1) Nimbua tár:

(2) Márkhu valley.

Micromeria biflora Benth.

(2) Khátmándu to Jáitpur, very abundant, 29847: Márkhu.

Calamintha umbrosa Benth.

(3) Chessapáni pass, 5,800 ft. 29599.

Calamintha longicaulis Benth.

(2-3) Jáitpur to Kakni, 29858.

Scutellaria discolor Coleb.

(1) Top of Bichiakoh pass, 29511.

(2) Near Khátmándu, 5th December 1907.

Scutellaria angulosa Benth.

(1) Hettáunda, common.

Scutellaria repens Ham.

(1) Top of Bichiakoh pass, 29507:

(2-3) Above Bhimpedi to Chessapáni pass.

Scutellaria rivularis Wall.

(1) Below Niakot, 10th December 1907.

Prunella vulgaris Linn.

(2) Khágu.

Craniotome versicolor Reichb.

(2) Near Khátmándu, 5th December 1907:

(3) Chessapáni pass, 5,800 ft., 29600.

Anisomeles ovata R. Br.

(1) Parsua, 29391: Simalbása:

(2) Between the river Bágmati and Pherpling.

Colquhounia coccinea Wall.

(2) Near Támbeh Kháni, 3,800 ft., 29631.

Leucas mollissima Wall.

(1) Bichiakoh to Hettáunda, frequent, 29497.

Leucas ciliata Benth.

(3) North side of Chándagiri pass, 7,700 ft., 29816.

Leucas Cephalotes Spreng.

(2) Márkhu, 4,000 ft., 29656.

Leucas hyssopifolia Benth.

(1) Parsua, 29387.

Leucas linifolia Spreng.

(1) Terai, Birganj to Parsua, plentiful.

Leonotis nepetæfolia R. Br.

(1) Parsua, 29398: Chorea ghâti.

Teucrium quadrifarium Ham.

(2) Above Márkhu, 4,500 ft., 29669.

Plantaginaceæ.

Plantago major Linn.

(1) Nimbua tár:

(2) Above Támbeh Kháni towards Chessapáni:

(3) Sisagárhi, 29985.

Nyctaginaceæ.

Bœrhaavia repens Linn.

(1) Hettáunda, 29,547: gorge north of Hettáunda, near Nimbua tár.

Amarantaceæ.

Deeringia celosioides R. Br.

(1) Near Bichiakoh, 29488:

(2-3) Chessapáni north side of pass, about 5,600 ft., 29596.

Amarantus spinosus Linn.

(1) Parsua: Bichiakoh village:

(2) Chitlong between Khágu and Támbeh Kháni.

Cyathula tomentosa Moq.

(2) Bhimpedi to Márkhu, 4,000—6,000 ft., abundant, 29591.

Cyathula capitata Moq.

(1) Banks of the Trisuli under Niakot, 28181:

(2) Between Khágu and Támbeh Kháni, 29981.

Achyranthes aspera Linn.

(1) Simalbása: Chorea Ghâti, common.

Alternanthera sessilis R. Br.

(1) Terai, Birganj to Simalbása:

(2) Márkhu.

Chenopodiaceæ.

Chenopodium ambrosioides Linn.

(1) Shingle at Bhimpedi:

(2) Niagáon between Khágu and Támbeh Kháni.

Polygonaceæ.

Polygonum tomentosum Willd.

(1) Parsua, 29407.

Polygonum glabrum Willd.

(1) Terai, Birganj to Parsua.

Polygonum barbatum Linn.

(1) Under the Sángli khola at Thánsing, 29936.

Polygonum Hydropiper Linn.

(1) Terai, Birganj to Parsua:

(2) Near Khátmándu, 5th December 1907.

Polygonum flaccidum Meissn.

(1) By Kuro nadi near Hettáunda, 29529.

Polygonum capitatum Ham.

(1) Supári tár to Bhimpedi, 29566:

(2) Márkhu, common: below Chessapáni, common on dry places about the hill, 29589.

Polygonum chinense Linn.

(1) Near Bichiakoh, 29492: Sángu on the Trisuli, 29914:

(2) North descent from Chessapáni pass.

Polygonum mite Schrank.

(1) Hettáunda to Bhimpedi, very common, 29557: by Kuro nadi near Hettáunda, 29528.

Piperaceæ.

Piper nepalense Miq.

(1) Top of Bichiakoh pass, 29996: Bháinsa Duhán, 29575.

Peperomia reflexa Dietr.

(3) Near Fákhel, west of Pherphing, 29970: north side of Chessapáni pass, 5,500, not abundant, 29609.

Laurineæ.

Litsæa oblonga Wall.

(2) Near Khátmándu, 5th December 1907: near Támbeh Kháni, 3,800 ft., 29634.

Litsæa lanuginosa Nees.

(2) Near Khátmándu, 5th December 1907.

Daphnidium bifarium Nees.

(2) Near Khátmándu, 5th December 1907.

Tetranthera glauca Wall.

(1) Parsua, 29392.

Thymelæaceæ.

Daphne cannabina Wall.

(2) Near Khátmándu, 5th December 1907:

(3) Kakni, at 6,500 ft., along the summit of the ridge, 29872.

Elæagnaceæ.

Elæagnus latifolia Linn.

(2) Close to the river Bágmati on the road from Pátun to Pherphing, 29957.

Loranthaceæ.

Loranthus odoratus Wall.

(3) Above Jáitpur, 29864.

Loranthus Scurrula Linn.

(1) Parsua, on *Flacourtia*, 29384:

(3) Above Jáitpur, 29865.

Loranthus longiflorus Desrouss.

(1) Parsua, 29378.

Loranthus umbellifer Schultz.

(3) Above Jáitpur, 29863.

Viscum monoicum Roxb.

(1) Parsua, 29379: Gurkháh in the Tárdi valley, abundant, 29926.

Viscum articulatum Burm.

(3) Forest above Chitlong, 29803.

Santalaceæ.

Osyris arborea Wall.

(3) Near Kakni, not uncommon, 29861.

Euphorbiaceæ.

Euphorbia pilulifera Linn.

(1) Terai, Birganj to Parsua: Chorea Ghâti, not uncommon.

Euphorbia neriifolia Linn.

(1) Near Parsua in hedges: Hettáunda, below Niakot, 29915:

(2) Márkhu valley.

Euphorbia Tirucalli Linn.

(1) Under Niakot.

Euphorbia near **E. pilosa** Linn.

(2) Chitlong, plentiful, 29683.

Sarcococca pruniformis Lindl.

(2) Támbeh Kháni to Márkhu, 3,500—4,000 ft., very common, 29629, 29643: near Khátmándu, 5th December 1907.

Bridelia retusa Spreng.

(1) Parsua, 29383: Simalbása: Hettáunda, very abundant.

Andrachne cordifolia Muell.-Arg.

(2) Jáitpur near Khátmándu, 29851.

Phyllanthus Emblica Linn.

(1) Simalbása: north face of Chorea Ghâti towards Hettáunda, common: above Bhimpedi: under Niakot.

Phyllanthus urinaria Linn.

(1) Tájpur, north of Birganj, 29372.

Phyllanthus parvifolius Ham.

(2) Márkhu, 3,500—4,000 ft., very common, 29651: Pherphing, common, west of Pherphing, common:

(3) Kakni, common, 29885, west of Pherphing, common.

Breynia patens Benth.

(1) Hettáunda, 29543.

Antidesma diandrum Roth.

(1) Adhabhár to Bichiakoh, plentiful, 29453: Chorea Ghâti above Bichiakoh, rare: gorge north of Hettáunda.

Jatropha Curcas Linn.

(1) Parsua: Hettáunda: banks of the Trisuli under Niakot:

(2) Sinduri village above the Tádi river:

(3) Niakot.

Mallotus philippensis Muell.-Arg.

(1) Parsua, plentiful, 29390: Simalbása.

Urticaceæ.

Celtis australis Linn.

(2) Márkhu.

Trema orientalis Blume.

(1) Parsua, not uncommon, 29415.

Streblus asper Lour.

(1) Simalbása.

Ficus religiosa Linn.

(1) Planted on roadsides, Birganj : under Niakot :

(2) Tádi valley, just above the sál forest near Sinduri.

Ficus Cunia Ham.

(1) Parsua : Thánsing.

Ficus glomerata Roxb.

(1) Parsua.

Ficus pyriformis Hook. & Arn., var. **subpyriformis** Miq.

(1) Bank of Trisuli below Niakot, 29921.

Ficus lævis Blume (*F. Emodi* Wall.)

(1) Gurkháh on Tádi river, 29924.

Ficus scandens Roxb.

(1) Top of Bichiakoh pass, 29514.

Urtica parviflora Roxb.

(1) Simalbása, 29,424 : top of Bichiakoh pass in abundance: Hettáunda, abundant, and in the gorge northwards :

(2) Bhimpedi to Sisagárhi : Márkhu valley : Chitlong : Niakot :

(3) Sisagárhi to Chessapáni pass.

Girardinia heterophylla Decne.

(1) Gorge north of Hettáunda :

(3) Forest above Chitlong.

Pilea anisophylla Wedd.

(2) North slope under Sángli khola, 29950.

Lecanthus Wightii Wedd.

(2) Near Khátmándu, 5th December 1907 : above Thánsing towards the Sángli khola, in the gorge.

Elatostema rupestre Wedd.

(1) Hettáunda, in the gorge, 29554.

Elatostema lineolata Wight.

(2) Khátmándu to Jáitpur, very common, 29844 : above Thánsing towards the Sángli khola.

Boehmeria rugulosa Wedd.

(1) South side of Bichiakoh pass, 1,400 ft., 29503 : gorge north of Hettáunda.

Boehmeria platyphylla Don, var. **macrostachya** Wedd.

(1) Bichiakoh to Hettáunda, not uncommon, 29489.

Maoutia Puya Wedd.

(1) Half way between Bichiakoh and the top of the pass, 29500: gorge above Bháinsa Duhán.

Myricaceæ.

Myrica Nagi Thunb.

(1) Gurkháh in Tádi valley, called "Káphul," 29927.

Cupuliferæ.

Alnus nepalensis Don.

(2) Near Khátmándu, 5th December 1907:

(3) Fákhel.

Quercus semecarpifolia Smith.

(2) Above Jáitpur: south of Khágu, very abundant:

(3) Chessapáni, 6,000 ft., 29587: forest above Chitlong: west of Pherphing, abundant: Kakni.

Quercus lanuginosa Don.

(2-3) Bhimpedi to Chessapáni, 4,500-5,800 ft., 29582.

Quercus glauca Thunb.

(2-3) Between Fákhel and Khágu, 29971:

(3) North side of Chándagiri pass, 7,700 ft., 29813 above Jáitpur, 29866.

Castanopsis indica A. DC.

(2) Niakot: on the ascent from Thánsing to the Sángli khola, called "Dalne Koruth," 29907.

Carpinus viminea Wall.

(2) North descent from Chessapáni pass, 4,500 ft., 29621: Chitlong:

(3) Fákhel.

Salicaceæ.

Salix tetrasperma Roxb.

(1) Parsua, 29380:

(2) Near Khátmándu, perhaps planted.

Ceratophyllaceæ.

Ceratophyllum demersum Linn.

(2) Pherphing, 29963.

MONOCOTYLEDONES.

Hydrocharidaceæ.

Hydrilla verticillata Casp.
(2) Pherphing, 29961.

Orchidaceæ.

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(1) Hettáunda, 29539.
? Eria
(1) Hettáunda, 29538.
Arundina bambusifolia Lindl.
(1) Supári tár.
Otochilus alba Lindl.
(1) Supári tár, 29567 :
(3) Chessapáni, very common, 5,000-6,000 ft., 29606.
Otochilus sp.
(1) South side of Hettáunda.
Rhynchostylis retusa Blume.
(1) Under Niakot, common, 29906.
Vanda parviflora Lindl.
(1) Simalbása to Bichiakoh, 29437.
Saccolabium papillosum Lindl.
(1) By Kuro nadi near Hettáunda, 29531.
Zeuxine sulcata Lindl.
(1) Banks of Trisuli, below Niakot, 10th December 1907.

Scitaminaceæ.

Costus speciosus Smith.
(1) Near Adhabhár,
Alpinia ?
(1) Simalbása.

Iridaceæ.

Pardanthus chinensis Ker.
(3) Kakni, common, called " Mangwájar," 29893.

Amaryllidaceæ.

Agave Vera-Cruz Mill.
(2) Under Niakot: Márkhu in plenty: towards Pherphing:
(3) Fákhel, west of Pherphing.

Agave Wightii Drummond & Prain.
(2) Above Thánsing towards the Sángli khola :
(3) Fákhel.

Dioscoreaceæ.

Dioscorea dæmona Roxb.
(1) Adhabhár to Bichiakoh, 29450.

Dioscorea pentaphylla Linn.
(1) Adhabhár to Bichiakoh, 29463 : Hettáunda.

Dioscorea anguina Roxb.
(1) Near Adhabhár, 29445 : Hettáunda, common.

Dioscorea glabra Roxb.
(1) Near Adhabhár, 29446 : Hettáunda, 29537.

Dioscorea bulbifera Linn.
(1) Parsua in jungle, 29394 : Simalbása to Bichiakoh : gorge north of Hettáunda almost to Bhimpedi, common, 28177.

Dioscorea belophylla Voigt.
(1) Near Adhabhár, abundant, 29449 : north of Bichiakoh, once : north of Bichiakoh pass 29519 :
(2) Above Thánsing towards the Sángli khola : north side of Chessapáni pass 4,500 ft., 29617 : Sinduri under Kakni, called "Ban Torul," 29896.

Dioscorea sikkimensis Prain & Burkill.
(1) Bichiakoh pass, 3,000 ft. : Hettáunda 28167 :
(2) Ascent from Likhu valley to Sángli khola, 29941 : under Niakot, 29909.

Liliaceæ.

Smilax parvifolia Wall.
(2) South of Támbeh Kháni : above Chitlong :
(3) West of Pherphing : Kakni hill top, 9th December 1907.

Smilax prolifera Roxb.
(1) Parsua in Jungle.

Asparagus racemosus Roxb.
(1) Simalbása to Bichiakoh, very common especially in the sál forest, 29458 : north face of Chorea Gháti :
(3) Forest above Chitlong 29692.

Tupistra aurantiaca Wall.
(3) Kakni, common on the hill top, 6,800 ft., 29886.

Pontederiaceæ.

Monochoria hastæfolia Presl.

(1) Tájpur north of Birganj, 29371.

Commelynaceæ.

Commelyna sp.

(1) Top of Bichiakoh pass.

Palmeæ.

Phœnix sylvestris Roxb.

(1) One tree under Niakot.

Phœnix humilis Royle.

(1) Parsua, rare in jungle: south of Hettáunda; foot of hill under Niakot, called "Thákar," not uncommon on the red soil, 29905.

Pandanaceæ.

Pandanus furcatus Roxb, var. **indica** Kurz.

(1) Bháinsa Duhán, 14th December 1907:

(2) Thánsing towards the Sángli khola.

Aroideæ.

Arisæma sp.

(3) Kakni, 6,000 ft.: Sángli khola.

Amorphophallus sp.

(1) Bháinsa Duhán.

Remusatia vivipara Schott.

(2) Near Khátmándu, 4,000 feet, 5th December 1907.

Colocasia Antiquorum Schott, var. **typica** Engler.

(1) Parsua, 29410: banks of the Trisuli below Niakot, 9th December 1907:

(2) Between Jáitpur and Kakni, 5,000 ft., 29875.

Raphidophora glauca Schott.

(1) Bháinsa Duhán.

Lasia heterophylla Schott.

(1) Parsua.

Lemnaceæ.

Lemna sp.

(2) Márkhu valley: Chitlong.

Alismaceæ.

Sagittaria sagittifolia Linn.

(1) Parsua, 29397.

Naiadaceæ.

Potamogeton oblongus Viv.

(2) Márkhu valley.

Potamogeton crispus Linn.

(2) Above Támbeh Kháni, 4,000 ft., 29640: Pherphing, 29962.

Eriocaulaceæ.

Eriocaulon sp.

(2) Chitlong, abundant, 29693.

Cyperaceæ.

Kyllingia triceps Rottb.

(1) Parsua, abundant, 29412.

Kyllingia brevifolia Rottb.

(1) Between Parsua and Simalbása, 29422.

Cyperus flavidus Retz.

(1) Half way between Birganj and Parsua near Tájpur, 29366: rice fields of the Tádi river.

Cyperus tuberosus Rottb.

(1) Banks of Trisuli below Niakot, very abundant, 29917.

Cyperus radiatus Vahl.

(1) Parsua, 29409*a*.

Cyperus auricomus Sieber.

(1) Parsua, very common, 29409*b*.

Cyperus pumilus Linn.

(1) Sands of Tádi river, under Niakot, 10th December 1907.

Mariscus microcephalus Presl.

(1) Birganj to Parsua, 29364: Parsua, common, 29395.

Fimbristylis dichotoma Vahl.

(1) Between Parsua and Simalbása, 29421.

Eriophorum comosum Wall.

(1) Above Bichiakoh, very plentiful:

(2) Márkhu valley, plentiful: near Bhimpedi in abundance.

Carex hymenolepis Nees.

(1) Bháinsa Duhán, 29573.

Carex filicina Nees.

(2) North descent from Chessapáni pass, 4,500 ft., not uncommon, 29626.

Gramineæ.

Panicum flavidum Retz.

(1) Simalbása, 29433.

Panicum colonum Linn.

(1) Terai, Birganj to Parsua.

Panicum prostratum Lamk.

(1) Simalbása to Bichiakoh, very common, 29434.

Panicum indicum Linn.

(1) By Kuro nadi near Hettáunda, 29533.

Panicum myosuroides R. Br.

(1) North of Birganj, 29365.

Thysanolæna acarifera Nees.

(1) Gorge north of Hettáunda, sparingly:

(2) Near Khátmándu, 11th December 1907: Chessapáni pass.

Oplismenus compositus Beauv.

(1) Parsua under trees: Simalbása to Bichiakoh, the commonest grass in the forest, 29431: Tádi valley, common.

Arundinella brasiliensis Raddi.

(1) Near the top of the Bichiakoh pass, very common, 29501.

Setaria glauca Beauv.

(1) Parsua to Bichiakoh, common, 29452: rice fields by the Tádi river.

Coix Lachryma-Jobi Linn.

(1) Top of Bichiakoh pass, 29998.

Pollinia articulata Trin.

(1) Simalbása to Bichiakoh, very common, 29438.

Pollinia argentea Trin.

(2) Above Márkhu, common, 29667.

Saccharum spontaneum Linn.

(1) Fields near the Tádi river.

Saccharum Narenga Ham.

(1) Parsua in jungle: Hettáunda.

Erianthus fulvus Nees.

(2) Márkhu, 4,000 ft., 29652.

Ischæmum angustifolium Hack.

(2) Above Thánsing, rare.

Pogonatherum polystachyuum Kunth.

(1) Bichiakoh in quantity: Supári tár: banks of the Trisuli under Niakot.

Andropogon assimilis Steud.

(1) Chorea Ghâti: Bichiakoh to Hettáunda, 29484: Bháinsa Duhán, 29576:

(2) Under Niakot:

(3) Kakni, common, 9th December 1907.

Andropogon contortus Linn.

(2) Niakot, 29912.

Andropogon fascicularis Roxb.

(1) Simalbása to Bichiakoh, not uncommon, 29442.

Andropogon intermedius Willd.

(1) Between Parsua and Simalbása, 29416.

Andropogon acicularis Willd.

(1) Terai, Birganj to Parsua.

Andropogon melanocarpus Elliott.

(1) Adhabhár to Bichiakoh, 29454.

Andropogon ? distans Nees.

(1) Adhabhár to Bichiakoh, 29465.

Cymbopogon Martini Stapf.

(1) Parsua in jungle and northwards: under Niakot.

Anthistiria gigantea Cav.

(1) Hettáunda, 29545.

Anthistiria imberbis Retz., var. **Roylei** Hook. f.

(2) Márkhu, 4,000—4,500 ft., 29668.

Cynodon dactylon Pers.

(1) Terai, Birganj to Simalbása, and in forest northwards: Bichiakoh.

Chloris incompleta Roth.

(1) Simalbása to Bichiakoh, common, 29432.

Eleusine coracana Gærtn.

(2) Near Khátmándu, 5th December 1907: ascent from Thánsing to Sángli khola, 29951.

Phragmites Karka Trin.

(1) Simalbása at edge of forest: Hettáunda: gorge of Bháinsa Duhán, above Bhimpedi.

Eragrostis amabilis W. & A.

(1) Terai, Birganj to Parsua, rice fields along Tádi river: Simalbása to Bichiakoh, 29439.

Eragrostis stenophylla Hochst.

(1) Raxaul to Parsua, 29362:

(2) Márkhu, 4,000 ft., 29658.

Arundinaria sp.

(3) Forest above Chitlong.

Bambusa ?

(1) A bamboo is not uncommon in the gorge north of Hettáunda.

GYMNOSPERMÆ.

Coniferæ.

Pinus longifolia Roxb.

(1) Chorea Ghâti, from Bichiakoh to the pass, and a very short way down on north face : rare, under Niakot.

Filicinæ.

Gleichenia dichotoma Wall.

(2) North descent from Chessapáni pass, 29624 : over the Bágmati river on the road from Pátun to Pherphing :

(3) Fákhel, common.

Gleichenia longissima Blume.

(3) Near Kakni, 29877.

Alsophila sp.

(2) North side of Sángli khola.

Ceratopteris thalictroides Linn.

(1) Under the Sángli khola at Thánsing, 29931.

Cheilanthes farinosa Kaulf.

(1) Thánsing.

Adiantum caudatum Linn.

(1) By the Trisuli river, south of Niakot.

Adiantum Capillus-Veneris Linn.

(1) Under Niakot.

Pteris aquilina Linn.

(2) Bhimpedi to Siságarhi :

(3) Kakni.

Nephrolepis tuberosa Presl.

(1) Under the Sángli khola at Thánsing, 29933.

Polypodium coronans Wall.

(1) Thánsing, 11th December 1907 : under Niakot :

(2) Bhimpedi to Sisagárhi, Fákhel.

Polypodium simplex Sw.

(2) Near Támbeh Kháni, 3,800 ft., 29632.

Polypodium sp.

(3) Near Kakni, 29874.

Ophioglossum vulgatum Linn.

(1) Trisuli banks, under Niakot, 29919.

Lycopodiaceæ.

Lycopodium cernuum Linn.

(1) Supári tár, very abundant.

Equisetaceæ.

Equisetum ? debile Roxb.

(2) Márkhu.

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